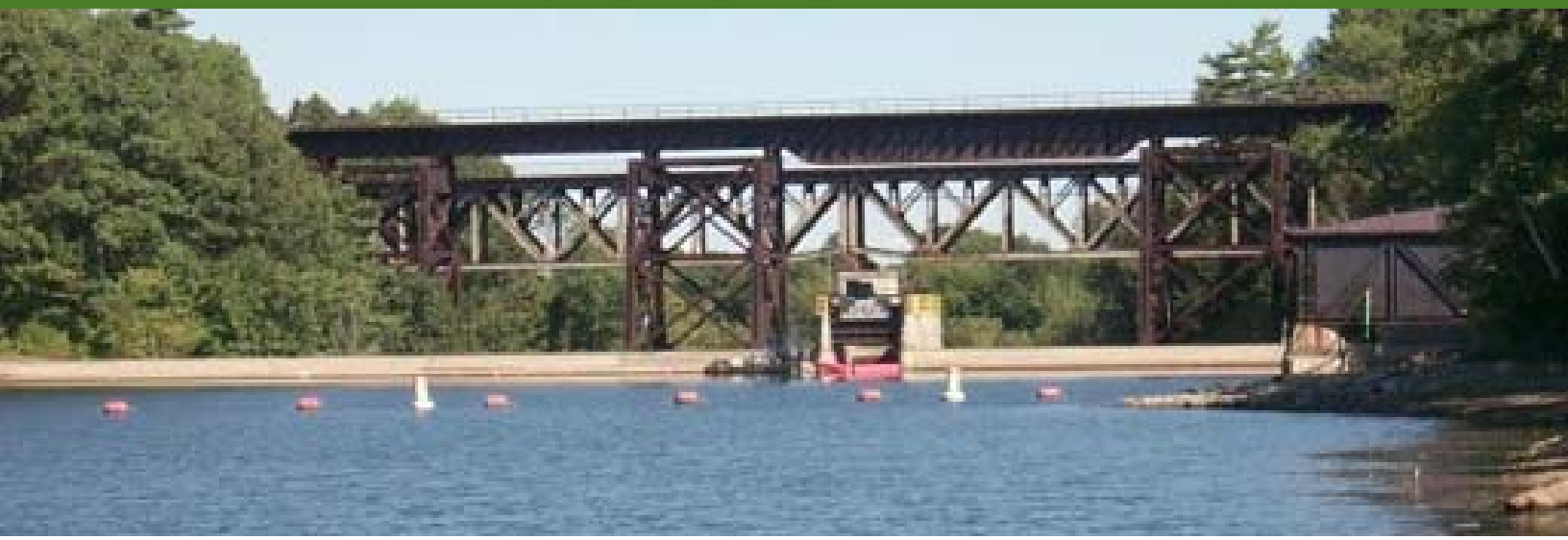
Watervliet Reservoir Watershed Protection Plan

March 2023



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CAPITAL DISTRICT Regional Planning Commission

Capital District Regional Planning Commission

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Executive Summary

The Drinking Water Source Water Protection Plan DWSP2 is a state-run program created to assist municipalities with proactively protecting their drinking water sources. The goal is to help municipalities develop and implement their own unique drinking water source protection plan for the source(s) of their drinking water. The DWSP2 program is a four agency initiative co-led by DEC and the NYS Department of Health (DOH) in collaboration with the Department of Agriculture and Markets (DAM) and Department of State (DOS). CDRPC is one of several technical assistance providers that work throughout the state, engaged with communities to develop a protection plan. As a result of this voluntary program, participating municipalities can use their newly developed drinking water source protection plan to start implementing protection measures.

The following study examines the water quality/non-point source water pollution issues of the Watervliet Reservoir, which is located in the town of Guilderland, Albany County, New York. The Watervliet Reservoir has been used by the city of Watervliet as a drinking water source for almost ninety years. During this time land use decisions were often made without adequate consideration of the potential water quality impacts. More recently the relationship between land use and water quality has become better understood, however, development pressures and a lack of sufficient water quality protection measures continue to threaten the long-term viability of the reservoir as a drinking water source.

The Tomhannock Reservoir is owned by the City of Troy and is its sole drinking water source. The reservoir is a public drinking water source for the of the cities of Rensselaer and Waterford, the towns of Brunswick, East Greenbush, Halfmoon, North Greenbush, Poestenkill and Schaghticoke and the village of Menands.

Construction of the reservoir began in 1900 as a successor to the Oakwood, Brunswick and Lansingburgh Reservoirs. The reservoir went into service in 1906 with a 33-inch riveted steel main. A, a supplemental 30 inch cast iron main was installed to stabilize the city's water supply. Facilities for chlorination, metering and the addition of lime to the water were added in 1952. In 1960, a study determined that the Tomhannock Reservoir could serve the city of Troy and the region immediately adjacent to the city (East Greenbush, North Greenbush, Brunswick, a portion of Schaghticoke, and West Sand Lake) in southern Rensselaer County. During the early 1960s a treatment plant was constructed, which provides filtration and additional supplementation with alum, carbon, potassium permanganate and fluoride.

In 2021, construction began to replace the 33-inch main and the 30-inch main from the reservoir to the water treatment plant off of Northern Drive with twin 36-inch water mains that would increase the existing capacity of the mains from around 32 million to 35 million gallons per day to 42 million to 45 million gallons per day. The project is expected to cost $40 million and is estimated to take 18 to 24 months to complete.

Today the reservoir can provide a safe yield of 32 million gallons per day. The average daily draw is approximately 19.15 million gallons per day, with summer draws that can reach 27.3 MGD. The populations served s 135,000 and there are approximately 13,000 service connections.

The City has identified continued concerns with trespassing and illegal dumping at the reservoir. In 2020 the Capital Region Partnerships for Regional Invasive Species Management (PRISM) conducted an aquatic invasive species macrophyte survey (AIS) to delineate Water Chestnut (Trapa natans) monocultures on the Tomhannock Reservoir. A visual inspection of the surface waters and subsurface were conducted along the (littoral zone) shoreline of the water body. The New York State Department of Fish and Wildlife ana a Rensselaer County Soil & Water Conservation District USDA NRCS Service Center Conservation Technician provided assistance.

The infestations are occurring in the shallow portions of the littoral zone where soft sediments are present. There are six major infestations present with a seventh forming. The seven sites altogether account for nearly 70 acers of biomass on the surface waters or 4.15% of the total lake acreage. Data was delineated using ARC GIS Collector.

Invasives infestations can be traced back to using nutrient levels and sedimentation carried by tributaries to the reservoir. Increased turbidity can also lead to a greater concentration of suspended organic material in the water, which, when interacting with chlorine from the water treatment process, can produce Trihalomethanes.

Goals

Based on this vision, the following goals were identified to guide the development of this plan:

Vision: "Through a comprehensive analysis of threats – existing and potential – to the Tomhannock Reservoir, and the development of potential solutions, policies, and regulatory guidelines that can mitigate these threats, this program will enable, encourage and support municipal and other efforts within the watershed to protect this valuable resource and ensure the reservoir remains a quality drinking water source."

- Increase stream buffers, working with willing landowners to purchase easements through grants or restrict encroachment
- Identify and address sources of pollutants of concern
- Focus development and minimize impacts, limit potential for harm to waterbodies feeding the reservoir
- Identify and address causes of nutrient loading and turbidity
- Provide assistance and support for the purchase or protect land of significant environmental protection value to the reservoir with the aid of willing landowners
- Remove invasives and work to ensure they do not return
- Continue to allow recreational access in and around in the reservoir but ensure its impact does not impair water quality as a result
- Map, inspect and repair failing septic systems

This Watershed Protection Plan prescribes initiatives the City, municipalities in the watershed and public agencies can implement to protect water quality and tackle threats to the drinking water supply.

Recommendations include the following projects and programs:

- Update municipal land use code to strengthen stormwater management techniques
- Revise the Watershed Rules and Regulations
- Develop and implement septic system mapping, inspection, public education and replacement programs
- Expand sampling to
    - o add an additional boundary site upstream of the current Normanskill testing site
    - o conduct emergent compound reconnaissance on the Black Creek
    - o Resume Fecal Coliform parameter reconnaissance on the XXXXXXXXXX watersheds.
- Remove the Water Chestnut infestation and manage the infestation on an annual basis, relying on partnerships for potential beneficial use or disposal practices such as bio digestion or composting
- Conduct additional sampling and emergent compound reconnaissance

- Acquire properties surrounding the reservoir that are most likely to have an impact on water quality if developed
- Follow-up on PFOA/PFOS surveys of fire stations and training facilities within the county to better assess potential threats from firefighting foam
- Develop an agricultural inspection program with involved agencies to ensure impacts from agricultural operations are minimized
- Engage in tree planting and shoreline stabilization initiatives
- Consider management IMA strategies to develop partnerships and coordinate the implementation of protection measures identified in this report
- Implement at Generic Environmental Impact Statement (GEIS) program to fund watershed protection through the purchase of lands surrounding the reservoir and of significant water quality protection value.

ACRONYMS

The following is a complete list of acronyms used in this document:

The following is a complete list of acronyms used in this document: **ACOE** United States Army Corps of Engineers **AEM** Agricultural Environmental Management **ACWQCC** Albany County Water Quality Coordinating Committee **BMPs** Best Management Practices **CAFO** Concentrated Animal Feeding Operation **CEF** Critical Environmental Area **CDBG** Community Development Block Grants **CDRPC** Capital District Regional Planning Commission **CNMP** Comprehensive Nutrient Management Plan **CSO** Combined Sewer Overflow **DPW** Department of Public Works **DWSP2** Drinking Water Source Protection Program **EPF** Environmental Protection Fund **FEMA** Federal Emergency Management Agency **FPIG** Farmland Protection Implementation Grant **GEIS** Generic Environmental Impact Statement **GI** Green Infrastructure **IMA** Intermunicipal Agreement **LWRP** Local Waterfront Revitalization Program **MGD** Million Gallons per Day **MS4** Municipal Separate Storm Sewer System **NYSDEC** New York State Department of Environmental Conservation **NYSDOS** New York State Department of State **NYSDOH** New York State Department of Health	**NYSDOT** New York State Department of Transportation **NYSEFC** New York State Environmental Facilities Corporation **NYSERDA** New York State Energy Research Development Authority **NYSOPRHP** New York State Office of Parks, Recreation and Historical Places **PCB** Polychlorinated Biphenyls **PFOA** Perfluorooctanoic Acid **POTW** Publicly Owned Treatment Works **PRISM** Partnership for Regional Invasive Species Management **SPDES** State Pollutant Discharge Elimination System **SWCD** Soil and Water Conservation District **TMDL** Total Maximum Daily Load **TOD** Transit Oriented Development **TNC** The Nature Conservancy **TU** Trout Unlimited **USDA** United States Department of Agriculture **USEDA** United States Economic Development Administration **USEPA** United States Environmental Protection Agency **USFWS** Unite States Fish and Wildlife Service **WI/PWL** Waterbody Inventory/Priority Waterbody List **WIIA** Water Infrastructure Improvement Act **WQIP** Water Quality Improvement Program

ADVISORY TEAM ACKNOLWEDGEMENTS

This report was developed with many thanks to the following individuals:

- Dave Dressel, Chief Water Plant Operator, The City of Watervliet
- Joe LaCivita, City Manager, City of Watervliet
- Jeremy Smith, Former City Manager, City of Watervliet
- Ken Kovalchik, Director of Planning, Town of Guilderland
- Nancy Heinzen, Director of the Stormwater Coalition of Albany County
- Laura DeGaetano, Natural Resources Director, Albany County Planning
- Susan Lewis – Albany County Soil and Water
- Tom Brady, Director of the Albany County Department of Public Health
- Mark King, Executive Director of the Mohawk Hudson Land Conservancy

Study Advisory Committee

To aid the development of this study and ensure the results of this initiative would have lasting impact, CDRPC engaged multiple stakeholders and watershed advocates into a Study Advisory Committee. This committee was established from the following groups:

- Stormwater Coalition of Albany County
- Albany County Soil & Water Conservation District
- Schenectady County Soil & Water Conservation District
- Albany County Water Quality Coordinating Committee
- Schenectady County Water Quality Coordinating Committee

These groups encompass the following large municipalities that also, as individual entities, provided guidance on the report:

- Albany County
- Schenectady County
- Town of Guilderland
- Town of Rotterdam
- Town of Knox
- Town of Duanesburg
- Village of Altamont
- Village of Voorheesville
- Town of New Scotland
- Town of Berne

The following Non-Governmental Organizations also provided input:

- Hudson Mohawk Land Conservancy
- Farm Bureau
- Hudson River Watershed Alliance
- Kate Meierdiercks, Siena College Department of Environmental Science

The Advisory committee met to review and provide feedback on goals and vision, prior study result and recommendations, maps, pollutants of concerns and then the final draft of the report.

Finally, thanks to the CDRPC staff that were instrumental in assembling this report:

- Martin Daley
- Mark Castiglione
- Todd Fabozzi
- Amanda Diaz
- Zeynep Tas
- Josh Tocci

Chapter 1: INTRODUCTION

1.1 About CDRPC

The Capital District Regional Planning Commission (CDRPC) is a regional planning and resource center serving Albany, Rensselaer, Saratoga, and Schenectady counties. CDRPC provides an objective analysis of data, trends, opportunities, and challenges relevant to the Region's economic development and planning communities. CDRPC serves the best interests of the public and private sectors by promoting intergovernmental cooperation; communicating, collaborating, and facilitating regional initiatives; and sharing information and fostering dialogues on solutions to regional challenges. CDRPC was established as a regional planning board in 1967 by a cooperative agreement among the counties of Albany, Rensselaer, Saratoga, and Schenectady. Its original purpose was to perform and support comprehensive planning work, including surveys, planning services, technical services, and the formulation of plans and policies to promote sound and coordinated development of the entire Region.

1.2 604b and The DWSP2 Program

The Federal Clean Water Act provides Water Quality Planning Grants that fund regional comprehensive water quality management planning activities as described in Section 604(b) of the federal Clean Water Act. These funds are administered by the New York State Department of Environmental Conservation (NYSDEC) and are used for water quality management planning activities, such as determining the nature, extent and causes of point and nonpoint source water pollution problems and developing plans to resolve these problems.

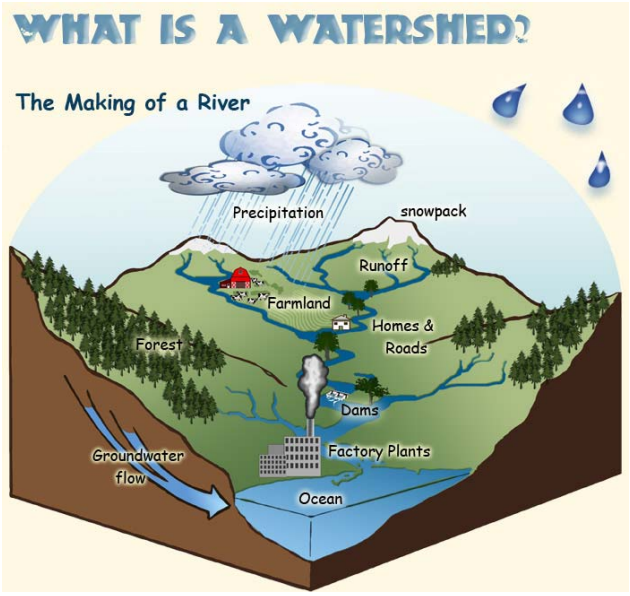
The Drinking Water Source Water Protection Plan DWSP2 is a state-run program created to assist municipalities with proactively protecting their drinking water sources. The goal is to help municipalities develop and implement their own unique drinking water source protection plan for the source(s) of their drinking water. The DWSP2 program is a four agency initiative co-led by DEC and the NYS Department of Health (DOH) in collaboration with the Department of Agriculture and Markets (DAM) and Department of State (DOS). CDRPC is one of several technical assistance providers that work throughout the state, engaged with communities to develop a protection plan. As a result of this voluntary program, participating municipalities can use their newly developed drinking water source protection plan to start implementing protection measures.

The purpose of a long-term protection plan for source water(s) is to protect public health and safety, and the environment. A drinking water source protection plan also helps municipalities make informed decisions to protect source water. This program will protect public health by preventing pollutants from entering a drinking water supply. It will help municipalities avoid preventable drinking water treatment costs, increase community confidence in their local public drinking water, create long-lasting partnerships that support implementation and utilize a broad array of existing funding sources to aid with project implementation costs.

A drinking water source can be groundwater from an aquifer or surface water, such as lake, stream, or river. Each protection plan is unique to the community and the drinking water source(s) they aim to protect. Preparing a drinking water source protection plan involves forming a stakeholder group, inventorying potential sources of contamination, identifying critical areas to be protected, and creating an implementation timeline. Following the plan completion, protection measures can be implemented to mitigate the risk of water supply contamination.

In 2018, NYSDEC and NYSDOH required 604b Awardees to incorporate the DWSP2 program into their respective workplans. CDRPC pledged to complete a 604b workplan for one community per year, provided the prior year's workplan was completed. CDRPC identified the Watervliet Reservoir as a municipally owned resource that would benefit from a DWSP2 Plan. The reservoir was the subject of a prior planning study, the Watervliet Reservoir Watershed Protection Study, published in 2003. CDRPC determined this first DWSP2 program would be well served to build off the prior report – and the report could function as a baseline for what initiatives had previously been successful, which had not, and what new initiatives may be proposed during this reengagement.

1.3 Watersheds



There a variety of ways in which water quality is impacted by manmade changes to the natural environment. The following is a general discussion of the ways in which land use and development practices affect water quality.

All land on earth is within a watershed. Precipitation falling on land feeds streams and replenishes groundwater. Precipitation onto water surfaces also enters into watershed flow. As water moves in surface and subsurface flows, it combines into progressively larger streams and rivers, local water tables, and regional aquifers. Watersheds may be as small as several acres, or some may encompass thousands of acres of land. Furthermore, smaller sub-watersheds aggregate to form larger watersheds. Watershed boundaries are defined by the highest and lowest elevations from which water drains toward a single channel. The highest elevations are the divides that separate one watershed from another and therefore define water (and water pollution) drainage. This boundary line will intersect at the lowest elevation of the watershed planning area, typically the mouth of a stream or the outlet of a lake or reservoir.

Water pollution components are transported downhill and downstream within watersheds, without regard to manmade political jurisdictions. Since all the activities within a watershed have the potential to impact the water quality downstream, it is at the watershed level that any analysis of water quality must occur.

On undeveloped land, rainfall has greater opportunity to slowly filter into the ground water than on developed land. Trees, shrubs and grasses all help to slow rainfall as it travels along the ground thus allowing a higher degree of percolation into the soil and groundwater. Vegetative cover also helps decrease the rate of surface water flow and, therefore, reduces the amount of soil, sediment and other particles carried off site and deposited in streams, rivers and lakes.

On developed land, however, both the volume and rate of surface runoff is substantially increased due to the clearing of vegetation, soil compaction by heavy equipment, and the construction of impervious surfaces and structures. Roadways are built, fields are paved over for parking lots and buildings are constructed on previously undeveloped land thereby reducing the amount of natural ground cover for the filtering of rainwater. Since rain cannot filter through impermeable surfaces, it accumulates on these surfaces and creates larger volumes of water to run over the land surface. As surface runoff volumes increase, the rate of flow also increases. This higher volume and faster rate of water runoff accelerates the erosion of stream channels, alters runoff patterns, increases downstream flooding and carries more sediment and surface pollutants to be deposited in streams, rivers and lakes. This increase in direct runoff

also reduces the amount of water left for groundwater recharge, soil moisture replenishment, and the base flow of water available to streams during dry periods, therefore, potentially impacting human water supplies and plant and animal habitats.

Surface runoff, as a result of excess rainfall, is a natural process that has shaped the landscape. This natural process involves the erosion of upland areas and the subsequent formation of wetlands and flood plains. Without human interference, this process is usually slow. However, as man-made elements alter the natural landscape, the natural processes become unbalanced, and the erosion process becomes accelerated.

Erosion and sedimentation from urban development occurs when a construction site is cleared of its natural vegetative cover. Exposed soil becomes detached by the impact of raindrops and by the force of water flowing over the land surface. As runoff gains more volume and velocity, more soil particles become detached, rills and gullies are cut into the surface, and eventually some of these soil particles end up being deposited as silt and sediment downhill in nearby water bodies. This condition becomes especially severe when critical areas such as steep slopes, highly erodible soils, and surface water boarders are disturbed.

Soil erosion from land disturbed by construction is a highly visible source of solids in urban runoff. Important sites include large-scale projects such as highway construction, large-scale residential subdivisions, commercial and industrial development and urban renewal.

1.4 Watershed and Waterbody Classifications and Regulatory Requirements

New York State classifies waterbodies in the following strata:

- The best usages of Class A waters are: a source of water supply for drinking, culinary or food processing purposes; and primary and secondary contact recreation; and fishing. The waters shall be suitable for fish, shellfish and wildlife propagation and survival.
- The best usages of Class B waters are primary and secondary contact recreation and fishing. These waters shall be suitable for fish, shellfish and wildlife propagation and survival.
- The best usage of Class C waters is fishing. These waters shall be suitable for fish, shellfish and wildlife propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.
- The best usage of Class D waters is fishing. Due to such natural conditions as intermittency of flow, water conditions not conducive to propagation of game fishery, or stream bed conditions, the waters will not support fish propagation. These waters shall be suitable for fish, shellfish and wildlife survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.

When the presence of a pollutant or an environmental factor has been identified as having a detrimental impact on the Water Quality Standard, waterbodies may be assigned as Stressed (data or information indicate a potential impact to the Best Use) or Impaired (data or information indicate failure to support the water quality standard).

The Federal Clean Water Act and supporting federal regulations require states to submit a list of impaired waters requiring the development of a Total Maximum Daily Load (TMDL), every two years. Waters that do not meet applicable water quality standards and do not support applicable best uses, thereby requiring the development of a TMDL, are published along with the identified pollutant(s) as the Section 303(d) List of Impaired Waters.

Once a waterbody/pollutant combination is added to the Section 303(d) List of Impaired Waters, NYSDEC may require a TMDL Program (Total Maximum Daily Load) or alternative restoration strategy to mitigate the cause/pollutant.

To removing a Waterbody from the 303(d) List there must be sufficient justification that meets the EPA delisting rationale. This may include the state determining the WQS is being met, flaws in original listing, other point source or nonpoint source controls are expected to meet WQS, impairment due to non-pollutant, or EPA approval of TMDL.

Pollutants that impact our waterways are categorized by their origin: point and non-point source, as well as type: toxic, sediment, nutrient and bacterial.

Toxic: Chemicals that poison and kill organisms. Examples include pesticides and herbicides, gasoline, oil and other automotive contaminants, household cleaning products, battery acid, and industrial chemicals and byproducts. human waste, food and some soaps and detergents. Sources may include failing septic systems, runoff, illicit discharges, spills or illegal dumping.

Sediment: Soil, sand, silt, clay and minerals that have eroded from the land and washed into water. Sources may include eroding slopes, construction activity, run-off or natural conditions such as shale.

Nutrients: Elevated levels of substances such as nitrogen and phosphorus, often referred to as nutrient loading. Sources include sewage treatment facilities, faulty septic systems, industrial discharges, and agricultural and lawn care fertilizers.

Bacteria: Elevated levels of harmful bacteria which can be lethal to animals and humans if consumed. Sources may include failing septic, CSOs, sanitary sewer overflows, faulty septic systems, and animal waste.

1.5 Chronic Pollutants Of Concern and Their Impacts on Watersheds

The waterbodies that feed the Watervliet Reservoir drain a large watershed. As stormwater travels across impervious surfaces, or saturated land unable to infiltrate, it can pick up and convey pollutants to a stream, tributary or wetland– this non-point source pollution can concentrate over time and present detrimental water quality impacts on public health and the environment.

1.5.1 Temperature

Suspended particles that absorb heat from solar radiation more efficiently than water and can increase the temperature of the surrounding water. This type of thermal pollution commonly comes from municipal or industrial effluents. There are several significant consequences of thermal pollution, including diminished dissolved oxygen levels, fish kills and influxes of invasive species and deforestation as water that is shaded by vegetation and other objects will not absorb as much heat as sunlit water.

There is also a critical link between temperature and the survival of native plants and animals. The metabolic rates of aquatic organisms increase as the water temperature increases. Temperature influences chosen habitats of a variety of aquatic life Some organisms, particularly aquatic plants flourish in warmer temperatures, while some fish such as trout or salmon prefer colder streams. For most fish, a 10°C increase in water temperature will double the rate of physiological function. Increased respiration rates at higher temperatures lead to increased oxygen consumption, which can be detrimental if rates remain raised for an extended period of time. Temperature fluctuations can also affect the behavior choices of aquatic organisms, such as moving to warmer or cooler water after feeding, predator-prey responses and resting or migrating routines.

1.5.2 Dissolved Oxygen

Oxygen enters a stream mainly from the atmosphere. This dissolved oxygen is breathed by fish and zooplankton and is needed by them to survive. Rapidly moving water, such as in a mountain stream or large river, tends to contain a lot of dissolved oxygen, whereas stagnant water contains less.

Bacteria in water can consume oxygen as organic matter decays. Thus, excess organic material in lakes and rivers can cause eutrophic conditions, which is an oxygen-deficient situation that can cause a water body to "die." Aquatic life can have a hard time in stagnant water that has a lot of rotting, organic material in it, especially in summer when dissolved-oxygen levels are at a seasonal low. Water near the surface may be too warm while water near the bottom has too little oxygen. Conditions may become especially serious during a period of hot, calm weather, resulting in the loss of many fish. Healthy water should generally have dissolved oxygen concentrations above 6.5-8 mg/l and between 80-120%.

1.5.3 pH

In chemistry, pH is a scale used to specify how acidic/basic water is. The range goes from 0 to 14, with 7 being neutral. A pH of less than 7 indicates acidity, whereas a pH of greater than 7 indicates a base. The pH of water is a very important measurement concerning water quality. The pH of water determines the solubility (amount that can be dissolved in the water) and biological availability (amount that can be utilized by aquatic life) of chemical constituents such as nutrients (Phosphate, nitrogen, and carbon) and heavy metals (lead, copper, cadmium, etc.). For example, in addition to affecting how much and what form of Phosphate is most abundant in the water, pH also determines whether aquatic life can use it. In the case of heavy metals, the degree to which they are soluble determines their toxicity. Metals tend to be more toxic at lower pH because they are more soluble.

High pH causes water pipes and water-using appliances become encrusted with deposits, and it depresses the effectiveness of the disinfection of chlorine, thereby causing the need for additional chlorine when pH is high. Low-pH water will corrode or dissolve metals and other substances. Abnormal pH can seriously harm animals and plants living in the water.

1.5.4 Chlorides

Chlorides are salts resulting from the combination of the gas chlorine with a metal. Some common chlorides include sodium chloride (NaCl) and magnesium chloride ($MgCl_2$).

Chlorides may get into surface water from several sources including:

- rocks containing chlorides;
- agricultural runoff;
- wastewater from industries;
- Oil well wastes;
- effluent wastewater from wastewater treatment plants, and;
- road salting

Chlorides can corrode metals and affect the taste of food products. Fish and aquatic communities cannot survive in high levels of chlorides. Chlorides are not usually harmful to people; however, the sodium part of table salt has been linked to heart and kidney disease. Public Drinking Water Standards require chloride levels not to exceed 250 mg/L. Criteria for protection of aquatic life require levels of less than 600 mg/L for chronic (long-term) exposure and 1200 mg/L for short-term exposure.

1.5.5 Fecal Coliform

Coliforms are bacteria present in the digestive tracts of animals, including humans, and are found in their wastes. They are also found in plant and soil material. Water pollution caused by fecal contamination is a serious problem due to the potential for contracting diseases from pathogens (disease causing organisms). Frequently, concentrations of pathogens from fecal contamination are small, and the number of different possible pathogens is large. As a result, it is not practical to test for pathogens in every water sample collected. Instead, the presence of pathogens is determined with indirect evidence by testing for an "indicator" organism such as coliform bacteria. Coliforms come from the same sources as pathogenic organisms. Coliforms are relatively easy to identify, are usually present in larger numbers than more dangerous pathogens, and respond to the environment, wastewater treatment, and water treatment similarly to many pathogens. As a result, testing for coliform bacteria can be a reasonable indication of whether other pathogenic bacteria are present. If coliform bacteria are present water humans drink or come into contact with, risk of contracting a water-borne illness is increased. A positive total coliform sample should be considered an indication of pollution.

Where could high levels of Fecal Coliform stem from?

- In streams near septic systems a high Fecal Coliform count could be the result of pollutants entering the stream from a missing or defective well cap, broken pipes or seals, cracks or holes in the well casing that allow water that has not been filtered through the soil to enter the well, or well flooding - a common problem for wellheads located below the ground in frost pits that frequently flood during wet weather.
- High concentrations of animals near the stream, such as agricultural operations, where stormwater runoff from manure can wash into the stream
- High concentrations of waterfowl
- Failing or leaking public sanitary sewers or septic systems

1.5.6 Nutrient Loading

Nutrients, such as nitrogen and Phosphate, are essential for plant and animal growth and nourishment, but the overabundance of certain nutrients in water can cause several adverse health and ecological effects.

Nitrogen is used in agriculture to grow crops, and on many farms the landscape has been greatly modified to maximize farming output. If excess nitrogen is found in the crop fields, the drainage water can introduce it into streams where excess nitrogen can lead to hypoxic conditions (lack of oxygen). Chemical fertilizers or animal manure is commonly applied to crops to add nutrients. It may be difficult or expensive to retain on site all nitrogen brought on to farms for feed or fertilizer and generated by animal manure. Heavy rains can generate runoff containing these materials into nearby streams. Wastewater-treatment facilities that do not specifically remove nitrogen can also lead to excess levels of nitrogen in surface or groundwater. Nitrate can get into water directly as the result of runoff of fertilizers containing nitrate. Ammonia and organic nitrogen can enter water through sewage effluent and runoff from land where manure has been applied or stored. Nitrate can also be formed in water bodies through the oxidation of other forms of nitrogen, including nitrite, ammonia, and organic nitrogen compounds.

Phosphate is a common constituent of agricultural fertilizers, manure, and organic wastes in sewage and industrial effluent. It is an essential element for plant life, but when there is too much of it in water, it can speed up eutrophication (a reduction in dissolved oxygen in water bodies caused by an increase of mineral and organic nutrients) of rivers and lakes. Soil erosion is a major contributor of phosphate to streams.

Bank erosion occurring during floods can transport a lot of phosphorous from the riverbanks and adjacent land into a streams, lakes, or other water bodies. Phosphate gets into water in both urban and agricultural settings. Phosphate tends to attach to soil particles and, thus, moves into surface-water bodies from runoff. Since groundwater often discharges into surface water, such as through streambanks into rivers, there is a concern about Phosphate concentrations in groundwater affecting the water quality of surface water. Additional control of Phosphate from non-point sources (such as applications of lawn fertilizers and disposal of animal wastes) may be useful to maintain or improve the water quality in streams and lakes near growing urban areas.

Levels of phosphates in excess of .1 ppm usually indicate organic pollution and may lead to explosive algae growth. Levels as low as .5 ppm are considered unsafe for drinking. Levels above 0.1 ppm usually indicate human-influenced pollution sources. This includes runoff into waterways from wastes produced by poultry, dairy and other animal farming operations that are not properly managed, concentrations of droppings from nuisance animals (e.g. Canada geese) and even household pets, seeping of sewage wastes from improperly-sited or poorly-maintained home septic systems, and inadequate sewage treatment plants.

1.5.7 Turbidity

Turbidity is the measure of relative clarity of a liquid. It is an optical characteristic of water and is a measurement of the amount of light that is scattered by material in the water when a light is shined through the water sample. The higher the intensity of scattered light, the higher the turbidity. During high flows, water velocities are faster and water volumes are higher, which can more easily stir up and suspend material from the stream bed, causing higher turbidities. During a rainstorm, particles from the surrounding land are washed into the river making the water a muddy brown color, indicating water that has higher turbidity. This can be caused by:

- Natural erosion
- Deforestation or removal of streambank vegetation
- Silt and soil in the stormwater flowing off active construction sites

Material that causes water to be turbid include clay, silt, very tiny inorganic and organic matter, algae, dissolved colored organic compounds, and plankton and other microscopic organisms. Sediment may destroy fish habitat by blanketing fish spawning and feeding areas and eliminating certain food organisms; directly impact fish through gill abrasion and fin rot; and reduce sunlight penetration, thereby impairing photosynthesis of aquatic plants. Suspended sediment decreases recreational values, reduces fishery habitat, adds to the mechanical wear of water supply pumps and distribution systems, and adds treatment costs for water supplies.

1.6 Acute Pollutants Of Concern (Potential Contaminant Inventory)

The following list includes potential sources of contamination that may impact the quality of drinking water sources, if improperly managed. The nature of potential contamination events from the sources provided below are variable. For example, contamination can occur via direct discharge to source waters, indirect discharges through stormwater runoff, or by providing a path to source waters through conduits.

Bulk Storage

- Chemical Bulk Storage Facilities (e.g. chemical manufacturing)
- Major Oil Storage Facilities (e.g. petroleum storage and distribution centers)
- Petroleum Bulk Storage Facilities (e.g. gas stations)

Waste Management and Disposal

- Active Landfills
- Inactive Landfills
- Hazardous Waste Management Facilities
- Land Application Sites
- Vehicle Dismantling Facilities (e.g. junkyards)

Contamination Sites or Incidents

- Remediation Sites (e.g. State Superfund Sites,

Brownfield Cleanup Sites, Environmental Restoration Program Sites, Federal Superfund

Sites)

- Spill Incidents

Mineral Extraction Sites

- Oil and Gas Wells
- Orphan Oil and Gas Wells
- Mines
- Historical Abandoned Mines

Discharges to Water

- State Pollutant Discharge Elimination System Permitees

Permitted (SPDES) Facilities (e.g. municipal wastewater treatment works)

- Combined sewer overflows (CSO)
- Concentrated animal feeding operations (CAFO)
- Solid waste management facilities, manufacturing operations)
- Sanitary Sewer Overflows (SSOs)
- Stormwater outfalls

Transportation

- Airports (e.g. de-icing operations)
- Transportation Corridors (e.g. highways, railroads, hazardous material routes)
- Road Maintenance Facilities
- Salt and Deicers Storage

Agriculture • Agricultural Activities

Residential Sources

- On-site Septic Systems (e.g. septic tanks, cesspools)
- Lawn and Garden chemicals
- Waterfront Property Management

Conveyances and Pipelines

- Oil and Gas Pipelines

Other

- Golf Courses
- Marinas and Boat Launches
- Stormwater
- Toxic Release Inventory (TRI) Facilities
- Fire Training and Dedicated Fire Training Facilities
- Nutrient Loading (Lakes Only)
- Saltwater Intrusion
- Road Salt Application

Chapter 2: WATERSHED CHARACTERISTICS

2.1 The Watervliet Reservoir

The Watervliet Reservoir is owned by the City of Watervliet and is its sole drinking water source. The reservoir is also the primary public drinking water source for the Town of Guilderland.

Three main tributaries feed the reservoir: the Normans Kill, the Bozen Kill and the Black Creek. The Watervliet reservoir was created in 1915 by impoundment of the Normans Kill. The reservoir impoundment was created by the construction of a hollow core, reinforced concrete slab and buttress dam that is keyed into a natural rock streambed. Crest elevation of the dam is 259 feet. There are flasher boards on the top of the dam that increase the elevation to 262 feet. The dam is 380 feet in length. The depth of the reservoir varies from mere inches to approximately 39 feet near the dam. The average depth is 33 feet. After the construction on the water supply, the State Health Department promulgated reservoir Watershed Rules and Regulations in 1917. Today the Watershed Rules are administered by the New Yok State Department of Health. It is important to note the regulations have not been updated since their adoption in 1917. The current Watershed Rules and Regulations are included with this report as Appendix A.

Watervliet's treatment process includes; peroxidation - using sodium permanganate for iron and manganese removal, coagulation - using poly aluminum chloride to cause small particles to stick together making larger heavier particles; sedimentation which allows the newly formed larger particles to settle out naturally; filtration which removes smaller particles by trapping them in sand filters; zinc ortho- phosphate for corrosion control ; and finally post chlorination to protect against contamination from harmful bacteria and other organisms. In 2021 Watervliet began making repairs to their flocculation system and sand filter tanks.

Watervliet residential customers are billed at a flat rate of $200.48 per 6 months. Commercial customers are metered and bill at a rate of $4.42 per 1000 gallons of water with a minimum of $220.60.

The Town of Guilderland pays the City of Watervliet $800,000 annually to draw up to 5.0mgd per day. The Guilderland Filtration Plant is an automated facility designed to operate at a capacity of 5.0 million gallons per day (MGD). Raw water is pumped from the Watervliet Reservoir at the raw water pumping station. As the water enters the plant, polyaluminumchloride (PACl) is added as a primary coagulant. Flocculation takes place in a series of stepped type units for a period of approximately 30 minutes. Then water flows from 60-degree tube settlers into mixed media filters. After the water is filtered through the mixed media filter, it is again filtered through the Granulated Activated Carbon (GAC) system. Final treatment of filtered water includes disinfection with chlorine, pH adjustment with caustic soda and the addition of sodium fluoride for dental protection. During the summer months, because of water quality issues, the Town has been forced to limit its treatment operations to 2mgd to avoid damage to its filtering system. The town is thus forced to put in use restrictions periodically.

A typical home in Guilderland uses 90,000 gallons of water annually. Residents are billed on assessed value and water use. Based on the average assessment of $175,000 for a single family home the annual water bill is: $ 296.84 (Average of $180 for water usage and an "Ad Valorem" tax of $ 116.84).

In 1982 a one-megawatt hydroelectric facility was developed at the reservoir, downstream of the dam, to generate power from excess water flows. The power generated at the plant is used at the facility to pump water to the filtration plant. The excess power is sold to National Grid.

Today the Normanskill plant consists of a 380-foot-long reinforced concrete Ambursen-type dam with a 306-foot-long overflow section having a crest elevation of 259 feet topped by 3-foot-high flashboards. A reinforced concrete underground powerhouse contains a single 1,250-kilowatt tube-type generating unit.

The City operates the impoundment to maintain water levels between 261.0 and 261.5 feet, with project outflows approximately equal to inflows to the impoundment. Generation at the project powerhouse is based on the water level and inflows. The project typically generates when impoundment elevations are greater than or equal to 261 feet. When impoundment elevations are lower than 261 feet, generation occurs less frequently (only about 8.4 percent of the time). The project cannot operate when impoundment elevations fall below 259 feet due to unit cavitation. The project operated 55 percent of the time between 1995 and 2019. During low-flow conditions, July, August, and September have the greatest number of non-operational days (18, 22, and 21 days per month, respectively). During the period from 2010 to 2019, the average annual generation was 2,863 megawatt-hours.

The City remains very concerned about invasive species, such as zebra mussels, and their potentially catastrophic impacts on the operation of the hydro facility, The City was steadfast in their opposition to allowing public access on to reservoir for fear boats could be a conduit for invasives.

A former town of Guilderland landfill lies within 1,500 feet of the reservoir. The site may have been utilized as a dump for wastes from the former army depot. It's not publicly known what kinds of wastes were dumped at the site from the depot. The town began using the site as a solid waste dump in 1970's until it ceased operation in early 1990's. The site is unlined and therefore has the potential to be leaking toxic leachate. An underground brook coming from the direction of the dump discharged water directly into the reservoir within 100 feet of the town and city intake points. To prevent possible contamination of the reservoir from ground water coming from the landfill, the City of Watervliet, with NYSDEC approval, re-routed the underground brook in April 2004 so that it now discharges below the reservoir dam. There is no indication that toxins were or are currently being discharged from this brook. This tributary was monitored from 1987 to April of 2004 when the stream was relocated.

Today the reservoir provides a safe yield of 12 million gallons per day. Currently the city of Watervliet utilizes approximately 2.13 million gallons per for its 10,000 residents. The total water produced in 2019 was 777,451,000 gallons. The town of Guilderland uses between three to four million gallons of water per day for its 27,000 residents. Watervliet maintains roughly 2,600 service connections and Guilderland has nearly 10,000. The City and the Town have separate intakes, treatment plants, pump stations, and transmission lines for processing and distributing the reservoir water. The City uses copper sulfate treatment in summer and employs four circulators within the reservoir.

Guilderland chlorinates its drinking water to kill viruses and bacteria. But the chlorine reacts with naturally occurring organic matter in the water, producing byproducts of trihalomethanes and haloacetic acids, which have demonstrated carcinogenic activity in laboratory animals, according to the federal Environmental Protection Agency.

In 2019 the town notified residents that trihalomethanes and haloacetic acids (TTHMs) in the town's water had been higher, over the last four quarters sampled, than the contamination limit set by the EPA and by the state's Department of Health. The running average for TTHMs over the four quarters of 2018 in Guilderland was 83.5 micrograms per liter, which is the same as 83.5 parts per billion, while the

contamination limit is 80. Testing in Guilderland for haloacetic acids show numbers below the federal and state limit of 60 parts per billion in recent years. In 2015, the average for reservoir water after it was treated in the plant was 43.4; in 2016, it was 48.2; in 2017, it was 58.5.

Guilderland's water plant uses activated carbon to remove a certain percentage, but the town is considering a multi-pronged approach, McIntyre said. This includes better filtering at the water plant, adding mixers in the town's water towers, and diversifying Guilderland's water supply.

In a 2019 interview with the Altamont Enterprise, the City of Watervliet General Manager cited limits in the watershed rules and regulations to respond to impacts on waterbodies feeding the reservoir. Watervliet was considering circulators at the time.

In September of 2002, an Enterprise article — "Hot spots: Water woes beneath the surface" — uncovered a problem because many areas of Guilderland had levels of disinfectant byproducts, TTHMs, in the 100s of parts per billion, mostly because they were at the end of "unlooped" water lines where chemicals became more concentrated. The treatment system was upgraded with carbon filters at a cost of $2,160,000. The town's West End Water Extension was built in 2008 for $4.3 million. This project brought water to the western end of town as well as looping the former dead-end lines and was financed by the entire district. In 2015 Town leadership concluded that the TTHM issues had been eliminate.

On December 29, 2021, the NYSDEC announced the availability of the Draft 2020-2022 Clean Water Act Section 303(d) List of Impaired/TMDL Waters for public comment. The Reservoir was included in the NYSDEC Draft 2022 Section 303d List because of dissolved oxygen, iron and manganese levels.

The majority of soils within the watershed fall into classes below A and B, which are well suited for drainage and infiltration. Only a small portion of the watershed contains soils conducive to individual septic systems. Most of the suitable soils are located in Rotterdam and Guilderland. Much of the land deemed suitable in Rotterdam has already been developed. Most of the land within Guilderland that is classified as suitable is located in close proximity to the reservoir and for this reason would not be an appropriate location for future development. It should be noted, however, that it is necessary to perform site specific soil tests in order to accurately ascertain the soil suitability of particular lots: there may be areas within the suitable soil groups that are unsuitable for septic systems; and there may be areas outside of the "suitable" soils groups that are also suitable for on-site systems.

Along the Guilderland/Knox border, and south into New Scotland, in Albany County, there is a long swath of steep rock outcrop known as the Helderberg Escarpment. The escarpment is an area of environmental sensitivity where both steep slopes and karst geology/hydrology create natural constraints for development. Karst areas to be extremely vulnerable to groundwater contamination. Other serious hydrogeologic problems include sinkhole flooding and sinkhole collapse.

There are currently five areas within the watershed severed by public sewer systems. These areas include a portion of the town of Rotterdam surrounding the Rotterdam Industrial Park, an area around and including the village of Delanson, the village of Altamont, an area adjacent to the northeast of the Northeast Industrial Park, and a portion of Guilderland northeast of the reservoir along Carman Road. Both village systems discharge treated wastewater into tributaries of the reservoir, the Altamont plant discharges to the Bozen Kill, roughly 3 miles upstream of the reservoir.

There are also several areas within the watershed served by public water systems. These areas generally cover the same areas as those served by public sewers, but also extend over a most of southwestern Rotterdam, and include the entire Northeast Industrial Park (and the surrounding area). A new district has also been formed that covers a large part of southern Princetown.

Public water and sewer districts are catalysts to urban growth. Given the poor soils and poor/limited water within much of the watershed, areas lacking this infrastructure will most likely remain lightly developed. However, there are substantial areas within the existing water districts available to accommodate additional growth, particularly in Rotterdam and Princetown, though there are many poor soils within these areas that would limit the amount and density of new development without the concurrent extension of public sewers.

The City has identified continued concerns with algae, water chestnuts, dissolved oxygen and turbidity. Water quality sampling on the three major tributaries to the reservoir illustrates continued trends of increasing temperature, Ph, chlorides, phosphorus, nitrogen and turbidity. A September 2019 report commissioned by the City identified approximately 167 acres of the reservoir have been choked off by water chestnut infestation.

2.2 Watervliet Reservoir and Tributary Sampling Program

Both Watervliet and Guilderland Water Treatment personnel, on a daily basis, test raw water from the Watervliet reservoir per requirements of the NYS Sanitary Code.

Both Watervliet and Guilderland test drinking water for inorganic contaminants, radiological contaminants, lead and copper, nitrate, volatile organic contaminants, and synthetic organic contaminants and coliform bacteria. Results of these tests are used to ensure proper dosing determination of treatment chemicals used in the treatment process.

New York State has adopted the first in the nation drinking water standard for 1,4-Dioxane along with one of the lowest maximum contaminant levels for PFOA and PFOS. Public water Supplies in NYS are required to test for PFOA, PFOS and 1,4-Dioxane. PFOA and PFOS have Maximum Contaminant Levels (MCL) of 10 parts per trillion each while 1,4-Diosane has an MCL of 1.0 parts per billion. The City of Watervliet Water Department and Town of Guilderland reported no PFOA, PFOS and 1,4-Dioxane contaminants in 2020.

Since 1987 The City of Watervliet Water Department staff has administered a monthly water quality test at six sites on or tributary to the Reservoir. This level of reconnaissance is uncommon for municipalities and it's commendable the City makes this investment to track water quality upstream of the reservoir. The data collected illustrates not only snapshots of water quality, but also trends in each of the three sub watersheds to the reservoir.

These sites are as follows:

- #1) Unnamed Creek (removed)
- #3) Black Creek at Route 158 (Guilderland Rd.)
- #4) Normans Kill at Route 20 (Western Turnpike)
- #7) Watervliet Reservoir Intake
- #8) Bozen Kill at Route 397 (Dunnsville Rd.)
- #9) Bozen Kill downstream of Altamont Wastewater Treatment Plant
- #10) Black Creek at Weaver Road

A seventh testing location was at the shoreline of the reservoir at an unnamed stream near Keetholts Park. The stream was rerouted in 2003 and sampling at this site was suspended.

This monthly sampling program provides the city with data on the following parameters:

- Temperature
- Dissolved Oxygen
- Oxygen Saturation
- pH
- Turbidity
- Chlorides
- Fecal Coliform (until 2002)
- Nitrates
- K-Nitrogen
- Organic Nitrogen
- Total Phosphate
- Total Organic Carbon

Some of these parameters, such as temperature and pH, can be determined instantly by sampling staff. Others, such as Organic Nitrogen and Fecal Coliform are determined by a lab and identified in a report generated later.

Each of these parameters provides a window into the health of the tributaries and reservoir as both a drinking water supply and a critical natural resource.

The Potential Contaminant Source Inventories of each of the sub watersheds is included in this report as Appendix S.

2.3 Agricultural Operations within the Watershed

Depending on the agricultural management techniques employed, agricultural uses can have adverse or beneficial impacts on the watershed and its environment. Agricultural activities have a large impact on water quality due to field and cropland erosion, nutrient loss through leaching and surface runoff, and improper animal waste management and disposal.

While the negative impacts of agricultural lands are well documented, the environmental benefits are more discrete. When managed properly, agriculture can help improve water and soil quality, protect wildlife habitat and biodiversity, and reduce the emission of greenhouse gasses. Best management practices such as conservation tillage have been shown to improve surface water quality by reducing the runoff of soil particles and keeping nitrate, phosphorus and herbicides on the fields and out of nearby waterbodies. Possible sources of pollution from farming range from nutrients and pathogens from manure sources to silt and sediment from field erosion. Excessive nutrients can runoff into surface waters or soak into the ground and possibly contaminate groundwater. When applied to crops, nutrients (from fertilizer or animal manure) have the potential to run off into surface waters during a storm or snowmelt event.

2.3.1 Agriculture Environmental Management (AEM)

The Albany County Soil and Water Conservation District publishes 5-year Agricultural Environmental Management (AEM) Strategy plans developed in partnership with the following agencies:

- Albany County Soil and Water Conservation District (SWCD)
- USDA Farm Service Agency (FSA)

- USDA Natural Resources Conservation Service (NRCS)
- Cornell Cooperative Extension of Albany County (CCE)
- Albany County Water Quality Coordinating Committee (ACWQCC)
- Albany County Office of Natural Resource Conservation
- Local AEM Working Group
- CGRASS Working Group - Columbia, Greene, Rensselaer, Albany, Schoharie, Schenectady Counties

The purpose of the plan is to guide funding through the AEM program. Launched in 2005, AEM Base Funding has increased the number of new farms involved in AEM and advanced more farms through the AEM framework from year to year. The State Environmental Protection Fund provides non-competitive grants for Soil and Water Conservation Districts to prioritize watershed concerns, document environmental stewardship, develop and implement conservation plans, evaluate effectiveness, and conduct educational outreach efforts. Since its inception the SWCD has been effective in encouraging new and old farms to participate in the program.

The AEM is designed to help farmers further protect those and other important natural resources. If a potential environmental concern is identified through the AEM assessment process, farmers can then take steps to plan for and then implement an appropriate course of action through the AEM approach. The AEM assessment, planning and implementation process helps to target limited local, state and federal technical and financial resources to farms with the greatest potential for impacting the environment. Unless the AEM is administered in response to a violation of a community's code or the Watershed Rules and Regulations, farmers participate in the program voluntarily. Limited AEM funding means there are always more applicants than projects that can be provided financial assistance. With greater emphasis on inspections and a drive for implementation of agricultural BMP implementation, more funding and programmatic support for the County AEM programs will be needed

Farms in New York State are regulated by both the state and federal government and are divided into two main categories: Concentrated Animal Feeding Operations (CAFOs) and Non-CAFOs. A CAFO is an animal feeding operation that meets certain animal size thresholds and that also confines animals for 45 days or more in any 12-month period in an area that does not produce vegetation. CAFO farms are more heavily regulated due to their size and the fact that with increased size comes an increase in the severity of any impact associated with farm activities. CAFO farms are required to develop a Certified Nutrient Management Plan (CNMP) that accounts for all nutrients that are utilized by the farm, including fertilizers and manure. That plan must be followed as part of the permit that allows the farm to operate in New York State. CNMPs create a plan for addressing the potential adverse impacts on water quality and public health associated with a farming operation.

According to the 2017 USDA Agricultural Statistic Service Census there are 440 active farms and 59,564 acres of farmland in Albany County with an average size of ~ 135 acres (in 2012 63,394 acres and 128 acres). Within the county there are roughly 6,800 head of cattle, 3,500 chickens, 670 sheep and 110 pigs. County farms contribute over $47.3 million to the local economy and hire a significant number of employees. The primary agricultural products sold in Albany County are nursery and greenhouse crops followed by cattle and calves for beef and milk and other dairy products. These figures are not available by watershed – but that would be useful to examine data on that level.

There are 184 active farms and 9,334 acres of farmland in Schenectady County with an average size of ~ 135 acres (in 2012 63,394 acres and 50.5 acres). County farms contribute over $5,462,000 million to the local economy. Within the county there are roughly 1,115 head of cattle, 650 chickens and 480 sheep (data on hogs was not available). These figures are not available by watershed – but that would be useful to examine data on that level.

2.3.2 Agricultural Non-Point Source Abatement & Control Grant Program

Led by the New York State Soil and Water Conservation Committee, in coordination with the Department of Agriculture and Markets, the goal of the Agricultural Nonpoint Source Abatement and Control Program is to reduce and or prevent the nonpoint source contribution from agricultural activities in watersheds across the state by means of supporting the Agricultural Environmental Management (AEM) framework. Cost share funds are provided through Soil and Water Conservation Districts for plans and the implementation of Best Management Practices (BMPs) Systems, as defined in Section 3 of the Soil and Water Conservation Districts Law. Grants can cost share up to 75% of project costs or more if farm owners or operators contribute, in planning or implementation. Planning funds are awarded to conduct environmental planning while implementation funds are awarded to construct or apply management practices.

Through AEM Base Funding, 226 farms have completed Tier I while 123 farms have moved onto Tier II.

The Study suspected sources of nutrients and sediment as related to agriculture are:

- Streambank Erosion
- Over grazed pasture - Livestock
- Manure/fertilizer spreading and storage
- Cropland Erosion - silt/sediment
- Heavy use areas including barnyards

More detailed Natural Resource Concerns include:

Nutrient Management

Farmers wish to follow nutrient recommendations and guidelines. Fuel cost and labor issues have been an impediment to properly allocating manure and fertilizer based on Cornell recommends. A growing number of farmers are looking to use soil health management systems to improve the health and function of their soil. Through proper soil health management farmers can save energy and inputs, save water and increase drought tolerance, reduce pests and disease, improve water quality, increase organic matter, increase water infiltration increase soil carbon and reduce CO2 emissions. These results can be achieved with a number of conservation practices, such as:

- Cover Crop
- Conservation Tillage
- Prescribed Rotational Grazing
- Conservation Crop Rotations

Livestock access to waterbodies and inadequate forage

There are many farms that allow livestock to access waterbodies on the farm to be sure the livestock can have drinkable water throughout the year. When livestock have full access to streams and other water bodies, they create water quality problems by loafing in these areas. Mud and manure can degrade water resources and contaminate livestock drinking water sources. By fencing streams and providing an alternative water source, animals have access to clean water while protecting water quality.

In addition, the pasture lot is typically over grazed due to inadequate fencing infrastructure. By implementing prescribed rotational grazing systems, animals have adequate forage to meet their nutritional needs without overgrazing pastures. When pastures are overgrazed, bare soil is susceptible to

erosion and compaction. Overgrazed pastures can result in muddy conditions during the winter months. The SWCD encourages the use of rotational grazing as a management tool.

Water Quality Contamination of Surface and Groundwater (nutrients, sediment, pathogens)

The County's water supply relies on surface reservoirs and subsurface aquifers. The main surface water aquifers are the Alcove, Basic, Watervliet and Vly Reservoirs. NYS Department of Health Source Water Assessment of public drinking water supplies identified six surface waterbodies and nine municipal wells as having elevated susceptibility to pollution or substantial potential risks. Agricultural activities have been identified as possible sources.

Erosion on Cropland

Soil erosion is a major concern on much of the cropland in Albany County. The hazard of erosion is related to the slope of the land, the erodibility of the soil, the amount and intensity of rainfall and the type of plant cover. Loss of soil through erosion results in loss of nutrients and water, formation of gullies on hillsides, deterioration of tilth, detrimental sedimentation downslope and pollution of streams and water reservoirs. Many tillage and conservation practices help control erosion. Minimum tillage, no-till, cover crops, crop residue on the surface and a cropping system that has a high proportion of sod crops are effective in controlling erosion (Albany County Soil Survey, Albany County Soil and Water Conservation District). Reduced tillage and conservation practices could potentially have an economic benefit to farms given fluctuating fuel costs and labor issues.

Streambank Erosion

Streambank erosion is one the highest concerns for the farming and non-farming community in Albany County. Farmers have expressed concerns about a loss of pasture and cropland. While natural stream processes are understood there still seems to be an abnormal increase in frequency and severity of damage to streambanks. This issue cannot be corrected through work on an individual farms alone but must also include a broad spectrum of actions throughout the community.

The AEM identified a desired future condition for the Normanskill: "Achieve a considerable reduction in agricultural sources of nutrient and sediment delivery in the watershed. Encourage riparian buffers along pasture and cropland. Promote soil health principles that will reduce incidence of bare soil- reduce tillage, cover cropping etc."

Albany County Agricultural Environmental Management 2015-2020 Strategic Plan Watershed Threats			
12 Digit HUC Watershed Name	**PWL ID**	**Class**	Albany County AEM Strategy Notes
020200060202 Indian House Creek	1311-0018	A	Upstream of Watervliet Reservoir, suburban encroachment
020200060203 Black Creek	1311-0024	C	Flows to Watervliet Reservoir, highly developed, Black Creek Marsh. High gradient in escarpment area
020200060204 Bozen Kill	1311-0017	C	Flows to Watervliet Reservoir, high gradient, Karst topography, many active farms

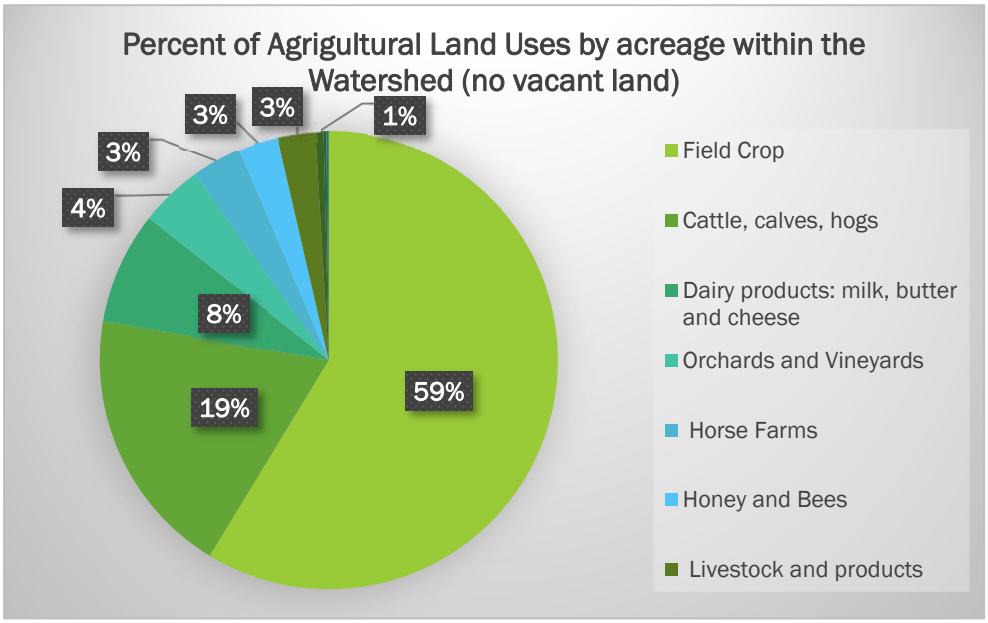
020200060205 Watervliet Reservoir	1311-000	A	Water supply, aquatic life and recreational uses in Watervliet Reservoir may experience minor impacts due to algal blooms and aquatic weed growth
020200060205 Hunger Kill	1311-0002	B	Urban-suburban development

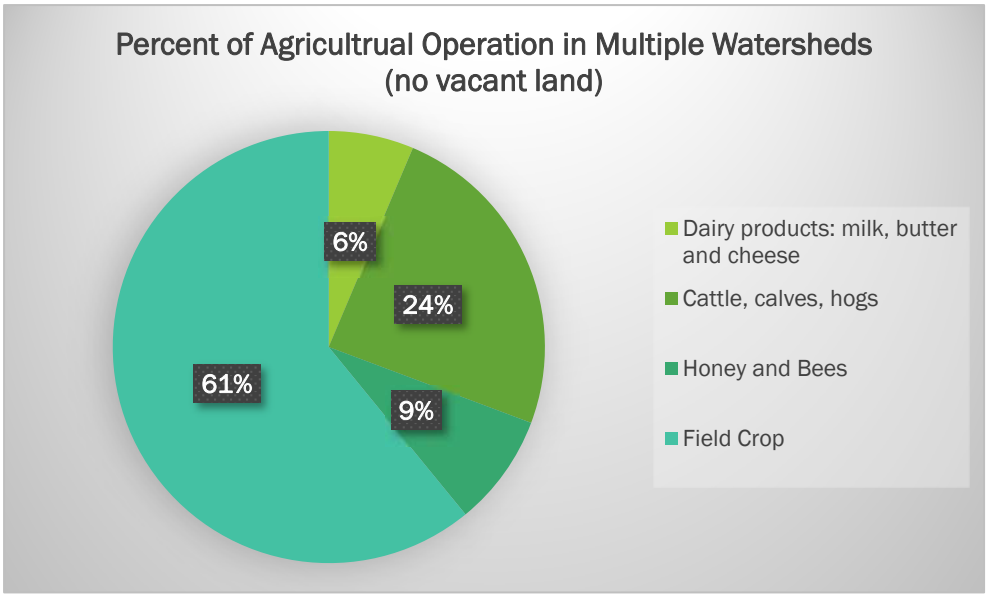
CDRPC obtained agricultural land use data within the Watervliet Reservoir Watershed by employing tax assessment records from 2018 and 2019, utilizing agricultural property class codes to assemble a database of active agricultural operations withing the watershed and subwatersheds. In sum, there are nearly 10,000 acres within the watershed of land with an agricultural property class code. This acreage can change annually as properties are sold, developed or subdivided. Thus the 10,000 acres is an estimate. From conversations with Soil and Water Conservation District staff we note that each year more agricultural land is lost to development. Thus, we can expect the 10,000 acres to decline as time goes on. Roughly 22.5% (2,230 acres) of the agricultural land uses within the watershed is vacant and not in productive use. These parcels are at the highest risk of being developed. Of the agricultural land that's active within the watershed, field crops occupy 4,500 acres, roughly 59% of the active agricultural land use. Cattle, calve and hog operations occupy 1,470 acres and nearly 20% of the watershed's active agricultural land use.

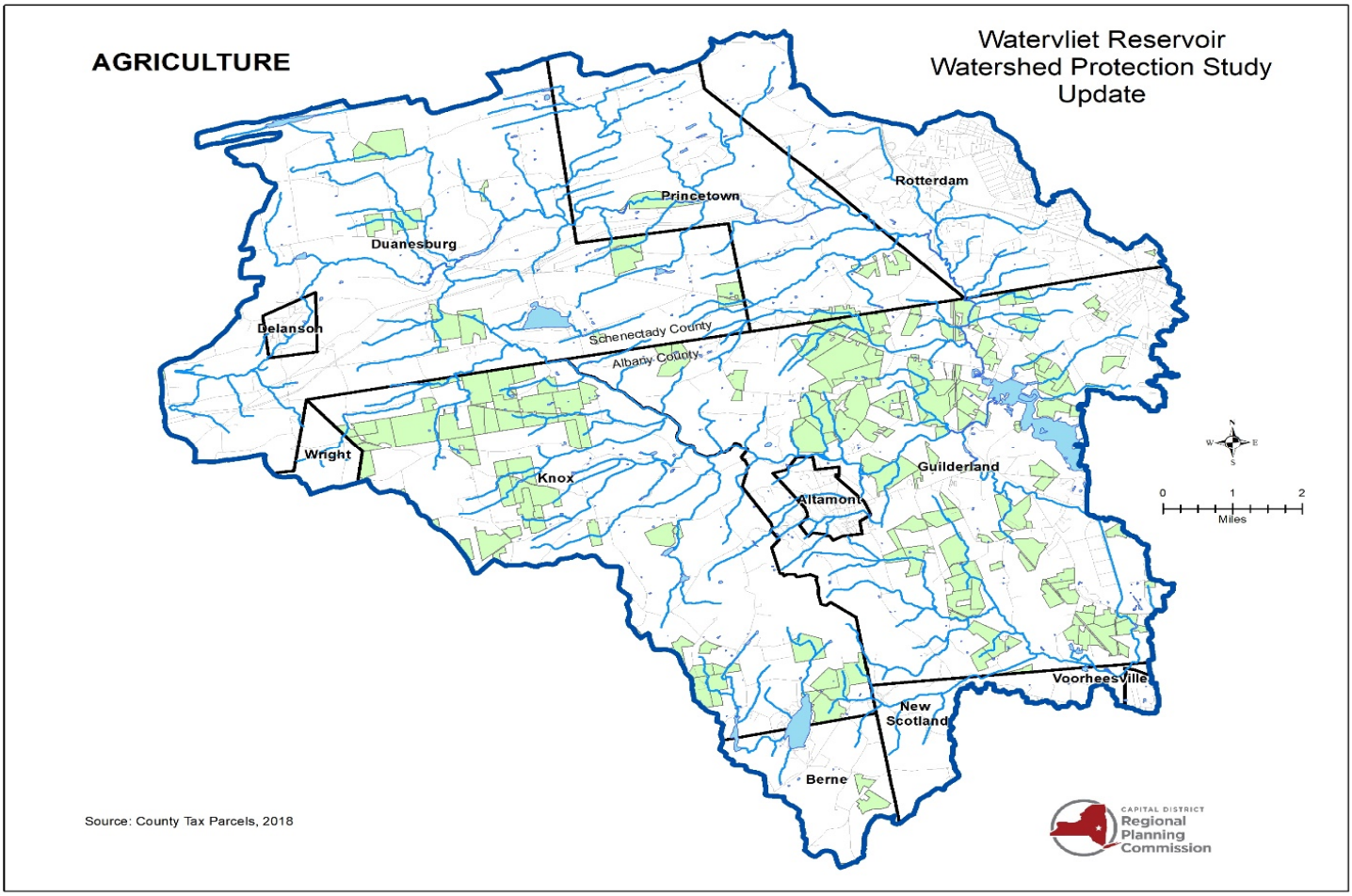
When CDRPC performed the agricultural land use analysis, we found 2,500 acres of agricultural land uses fell into multiple watershed boundaries. Of this acreage 610 acres was vacant leaving roughly 1875 acres of active agricultural operations, the vast majority of which, 1150 acres, for field crops. A total of 460 acres was in active use for cattle, calves and hogs.

Agricultural Land Uses Within the Watershed		
Agricultural Operation	**Total Acreage**	**% of Ag**
Field Crop	4522	58.70%
Cattle, calves, hogs	1466	19.03%
Dairy products: milk, butter and cheese	608	7.90%
Orchards and Vineyards	341.93	4.44%
Horse Farms	271	3.52%
Honey and Bees	214.97	2.79%
Livestock and products	206	2.68%
Nursery and Greenhouses	45.18	0.59%
Other fruits	14.43	0.19%
Sheep and wool products	13	0.17%

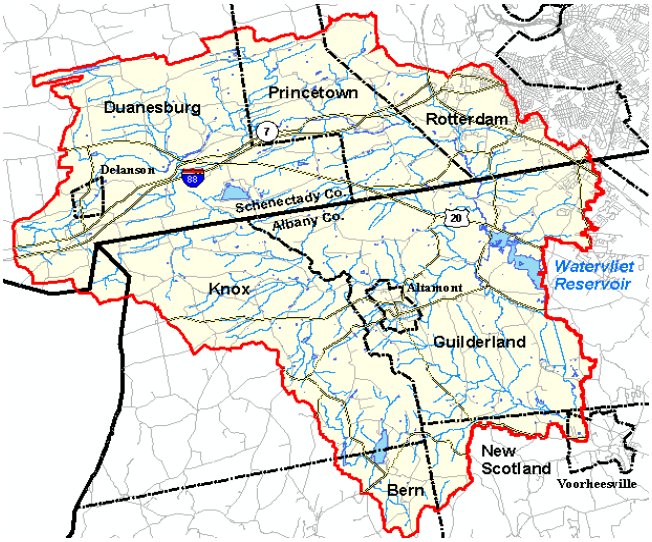
Within subwatersheds of the Reservoir, when properties within multiple watersheds are removed, field crops dominate the percentage of active agricultural operations in the Bozen Kill Watershed at nearly 32% of the acreage. Field crop acreage within in the Black Creek is at 11%. All other active ag operations by class and watershed fall below 10% of the total watershed.







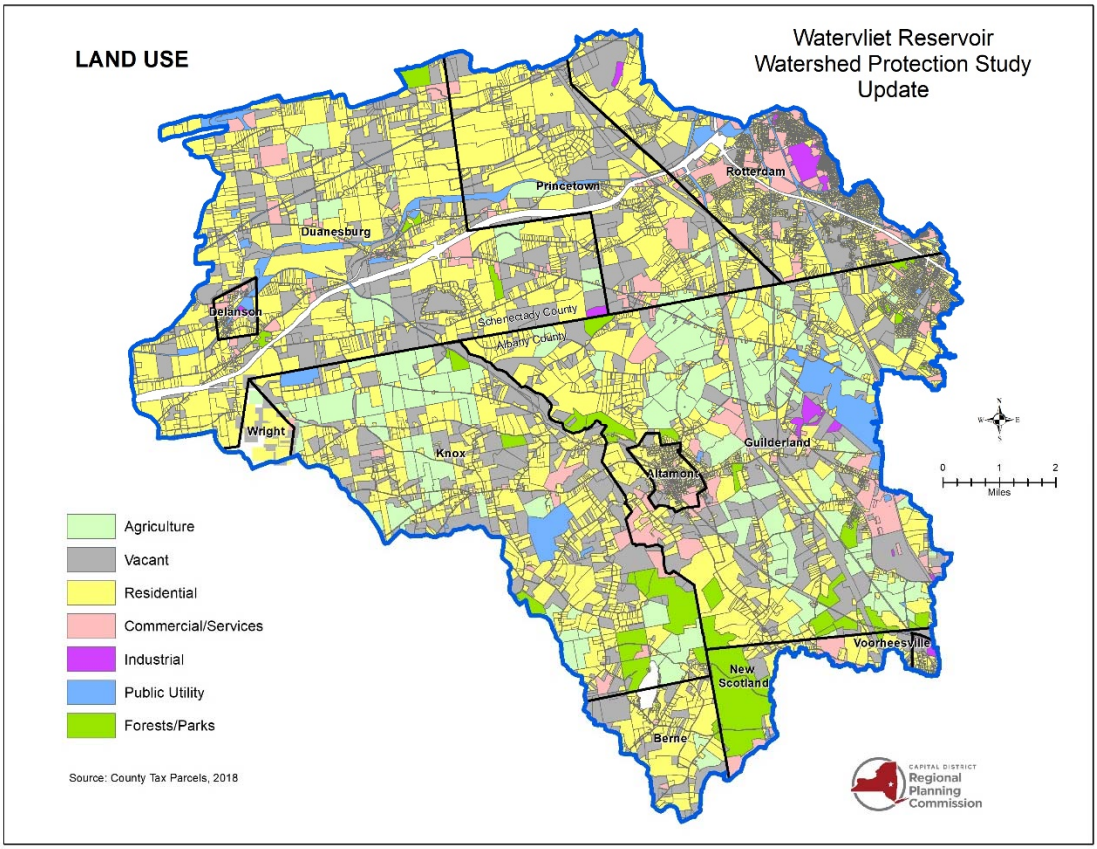
2.4 Municipalities Within the Watershed

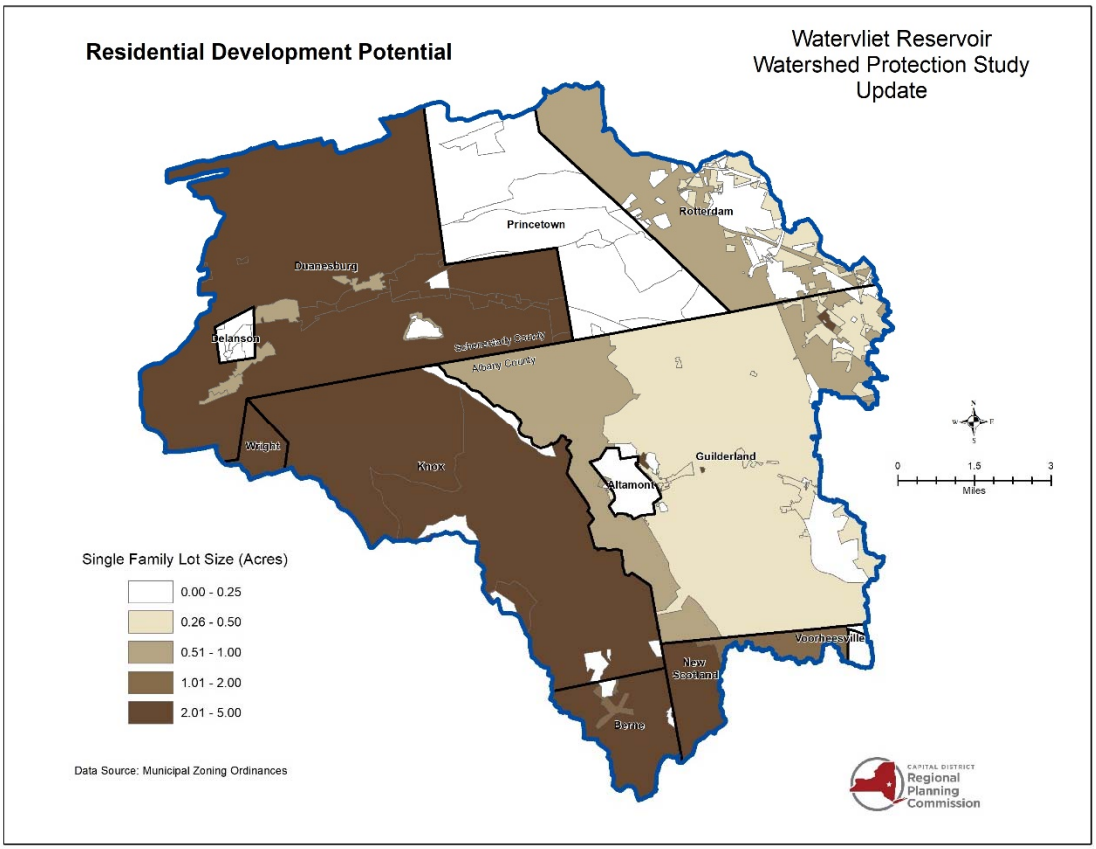


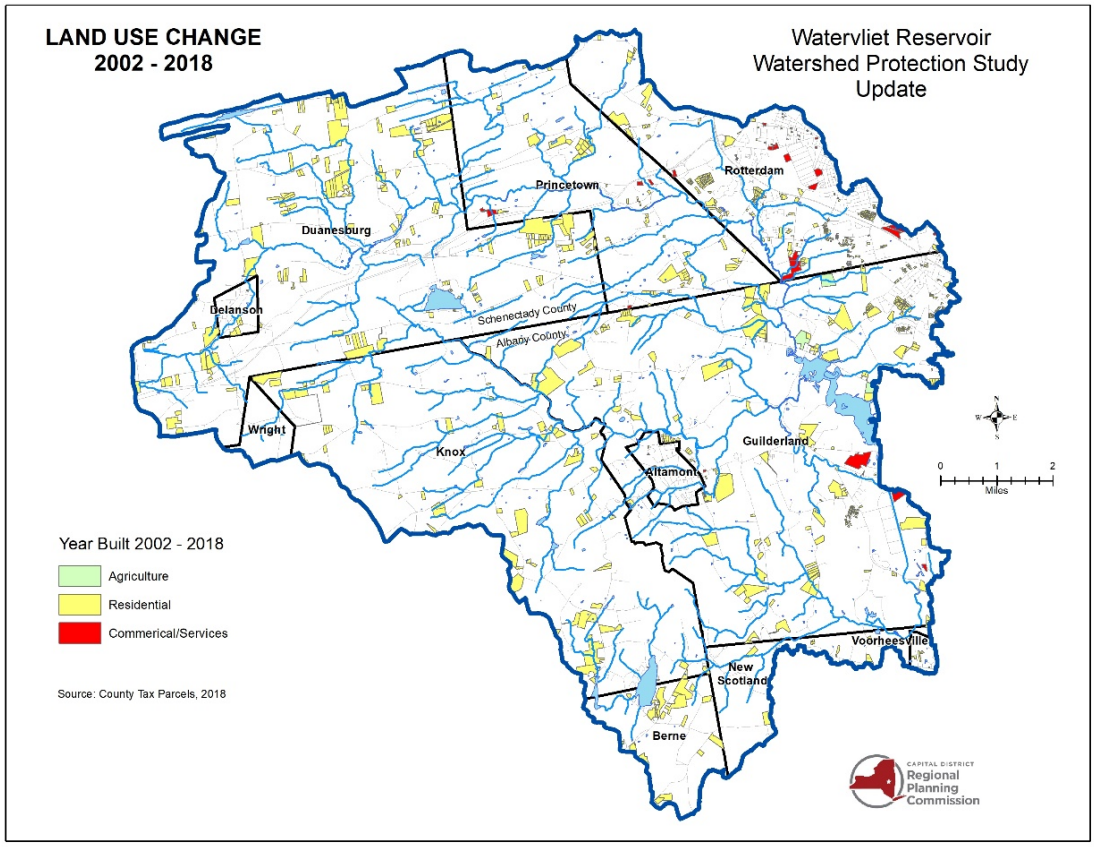
The Watervliet Reservoir watershed is comprised of an area of approximately 115 square miles and falls within three counties – Albany, Schenectady and Schoharie. The watershed encompasses land from eight towns (Guilderland, New Scotland, Knox, Princetown Duanesburg, Rotterdam, Berne and Wright) and three villages (Voorheesville, Altamont and Delanson).

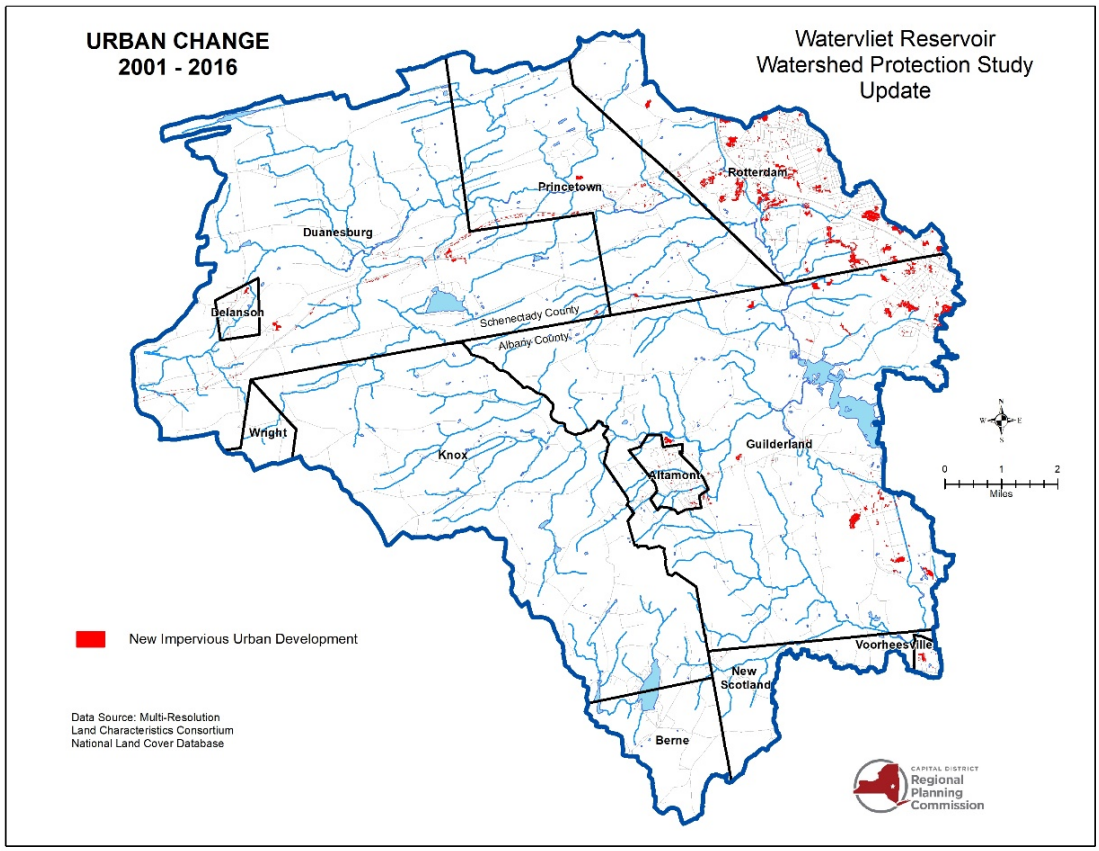
In CDRPC's 2000 report, town populations were used to calculate growth within the watershed. For this report, CDRPC examined population growth within the Watershed boundaries by delineating census blocks that eclipse the watershed boundaries. A growth table is included in this report as Appendix B.

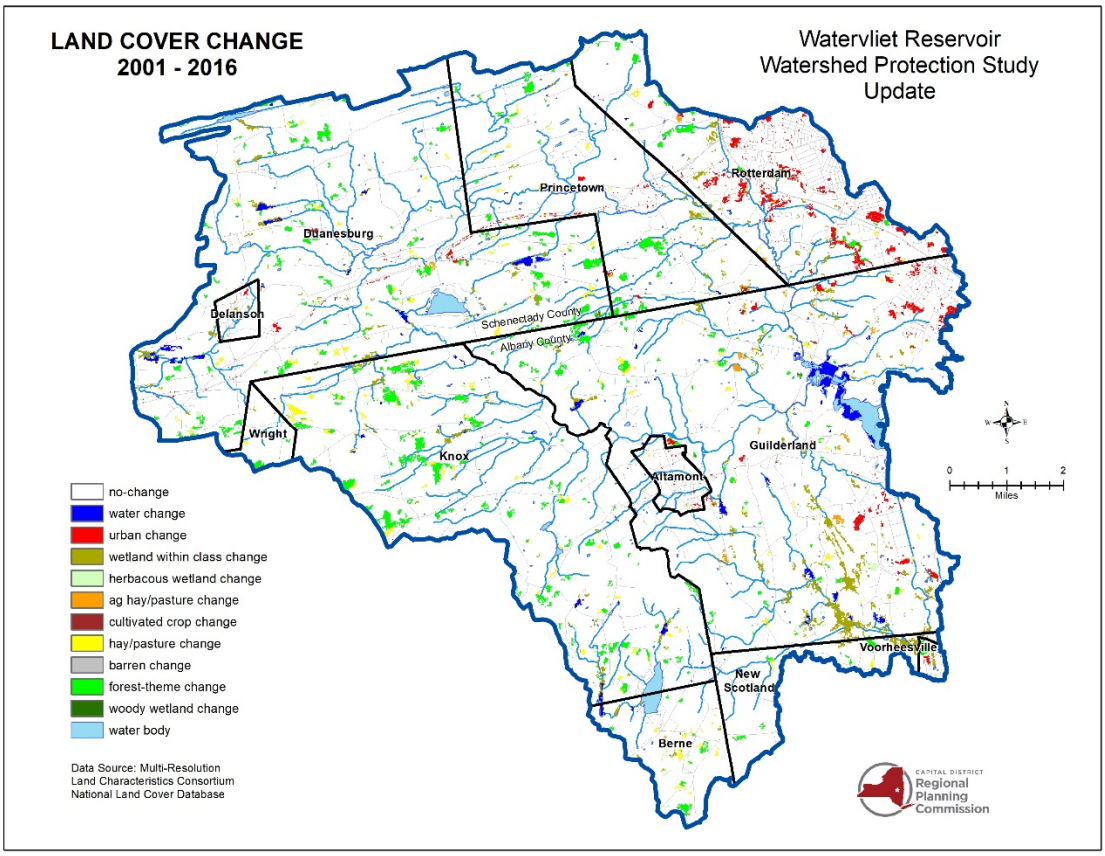
Suburban growth has slowed since the late 1990s – early 2000s and for rural communities it has reversed course. Despite this, developed land coverage has continued to grow – urban change in the construction of roads buildings, and parking lots has not subsided.

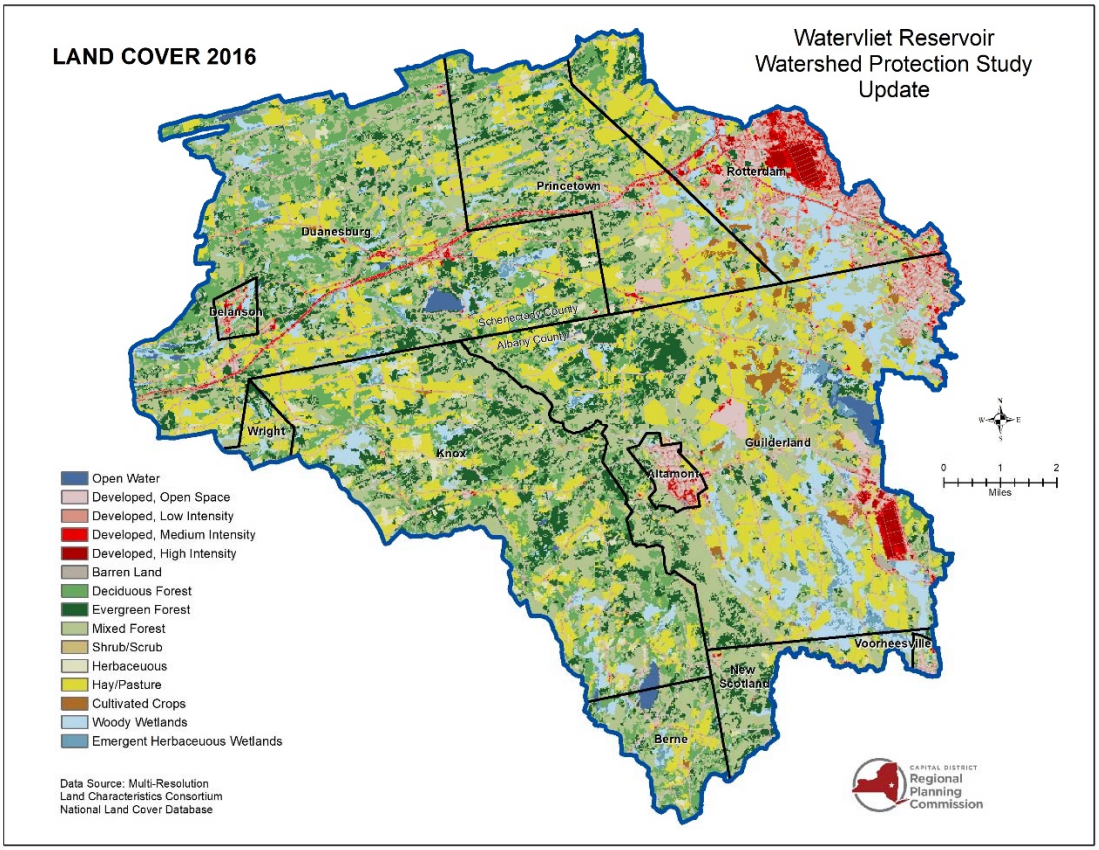

LAND USE
Watervliet Reservoir
Watershed Protection Study
Update
Princetown
Rotterdam
Duanesburg
Delanson
Schenectady County
Albany County
Wright
Knox
Guilderland
Altamont
Voorheesville
New Scotland
Berne
0 1 2
Miles
Agriculture
Vacant
Residential
Commercial/Services
Industrial
Public Utility
Forests/Parks
Source: County Tax Parcels, 2018
CAPITAL DISTRICT
Regional
Planning
Commission

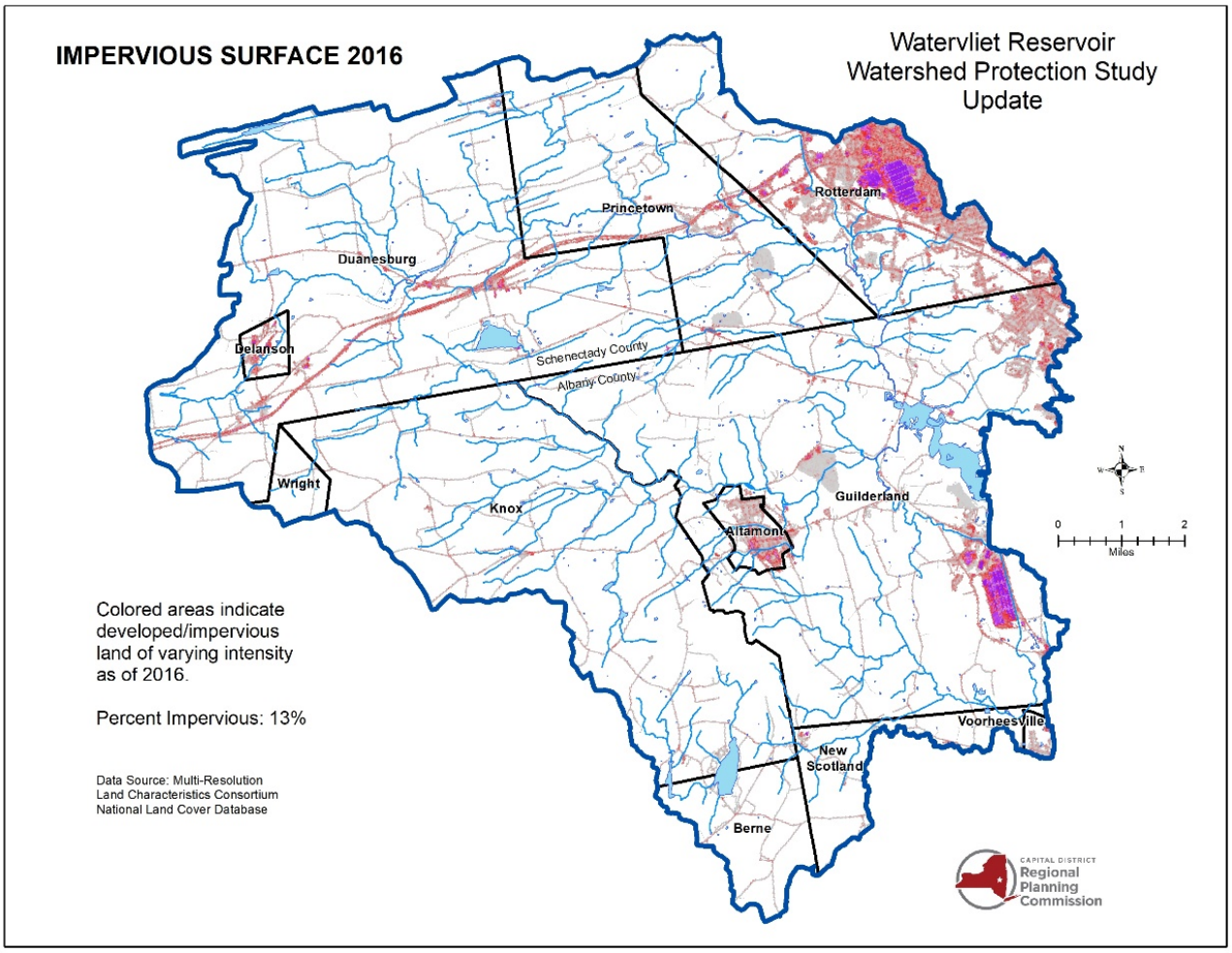

Residential Development Potential
Watervliet Reservoir
Watershed Protection Study
Update
Princetown
Rotterdam
Duanesburg
Delanson
Schenectady County
Albany County
Wright
Knox
Guilderland
Altamont
Voorheesville
New Scotland
Berne
0 1.5 3
Miles
Single Family Lot Size (Acres)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 5.00
Data Source: Municipal Zoning Ordinances
CAPITAL DISTRICT
Regional
Planning
Commission


LAND USE CHANGE
2002 - 2018
Watervliet Reservoir
Watershed Protection Study
Update
Princetown
Rotterdam
Duanesburg
Delanson
Schenectady County
Albany County
Wright
Knox
Guilderland
Altamont
Voorheesville
New Scotland
Berne
0 1 2
Miles
Year Built 2002 - 2018
Agriculture
Residential
Commerical/Services
Source: County Tax Parcels, 2018
CAPITAL DISTRICT
Regional
Planning
Commission


URBAN CHANGE
2001 - 2016
Watervliet Reservoir
Watershed Protection Study
Update
Princetown
Rotterdam
Duanesburg
Delanson
Schenectady County
Albany County
Wright
Knox
Guilderland
Altamont
Voorheesville
New Scotland
Berne
0 1 2
Miles
New Impervious Urban Development
Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database
CAPITAL DISTRICT
Regional
Planning
Commission


LAND COVER CHANGE
2001 - 2016
Watervliet Reservoir
Watershed Protection Study
Update
Princetown
Rotterdam
Duanesburg
Delanson
Schenectady County
Albany County
Wright
Knox
Guilderland
Altamont
Voorheesville
New Scotland
Berne
no-change
water change
urban change
wetland within class change
herbacous wetland change
ag hay/pasture change
cultivated crop change
hay/pasture change
barren change
forest-theme change
woody wetland change
water body
Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database
0 1 2
Miles
CAPITAL DISTRICT
Regional
Planning
Commission


LAND COVER 2016
Watervliet Reservoir
Watershed Protection Study
Update
Princetown
Rotterdam
Duanesburg
Delanson
Schenectady County
Albany County
Wright
Knox
Guilderland
Altamont
Voorheesville
New Scotland
Berne
Open Water
Developed, Open Space
Developed, Low Intensity
Developed, Medium Intensity
Developed, High Intensity
Barren Land
Deciduous Forest
Evergreen Forest
Mixed Forest
Shrub/Scrub
Herbaceuous
Hay/Pasture
Cultivated Crops
Woody Wetlands
Emergent Herbaceuous Wetlands
Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database
0 1 2
Miles
CAPITAL DISTRICT
Regional
Planning
Commission


IMPERVIOUS SURFACE 2016
Watervliet Reservoir
Watershed Protection Study
Update
Rotterdam
Princetown
Duanesburg
Delanson
Schenectady County
Albany County
Wright
Knox
Guilderland
Altamont
0
1
2
Miles
Colored areas indicate developed/impervious land of varying intensity as of 2016.
Percent Impervious: 13%
Data Source: Multi-Resolution Land Characteristics Consortium National Land Cover Database
Voorheesville
New Scotland
Berne
CAPITAL DISTRICT
Regional Planning Commission

2.4.1 Regulatory Tools and Assessment

CDRPC examined the codes of ten municipalities within the watershed for the presence of local plans and codes related to watershed protection practices. A summary chart, below, provides a synopsis of the presence of these local codes and plans. Of note, some requirements, such as wetland buffers, stormwater and erosion and sediment controls may be functions of a regulatory oversight beyond the control of the municipalities such as federal or state mandates like the MS4 program. Communities have the authority to enact more restrictive stormwater control measures than mandated by higher authorities, however.

Zoning Regulations Survey Summary											
Community	Zoning	Comp. Plan	Stream Buffer Regs.	Wetland Buffer Regs. *	Steep Slope Regs.	Subdivision Regs.	Cluster Subdivision Regs.	Conservation Subdivision Regs.	Stormwater & Erosion Control Regs. (beyond State minimum standards)	MS4	Right to Farm Law**
Guilderland	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rotterdam	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Berne	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes
Altamont	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
New Scotland	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes (portion)	Yes
Knox	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes
Duanesburg	Yes	Yes	No	No	No	Yes	Yes	No	No	No (Waiver)	Yes
Voorheesville	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Princetown	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No
Delanson	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No

*****Although state and federal laws regulate activities in or near certain wetlands, not all wetlands are covered by these protections. New York regulates freshwater wetlands greater than 12.4 acres with a 100-foot adjacent area and certain wetlands of unusual local importance. For setbacks we looked for community standards that supplemented the 100' setback for large wetlands or created setbacks for wetlands of smaller size.

**Albany County enacted an encompassing a right to farm law.

2.4.2 General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems

Guilderland, Rotterdam, New Scotland, Voorheesville and Altamont are all regulated under the NYS Municipal Separate Storm Sewer Systems ("MS4") permit. (The New York State Department of Environmental Conservation administers the Draft State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from MS4s. Small municipal MS4s that are located within the boundaries of a Census Bureau defined "urbanized area" are regulated under EPA's Phase II Stormwater Rule. This requires MS4s to develop a stormwater management program that will reduce pollutants carried by stormwater during storm events to waterbodies to the "maximum extent practicable". The goal of the program is to improve water quality and recreational use of waterways. At the time of the prior 2003

CDRPC Watershed Report rules for permit coverage were being promulgated and while these communities were not regulated, there was an expectation permit coverage would be needed in the future.

Overview of the Minimum Control Measures (MCM)

The permit requires development of a Stormwater Management Program (SWMP) that includes the six required program components, or the six minimum control measures (MCMs).

1. Public Education and Outreach: This includes the distribution of educational materials and outreach activities that inform the public about the impacts of polluted stormwater runoff can have on water quality.
2. Public Participation/Involvement: Provide opportunities for citizens to participate in the development, implementation, review and revision of the stormwater management program. This includes publicizing public hearings and encouraging citizens participate in the stormwater management program process.
3. Illicit Discharge Detection and Elimination: Develop, implement and enforce a plan to detect and eliminate illicit discharges. This includes developing and maintaining a map of outfall locations and their receiving waterbodies, mapping the storm sewer shed, prohibit illicit discharges through laws or ordinances, and inform the public about the hazards associated with illegal discharges and the improper disposal of waste.
4. Construction Site Runoff Control: Develop, implement and enforce an erosion and sediment control program for construction activities that disturb greater than or equal to one acre of land.
5. Post-construction Runoff Control: Develop, implement and enforce a plan that addresses stormwater runoff from new development and redevelopment projects and incorporates enforceable mechanisms. Applicable controls could include preventative actions (e.g., protecting sensitive areas) or the use of structural controls (e.g., grassed swales or porous pavement).
6. Pollution Prevention/Good Housekeeping: Develop and implement a program to prevent or reduce pollutant runoff from municipal operations. The program must include municipal staff training on pollution prevention measures and activities to reduce the amount of pollutants in stormwater (e.g., regular street sweeping, reduce the use of pesticides or street salt, or frequent cleaning of catch-basins).

In response to growing demands upon communities with MS4 permit coverage, The Stormwater Coalition of Albany County, currently comprised of 11 municipalities and the University at Albany, was formed in 2008 by local governments in Albany County that previously participated in two NYSDEC Stormwater Implementation grants. The Coalition is an independent, self-funded organization which relies on annual membership fees to cover administrative expenses. Albany County, is both a dues-paying member and host of the Coalition, providing office space and administrative staff support to the Coalition. The Stormwater coalition provides assistance and coordination for several of the community MCMs. In addition, the Coalition administers a point based technical assistance program for which communities can request additional services, for a fee, which may include mapping and outfall sampling. The Coalition developed a wide range of public outreach tools (https://stormwateralbanycounty.org/what-can-you-do/) and informative maps such as the “getting to know the stream next door” maps (https://stormwateralbanycounty.org/maps-and-webmappers/.)

2.4.3 DRAFT General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems GP-0-22-002

The NYSDEC has released a Draft State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4) for public comment. This

new permit has a significantly greater reach and administrative stormwater management requirements than its predecessor. These permit requirements, when effective, will impact the operations of Guilderland and Rotterdam, the two municipalities within the Watershed that have obtained MS4 permit coverage. The Town of Princetown would be covered but was granted a waiver under the prior permit and it is yet to be determined if the town will be able to waiver out again. A small portion of the Town of New Scotland is within the watershed area, and Permit coverage for that portion of the town is not in effect, although there are aspects of permit control measures the Town does carry out town wide. At the time of CDRPC's 2003 report, the Phase II MS4 SPDES permit had yet to be released and many of the report's recommendations concerning construction site oversight, illicit discharge monitoring, outfall sampling and erosion and sediment controls have been implemented by covered municipalities.

MCM 3, Illicit Discharge Detection and Elimination, requires MS4 Operators to develop, implement, and enforce a program which systematically detects, tracks down, and eliminates illicit discharges to the MS4. This MCM is designed to manage the MS4, so it is not conveying pollutants associated with flows other than those directly attributable to stormwater runoff.

The monitoring locations used to detect illicit discharges are identified as follows:

i. MS4 outfalls;
ii. Interconnections; and
iii. Locations where stormwater is conveyed from the MS4 Operator's municipal facility to the MS4 Operator's own MS4.

Within three (3) years of the Effective date of the new permit the MS4 Operator must develop and maintain an inventory of the monitoring locations in the SWMP Plan. They must also prioritize all known monitoring locations as follows:

a) High priority monitoring locations include monitoring locations:

I. At a high priority municipal facility, as defined in Part VI.F.2.c;
II. Discharging to impaired waters as required by Part VIII;
III. Discharging within a TMDL watershed as required by Part IX;
IV. Discharging to waters with designated best usage of primary and secondary contact recreation or higher (Class AA-S, A-S, AA, A, B, SA, or SB); and/or
V. Confirmed citizen complaints on three or more separate occasions in the last 12 months.

b) All other monitoring locations are considered low priority.

Within thirty (30) days of when a monitoring location is constructed or the MS4 Operator discovers it, the MS4 Operator must prioritize those monitoring locations; and

Annually, after the initial prioritization, the MS4 Operator must update the monitoring location prioritization in the inventory based on information gathered as part of the monitoring location inspection and sampling program. The monitoring locations inspection and sampling procedures require the operator to inspect all monitoring locations during dry weather:

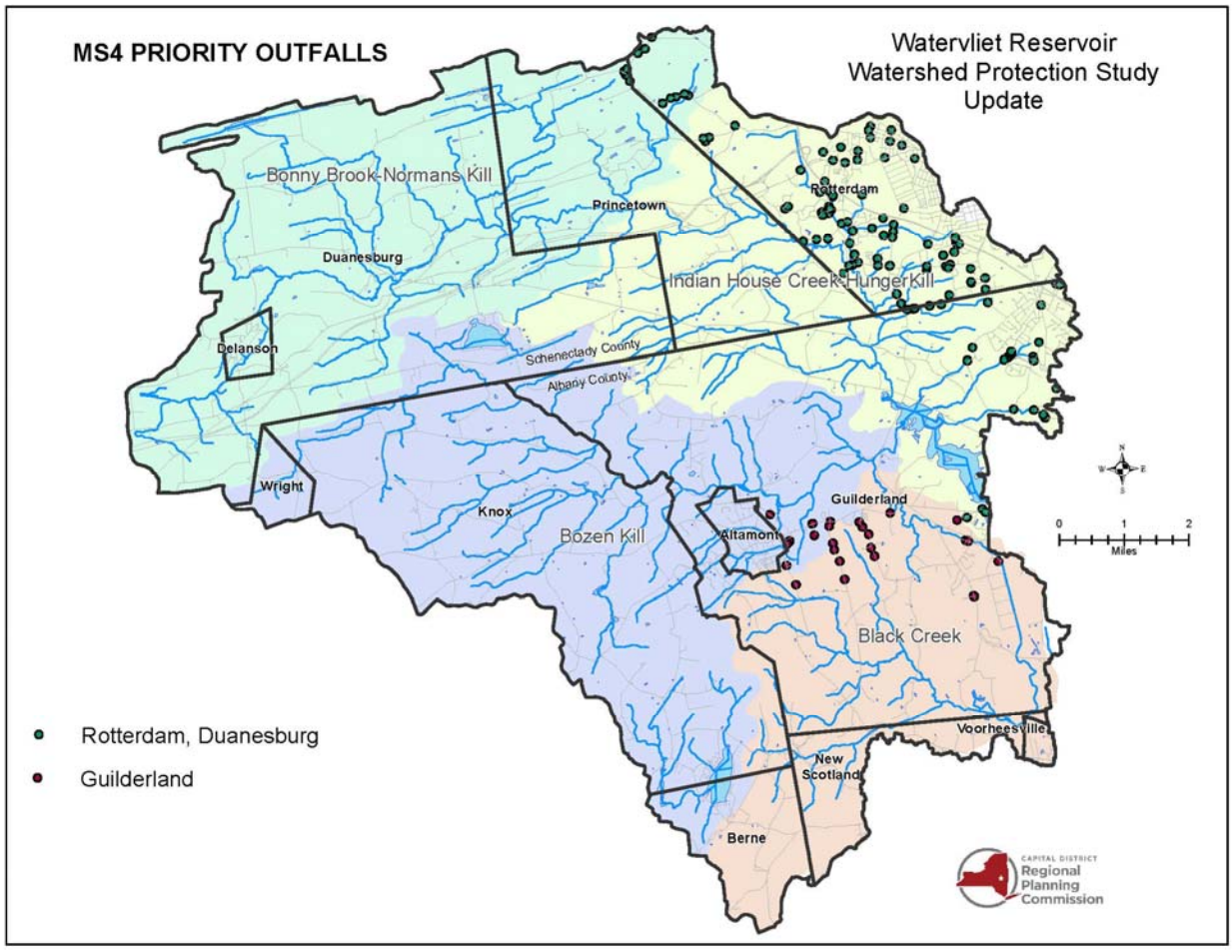
i) Inspect high priority monitoring locations twice a permit term, separated by a minimum of one (1) year; and

ii) Inspect low priority monitoring locations once a permit term.

The Normanskill is designated as class A water body; a source of water supply for drinking, culinary or food processing purposes; and primary and secondary contact recreation; and fishing. Using the Stormwater

Coalition of Saratoga County's cost estimate for each outfall inspection, the per outfall inspection cost for time and materials is $50.

Guilderland has identified 23 priority outfalls within the Normanskill Watershed – 46 inspections within the permit term. Guilderland has also identified 25 non-priority outfalls within the Black Creek and Bozen Kill Watersheds that will need inspection at least once in the permit term. The total estimated cost of outfall inspection for the Town is $3,550 ($710 per year for the 5-year permit cycle). The Town of Rotterdam maintains a list of 97 high priority outfalls within the Normanskill Watershed – requiring 194 inspections within the permit term. The total estimated cost of outfall inspection for the Town is $9,700 ($1,940 per year for the 5-year permit cycle). These estimates do not consider any time for illicit discharge track down and elimination, if needed.



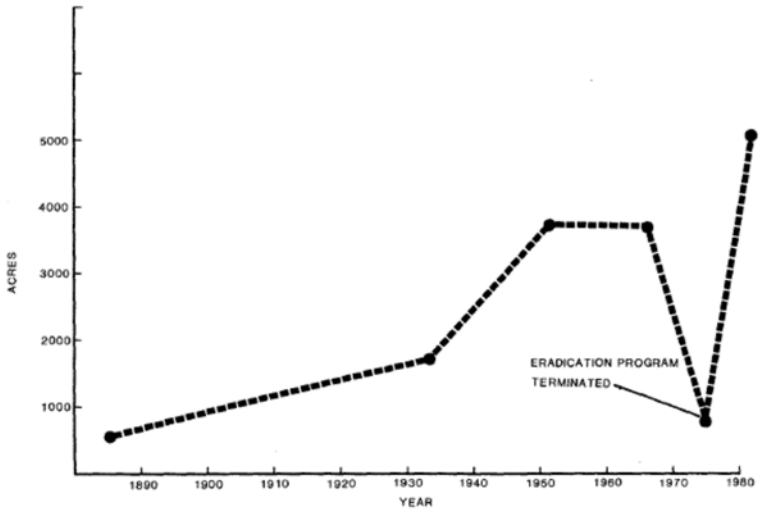
2.5 Water Chestnuts

Trapa natans L., commonly called water chestnut, is so-called because it produces single-seeded fruits, commonly known as chestnuts. Each tetrahedrally shaped fruit has four sharp spines and each spine is provided with several recurved barbs. The plant bears both submersed and floating leaves. The feather-like submersed leaves are borne in opposite pairs along the wiry stem. As the plant matures these submersed leaves turn black and are often mistaken for roots. The floating leaves are triangular or rhombic in shape. On the petiole of each floating leaf is a bladder-like swelling filled with air and spongy tissue. These floating leaves form a rosette on the water surface. Where Trapa is abundant these rosettes completely cover the water surface.

Water chestnut is an annual plant whose seeds germinate in the early spring. It grows in water as deep as ten feet or more but is most abundant where water depths do not exceed six feet. Trapa plants begin flowering in June. The nuts begin to ripen in early July. The mature nuts are heavier than water and sink rapidly when they drop from the plant. In the fall the plant is killed by frost and deteriorates quickly leaving only its seeds to produce a crop the following year.

Water chestnut is a nuisance plant primarily because of its aggressive growth habit. In areas where it grows its wiry stems and submersed and floating leaves tangle about outboard motor propellers and make boating and fishing nearly impossible. The spiny fruits wash ashore and inflict painful wounds to swimmers who chance to step on them. Water chestnut is of little value to wildlife. It quickly crowds out more desirable aquatic plants which provide food and shelter to fish and waterfowl.

Trapa natans is not native to the United States. Water chestnut is an aquatic invasive plant that is native to Eurasia and Africa. It was introduced in the United States in the mid-1800' as an ornamental plant – it's proliferation and penchant for damage was unknown at the time. As an interesting local historical footnote, Sander's Lake, now known as Collin's Lake, in Scotia, NY, was one of the first know waterbodies in the US to be utilized for water chestnut planting, as early as 1884. The lake drains into the Mohawk River via Collin's Creek. Trapa natans escaped from Collins Lake into the nearby Mohawk River and became well established there as early as 1920. By 1930 the Trapa infestation in the Mohawk River was estimated to cover 100 acres. Trapa soon spread downstream to the Hudson River. In 1952 the total New York State infestation was estimated at 3500 acres. Trapa natans remains a problematic invasive for the Mohawk.



PARTIAL HISTORICAL RECORD OF TRAPA NATANS – WATER CHESTNUT REPORT 1980

For many years New York State successfully used the herbicide 2, 4-D to control Trapa infestations in the Mohawk and Hudson Rivers, as well as in Lake Champlain. This chemical was sprayed in undiluted form on water chestnut plants at the rate of 2 gallons per acre (4 pounds active ingredient per gallon). In 1976 New York State officials became concerned that this application rate might be causing harmful side effects in fish and aquatic invertebrates. Experience showed that lesser amounts of 2, 4-D were ineffective in controlling water chestnut. As

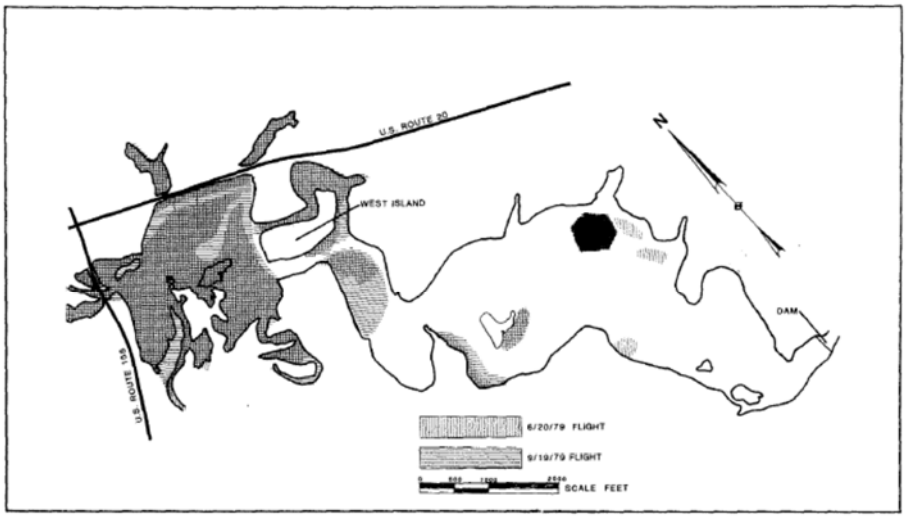


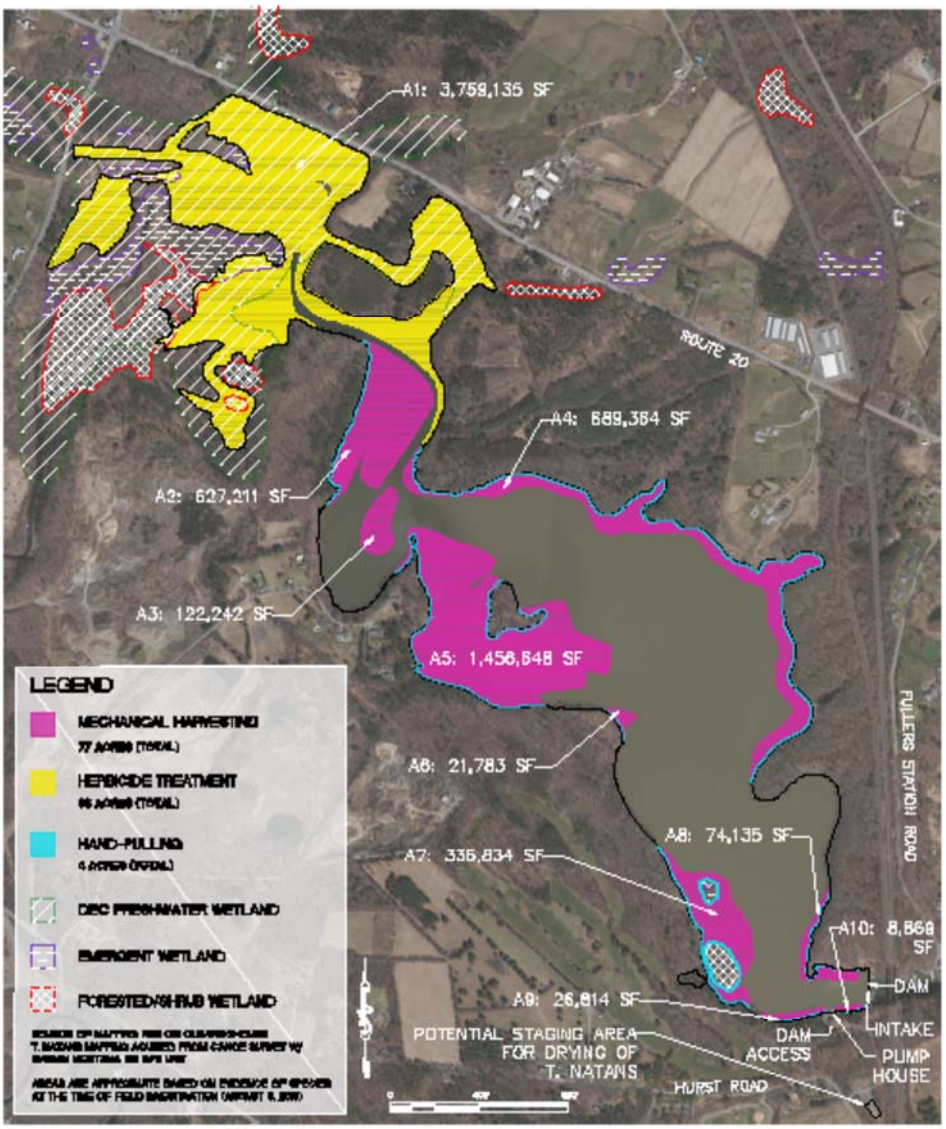
Figure 2-3. Trapa natans in Watervliet Reservoir. Determined through photogrammetry in Summer 1979.

a result alternative herbicides were sought. None was found and it was deemed a massive hand pulling effort would be too costly. Accordingly, in 1977 the New York State Department of Environmental Conservation terminated its Trapa control program throughout the state. Populations of the invasive plant rebounded and quicky exceeded its previous annual acreage high of 4000 acres, established in 1940.

Until recently, the City of Watervliet administered a management program to cut back the water chestnut infestations at the reservoir. An air boat modified with a Zamboni machine-like blade was employed, as were student conservation interns for shoreline and shallow area hand pulling. The program was deemed too expensive to continue operation as repair costs to the airboat and staff time expenses mounted.

The City had considered using Grass Carp as a biological control measure however, these fish are not native to the United States. They are not selective in their diet and could destroy native aquatic vegetation along with the Water Chestnut. Grass carp's size and jumping ability make them difficult to confine.

In September on 2019 the City completed a Water Chestnut Control Study that detailed multiple control strategies, their effectiveness and potential costs. The study found the Watervliet Reservoir infestation had taken up 169 acres of the Reservoir (in 1980 the size of the infestation was estimated at 140 acres). "Ultimately, T. natans detrimentally impact water quality and fisheries in the reservoir and downstream resources. They can also result in increased water treatment costs in areas used for municipal potable water supply," the report concluded. A combination of methods was recommended, including mechanical harvesting, hand-pulling, and herbicide treatment. "If complete removal is not possible," the report suggested, "a systematic approach of eradication from the north to south is advised, with the understanding that the seed bank will continue to proliferate in unmanaged sections." The 2019 Weston and Sampson engineering report approximated the removal and treatment costs as $5,000 for hand-pulling, $195,000 for mechanical harvesting, and $70,000 for herbicide treatment; an overall cost of approximately $270,000. Of that expense, it was estimated that $85,000, for the mechanical harvester, was the only non-recurring cost. The report estimated a $1,233/acre removal cost and an equal $1,223 disposal fee/acre. The Final Draft of this Water Chestnut Study is report is included with this report as Appendix C.



Trapa Natans Distribution and Wetland Boundaries in the Watervliet Reservoir

Normanskill Reforesting – Water Chestnut Control Study Watervliet, New York

Due to the longevity of water chestnut fruit and the resilience of the plant, management will prove a lengthy endeavor. Seeds dropped in the sediment of the reservoir remain viable for up to a decade, and the report identified water chestnut populations in upstream tributaries. Further complicating removal is that the optimal harvesting season is short – as harvesting must be done before the plant fruits. Thus, July-August is best suited for removal operations – this impacts the ability for multiple municipalities to share a harvester unit. In late 2021 City purchased a WeeDoo TC3000 harvesting machine with plans to resume removal of the Water Chestnut. The Weedoo boat features a side boom weed cutter and weed removal front end loader with marine bucket. The deck-mounted aquatic cutter boom can cut submerged vegetation to depths of 5 foot and also articulates allowing continuous aquatic vegetation cutting along shorelines and shallow lake banks. The aquatic weed removal front end loader with special weed removal bucket is designed the remove aquatic vegetation of any kind and can remove most lake weeds at a rate

of 1,200 lbs. per minute per the manufacturer. Removing T. natans in the shallow, northern portion of the reservoir also presents a challenge due to problem of suspended sediment. The limited range of the machine and the short season mean that mechanical harvesting alone will never eradicate the water chestnut infestation.

The City has yet to identify disposal methods and is in the process of identifying potential strategies and is looking at composting. Watervliet owns a biodigester facility but it not currently operational. The city's biodigester is not adequate for processing the large amount of biomass from the removal of the water chestnut infestation at the reservoir.

2.6 Potential Contaminant Inventory

The Potential Contaminant Source Inventories of each of the subwatersheds is included in this report as Appendix S.

2.6.1 PFOA and PFOS

Per- and Polyfluoroalkyl Substances (PFAS) are a group of chemicals used to make fluoropolymer coatings and products that resist heat, oil, stains, grease, and water. Fluoropolymer coatings are blends of resins and lubricants used in products such as water-repellent clothing, furniture, adhesives, paint and varnish, food packaging, heat-resistant non-stick cooking surfaces and insulation of electrical wires. Chemicals in this group include perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS). Although the use of perfluorooctanoic acid (PFOA) is being phased out, the chemical is still used to make household and commercial products that resist heat and repel stains. Perfluorooctane sulfonic acid (PFOS) is used in fire-fighting foam and is a newly listed hazardous substance (as is PFOA). Some PFAS do not break down easily and persist for a long time in the environment, especially in water. Their toxicity and persistence in the environment mean they are a potential danger to public health and the environment. In early 2016, New York, joined by Vermont and New Hampshire, urged the U.S. Environmental Protection Agency (EPA) to acknowledge that PFOA contamination is a national problem that requires consistent federal guidelines. On May 19, 2016, EPA issued a lifetime health advisory of 70 parts per trillion (PPT) for long-term exposure to PFOA and PFOS in drinking water.

NYSDEC surveyed select businesses, fire departments, fire training centers, bulk storage facilities, airports, and Department of Defense (DoD) facilities from June to September 2016. The responses to the survey have helped to determine if these entities used or stored materials containing PFOA/PFOS and dispersants used in Teflon coating operations. The results of this survey are updated periodically as additional responses are received.

PFOA/PFOS Facility Identification Survey (Survey 1) (1/16/19)
(https://www.dec.ny.gov/chemical/108831.html) – No facilities in the watershed reported any record of PFOA or PFOS use.

Class B Fire Suppression Foam Usage Survey - Fire Departments, Bulk Storage Facilities, Airports, DOD Facilities (Survey 2) (as of 1/16/19) (https://www.dec.ny.gov/docs/remediation_hudson_pdf/pfoasurvey2.pdf)

Facilities within the Watershed that responded PFOA and / or PFOS was employed at any time include:

- FDP0820 Knox Volunteer Fire Dept

Facilities within the Watershed that responded PFOA and / or PFOS was never employed at any time include:

- FDP1222 Pine Grove Fire Dept
- FDP0403 Duanesburg Fire Dept

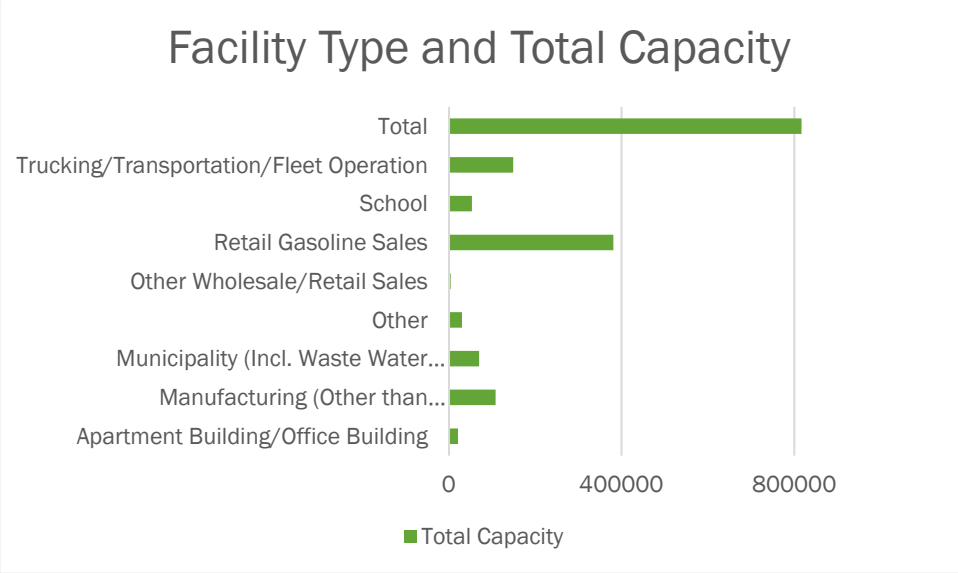
No response:

- FDP064 Guilderland Center Fire District Guilderland Center
- FDP0022 Altamont Volunteer Fire Dept
- FDP1655 Voorheesville Volunteer Fire Dept
- FDP1363 Rotterdam Fire District #2 (Schenectady)
- FDP0110 Berne Volunteer Fire Co
- FDP0382 Delanson Volunteer Fire Dept

Class B Fire Suppression Foam Usage Survey - New York State Fire Training Centers (Survey 3) (as of 1/16/19)

Facilities within the Watershed that responded PFOA and / or PFOS was never employed at any time include:

- FTR0079 Town of Guilderland

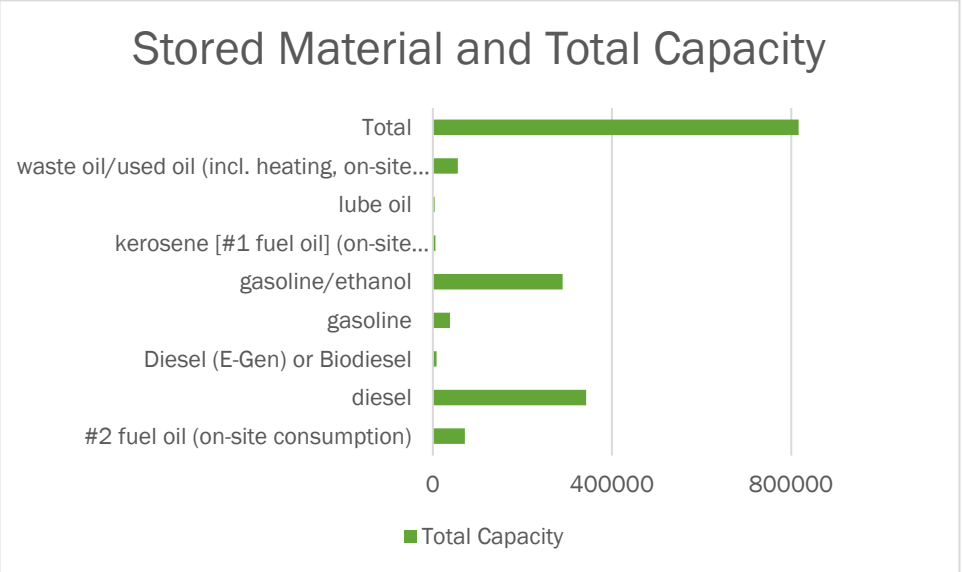


2.7 Permitted Facilities within in the Watershed

Petroleum Bulk Storage

Petroleum Bulk Storage facilities are those that store more than 1,100 gallons of petroleum in aboveground and underground storage tanks, or facilities with one or more underground storage tanks larger than 110 gallons.

Within the Watershed there are 147 registered chemical bulk storage tanks with total capacity of 816,735 gallons. These tanks are scattered throughout 47 discrete locations throughout the watershed. Many facilities, such as auto fueling stations, will have multiple tanks on site for different grades of gasoline and diesel fuel, the predominant material by volume stored.



There are no Major Oil Storage Facilities are within the Watershed.

Chemical Bulk Storage

Chemical Bulk Storage facilities are facilities that contain one or more hazardous substances in an aboveground storage tank larger than 185 gallons, any size underground storage tank, with some exceptions, or in a non-stationary tank used to store 1,000 kg or more for a period of 90 consecutive days or more. Hazardous substances are those that, if improperly stored, can pose a serious threat to human health and the environment. Chemical Bulk Storage facilities are regulated by and must be registered with the DEC's Division of Environmental Remediation and managed in compliance with applicable regulations for the storage and handling of hazardous substances.

There are 15 Chemical Bulk Storage sites within the watershed (six within Guilderland). Only two of these facilities are still active.

Active Chemical Bulk Storage Sites Within the Watershed				
Site Number	Facility Name	Locality	Site Address	Zip Code
4-000277	DUANESBURG/DELANSON WASTEWATER PLANT	DELANSON	1378 COLE ROAD	12053
4-000028	GUILDERLAND WATER TREATMENT PLANT	GUILDERLAND	2 VAN BUREN BLVD.	12009

Mines

Six mines (five sand and gravel and one shale mine) are located within the Watershed. The total area of the mines is 685 acres, with 164 acres actively permitted for extraction and 34 acres reclaimed.

Active Mines Within the Watershed										
Permittee	Status	Location	County	Town	Total Acres	Acres Permitted	Acres Reclaimed	Commodity	Reclamation Type	Subwatershed
Helderberg Excavating & Trucking Inc	Active	Stitt Road (Osborn side)	Albany	Guilderland	82.5	6.35	0	Sand and Gravel	Grass	Black Creek
J W Kendall LLC	Active	Becker Road near NYS RTE 158	Albany	Guilderland	30	12.6	0	Sand and Gravel	Grass	Bozen Kill
William M Larned & Sons Inc	Active	Rt. 158, one mile SW of the bridge over Watervliet Reservoir	Albany	Guilderland	208	104	31.2	Sand and Gravel	Grass	Hunger Kill-Normans Kill
William M Larned & Sons Inc	Active	90 Campbell Rd., Schenectady	Schenectady	Rotterdam	15.5	10.7	2	Sand and Gravel	IND	Indian House Creek-Normans Kill
Rowley, Scott & Brenda	Vacant	5539 Western Turnpike,	Schenectady	Duanesburg	318	4	0	Sand and Gravel	Other	Bonny Brook-Normans Kill

		Duanesburg, NY (US Route 20)								
William M Larned & Sons Inc	Active	Currybush Road, Rotterdam, Schenectady, NY,	Schenectady	Rotterdam	31	26.2	0.7	Shale	Grass	Bonny Brook-Normans Kill

Landfills

Two permitted active landfills are within the watershed. Both are permitted for land clearing debris. One is located in Guilderland, the other in Duanesburg.

SPDES Regulated Sites

There are five operations in the Watershed with SPDES coverage. They include the following operations

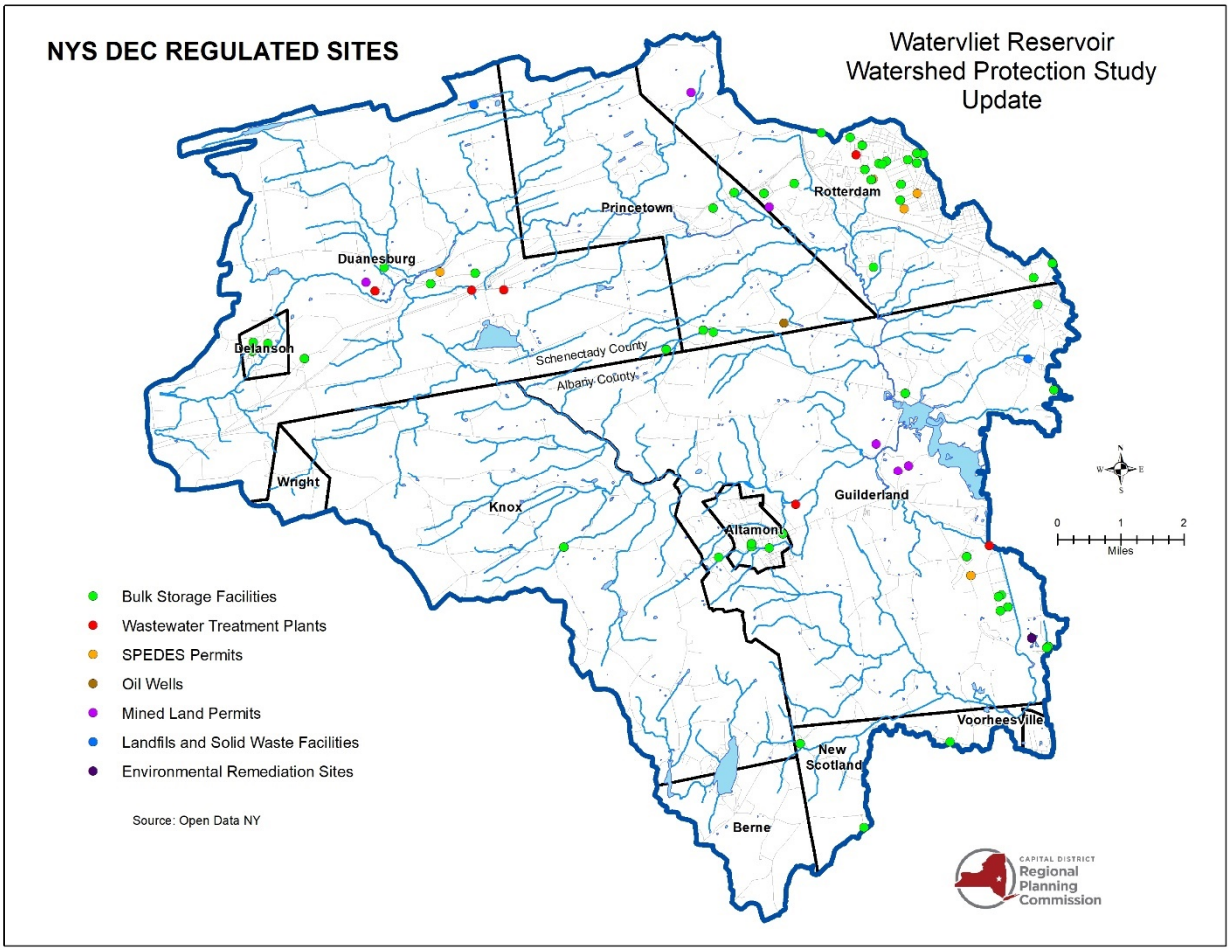
- LAND O LAKES PURINA ANIMAL NUTRITION LLC
- NEW DYNAMICS CORP
- FEDEX FREIGHT INC - ALB
- GOLUB CORPORATION
- ROTTERDAM USARC/AMSA 8
- MARIAVILLE MATERIALS LLC

Permitted Wastewater Facilities

Six facilities in the Watershed are permitted for wastewater discharges. Three are municipal operations, three are Industrial permitees:

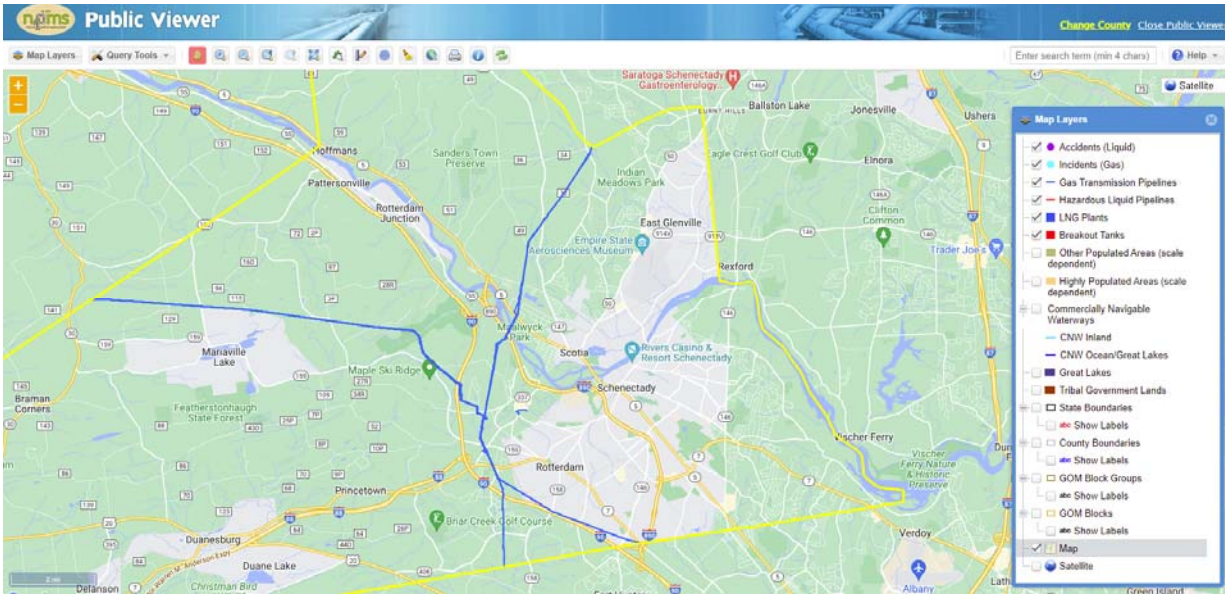
Permitted Wastewater Facilities Within the Watershed							
Plant Type	**SPDES Permit**	**Facility Name**	**Discharge Type**	**Avg. Mo. Flow Limit (MGD)**	**Street**	**City**	**Sub watershed Name**
Municipal	NY0031534	ALTAMONT - V STP (WWTP)	Surface	0.42	GUN CLUB RD	ALTAMONT	Bozen Kill
Municipal	NY0022217	PARK GUILDERLAND - NORTHEAST INDUSTRIAL PARK	Surface	0.36	N EASTERN IND PK	GUILDERLAND CENTER	Black Creek
Municipal	NY0261271	DUANESBURG SEWER DIST 1 STP	Surface	0.1	US RTE 20 - S SIDE - BEHIND TOWN HALL	DUANESBURG	Bonny Brook-Normans Kill
Industrial	NY0123561	PEDE BROS ITALIAN SPECIALTY FOODS	Ground	0.0034	DUANESBURG RD	SCHENECTADY	Indian House Creek-Normans Kill
Industrial	NY0242659	DUANESBURG DOT RT 7	Surface	0.0002	RTE 7	DUANESBURG	Bonny Brook-

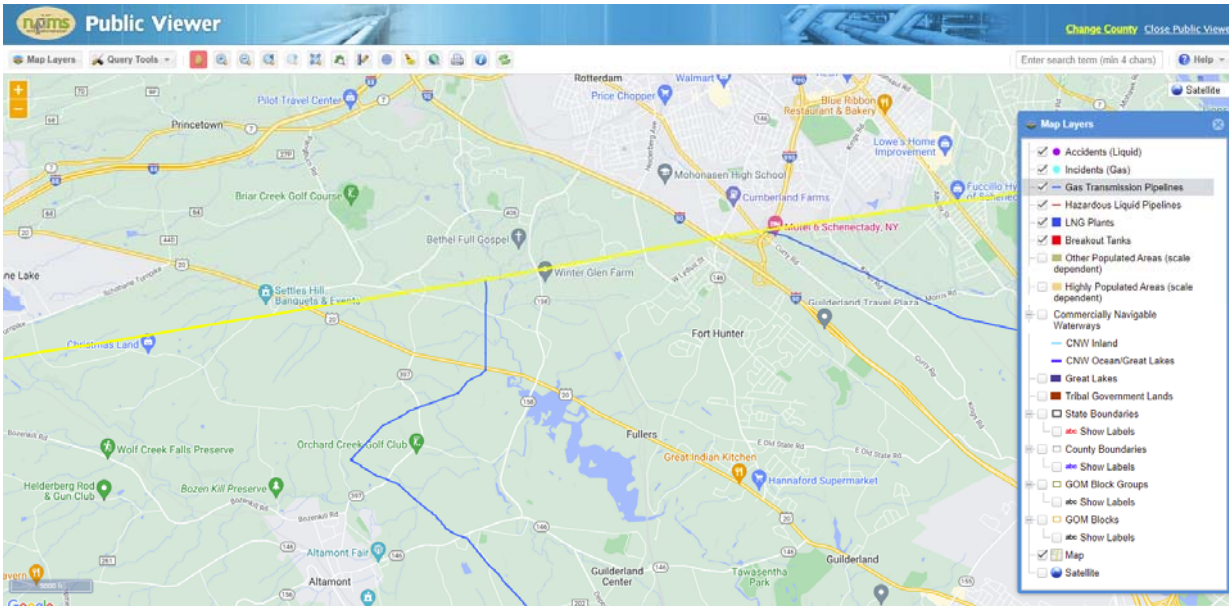
							Normans Kill
Industrial	NY0268275	DUNCO INC MIKEY MART II	Surface	0	6030 DUANESBURG RD|ST RTE 7	DUANESBURG	Bonny Brook-Normans Kill



Underground Chemical and Gas Transmission Facilities

An underground natural gas pipeline bisects the watershed, crossing through each of the sub watersheds of the Reservoir.





2.7.1 Septic Systems

Albany County Department of Health requires, upon the application of a permit to construct a system. That two copies of the proposed layout be sent to the appropriate Building Department.

The Standards are as follows

"ALBANY COUNTY DEPARTMENT OF HEALTH ADDENDUM TO NEW YORK STATE DEPARTMENT OF HEALTH APPENDIX 75-A APPENDIX 75-A SETS FORTH ON-SITE WASTEWATER TREATMENT SYSTEM STANDARDS FOR INDIVIDUAL HOUSEHOLD SEWAGE DISPOSAL SYSTEMS IN ALBANY COUNTY, EXCEPT FOR THE FOLLOWING SPECIFIC ITEMS, WHERE A MORE STRINGENT STANDARD IS REQUIRED BY THE ALBANY COUNTY DEPARTMENT OF HEALTH.

1. The minimum design flow for new construction shall be 130 gallons per day per bedroom.

2. Slopes greater than 10% are unacceptable for the installation of conventional and alternative wastewater treatment systems.

3. There must be at least six (6) feet of soil cover over any subsurface rock layer, except where a two (2) foot layer of impervious soils exists and a special design is required.

4. A minimum horizontal separation distance of 100 feet shall be maintained between wastewater treatment systems and open and fractured bedrock.

5. Prefabricated fiberglass or plastic distribution boxes, corrugated plastic pipe, and steel, fiberglass, polyethylene and aerobic septic tanks shall not be used unless approved, in writing, by this Department.

6. Serial distribution and drop manholes shall not be used.

7. Ends of absorption field distribution lines should be capped or plugged.

8. The use of mounds, intermittent sand filters, evapotranspiration and evapotranspiration/absorption systems will be considered only on a limited experimental basis or for replacement systems on difficult sites. Engineering plan design; site/soil evaluation; supervision and certification of construction; and performance monitoring will be required for each system for which approval is requested."

We recommend the County Department of Health Update these regulations to ensure their consistency with recommended watershed rules and regulations proposed elsewhere in this report. Specifically, we recommend adding:

"1. On-site Disposal Systems:

a. No human excreta or sewage shall be deposited or allowed to escape into any reservoir or primary or secondary watercourse on the watershed.

b. All wastewater treatment works discharging to groundwater and receiving wastewater without the admixture of industrial or other wastes, as those terms are defined in Environmental Conservation Law, Section 17-0701, in quantities of less than 1,000 gallons per day shall be designed, installed and maintained in accordance with the sanitary code and standard as established in 10 NYCRR Part 75 (Appendix 75A) and any wastewater disposal standards promulgated by the Albany or Schenectady County Health Departments where such standards are more stringent.

c. A permit is required prior to the installation of any subsurface disposal system. This permit must be obtained from the County Health Department or from the Town or Village office having local jurisdiction. Conditions for a permit shall include an approved engineering plan, verification of the percolation rate by a disinterested party and inspection of the installation prior to backfilling. Permits are renewable on a five-year basis. All septic tanks shall be pumped clean every five years or more often if conditions warrant.

d. The applicable standards and permit requirements of the NYS Department of Environmental Conservation shall apply to systems with flows in excess of 1,000 gallons per day or those which contain industrial wastewater.

e. No portion of the seepage unit shall be constructed, placed or rebuilt within 50 feet linear distance of a lake, reservoir, impoundment, stream or their tributary watercourses."

For systems within 200 feet of any watercourse tributary to the reservoir we recommend adding to county Septic System regulations

"A permit is required prior to the installation of any subsurface disposal system. This permit must be obtained from the County Health Department or from the Town or Village office having local jurisdiction. Conditions for a permit shall include an approved engineering plan, verification of the percolation rate by a disinterested party and inspection of the installation prior to backfilling. Permits are renewable on a five-year basis. All septic tanks shall be pumped clean every five years or more often if conditions warrant."

Neither the Albany County or the Schenectady County Department of Health maintain a database of septic systems, nor are they geocoded to provide a geographic location of the systems. Attributes like age of the system and its maintenance history are also not available. This data gap represents a significant challenge to assess the potential impact of septic systems on local waterbodies and drinking water supplies.

Section 201 of The NYS Public Health Law establishes wastewater treatment system standards for septic systems. Table 2 of the law provides setback requirements:

TABLE 2
SEPARATION DISTANCES FROM WASTEWATER SYSTEM COMPONENTS
(IN FEET)

System Components	Well or Suction Line (e)(g)	To Stream, Lake, watercourse (b), or Wetland	Dwelling	Property Line
House sewer (watertight joints)	25 if cast iron sewer pipe, 50 otherwise	25	3	10
Septic tank or watertight ETU	50	50	10	10
Effluent line to distribution box	50	50	10	10
Distribution box	100	100	20	10
Absorption field (c)(d)	100 (a)	100	20	10
Seepage pit(d)	150 (a)	100	20	10
Raised or Mound system (c)(d)	100 (a)	100	20	10
Intermittent Sand Filter (d)	100 (a)(f)	100 (f)	20	10
Non-Waterborne Systems with offsite residual disposal	50	50	20	10
Non-Waterborne Systems with onsite discharge	100	50	20	10

NOTES:

(a) When wastewater treatment systems are located upgrade and in the direct path of surface water drainage to a well, the closest part of the treatment system shall be at least 200 feet away from the well.

(b) Mean high water mark.

(c) For all systems involving the placement of fill material, separation distances are measured from the toe of the slope of the fill.

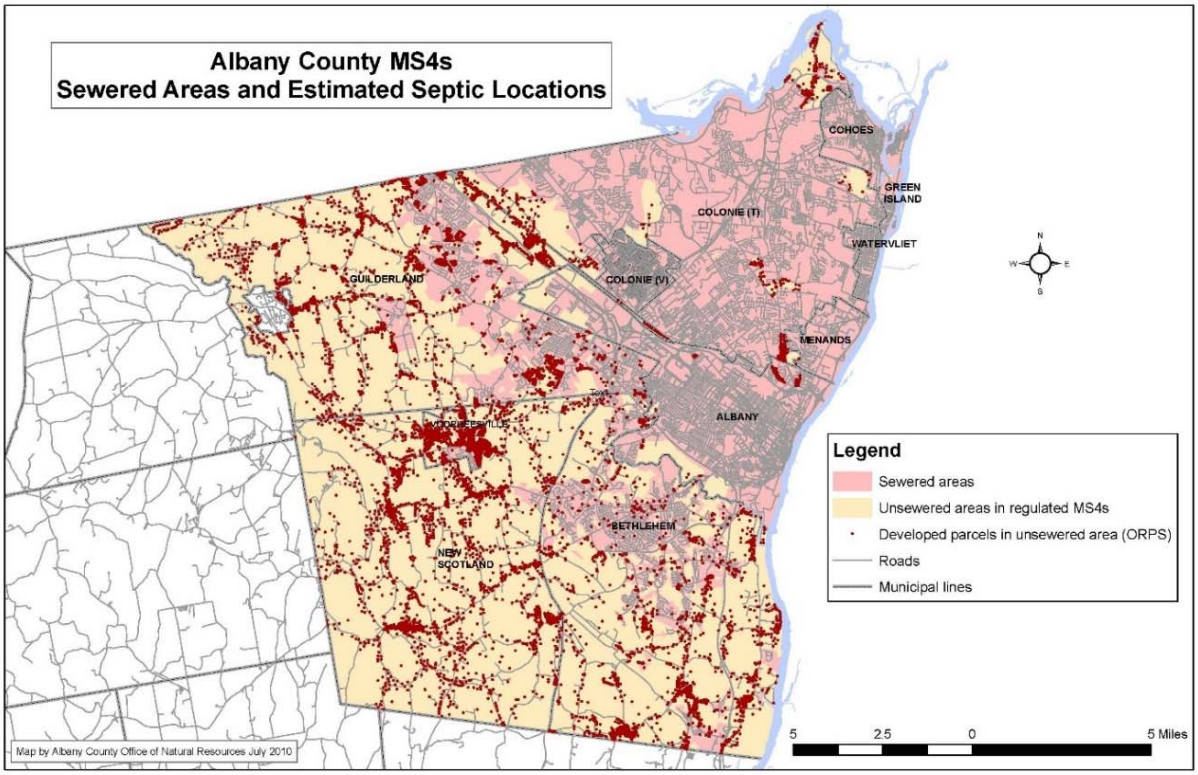
(d) Separation distances shall also be measured from the edge of the designated additional usable area as described in Section 75-A.4 (a)(5).

(e) The closest part of the wastewater treatment system shall be located at least 10 feet from any water service line (e.g. public water supply main, public water service line or residential well water service line).

(f) When sand filters are designed to be watertight and collect all effluent, the separation distance can be reduced to 50 feet.

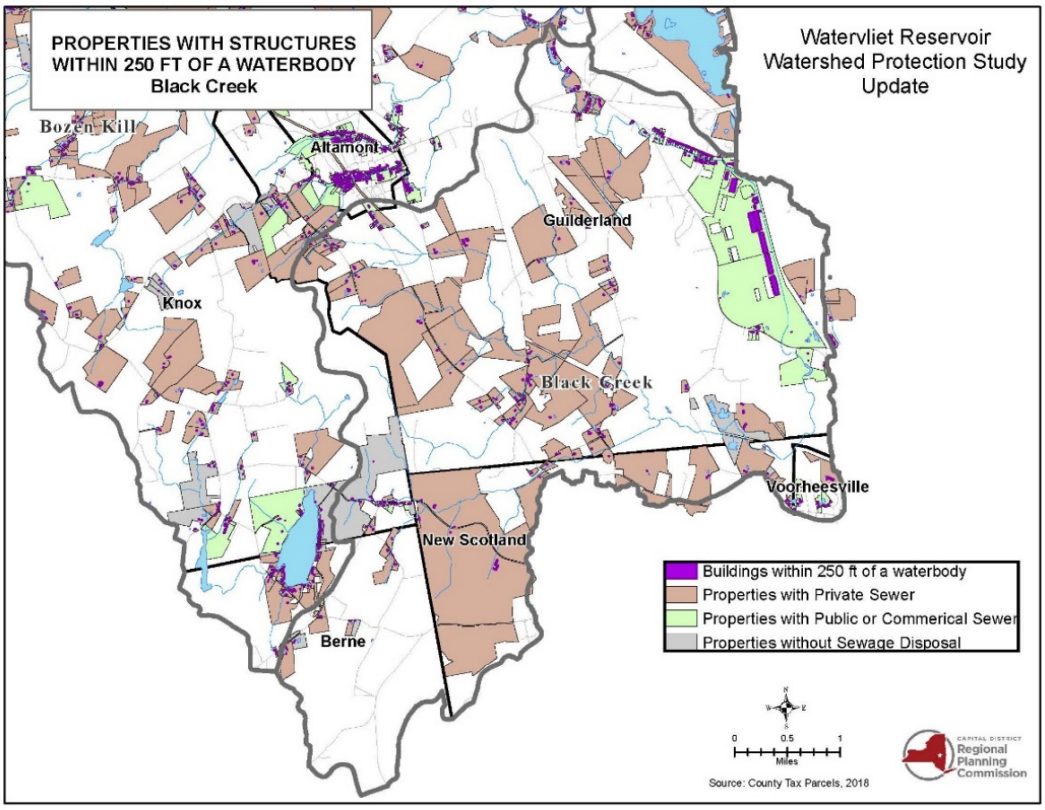
(g) The listed water well separation distances from contaminant sources shall be increased by 50% whenever aquifer water enters the water well at less than 50-feet below grade. If a 50% increase cannot be achieved, then the greatest possible increase in separation distance shall be provided with such additional measures as needed to prevent contamination.

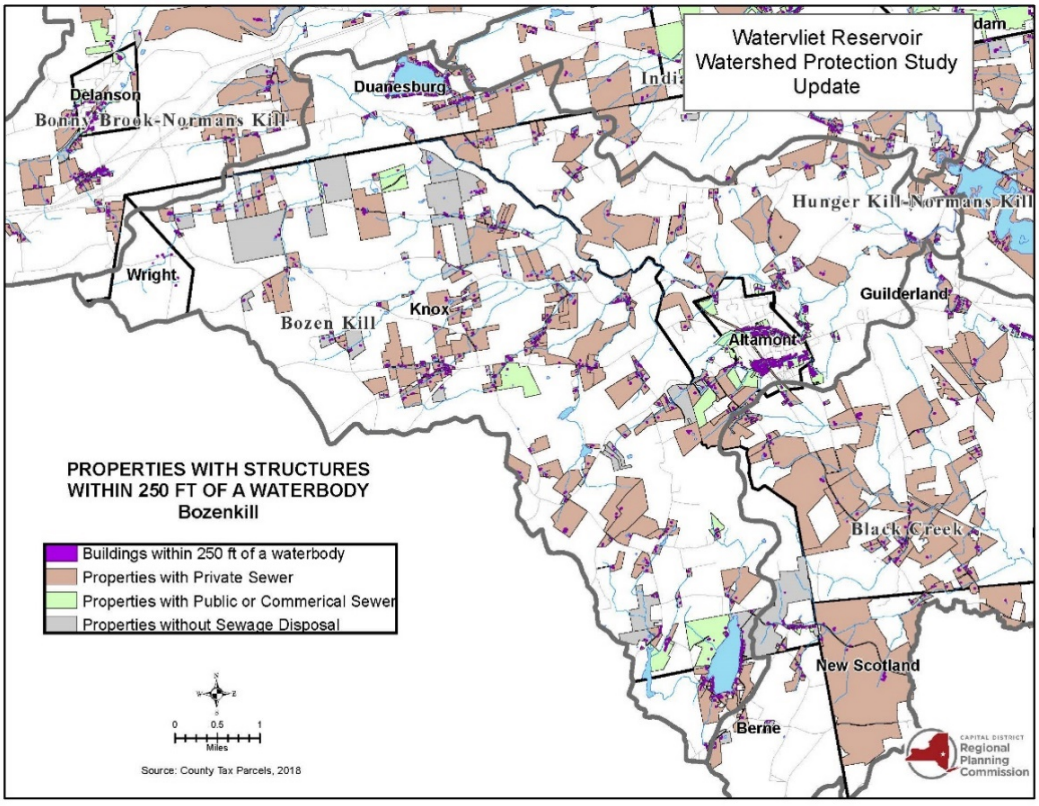
In 2010, the Stormwater Coalition of Albany County developed a map to illustrate potential locations of septic systems within the boundaries of MS4 regulated communities in the County. To develop the map all final shapefiles showing areas of sewered and unsewered areas of the MS4s were delineated using 2010 parcel boundaries from Albany County Real Property Tax Services. To estimate the number and general location of septic systems in the unsewered areas of regulated MS4 communities ONR clipped the NYS ORPS 2009 point data to the unsewered area and selected out property tax codes that indicate developed land. It was inferred that developed land, as categorized, most likely has a septic system. Based on this methodology, as of July 2010, there were an estimated 7543 septic systems located within the regulated Phase II municipalities of Albany County.

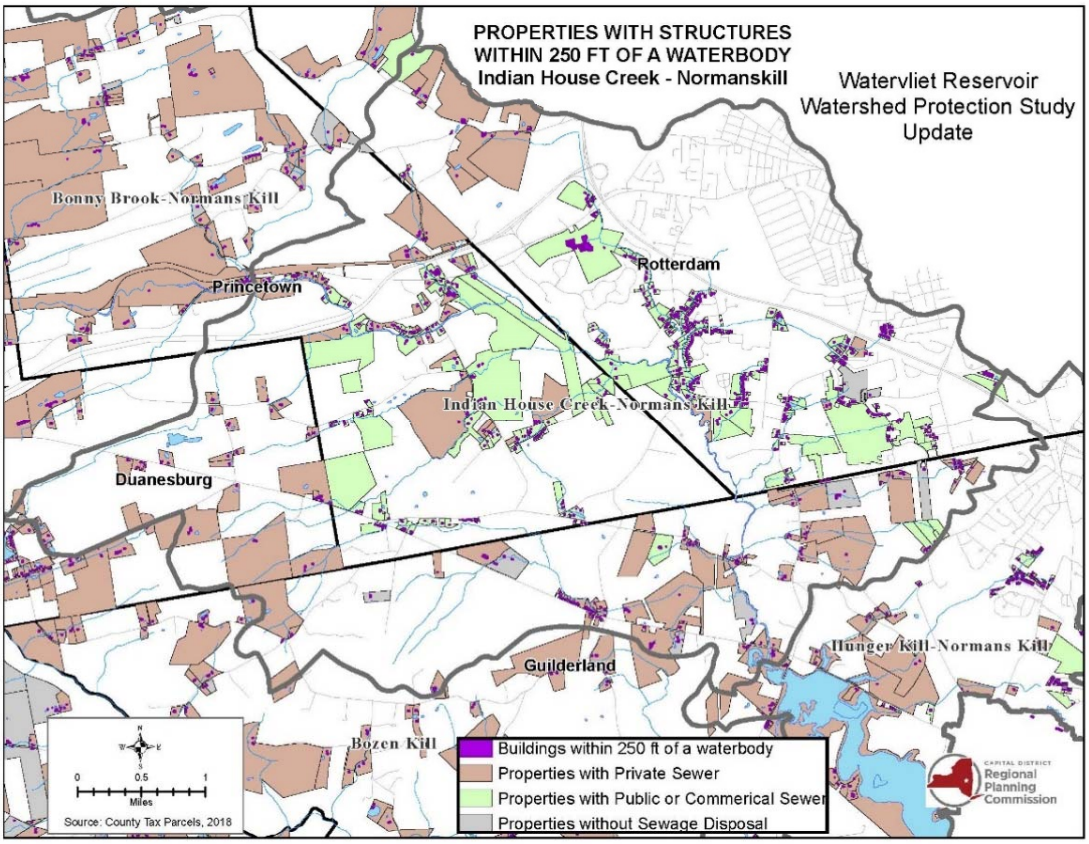


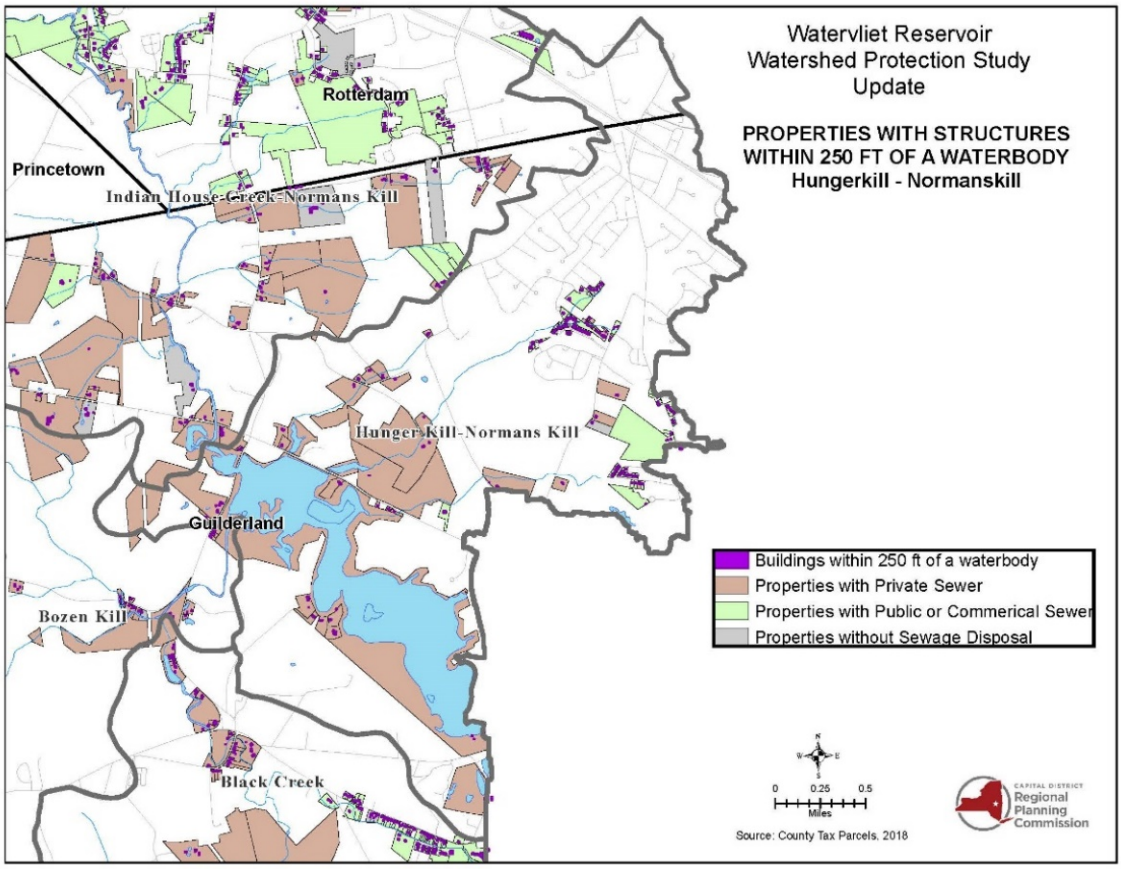
To develop a defensible estimate of the scale and location of current septic systems within the whole of the watershed CDRPC obtained 2018 year property data, the latest available, for all parcels withing the watershed. The database for likely septic locations within the Watervliet Reservoir is included as Appendix E. All parcels with public sewer were excluded from the parcel data. For the remaining parcels, labeled as "private or none" in the attribute table, land cover analysis determined which parcels were developed and had a structure within 250 ft. of a waterbody. This methodology for mapping systems with a higher likelihood of impact on surface water assumed that the further away septic systems were from homes, the more costly these systems would be to install, and that at 200 feet of separation from a structure the cost would be burdensome enough to discourage a property owner from considering such a remote installation. Thus, 250 feet was used as a conservative estimate for the maximum buffer between a structure and a waterbody where a system could be located (conservative to include more systems). These parcels were mapped for each of the Reservoir's four primary watersheds to illustrate systems that, if failing or non-performing, could have an impact on an adjacent water body tributary to the drinking water supply. From this data, an attribute table was developed with addresses of each parcel. This attribute table may be used to contact septic system owners in educate them about maintaining their systems and to provide resources for them should they need to make repairs or install new systems. The final data set indicates

that within the watershed there are an estimated 1,254 non-publicly sewered parcels where a structure is located within 250-feet of a waterbody. The property dataset also yielded kitchen and bathroom counts. Subwatershed maps of these structures are provided here.






PROPERTIES WITH STRUCTURES
WITHIN 250 FT OF A WATERBODY
Indian House Creek - Normanskill
Watervliet Reservoir
Watershed Protection Study
Update
Bonny Brook-Normans Kill
Princetown
Rotterdam
Indian House Creek-Normans Kill
Duanesburg
Guilderland
Hunger Kill-Normans Kill
Bozen Kill
Buildings within 250 ft of a waterbody
Properties with Private Sewer
Properties with Public or Commerical Sewer
Properties without Sewage Disposal
0 0.5 1
Miles
Source: County Tax Parcels, 2018
Regional Planning Commission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Rotterdam
Princetown
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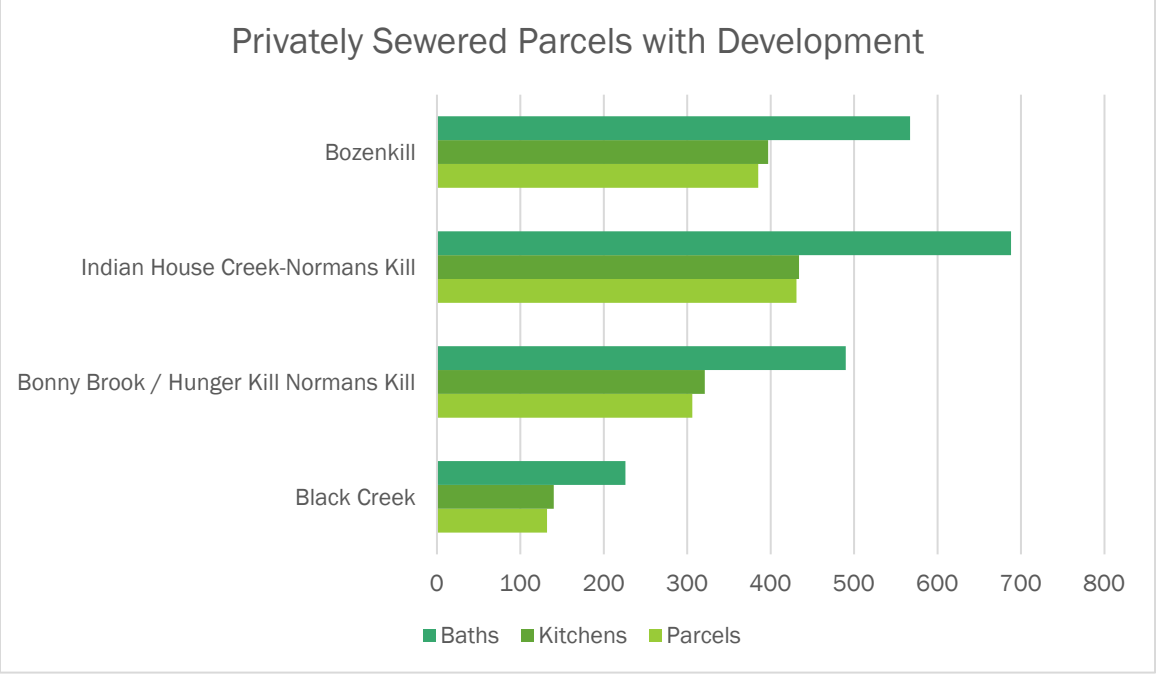
Hunger Kill-Normans Kill
Guilderland
Bozen Kill
Black Creek
Buildings within 250 ft of a waterbody
Properties with Private Sewer
Properties with Public or Commerical Sewer
Properties without Sewage Disposal
0 0.25 0.5
Miles
Source: County Tax Parcels, 2018
Regional Planning Commission



2.8 Sub-watersheds of the Reservoir

The 115-mile Watervliet Reservoir Watershed is comprised of four sub-watersheds, the Bozen Kill Watershed, the Normanskill/Indian House Creek Watershed, the Bonny Brook Normanskill Watershed, and the Black Creek Watershed.

CDRPC created a series of thematic maps for each of the four subwatershed areas. Each map set includes the following maps:

- Agriculture
- Flood Plains
- Impervious Cover
- Land Cover
- Land Cover Change
- Land Use
- NYSDEC Regulated Sites
- Soil Permeability
- Steep Slopes
- Urban Change
- Wetlands
- Year Built 2002-2018
- Likely Septic system locations and water districts

The Potential Contaminant Source Inventories of each of the subwatersheds is included in this report as Appendix S.

2.8.1 The Bozen Kill

The 36.3 sq mile Bozen Kill watershed is the largest sub watershed of the Reservoir by area. Portions of Guilderland, Altamont, Knox, Berne, Duanesburg, and Wright are within the Bozen Kill Watershed. The Bozen Kill and its minor tributaries are classified as Class C waters. Wright, in Schoharie County, and Berne, Albany County, are the greatest distance from the reservoir, more than 10 miles upstream on the Bozen Kill.

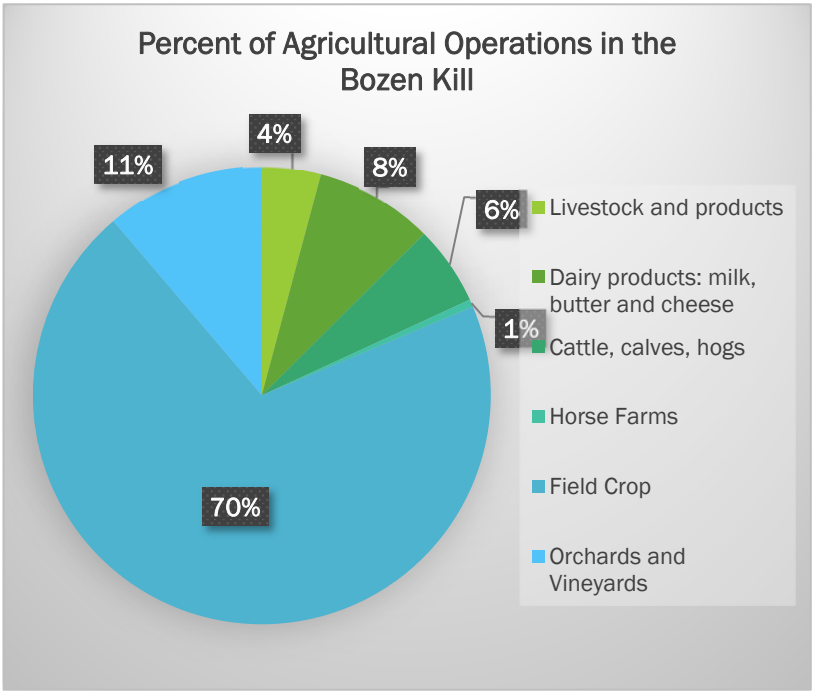
A biological (macroinvertebrate) assessment of Bozen Kill in Altamont (at Route 158) was conducted in 1997. Sampling results indicated slightly impacted water quality conditions. These impacts were identified as likely the result of municipal discharges from the Village of Altamont Wastewater Treatment Plant. Previous operational problems and ammonia violations led to plant upgrading in 1990. Subsequent biological macroinvertebrate) sampling in 1993 revealed an enriched stream, but one that was assessed as only slightly impacted. This assessment represented a significant improvement in water quality since the plant upgrade.

The NYSDEC designated the Bozen Kill as stressed Water Quality Assessment yielded the presence of nutrients, specifically phosphorus, as a known pollutant. Dissolved oxygen levels and ammonia were identified as potential pollutants. The assessment identified the Village of Altamont Wastewater Treatment Plant as a potential source.

The City of Watervliet collects and evaluates water quality samples from two locations on the Bozen Kill at Rte. 397 and further downstream, past the Village WWTP.

At Rte. 397 The Bozen Kill the following stresses have been documented:

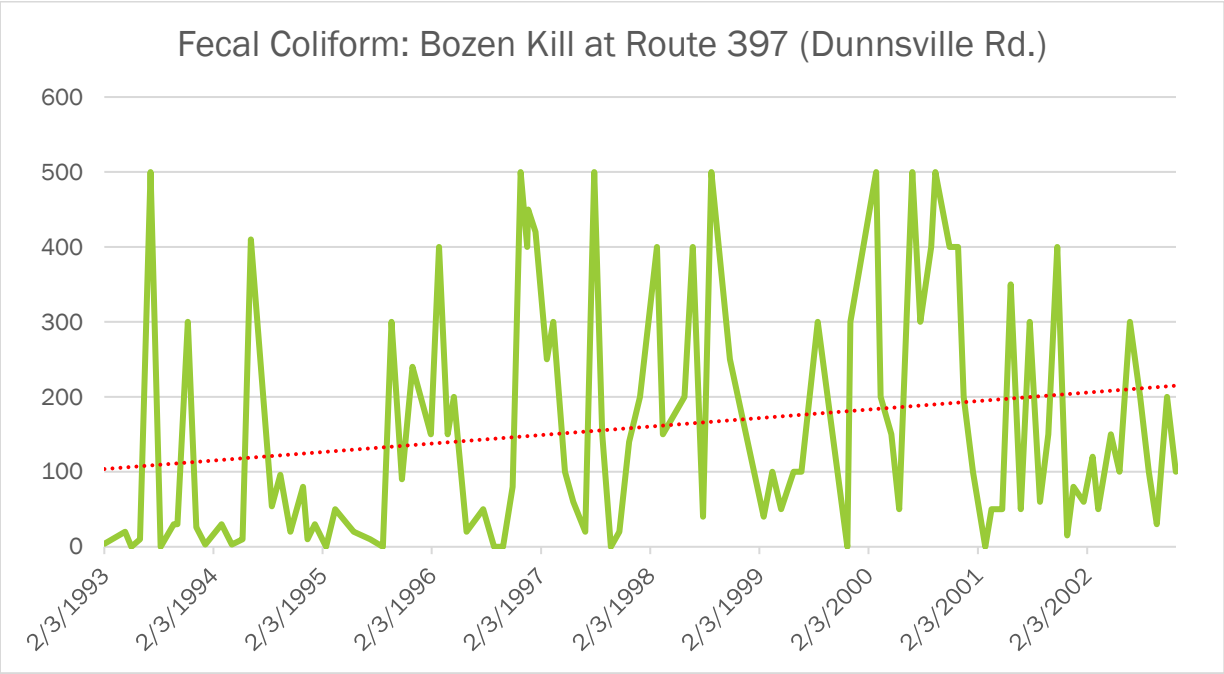
- **Dissolved Oxygen** levels have remained steady between 11 mg/l and 12 mg/l, which, while high, will sustain a healthy diversity of plants and animals in the water, and
- **pH** has risen slightly from at just under 7.5 to 8. The normal, healthy range of pH for supporting aquatic life is between 5 and 7.
- **Fecal Coliform** levels had steadily risen from 1993 to 2002 when sampling ceased for this organism. Levels were trending to more than 200 colonies per sample.

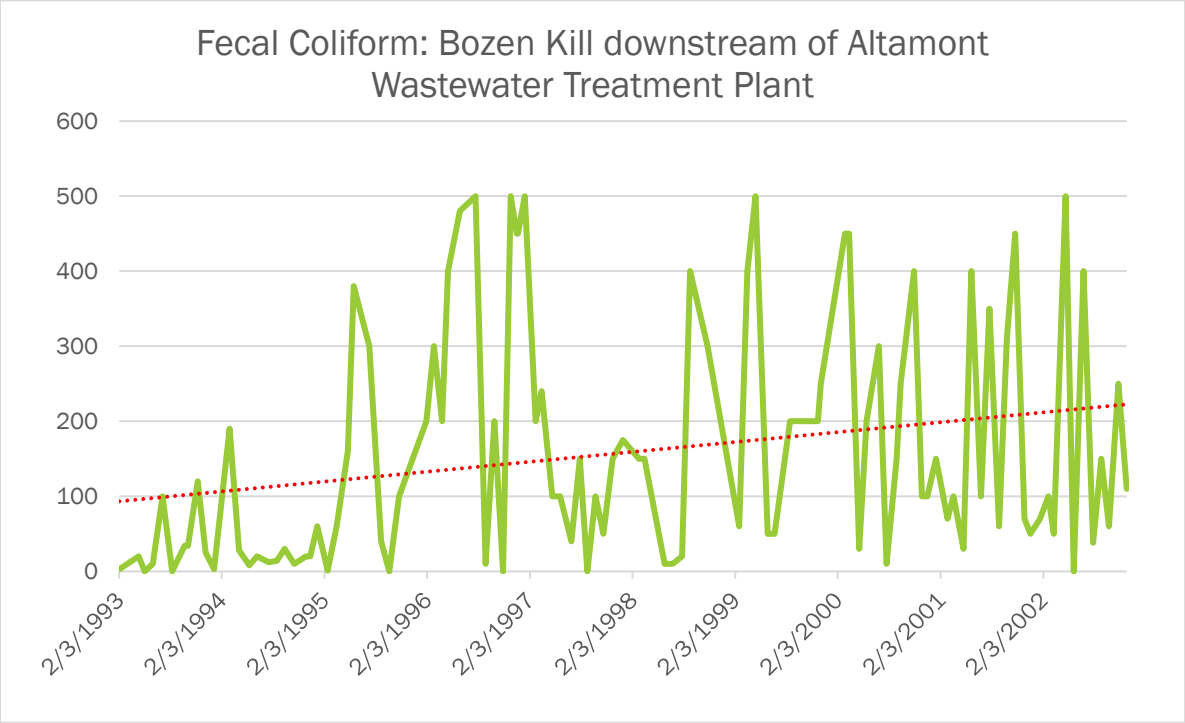


Downstream of the WWTP the following factors of concern have been documented:

- **Dissolved Oxygen** levels have steadily increased from 11 mg/l to 12 mg/l, which, while high, will sustain a healthy diversity of plants and animals in the water.

- **pH** has risen slightly from slightly 7.5 to 8. The normal, healthy range of pH for supporting aquatic life is between 5 and 7.
- **Fecal coliform** average, non-geomean levels had increased sharply between 1987 and 2002, when testing for fecal coliform was discontinued, rising from 100 colonies /100mL to more than 200 colonies /100mL.





Agricultural Operations within the Bozenkill Watershed

Agricultural Operation	Total Acreage	Percent of Agricultural Operation in the Bozen Kill
Livestock and products	120.10	4.17%
Dairy products: milk, butter and cheese	241.14	8.37%
Cattle, calves, hogs	161.50	5.61%
Horse Farms	15.20	0.53%
Field Crop	2019.17	70.09%
Orchards and Vineyards	323.67	11.24%
Total	**2880.78**	100.00%

Field crop acreage dominates the active agricultural operations within the Bozen Kill Watershed covering more than 70% of active ag operations with nearly 2,020 acres. The Bozen Kill watershed has more than 35% of the total active agricultural operations by acreage in the entire Watervliet Reservoir watershed area. The Bozen Kill also has a large share of orchard and vineyard operations by acreage within the subwatershed and by percent of active acreage in the watershed at 11.24% and 5.6%, respectively. Dairy and milk product production rounds out the top three at 8.37% of the sub watershed and 4.15% of the total watershed's active agricultural operations by acreage.

Subwatershed maps for the Bozen Kill are provided as Appendix F of this report.

2.8.2 The Normanskill Indian House Creek / Hunger Kill Sub Watershed

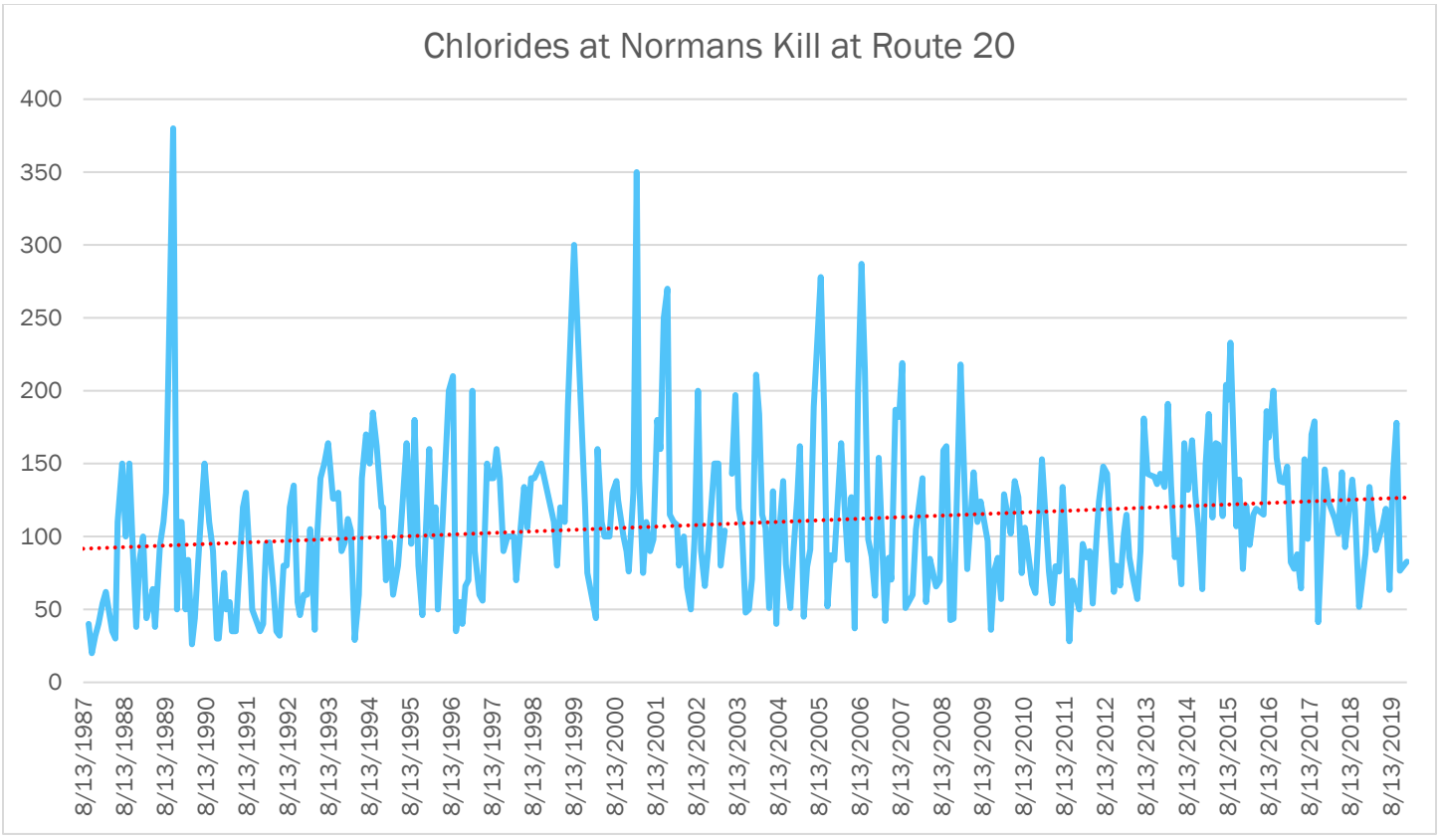
The Normanskill Indian House Creek / Hunger Kill subwatershed is 23.2 sq miles. Portions of Guilderland, Duanesburg, Rotterdam and Princetown are within this subwatershed. The Normanskill/Indian House Creek and its minor tributaries are classified as Class A waters.

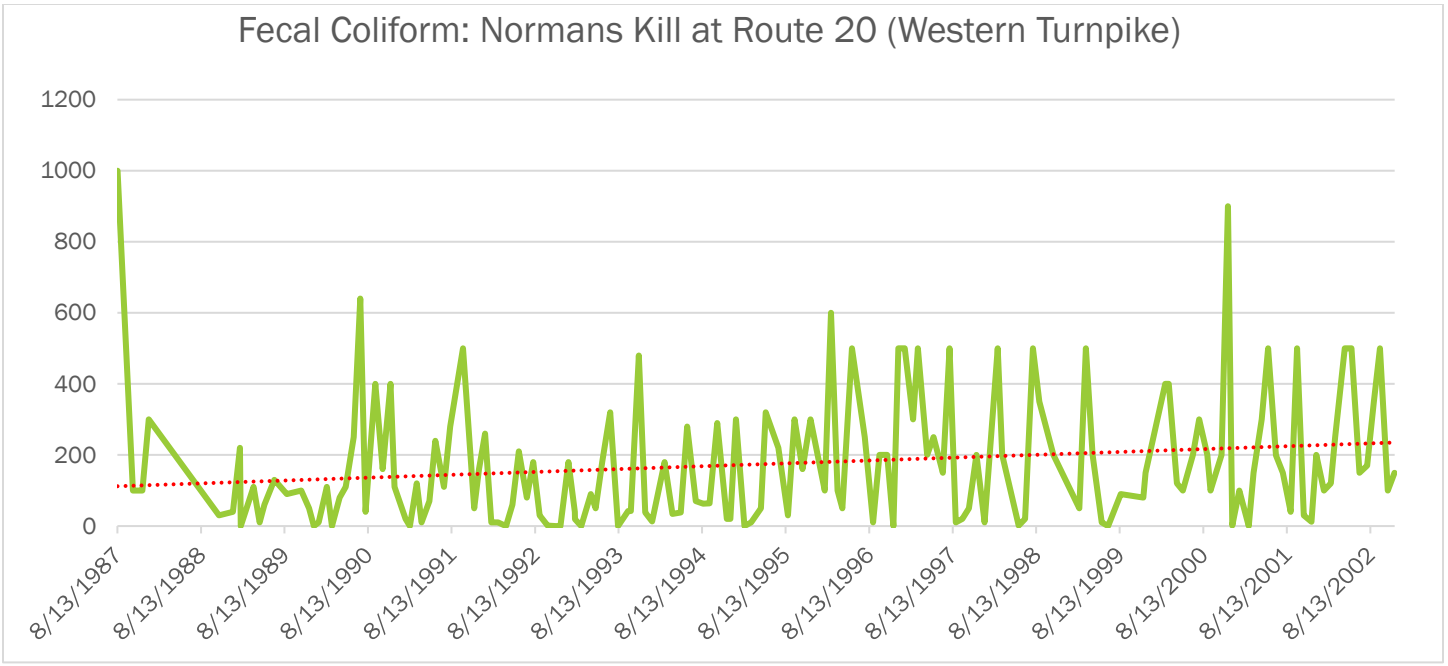
The NYSDEC designated the Normanskill as Fully Supported for fishing, primary, and secondary contact recreations, albeit dissolved oxygen, nitrates and pH were identified as pollutants. As a source for the water supply the DEC designated the Normanskill as Stressed for the presence of chlorides.

The City of Watervliet collects and evaluates water quality by collecting water samples of the Normanskill at State Route 20.

Chlorides at the Normanskill Rte. 20 sampling site have risen sharply from 100ppm levels in 1987 to a roughly 125ppm average in 2019. Chloride concentrations of between 1 and 100 ppm (parts per million) are normal in freshwater. This could be an indication that road salt application is impacting the stream.

- **pH** has held steady, at just under 8 on average,
- **Chlorides** have risen steadily from 100ppm levels in 1987 to a roughly 125ppm average in 2019,
- **Fecal coliform** levels have risen slowly but steadily since 1987. Sampling ended in 2002 when average levels (not a geomean) was slightly above 200 colonies per 100/mL with seasonal spikes in warmer months,
- **Total Phosphate** has remained stable, and high, at roughly .4 ppm, and
- Turbidity has increased sharply from 1987, from roughly 1 to slightly above 5 NTU.


Chlorides at Normans Kill at Route 20
400
350
300
250
200
150
100
50
0
8/13/1987
8/13/1988
8/13/1989
8/13/1990
8/13/1991
8/13/1992
8/13/1993
8/13/1994
8/13/1995
8/13/1996
8/13/1997
8/13/1998
8/13/1999
8/13/2000
8/13/2001
8/13/2002
8/13/2003
8/13/2004
8/13/2005
8/13/2006
8/13/2007
8/13/2008
8/13/2009
8/13/2010
8/13/2011
8/13/2012
8/13/2013
8/13/2014
8/13/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019


Fecal Coliform: Normans Kill at Route 20 (Western Turnpike)
1200
1000
800
600
400
200
0
8/13/1987
8/13/1988
8/13/1989
8/13/1990
8/13/1991
8/13/1992
8/13/1993
8/13/1994
8/13/1995
8/13/1996
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8/13/1999
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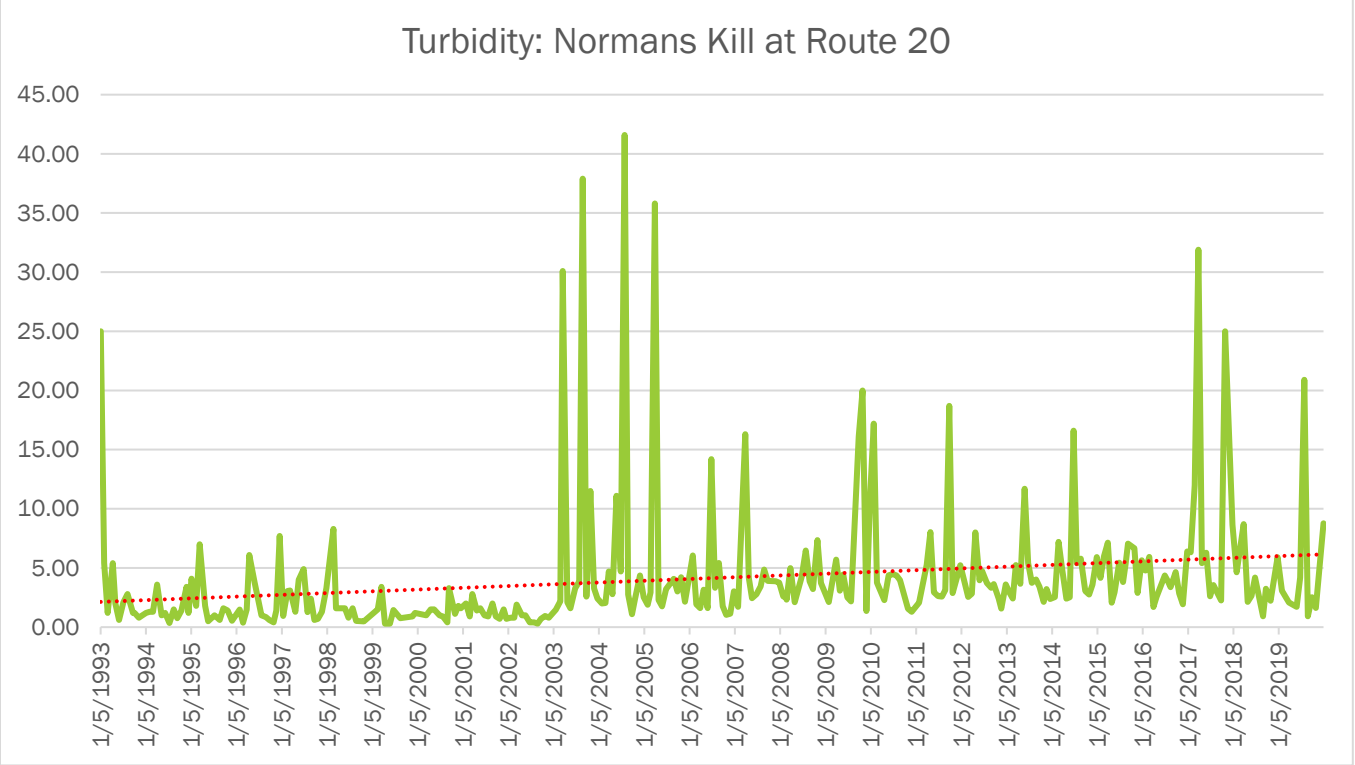
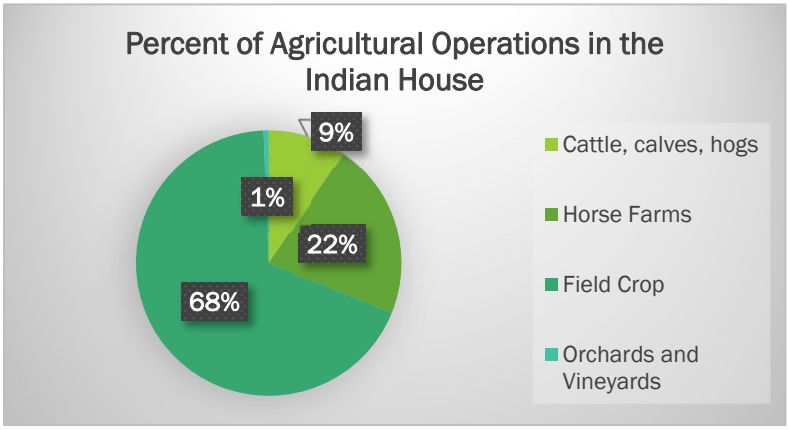
8/13/2001
8/13/2002



Field crops dominate the acreage of active agricultural land use within the Normans Kill / Indian House Creek Watershed at nearly 70%. By the Watervliet Watershed, however, field crops make up 6.7% of the active acreage, ranking fourth in percent of active acreage. Horse farms make up 21.62% of the acreage on the watershed and 2% of active agricultural acreage in the total Watervliet reservoir watershed. This watershed has the most acreage of horse farms of any of the subwatersheds with nearly 120 acres. Finally, cattle, calves and hog farm operations make up nearly 10% of the acreage in the watershed and 1% of the acreage Watervliet reservoir-wide at 51 acres.

Percent of Agricultural Operation in the Normans Kill / Indian House Creek Watershed		
Agricultural Operation	**Total Acreage**	**Percent of Agricultural Operation in the Indian House**
Cattle, calves, hogs	51	9.48%
Horse Farms	117	21.62%
Field Crop	370	68.28%
Orchards and Vineyards	3	0.63%
Total	**542.38**	**1.00**



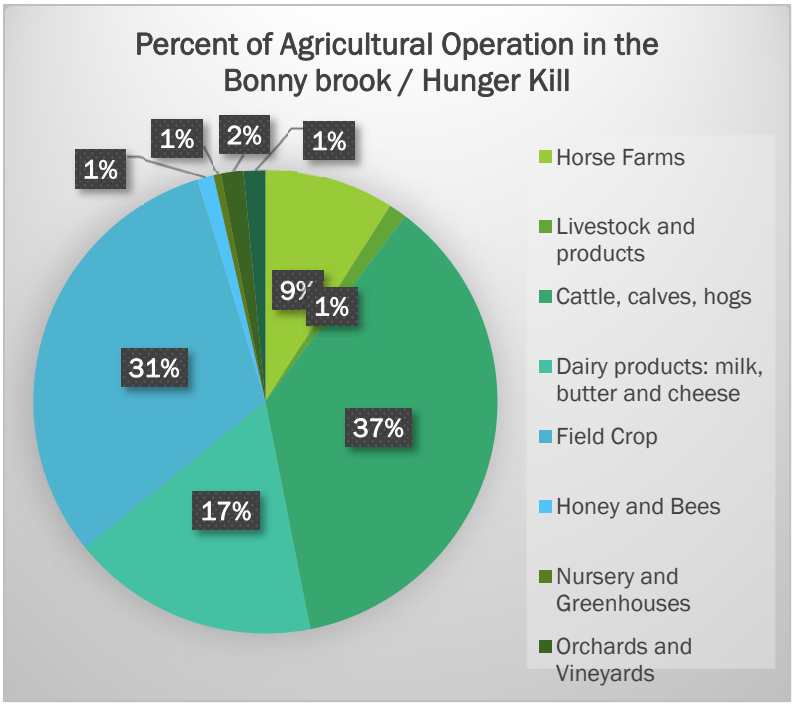
Sub watershed maps for the Normanskill Indian House Creek Hunger Kill Subwatershed are provided as Appendix G of this report.

2.8.3 Normanskill Bonny Brook Sub Watershed

The Normans Kill Bonny Brook Watershed is 31.8 sq miles. portions of Duanesburg,

Delanson, Princetown, Rotterdam, Wright and Knox are within this watershed. It is the least developed, urbanized sub watersheds of the four major sub watersheds. The Bonny Brook-Normanskill Watershed are classified as Class A waters. Delanson and Wright are at the furthest reaches of the watershed, more than

10 miles upstream of the Normanskill.



The City of Watervliet collects and evaluates water quality by collecting water samples of the Normanskill at State Route 20, thus it is not possible to determine what impacts are present within this watershed versus those present within the Normanskill/Indian House Creek. To better determine the impacts within this watershed, versus those of the Normanskill/Indian House Creek, CDRPC recommends the City add a sampling site at Pangburn Rd. in Duanesburg.

Duane Lake is tributary to the Upper Normanskill/Indian House Creek Watershed. The lake is surrounded by private property with no public access. The average annual year-long population within the area around the lake is roughly 325 people. The residences around the lake are not connected to public sewers. In 2010 the lake was added the NYS303d list for phosphorus. The lake has also suffered from harmful algae blooms in recent years. The presence of high levels of phosphorus is indicative of failing septic systems. When there are too many nutrients – nitrogen and phosphorus - in surface water, they act as a fertilizer for fast-growing bacteria and algae.

The predominant percentage of active agricultural land use within the watershed is cattle, calves, hog operations with 36.61% of the acreage, 6% of the acreage of active agricultural operations within the total watershed of the reservoir. Field crops occupy 6.37% of the total reservoir's watershed's active ag operations, followed by dairy product production.

Sub watershed maps for the Normans Kill Bonny Brook Sub watershed are provided as Appendix H of this report.

Agricultural Operation	Total Acreage	Percent of Agricultural Operation in the Bonny brook / Hunger Kill
Horse Farms	86.00	9.04%
Livestock and products	11.93	1.25%
Cattle, calves, hogs	348.38	36.61%
Dairy products: milk, butter and cheese	164.09	17.24%
Field Crop	296.16	31.12%
Honey and Bees	10.79	1.13%
Nursery and Greenhouses	4.95	0.52%
Orchards and Vineyards	14.86	1.56%
Other fruits	14.43	1.52%

2.8.4 The Black Creek

The Black Creek watershed is 20.5 sq miles. Portions of Guilderland, New Scotland, Voorheesville, Knox, Berne, Altamont are within this watershed. Berne is the furthest from the reservoir at more than 10 miles upstream. The Black Creek and its minor tributaries are classified as Class C waters.

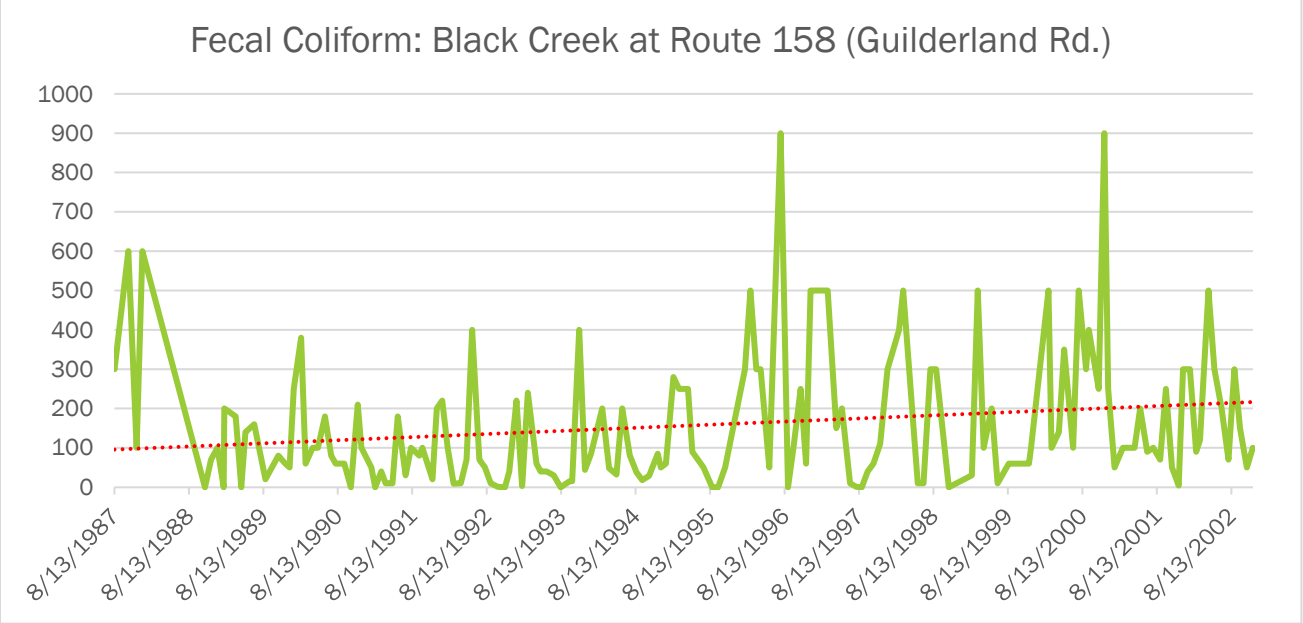
The NYSDEC designated the Black Creek as Impaired for dissolved oxygen.

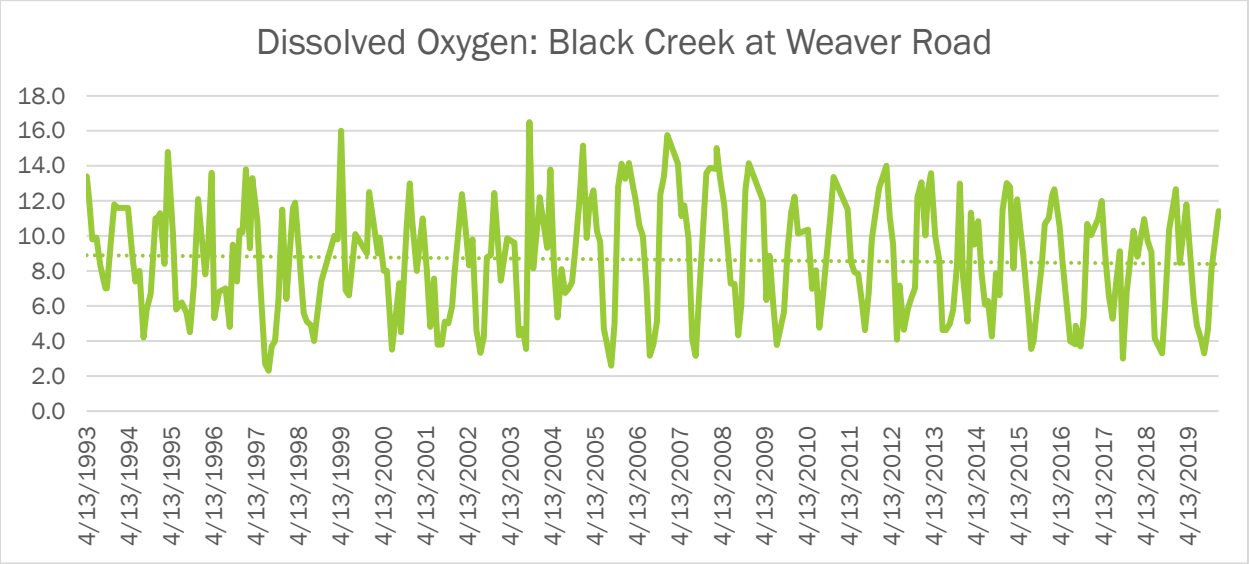
The City of Watervliet collects and evaluates water quality by collecting water samples of the Black Creek at two locations, Route 158 and further downstream at Weaver Rd., downstream of the confluence of the Bozen Kill and the Black Creek. The Town of Guilderland Industrial Park, a former US Army Supply Depot, is within the Black Creek Watershed.

At the Weaver Road sampling location, the following pollutants were identified as a concern:

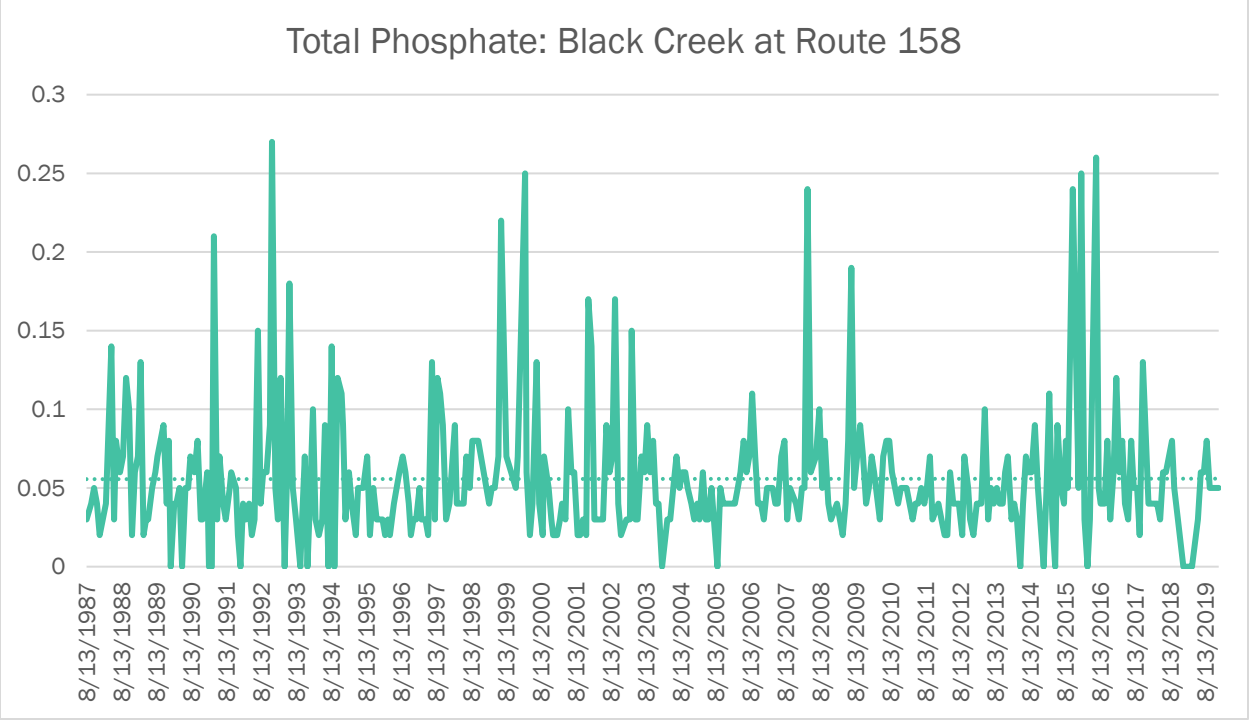
- **Fecal coliform** average, non-geomean levels had increased between 1987 and 2002, rising from 150 colonies /100mL to more than 200 colonies /100mL,
- **Oxygen Saturation** Levels have held steady, but are very low, just below 80%, the threshold for supporting a healthy, diverse ecosystem in the creek,
- **Dissolved Oxygen** "DO" levels have declined from 9.5 mg/l in 1987 to 8 in 2019
- **pH** in the Black Creek has risen slightly from 7.5 to 8 on average, and
- **Total Phosphate** has remained stable, and high, at .5 ppm. For protection of ecological health phosphate levels should be <.05 ppm.

The NYSDEC designated the Black Creek as Impaired for dissolved oxygen.





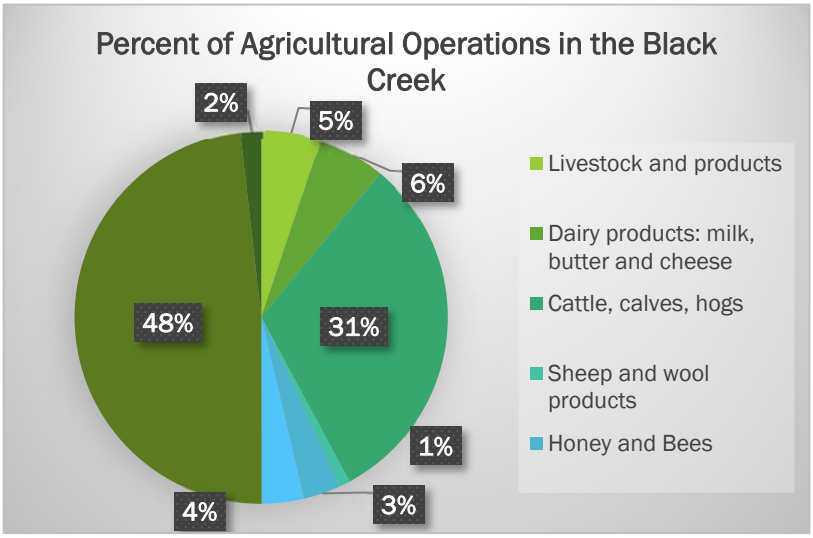
Agricultural Operations in the Black Creek Watershed		
Agricultural Operation	Total Acreage	Percent of Agricultural Operation in the Black Creek
Livestock and products	74.16	5.16%
Dairy products: milk, butter and cheese	83.80	5.83%
Cattle, calves, hogs	447.40	31.15%
Sheep and wool products	13.10	0.91%
Honey and Bees	46.68	3.25%
Horse Farms	52.50	3.66%
Field Crop	692.83	48.24%
Nursery and Greenhouses	25.80	1.80%



Field crops dominate the acreage of the active agricultural operations within the Black Creek watershed, occupying nearly 50% of active agricultural acreage. The nearly 700 acres constitute nearly 12% of the reservoir's watershed even though the Black Creek sub watershed is relatively small at 20.5 miles. At nearly 450 acres, cattle, calves, and hog operations rank second in acreage within the sub watershed and 7.7% of the total Watervliet watershed – the third ranked percent of acreage overall – making this watershed the location of the highest concentration of this agricultural use.

Sub watershed maps for the Black Creek are provided as Appendix I of this report.

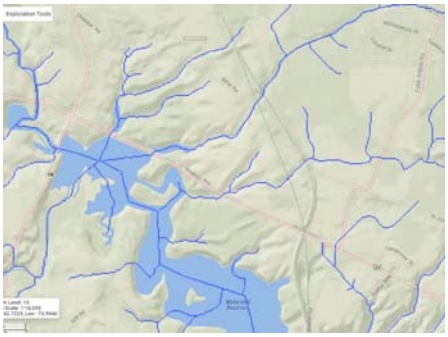
2.8.5 Unnamed Minor Watersheds Within the Normanskill/Indian House Creek Subwater Shed



StreamStats is a web application that provides access to an assortment of Geographic Information Systems (GIS) analytical tools that are useful for water-resources planning and management, and for engineering and design purposes. The map-based user interface can be used to delineate drainage areas for user-selected sites on streams, and then get basin characteristics and estimates of flow statistics for the selected sites anywhere this functionality is available.

Utilizing Streamstats, CDRPC has delineated three small, unnamed subwatersheds that impact the Reservoir that account for nearly 4 square miles of the Reservoir's Watershed Area.

The Northernmost small watershed, a roughly .6 sq mi. basin, is the smallest of the three. Less than 2% of this watershed is impervious and nearly 15% of the land is identified as developed (according to National Land Cover Data from 2011). This watershed is bisected by a CSX rail line.



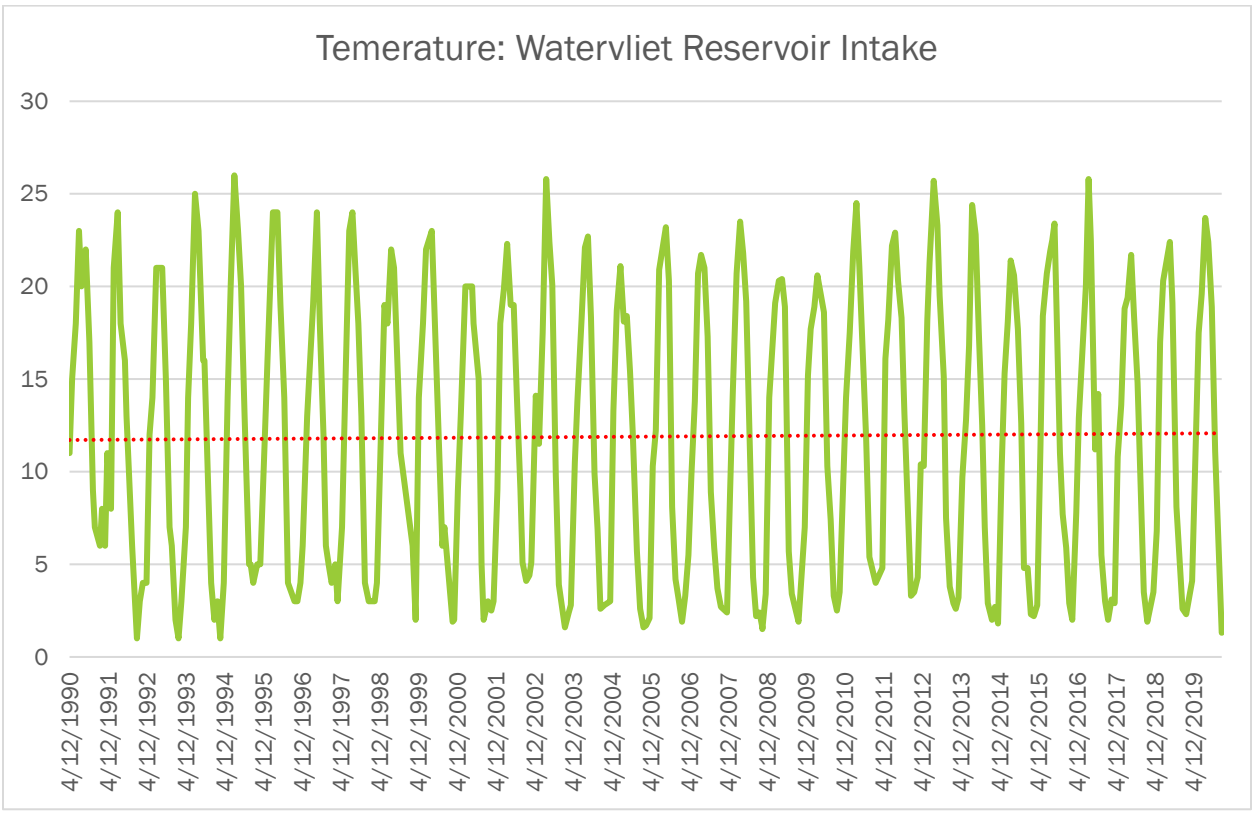
The "middle" small watershed roughly 2.2 sq mi. basin, is the largest of the three. 13.2% of this watershed is impervious and 60% of the land is identified as developed (according to National Land Cover Data from 2011) This watershed is bisected by a CSX rail line. At 2,700 feet from the Reservoir it's the closest rail-waterbody direct connection. This watershed extends into developed areas of Guilderland and Rotterdam. In 2021 CDRPC applied to the NYSDEC Hudson River Estuary Program for monitoring on this unassessed stream, but the application was not selected.

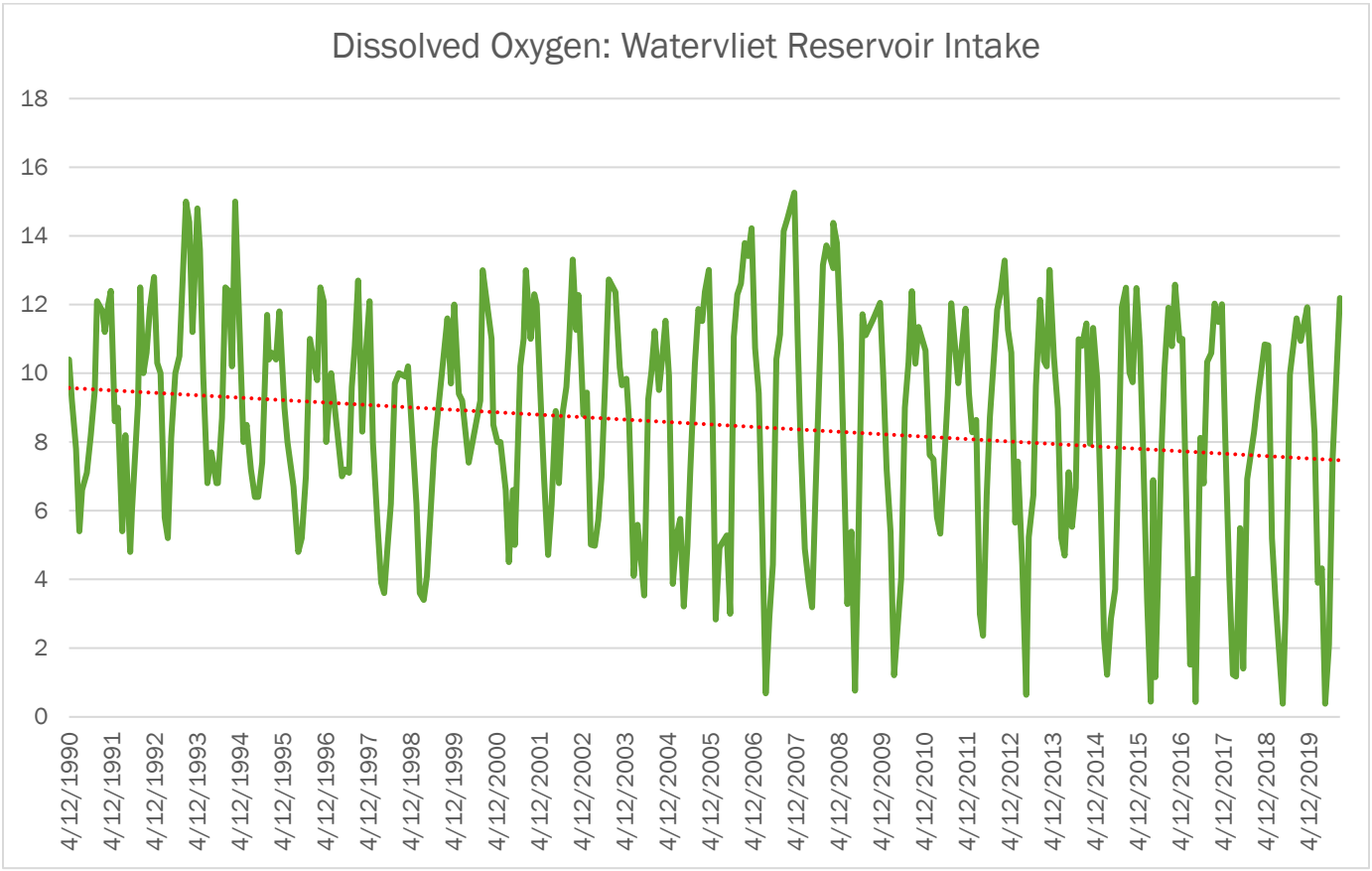
The easternmost small watershed is roughly 1 sq mi. Less than 3% of this watershed is impervious and less than 5% of the land is identified as developed (according to National Land Cover Data from 2011)

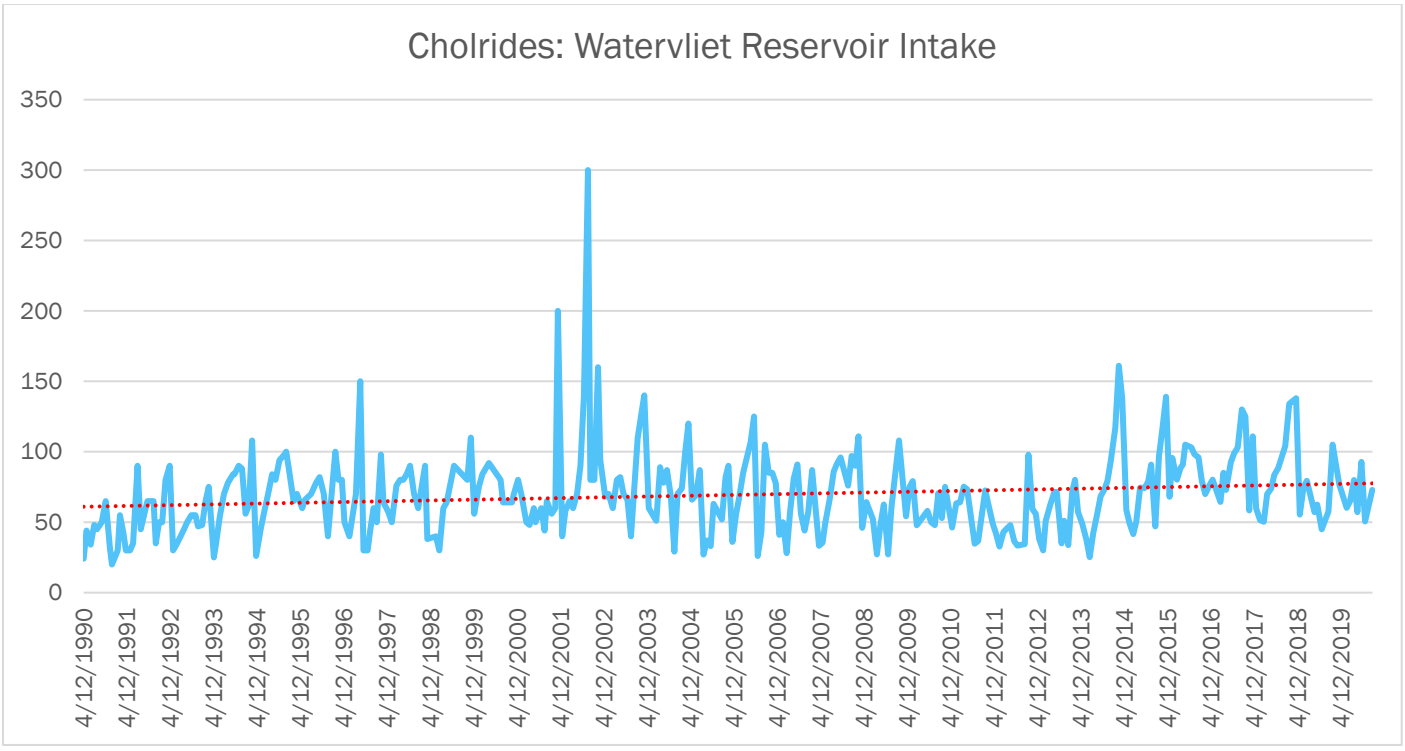
2.8.6 The Watervliet Reservoir

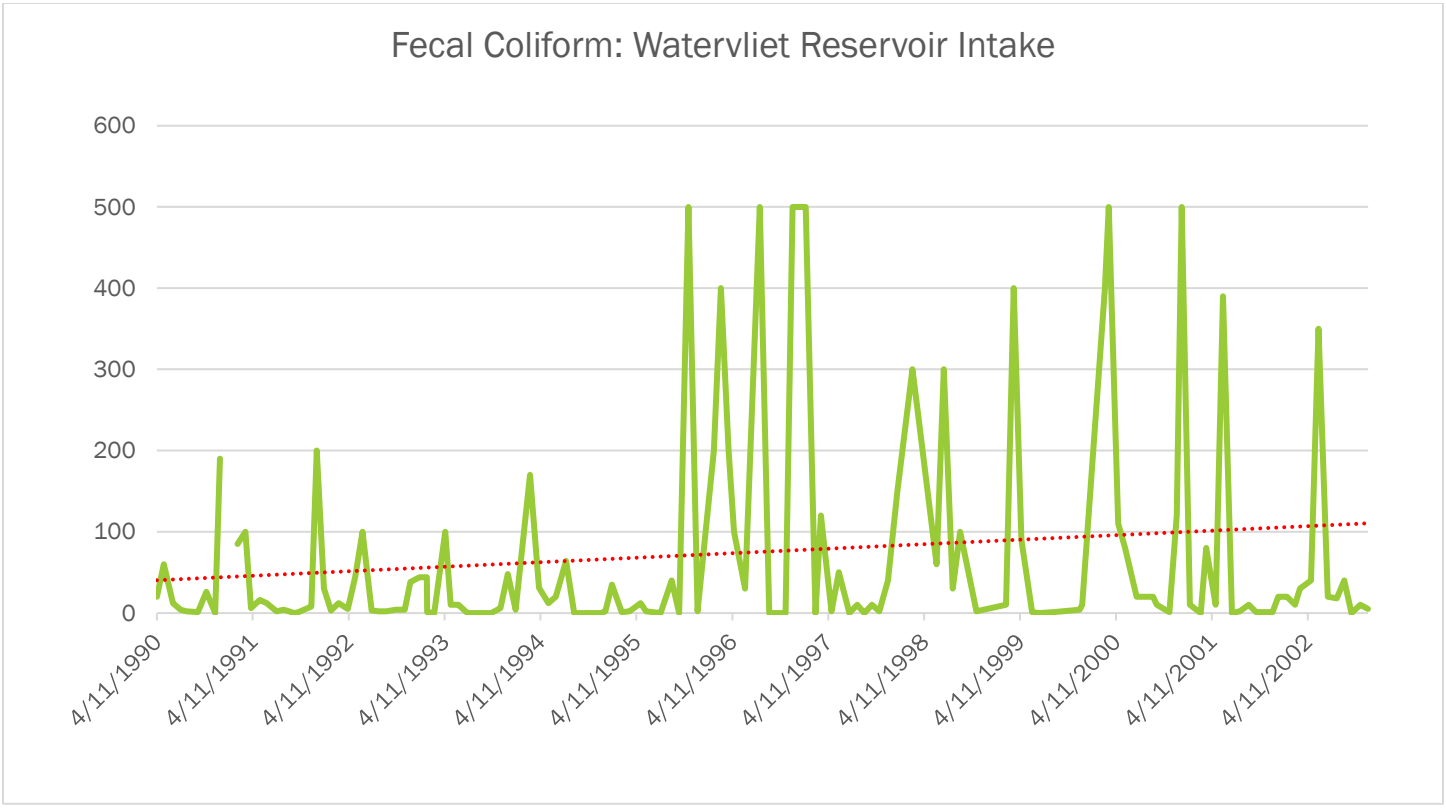
At the Reservoir's sampling location, the following pollutants were identified as a concern:

- Average annual **temperature** has increased slightly. Similar to temperatures in each of the tributaries to the reservoir
- **Dissolved oxygen** levels continue to fluctuate seasonally but have trended downward with increasing swings downward,
- **Chloride levels** have continued to rise. While chloride levels in the Bozen Kil land Black Creek have fallen, choloride levels in the Normanskill, the prorary source of the Watervliet Reservoiur, has risen - in dicating the cloride loading withing the Normanskill Watershed is impacting the Reservoir, and
- **Fecal coliform** levels have continued to rise. This could be due to influence from the triburaties – all of which have higher trending fecal coloform counts.


Temerature: Watervliet Reservoir Intake
30
25
20
15
10
5
0
4/12/1990
4/12/1991
4/12/1992
4/12/1993
4/12/1994
4/12/1995
4/12/1996
4/12/1997
4/12/1998
4/12/1999
4/12/2000
4/12/2001
4/12/2002
4/12/2003
4/12/2004
4/12/2005
4/12/2006
4/12/2007
4/12/2008
4/12/2009
4/12/2010
4/12/2011
4/12/2012
4/12/2013
4/12/2014
4/12/2015
4/12/2016
4/12/2017
4/12/2018
4/12/2019


Dissolved Oxygen: Watervliet Reservoir Intake
18
16
14
12
10
8
6
4
2
0
4/12/1990
4/12/1991
4/12/1992
4/12/1993
4/12/1994
4/12/1995
4/12/1996
4/12/1997
4/12/1998
4/12/1999
4/12/2000
4/12/2001
4/12/2002
4/12/2003
4/12/2004
4/12/2005
4/12/2006
4/12/2007
4/12/2008
4/12/2009
4/12/2010
4/12/2011
4/12/2012
4/12/2013
4/12/2014
4/12/2015
4/12/2016
4/12/2017
4/12/2018
4/12/2019


Cholrides: Watervliet Reservoir Intake
350
300
250
200
150
100
50
0
4/12/1990
4/12/1991
4/12/1992
4/12/1993
4/12/1994
4/12/1995
4/12/1996
4/12/1997
4/12/1998
4/12/1999
4/12/2000
4/12/2001
4/12/2002
4/12/2003
4/12/2004
4/12/2005
4/12/2006
4/12/2007
4/12/2008
4/12/2009
4/12/2010
4/12/2011
4/12/2012
4/12/2013
4/12/2014
4/12/2015
4/12/2016
4/12/2017
4/12/2018
4/12/2019


Fecal Coliform: Watervliet Reservoir Intake
600
500
400
300
200
100
0
4/11/1990
4/11/1991
4/11/1992
4/11/1993
4/11/1994
4/11/1995
4/11/1996
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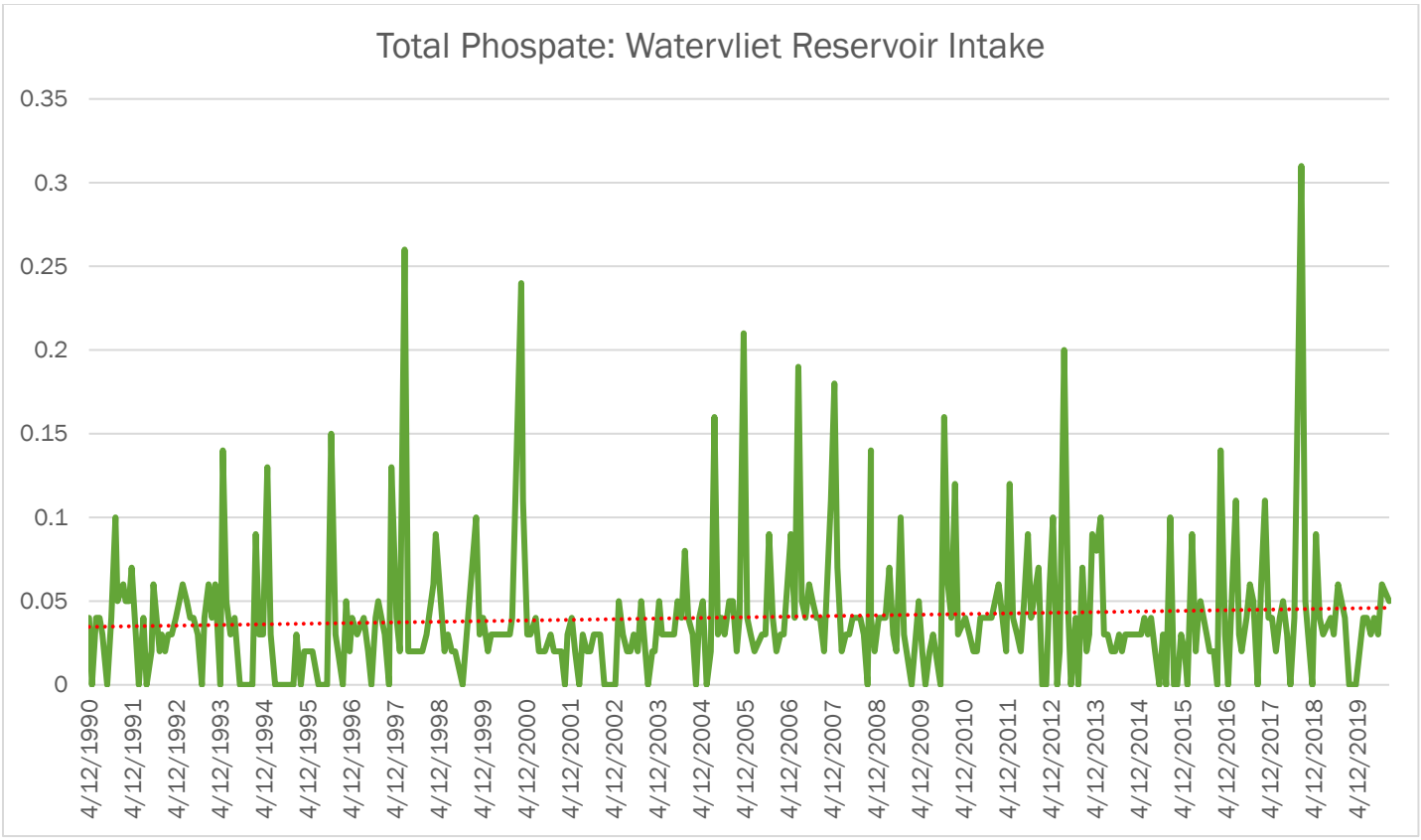
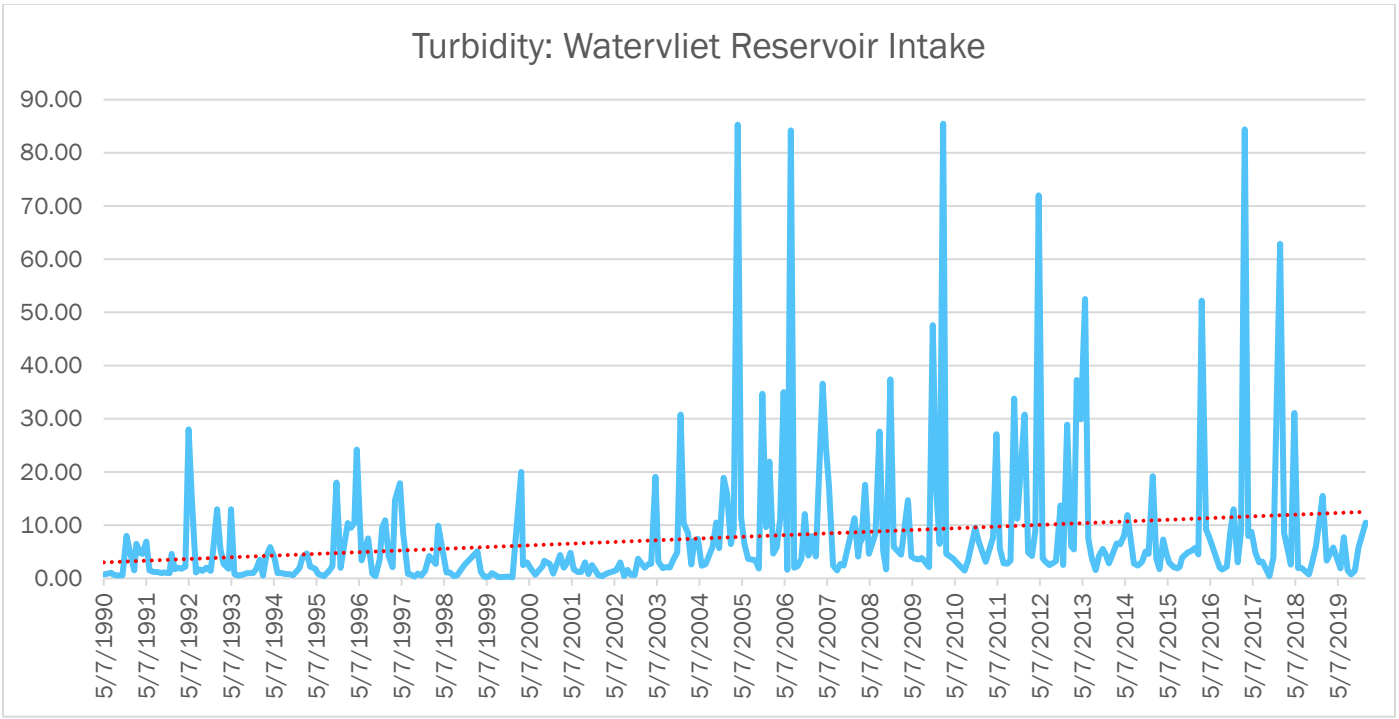
4/11/1998
4/11/1999
4/11/2000
4/11/2001
4/11/2002


Total Phospate: Watervliet Reservoir Intake
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
4/12/1990
4/12/1991
4/12/1992
4/12/1993
4/12/1994
4/12/1995
4/12/1996
4/12/1997
4/12/1998
4/12/1999
4/12/2000
4/12/2001
4/12/2002
4/12/2003
4/12/2004
4/12/2005
4/12/2006
4/12/2007
4/12/2008
4/12/2009
4/12/2010
4/12/2011
4/12/2012
4/12/2013
4/12/2014
4/12/2015
4/12/2016
4/12/2017
4/12/2018
4/12/2019


Turbidity: Watervliet Reservoir Intake
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
5/7/1990
5/7/1991
5/7/1992
5/7/1993
5/7/1994
5/7/1995
5/7/1996
5/7/1997
5/7/1998
5/7/1999
5/7/2000
5/7/2001
5/7/2002
5/7/2003
5/7/2004
5/7/2005
5/7/2006
5/7/2007
5/7/2008
5/7/2009
5/7/2010
5/7/2011
5/7/2012
5/7/2013
5/7/2014
5/7/2015
5/7/2016
5/7/2017
5/7/2018
5/7/2019

Chapter 3: 2003 CDRPC WATERSHED PROTECTION PLAN

In 2003 CDRPC authored a Watershed Protection Plan for the Watershed. The plan pre-dated, but was drafted with the expectation of new, Phase II permits for Municipal Separate Storm Sewer Systems (MS4), a permit under the State's Pollutant Discharge Elimination System (SPDES) providing permit coverage for Storm Sewer Systems and construction activities disturbing one or more acres. The general permit requires permitees to identify and implement specific stormwater management practices and regulations that best protect the environment.

The 2003 Study summarized existing issues of concern and recommendations for municipal actions that could be implemented in response.

The plan identified the following threats:

- The Northeast Industrial Park (once a Class 2 Inactive Hazardous Waste Disposal Site.),
- A former town of Guilderland landfill adjacent to the reservoir (concerns for an underground brook discharging to the reservoir),
- Proximity of Roads and Run-off,
- Invasive Plants,
- Mining Operations,
- Fragmented Development Review,
- Lawn Chemicals, and
- Future Watershed Development Practices

3.1 CDRPC 2003 Watershed Protection Plan Summary Findings

3.1.1 The Northeast Industrial Park

At the time of the 2003 Plan a Restoration Advisory Board (RAB) had only just been formed to facilitate communication and make recommendations to the Corps about activities at the site. The RAB is composed of interested community members, representatives from local and state agencies, and the Corps. The RAB meet every two to three months to offer and receive input from the community and the Corps about ongoing activities at the site. The Army Corps had conducted several studies at the former Depot, and in concert with the Defense Logistics Agency (DLA), has prepared a Remedial Investigation Field Sampling Plan and a General Safety and Health Plan to establish and define what further environmental measures are necessary at the site. At the time of the plan's writing, the Corps was evaluating and addressing public comments responding the field sampling plan and a final remediation plan was expected.

At the **U.S. Army Southern Landfill** three surface water and sediment samples were collected from a large pond, and a seasonally-wet area. Bis(2-ethylhexyl)phthalate (BEHP) and aluminum were detected above NYSDEC criteria and upstream ranges in surface water. PAHs, pesticides, PCBs, and up to ten metals were present above NYSDEC criteria and background in sediments from the main pond. A visual survey of potential drainage structures along the railroad tracks was conducted on June 29, 2000, and did not identify any drainage structures.

At the former **Bivouac area** located west of County Route 201, Analytical samples of surface soil and subsurface soil did not contain any VOCs, SVOCs, pesticides or PCBs above NYSDEC soil criteria. No VOCs or PCBs were detected above surface water criteria and no VOC, SVOCs, or PCBs were detected above sediment criteria. Pesticides were detected above surface water and sediment criteria in two samples and

one sample, respectively. SVOCs were detected above surface water criteria in one sample. Metals were detected above the various criteria in each of the media sampled. No VOCs, SVOC, pesticides, or PCBs were detected above Class GA groundwater standards in either of the former domestic wells. No metals were detected above Class GA criteria in the on-site domestic well. Three metals were detected above Class GA criteria in the former domestic supply well at the neighboring property.

At the former **Burn Pit Area** located at the north end of the site surface soils containing CPAHs, pesticides, and PCBs were identified; however, all but one of the those areas were within the footprint of a new warehouse or paved parking and roadway areas, so the exposure risk was deemed to be minimized. Subsurface soil contamination by VOCs, CPAHs, NPAHs, pesticides, and metals was detected and delineated. The former burn pit area near SB-06 was heavily contaminated. The contamination extended into the top of the water table. The vertical extent of contamination was not fully characterized and represents a data gap. Groundwater contamination (VOCs, SVOCs, and lead) was detected in SB06R and at the western property line in HP02 and MW-2. A plume appears to be moving offsite in a north-northwesterly direction. The extent of the plume was not known and represented a data gap.

In the area of the former **Voorheesville Depot**, fourteen surface water and sediment samples were collected from the perimeter ditches, site ponds, storm sewer infills, and ditches adjacent to the former open storage area. It was determined there were no impacts from the materials stored on-site on groundwater or surface water. The metals stored at the site were detected in soils and sediments at concentrations above the applicable criteria and background ranges. Since the stockpiles of metals and ores have been moved around all areas of the site over the past 30 years, most of the site surface soils have likely been impacted.

For the **"triangular-shaped disposal area"** that was located near the southeastern end of the site, formerly bounded by railroad tracks on three sides. Aerial photographs from the early 1940s indicated the presence of a possible dump in this triangular area. A small amount of fill was encountered in the test pits. The fill consisted of railroad ties, charred wood, angular gravel, and glass bottles. Metals concentrations slightly above background were widespread in surface soil and subsurface soil. BEHP was detected above the NYSDEC Class GA groundwater standard in all five groundwater samples. Since BEHP was detected in all locations, including upgradient of AOC 7, it may not be a site-specific problem attributable to AOC 7. Metals were also detected in the groundwater samples above groundwater standards. The metals concentrations may have been related to turbidity in the groundwater samples and not to metals contamination.

The Black Creek flows near many of the site's areas of concern and receives surface water runoff from most of the site through perimeter ditches or by direct inflow. Investigation objectives were met through the collection of four background surface water and sediment samples, and the collection of seven surface water and eight sediment samples on-site or downstream of the site. Two sampling areas contained the greatest number of metals (five and six, respectively) above surface water standards. Sediments also contained elevated concentrations of metals at these sample locations. These two sample locations were in ditches near the former open storage area and the former Depot Site and may indicate impacts from these areas. Elevated metals concentrations in sediments were also detected near the C&D landfill. . One carcinogenic PAH was detected above sediment criteria and background ranges. However, the total PAH concentration was higher upstream of the SADVA, indicating the one elevated PAH concentration at the sampling site may be from a source other than the industrial park. The surface water results suggested the presence of BEHP could be originating at the former Bivouac area, but an offsite source "could also exist downstream of the industrial site," the report theorized.

The area around "Building 60" was identified as an area of concern as was the location of a former oil/water separator and a storm sewer pipeline leading from the oil/water separator to Black Creek. Both have been removed. Soil along the former 12-inch clay sewer route was assessed to determine whether residual contamination exists. Groundwater was also assessed to determine whether contaminants are present and whether they are migrating toward Black Creek. Four soil borings were drilled along the former sewer pipe path. Eight soil samples were collected to characterize the soils. Four groundwater samples were collected from four existing monitoring wells to characterize groundwater. Metals concentrations slightly above background were widespread in soils. None of the metals detected were anomalously higher than the soil criteria and background ranges. Groundwater contamination was present in Monitoring Well 9 (MW9). MW9 contained bis(2-ethylhexyl)phthalate slightly above the groundwater standards and arsenic, iron, and manganese above groundwater standards. The integrity of well MW9 was in question and the report recommended the location be resampled prior to making remedial action decisions.

3.1.2 Guilderland Landfill

The former town of Guilderland landfill lies within 1,500 feet of the Watervliet Reservoir. The town began using this land as a solid waste dump in the 1970's and ceased its operations in the early 1990's. Unfortunately, the site was unlined which means it has the potential to be leaking toxic leachate.

CDRPC recommended the town of Guilderland and the city of Watervliet should pursue NYS Department of Environmental Conservation approval to re-route an underground brook so that it discharged below the reservoir dam, and not to the Drinking Water Suppl, to prevent possible contamination of the reservoir from groundwater coming from the landfill. The Brook was successfully rerouted in 2003 and disconnected from the reservoir's watershed.

The landfill still remains, unlined, and it continues to prevent a potential threat to groundwater. It is unclear if the groundwater impacts from this site have the potential to impact the reservoir itself.

3.1.3 Proximity of Roads and Runoff

The Watervliet reservoir is bounded by two State highways, US highway 20 on the northeast and country highway 158 on the northwest. The city of Watervliet detected high levels of chloride and sodium in the watershed, with higher rates in winter months, indicative of road salt application in the wintertime. With the proliferation of impervious surfaces in each of the four sub watersheds of the reservoir, the continued rise of Chlorides in the Water supply is not a surprise.

3.1.4 Fragmented Development Review

Because the Watervliet Reservoir does not fall within the city of Watervliet's boundaries, the City has limited opportunity to weigh in on regulatory control f land use within the Watershed and they must rely on the New York State Health Department's limited set of Watershed Rules and Regulations. For the 2003 Report CDRPC drafted a set of revised watershed rules and regulations to allow the City some greater enforcement and oversight actions within the watershed. The watershed rules and regulations were never modified however, and the City should reengage NYSDOH to amend these regulations.

The current Watershed Rules, as well as the update, bestow upon the City the authority to conduct site assessments:

"Inspection: The General Manager of the City of Watervliet or any persons charged with the maintenance or supervision of the public water supply system by its officers or their duly appointed representative, shall make regular and thorough inspections of the identified protection zones to ascertain compliance with the rules and regulations set forth in this section. It shall be the duty of the aforesaid officials to cause copies of any rules and regulations violated to be served upon the persons violating the same, together with notices of such violations. If such persons served do not immediately comply with the rules and regulations, it shall be the further duty of the aforesaid officials to notify the NYS Commissioner of Health or his designee of such violations."

The City of Watervliet has not had the resources to conduct site inspections to determine if watershed rules and regulations are being adhered to. Some provisions of the Rules and Regulations do require continued monitoring. For example:

a. *"No concentration of animal wastes from an agricultural operation, including but not limited to: Manure piles, feedlots, barnyards and yarding areas, shall be located within a 100 feet linear distance from any lake, reservoir, impoundment or watercourse. Areas utilized for the storage or stockpiling of manure and agriculturally associated animal waste shall be constructed and maintained such that seepage, leachate and runoff from storage or stockpiling of animal waste cannot adversely impact the quality of the groundwater or surface water.*
b. *Barnyards, feedlots, yarding areas and manure piles shall be separated from streams and water bodies by ditches or surface grading to prevent their runoff from entering streams and water bodies.*
c. *Drainage from barnyards, feedlots, yarding areas and manure piles shall not be discharged directly to a lake, reservoir, impoundment or watercourse. Such drainage shall be dispersed over the surface of the ground at a minimum distance of 250 feet linear distance from any lake, reservoir, impoundment or watercourse.*
d. *Provisions shall be made for satisfactory disposal of milk house waste either by surface or subsurface irrigation that prevents any discharge to any lake, reservoir, impoundment or watercourse. Such facilities shall be located at least 100 feet linear distance from any lake, reservoir, impoundment or watercourse.*
e. *Manure shall not be spread on frozen ground if there is any likelihood that surface runoff will be carried into adjacent lakes, reservoirs, impoundments or watercourses. No manure shall be spread on land within 250 feet of a lake, impoundment or watercourse from November 1 through March 31.*
f. *No structures of any kind for the purpose of sheltering or corralling animals shall be constructed within a 100 foot linear distance of any reservoir or watercourse."*

For the 2003 Report CDRPC drafted a set of revised watershed rules and regulations to allow the City some greater enforcement and oversight actions within the watershed. The watershed rules and regulations were never modified however, and the City should reengage NYSDOH to amend these regulations. The Draft regulations are included in this report as Appendix J. Note the regulations have been amended to include regulations developed as part of this planning effort. The new regulations are redlined.

3.1.7 Lawn Chemicals

Homeowners are likely to use 10 times more chemicals per acre on their lawns than farmers use on agricultural land. As new homes are continually being built in the Watervliet Watershed, pollution from lawn pesticides is a mounting concern. 2,4D-Dichlorophenoxyacetic acid is one of the most widely adopted defoliants and pesticides available in the US. It's so prevalent that 2,4D is found in 40 percent of

NY State's water supplies and up to 75 percent in farming areas of the Hudson River Valley. In June 2015, the World Health Organization's International Agency for Research on Cancer confirmed its 1987 classification of 2,4-D as a possible carcinogen.

The 2003 CDRPC Watershed Plan recommended that New York policy makers should adopt policy reforms that address the problem of dangerous pesticide usage, and that New York should enact a ban on pesticides used for solely aesthetic purposes.

3.1.8 Future Watershed Development Practices

Both the 2003 CDRPC report and the 2019 Water Chestnut Control Study highlighted significant development pressure, especially lands north of the reservoir in Guilderland, Rotterdam and Princetown. While population growth in these areas has not been significant since 2010, continued development still provides a threat to the reservoir from pollutants such chlorides, lawn chemicals, pesticides, metals and warmed stormwater runoff. These areas pose the greatest threat to water quality from future development and should be priority areas for implementing recommendations to follow. A new water district is being considered for land surrounding the reservoir in Guilderland if this extension occurs it will likely increase development activity in this sensitive area. Public discussions have taken place regarding the extension of sewer lines along Route 7 from Rotterdam to Duanesburg, which may be funded by the Schenectady Metroplex Authority, if this extension occurs new suburban growth would likely follow. City of Watervliet's plan for regional water service would greatly increase the development activity within the watershed. Regulations for the reservoir that are currently in place are inconsistent from community to community and are inadequate to accommodate a large amount of new development in a sustainable fashion. Not one community within the Watervliet Reservoir Watershed meets the impervious surface standards recommended by the Center for Watershed Protection.

The 2019 Water Chestnut Study advised that more investigation is needed to identify sources of upstream sediment loading from development and/or erosion conditions are occurring upstream to cause this influx of sediment. It also recommended that partnerships with the Town of Guilderland and landowners adjacent to any tributary are recommended to correct erosion upstream. In addition, the restoration of wetlands with native species is highly recommended, to provide filtration and capture of sediment in the northern portion of the reservoir.

3.1.9 Spill Response

In 2003, the CDRPC Report recommended that the town of Guilderland and the city of Watervliet should develop a joint spill response plan to address both accidental and purposeful contamination. During this time the city of Watervliet did have an emergency response plan for chemical spills within the reservoir, storage reservoir and watershed which included the following actions.

- *"Call John McDonald of McDonald engineering immediately, he will act as the lead person representing the city. If he is not available, contact James Besha and the lead person will secure the necessary equipment and labor to address the spill.*
- *Next the Albany County Health Department and the NYS Department of Environmental Conservation should be called.*
- *Following this both the Guilderland Water Department and town Police should be called as well.*
- *The next course of action should be to isolate the transmission main and service reservoir, if necessary. Then either the reservoir, transmission main, or service reservoir should be flushed, and the treatment processes should be adjusted at the filter plant if necessary.*

- *Consumers should then be informed of the leak via TV and radio of the nature of the problem and the steps that should be taken to remedy the problem.*
- *The lead person should then activate interconnects if necessary and perform water testing of water entering and leaving the plant."*

The spill response plan should be updated, and drills should be conducted periodically.

The 2003 CDRPC Watershed Protection plan is included as Appendix K.

Chapter 4: DRINKING WATER SOURCE WATER PROTECTION PLAN RECOMMENDATIONS

4.1 Municipal Code Revisions

The 2003 CDRPC Watershed report recommended stormwater controls and code modifications that would implement requirements of the pending Phase II MS4 permit coverage some communities within the watershed would be required to obtain.

The Stormwater Coalition of Albany County (Coalition) was formed via IMA in 2008 to provide mutual support and assistance in implementation of the New York State Department of Environmental Conservation (NYSDEC) Municipal Separate Storm Sewer System (MS4) Permit requirements. Membership in the coalition has changed, but over the course of the organization's history Guilderland, Altamont, Voorheesville and New Scotland have participated in the entity. The Coalition's website is https://stormwateralbanycounty.org/.

In 2010, the Coalition applied for a NYSDEC Water Quality Improvement Grant to provide funding assistance to carry out several elements of the NYSDEC MS4 Permit. Among those elements is that municipalities are encouraged to review and revise, where appropriate, local codes and laws which preclude green infrastructure and, to the maximum extent practical, consider the principles of Low Impact Development, Better Site Design, and Green Infrastructure when developing planning documents and updating regulations.

The code developed by the coalition may be utilized by any of the municipalities in the watershed – whether in Albany county or not. The biggest value for protection measures through code modification would be made in and Guilderland Rotterdam – the two most densely developed communities that are also in closest proximity to the water body. Altamont, Knox and Duanesburg have the next highest potential impact of code modifications, followed by Voorheesville and New Scotland, where only small portions of these communities (and largely undeveloped) fall into the watershed. Finally, Delanson, Wright and Berne, small, largely undeveloped communities and each more than 10 miles upstream from the reservoir have the lowest potential code revision impact on the reservoir.

Code recommendations are provided in Sections 8, 9, 10 and 11 of this report.

The full set of stormwater Coalition of Albany County Local Law recommendations were provided as an appendices to their report available at http://stormwateralbanycounty.org/wp-content/uploads/2011/12/A_GrnInfModLocLawProj_SWCoalAlbCntyNY_2013_Nov_ForDistribution.pdf. The report's specific recommendations to actionable amendments to town code as they relate this this White Paper and CDTC's New Visions policies are provided.

4.2 Protection Zones and the Adoption of Updated Watershed Rules and Regulations

The 2003 CDRPC Study recommended the three protection areas; zones designated Zone I, Zone II and Zone III.

- Zone I, the Reservoir Protection Zone includes the Watervliet Reservoir and all city-owned lands bordering the reservoir.
- Zone II, the Water Supply Protection Zone includes all primary and secondary watercourses flowing directly or indirectly into the Watervliet Reservoir and all lands within 500 feet of primary and secondary watercourses.
- Zone III, the Watershed Protection Zone is all the land area which is tributary to Zone I and Zone II and is the tributary surface area from which the reservoir is replenished by runoff.

CDRPC's draft watershed rules and regulations, and a watershed zone map produced by the project's consultant engineering firm, were filed with the New York State Commissioner of Health and with the City Clerk of the City of Watervliet and included as Appendix A of the Draft Rules – but the rules and watershed protection zone map were not adopted by the NYSDOH and thus went no further. Unfortunately, efforts to secure this watershed map from the consultant, City of Watervliet and State Health Department have proved unsuccessful.

CDRPC continues to encourage NYSDOH to adopt the revised watershed Rules and Regulations containing protection zones. These are included in the report as Appendix J. Each of the communities within the watershed should ensure these Watershed Rules and Regulations should be posted on their municipal website(s).

The following steps for Updating Watershed Rules and Regulations have been shared by the NYSDEC and NYSDOH as a playbook for local municipalities.

1. Local government drafts new or updated Watershed Rules and Regulations and submits them to the NYSDOH.
    a. Local Governments must receive written approval of the draft from other impacted state agencies such as the DEC and Agriculture and Markets prior to submission to NYSDOH.
    b. Stakeholder and community outreach should occur and guide the development and modifications of the Rules and Regulations.
    c. Formal adoption of the Local Government's draft is not required.
    d. If the county has already established a "county small watershed agency" or a "watershed district" in accordance with County Law Article 5-D, NYSDOH encourages the county to consult with such agency or district during the development or updating of the Regulations, and prior to submitting to NYSDOH (Note: Albany County has not developed such a district)
    e. Local governments are also strongly encouraged to review and incorporate any existing rules and regulations adopted under County Law § 299-p(4) pertaining to recreational use of water, and any local laws that are already promulgated for the applicable watershed.

After the Watershed Rules and Regulations are send to NYSDOH, the following actions will be set in motion:

1. NYSDOH performs a preliminary review for completeness and to ensure other impacted state agency input.
2. NYSDOH works with the local government to revise, as needed.
2. NYSDOH publishes the Regulations for public notice and comment.
3. NYSDOH reviews public comments and reviews any necessary amendments with local government. (Note: if amendments are needed, another 30-day comment period is required for compliance with the State Administrative Procedure Act.)
4. NYSDOH finalizes rule.
    a. Required: Local government publishes in a local newspaper, per Public Health Law §1100.

b. Optional: Local government incorporates into local law.

5. Affidavit and Regulations are filed with the Albany County clerk's office, per Public Health Law §1100.

4.3 Septic Systems

4.3.1 County Level Data Collection

CDRPC analyzed developed parcels in the Watervliet reservoir that rely upon private sewers and estimated more than 1,250 parcels may have private septic systems within 200-feet of a tributary to the reservoir.

Privately Sewered Parcels with Development	Parcels
Rotterdam	327
Guilderland	280
Duanesburg	241
Knox	194
Delanson	146
Berne	37
Village of Altamont	18
Town of New Scotland	11
Total	**1254**

A significant data gap exists for septic systems. Neither Albany or Schenectady County Departments of Health maintain a database of systems, nor are they geocoded. Attributes like age of the system and its maintenance history are also not available. This data gap represents a significant challenge to assess the potential septic systems on local waterbodies and drinking water supplies.

For this reason it is strongly recommend that county health departments develop GIS inventories of septic systems and that these GIS systems include attributes such as location of system, age of system, date of last repair or replacement and date of last inspection. This type of project, the adoption of a database and GIS locations of systems, would be an ideal NYS Department of State Local Government Efficiency Grant application.

We recommend that Albany and Schenectady Counties also engage in outreach to septic system owners at the same time the data collection efforts are underway. The NYS Department of State Local Government Efficiency Grant Program could also fund this program.

Case Study: Snohomish County Septic System Outreach Pilot Program

Studies of streams in multiple Snohomish County, Washington, watersheds consistently showed the presence of bacteria from human sources. This regular presence indicated that failing septic systems may be a probable source.

As of 2011, more than 78,000 septic systems were registered in the county however the number of failing systems was unknown. The county's Surface Water Management Division launched a septic system outreach pilot program to improve water quality by encouraging septic system owners to adopt a suite of best management practices (BMPs) related to the

care and maintenance of septic systems.

Through a Centennial Clean Water Fund grant from the Washington State Department of Ecology, the Surface Water Management Division conducted research in order to select

target audiences, solidify realistic program goals and objectives, and identify audience barriers to BMP adoption and motivators for behavior change. Research methods

included:

For Septic System Owners:

- Interactive polling,
- Telephone survey, and
- Focus groups.

For Service Providers:

- Questionnaire, and
- Rapid Ethnographic Survey.

From this research, the Surface Water Management Division developed and tested a multi-modal public involvement and septic system education strategy consisting of:

- Direct mail campaigns,
- Landowner workshops,
- Onsite septic system care web pages, and
- "House calls" from Snohomish Health District sanitarians to inspect properties and speak one-on-one with homeowners about their septic systems.

Challenges

The Surface Water Management Division's first challenge regarding its pilot program was identifying key geographic areas to target. This was solved by narrowing down targeted

areas to select sub-basins in northern and southern areas of the county, as well as rural and suburban neighborhoods. Focus group research indicated that homeowners with septic

systems had strong negative reactions to scare tactics, such as suggesting homeowners with systems that are 30 years old or older may need to replace their system simply due to

its age. To mitigate these negative reactions, the program's messaging utilized a positive tone.

Additional research proved that many homeowners were unsure if they could trust septic system professionals. This was addressed with an ethnographic survey, which increased understanding and explored limitations of the septic industry.

Program managers suggest that some BMPs, such as inspecting septic tanks routinely, may have barriers that are difficult to overcome with education alone. By integrating an education program with an enforcement program or a service area, such as a septic district, agencies

may be able to influence a significant majority of homeowners to adopt these higher-barrier BMPs.

Program partners were critical to the success of the septic campaign.

- A collaboration with the Snohomish Health District and Department of Ecology to develop a Snohomish County Septic System Program Public Involvement and Education (PIE) plan.
- An alliance with Edmonds Community College to conduct a rapid ethnographic assessment of septic system industry professionals.
- A collaboration with the Snohomish Health District Septic Issues Committee to survey operation and maintenance providers.

Results

Overall, participants responded positively to the pilot program, stating that they preferred the effort's "direct, no-nonsense" information versus "scare tactics." In addition to boosting residential septic system awareness and improved behavioral changes, the program has increased the Surface Water Management Division management's understanding of homeowner attitudes, beliefs, and behaviors regarding septic systems. With this increased understanding, the division has been able to create improved messaging that will better connect with audiences. The program's success was measured via a direct mail campaign, focus groups, house calls, and post-workshop surveys mailed to participants seven months after the workshops.

A full report on this pilot program and outreach materials are available at the Septic System Outreach Pilot Program website: www.septicreport.surfacewater.info.

4.3.2 Town Level Inspections Upon Property Transfer

We recommend each town and village within the watershed enact legislation that requires a septic system inspection prior to the sale or transfer of any real property, if the property is in located within the watershed of the reservoir, and if that property utilizes an on-site wastewater treatment system, and the system is within 250-feet of a tributary to the reservoir or the reservoir itself. Inspection could be waived for any property that demonstrates, by submission of stamped drawings, that all portions of the onsite treatment septic system (including the drainfield) is located more than 200 feet from a waterbody tributary to the reservoir. These inspections should also be utilized to field verify and archive the location, age and type of systems – data currently missing or difficult to determine from disparate county and municipal records.

Case Study: Town of Queensbury New York 2018 local law requiring inspections prior to property transfers within the "Waterfront Residential Zone."

The town borders Lake George, a major scenic and recreational asset but also a drinking water supply. The residential zone applies to properties near the Hudson, Lake George, Glen Lake, and Lake Sunnyside in the center of the town. The law is aimed at protecting water quality and human health.

The law states: *"Prior to any conveyance of real property in the Town of Queensbury Waterfront Residential (WR) Zone where the property utilizes an on-site wastewater treatment system (OWTS), the OWTS must be inspected by the Town of Queensbury Building and Codes Enforcement Office (herein referred to as the "Building and Codes Enforcement Office"). The inspection shall include a septic tank pump out by a NYSDEC registered septic hauler and all seepage pits and septic drainfield distribution boxes (D-box) accepting effluent from a septic tank must be uncovered and opened by the property owner or their agent prior to inspection. The property transfer inspection and pump out shall be arranged by the property owner as early in the conveyance of real property process as possible in order to obtain an accurate and timely assessment of the OWTS. Upon submission of a complete application to the Building and Codes Enforcement Officer and payment of the applicable fee, the property owner must make arrangements to schedule the inspection with no less than 48 hours' advance notice and shall coordinate with the septic hauler to be on site simultaneously. The cost of the inspection, as set forth in the Town's Fee Schedule Ordinance, shall be paid to the Town of Queensbury prior to the inspection. Inspections must be undertaken within one year of the application or a renewal application with payment of the associated fee will be required." The cost of these inspections is $275 and paid to the Town.*

The full language of the law is provided as Appendix L of this report. Town inspection forms are provided as Appendix M.

4.3.3 Funding for Septic Repair and Replacement

The New York State Septic Replacement Program offers up to $10,000 (or 50 percent) per homeowner to upgrade underperforming backyard septic systems, which are known to leak phosphorus into the water, thereby fueling the algae blooms. This program would be an ideal funding source for which lake residents can access to update their failing septic, however the Duane Lake community is ineligible for these funds since the lake is closed to public recreational access, and that such use of funds would violate a State Constitution prohibition, specifically Article VII, Section 8: "The money of the state shall not be given or loaned to or in aid of any private corporation or association, or private undertaking . . ." This legislation may have been enacted to ensure public funds are not earmarked for private benefit. However, the legislation's limited intent means the program's ability to protect drinking water supplies is somewhat neutered. We strongly recommended the City of Watervliet, and Albany and Schenectady Counties, clean water advocates an each of the communities within the watershed educate State decision makers and to being work on expanding access to the New York State Septic Replacement Program to allow. An expansion for septic systems located upstream of sole source drinking water supplies could prove effective in managing pollutants. This added program eligibility would also ease replacement costs for failing septic systems identified during the inspection program highlighted earlier in this report.

The New York State Priority Waterbody Inventory List ("PWL") is an inventory of the state's surface water quality. The WI/PWL reports are produced for each of the 17 major drainage basins in the state on a schedule that allows each to be updated every 5 years. The data are displayed in four themes, representing the types of waterbodies included on the PWL. They include Shoreline, Rivers/Streams, Lakes/Reservoirs, and Estuary. When a waterbody is added to the PWL list under "Precluded, Impaired, Stressed, or Threatened" it is in indication that a pollutant is impacting its usage classification. The NYS Septic Repair and Replacement program is designed to address systems that are impacting "Impaired"

waterbodies, and, as Albany and Schenectady County are not yet able to participate in the Septic Repair and Replacement Program (https://efc.ny.gov/septic-replacement).

The Black Creek is listed as impaired for dissolved oxygen. The Normanskill is listed as stressed for the presence of chlorides. On December 29, 2021, the NYSDEC announced the Draft 2020-2022 List of Impaired Waters for public comment. The Reservoir was included in the NYSDEC Draft 2022 Section 303d List because of dissolved oxygen, iron and manganese levels.

Albany and Schenectady Counties should engage DEC to be enrolled in the Septic Replacement and Repair program given the impairments in the Black Creek and the Reservoir and the stressed conditions of the Black Creek and Bozenkill. The Counties currently are not able to participate.

Of note, the NYSDEC designated the Bozen Kill as stressed (data or information indicate a potential impact to the Best Use). Water Quality Assessment yielded the presence of nutrients, specifically phosphorus, as a known pollutant. Dissolved Oxygen levels and Ammonia were identified as potential pollutants. The assessment identified the Village of Altamont Wastewater Treatment Plant as a potential source. According to the EPA ECHO reporting system, the plant has had periodic violations issued for their Choline/Sodium Bisulfite disinfection system's dosing of the dichlorination element. The Village is working with an engineering consultant on assessing the disinfection system and designing an upgrade. The plant is operating within permit limits for all aspects of their SPDES permit, however, and no enforcement actions have taken place. The Village's plan to modify the disinfection system should include a look at ammonia and mitigation measures to the DEC's water quality assessment of the creek and confirm or eliminate the Plant as a contributing source.

4.4 Water Chestnut Removal

In September 2019 a study estimated the water chestnut infestations covered 169 acres of the Reservoir (in 1980 the size of the infestation was estimated at 140 acres). That 2019 Weston and Sampson report approximated the removal and treatment costs as $5,000 for hand-pulling, $195,000 for mechanical harvesting, and $70,000 for herbicide treatment; an overall cost of approximately $270,000. Of those expenses, the $85,000 for the mechanical harvester was the only non-recurring cost. The report estimated a $1,233/acre removal cost and an equal $1,223 disposal fee/acre. The report estimated an annual removal cost of roughly $75,000, after up front investments for the harvesting equipment is made.

While water chestnut is an invasive nuisance at the Reservoir, and it had detrimental impacts on Dissolved Oxygen levels, the plant does have some water quality benefits. Since the plant is able to fix a large quantity of nitrogen and phosphorus it reduces eutrophication. This phenomenon explains, in part, the upstream conditions of nutrient runoff have played in the proliferation of the plant. Water chestnut also chokes out competing invasizes such as Eurasian milfoil, which is present in the reservoir in small quantities, and algae blooms. As these benefits can only be achieved before plants begin to decay, harvesting the material, as opposed to eradication it preserves the benefits. The report did not calculate the capacity of harvesting technologies by acre. Typically, water chestnut begins flowering in June. And the nuts begin to ripen in early July. Thus, the window of time for management before they fruit is short. Should the City engage in efforts intent on eradication, which can take as much as a decade to complete, they would need to cover 87 aces each year in a window of time of roughly 45 days harvesting two to three acres per day depending on the work schedule. Even at a conservative rate of two acres a day would be beyond the capacity of the sole WeeDoo harvester machine the City has purchased. The City would still need to invest in 5-acres of hand-pulling and 77 acres of herbicide treatment annually (estimated to be $5,000 and $61,000 annually for a period of 10 years). As removal efforts in an eradication scenario will yield declining costs, the numbers presented here are the upper limits of a conservatively high estimate. With a disposal site secured and in-kind use of transportation and composting, the costs could be substantially lower.

The City of Watervliet has expressed a desire to manage, rather than fully eradicate the water chestnut – partly due to the cost and partly due to water chestnut's ability to out compete invasives such as milfoil and algae blooms which are more harmful to water treatment operations. A mix of management by cutting back the plant before it dies off in October and strategic removal of designated plant mats is the preferred method of management for the City. The City has yet to estimate the cost of their preferred management strategy.

4.4.1 Bio Digestion

In 1980 the City of Watervliet commissioned a report to determine harvestable mass of water chestnut plants, determine volatile solids content of water chestnut and its variability, conduct from two to six trials of laboratory-scale anaerobic digestion of samples of harvested water chestnut, collect and quantitatively and qualitatively analyze the gas produced, and determine seasonal electrical energy potential at Watervliet Reservoir by using methane from anaerobic digestion of water chestnut. The third phase of this report, funded by the NYSERDA, attempted to determine the feasibility and costs/benefits of using water chestnut biomass as an independent source of electricity at Watervliet Reservoir.

The 1980 report found that digester gas produced by the water chestnut biomass could be utilized to produce electricity. Based upon an expected daily production rate of 8.08 x 104 cubic feet per day of 650 BTU/SCF gas, the report estimated the daily electrical energy output could be roughly on average 100 kilowatt hours per day.

The City's biodigester unit has been out of operation for several years. The cost of transporting water chestnut 20 miles from the reservoir to the City may prove to undermine any financial or environmental benefits from bio digestion on site or near the reservoir. Transport of the water chestnuts is regulated by Part 575 of the environmental conservation law and permit is needed. The removal of biomass may trigger additional review if there is the disturbance to bottom soils and generation of turbidity.

Several communities along the Mohawk, including Colonie, Rotterdam, Schenectady, Halfmoon, Clifton Park and Niskayuna are struggling with the proliferation of water chestnut infestations within the Mohawk River. Hand pulling efforts are the only removal methods being employed along the Mohawk.

In 2018 Albany and Saratoga Counties had jointly developed a study for the construction of an anerobic digester at the Albany County Water Purification District's North Plant. Albany County now incinerates sewer sludge and disposes of the waste in the city of Albany landfill. Saratoga County had hauled its leftover waste outside the Capital Region to a landfill near Rochester with Casella Organics. It's now transported to an incinerator in Connecticut and a landfill in Ontario. Both counties spend roughly $2 million annually with their respective methods. In 2021 Albany County suspended its role in the project due to an estimated price increase in the $45 million project to $69 million. It may be possible to direct spoils from the Mohawk and the Reservoir to the county biodigester project should it be advanced.

4.4.2 Composting

Partnering with Guilderland to dispose of the spoil at their transfer station until a regional biodigester option is feasible is the optimal short term solution. The Town's transfer station at 6363 French's Mill Road in Altamont is less and a ½ mile from the reservoir. Unfortunately, the size of the facility limits the operations to storage of brush only, and for disposal of yard waste a contractor is retained for processing and removal. While roughly 20,000 cubic yards of yard waste are processed each year the Town only retains 100 yards at a time and no organic waste is processed.

The town of Bethlehem has the region's most dynamic composting operation. The town has partnered with local private hauler FoodScraps360, a hauler that services residents and small businesses in the town. The town recently was awarded state grant funding to install an aerated static pile method of composting that drastically reduces compost times for turnover. The $240,000 project has already seen return on the investment. In 2020, nearly $160,000 in compost sales revenue was generated. The Town's composting center, located in Selkirk, NY is roughly 8 acres in size.

The town of Guilderland should consider acquisition of private property, potentially a former mine, for development of a composting facility similar to the Bethlehem facility.

The town could purchase the 12.6 acre 6662 Rte. 158 property and dedicate 9 acres of the site to handling compost material. This would require a transfer of the mining permit and an amendment to the reclamation plan, which could be a lengthy process.

The City of Watervliet could relocate their biodigester to this site and partner with the town for disposal of food waste and spoils from the reservoir or other waterbodies such as the Mohawk. The biodigester could be used to offset the energy costs of aeration for compost piles. With state grant funding for the acquisition and development of the site, the energy harvesting, and sale of the compost could make the facility both a low cost investment and have a positive return for the Town on operations.

In 2022 the NYSDEC launched the Municipal Funding for Food Scraps Recycling Initiatives grant program. The goal of this funding program is to assist municipalities in starting or expanding municipal food scraps recycling programs. To ensure equitable access and development of food scraps recycling opportunities for all New Yorkers, this year's opportunity will prioritize the first half of available funds for eligible projects serving Environmental Justice and Disadvantaged communities. Approximately $2 million is available statewide for the funding of Municipal Food Scraps Recycling Initiatives. Creating or expanding programs to increase residential food scraps recycling and creating or expanding food scraps recycling programs and facilities are both eligible activities. More about this program can be found at https://www.dec.ny.gov/chemical/97456.html.

If a former mine site is best suited for acquisition, the Town should work expeditiously to begin the process to ensure there is grant funding available once the permit is transferred and an approved, revised reclamation plan is approved.

4.5 Additional Sampling and Emergent Compound Reconnaissance

The City of Watervliet collects and evaluates water quality by collecting water samples of the Normanskill at State Route 20, thus it is not possible to determine what impacts are present within this watershed versus those present within the Normanskill/Indian House Creek. To better determine the impacts within this watershed, versus those of the Normanskill/Indian House Creek, CDRPC recommends the City add a sampling site at Pangburn Rd. in Duanesburg.

We also recommend the City of Watervliet apply for Hudson River Estuary Program Grant funds to conduct a series of emergent contaminant sampling. Data collected by the City until 2002 included Fecal Coliform analysis. Coliform levels between 1987 and 2002 had been trending upwards in the reservoir and each of the subwatersheds of the reservoir. It's unknown if the increasing levels were due to agricultural operations, failing septic systems, treatment plant issues, wildlife or illicit connections/ I&I.

In 2016 a $50,000 Hudson River Estuary Grant supported an initiative in Rensselaer County to ascertain water quality as it related to Emergent Compounds in at 18 sites along 5 tributaries of the Hudson River;

the Poesten Kill, Wynants Kill, Mill Creek, Quackendary and the Moordener Kill. The effort was led by the Rensselaer Land Trust and a program manager retained to administer the grant. The data collected during the sampling program supplemented a Consent Order mandate that the communities investigate non-CSO bacteria sources along Mill Creek, the Poesten Kill, and the Wynants Kill tributaries. These inspections, coupled with the Land Trust data, helped identify repairs that reduce infiltration and exfiltration and negatively impact water quality in these tributaries. Both the City of Troy and City of Rensselaer invested in cleaning, lining and repair work in 2018 and 2019 as a result of the program. In addition, the previous round of sampling uncovered an illegal connection that has since been corrected by the City of Rensselaer. A similar program employed on the Normans Kill and the Bozenkill may help identify failing septic systems.

Sampling for emergent compounds should be conducted along the Black Creek downstream of the former Army Depot site and the former Town landfill. This sampling could be used to determine if these facilities are contributing pollutants such as metals and/or and chemical compounds like Perfluorooctanoic acid (PFOA), Perfluorooctane sulfonic acid (PFOS), and 1,4-Dioxane (1,4-D). The sampling could also identify failing septic systems. The City, the Town of Guilderland, Albany County and not-for-profit entities are all eligible to apply for funding and conduct this sampling protocol. Approximately $600,000 is available for Local Stewardship Planning (for which water quality monitoring, watershed characterization, and water quality improvement planning and design is an eligible activity). The minimum award amount is $10,500 and the maximum award amount is $50,000. More information is available at https://www.dec.ny.gov/lands/5091.html.

4.6 Inactive Gravel Quarries

Four former gravel pits are located directly adjacent to the reservoir on Stitt Rd. or Rte. 158. The 2003 CDRPC Watershed Protection Plan report recommended these former gravel mines be reclaimed for natural game preserve. Roughly 103 acres of land falls within these four parcels.

Location	Tax Map	Description	Acreage
6635 Stitt Rd	38.00-3-31	322 rural vacant (formerly mined)	36.5
Rte. 158	38.00-3-42	322 rural vacant (former mined)	28.33
Rte. 158	26.00-4-10	105 vac farmland (former mined)	26
6662 Rte. 158	38.00-3-1.1	311 Res vac land (former mined)	12.4

To date no action has been taken to acquire these parcels for preservation. Many are within or border the Critical Area (500 feet) of the reservoir and/or its tributaries. The reclamation plans for these parcels call for transfer to the town of Guilderland for natural restoration /when the owners dispose of the property. The Town of Guilderland should look into the acquisition of the 36.5, 28.33 and 26 acre sites (a total of more than 90 acres) that could be converted to parkland and hiking trails – amenities the town has been engaged in attempting to develop. Portions of these sites could alternatively be used for the location of private or municipally owned solar – land uses that would preserve some of the value of the land to offset their release from the tax roles in portions of the land are dedicated as parkland. The town of Guilderland has expresses desire to expand their offerings of natural areas and nature trails, specifically around the Reservoir. The sites could also be utilized for composting spoils from water chestnut harvesting, however the process to utilize the mined land for another activity other thar reclamation would involve da willing landowner deeding the land to the Town of Guilderland after which the Town could petition DEC to grant an amendment to the Reclamation Plan that would allow composting or solar facilities.
For the installation of municipally owned solar, NYSERDA may be an option through their Build-Ready Program advances large-scale renewable energy projects by identifying sites that are consistent with the

State's standards and are made build-ready for private renewable energy developers. Through this program, NYSERDA works with its State partners and local communities to rapidly advance new Build-Ready projects, prioritizing the development of existing or abandoned commercial sites, brownfields, landfills, former industrial sites, and other abandoned or underutilized sites. NYSERDA will pursue site control and pre-construction development activities prior to competitively auctioning the developed sites, bundled with contracts for renewable energy payments, to provide a de-risked package for private developers to construct and operate projects at these sites. Vacant mines and industrial sites make for appealing uses for the Build ready program – but not every site can advance to shovel ready for the program, as the graphic here illustrates there are some constraints that limit the viability of sites. Buildable area, lack of landowner interest and private interest are the dominant forces in making a site under NYSERDA's 2021 outreach program unviable for development.

Table 4. Common Challenges to Advancing Build-Ready Sites

Challenge	Number of Closed Sites
Insufficient Buildable Area	45
Lack of Landowner Interest	32
Private Renewable Energy Developer Interest	21
Nonviable Interconnection	14
Environmental Issues	11
Agricultural District/Activity	9
Potential Non-Energy Use	9
Total	141

FIGURE 1 - WATERVLIET RESERVOIR

4.7 Former Golf Course

In early 2018, the owners of the 12-acre French's Hollow Fairways Golf Course, located adjacent to the reservoir, announced plans to close after 46 years in operation. The City of Watervliet believes one of the courses holes had encroached on City-owned land since the course's inception. French's Hollow Fairways was originally a dairy farm and apple orchard. In a February 2018 Altamont Enterprise article the owners were quoted as saying they had no plans for what to do with the land. "We're going to let it go fallow for a while. We're thinking about trying to get a conservation easement for the property, which will restrict development on it." This land presents an enormous conservation value for the protection of the reservoir. If developed it could have a significantly detrimental impact on the water supply. So too, the fallow farmland located adjacent to the reservoir. Should the opportunity to purchase or provide a conservation easement on these lands from willing owners the City and/or Town should move forward without hesitation.

Parcels of Watershed Preservation Value

Parcel Address	Tax map	Description	Acreage	Notes	Full Market Value (2018)
4657 Hurst Rd	38.00-5-4	120 Field crops	72.4	Farm adjacent to former French's Mills Golf Course and reservoir	$381,000.00
4701 Hurst Rd	38.00-3-25	311 Res vac land	11.8	Former Frenches Mills golf course	$59,000.00
4478 Western Tpke	26.00-4-1	4478 Western Tpke.	10.5	N/W corner of Western Turnpike and Route 158	$65,000.00

7 parcels	Total Acreage	95.4	Total Assessed Value	$505,000.00

In addition to the former golf course and vacant farmland, a 10.5 acre site at the northwest corner of the reservoir is of critical importance to protecting water quality. Both Guilderland and Watervliet have expressed concern over potential negative water quality impacts should this parcel be developed. The combined value of these properties, according to the county's real property survey, is $505,000.

Multiple land acquisition programs are available for the conservation initiatives that could be employed to preserve these lands and prevent development that would be incongruous with water quality protection.

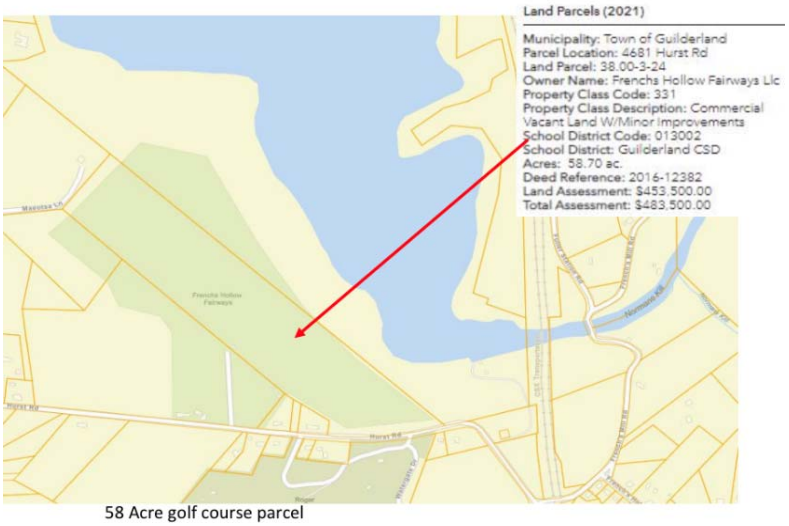


FIGURE 2 - FORMER GOLF COURSE

The Water Quality Improvement Program (WQIP) Land Acquisition grant for Source Water Protection provides funding to municipalities, land trusts and soil and water conservation districts to purchase land and/or conservation easements to protect their public drinking water. Awardees can then be stewards for that land, managing its use to help insure protection of the nearby public water supply. The Land Acquisition for Source Water Protection program requires a 25% local match. Resources for the program can be found at https://www.dec.ny.gov/pubs/115920.html and https://www.dec.ny.gov/pubs/4774.html. It is important to note that the inclusion of specific properties within the DWSP2 Plan, such as this one, added points for scoring in the WQIP Land Acquisition Projects for Source Water Protection.

Municipalities, and Soil and Water Conservation Districts and Not-for-Profit Corporations are eligible for the Land Acquisition for Source Water Protection program. Land Trusts such as the Mohawk Hudson Land Conservancy, the Open Space Institute, the Trust for Public Land and the Nature Conservancy may be critical partners for the program.

The City of Watervliet or Town of Guilderland could purchase property through the WQIP protection program and then transfer ownership to a non-profit, such as a land trust.

Case Study: The Rensselaer Land Trust utilizes WQIP funds for purchase of two parcels, totaling 120 acres, for source water protection of the Tomhannock Reservoir

These acquisitions are the first of several purchased by RLT with funding from a $1.5 million WQIP grant. To acquire the parcels, RLT worked with the Rensselaer Plateau Alliance and Agricultural Stewardship Association, a partnership known as the Tomhannock Rural Land Campaign. The two land acquisitions, located in the town of Pittstown, will help protect the Tomhannock Reservoir, which serves as a public drinking water supply for more than 135,000 people in the Capital Region. The land will be owned and managed by RLT. Both properties are located upstream of the 1,700-acre Tomhannock Reservoir and woodland and wetland areas. The acquisitions will support protecting source waters by helping to decelerate stormwater runoff and filtering and absorbing pollutants. RLT, working with their partners, will use the remaining WQIP grant funds to acquire additional parcels and easements to protect the reservoir.

4.8 Pesticide Regulation

Companion legislation within the NYS Senate and Assembly, S699B/A7429, would prohibit the sale of neonicotinoid or "neonics" pesticides, insecticides and coated seeds if passed. Neonics, an environmentally damaging pesticide, harms bees, birds, fish, pollutes the water supply and can pose health risks, according to a 2020 Cornell University report on state neonicotinoid insecticides. At the time of this report's writing, the legislation is still in committee. The bills would restrain the use of neonics on coated seeds, including corn, soybean and wheat. According to bill sponsor Sen. Brad Hoylman, D-Manhattan, beekeepers in the state have lost more than 40% of their bee colonies almost every year over the last decade.

Municipalities may exercise their authorities to eliminate the use of pesticides on municipally owned property within the watershed.

Homeowners should institute a soil rebuilding and natural lawn program and could include the following: aeration and compost applications, seeding with grasses best suited to your area, corn gluten for pre-emergence weed control, biological controls for insects if necessary, and one or more applications annually of a slow-release nitrogen organic fertilizer. Additional steps could include mowing lawns high at 2-3 inches, deep watering early in the morning, and performing periodic soil testing to determine needed amendments such as lime or rock dust.

New York State has a fertilizer law ("the Nutrient Runoff law) in effect that sets the following parameters:

When fertilizing your lawn homeowners shall not:

- Use lawn fertilizer that contains phosphorus unless you are establishing a new lawn, or a soil test shows that your lawn does not have enough phosphorus.
- Apply any lawn fertilizer December 1 - April 1.
- Apply fertilizer on sidewalks, driveways or other impervious surfaces. If fertilizer spills onto these surfaces, you MUST sweep it up to prevent it from washing into drains or waterways. Do not hose if off.
- Apply lawn fertilizer within 20 feet of any water body unless…
    - There is at least a 10-foot buffer of shrubs, trees or other plants between the area you are fertilizing and the water, or
    - Fertilizer can be applied no closer than 3 feet from the water using a device with a spreader guard, deflector shield or drop spreader.

The law applies to:

- Homeowners applying fertilizer themselves

- Landscapers and lawn care professionals
- Pesticide applicators
- Retailers, distributors and manufacturers of lawn fertilizers
- Fertilizer/pesticide combination products (sometimes called "weed and feeds") when these products contain over 0.67% phosphorus.
- Organic phosphorus fertilizer (such as bone meal).

All towns and villages within the watershed should consider amending their Town code to incorporate language of the Nutrient Law to help inform residents and delineate its enforceability as a violation. Towns and villages should consider prohibiting the application of fertilizer at a 20-foot buffer to a waterbody as an effort to curb nutrient loading and prevent toxic pesticides from impacting the Reservoir.

Nutrient and pesticide loading regulations may be difficult to enforce but municipalities within the watershed should be periodically reminding homeowners of the Nutrient Run off Law. The NYDSEC maintains a fact sheet included in this report as Appendix N, which should be distributed to homeowners. The form can also be accessed at http://stormwateralbanycounty.org/wp-content/uploads/2011/12/NYSDEC_NoO_fertilizersign_2015_2pgFactSheet.pdf. To distribute the form, municipalities may elect to include the form in water bills, tax bills. It should also be posted on municipal websites and in any store that sells fertilizer for lawn application.

4.9 Fire and Fire Training Facilities

The Guilderland Volunteer Fire Department owns and operates a Fire Training facility located on Van Buren Blvd near the Northeast Industrial Park. This facility is used by municipal fire and emergency responders, not just those employed within the Town, to practice for situations involving all types of fires, including flammable liquid fires that may require use of a foam suppressant. In addition to firefighting foams, oil and other flammable substances may be used during training exercises to ignite structures or vehicles to simulate live fire situations. If the area is not properly designed or maintained, chemicals used could potentially runoff into a storm drain or waterbody. Firefighting foams, oil and other flammable substances may runoff into a nearby storm drain or waterbody if not properly maintained. These contaminants have the potential to contaminate the water supply causing potential health impacts.

Emergency responders may utilize firefighting foams containing fluorinated surfactants such as Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS). These perfluorinated compounds are among a class of chemicals that improve the effectiveness of Class B firefighting foams in fighting petroleum and other fires. PFOA and PFOS are regulated hazardous substances in New York State. Use of Class B foam containing PFOA and/or PFOS is prohibited for training purposes in New York State. To facilitate removal of unwanted stockpiles of foam, DEC worked with municipal fire and emergency response departments across the state to dispose of the unused Class B foam. As of summer, 2018, more than 25,000 gallons of foam has been collected and properly disposed; collections are ongoing. The NYSDEC regulated chemical bulk storage tanks, including those that may be used to store firefighting foam. The database for regulated sites does not include a permit for the training facility in the watershed. Furthermore, the training facility's response to NYSDEC's "Class B Fire Suppression Foam Usage Survey at New York State Fire Training Centers" was that no PFOA/PFOS material had ever been employed at the grounds.

NYSDEC also conducted a Class B Fire Suppression Foam usage survey for Fire Departments, Bulk Storage Facilities, Airports and DOD Facilities

The following facilities did not respond to the survey:

- FDP064 Guilderland Center Fire District Guilderland Center
- FDP0022 Altamont Volunteer Fire Dept
- FDP1655 Voorheesville Volunteer Fire Dept
- FDP1363 Rotterdam Fire District #2 (Schenectady)
- FDP0110 Berne Volunteer Fire Co
- FDP0382 Delanson Volunteer Fire Dept

An effort should be made to follow up with these facilities to determine of PFOA/PFOS was ever employed or stored at a facility owned or used by these entities.

4.10 Spill Response

Three small, unnamed subwatersheds immediately adjacent to the Reservoir are bisected by a CSX rail line.

Federal Highway Administration safety data indicates 35 trains pass through the County Line Rd. at-grade crossing each day. With a potential merger between CSX and Pan Am, train traffic on this line may increase. Rail cars on this line carry a variety of chemicals, although what material is carried was not able to be obtained. Petroleum, including crude oil, is just one of the goods transported along the line.

Spills are required to be reported under state law and under certain local and federal laws. These various requirements, summarized in the NYS Spill Reporting and Initial Notification Requirements Technical Field Guidance Manual published by NYSDEC. Under state law, all petroleum and most hazardous material spills must be reported to DEC Hotline (1-800-457-7362). Prompt reporting by spillers allows for a quick response, which may reduce the likelihood of any adverse impact to human health and the environment.

CDRPC was not able to confirm whether any municipality within the watershed conducts spill response drills for potential CSX train derailments. It is recommended that the town of Guilderland, in partnership with NYSDEC, Albany County and the NYS Division of Homeland Security and Emergency Services conduct spill response drills on the three unnamed tributaries immediately between the reservoir and railroad tracks, where immediate response may be required to contain harmful pollutants.

Approximately 1,750 SPDES permitted wastewater treatment facilities and 1,600 industrial facilities with permitted storm water runoff, submit monitoring data required by their permits to DEC via Discharge Monitoring Reports (DMRs). This DMR data is entered into EPA's Federal database and made available to the public through EPA's Enforcement Compliance History Online (ECHO) website, https://echo.epa.gov/.

The Division of Water (DOW) SPDES Compliance and Enforcement Annual Reports provide details on oversight activities that protect waters of New York State, primarily through the State Pollutant Discharge Elimination System (SPDES) program. These reports focus on statewide efforts to monitor discharges to water bodies through facility inspections, assessment of self-reported data and information, assessment of compliance with issued permits and Orders on Consent, and adherence to other applicable laws and requirements.

Along with monitoring data, ECHO integrates inspection, violation, and enforcement information for the Clean Water Act, Clean Air Act, and hazardous waste laws. ECHO also includes Safe Drinking Water Act data, Toxics Release Inventory data, National Emissions Inventory data, and Water Quality Data. The system's features range from simple to advanced, allowing users to conduct broad analyses as well as complex searches. Specifically, ECHO allows the user to find and download information on:

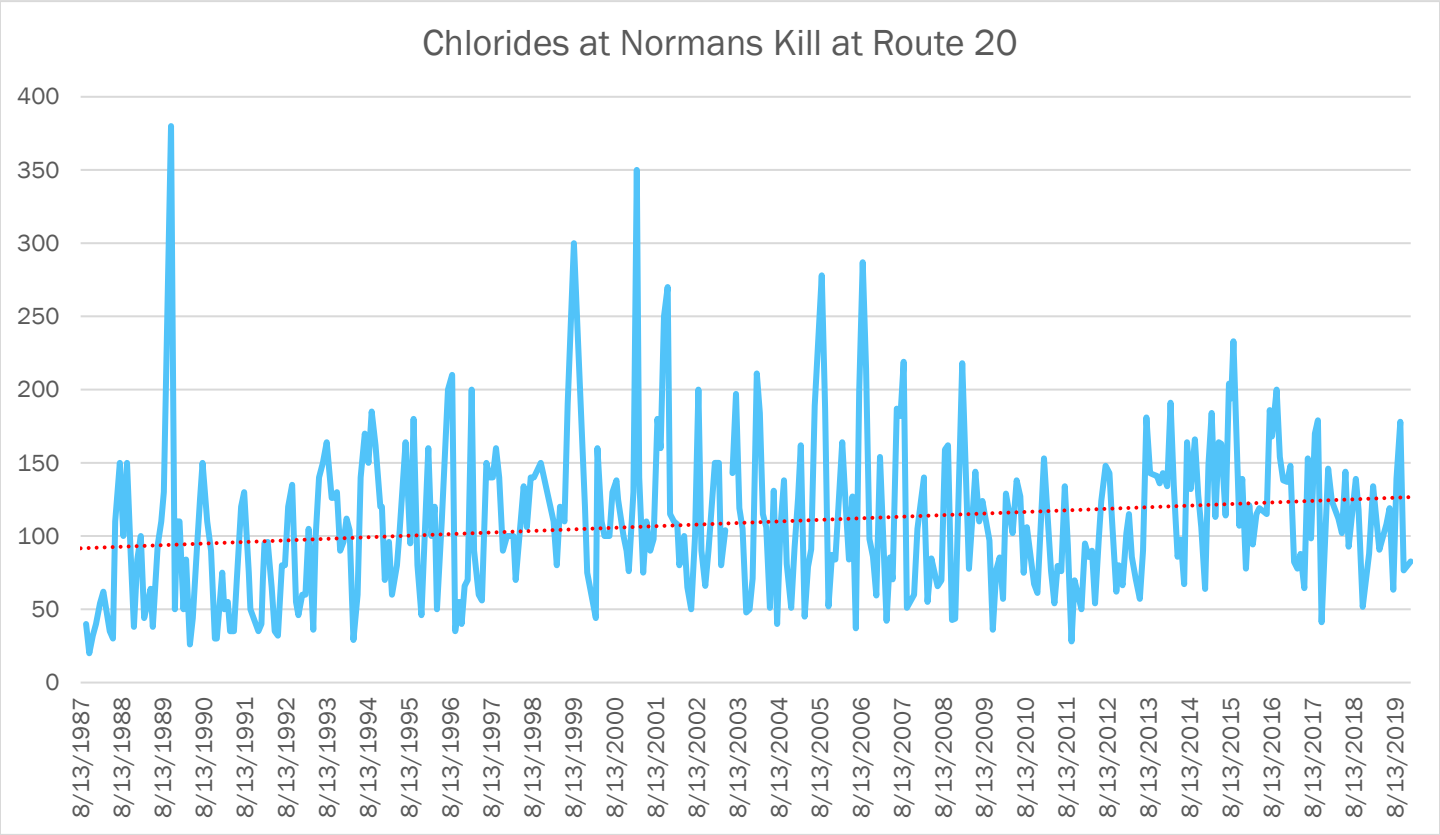
- Facility monitoring data;

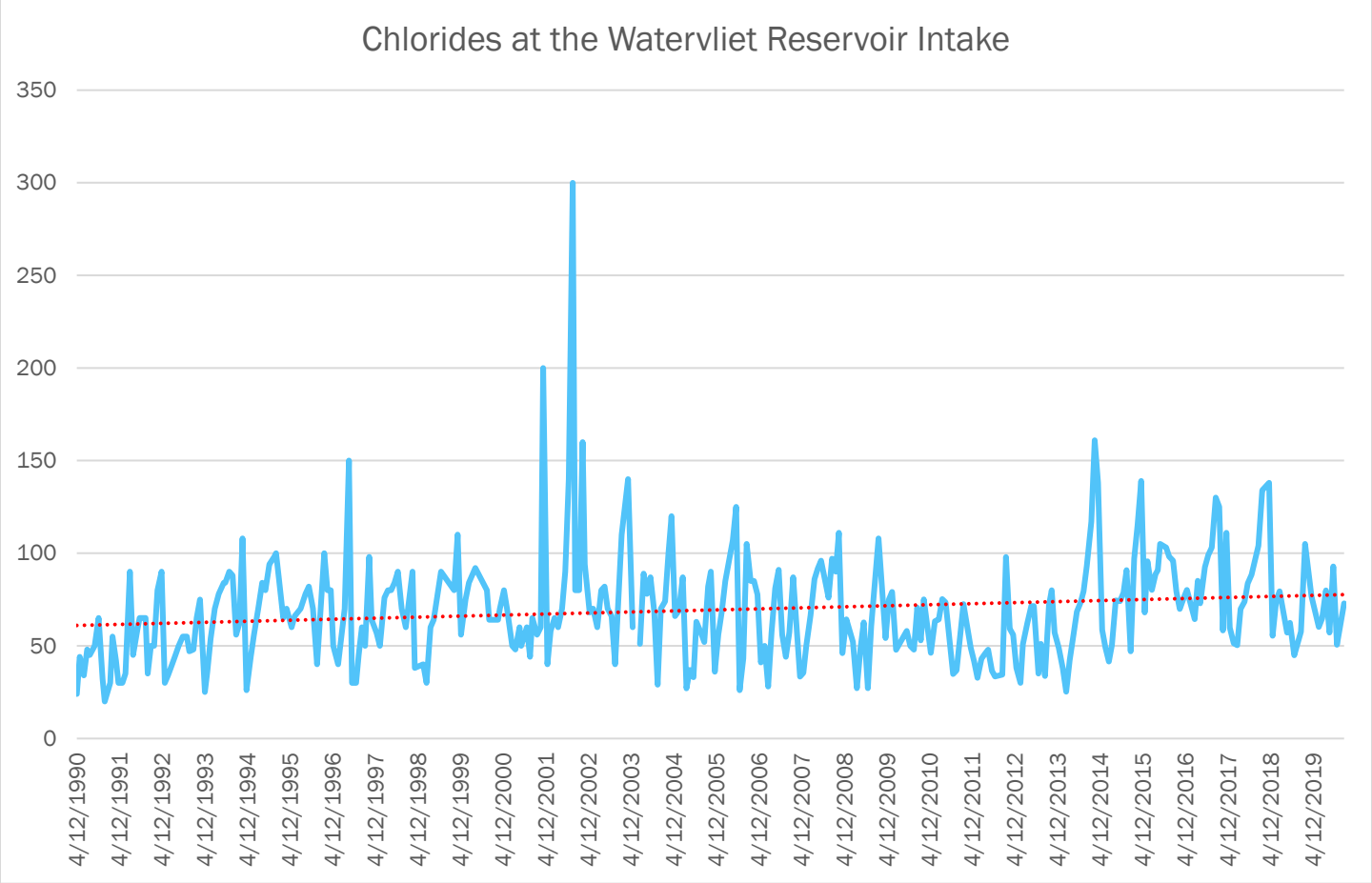
- Permit data;
- Inspection dates and findings;
- Violations;
- Enforcement actions; and
- Penalties assessed.

Communities within the watershed should continuously monitor the ECHO site for users learning the system, the ECHO website contains video tutorials, information on training sessions and links to a data dictionary explaining the site. Access the ECHO website

4.11 Road Salt Application

The Normanskill Subwatershed has been significantly impacted by the proliferation of Chlorides. Chlorides have risen sharply from 100ppm levels in 1987 to a roughly 125ppm average in 2019. The NYSDEC designated the Normanskill as “stressed” for the presence of chlorides. A stressed designation is based on data or information indicate a potential impact to the Best Use(s), in the case of the Normanskill is designated as Class A waters and its best uses are fishing, primary, and secondary contact recreations.





Secondary standards are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply with the standard. However, states may choose to adopt them as enforceable standards. The EPA secondary standard for Chloride is 250 mg/L.

While there is no drinking water standard for sodium, the State Health Department recommends sodium levels in water not exceed 20 milligrams per liter (mg/L) for people on very low sodium diets and 270 mg/L for people on moderately restricted sodium diets. Sodium in drinking water is a more serious concern if you have a medical condition such as high blood pressure, or certain heart, kidney or liver diseases. The drinking water standard for chloride is a maximum level of 250 mg/L. This standard is based on taste considerations, rather than health concerns.

Chloride in surface waters can be toxic to many forms of aquatic life. Aquatic species impacted include fish, macro-invertebrates, insects, and amphibians.

While road salting is not yet a concern for public health impacts for the reservoir, the continued rise in chloride levels within the Normanskill does present a concern for wildlife and an eventual risk to public health if levels continue to rise.

Case Study: Communities surrounding Lake George implement Road Salt Control programs to reduce the amount of chlorides washing into the lake

The towns' and County's efforts are founded on a proactive anti-icing strategy, whereby liquid brine (with just a 23% road salt content) is sprayed on roads in advance of storms. The brine helps prevent

a bond from forming between the snow and the pavement, much like using cooking spray on a pan, and makes it easier to scrape the road clean. This is in contrast to a de-icing strategy where much greater amounts of road salt are used to break the ice-to-road bond after it has already formed. While some road salt is typically still needed during a storm, the amounts are far less. Both the Town of Hague and Warren County have recently installed their own brine plants with underwriting from the LGA.

Plow trucks have been upgraded to include GPS-linked technologies that record the temperature at the surface of the roads and also calibrate and track each truck's road salt application patterns. Video cameras in the cabs and along roads provide a real-time look at conditions and how effectively the ice prevention strategy is working. Plow trucks are also equipped with Live-Edge plows, which are specially engineered with the plow blade segmented into a series of jointed, spring-loaded sections that move up and down to conform with the contours of the road, removing snow and ice far closer to the surface than traditional plows and reducing the need for salt. The Lake George Association has become a certified distributor of Live Edge plows to enable local municipalities to purchase this innovative snow-removal technology at the lowest available cost. Also inspired by the Initiative's success, the New York State Department of Transportation has implemented a salt-reduction pilot program on two heavily traveled state roads in the Basin, the results of which are being monitored by the Lake George Waterkeeper.

Town, County and State-owned plows operating within the Normanskill watershed should be considered for upgrades to manage salt application. This not only can improve water quality but reducing salt applications can also save money. It is unknown if chlorides are impacting private wells in the Normanskill watershed. Where wells are contaminated with chloride, cyanide can also be present. Cyanide-containing compounds, such as sodium ferrocyanide and ferric ferrocyanide, are commonly added to road deicing salts as anticaking agents.

In the immediate term, we recommend that communities prohibit the storage of chloride salts within 500-feet of any watercourse (consistent with NYSDEC TOGS517 issued by NYSDEC on January 26, 1989, advising salt pile managers to "maintain a reasonable separation (e.g. several hundred feet or more) from streams, lakes, or ponds). Municipal stockpiles should also be stored within structures designed to minimize contact with precipitation and constructed on low permeability pads designed to control seepage and runoff.

The NYSDEC has apportioned funds through the WQIP program for salt storage, and the grants will cover up to 50% of costs to construct municipally owned covered storage facilities.

4.12 Stormwater Outfall Construction Requirements

We recommend that new storm sewer outlets should be municipally prohibited from discharging directly to lakes, reservoirs, impoundments, streams or their tributary watercourses and that provisions shall be made to discharge to the surface at least 100 feet from lakes, reservoirs, impoundments, streams and their tributary watercourses.

4.13 Roadside Sedimentation Program

Case Study: *Rural Roads Active Management Program* Champlain Watershed Improvement Coalition of New York (CWICNY).

The manual developed by CWICNY and the LCLGRPB provides best management practices for county and municipal highway departments to implement in roadside maintenance to prevent soil erosion and sedimentation. The full guide can be found at: https://www.cwicny.org/files/RRAM_Manual.pdf

All communities in the watershed should consider adoption of a Rural Roads Active Management Program manual for roadway maintenance standards.

4.14 Floating Solar

In 2018, the City of Cohoes launched an initiative to construct floating solar arrays at their city reservoir. The city's proposed municipally owned and operated 3.2 MWdc Floating Solar demonstration project will be installed on its secured 10-acre water reservoir, at a cost of $5.9 million. The City is relying on State grants and funding from National Grid to offset to cost. When operational, the Cohoes Floatovoltaic (FV) clean energy installation will generate 100% of the city's energy demand for its municipal facilities and streetlights. The installation will significantly reduce the city's current annual electricity cost of approximately $660,000.

A September 2019 report commissioned by the City of Watervliet identified approximately 167 acres of the reservoir have been choked off by water chestnut infestation. Roughly 50 acres of the investigation are within a shallow basin to the northwest of the reservoir, where it is bordered by State Route 20 on the North. With a very rough estimate on cost, tied directly to scalability, it seems likely a 50-acre solar installation is possible, at a cost of $60m. The facility could generate as much as 20 MWdc power – enough to provide power to more than 3,200 homes. Put in perspective, a 20mw array could power more than 33% of Guilderland's homes. A large scale floating array on the reservoir would not remove farmland from productive use, nor would it prevent development for a different use. It may choke out some sunlight that helps proliferation of water chestnut in this shallow area of the reservoir where the depth renders hand pulling by boat challenging and mechanical harvesting impossible.

FIGURE 3 - FLOATING SOLAR EXAMPLE (SAYREVILLE, NJ)

Floating solar is included in this report as a recommendation both because the arrays may have an impact in reducing water chestnut, but primarily because as a revenue source for the City of Watervliet, the installation could easily offset even potentially significant costs on increased oversight of the reservoir and capital projects that the city could undertake to further protect water quality in the lake.

4.15 Agriculture Inspection Program

The current Watershed Rules, as well as the update, bestow upon the City the authority to conduct site assessments.

"Inspection: The General Manager of the City of Watervliet or any persons charges with the maintenance or supervision of the public water supply system by its officers or their duly appointed representative, shall make regular and thorough inspections of the identified protection zones to ascertain compliance with the rules and regulations set forth in this section. It shall be the duty of the aforesaid officials to cause copies of any rules and regulations violated to be served upon the persons violating the same, together with notices of such violations. If such persons served do not immediately comply with the rules and regulations, it shall be the further duty of the aforesaid officials to notify the NYS Commissioner of Health or his designee of such violations."

We recommend updating the Watershed Rules and Regulations to ensure animal waste does not have detrimental impacts on water quality within the watershed.
"Animal Wastes:

a. No concentration of animal wastes from an agricultural operation, including but not limited to: Manure piles, feedlots, barnyards and yarding areas, shall be located within a 100 feet linear distance from any lake, reservoir, impoundment or watercourse. Areas utilized for the storage or stockpiling of manure and agriculturally associated animal waste shall be constructed and maintained such that seepage, leachate and runoff from storage or stockpiling of animal waste cannot adversely impact the quality of the groundwater or surface water.
b. Barnyards, feedlots, yarding areas and manure piles shall be separated from streams and water bodies by ditches or surface grading to prevent their runoff from entering streams and water bodies.
c. Drainage from barnyards, feedlots, yarding areas and manure piles shall not be discharged directly to a lake, reservoir, impoundment or watercourse. Such drainage shall be dispersed over the surface of the ground at a minimum distance of 250 feet linear distance from any lake, reservoir, impoundment or watercourse.
d. Provisions shall be made for satisfactory disposal of milk house waste either by surface or subsurface irrigation that prevents any discharge to any lake, reservoir, impoundment or watercourse. Such facilities shall be located at least 100 feet linear distance from any lake, reservoir, impoundment or watercourse.
e. Manure shall not be spread on frozen ground if there is any likelihood that surface runoff will be carried into adjacent lakes, reservoirs, impoundments or watercourses. No manure shall be spread on land within 250 feet of a lake, impoundment or watercourse from November 1 through March 31.
f. No structures of any kind for the purpose of sheltering or corralling animals shall be constructed within a 100 foot linear distance of any reservoir or watercourse.
g. No animal shall be allowed to stand, wallow, wade or swim in any reservoir or watercourse.
h. Pet owners in urban areas must provide for animal waste disposal on an individual basis.
i. Farm tillage practices shall be in conformance to the degree practicable with "Agricultural Best Management Practice Systems Catalogue," NYS Soil and Water Conservation Committee, dated April 2021, and included as Appendix B of the Watershed Rules and Regulations.

The City of Watervliet has not had the resources to conduct site inspections to determine if watershed rules and regulations are being adhered to. Some provisions of the Rules and Regulations do require continued monitoring.

CDRPC has developed a dataset from which the City and partners (such as host municipalities and respective Soil and Water Conservation Districts) may work from to conduct an outreach program, similar to those that have been implemented locally by agencies such as the Albany Water Board. The Water Board, on a periodic basis, sends letters to property owners within the watershed of the Alcove and Basic Creek reservoirs, informing that property inspections may take place. Water Board staff has the authority to conduct site visits, and frequently partners with Soil and Water Conservation District and USDA staff. When violations of the Watershed Rules and Regulations are found, the Soil and Water Conservation District and USDA staff can provide technical assistance and resources for remediation of these issues – for example funds to relocate or cover manure storage or concentrated feed sites. A similar program, in partnership with a host municipality, would be beneficial to addressing watershed rule and regulation violates and ensuring avoidance of future violations

Model contact forms are provided in Appendix O.

Given the scale of field crop acreage within this subwatershed, and the prevalence of fecal coliform levels in the watershed, best management practices for manure storage and spreading should be increased. Through AEM the SWCD has inventoried farms in the watershed and identified and prioritized environmental practices and concerns affecting watersheds and identified manure/fertilizer spreading and storage, silage storage and nutrient rich leachate, cropland Erosion as threats. These programs need more support within the Bozen Kill sewershed.

Best management practices for manure storage and spreading should be increased within the Normans Kill / Indian House Creek Watershed due to increasing levels of fecal coliform. The same for fertilizer applications given the high ppm. Through AEM the SWCD has inventoried farms in the watershed and identified and prioritized environmental practices and concerns affecting watersheds and identified manure/fertilizer spreading and storage, silage storage and nutrient rich leachate, cropland Erosion as threats. These programs need more support within the Normanskill / Indian House Creek Watershed. Inspections of Horse Farms and cattle, calves and hog operations for proper manure storage, and feeding operations, should be made to ensure manure is not entering waterbodies adjacent or running through these facilities.

Best management practices for manure storage and spreading should be increased in the Bonny Brook/ Normanskill Watershed. The same for fertilizer applications as the impacts from nutrient loading are affecting Duane Lake. These programs need more support within the Normanskill / Indian House Creek Watershed. Inspections of animal operations (such as dairy and cattle farms) for proper manure storage, and feeding operations, should be made to ensure manure is not entering waterbodies adjacent or running through these facilities.

Given the sharp rise in fecal coliform within the Black Creek it's imperative the inspection programs and best management practices be advanced in this area for animal operations and manure spreading for fields.

4.16 Erosion and Sediment Control

Trees for Tribs, a NYSDEC Hudson River Estuary grant program, offers free native trees and shrubs for qualifying planting projects in the Hudson River estuary watershed. Program staff may also be able to assist with plant selection, designing a planting plan, and other technical assistance to help a project succeed. Owners and property managers of property near a stream in the Hudson estuary watershed are eligible to apply for assistance from Trees for Tribs. To apply they must submit an application. If the project

is selected, the landowner will be responsible for preparing, planting and maintaining the site. The application deadlines are March 1 for a planting in spring, and August 1 for planting in the fall. The program website is here: https://www.dec.ny.gov/lands/43668.html

The communities within Normanskill Indian House Creek / Hunger Kill Subwatershed, Guilderland, Rotterdam and Princetown, should conduct site assessments to identify areas of erosion or unstable slopes along the streams and creeks of this subwatershed. This watershed has been highlighted due to a consistent and steady rise in its turbidity as measure from the Rt. 20 bridge. Once sites are identified, targeted outreach to property owners should be made to encourage participation. The program could also be a staple of the resources that property owners are directed to during site visits by Watervliet and community staff during the site inspection process.

4.17 Management IMA options

Albany County, Watervliet, Guilderland, New Scotland and Altamont participate in an active MS4 Coalition that provides share services on permit required activities such as mapping, reporting public outreach and grant administration. This body could undertake many of the recommendations of this report as they relate to stormwater management, but it is not currently set up for all the tasks their report recommends (such as coordinating land purchases, conducting inspections of property or engaging in septic replacement initiatives.

The Albany County Water Quality Coordinating Committee (ACWQCC), formed in 1991, is composed of individuals, non-governmental organizations, and governmental agencies, who are all stakeholders in the quest to protect and enhance the quality of Albany County's surface and sub-surface waters. The Committee focuses its efforts on nonpoint source pollution prevention and protection of the county's water bodies and water supplies. The Committee also serves as a clearinghouse for water quality information, a funding source for small water quality improvement projects, and a forum where stakeholders can collaborate on projects and activities that protect and enhance the quality of the county's water resources.

Members currently include the following entities:

- Albany County Department of Health
- Albany County Office of Natural Resource Conservation
- Albany County Soil and Water Conservation District
- Capital District Regional Planning Commission
- Cornell Cooperative Extension of Albany County
- City of Albany Department of Water and Water Supply
- Hudson River Environmental Society
- United States Department of Agriculture, Natural Resource Conservation Service
- United States Department of Agriculture, Farm Service Agency
- New York State Department of Environmental Conservation Division of Water
- Berne Township
- Hudson River Watershed Alliance

Schenectady County hosts a similar Water Quality Coordinating Committee with similar functions and programs to that of Albany's. The county does not have an MS4 Coalition, and the WQCC does provide some opportunity for communities to collaborate on permit related activities. The SCWQCC has a more robust participation from the towns and villages than the ACWQCC. Rotterdam, Niskayuna, Duanesburg, Princetown and Schenectady are all active participants.

WQCCs do provide some ability to provide program support to recommendations within this report, but to do so there would need to be more active municipal buy-in to the ACWQCC and coordination between the two entities.

In many communities across the State stewardship of water supplies has been assigned, at least in part, to bodies built upon intermunicipal agreements, such as the Great Flats Aquafer's "The Intermunicipal Watershed Rules and Regulations Board" comprised of the chief elected official of each of the municipal jurisdictions in Schenectady County served by the Aquifer. The body was established to enforce and administer rules and regulations and to conduct the central review function of actions taking place within the designated protection zones of the Aquifer. The Board was established by adoption of An Agreement for Intermunicipal Cooperation for an Aquifer Protection Program and was previously known as the "Watershed Committee."

This IMA is provided in Appendix P and the Watershed Rules and Regulations are provided as Appendix Q.

CDRPC is keenly aware of the challenge of creating additional boards and control mechanisms that bleed into existing management structure's goals and responsibilities. A long term goal of Guilderland and Watervliet, both owners and users of the water supply, should be to establish an IMA to initiate the functions the Great Flats IMA provides for administrative oversight of potentially hazardous uses within the protection zones of the water supply.

The DWSP2 program strongly encourages the development of a Plan Management Team to be tasked with overseeing the implementation of the DWSP2 Plan. In the near term, it would be advantageous for Albany County municipalities within watershed to reengage in the ACQWCC and for Watervliet to participate in the SCWQCC until such time and capacity exists for broader management and oversight – if and when that is needed. If strategies and tasks identified in this report can be carried to fruition within the framework of existing partnerships, then additional levels of administrative oversight may only act as detriments, spreading already thin capacity even thinner.

4.18 Implementation of Generic Environmental Impact Statement (GEIS) Programs

A GEIS is a report that assesses the potential impact of actions that could "significantly affecting the quality of the human environment." The report, which documents the cumulative and long-term impacts of projected growth, also establishes policies and procedures for future actions to be undertaken or approved by the community within defined areas identified in the report as needing consideration for projects, funding or programs that offset any negative enviroental impacts. Traditionally, GEIS programs have been implemented to manage congestion, protect open space and to ensure protection of natural resources. GEIS programs establish a requirement that developers of new projects that have the likelihood of causing significant impacts to the environment contribute a proportionate share of the cost of improvements to offset the impacts of development. Development mitigation costs" are applied, in most cases, to large projects such as major subdivisions, planned use development districts, large scale commercial and industrial operations and resource intense uses such as mining or timber harvesting. The towns of Colonie, Halfmoon, East Greenbush and Malta have all implemented GEI programs, Colonie's the most senior of the programs having been established in in 1989. The Town of East Greenbush program, launched in 2009, has a sophisticated and robust program and the final report used to establish the program can be accessed at

https://www.eastgreenbush.org/application/files/7214/9098/6755/Final_GEIS_East_Greenbush_-_7-2-09.pdf. The law and program were renewed in 2018.

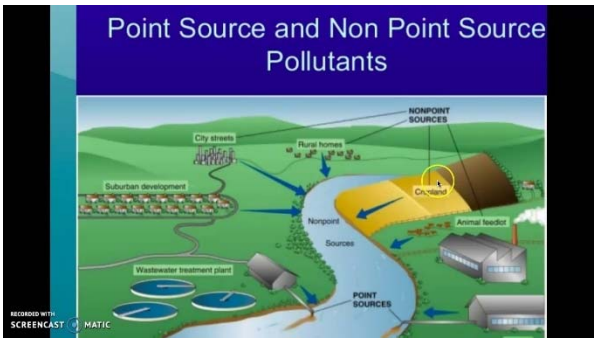
This Watershed Protection Plan can be used to form the backbone of the GIES' statement of purpose as well as define the physical boundaries of the program. Because of the robust reconnaissance within each of the subwatersheds, municipalities could develop GEIS programs that are incongruous with these subwatersheds and are directed for the specific task of projects and improvements within these subwatersheds to address specific pollutants of concern (such a turbidity, chlorides and phosphate in the Normanskill, and phosphate in the Black Creek). Because of the significant decline in water quality of the Normanskill, it would be most prudent.

The Town of East Greenbush GEIS Local Law of 2019 is included as Appendix W. This local law can form a template for town level GEIS programs within the Watervliet Reservoir.

Chapter 5: FUNDING

A summarized database of funding opportunities is summarized in Appendix T. This section provides more substantial detail on the grant programs.

5.1 Agricultural Nonpoint Source Abatement & Control Grant Program



Led by the New York State Soil and Water Conservation Committee, in coordination with the Department of Agriculture and Markets, the goal of the Agricultural Nonpoint Source Abatement and Control Program is to reduce and or prevent the nonpoint source contribution from agricultural activities in watersheds across the state by means of supporting the Agricultural Environmental Management (AEM) framework. Cost share funds are provided through Soil and Water Conservation Districts for plans and the implementation of Best Management Practices (BMPs) Systems, as defined in Section 3 of the Soil and Water Conservation Districts Law.

Grants can cost-share up to 75% of project costs or more if farm owners or operators contribute, in planning or implementation. Planning funds are awarded to conduct environmental planning while implementation funds are awarded to construct or apply management practices – many aimed at protecting water courses.

Examples of projects:

- Agricultural Waste Management is the management of on-farm generated wastes in an environmentally, economically, and agronomically responsible manner, addressing manure, milkhouse wastewater, barnyard water, silo leachate, and other organic wastes as needed. One of the goals of agricultural waste management is to utilize the waste by recycling it through soil and plants. Waste can be collected, stored, and then spread on the land. Proper nutrient management planning helps ensure waste is applied to the land at rates that won't contribute to nutrient pollution problems in nearby waterways.
- Water and Sediment Control Basin (WASCOB) improves a farmer's ability to farm sloping lands by trapping sediment and water running off of higher elevation farmlands and preventing it from washing onto land and water bodies below. This is beneficial to both the farmer and the public as it improves water quality.
- Stabilized Waterways that reduce erosion by slowing the velocity of the flowing water during normal and heavy precipitation. This reduces the amount of sediment and nutrients being carried to rivers and streams, the formation of gullies, and the impact of flooding.

5.2 NYS Conservation Reserve Enhancement Program (CREP)

Farmers are eligible to receive annual rental payments and other financial incentives for enrolling environmentally sensitive land within priority watersheds and public well-head areas in the New York State Conservation Reserve Enhancement Program, otherwise known as CREP.

The CREP Program is a partnership between state and federal agencies designed to help farmers address agricultural related environmental concerns on 40,000 acres of land across the state. Participants voluntarily retire cropland or pastureland that is located on steep slopes or borders streams, creeks, lakes and public well-head areas to help reduce sediment and nutrient runoff from entering critical watersheds. Retiring highly erodible lands and planting it to native grasses, trees and other protective vegetation will enhance water quality and provide shelter, nesting areas and food for wildlife. In return for taking these environmentally sensitive lands out of production and placing them in the CREP for 10-15 year contract periods, producers are eligible to receive the following: annual rental payments, annual maintenance payments, cost-share assistance, practice incentive payments, a signing incentive payment, and possibly an annual tax credit.

In order to be eligible to enroll in the CREP, land must be located within the eligible watersheds of 12 major New York State basins or surrounding a public well-head. Additionally, cropland must have been cropped four of the six years between 2012 and 2017 and must be capable of being cropped in a normal manner today. Marginal pastureland is also eligible for enrollment, provided it is suitable for use as a grass, riparian or a wetland buffer practice. Creating buffers and establishing vegetative cover demonstrates agriculture's commitment to the environment and the health of community neighbors.

The goals of the New York CREP are: Reduce nutrient loading of * phosphorus from 145,284 pounds per year to 72,642 pounds per year * nitrogen from 77,376 pounds per year to 38,688 pounds per year * sediments from 175,316 tons per year to 70,126 tons per year. Reduce the potential for pathogens to enter identified waterbodies. Establish riparian buffers adjacent to 4,598 stream miles and 473,457 acres of surface waters. Establish conservation vegetation on areas that serve Environmental Protection Agency approved wellhead zones.

Field boundaries and marginal pastureland adjacent to surface water are the primary focus of the program. These acres would be planted to grass or a combination of grasses, shrubs and trees. * Whole fields may be enrolled, but to qualify the slope of the acreage must meet certain highly erodible qualifications and 50 percent of the acreage must be within 1,000 feet of a surface water source. These fields may be planted to grasses, trees, wildlife habitats and/or wetlands. * Fields located in wellhead protection areas can be planted to grasses and trees as well.

New York CREP participants will be eligible for the following types of USDA payments: * Annual Rental Payments: all producers will receive an annual rental payment based on the soil's pre-determined rental rate. This rate will then be increased by an additional 145 percent as an incentive to enroll in the program (Example: A $40 rental rate plus the 145% incentive payment ($58) equals a $98/acre annual rental payment.). Annual rental payments are issued in October. * Annual Maintenance Payment: To offset any cost incurred by the producer for preserving the conservation practice, a maintenance payment of $2 to $10 dollars per acre will be added into the annual rental payment on buffer practices. * Cost-Share Assistance: USDA will reimburse farmers up to 50 percent of the eligible costs for installing conservation practices. * Practice Incentive Payment: As an incentive to establish certain practices, a one-time payment equal to 40 percent of the installation cost will be issued. This payment is in addition to the cost-share assistance and issued upon completion of the practice. * Signing Incentive Payment: Eligible producers will also receive a one-time payment of up to $100 per acre for land enrolled in a grass waterway, riparian buffer, filter strip, upland wildlife habitat buffer or wetland buffer practice. This payment is made after the contract has been signed and approved. In addition, New York will offer: * An annual tax credit: CREP acres may be added to the first 250 acres of qualified agricultural land eligible for a New York State income tax credit to offset school taxes. Cost-Share Assistance: Producers may be eligible to receive additional cost-share assistance through New York State on a competitive basis.

Establishment of riparian buffers and other CREP practices is a visible way to demonstrate your commitment to environmental stewardship. Neighbors and community members often notice and appreciate these efforts toward protecting water quality and wildlife. Participation in CREP can also help ensure a safe drinking water supply for your livestock by reducing contaminants entering surface water. If livestock are fenced out of streams altogether, an alternate water supply may be installed to provide fresh drinking water.

Both Albany County and Schenectady County Sol and Conservation Districts manage CREP programs. https://www.albanycounty.com/departments/soil-and-water-conservation-district and https://www.schenectadycounty.com/conservation-district, respectively.

5.3 NYS Trees for Tribs Program

DEC's Trees for Tribs program goal is to plant trees and shrubs along streams to create a forested riparian (streamside) buffer that helps decrease erosion, reduce flooding damage, improve wildlife and stream habitat, and protect water quality.

Vegetation, such as trees, shrubs, and grasses along waterways creates a natural buffer that protects the water and provides many benefits. An established streamside buffer:

- slows down and filters run off, preventing pollutants from getting into the water,
- intercepts and slows water from heavy rains, reducing the instances of flooding,
- shades streams, creating cooler temperature conditions to support fish species such as trout,
- holds soil in place, preventing streambanks from eroding away during heavy rains, and
- provides food and habitat for invertebrates, fish and other wildlife.

Application information for the Trees for Tribs and the buffer in a Bag program within the Hudson River Estuary is available at https://www.dec.ny.gov/lands/43668.html

Buffer in a Bag Program

The Buffer in a Bag program provides organizations and private landowners with free tree and shrub seedlings to help establish or improve a stream buffer on their property. As of March 9, we have reached the maximum number of applicants and are no longer accepting new applications for the 2022 program. Thank you for your interest.

Anyone who owns or manages land in New York State with at least 50 feet along a stream or waterbody is eligible to receive a free bag of seedlings. Organizations or individuals with permission to plant on a given property with stream or waterbody access may also participate. Applicants are limited to one bag per property, but previous participants are encouraged to apply each year to continue to grow their stream buffer.

Program Requirements: Seedlings must be planted within a riparian area (along the bank of a river, creek, or stream or shore of a lake). This can include areas within a floodplain or within 300 feet of a stream. No road, structure, stormwater pond, drainage ditch, or other constructed feature should separate the planting area from the waterbody. Ponds may be accepted if you can provide photo evidence of a natural outlet.

More information on the Buffer in a Bag program is available at:
https://www.dec.ny.gov/animals/77710.html

5.4 NYSDEC Water Quality Improvement Grants

The Water Quality Improvement Project (WQIP) program is a competitive, reimbursement grant program that funds projects that directly improve water quality or aquatic habitat or protect a drinking water source. A total of at least $75 million is available. See individual project types for maximum individual grant amounts.

Eligible Project Types & Required Match

- Wastewater Treatment Improvement (high priority projects 25%, general projects 60%)
- Nonagricultural Nonpoint Source Abatement and Control (25%)
- Land Acquisition for Source Water Protection (25%)
- Salt Storage (50%)
- Aquatic Connectivity Restoration (25%)
- Marine District Habitat Restoration (25%)

Match is the percentage of the award amount grant recipients are required to provide as a local share. For more information about each category, including priorities, application requirements, and scoring criteria, view the WQIP Program Overview (PDF).

Municipalities and Soil and Water Conservation Districts are eligible for all project types.

Not-for-Profit Corporations are eligible for Aquatic Connectivity Restoration, Marine District Habitat Restoration, and Land Acquisition for Source Water Protection only.

More information is available at https://www.dec.ny.gov/pubs/4774.html

5.5 NYSDEC Water Quality Improvement Grants for Land Acquisition

The Water Quality Improvement Project Program (WQIP) is a competitive, statewide, reimbursement grant program. The grant program protects sources of public drinking water by providing funds to purchase parcels and/or conservation easements for land that is near an active public drinking water supply.

The Maximum grant amount is $4,000,000 with a 25% of requested grant amount. Eligible project costs include buying land or development rights; transactional costs such as surveys, appraisals, transfer taxes, and title reports; and riparian buffer or wetland restoration costs. Eligible applicants include Municipalities, Not-for-profit corporations (such as Land Trusts) and Soil and water conservation districts. A partnership between The City of Watervliet and a land trust or the County oil and Water Conservation District would allow for the purchase of these parcels and their management as protected lands. As the Town of Guilderland is interested in protecting open space and creating public parks and trails for its residents, access to these trails, and create new trails on the reclaimed mine land that link with existing trails. Park and trails could be a big benefit to town residents. It could also relieve pressure on access to hiking trails around the reservoir. The NYSDEC maintains a very comprehensive toolkit for the WQIP program's land acquisition program at https://www.dec.ny.gov/pubs/115920.html. It is important to note that land acquisitions identified in an DWSP2 Plan receive the benefits of extra points for grant application scoring.

5.6 NYSDOS Local Government Efficiency Grants

Assist local governments to implement new opportunities for savings and modernized service delivery. $4 million is available for 2022-2023 program. Requires partnership between two or more municipalities and/or nonprofits.

Eligible Funding:

Planning

- Capped at $12,500 per municipality, per project
- Maximum of $100,000 for a project
- 50% State Funds/50% Local Funds

Implementation

- Capped at $200,000 per municipality, per project
- Maximum of $1,000,000 for a project
- 90% State Funds/10% Local Funds

Eligible Expenses

- Legal and consultant services
- Capital improvements and equipment
- Transitional personnel costs not to exceed three years

5.7 NYSDOS Smart Growth Program

The Smart Growth Program offers municipalities the opportunity to plan and zone for their community by addressing all aspects of Smart Growth. Maximum grant award: $100,000 for most categories.

Eligible Activities include:

- Preparing the Plan and/or zoning ordinance;
- Holding and facilitating community forums and public outreach;
- Coordinating with other governmental entities;
- SEQR and environmental review; and
- Project management
- Combined area planning/area zoning projects have a maximum award of $200,000.
- Award may not exceed 90% of the total eligible cost of the project. Applicant must provide the remaining 10%.

Eligible costs:

- Personal Services – including direct salaries, wages, and fringe benefits of grantee employees for activities related to project work (project management and grant administration).
- Non-Personal Services –including consultant/contractual services for direct project related costs, project management, and limited grant administration; project related supplies and materials; necessary travel; and other goods and services required to complete the project.

Request for Applications (RFA# 22-OPDSG-3) https://dos.ny.gov/funding-bid-opportunities

5.8 NYSDOS Local Waterfront Revitalization Program

The Department of State's Local Waterfront Revitalization Program (LWRP), funded under Title 11 of the Environmental Protection Fund, provides matching grants on a competitive basis to eligible villages, towns, cities, and counties located along New York's coasts or designated inland waterways for planning, design, and construction projects to revitalize communities and waterfronts. This program helps communities breathe new life into their waterfront and underused assets in ways that ensure successful and sustainable revitalization.

The Department encourages applications that create public access to outdoor recreation and consider resiliency in design. Projects that create dynamic public areas, improve community parks and trails, and enhance recreational opportunities can provide a significant stimulus for the local economy and set the stage for community resiliency. Public investment in these types of projects can not only increase public access and enjoyment of the waterfront, but also spur private investment, create jobs, and grow the economy. The EPF LWRP Request for Applications, which details all grant program requirements is available on the Department's website Funding & Bid Opportunities website at https://dos.ny.gov/funding-bid-opportunities. All applicants are encouraged to read the RFA in its entirety as grant program requirements may change from year to year.

Approximately $16.3 million is anticipated for award for this procurement, with up to $2 million dedicated for updates to existing LWRPs to mitigate future physical climate risks. Approximately $10.5 million of the available funding will be awarded for projects which are in, or primarily serve, areas where demographic and other relevant data demonstrate that the areas are:

- densely-populated and have sustained physical deterioration, decay, neglect, or disinvestment; or
- where a substantial proportion of the residential population is of low income, or is otherwise disadvantaged and is underserved with respect to the existing recreational opportunities

The minimum State assistance request for EPF LWRP grant funding per grant application is $50,000 and the maximum State assistance request is $3 million. Applications requesting under $50,000 in EPF LWRP grant funding will be disqualified and will not be scored.

Grant funds may be used for the following costs associated with the scope outlined in the application:

Personal Services – including direct salaries, wages, and fringe benefits for activities related to project work by municipal employees, including project management, capacity building, and grant administration. Fringe benefits must be outlined in the application and include the organizations' documented rate.

Non-Personal Services – including supplies and materials, travel, equipment, consultant/contractual services for direct project related costs, project management, capacity building, limited grant administration, and other goods and services.

Equipment –Equipment purchases will only be considered as an eligible cost if the equipment is essential to accomplish tasks included in project scope of work and is demonstrated to be more cost-effective than renting or leasing the equipment. The application should list each piece of equipment to be purchased with an estimated cost and how it will be used to accomplish project tasks. Equipment purchased with EPF LWRP grant funding cannot be sold without prior approval from the Department. If equipment purchased with EPF LWRP funds is sold without DOS approval, the Department may require that grant funds be returned to the Department. Equipment usage may only be used as local match.

5.9 NYSEFC Green Innovation Grant Program

The New York State Environmental Facilities Corporation (EFC) will offer grants to help pay for certain projects that improve water quality and mitigate the effects of climate change through the Green Innovation Grant Program (GIGP). Funding Available: $15 million

The GIGP grants are awarded on a competitive basis for municipal projects that will implement one or more of the following green practices (Green Practice(s)):

- Green Stormwater Infrastructure
- Energy Efficiency
- Water Efficiency
- Environmental Innovation

GIGP projects selected for funding maximize opportunities to leverage the multiple benefits of green infrastructure, energy efficiency, water efficiency, and environmental innovation to build capacity in these fields and facilitate the transfer of modern technologies and practices to other areas of the State.

PROGRAM PRIORITIES:

- Climate Change Mitigation: Projects that implement one of the eligible Green Practices to reduce the effects of greenhouse gases and/or support clean energy initiatives.
- Environmental Justice: Projects that use Green Practices to advance the fair treatment and meaningful involvement of all people regardless of race, income, national origin or color, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.
- Integration: Water infrastructure projects that integrate green stormwater infrastructure into traditional gray infrastructure projects to demonstrate the value of water quality improvements to the community and ecosystem to provide water quality benefits). The planning process for such projects should include the evaluation of important community benefits such as economic opportunity, climate action, and water equity.
- Natural Restoration: Projects that demonstrate the effectiveness of green stormwater infrastructure in a natural environment, such as flood plains, riparian buffers, streams, and wetlands.
- Transformation: Larger transformative projects that utilize Green Practices to provide multiple environmental, economic, and social benefits. These projects align with larger goals of the community or region.

Up to $15 million will be available for several types of grants that range from a minimum of 50% up to a maximum of 90% of total eligible project costs up to a maximum of $3 million. The grant amount is determined based on the eligible project costs as estimated in the application for planning, design, and construction.

Funding will be provided to projects to the extent that funds are available based on the evaluation criteria, including the specific green practice, water quality impacts of the project, and financial need of the municipality.

A local match for the balance of the estimated project costs is required. The maximum percentage available to fund a GIGP project will be determined based on the median household income (MHI) of the municipality in which the project is located and whether EFC determines the project serves, protects, or benefits an environmental justice (EJ) area.

Projects in municipalities that meet the following Median Household Income (MHI) 1criteria, or that serve, protect, or benefit an EJ area will be eligible to receive up to the maximum grant available for the Green Practice.

- Municipal MHI equal to or less than $75,000 for communities in New York State, excluding the Long Island, New York City and Mid-Hudson Regions.
- Municipal MHI equal to or less than $95,000 for communities in the Long Island, New York City and Mid-Hudson Regions.

All other projects will be eligible for a maximum grant up to the lesser grant available as set forth under "Funding" for each practice. If a project employs two types of Green Practices, EFC, at its sole discretion, will determine which maximum applies.

5.10 NYSEFC Water Infrastructure Improvement Grants (WIIA) and Intermunicipal Grants (IMG)

- $225 Million in Grants for Municipalities to Bolster New York's Actions to Protect Drinking Water Supplies and Vital Resources
- $30 Million in Funding to Targeted Counties Will Incentivize Replacement of Old Septic and Cesspool Systems to Prevent Water Pollution

WIIA and IMG grants are available only to county, city, town, village, district corporation, county or town improvement district, school district, Indian nation or tribe recognized by the State or the United States with a reservation wholly or partly within the boundaries of New York State, any public benefit corporation or public authority established pursuant to the laws of New York, or any agency of the State that is empowered to construct and operate a water quality infrastructure project. While school districts are eligible for WIIA and IMG grants, they are ineligible for CWSRF financial assistance.

WIIA and IMG grants can be used for project planning and design costs as long as those costs result in a completed water infrastructure improvement project under the same financing agreement. Please note that all contracts entered into that are to be paid for with WIIA funds, IMG funds, or SRF financial assistance must demonstrate compliance with EFC's terms and conditions and must include the required contractual language from the applicable EFC Terms and Conditions. Any contracts that do not include the required contractual language, including those executed prior to grant application, will be disqualified from funding. Read more at https://efc.ny.gov/wiia

5.11 NYSEFC Drinking Water State Revolving Fund (DWSRF)

The Drinking Water State Revolving Fund provides a financial incentive for public water systems to undertake needed drinking water infrastructure improvements (e.g., treatment plants, distribution mains, storage facilities). The Safe Drinking Water Act requires the State to prepare a plan identifying the estimated and intended uses of the DWSRF funds and a description of how those uses support the goals of the DWSRF. To meet that requirement, the State prepares an annual Intended Use Plan (IUP), which provides information on types of financial assistance available, sources and uses of DWSRF funds, and provides a priority list of projects that are eligible for financial assistance. A Final IUP is issued annually after a public comment period.

Projects eligible for DWSRF financing include investments to upgrade or replace infrastructure needed to achieve or maintain compliance with federal or state drinking water standards, meet treatment/performance criteria, prevent contamination, provide adequate delivery pressures, replace

contaminated supplies, and provide the public with safe affordable drinking water. Examples of such projects are:

- construction of new and/or rehabilitation of treatment facilities, transmission and distribution mains, storage facilities including finished water reservoirs, interconnections, pumping stations, and drinking water sources;
- funding and/or construction to promote the consolidation of water supply services, particularly in circumstances where individual homes or water systems generally have an inadequate quantity of water, the water supply is contaminated, or the system is unable to maintain adequate compliance for financial or managerial reasons;
- capital investments made to improve the security of drinking water systems;
- the purchase of a portion of another system if the purchase is part of a consolidation plan to bring the system(s) into compliance; and
- any of the above listed project types which are municipally owned, and which were previously financed after July 1, 1993 may be eligible for refinancing.

Projects submitted by systems lacking technical, managerial or financial capacity or significant non-compliers are not eligible for funding unless the proposed project will improve capacity or compliance. Also, projects whose primary purpose is fire protection or growth/development, dams and reservoirs, or acquisition of land not integral to an eligible project are not eligible.

Types of DWSRF Assistance:

- Short-Term Financing Program - Short-term financing will be offered interest free and at market rate for terms of up to three (3) – five (5) years. Before any short-term financing is provided, an applicant must, among other conditions, receive approval of an engineering report for the project, complete the State Environmental Review Process (SERP), be evaluated for compliance with the Smart Growth Act, obtain approval from the Office of the State Comptroller for any necessary district formation, and adopt a bond resolution for the project.
- Leveraged Financing - Leveraged Financing are DWSRF financings funded from bond proceeds. Certain bond series issued to fund DWSRF financing will be secured by federal and state match dollars deposited to and held in program financing indentures. Leveraged Financing will receive an interest subsidy either from earnings received from a dedicated reserve allocation equal to one-third of the financing amount or from other program assets. Other program assets or investment earnings from the reserve allocation will provide an interest subsidy to the recipients, thereby resulting in a net of subsidy interest rate on the financing.
- Regular Reduced Rate Direct Financing - Regular Reduced Rate Direct Financing will be made available to recipients not eligible for Leveraged Financing. Recipients determined by the EFC to be non-investment grade, or which have submitted small financing requests may receive Direct Financing.
- Hardship Financing - Hardship Financing will be made available to qualified recipients at rates below the regular reduced interest rate. Certain hardship eligible recipients may receive leveraged financing.
- Additional Financial Assistance (Grants) - Grants as available, also called additional subsidy, may be made available to eligible qualified recipients.
- Emergency Financing - Emergency financing allows for the immediate financing of emergency situations at eligible public water systems and is only available to water supply systems for emergency repairs when no other funding source is available to the system. The determination of when an emergency exists would be made by the DOH.

- SRF Bond Market Rate Program - The SRF Bond Market Rate Program provides eligible financing recipients with project scores below the subsidy funding line on the Project Annual List access to the public market at preferred market rates. Projects funded with market rate obligations will be retained on the Project Annual List of the IUP for 5 years. For projects with scores that rise above the subsidy funding line during that 5 year period (including through by-pass), subsidy assistance will become available at the then target rate for the remaining term of the recipient financing.
- SRF Bond Guarantee Program - The SRF Bond Guarantee Program provides eligible financing recipients with project scores below the subsidy funding line on the Project Annual List access to the public market at preferred market rates. For projects that quality for subsidy assistance, a bond guarantee will be available to extend repayment terms beyond the previous DWSRF limit of 20 years from project completion.

Application materials can be accessed at
https://www.health.ny.gov/environmental/water/drinking/water.htm

5.12 NYSERDA Build-Ready Program

NYSERDA partners with local communities across New York State to identify and advance under-utilized land for renewable energy projects. NYSERDA takes difficult sites and makes them "build-ready" for private renewable energy developers to construct and operate. Renewable energy projects not only provide a source of energy that is environmentally sustainable—they make good neighbors by unlocking new revenue, creating local jobs, and transforming previously under-utilized spaces.

Under-utilized lands include, but are not limited to:

- Existing or abandoned commercial sites
- Brownfields
- Landfills
- Former commercial or industrial sites
- Dormant electric generating sites

An elected official, local community member, private company, or other interested party nominates a potential Build-Ready site through a nomination form. If the site is viable, NYSERDA works with municipalities to advance the permitting, design and interconnection process. In parallel, NYSERDA actively engages with the host community to put together a customized benefits package. NYSERDA then auctions the site to private renewable energy developers through an open and competitive process for construction and operation. This program may be best suited for the former Guilderland Landfill or inactive gravel mines.

More information is available at https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Standard/Landowners-and-Local-Governments/Build-Ready-Program.

A complete set of funding opportunities are summarized in Appendix T.

Chapter 6: PROJECT MATRIX

Chapter 7: PROJECT TIMELINE

CHAPTER 8: GUILDERLAND ZONING CODE RECCOMENDATIONS

The following set of code amendment recommendations apply to the Town of Guilderland. These recommendations were developed to increase the likelihood of adoption of run-off reduction practices and land-use controls as a method to protect water quality in the reservoir.

8.1 Definition Recommendations

The following section contains definitions the Town should add to town code to clarify green infrastructure and run-off reduction techniques. Many of the words contained within the proposed definitions section appear in Town code. For example, The town refers to "green infrastructure" in § 280-39, § 280-53 and § 280-25 but does not define what it considers to be qualifying green infrastructure practices.

Town should consider adding the following definitions to § 280-5 of town code:

"Green infrastructure (or "GI") - practices that maintain or restore stormwater's natural flow pattern by allowing the water to slowly permeate into the ground, evaporate and/or and be used by plants. Practices include rain gardens, bioretention, vegetated swales, green roofs and porous pavements. Practices may also include rainwater harvesting systems such as cisterns and underground storage for reuse. Green infrastructure also includes preserving or restoring natural areas, such as forests, stream buffers and wetlands, and reducing the size of paved surfaces. Green infrastructure can recharge groundwater, provide wildlife habitat, beautify neighborhoods, cool urbanized areas, improve air quality and reduce stress on sewer systems."

"Cistern - Large tanks that store rainwater collected from impervious surfaces for domestic, non-potable uses including, but not limited to, flushing toilets, irrigation, cleaning laundry, and washing cars. A cistern employed as part of a stormwater management practice must not overflow into the sanitary sewer. Cistern overflows must be directed to a Green Infrastructure practice that allows water to infiltrate back into the ground. Cisterns and plumbing to support rainwater harvesting must conform to NYS Plumbing Code, specifically Section 1303, Nonpotable Collection and Distribution Systems."

Green Roof - A vegetated roof design that is explicitly designed to absorb rainfall or snowmelt, typically to manage stormwater, mitigate the heat island effect, provide habitat for urban wildlife, or offer leisure and recreational space for building occupants.

Greenspace - That portion of land shown on a development plan, Master Plan or Official Map the purpose of which is intended for open space preservation, recreation (active or passive), landscaping, green infrastructure for the express purpose of managing stormwater, or parkland. Unless otherwise required by the Planning or Town Board, said lands shall be undisturbed and seeded and planted with appropriate materials or left in their natural state.

Construction Activity - Activities requiring authorization under the SPDES permit for stormwater discharges from construction activity, GP-02-01, as amended or revised. These activities include construction projects resulting in land disturbance of one or more acres. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition."

Steep Slopes

§ 247-6. defines a protected slope reserve as "the area comprised of any land where there is a slope of 30° or greater, and the difference in elevation between the horizontal planes at the bottom and top of the

slope is 20 feet or greater. This area is established as any slope 30º or greater. Also see, "setback, protected slope reserve" and § 247-31B."

Per the NYSDEC Fact Sheet for the SPDES General Permit for Stormwater Discharges for Construction Activity (https://www.dec.ny.gov/docs/water_pdf/constgpfactsheet.pdf) "Construction on steep slopes (greater than 15%) can result in adverse impacts including land slippage, erosion, changes to stormwater runoff quantity and location, visual impacts, and safety issues for vehicular access. Upstream and downstream habitats and resources can be affected by erosion and sedimentation."

The town should consider defining steep slopes as slopes over 15% and should look to Westchester County's Code as a model for resiliency. Westchester County code establishes the following:

Steep Slope Definition:

Those areas with an average slope equal to or greater than 15%, as measured in accordance with the slope measurement criteria, with minimum 500 sq ft.

Steep Slope Restrictions:

Land that includes a slope equal to or greater than 15% that has a request to be developed and/or regraded or stripped of vegetation will require a permit. The percentage of land that can be possibly developed should vary depending on the steepness of the land.

Ideal Recommendations:

- Sloped land slope = 15% requires permit;
- Sloped area from 15%-20% not more than 25% of the area may be disturbed;
- Sloped area slope = 20%, no more than 10% of that area may be disturbed;
- Sloped area slope = 25% may not be disturbed.

Cut and Fill of Steep Slopes:

Cut and Fill provisions should be included for all steep slope activity. Cut and fill slopes does not exceed a slope of one vertical to three horizontal except where retaining walls, structural stabilization, or other methods acceptable to the Town Engineer are used.

Mitigation Measure:

Proper completion of the proposed activity in accordance with the approved plans. The restoration of the area to its natural condition as far as practicable and protection of adjoining property owners from damage resulting from steep slope disturbances.

Permit Requirements:

Permits should be required when developing, regrading or stripping land slope is equal to or greater than 15% slope.

Impervious Lot Coverage

It is unclear if the town uses building footprints to determine lot coverage or if lot coverage is defined by impervious surface. Using impervious surface as the standard for lot coverage allows Green Infrastructure ("GI") to be used to manage stormwater. If building size is the metric by which lot coverage is currently defined, the Town will need to evaluate lot coverage standards before moving to an impervious based coverage standard.

The town should amend their code and add a section to define impervious surface as the total area of any lot or parcel occupied by all of the following:

1) The footprint of the principal building (but excluding the surface area of any Green Roof or an area that drains into a cistern.)
2) The footprints of all accessory buildings, parking garages, carports, utility and storage sheds (but excluding the surface area of any Green Roof or an area that drains into a cistern.)
3) All areas or areas otherwise covered with materials impervious to water including parking areas and driveways (but not including parking areas and driveways with pervious or semi-pervious paving materials); and
4) All areas occupied by above ground swimming pools (but not in-ground pools).

8.2 Watercourse Buffer Recommendations

The Guilderland Code restricts development along water courses:

§ 280-30 *B Watercourses. No structure shall be allowed within 100 feet of the top of the bank of a watercourse or body of water except man-made farm ponds not fed or drained by a running stream.*

C. Watervliet Reservoir. No use or structure shall be allowed within 250 feet of the top of a bank of a watercourse feeding into the Watervliet Reservoir or within 500 feet of the high-water mark of the Watervliet Reservoir.

Guilderland's waterbody protections are excellent and should be the setback requirements for the entire watershed, and other communities within the watershed should consider adoption of similar standards.

For reference, the NYSDEC maintains a substantial volume of best management practices for protecting stream health. Healthy buffers that can withstand flooding and provide the highest level of protection for streams consist of multiple zones.

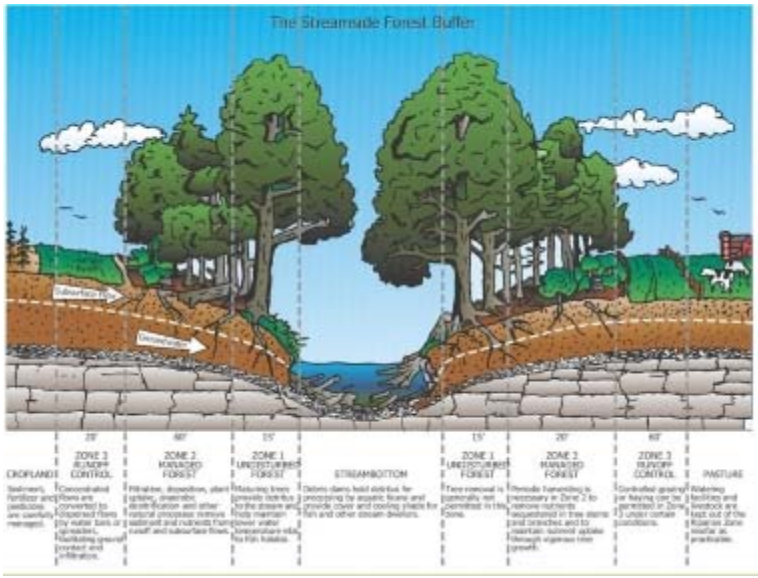


FIGURE 4 - STREAM BUFFERS (*PHOTO CREDIT: STROUD WATER RESEARCH CENTER*)

- Zone 1: The area closest to the stream or waterbody should be planted with native species of water-tolerant trees and large shrubs with little or no harvesting. This zone provides streambank stabilization and provides leaf litter inputs to the stream. Leaf litter is eaten by macroinvertebrates in the stream, which are in turn eaten by fish. When trees grow in Zone 1, they shade the stream, which cools the water and provides better conditions for brook trout or other cold water-dependent fish species. Ideally, Zone 1 should be at least 15 feet wide.
- Zone 2: The zone upland from Zone 1 should be planted with native faster growing, smaller, shade-tolerant tree or shrub species. This zone allows water runoff to be absorbed and held in the soil. Nutrients and other pollutants are also filtered by the soil. Faster growing plants are able to uptake and store nutrients in their woody biomass. Zone 2 can range from 20 to 60 feet in width.
- Zone 3: The zone farthest from the stream and next to land use areas (for example, houses, crops or pastureland), should be planted with native grasses, wildflowers, or other herbaceous plants. These plants slow fast-moving water runoff and filter sediment. Zone 3 can range from 15 to 60 feet in width.

NYSDOS, in guidance material for communities to assess flood risk and ways to mitigate flooding risk, also provides recommended buffer widths.

Recommended Minimum Buffer Width for Common Stream Management Objectives[47]	
Purpose of Buffer	Minimum Width of Buffer
Bank Stabilization	98 - 164 feet
Retain Nitrogen and Phosphorous to Protect Water Quality	16 – 295 feet
Prevent Erosion (Sediment Input)	32 – 393 feet
Wildlife Habitat	98 feet – 5249 feet
Flood mitigation	65 – 492 feet

Figure 5 - Wetland and Watercourse Protection Measures (NYSDOS, 2019)

NYSDEC recommends the total width for all three zones is at least 100 feet. Riparian buffers that are at least 100 feet wide provide the minimum protection for water quality and stream protection.

The Town should define and codify the list of prohibited activities within the designated protected watercourse areas should also be amended to strengthen these water body protections.

Communities should consider prohibiting removal of native vegetation or allowing such removal under permit only – in which case an applicant must seek approval from the Town the ability to remove vegetation. In that circumstance, the town could require landscape plan that includes replacement, native plantings, as well a statement demonstrating the slopes of the waterbody's banks will not be subject to erosion as a result of the removal of native plants.

The Town should also expand on watercourse prohibitions in § 247-30 and § 247-31 As it relates to the construction of streets, driveways or walkways, parking areas; patios or other such surfaces greater than 200 square feet in total ground surface area per lot, except for replacement in kind of an existing facility.

"Encroachments by such surfaces, 200 square feet or less in total area per lot, shall be permitted if not nearer than the minimum horizontal distance of 100 feet away from and parallel to the high-water level or top of bank (whichever is easiest to accurately determine) of a watercourse."

8.3 Parking Lot Design Recommendations

The following Minimum, Best, and Model recommendations were drafted by the Stormwater Coalition of Albany County and slightly modified for the purposes of this report:

Minimum Action Level

a) Landscaped areas in a project site plan, including in parking lots, shall be lowered and incorporate curb cuts or other diversion devices to divert stormwater to the landscaped areas as part of a stormwater management plan.
b) Parking lots shall include one tree for every 1,200 feet of impervious parking area. Sufficient permeable or infiltration areas shall be provided around the expected radius of the mature tree to provide infiltration for the tree drip area. Existing mature trees shall not be included in the calculation for minimum trees except for areas where the existing mature tree canopy extends over impervious surfaces. Tree plantings may be designed as tree pits for stormwater treatment as provided in the latest version of the New York State Stormwater Management Design Manual.

Best Management Action Level *(all of the Minimum Actions plus the following)*

c) For every impervious parking space, the site plan shall include at least 20 square feet of vegetated area within the parking lot. "Within the parking lot" means that at least 75% of the perimeter of the landscaped area is located within the parking lot. Vegetated areas must include native non-invasive species and may be used for green infrastructure stormwater practices.

Model Community Action Level *(all of the Minimum and Best actions plus the following)*

Surface parking lots with more than two rows of parking shall include a minimum of a 4' wide landscaping islands between rows. These islands shall include curb cuts/wheel stops to allow entry of stormwater for treatment/infiltration. Landscaped areas shall utilize tree plantings, native vegetation, dry swales, stormwater planters, tree pits, or bioretention in center islands between parking rows. Stormwater management features must be designed in accordance with the latest version of the New York State Stormwater Management Design Manual and shall include the following:

"Landscaping should include a minimum of one tree island containing at least 50 square feet of land area, which shall include at least one medium shade tree or larger for every 20 parking spaces. Parking lot screening at the perimeter of the lot should not be used to meet this the percent landscaping requirement.

Surface parking lots with more than two rows of parking shall include a minimum of a 4' wide landscaping islands between rows. These islands shall include curb cuts/wheel stops to allow entry of stormwater for treatment/infiltration. Landscaped areas shall utilize tree plantings, native vegetation, dry swales, stormwater planters, tree pits, or bioretention in center islands between parking rows. Stormwater management features must be designed in accordance with the latest version of the New York State Stormwater Management Design Manual and shall include the following:

- Trees shall have dense canopy for rainfall interception, being round, oval, or v-shaped in form.
- Trees used shall be native and have proven observed salt tolerance if applicable.
- The area of the parking lot subject to vehicular traffic, that also corresponds to the mature tree's canopy area, shall incorporate structural measures to prevent soil compaction and root damage. This may be accomplished by use of a soil structure specifically designed to withstand observed traffic loading.
- Water must be allowed to infiltrate to the tree roots in an amount to ensure tree survival with minimal watering after the first year.
- Soil volume must be the amount required for the specific tree and intended function.
- Trees shall be selected based on several factors, including observed local healthy tree stands in similar applications, existing and anticipated soil compaction, existing pH, planned water availability, adjacent road maintenance (salt, sand, etc.), presence of overhead utilities, availability of sunlight, percolation rate, soil's ability to circulate air, and soil type.
- Because paved parking lots and the cars associated with them can raise local temperatures by up to 20 degrees, trees selected near heat islands should be tolerant of these conditions.
- Trees shall be selected based on best landscape practices, using the guidance document "Recommended Urban Trees: Site Assessment and Tree Selection for Stress Tolerance", as published by the Urban Horticultural Institute, Department of Horticulture, Cornell University, Ithaca, NY or other industry accepted standard at the discretion of the Town.
- All parking lot runoff is required to flow through a planted area to cool runoff temperatures before entering the storm drain system.
- Parking lots larger than 1,200 sf, located on soils of hydrologic soil groups A, B, or C, excluding the area reserved for vegetation and stormwater management, are required to be construction of impervious paving material over a minimum of 20% of the parking lot area. Parking lots larger than 1,200 sf, located on soils of hydrologic soil group D, excluding the area reserved for vegetation and stormwater management, are required to be construction of impervious paving material over a minimum of 10% of the parking lot area.

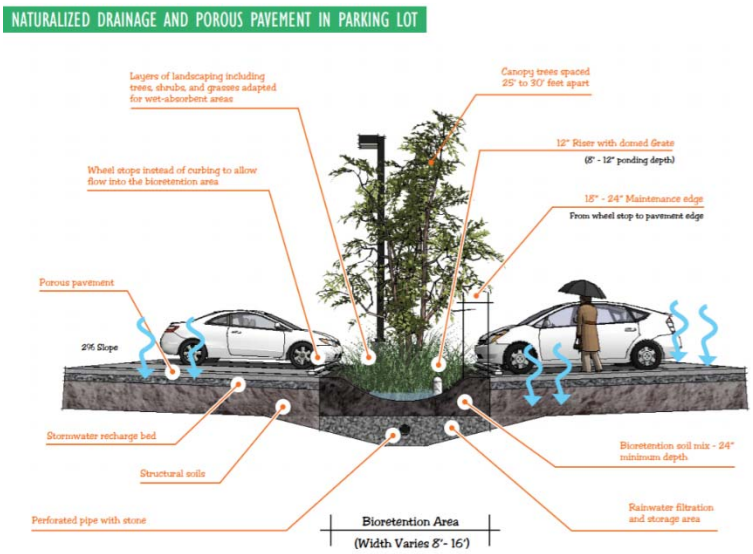


FIGURE 6 - SUSTAINABLE GREEN PARKING LOTS GUIDEBOOK (MONTGOMERY COUNTY PLANNING COMMISSION)

When incorporated appropriately, parking lot landscaping can do more than provide an aesthetic benefit. While trees have long been recognized for their ability to help clean the air, reduce energy needs, raise property values, and mitigate heat island effects, their innate ability to absorb and divert rainfall has been underutilized. Trees have proven value in reducing runoff and mitigating the costs of stormwater

management. In fact, research by the United States Forest Service has shown the environmental and economical values trees contribute to the community.

The Town should consider revising the parking standards town-wide to require at least ten percent of the surface area occupied by vehicle parking spaces be landscaped, inclusive of driving aisles and driveways necessary for access to and circulation among those spaces.

Recessed, bioretention islands should incorporate the following features:

i. Any curbs installed at the edges of required perimeter and interior landscaped areas shall have openings that allow drainage from the pavement to enter and percolate through the landscaped areas.
ii. Mulch shall not be installed adjacent to any sidewalk, parking area, or driveway with less than a one foot border of grass or other permanent live groundcover to ensure mulch is not washed into the drainage system.

Where a parking area or lot for 10 or more spaces is adjacent a lot containing a principal Residential use, and the parking lot is not separated from the adjacent property by a principal or accessory structure, the parking area or lot shall be screened from the adjacent district or use by one or both of the following, located within five feet of the front lot line:

1) A masonry wall (not including Concrete Masonry Unit blocks) between 30 and 36 inches in height; or
2) A decorative wrought-iron-style fence between 30 and 42 inches in height, with masonry piers that may extend to 48 inches in height. Masonry piers may not exceed 18 inches in width, viewed from the street, and may not occupy more than 20 percent of the length of the fence.
3) A continuous line of shrubs that achieves 80 percent opaque screening between 30 and 48 inches in height during summer months.

8.4 SWPPP Plan Applicability Requirement Recommendations

Currently, NYS requires the owner or operator of a construction project that will involve soil disturbance of one or more acres to obtain coverage under the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity before commencing construction activity.

The Town stormwater law states *"No approval of a land development activity shall be issued until a stormwater pollution prevention plan (SWPPP) has been accepted."* The Town defines a land development activity as "An activity, including clearing, grading, excavating, soil disturbance or placement of fill, that results in land disturbance equal to or greater than one acre or an activity disturbing less than one acre of total land area that is part of a larger common plan of development or sale, even though multiple separate and distinct land development activities may take place at different times on different schedules. The Town applies this standard to land development projects – those that meet or exceed the 1 acre threshold.

The town should consider requiring sites with disturbance smaller than 1 acre, and larger than ½ acre to implement Green Infrastructure practices on site, without the requirement of a SWPPP. For projects within

this threshold, the Town could require projects with more than ¼ acre of land disturbance, but not more than a ½ acre, to install at least one of the following site design features to reduce stormwater flows.

A. Install one of the following, designed to detain the first one (1) inch of rainfall and design the site to direct all rooftop stormwater and at least 75% of surface stormwater flows into that site feature, provided the feature is designed to the standard established in the New York State Stormwater Management Design Manual:
    1. A tree in a tree well.
    2. A drainage swale or rain garden.
    3. An underground cistern.
B. Install a green roof

The Town may approve alternatives to the features listed in subsection (A) above if it determines that the alternative features would achieve the same or greater detention or infiltration of stormwater.

Code should grant the Planning Board the ability, during project design review, to require incorporation of low-impact development standards wherever feasible. Appropriate engineering should include use of one or more of the following low-impact development techniques:

1. Soil amendments.
2. Conservation of land in natural state.
3. Minimizing imperviousness

8.5 Density Bonus Recommendations

The town should consider expanding upon the density bonus project eligibility criteria for projects that meet stormwater performance measures above and beyond the minimum standards stablished in § 190-79.

New development or redevelopment of a site that incorporates a green (vegetated) roof, or other building or site features that are designed so that off-site flow of the first one inch of rainfall during the first 24 hours after rainfall ends is reduced by at least 50 percent shall receive the following benefits:

a. The project may reduce any required building setback by 20 percent (provided the required reduction in off-site water flow is still achieved); and
b. The project may increase the maximum height of any primary building (or part of a primary building) by 10 feet.

8.6 Design Guidance

The NYSDEC has identified a set of 18 "better site design practices" (www.dec.ny.gov/docs/water_pdf/bsdcomplete.pdf) which can reduce the impacts of a project, and also often reduce costs. Many of these practices will result in smaller required stormwater treatment and storage volumes. These are generally nonstructural or smaller-scale practices than those described in the Stormwater Design Manual.

The Capital District Regional Planning Commission also maintains a Green Infrastructure Design Toolkit that may be relied upon for development of Green Infrastructure practices for Stormwater Management. This guidance document is available at www.cdrpc.org/programs/water-quality/green-infrastructure-toolkit

These guides should be referenced in code as a tool for developers and landscape designers to refer to when planning a site.

Several Towns and Villages in the region have adopted Landscape Manuals to guide and define the landscaping aesthetic the community prescribes for developments. Examples include the "Town of Glenville Design Manual" (https://www.townofglenville.org/economic-development-planning-department/pages/manuals-design-landscape) and the "Village of Colonie Design Guidelines" (https://www.cdtcmpo.org/link/colonie.pdf). The town should consider drafting a landscape manual to better prescribe the selection of plantings they wish to see implemented throughout the town.

Chapter 10: ROTTERDAM ZONING CODE RECCOMENDATIONS

The following set of Code amendment recommendations apply to the Town of Rotterdam. These recommendations were developed to increase the likelihood of adoption of run-off reduction practices and land-use controls as a method to protect water quality in the reservoir.

10.1 Definition Recommendations

The following section contains definitions the Town should add to town code to clarify green infrastructure and run-off reduction techniques. Many of the words contained within the proposed definitions section appear in § 270-5 of Town code.

Green infrastructure - practices that maintain or restore stormwater's natural flow pattern by allowing the water to slowly permeate into the ground, evaporate and/or and be used by plants. Practices include rain gardens, bioretention, vegetated swales, green roofs and porous pavements. Practices may also include rainwater harvesting systems such as cisterns and underground storage for reuse. Green infrastructure also includes preserving or restoring natural areas, such as forests, stream buffers and wetlands, and reducing the size of paved surfaces. Green infrastructure can recharge groundwater, provide wildlife habitat, beautify neighborhoods, cool urbanized areas, improve air quality and reduce stress on sewer systems.

Cistern - Large tanks that store rainwater collected from impervious surfaces for domestic, non-potable uses including, but not limited to, flushing toilets, irrigation, cleaning laundry, and washing cars. A cistern employed as part of a stormwater management practice must not overflow into the sanitary sewer. Cistern overflows must be directed to a Green Infrastructure practice that allows water to infiltrate back into the ground. Cisterns and plumbing to support rainwater harvesting must conform to NYS Plumbing Code, specifically Section 1303, Nonpotable Collection and Distribution Systems.

Green Roof - A vegetated roof design that is explicitly designed to absorb rainfall or snowmelt, typically to manage stormwater, mitigate the heat island effect, provide habitat for urban wildlife, or offer leisure and recreational space for building occupants.

Greenspace - That portion of land shown on a development plan, Master Plan or Official Map the purpose of which is intended for open space preservation, recreation (active or passive), landscaping, green infrastructure for the express purpose of managing stormwater, or parkland. Unless otherwise required by the Planning or Town Board, said lands shall be undisturbed and seeded and planted with appropriate materials or left in their natural state.

Construction Activity

“Activities requiring authorization under the SPDES permit for stormwater discharges from construction activity, GP-02-01, as amended or revised. These activities include construction projects resulting in land disturbance of one or more acres. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.”

Steep Slopes

Per the NYSDEC Fact Sheet for the SPDES General Permit for Stormwater Discharges for Construction Activity (https://www.dec.ny.gov/docs/water_pdf/constgpfactsheet.pdf) “Construction on steep slopes (greater than 15%) can result in adverse impacts including land slippage, erosion, changes to stormwater runoff

quantity and location, visual impacts, and safety issues for vehicular access. Upstream and downstream habitats and resources can be affected by erosion and sedimentation."

Within § 270-5, the Town definitions steep slopes, as "Ground areas with a slope greater than 15% covering a minimum horizontal area of 1/4 acre or 10,890 square feet and a minimum horizontal dimension of 10 feet.

The town should consider defining **steep slopes** as slopes over 15% which cover covering minimum horizontal area 2,000 of because of contiguous sloped area," referring to the NYSDEC consideration of steep slope values, as the potential for negative adverse impacts including land slippage, erosion, changes to stormwater runoff quantity and location should be under greater scrutiny. Upstream and downstream habitats and resources can also be affected by erosion and sedimentation.

Westchester County's Code as it relates to Steep Slopes is a model for resiliency. Westchester County code establishes the following:

Steep Slope Definition:

Those areas with an average slope equal to or greater than 15%, as measured in accordance with the slope measurement criteria, with minimum 500 sq ft.

Steep Slope Restrictions:

Land that includes a slope equal to or greater than 15% that has a request to be developed and/or regraded or stripped of vegetation will require a permit. The percentage of land that can be possibly developed should vary depending on the steepness of the land.

Ideal Recommendations:

- Sloped land slope = 15% requires permit;
- Sloped area from 15%-20% not more than 25% of the area may be disturbed;
- Sloped area slope = 20%, no more than 10% of that area may be disturbed;
- Sloped area slope = 25% may not be disturbed.

Cut and Fill of Steep Slopes:

Cut and Fill provisions should be included for all steep slope activity. Cut and fill slopes does not exceed a slope of one vertical to three horizontal except where retaining walls, structural stabilization, or other methods acceptable to the Town Engineer are used.

Mitigation Measure:

Proper completion of the proposed activity in accordance with the approved plans. The restoration of the area to its natural condition as far as practicable and protection of adjoining property owners from damage resulting from steep slope disturbances.

Permit Requirements:

Permits should be required when developing, regrading or stripping land slope is equal to or greater than 15% slope.

Impervious Lot Coverage

It is unclear if the town uses building footprints to determine lot coverage or if lot coverage is defined by impervious surface. Using impervious surface as the standard for lot coverage allows Green Infrastructure ("GI") to be used to manage stormwater. If building size is the metric by which lot coverage is currently defined, the Town will need to evaluate lot coverage standards before moving to an impervious based coverage standard.

The town should amend their code to define impervious surface as the total area of any lot or parcel occupied by all of the following:

5) The footprint of the principal building (but excluding the surface area of any Green Roof or an area that drains into a cistern.)
6) The footprints of all accessory buildings, parking garages, carports, utility and storage sheds (but excluding the surface area of any Green Roof or an area that drains into a cistern.)
7) All areas or areas otherwise covered with materials impervious to water including parking areas and driveways (but not including parking areas and driveways with pervious or semi-pervious paving materials); and

All areas occupied by above ground swimming pools (but not in-ground pools).

Buffer Area

The Town should consider amendments to § 270 as it relates to "buffer areas" to increase the adoption of Green Infrastructure practices and remove any barriers to its employment withing the barrier, as GI practices may often be "structures" that would otherwise be prohibited by code.

The town should consider language that allows for the siting of GI practices within the buffer.

"Open spaces, landscaped areas, fences, walls, berms or any combination thereof used to physically separate or screen a use or property from another so as to visually shield or block noise, lights or other nuisances. This buffer may be used for green infrastructure practices that manage stormwater provided those practices meet setback requirements established elsewhere in Town Code."

For specific green infrastructure practices the town may wish to see employed in its implementation of a Green Area Ratio/Green Factor (Section 12), the Town should define each practice and performance measures in the same manner Seattle and Washington, DC have done.

10.2 Watercourse Buffer Recommendations

The Town should revise the Watercourse Area calculation to better protect waterbodies from turbidity, sedimentation and erosion from construction activities, clearing or grading.

§ 270-5 defined a watercourse buffer as the horizontal distance of 50 feet away from and parallel to the mean high water level of a watercourse.

The NYSDEC maintains a substantial volume of best management practices for protecting stream health. Healthy buffers that can withstand flooding and provide the highest level of protection for streams consist of multiple zones.

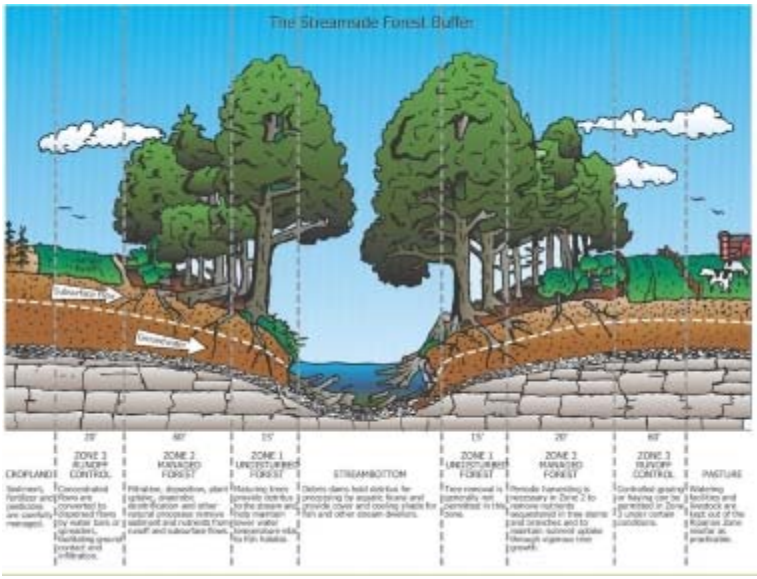


FIGURE 7 - STREAM BUFFERS (***PHOTO CREDIT: STROUD WATER RESEARCH CENTER***)

- Zone 1: The area closest to the stream or waterbody should be planted with native species of water-tolerant trees and large shrubs with little or no harvesting. This zone provides streambank stabilization and provides leaf litter inputs to the stream. Leaf litter is eaten by macroinvertebrates in the stream, which are in turn eaten by fish. When trees grow in Zone 1, they shade the stream, which cools the water and provides better conditions for brook trout or other cold water-dependent fish species. Ideally, Zone 1 should be at least 15 feet wide.
- Zone 2: The zone upland from Zone 1 should be planted with native faster growing, smaller, shade-tolerant tree or shrub species. This zone allows water runoff to be absorbed and held in the soil. Nutrients and other pollutants are also filtered by the soil. Faster growing plants are able to uptake and store nutrients in their woody biomass. Zone 2 can range from 20 to 60 feet in width.
- Zone 3: The zone farthest from the stream and next to land use areas (for example, houses, crops or pastureland), should be planted with native grasses, wildflowers, or other herbaceous plants. These plants slow fast-moving water runoff and filter sediment. Zone 3 can range from 15 to 60 feet in width.

NYSDOS, in guidance material for communities to assess flood risk and ways to mitigate flooding risk, also provides recommended buffer widths.

Recommended Minimum Buffer Width for Common Stream Management Objectives[47]	
Purpose of Buffer	Minimum Width of Buffer
Bank Stabilization	98 - 164 feet
Retain Nitrogen and Phosphorous to Protect Water Quality	16 – 295 feet
Prevent Erosion (Sediment Input)	32 – 393 feet
Wildlife Habitat	98 feet – 5249 feet
Flood mitigation	65 – 492 feet

Figure 8 - Wetland and Watercourse Protection Measures (NYSDOS, 2019)

NYSDEC recommends the total width for all three zones is at least 100 feet. Riparian buffers that are at least 100 feet wide provide the minimum protection for water quality and stream protection.

In effort to protect streams, ponds, wetlands, and shorelines from development impacts through imposition of buffers the Town **should define the watercourse area as a minimum horizontal distance of 100 feet away from and parallel to the high-water level or top of bank (whichever is easiest to accurately determine) of a watercourse.** The town should adopt language that allows the planning board to increase this minimum distance in consideration of site-specific soil conditions, existing water quality of the subject watercourse or other pertinent factors such as conservation value.

The Town's list of prohibited activities within the designated protected watercourse areas should also be amended to strengthen these water body protections. The removal of vegetation, "except for the reasonable upkeep or preservation of the property" gives a wide latitude for clear cutting and destroying valuable plants that maintain soils and provide for critical habitat. The town should consider wholly prohibiting *any* removal of native vegetation or allowing such removal under permit only – in which case an applicant must seek approval from the Town the ability to remove vegetation. In that circumstance, the town could require landscape plan that includes replacement, native plantings, as well a statement demonstrating the slopes of the waterbody's banks will not be subject to erosion as a result of the removal of native plants.

The Town should also spell out and expand the limits of disturbance within the watercourse buffer.

"H: Construction of streets, driveways or walkways, parking areas; patios or other such surfaces greater than 200 square feet in total ground surface area per lot, except for replacement in kind of an existing facility. Encroachments by such surfaces, 200 square feet or less in total area per lot, shall be permitted if not nearer than the minimum horizontal distance of 100 feet away from and parallel to the high-water level or top of bank (whichever is easiest to accurately determine) of a watercourse."

10.3 Parking Lot Design Recommendations

The following Minimum, Best, and Model recommendations were drafted by the Stormwater Coalition of Albany County and slightly modified for the purposes of this report:

Minimum Action Level

d) Landscaped areas in a project site plan, including in parking lots, shall be lowered and incorporate curb cuts or other diversion devices to divert stormwater to the landscaped areas as part of a stormwater management plan.
e) Parking lots shall include one tree for every 1,200 feet of impervious parking area. Sufficient permeable or infiltration areas shall be provided around the expected radius of the mature tree to provide infiltration for the tree drip area. Existing mature trees shall not be included in the calculation for minimum trees except for areas where the existing mature tree canopy extends over impervious surfaces. Tree plantings may be designed as tree pits for stormwater treatment as provided in the latest version of the New York State Stormwater Management Design Manual.

Best Management Action Level *(all of the Minimum Actions plus the following)*

f) For every impervious parking space, the site plan shall include at least 20 square feet of vegetated area within the parking lot. "Within the parking lot" means that at least 75% of the perimeter of the landscaped area is located within the parking lot. Vegetated areas must include native non-invasive species and may be used for green infrastructure stormwater practices.

Model Community Action Level *(all of the Minimum and Best actions plus the following)*

Surface parking lots with more than two rows of parking shall include a minimum of a 4' wide landscaping islands between rows. These islands shall include curb cuts/wheel stops to allow entry of stormwater for treatment/infiltration. Landscaped areas shall utilize tree plantings, native vegetation, dry swales, stormwater planters, tree pits, or bioretention in center islands between parking rows. Stormwater management features must be designed in accordance with the latest version of the New York State Stormwater Management Design Manual and shall include the following:

"Landscaping should include a minimum of one tree island containing at least 50 square feet of land area, which shall include at least one medium shade tree or larger for every 20 parking spaces. Parking lot screening at the perimeter of the lot should not be used to meet this the percent landscaping requirement. Surface parking lots with more than two rows of parking shall include a minimum of a 4' wide landscaping islands between rows. These islands shall include curb cuts/wheel stops to allow entry of stormwater for treatment/infiltration. Landscaped areas shall utilize tree plantings, native vegetation, dry swales, stormwater planters, tree pits, or bioretention in center islands between parking rows. Stormwater management features must be designed in accordance with the latest version of the New York State Stormwater Management Design Manual and shall include the following:

- Trees shall have dense canopy for rainfall interception, being round, oval, or v-shaped in form.
- Trees used shall be native and have proven observed salt tolerance if applicable.
- The area of the parking lot subject to vehicular traffic, that also corresponds to the mature tree's canopy area, shall incorporate structural measures to prevent soil compaction and root damage. This may be accomplished by use of a soil structure specifically designed to withstand observed traffic loading.
- Water must be allowed to infiltrate to the tree roots in an amount to ensure tree survival with minimal watering after the first year.
- Soil volume must be the amount required for the specific tree and intended function.
- Trees shall be selected based on several factors, including observed local healthy tree stands in similar applications, existing and anticipated soil compaction, existing pH, planned water availability, adjacent road maintenance (salt, sand, etc.), presence of overhead utilities, availability of sunlight, percolation rate, soil's ability to circulate air, and soil type.
- Because paved parking lots and the cars associated with them can raise local temperatures by up to 20 degrees, trees selected near heat islands should be tolerant of these conditions.
- Trees shall be selected based on best landscape practices, using the guidance document "Recommended Urban Trees: Site Assessment and Tree Selection for Stress Tolerance", as published by the Urban Horticultural Institute, Department of Horticulture, Cornell University, Ithaca, NY or other industry accepted standard at the discretion of the Town.

- All parking lot runoff is required to flow through a planted area to cool runoff temperatures before entering the storm drain system.
- Parking lots larger than 1,200 sf, located on soils of hydrologic soil groups A, B, or C, excluding the area reserved for vegetation and stormwater management, are required to be construction of impervious paving material over a minimum of 20% of the parking lot area. Parking lots larger than 1,200 sf, located on soils of hydrologic soil group D, excluding the area reserved for vegetation and stormwater management, are required to be construction of impervious paving material over a minimum of 10% of the parking lot area.

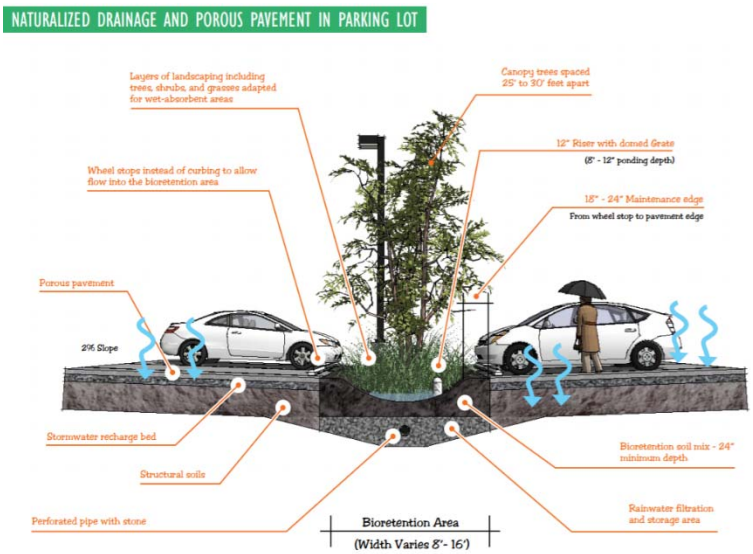


FIGURE 9 - SUSTAINABLE GREEN PARKING LOTS GUIDEBOOK (MONTGOMERY COUNTY PLANNING COMMISSION)

When incorporated appropriately, parking lot landscaping can do more than provide an aesthetic benefit. While trees have long been recognized for their ability to help clean the air, reduce energy needs, raise property values, and mitigate heat island effects, their innate ability to absorb and divert rainfall has been underutilized. Trees have proven value in reducing runoff and mitigating the costs of stormwater management. In fact, research by the United States Forest Service has shown the environmental and economical values trees contribute to the community.

The Town should consider revising the Parking Standards town-wide to require at least **ten percent** of the surface area occupied by vehicle parking spaces be landscaped, inclusive of driving aisles and driveways necessary for access to and circulation among those spaces.

Recessed, bioretention islands should incorporate the following features:

iii. Any curbs installed at the edges of required perimeter and interior landscaped areas shall have openings that allow drainage from the pavement to enter and percolate through the landscaped areas.

iv. Mulch shall not be installed adjacent to any sidewalk, parking area, or driveway with less than a one foot border of grass or other permanent live groundcover to ensure mulch is not washed into the drainage system.

Where a parking area or lot for 10 or more spaces is adjacent a lot containing a principal Residential use, and the parking lot is not separated from the adjacent property by a principal or accessory structure, the parking area or lot shall be screened from the adjacent district or use by one or both of the following, located within five feet of the front lot line:

4) A masonry wall (not including Concrete Masonry Unit blocks) between 30 and 36 inches in height; or

5) A decorative wrought-iron-style fence between 30 and 42 inches in height, with masonry piers that may extend to 48 inches in height. Masonry piers may not exceed 18 inches in width, viewed from the street, and may not occupy more than 20 percent of the length of the fence.
6) A continuous line of shrubs that achieves 80 percent opaque screening between 30 and 48 inches in height during summer months.

10.4 SWPPP Plan Applicability Requirement Recommendations

Currently, NYS requires the owner or operator of a construction project that will involve soil disturbance of one or more acres to obtain coverage under the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity before commencing construction activity.

The Town stormwater law states *"No approval of a land development activity shall be issued until a stormwater pollution prevention plan (SWPPP) has been accepted."* The Town defines a land development activity as "An activity, including clearing, grading, excavating, soil disturbance or placement of fill, that results in land disturbance equal to or greater than one acre or an activity disturbing less than one acre of total land area that is part of a larger common plan of development or sale, even though multiple separate and distinct land development activities may take place at different times on different schedules. The Town applies this standard to land development projects – those that meet or exceed the 1 acre threshold.

The town should consider requiring sites with disturbance smaller than 1 acre, and larger than ½ acre to implement Green Infrastructure practices on site, without the requirement of a SWPPP. For projects within this threshold, the Town could require projects with more than ¼ acre of land disturbance, but not more than a ½ acre, to install at least one of the following site design features to reduce stormwater flows.

B. Install one of the following, designed to detain the first one (1) inch of rainfall and design the site to direct all rooftop stormwater and at least 75% of surface stormwater flows into that site feature, provided the feature is designed to the standard established in the New York State Stormwater Management Design Manual:
    4. A tree in a tree well.
    5. A drainage swale or rain garden.
    6. An underground cistern.
B. Install a green roof

The Town may approve alternatives to the features listed in subsection (A) above if it determines that the alternative features would achieve the same or greater detention or infiltration of stormwater.

Code should grant the Planning Board the ability, during project design review, to require incorporation of low-impact development standards wherever feasible. Appropriate engineering should include use of one or more of the following low-impact development techniques:

4. Soil amendments.
5. Conservation of land in natural state.
6. Minimizing imperviousness

10.5 Density Bonus Recommendations

The town should consider expanding upon the density bonus project eligibility criteria for projects that meet stormwater performance measures above and beyond the minimum standards stablished in § 190-79.

New development or redevelopment of a site that incorporates a green (vegetated) roof, or other building or site features that are designed so that off-site flow of the first one inch of rainfall during the first 24 hours after rainfall ends is reduced by at least 50 percent shall receive the following benefits:

c. The project may reduce any required building setback by 20 percent (provided the required reduction in off-site water flow is still achieved); and
d. The project may increase the maximum height of any primary building (or part of a primary building) by 10 feet.

10.6 Design Guidance

The NYSDEC has identified a set of 18 "better site design practices" (www.dec.ny.gov/docs/water_pdf/bsdcomplete.pdf) which can reduce the impacts of a project, and also often reduce costs. Many of these practices will result in smaller required stormwater treatment and storage volumes. These are generally nonstructural or smaller-scale practices than those described in the Stormwater Design Manual.

The Capital District Regional Planning Commission also maintains a Green Infrastructure Design Toolkit that may be relied upon for development of Green Infrastructure practices for Stormwater Management. This guidance document is available at www.cdrpc.org/programs/water-quality/green-infrastructure-toolkit

These guides should be referenced in code as a tool for developers and landscape designers to refer to when planning a site.

Several Towns and Villages in Region have adopted Landscape Manuals to guide and define the landscaping aesthetic the community prescribes for developments. Examples include the "Town of Glenville Design Manual" (https://www.townofglenville.org/economic-development-planning-department/pages/manuals-design-landscape) and the "Village of Colonie Design Guidelines" (https://www.cdtcmpo.org/link/colonie.pdf). The town should consider drafting a landscape manual to better prescribe the selection of plantings they wish to see implemented throughout the town.

Chapter 11: ALTAMONT ZONING CODE RECOMMENDATONS

The following set of Code amendment recommendations apply to the Village of Altamont. These recommendations were developed to increase the likelihood of adoption of run-off reduction practices and land-use controls as a method to protect water quality in the reservoir.

11.1 Definition Recommendations

The Village should consider adding the following definitions to the Village Zoning Ordinance, § 355-5 to provide clarity on practices and programs that support the implementation of green infrastructure:

Green infrastructure - practices that maintain or restore stormwater's natural flow pattern by allowing the water to slowly permeate into the ground, evaporate and/or and be used by plants. Practices include rain gardens, bioretention, vegetated swales, green roofs and porous pavements. Practices may also include rainwater harvesting systems such as cisterns and underground storage for reuse. Green infrastructure also includes preserving or restoring natural areas, such as forests, stream buffers and wetlands, and reducing the size of paved surfaces. Green infrastructure can recharge groundwater, provide wildlife habitat, beautify neighborhoods, cool urbanized areas, improve air quality and reduce stress on sewer systems.

Cistern - Large tanks that store rainwater collected from impervious surfaces for domestic, non-potable uses including, but not limited to, flushing toilets, irrigation, cleaning laundry, and washing cars. A cistern employed as part of a stormwater management practice must not overflow into the sanitary sewer. Cistern overflows must be directed to a Green Infrastructure practice that allows water to infiltrate back into the ground. Cisterns and plumbing to support rainwater harvesting must conform to NYS Plumbing Code, specifically Section 1303, Nonpotable Collection and Distribution Systems.

Green Roof - A vegetated roof design that is explicitly designed to absorb rainfall or snowmelt, typically to manage stormwater, mitigate the heat island effect, provide habitat for urban wildlife, or offer leisure and recreational space for building occupants.

Greenspace - That portion of land shown on a development plan, Master Plan or Official Map the purpose of which is intended for open space preservation, recreation (active or passive), landscaping, green infrastructure for the express purpose of managing stormwater, or parkland. Unless otherwise required by the Planning or Town Board, said lands shall be undisturbed and seeded and planted with appropriate materials or left in their natural state.

Construction Activity - Activities requiring authorization under the SPDES permit for stormwater discharges from construction activity, GP-02-01, as amended or revised. These activities include construction projects resulting in land disturbance of one or more acres. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition."

Lot Coverage

It is unclear if the Village uses building footprints to determine lot coverage or if lot coverage is defined by impervious surface. Using impervious surface as the standard for lot coverage allows Green Infrastructure to be used to manage stormwater. If building size is the metric by which lot coverage is currently defined, the Town will need to evaluate lot coverage standards before moving to an impervious based coverage standard.

Impervious Lot Coverage- The total area of any lot or parcel occupied by all of the following:

8) The footprint of the principal building (but excluding the surface area of any Green Roof or an area that drains into a cistern.)
9) The footprints of all accessory buildings, parking garages, carports, utility and storage sheds (but excluding the surface area of any Green Roof or an area that drains into a cistern.)
10) All areas or areas otherwise covered with materials impervious to water including parking areas and driveways (but not including parking areas and driveways with pervious or semi-pervious paving materials); and
11) All areas occupied by above ground swimming pools (but not in-ground pools).

Steep Slopes

The Village defines Buildable Land as "excluding state or federally regulated wetlands, water bodies, floodways, and slopes 25% or greater, including the environmental and municipally required setbacks and buffers of these features, and preexisting developed areas of the site."

Per the NYSDEC Fact Sheet for the SPDES General Permit for Stormwater Discharges for Construction Activity (https://www.dec.ny.gov/docs/water_pdf/constgpfactsheet.pdf) "Construction on steep slopes (greater than 15%) can result in adverse impacts including land slippage, erosion, changes to stormwater runoff quantity and location, visual impacts, and safety issues for vehicular access. Upstream and downstream habitats and resources can be affected by erosion and sedimentation."

The Village's definition for "buildable land" is as follows: "Land excluding state or federally regulated wetlands, water bodies, floodways, and slopes 25% or greater, including the environmental and municipally required setbacks and buffers of these features, and preexisting developed areas of the site."

The Village should consider defining **steep slopes** as slopes over 15% which include 2,000 of because of contiguous sloped area," referring to the NYSDEC consideration of steep slope values, as the potential for negative adverse impacts including land slippage, erosion, changes to stormwater runoff quantity and location should be under greater scrutiny. Upstream and downstream habitats and resources can also be affected by erosion and sedimentation.

11.2 Watercourse Buffer Recommendations

The village should revise the Watercourse Area calculation to better protect waterbodies from turbidity, sedimentation and erosion from construction activities, clearing or grading.

The villages' code, 355-25, Protection of stream banks and water bodies, requires one-hundred-foot buffer between the stream bank of the Bozenkill Creek or Black Creek or their tributaries and any site disturbance. All wooded or other natural vegetation shall remain undisturbed within this buffer. This 100-foot setback consistent with the NYSDEC recommendation for buffer protection.

In effort to protect streams, ponds, wetlands, and shorelines from development impacts through imposition of buffers the Town should expand watercourse protection requirements to include a horizontal distance of 100 feet away from and parallel to the high-water level or top of bank (whichever is easiest to accurately determine) of a watercourse. The town should adopt language that allows the planning board to increase this minimum distance in consideration of site-specific soil conditions, existing water quality of the subject watercourse or other pertinent factors such as conservation value.

The village's list of prohibited activities within the designated protected watercourse areas should also be amended to strengthen these water body protections. The removal of vegetation, "except for the reasonable upkeep or preservation of the property" gives a wide latitude for clear cutting and destroying valuable plants that maintain soils and provide for critical habitat. The town should consider wholly prohibiting *any* removal of native vegetation or allowing such removal under permit only – in which case an applicant must seek approval from the village the ability to remove vegetation. In that circumstance, the village could require landscape plan that includes replacement, native plantings, as well a statement demonstrating the slopes of the waterbody's banks will not be subject to erosion as a result of the removal of native plants.

The village should also spell out and expand the limits of disturbance within the watercourse buffer.

"H: Construction of streets, driveways or walkways, parking areas; patios or other such surfaces greater than 200 square feet in total ground surface area per lot, except for replacement in kind of an existing facility. Encroachments by such surfaces, 200 square feet or less in total area per lot, shall be permitted if not nearer than the minimum horizontal distance of 100 feet away from and parallel to the high-water level or top of bank (whichever is easiest to accurately determine) of a watercourse."

11.3 Parking Lot Design Recommendations

The following Minimum, Best, and Model recommendations were drafted by the Stormwater Coalition of Albany County and slightly modified for the purposes of this report:

Minimum Action Level

g) Landscaped areas in a project site plan, including in parking lots, shall be lowered and incorporate curb cuts or other diversion devices to divert stormwater to the landscaped areas as part of a stormwater management plan.
h) Parking lots shall include one tree for every 1,200 feet of impervious parking area. Sufficient permeable or infiltration areas shall be provided around the expected radius of the mature tree to provide infiltration for the tree drip area. Existing mature trees shall not be included in the calculation for minimum trees except for areas where the existing mature tree canopy extends over impervious surfaces. Tree plantings may be designed as tree pits for stormwater treatment as provided in the latest version of the New York State Stormwater Management Design Manual.

Best Management Action Level *(all of the Minimum Actions plus the following)*

i) For every impervious parking space, the site plan shall include at least 20 square feet of vegetated area within the parking lot. "Within the parking lot" means that at least 75% of the perimeter of the landscaped area is located within the parking lot. Vegetated areas must include native non-invasive species and may be used for green infrastructure stormwater practices.

Model Community Action Level *(all of the Minimum and Best actions plus the following)*

Surface parking lots with more than two rows of parking shall include a minimum of a 4' wide landscaping islands between rows. These islands shall include curb cuts/wheel stops to allow entry of stormwater for treatment/infiltration. Landscaped areas shall utilize tree plantings, native vegetation, dry swales, stormwater planters, tree pits, or bioretention in center islands between parking rows. Stormwater management features must be designed in accordance with the latest version of the New York State Stormwater Management Design Manual and shall include the following:

“Landscaping should include a minimum of one tree island containing at least 50 square feet of land area, which shall include at least one medium shade tree or larger for every 20 parking spaces. Parking lot screening at the perimeter of the lot should not be used to meet this the percent landscaping requirement. Surface parking lots with more than two rows of parking shall include a minimum of a 4’ wide landscaping islands between rows. These islands shall include curb cuts/wheel stops to allow entry of stormwater for treatment/infiltration. Landscaped areas shall utilize tree plantings, native vegetation, dry swales, stormwater planters, tree pits, or bioretention in center islands between parking rows. Stormwater management features must be designed in accordance with the latest version of the New York State Stormwater Management Design Manual and shall include the following:

- Trees shall have dense canopy for rainfall interception, being round, oval, or v-shaped in form.
- Trees used shall be native and have proven observed salt tolerance if applicable.
- The area of the parking lot subject to vehicular traffic, that also corresponds to the mature tree’s canopy area, shall incorporate structural measures to prevent soil compaction and root damage. This may be accomplished by use of a soil structure specifically designed to withstand observed traffic loading.
- Water must be allowed to infiltrate to the tree roots in an amount to ensure tree survival with minimal watering after the first year.
- Soil volume must be the amount required for the specific tree and intended function.
- Trees shall be selected based on several factors, including observed local healthy tree stands in similar applications, existing and anticipated soil compaction, existing pH, planned water availability, adjacent road maintenance (salt, sand, etc.), presence of overhead utilities, availability of sunlight, percolation rate, soil’s ability to circulate air, and soil type.
- Because paved parking lots and the cars associated with them can raise local temperatures by up to 20 degrees, trees selected near heat islands should be tolerant of these conditions.
- Trees shall be selected based on best landscape practices, using the guidance document “Recommended Urban Trees: Site Assessment and Tree Selection for Stress Tolerance”, as published by the Urban Horticultural Institute, Department of Horticulture, Cornell University, Ithaca, NY or other industry accepted standard at the discretion of the Town.
- All parking lot runoff is required to flow through a planted area to cool runoff temperatures before entering the storm drain system.
- Parking lots larger than 1,200 sf, located on soils of hydrologic soil groups A, B, or C, excluding the area reserved for vegetation and stormwater management, are required to be construction of impervious paving material over a minimum of 20% of the parking lot area. Parking lots larger than 1,200 sf, located on soils of hydrologic soil group D, excluding the area reserved for vegetation and stormwater management, are required to be construction of impervious paving material over a minimum of 10% of the parking lot area.

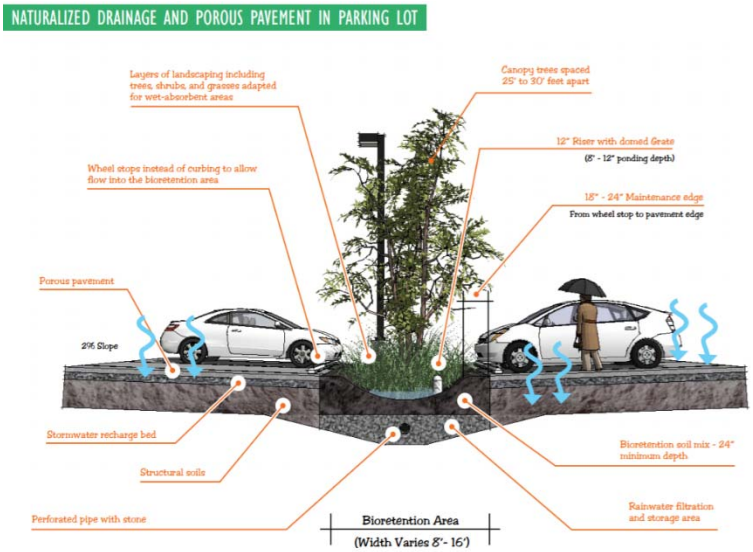


FIGURE 10 - SUSTAINABLE GREEN PARKING LOTS GUIDEBOOK (MONTGOMERY COUNTY PLANNING COMMISSION)

When incorporated appropriately, parking lot landscaping can do more than provide an aesthetic benefit. While trees have long been recognized for their ability to help clean the air, reduce energy needs, raise property values, and mitigate heat island effects, their innate ability to absorb and divert rainfall has been underutilized. Trees have proven value in reducing runoff and mitigating the costs of stormwater management. In fact, research by the United States Forest Service has shown the environmental and economical values trees contribute to the community.

The village should consider revising the Parking Standards town-wide to require at least **ten percent** of the surface area occupied by vehicle parking spaces be landscaped, inclusive of driving aisles and driveways necessary for access to and circulation among those spaces.

Recessed, bioretention islands should incorporate the following features:

v. Any curbs installed at the edges of required perimeter and interior landscaped areas shall have openings that allow drainage from the pavement to enter and percolate through the landscaped areas.
vi. Mulch shall not be installed adjacent to any sidewalk, parking area, or driveway with less than a one-foot border of grass or other permanent live groundcover to ensure mulch is not washed into the drainage system.

Where a parking area or lot for 10 or more spaces is adjacent a lot containing a principal Residential use, and the parking lot is not separated from the adjacent property by a principal or accessory structure, the parking area or lot shall be screened from the adjacent district or use by one or both of the following, located within five feet of the front lot line:

7) A masonry wall (not including Concrete Masonry Unit blocks) between 30 and 36 inches in height; or
8) A decorative wrought-iron-style fence between 30 and 42 inches in height, with masonry piers that may extend to 48 inches in height. Masonry piers may not exceed 18 inches in width, viewed from the street, and may not occupy more than 20 percent of the length of the fence.
9) A continuous line of shrubs that achieves 80 percent opaque screening between 30 and 48 inches in height during summer months.

11.4 SWPPP Plan Applicability Requirement Recommendations

Currently, NYS requires the owner or operator of a construction project that will involve soil disturbance of one or more acres to obtain coverage under the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity before commencing construction activity.

The Town stormwater law states *"No approval of a land development activity shall be issued until a stormwater pollution prevention plan (SWPPP) has been accepted."* The Town defines a land development activity as "An activity, including clearing, grading, excavating, soil disturbance or placement of fill, that results in land disturbance equal to or greater than one acre or an activity disturbing less than one acre of total land area that is part of a larger common plan of development or sale, even though multiple separate and distinct land development activities may take place at different times on different schedules. The Town applies this standard to land development projects – those that meet or exceed the 1 acre threshold.

The village should consider requiring sites with disturbance smaller than 1 acre, and larger than ½ acre to implement Green Infrastructure practices on site, without the requirement of a SWPPP. For projects within this threshold, the Town could require projects with more than ¼ acre of land disturbance, but not more than a ½ acre, to install at least one of the following site design features to reduce stormwater flows.

C. Install one of the following, designed to detain the first one (1) inch of rainfall and design the site to direct all rooftop stormwater and at least 75% of surface stormwater flows into that site feature, provided the feature is designed to the standard established in the New York State Stormwater Management Design Manual:
    7. A tree in a tree well.
    8. A drainage swale or rain garden.
    9. An underground cistern.

B. Install a green roof

The village may approve alternatives to the features listed in subsection (A) above if it determines that the alternative features would achieve the same or greater detention or infiltration of stormwater.

Code should grant the Planning Board the ability, during project design review, to require incorporation of low-impact development standards wherever feasible. Appropriate engineering should include use of one or more of the following low-impact development techniques:

7. Soil amendments.
8. Conservation of land in natural state.
9. Minimizing imperviousness

11.5 Density Bonus Recommendations

The village should consider expanding upon the density bonus project eligibility criteria for projects that meet stormwater performance measures above and beyond the minimum standards stablished in § 190-79.

New development or redevelopment of a site that incorporates a green (vegetated) roof, or other building or site features that are designed so that off-site flow of the first one inch of rainfall during the first 24 hours after rainfall ends is reduced by at least 50 percent shall receive the following benefits:

e. The project may reduce any required building setback by 20 percent (provided the required reduction in off-site water flow is still achieved); and
f. The project may increase the maximum height of any primary building (or part of a primary building) by 10 feet.

11.6 Design Guidance

The NYSDEC has identified a set of 18 "better site design practices" (www.dec.ny.gov/docs/water_pdf/bsdcomplete.pdf) which can reduce the impacts of a project, and also often reduce costs. Many of these practices will result in smaller required stormwater treatment and storage volumes. These are generally nonstructural or smaller-scale practices than those described in the Stormwater Design Manual.

The Capital District Regional Planning Commission also maintains a Green Infrastructure Design Toolkit that may be relied upon for development of Green Infrastructure practices for Stormwater Management. This guidance document is available at www.cdrpc.org/programs/water-quality/green-infrastructure-toolkit

These guides should be referenced in code as a tool for developers and landscape designers to refer to when planning a site.

Several Towns and Villages in Region have adopted Landscape Manuals to guide and define the landscaping aesthetic the community prescribes for developments. Examples include the "Town of Glenville Design Manual" (https://www.townofglenville.org/economic-development-planning-department/pages/manuals-design-landscape) and the "Village of Colonie Design Guidelines" (https://www.cdtcmpo.org/link/colonie.pdf). The town should consider drafting a landscape manual to better prescribe the selection of plantings they wish to see implemented throughout the town.

Chapter 12: GENERAL MUNICPAL CODE RECCOMDATIONS

For Guilderland, Rotterdam and Altamont this report provided specific code recommendations and sections of code within these communities. The following code recommendations may apply to any of the municipalities within the watershed.

12.1 Rooftop Runoff

The standards and requirements of this law are intended to reduce the impact on the environment and protect water quality by directing rooftop runoff into landscaped areas and other infiltration devices and avoiding direct discharge into watercourses or areas that can cause erosion.

These provisions can best be inserted in subdivision laws and zoning law sections governing site plan review. In most municipalities, single and two-family homes on existing lots do not require site plan approval so these provisions would be difficult to impose upon new construction of those residences absent a stand-alone law or an expansion of the scope of the zoning law.

Minimum Action Level

a. *Site Plan Review: All buildings included in any site plan approval shall be designed with rooftop stormwater conveyance systems that direct stormwater away from roads and parking lots and to vegetated areas with hydrologic soil groups A and B and soils with an infiltration capacity of more than 0.5 inches/hour.*
b. *Subdivision Review: All buildings to be constructed in an approved subdivision shall be designed with rooftop stormwater conveyance systems that direct stormwater away from roads and parking lots and to vegetated areas with hydrologic soil groups A and B and soils with an infiltration capacity of more than 0.5 inches/hour.*

Best Management Action Level (all of the Minimum Actions plus the following)

a. *Rooftop runoff shall be diverted to a series of rain barrels (or similar rainwater harvesting container); a grassed or vegetated area; a rain garden; a vegetated open channel; an infiltration trench, a pervious surface or a combination of the above or similar measures. All measures shall be designed in accordance with the most recent New York*
b. *State Stormwater Management Design Manual.*

Model Community Action Level ((all of the Best Actions plus the following)

a. *For all applications for site plan approval, the [municipality] encourages applicants to consider installing Green roofs on all new commercial and multi-family residential structures and on non-enclosed covered areas of 100 square feet or larger. Non-enclosed covered areas include parking structures, covered picnic areas and covered courtyards.*
b. *When an applicant provides a green roof on a new or renovated building and the green roof encompasses at least 80% of the available rooftop area, (excluding the area occupied by mechanical equipment, skylights, vents and other required appurtenances) the applicant shall be entitled to a density bonus up to 20% of the applicable Floor Area Ratio (FAR), lot coverage limits or height restriction without requiring a variance and provided the building complies with all setback requirements.*
c. *Buildings with green roofs must have a maintenance plan that is recorded with the municipality and filed with the deed. Green roofs must be inspected annually by a qualified inspector and the inspection reports must be filed with the municipality within two weeks of the date of the inspection.*

12.2 Vegetated Open Channels

The standards and requirements of this law are intended to reduce the impact on the environment and protect water quality by using vegetated open channels in the rights of way of streets to convey and treat stormwater runoff. The redevelopment of properties that are part of a government approved plan for the clean-up of contaminated properties may be permitted to have larger areas of impervious surfaces where impermeable cover is a requirement of an approved remediation and redevelopment plan.

This language can be applied to subdivision, zoning and local road laws that provide design requirements for developments, roads and driveways.

Minimum Action Level

a. *New Developments and Redevelopment of Previously Developed Properties. For subdivision and site plan approval. Concrete or paved gutters should not be used in any stormwater conveyance measure unless site conditions significantly restrict the ability to use engineered vegetated swales or bioretention methods. Vegetated swales and bioretention measures shall be placed between roads and sidewalks, if sidewalks are proposed, and shall be designed to include safe emergency overflow provisions for large storm events. Whenever vegetated swales and bioretention measures are utilized, provision shall be made for access to the areas for maintenance of the swales and bioretention measures, including if necessary, agreements with adjacent property owners to allow equipment to access the stormwater measures for maintenance activities.*
b. *Improvement of (Town, Village or City) Roads For local road laws. When a new (town, village or city) road is being designed or an existing town road is reconstructed, and sufficient space is available in the right-of-way and appropriate soil conditions are present, vegetated swales or bioretention methods should be used for stormwater conveyance and treatment and shall be designed to include safe emergency overflow events for large storm events. Concrete or paved gutters should not be used unless there are no practicable alternatives.*

Best Management Action Level (all of the Best Actions plus the following)

a. *New Developments and Redevelopment of Previously Developed Properties For subdivision and site plan approval. Curbing shall not be included along any roads or driveways which may interfere with stormwater flows unless it is demonstrated that such curbs are necessary for engineering or safety reasons.*
b. *Improvement of (Town, Village or City) Roads For local road laws. When a new (town, village or city) road is being designed or an existing (town, village or city) road is reconstructed, curbing shall not be included along any roads which may interfere with stormwater flows unless it is demonstrated that such curbs are necessary for engineering or safety reasons.*

Model Community Action Level (all of the Best Actions plus the following)

a. *All curbs adjacent to stormwater management areas (including green infrastructure) shall include curb cuts or other means to direct stormwater towards the stormwater management areas.*
b. *Green infrastructure stormwater treatment devices shall be designed in accordance with the most recent New York State Stormwater Management Design Manual and may include bioretention, tree pits, vegetated swales, dry swales, wet swales or sunken stormwater planters.*

12.3 Locating Sites in Less Sensitive Areas and Clearing & Grading

The standards and requirements of this law are intended to reduce the impact on the environment and protect water quality by locating development away from ecologically sensitive areas, permeable soils and limiting the amount of clearing and grading to reduce the potential for erosion and protect sensitive habitats.

Applicants are encouraged to incorporate the principles of Low Impact Development, Better Site Design and other Green Infrastructure measures to meet these goals and meet the requirements of the most recent New York State Stormwater Management Design Manual. The redevelopment of properties that are part of a government approved plan for the clean-up of contaminated properties may be permitted to have larger areas of impervious surfaces where impermeable cover is a requirement of an approved remediation and redevelopment plan.

This language can be applied to subdivision and zoning laws. While the language below is drafted for site plan review, it can also be applied to the review of subdivision plats.

Minimum Action Level

2.1Site Plans Contents

a. *An application for site plan approval shall include a soil protection plan which identifies the areas of the various soil types on the property, hydrologic soil groups and soil erosion factors. The plan shall identify construction staging areas and soil disturbance areas. To the extent practicable construction staging areas should be limited to previously disturbed areas or areas with compacted or poorly infiltrating soils.*
b. *Site plans must include:*
    i. *all watercourses and water bodies, including classification information if available.*
    ii. *unique geological features*
    iii. *State and federally designated wetlands and the 100' adjacent area for NYS regulated wetlands.*
    iv. *locations of significant natural communities (including endangered, threatened or rare plant species; high quality forested areas)*
    v. *Slopes equal to or greater than 15%.*
    vi. *100-year floodplains.*
    vii. *A grading plan.*
    viii. *A tree conservation plan identifying all existing trees 12'' diameter at breast height (dbh) or greater and identifying the extent of tree clearing and preservation measures.*

c. *Site Plan Review Standards*

    In its review of a site plan application, the Planning Board shall consider whether the applicant has avoided or minimized impacts to sensitive areas (including wetlands, floodplains, sensitive soils and tree preservation) to the maximum extent practicable consistent with the project goals.

Best Management Action Level (all of the Minimum Actions plus the following)

a. *Grading on slopes equal to or greater than 15% should be avoided to the maximum extent practicable.*
b. *Redevelopment of previously developed sites containing grades equal to or greater than 15% should be limited to the areas of the site currently covered by impervious surfaces. Grading on the remainder of the site with slopes equal to or greater than 15% should be avoided to the maximum extent practicable.*

c. *Locating stormwater management control devices within the 100-year floodplain is strongly discouraged and should only be approved if there are no other practicable alternatives.*
d. *New development should not be located on highly erodible soils or clay soils prone to slippage, unless supported by a report from a geotechnical engineer attesting to the suitability of the soils for construction and the limitation of potential erosion.*
    i. *Erodible soils are those soils with an erosion factor (K or Kw) of 0.43 or greater as determined by the most recent Natural Resources Conservation Service survey data.*
e. *New impervious surfaces shall not be located on hydrologic soil groups A or B unless there are no other practicable alternatives.*
f. *All construction activities, including staging areas, shall be shown on the site plan, be delineated in the field prior to commencing construction and be limited to the following areas:*

    i. *Within 40 feet of the building perimeter.*
    ii. *Within 10 feet of surface walkways, patios, surface parking and utilities with a diameter of 12 inches or less.*
    iii. *Within 15 feet of road curbs and main trenches for utilities with a diameter of greater than 12 inches.*
    iv. *Within 25 feet of areas constructed with pervious surfaces (including pervious paving materials, stormwater management facilities and playing fields.*

g. *Unless specifically approved by the Planning Board, vegetation beyond the disturbance areas set forth in Sec. 2.2(f) shall not be cleared or disturbed and all vegetation within the disturbance areas shall be replaced upon completion of construction.*
h. *Construction staging areas and vehicular travel areas shall not be located underneath tree canopies. Trees identified on the site plan for preservation shall be marked in the field and their tree canopy area delineated.*
i. *All vegetation, with the exception of invasive species, shall be maintained on all slopes equal to or greater than 15% and for all areas within 50 feet of watercourses and drainage swales.*
j. *Constructed or graded slopes may not have a slope greater than 3:1unless an engineering report and soil stability analysis is provided that demonstrates a slope with a steeper grade has a safety factor of at least 1.5 for static loads and 1.1 for pseudostatic loads.*
k. *No clearing, excavation, stockpiling of materials or placement of fill shall occur on the slide block of unstable slopes or other unstable soil areas unless approved by the Planning Board upon a demonstration that the proposed activity will not increase the load, drainage, or erosion on the slope or increase the risk of damage to people, adjacent properties or natural resources.*

Model Community Action Level *(all of the Best Actions plus the following)*

2.2Site Plan Review Standards.

a. *Proposed paved surfaces on previously undeveloped soils within Hydrologic Soil Group A shall be constructed so at least 90% of the surface is comprised of pervious materials (including porous concrete, porous asphalt, structural pavers and structural grass or equivalent materials), unless the applicant can demonstrate with an engineering report that the pervious materials present a threat to public health or safety.*
b. *New buildings proposed on Hydrologic Soil Group A shall have a maximum footprint of 4,500 feet of continuous impervious surface, excepting covered pedestrian walkways with a maximum covered width of 10 feet. Building footprint area consisting of an approved Green Roof or decompacted courtyards or walkways shall be considered pervious surfaces and shall not be calculated as included in the 4,500 maximum area.*
c. *Proposed paved surfaces on previously undeveloped soils within Hydrologic Soil Group B shall be constructed so at least 80% of the surface is comprised of pervious materials (including porous*

concrete, porous asphalt, structural pavers and structural grass or equivalent materials), unless the applicant can demonstrate with an engineering report that the pervious materials present a threat to public health or safety.

12.4 Natural Resource Buffers

a. Except as otherwise provided herein, natural area buffers shall be maintained in their natural state adjacent to watercourses, wetlands and areas shown on the site plan containing sensitive plant species.

b. Minimum buffer areas shall be as follows and may be extended by the Planning Board in appropriate instances where topography requires a greater buffer to provide a level of protection equivalent to the distances set forth herein:

i. 100 feet from the boundary of any state or federally designated wetland.
ii. 100 feet from the top of bank of any perennial watercourse.
iii. 50 feet from the top of bank of an intermittent watercourse.
iv. 50 feet from the boundary of areas containing sensitive plant species.

c. Buffer Averaging. The Planning Board may alter the buffer requirements and approve an average buffer upon a demonstration that a uniform buffer will result in extraordinary hardship to the applicant due to the unique characteristics of the subject property or the character of the buffer area varies in slope, soil types or vegetation and the resource being protected would benefit from a wider buffer in certain areas and would not be adversely impacted by a narrower buffer in other areas. To be approved an averaged buffer area shall meet the following conditions:

i. The applicant shall demonstrate that averaging shall not adversely impact the functions and values of the protected watercourses, wetlands and sensitive habitat areas.
ii. The total area contained within the buffer after averaging shall not be less than the area that would be contained in the buffer without averaging.
iii. To the extent practicable, lower intensity land uses which are less likely to introduce pollutants or activity in the protected areas shall be located near the narrower buffer widths and higher intensity uses, (such as parking lots) shall be located adjacent to the widest buffer areas.

d. Except as otherwise provided herein and as approved by the Planning Board, buffer areas shall be left undisturbed. Buffer areas shall be shown on the site plan or a survey filed with the County Clerk and the restrictions on the use of the buffer set forth herein shall be included in a deed restriction filed with the County Clerk. The delineation of the buffer areas shall be demarcated on site both during and after construction.

e. Allowable Buffer Area Uses.

i. The 25 feet of the buffer area closest to the protected resource shall be left undisturbed unless a clearing plan is approved by the Planning Board to create a view corridor.
ii. Within the 25 feet the Planning Board may approve construction of boardwalks to a watercourse or waterbody, footpaths parallel to the watercourse, stormwater management measures and road and utility crossings.
iii. Within the balance of the buffer area the Planning Board may approve the placement of constructed wetlands, hiking trails and bicycle paths constructed of pervious materials.

f. Prohibited Buffer Area Uses and Activities. Unless specifically approved by the Planning Board pursuant to subparagraph (g), buffer areas shall remain undisturbed without any clearing, grading, construction or

be used for the storage or stockpiling of any materials including sand, gravel or snow accumulated from snowplowing. There shall be no application of herbicides, pesticides or fertilizers in the buffer area. Where any government regulation, except for this zoning code, establishes separation distances for the regulated activity, such distance shall be measured from the outer edge of the buffer area.

The following provision should also be considered

To dimensional requirements of the desired district: Setbacks from streams and wetlands.

*Buildings, structures, paved areas, or storage of construction equipment or machinery shall not be located within **200 linear feet** of the bank of any permanent or impermanent stream, and one hundred feet of any wetland. The [insert name of review board, such a Planning Board or Conservation Commission] may increase the setback from streams and wetlands by up to fifty percent if they determine that such an increase is necessary to protect water quality or to minimize the impacts of erosion and sedimentation. For the purposes of this section, a wetland is defined by both state and federal governing regulations, however wetland setbacks apply only to federally-protected wetlands greater than one-tenth (0.1) acre.*

12.5 Tree Protection

Minimizing the removal of trees and preserving mature trees protects the environment by reducing stormwater runoff, maintaining habitat, promoting clean air and reducing heat island effects. As part of its site plan review, the Planning Board shall review and approve a tree preservation plan that minimizes to the maximum extent practicable the removal of trees.

a. Projects clearing 0.5 acres or greater of undisturbed land. The site plan application shall identify the location of all major vegetation including all trees larger than 6 inches dbh. In approving a site plan that meets the objectives of the applicant, the Planning Board shall minimize the loss of trees by identifying the following for preservation:

- *i. Trees that are important to the site or neighborhood due to their size, age or rarity.*
- *ii. Trees located in environmentally sensitive areas such as wetlands.*
- *iii. Trees that offer visual screening or noise buffers to adjoining properties.*
- *iv. Trees that shelter other trees from strong winds or are part of a continuous and mutually dependent canopy.*

b. the applicant shall undertake the following:

- *i. If development of the project will require the disturbance of tree root zones, a certified arborist or registered landscape architect shall prepare a detailed tree protection plan which protects root zones to the maximum extent practicable, prior to the commencement of site activities and a copy of the plan shall be provided to the Building Inspector.*
- *ii. The applicant shall prevent damage to the trunks of trees identified for preservation. In extremely confined work zones, there shall be a protective barrier placed around the tree. Where disturbance of roots is necessary, excavation within the root zone shall be done with extreme care using hand tools to prevent unnecessary damage to adjacent fibrous root structures. Roots should be pruned using clean vertical cuts that do not fray or strip the roots.*
- *iii. Trees that have had their roots pruned shall also have their canopy pruned in direct proportion to the amount of root trimming as provided in the tree protection plan.*
- *iv. Any trees which are removed during development of the site plan which were not previously approved for removal by the Planning Board shall be replaced with equivalent trees unless otherwise waived by the Planning Board.*

c. *Nothing contained herein shall preclude a property owner from removing trees identified for preservation, which are diseased, severely damaged or otherwise present a threat to public health or safety.*

12.6 Cul-de-Sac Design

The standards and requirements of this law are intended to reduce the impact on the environment and protect water quality by limiting the amount of impervious areas, protecting natural resources and maintaining natural hydrological conditions. This law is intended to comply with the New York State Department of Environmental Conservation's SPDES General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems, (Permit No. GP-0-10-002). Applicants are encouraged to incorporate the principles of Low Impact Development, Better Site Design and other Green Infrastructure measures to meet these goals. The redevelopment of properties that are part of a government approved plan for the clean-up of contaminated properties may be permitted to have larger areas of impervious surfaces where impermeable cover is a requirement of an approved remediation and redevelopment plan.

Cul-de-Sacs may be proposed as part of residential subdivisions or commercial developments with internal roads. Cul-de-sacs have the potential for the greatest impact on stormwater quality compared to alternative road layouts and should be discouraged where it is practical to do so. Where they are determined to be necessary or desired, they should be designed to minimize width an amount of impervious materials to protect water quality.

These sections may be used to amend local subdivision, zoning or road laws that govern the creation of new public or private roads.

Minimum Action Level

a. *Internal roads proposed for new residential subdivisions or commercial development shall be designed in a manner that facilitates the connection with existing roads or for connection with future roads on adjacent undeveloped or underdeveloped properties.*
b. *Where internal roads terminate in a dead end, cul-de-sacs shall only be used where other design options such as hammerheads, loop roads or boulevards are not reasonably practical or feasible. Where an applicant proposes a cul-de-sac in lieu of alternative designs, the application must include an engineering analysis demonstrating why the alternative designs are not reasonably practical or feasible.*
c. *The outside turning radius of cul-de-sac may not exceed 35 unless determined necessary and recommended by the Town Highway Superintendent. The maximum allowable outside turning radius is 45 feet and may only be approved if determined necessary for emergency vehicles and large school buses.*
d. *For all cul-de-sacs with an outside turning radius greater than 35 feet, all sidewalks adjacent to the cul-de-sac shall be constructed of pervious materials and all driveways connected to the cul-de-sac shall either be constructed of pervious materials or be a two-track design. Where a radius greater than 35 feet is required for emergency vehicles or school buses, the Planning Board may waive the requirement for pervious sidewalks and driveways.*
e. *The paved width of the road in the cul-de-sac shall be the equivalent of one-half of the design standards for a local town road excepting shoulder areas.*
f. *Internal roads shall be designed to accommodate snow storage areas within permeable medians and the centers of cul-de-sacs.*

Best Management Action Level (all of the Minimum Actions plus the following)

a. *Centers of cul-de-sacs shall be designed to promote stormwater infiltration and should not be curbed or raised in a manner that prevents stormwater from draining into the center.*
b. *Unless there are no reasonably practical or feasible alternatives, utilities shall not be located in the center of cul-de-sacs so that such areas can maximize green space.*
c. *Centers of cul-de-sacs shall consist of pervious surfaces including pervious pavement, porous pavers, grass, structural grass to accommodate emergency vehicles and trucks, low-growing bioretention areas, rain gardens, trees or other permeable stormwater treatment measure approved as part of a stormwater pollution prevention plan. Stormwater control measures in the centers of cul-de-sacs must be located on underlying soils with an infiltration rate of at least 0.5 inches/hour at a depth as required by the current version of the New York State Stormwater Management Design Manual.*
d. *If a loop road or boulevard is used the medians of such roads shall be maintained with native*
e. *vegetation or green infrastructure stormwater management practices and may be used as passive or active recreational areas.*

12.7 Sidewalks and Curbs

Minimum Action Level

a. *Sidewalks should have a maximum width of 5 feet unless local conditions or high pedestrian volumes warrant a wider sidewalk.*
b. *Sidewalks shall be graded such that they drain to the front yards except in areas where the introduction of additional groundwater may be undesirable (building foundations, Hydrologic Soil Group C or D soils) or determined to be physically impracticable.*

Best Management Action Level (all of the Minimum Actions plus the following).

c. Sidewalks constructed in accordance with the Americans with Disabilities Act (ADA) utilizing compliant porous pavement or alternative porous surface are encouraged. Permeable sidewalks are strongly encouraged and may be required in lieu of impermeable sidewalks where soils are within Hydrologic Soil Group A or B, unless determined to be physically infeasible or waived due to verified safety concerns supported by engineering analysis

Model Community Action Level (all of the Best Actions plus the following)

e. A continuous permeable strip shall be located between the sidewalk and the curbside or edge of pavement. The permeable strip shall be 3 feet wide or 1/3 the width of the sidewalk, whichever is greater and shall extend for the length of the sidewalk.

Curb Design

a. *Curbs along roads, parking lots and driveways shall include curb cuts to allow for diversion into green infrastructure practices, including stormwater planters, bioretention*
b. *areas, tree pits and filter strips. Curb cuts should incorporate trash racks to prevent trash from entering the green infrastructure measures.*

c. *Curb bump-outs with overflows to divert stormwater to a conventional stormwater system may be used in certain circumstances. Curb bump-outs are encouraged in lieu of catch basins in residential districts where soils are within Hydrologic Soil Group A or B.*
d. *Curb bump-outs may be placed in locations where catch basins would otherwise be constructed, and also serve as a traffic calming measure, and crosswalk length reduction. Curb bump-outs/curb extensions shall be designed in accordance with the New York*
e. *State Stormwater Management Design Manual's requirements and guidance for Stormwater Planters.*
f. *A curb bump-out is a vegetated curb extension that protrudes into the street either midblock or at an intersection, creating a widening of the permeable strip between the sidewalk and the road or parking lot and a narrowing of the road. A bumpout is composed of a layer of stone that is topped with soil and plants. An inlet or curb-cut directs runoff into the bumpout structure where it can be stored, infiltrated, and taken up by the plants.*

12.8 Design and Maintenance of Permeable Strips

a. *Permeable strips between sidewalks and roads and parking lots may be utilized as linear bioretention areas with curb cuts that divert the stormwater into the bioretention areas. In addition to the requirements included in the section, the bioretention area must be designed in accordance with the New York State Stormwater Design Manual. If the bioretention area is part of an approved SWPP and the area is not conveyed to the [municipality] a maintenance plan for the bioretention area must be included with the application.*
b. *The [site plan or subdivision application] shall include a paving plan that shows all existing and proposed trees and their species in the area of the permeable strip.*
c. *Trees to be planted in the permeable strip shall be planted either individually or in groups with a minimum separation distance of 30 feet on center and a maximum separation distance of 75 feet on center. Selected trees shall be noninvasive and have an upright branching pattern with a minimum vertical clearance of 8 feet to the lowest branches at the time of planting. These requirements may be modified to comply with the requirements of other regulatory agencies.*
d. *For non-planted permeable strips, the surface material shall be permeable based on NYSDOT material options applicable to the intended use and neighborhood. Design shall be such that the surface is not subject to frost heave conditions damaging the structure of the strip.*
e. *When backfill is proposed beyond the planting zone within the permeable strip, the backfill shall be structural soil with a depth no less than 24 inches from finished grade.*
f. *The use of recycled concrete aggregate shall not be permitted as backfill.*
g. *For planted permeable strips turf grass is prohibited. Plants shall consist of native meadow plantings, low herbaceous plants or no-mow ground covers, except that street trees within the planting strip shall have a 3 foot diameter/square mulch bed at their base.*
h. *Meadow or other grasses shall be mowed at least once per year except for:*
    1. *Sidewalk zones where the distance between the curb and the lot line is less than 9 feet wide.*
    2. *Areas within curb cuts.*
    3. *Areas with subgrade structures that could be adversely impacted by mowing.*
    4. *Historic sidewalks.*
5. *Areas incorporating large rocks or rock outcroppings that make mowing impracticable.*

Chapter 13: THE GREEN AREA RATIO

The Green Area Ratio (GAR) (or Green Factor) is a zoning regulation that integrates landscape elements into parcel site design to promote sustainable and aesthetically-pleasing development. This score is based on assessment of the square footage of landscape elements that can be incorporated with each type of land and relates to an increase in the quantity and quality of environmental performance of the urban landscape. an use GAR sets integrated environmental requirements for landscape elements and site design that contribute to the reduction of stormwater runoff, the improvement of air quality, and the mitigation of the urban heat island effect. The purposes of the GAR regulations are to implement a value-based system of requirements for environmental site design that provides flexibility in meeting environmental performance standards and promotes attractive and environmentally functional landscapes. The GAR is a tool that communities within the watershed of the Watervliet Reservoir may consider utilizing as a method to increase the adoption of on-site stormwater management and run-off reduction practices that can protect water quality.

The Green Area Ratio concept began in 1997 and was first employed in Berlin, Germany. Since its implementation in Berlin, the GAR has been adopted in Sweden and South Korea. Seattle was the first U.S. city to adopt a GAR program, known there as the Seattle Green Factor (SGF). The city describes the SGF as a "score-based code requirement that increases the amount and improves the quality of landscaping in new development." It aims to manage stormwater runoff, aesthetically enhance neighborhoods, and improve habitat for birds and beneficial insects. Seattle adopted the SGF in 2006 and expanded the program in 2009, with the priorities being livability, ecosystem services, and climate change adaptation. Fife, Washington, a suburb of Tacoma near Seattle, also adopted a green factor as part of a low-impact development ordinance in 2009.

To qualify for permits, development projects in Seattle must achieve a minimum SGF score determined by zoning, with different standards set for commercial and residential properties.

According to the American Society of Landscape Architects, "because SGF significantly raises the bar for landscaping in affected zones, landscape design now starts in the initial stages of site planning, allowing more collaboration between design professionals; the resulting landscapes are more attractive and better integrated into site programs and amenity areas."

The GAR requires development sites to incorporate strategic sustainable features to reduce storm water runoff, improve air quality and keep the city cooler. For the developer, the ratio provides flexibility, a toolbox of techniques that contribute different levels of environmental benefits – and a system it may perform much better than the sum of assorted parts that could be working together. For example, in planning a traditional site, a developer may remove mature trees that soak up stormwater, replace these trees with structures, add stormwater control devices, and add landscaping for beautification – ignoring

the potential stormwater and aesthetic value of the mature trees and needlessly spending thousands of dollars on extraneous engineered solutions. The GAR also simplifies the process of landscaping and planning stormwater techniques for a site because it assigns "weights" based on a scientifically backed assessment of a practices' ability to manage environmental impacts and climate adaptations, including urban heat island amelioration, air quality improvement and storm water mitigation. The points are weighted by green infrastructure size, functionality, and aesthetics, with the total divided by the parcel size. The menu may include rain gardens, native landscaping, vegetated walls, green roofs, and food gardens. The system encourages the layered use of different stormwater mechanisms to increase absorption capacity and create rich aesthetics that support how new developments look and function.

13.1 Benefits of the Green Area Ratio (GAR) / Green Factor (GF)

The Green Area Ratio (and Green Factor, as it's called in Seattle, WA) allows greater flexibility and predictability for the development community to meet host municipality's expectations for landscape and green infrastructure controls. It also allows the host municipality to strategically modify the values of practices to encourage or discourage practices. Through adjustments of the GAR scores, host municipality can easily program more landscaping, or higher performance green infrastructure to specific zones. For example, should host municipality wish to place a greater emphasis on preservation of existing stands of mature trees, the multiplier for Tree canopy for preservation of existing trees 24 inches in diameter or larger could be increased (using Washington DC's multiplier as an example, the value may be increased from .8 to 1).

GAR Required by Zone District:
Effective September 6, 2016

Zone District	Green Area Ratio
RA-1, RA-2, RA-6, RA-7, RA-8 RC-1; WR-2, WR-3, WR-4, WR-5, WR-7, WR-8	0.40
RA-3, RA-4, RA-5, RA-9, RA-10 MU-1, MU-2, MU-3, MU-4, MU-5, MU-6, MU-12, MU-13, MU-14, MU-15, MU-16, MU-17, MU-18, MU-19, MU-23, MU-24, MU-25, MU-26, MU-27, NC-1, NC-2, NC-3, NC-4, NC-5, NC-7, NC-9, NC-10, NC-11, NC-14, NC-16, NC-17 SEFC-2, SEFC-3, CG-1, CG-2, RC-2, RC-3 ARTS-1, ARTS-2, D-2, CG-5	0.30
MU-7, MU-8, MU-28 NC-6, NC-8, NC-12, NC-13, NC-15, ARTS-3	0.25
MU-9, MU-10, MU-20, MU-21, MU-22, MU-29 D-3, D-4 , D-5, D-1-R, D-4-R, D-5-R, D-6, D-6-R, D-7, D-8 SEFC-1, CG-4, ARTS-4, CG-3	0.20
PDR (all lots unless otherwise noted): • Lot with principal building that is one (1) story in height • Lot with principal building that is two (2) stories in height	0.30 0.10 0.20

FIGURE 11 - WASHINGTON, DC GAR DISTRICT VALUES

Current code requires landscaping that is likely to fall into a repeated, patter book approach, which can give the impression of monotonous uniformity from the public while at the same time frustrating designers and the planning board as they attempt to apply a prerequisite pattern to any ill-fitting site with unusual geographic features, lot dimensions, sight lines or hydrologic features. GAR allows host municipality to emphasize diversity and flexibility – reducing the likelihood of unpleasant uniformity of landscape plans. GAR also allows the developer or site planner more flexibility to design to the site and rely less on code that may unintentionally force ill-fitting or unattractive landscaping. GAR may also save time before planning boards, in which the developer and community may be trapped in loops of site plan changes to fit code that lack clarity on the types on plantings host municipality wishes to see.

Washington, DC strategically applies the GAR and enhanced controls between zoning districts, providing a strong emphasis on GAR requirements withing residential districts, and relaxed standards applied to commercial and mixed-use districts. By contrast, most village and town landscaping requirements apply town-wide, although there are some additional requirements specific to multi-family developments. By

tying GAR point values to districts, host municipality could simplify what may otherwise be daunting and confusing disparate landscaping requirements between districts. It may also apply modified GAR values to overlay areas – for the purposes of watershed protection it's recommended a Reservoir Overlay be established if the GAR isn't going to be applied town of village wide, or the pints for the program be adjusted for stringer stormwater controls within the Reservoir GAR overlay.

13.2 Limitations / Challenges to GAR Implementation

The Green Area Ratio requirements do not replace stormwater requirements and cannot replace required post construction stormwater controls for development. The GAR is a landscaping tool, however, GAR does provide an opportunity to further encourage the adoption of Green Infrastructure Practices in the portfolio of landscape features on a site and it encourages the use of plantings to both provide an aesthetic benefit and manage stormwater on site.

Allowing developers and landscape planners the ability to more creatively approach a landscape plan while providing a clear and legible guide for the value of specific landscape elements the public wishes to employ may be a benefit, but the host municipality must be able to ensure these practices are maintained – especially if these practices are part of the site's stormwater management system. Prudent and cost-conscious landscape designers may employ GAR practices to manage stormwater and take advantage of what may be today a 'double dipping" for the landscape and stormwater requirements. For the host municipality, their regulatory staff will need to be keenly aware of how Green Infrastructure practices perform, how they should be maintained, what failure of a practice looks like and what corrective actions to request from a site owner. The NYSDEC published a Maintenance Guide for Stormwater Practices in March 2017 that should be the underpinning of any training staff undertake to monitor and maintain post construction stormwater controls. This guide can be accessed at https://www.dec.ny.gov/docs/water_pdf/smpmaintguidance.pdf.

13.3 The Nuts and Bolts: How GAR works

Seattle and Washington, DC are the only two communities in the United States employing a point-based landscaping code, the Green Area Ratio. Their programs are fundamentally the same but have slight differences in their approach.

13.4 Seattle's "Green Factor"

Seattle, WA was the first community in the United States to adopt The Green Area Ratio. Seattle calls their program "The Green Factor" however, this is simply a difference in nomenclature.

The Seattle Green Factor is a menu of landscaping strategies that is required for all new development in neighborhood business districts with more than four dwelling units, more than 4,000 square feet of commercial uses, or more than 20 new parking spaces. It is intended to increase the amount and quality of urban landscaping in dense urban areas while allowing increased flexibility for developers and designers to efficiently use their properties. Seattle maintains a website for the Green Factor Program at https://www.seattle.gov/sdci/codes/codes-we-enforce-(a-z)/seattle-green-factor .

The City maintains a comprehensive set of regulations, tools, presentations, guides and how-to tips at https://www.seattle.gov/sdci/codes/codes-we-enforce-(a-z)/seattle-green-factor.

Seattle requires Green Factor Landscape plans to be designed by licensed landscape architects, certified professional horticulturalists, or certified landscape designers. The landscape professional for a project must sign all landscape plan sheets submitted with a permit application and must sign the Landscape

Improvement Checklist confirming that the project adheres to City requirements and has been installed according to the approved plans.

Any work in the right-of-way requires that the Landscape Architect complete and submit a Construction Phase Checklist for Landscape Professionals. This checklist is found on SDOT's Urban Forestry Trees and Construction webpage: http://www.seattle.gov/transportation/projects-and-programs/programs/trees-and-landscaping-program/trees-and-construction.

Seattle requires the equivalent of 30% of a parcel in the commercial zones to be vegetated by using the Seattle Green Factor. The same percentage host municipality requires for Greenspace in most districts. The Green Factor encourages maximizing the "vegetation potential" of the rights-of-way through planting of layers of vegetation and larger trees in areas visible to the public. There are additional bonuses for rainwater harvesting and/or low water use plantings. Use of larger trees, tree preservation, green roofs, green walls and water features are encouraged by this requirement.

"Table A" Seattle's Green Factor landscape elements	Multiplier
A. Planted areas (choose one of the following for each planting area)	
1. Planted areas with a soil depth of 24 inches or more:	0.6
2. Bioretention facilities meeting standards of the Stormwater Code, Title 22, Subtitle VIII	1
B. Plants	
1. Mulch, ground covers, or other plants normally expected to be less than 2 feet tall at maturity	0.1
2. Medium shrubs or other perennials at least 2 feet tall, but less than 4 feet tall, at maturity	0.3
3. Large shrubs or other perennials at least 4 feet tall at maturity	0.3
4. Small trees	0.3
5. Small/medium trees	0.5
6. Medium/large trees	0.7
7. Large trees	0.9
8. Preservation of existing trees at least 6 inches in diameter at breast height	1
C. Green roofs	
1. Planted over at least 2 inches but less than 4 inches of growth medium	0.4
2. Planted over at least 4 inches but less than 8 inches of growth medium	0.6
3. Planted over at least 8 inches of growth medium	0.8
D. Vegetated walls in C and NC zones only	0.4
E. Permeable paving	
1. Installed over at least 6 inches and less than 24 inches of soil and/or gravel	0.2
2. Installed over at least 24 inches of soil and/or gravel	0.5

F. Structural soil		0.5
G. Bonuses applied to Green Factor landscape elements:		
	1. Landscaping that consists entirely of drought- tolerant or native plant species	0.1
	2. Landscaping that receives at least 50% of its irrigation through the use of harvested rainwater	0.2
	3. Landscaping visible from adjacent rights-of-way or public open space	0.2
	4. Landscaping in food cultivation	0.1

"Table B" Seattle's Equivalent square footage of trees and large shrubs	
Landscape elements	**Equivalent sq. ft.**
Medium shrubs or other perennials at least 2 feet tall, but less than 4 feet tall, at maturity	9 per plant
Large shrubs or other perennials at least 4 feet tall at maturity	36 per plant
Small trees	75 per tree
Small/medium trees	150 per tree
Medium/large trees	250 per tree
Large trees	350 per tree
Existing trees	20 per inch of trunk diameter 4.5 feet above grade

13.5 Seattle City Code 23.86.019 – Requirements for Green Factor

"Development standards for certain areas require landscaping that meets a minimum Green Factor score. All required landscaping shall meet standards promulgated by the Director to provide for the long-term health, viability, and coverage of plantings. These standards may include, but are not limited to, the type and size of plants, spacing of plants, depth, and quality of soil, use of drought-tolerant plants, and access to light and air for plants. The Green Factor score shall be calculated as follows:

1.Identify all proposed landscape elements, sorted into the categories presented in Table A for 23.86.019.

2. Multiply the square feet, or equivalent square footage where applicable, of each landscape element by the multiplier provided for that element in Table A, according to the following provisions:

> *a. If multiple elements listed on Table A f occupy the same area (for example, groundcover under a tree), count the full square footage or equivalent square footage of each element.*

b. Landscaping elements in the right-of-way between the lot line and the roadway may be counted, provided that they are approved by the Director of the Department of Transportation.

c. Elements listed in Table A that are provided to satisfy any other requirements of this Title 23 may be counted.

d. For trees, large shrubs, and large perennials, use the equivalent square footage of each tree or shrub according to Table B.

e. For vegetated walls, use the square footage of the portion of the wall covered by vegetation. All vegetated wall structures, including fences counted as vegetated walls, shall be constructed of durable materials, provide adequate planting area for plant health, and provide appropriate surfaces or structures that enable plant coverage.

f. For all elements other than trees, large shrubs, large perennials, and vegetated walls, square footage is determined by the area of the portion of a horizontal plane that lies over or under the element.

g. All permeable paving and structural soil credits together may not count for more than one third of the lot's Green Factor score.

3. Add together all the products calculated under subsection 23.86.019.A.2 to determine the Green Factor numerator.

4.Divide the Green Factor numerator by the lot area to determine the Green Factor score.

Seattle provides a Green Factor Worksheet, included in this report as Appendix A, for the use of calculating the GF score.

13.6 Washington, D.C. Green Area Ratio

Washington D.C.'s Green Area Ratio standards are more aggressive that Seattle's and apply to **all new buildings and to all existing buildings where any additions, interior renovations, or both, within any twelve (12) month period exceed one hundred percent (100%) of the assessed value of the building except:**

i. Single family residences
ii. Buildings that do not require certificates of occupancy;
iii. Municipal wastewater treatment facilities operated by the District of Columbia Water and Sewer Authority;
iv. The interior renovation of an existing building that meets all of the following:
    i. Is located in the Central Employment Area;
    ii. Has an existing one hundred percent (100%) lot occupancy prior to the filing of the building permit;
    iii. Has an existing roof that cannot support a dead load of four inches (4 in.) of growth medium on the roof; and
    iv. The work proposed by the building permit application will not result in a roof capable of supporting a dead load of four inches (4 in.) of growth medium on the roof; or
v. A historic resource and any additions thereto

The program includes requirements that may trigger predeveloped sites into coming to compliance. Any approved change or modification to a permit, project or application in that results in an increase in impervious surface or lot occupancy of twenty percent (20%) or more also causes the GAR to be applicable for that portion of a project that is effected by the modification. Cost basis for additions, alterations or repairs to an existing building is the amount indicated by the applicant on the application for a building permit.

Washington, DC's Green Area Resources can be found at https://doee.dc.gov/service/green-area-ratio-overview.

The GAR is calculated using the following formula:

$$GAR = \frac{\text{(area of landscape element 1 x multiplier)} + \text{(area of landscape element 2 x multiplier)}}{\text{Lot Area}}$$

The term "landscape element" refers to one (1) of the elements listed in the table A, below.

Table A, Washington, DC GAR LANDSCAPE ELEMENTS	MULTIPLIER
Landscaped area (select 1 of the following for each area)	
Landscaped areas with a soil depth of less than 24 inches	0.3
Landscaped areas with a soil depth of 24 inches or more	0.6
Bioretention facilities	0.4
Plantings	
Ground covers, or other plants less than 2 feet tall at maturity	0.2
Plants, not including grasses, at least 2 feet tall at maturity	0.3
Tree canopy for all new trees with mature canopy spread of 40 ft. or less calculated at 50 sq. ft. per tree	0.5
Tree canopy for all new trees with mature canopy spread of greater than 40 ft. calculated at 250 sq. ft. per tree	0.6
Tree canopy for preservation of existing trees 6 inches to 24 inches in diameter	0.7
Tree canopy for preservation of existing trees 24 inches in diameter or larger	0.8
Vegetated wall, plantings on a vertical surface	0.6
Vegetated roofs	
Extensive vegetated roof over at least 2 inches but less than 8 inches of growth medium	0.6
Intensive vegetated roof over at least 8 inches of growth medium	0.8
Permeable paving	
Permeable paving over at least 6 inches and less than 2 feet of soil or gravel	0.4
Permeable paving over at least 2 feet of soil or gravel	0.5

Table A, Washington, DC GAR LANDSCAPE ELEMENTS	MULTIPLIER
Other	
Enhanced tree growth systems	0.4
Renewable energy generation (area of)	0.5
Water features (using at least 50% recycled water)	0.2
Bonuses	
Native plant species listed in Subtitle C § 603.9	0.1
Landscaping in food cultivation	0.1
Harvested stormwater irrigation	0.1

TABLE B: WASHINGTON DC GAR EQUIVALENT SQUARE FEET OF TREE CANOPY AND LARGE SHRUBS	EQUIVALENT SQ. FT.
Plants, not including grasses, at least 2 feet tall at maturity	9 sq. ft. per plant
Tree canopy for trees 2.5 inches to 6 inches in diameter	50 sq. ft. per tree
Tree canopy for trees 6 inches to 12 inches in diameter	250 sq. ft. per tree
Tree canopy for trees 12 inches to 18 inches in diameter	600 sq. ft. per tree
Tree canopy for trees 18 inches to 24 inches in diameter	1,300 sq. ft. per tree
Tree canopy for trees larger than 24 inches in diameter	2,000 sq. ft. per tree

The process for calculating a property's GAR under the formula is as follows:

- The area of each landscape element is multiplied by its corresponding multiplier; The resulting numbers for all landscape elements are added together; The resulting point total is then divided by the total land area of the lot; and
- The product of the equation equals the property's GAR.
- The total points for all permeable paving and enhanced tree growth credits may not count for more than one-third (1/3) of the GAR score for a lot.

The City has a stronger emphasis on GAR requirements within residential districts, and relaxed standards applied to commercial and mixed use districts. Washington, DC is very prescriptive for its Landscape Practices, definitions which, if also adopted by host municipality may help it strategically identify and encourage specific practices.

Washington, DC requires that applicants shall submit a GAR score sheet with the GAR calculated for the given lot at the time of building permit application.

Applicants shall provide a landscape plan prepared by a Certified Landscape Expert that includes the following information:

- GAR elements called out by category and area, which may be provided as a part of the landscape plan or as a separate document;
- Lot dimension and size;
- Location and areas of all landscape elements with dimensions;
- Location, size, and species of all plants used to meet requirements;
- Both common and botanical names of all plant material;
- Identification of all existing trees that are to be preserved, with their location, trunk diameter at four feet, six inches (4 ft. 6 in.) above grade, canopy radius, and species;
- Plans indicating how preserved trees and other plants will be protected during demolition and construction;
- Location and dimensions of wheel stops, curbs, or other devices to protect landscaping for landscaped areas adjacent to driveways;
- A schematic irrigation and drainage plan and the size and depth of all plant containers for rooftop or container landscaping or areas to be irrigated with rainwater;
- Location and size of any trees to be removed;
- Specifications for soil improvement; and
- Signature of the Certified Landscape Expert who prepared the plans together with verification that plantings and other landscape elements

Certified Landscape Expert

- Washington, DC mandates that GAR project applicants must secure a CLE to verify the plans and installation comply with GAR. The CLE who signs the GAR plans may be different from the CLE who signs the Landscape Checklist. The applicant should select a CLE who specializes in the type(s) of landscape elements used in the project.

The CLE is defined as any of the following:

- A Maryland or Virginia Licensed Landscape Architect;
- An International Society of Arboriculture (ISA) Certified Arborist;
- A Maryland Professional Horticulturist; or
- A Landscape Contractors Association, DC-MD-VA Landscape Industry Certified Technician.

The CLE must do the following:

- Sign off on submitted GAR plans to indicate they conform to the GAR regulations and GAR Guidebook;
- Confirm the landscape elements are installed according to the approved plan and then sign off on the Landscape Checklist; and
- Prepare and sign a landscape maintenance plan for the property owner.

Applicants are also required to provide a landscape maintenance plan prepared and signed by a Certified Landscape Expert that describes how the plantings, water features, and hardscape features will be cared for and maintained including:

- Soil preparation;
- Use of compost;
- Plant replacement;
- Irrigation;
- Weed and pest control; and

- Control of noxious or invasive species.

The following modifications or substitutions to the landscape elements of an approved landscape plan require a plan revision and approval:

- Number of trees, shrubs, or groundcovers;
- Location of required plantings or landscape features;
- Substitution of species; or
- Revisions of any feature that could decrease the planting area or lower the GAR score.

Prior to the issuance of the certificate of occupancy, a landscape checklist must be signed by a Certified Landscape Expert, verifying that that landscaping was installed according to the building permit approved by Department of Consumer and Regulatory Affairs.

Payment Type	Payment Requirement	Fees by Combined Area of Land Disturbance and Substantial Improvement Building Footprint	
		≤ 10,000 ft²	> 10,000 ft²
Initial	Due upon filing for building permit	$593.55	$877.43
Final	Due before building permit is issued	$129.03	$206.45
Supplemental	For reviews after first resubmission	$516.13	

FIGURE 12 - WASHINGTON, DC GAR FEE STRUCTURE

Washington, DC places the administrative oversight of the GAR on The Zoning Administrator. The Administrator may grant a temporary certificate of occupancy when installation of the required landscaping is not currently possible due to weather, season, or site construction subject to the condition that the required landscaping must be installed within four (4) months after the date the temporary certificate is issued. The Zoning Administrator may grant up to two (2) extensions of a temporary certificate of occupancy, each for a four (4) month period.

13.7 Recommended GF/GAR Approach

Both Seattle and Washington DC have GF/GAR elements host municipality should consider adopting.

Seattle's program, which applies to all new development in neighborhood business districts with more than four dwelling units, more than 4,000 square feet of commercial uses, or more than 20 new parking spaces, well suited for capturing the bulk and scale of commercial projects for which host municipality's Comprehensive Plan establishes goals for stormwater, landscaping and community harmony.

Seattle's GF requires that the Green Factor Landscape areas must be designed by licensed landscape architects, certified professional horticulturalists, or certified landscape designers if the proposed project contains the following which triggers the Green Factor:

A. 10 or more residential units,
B. 20 or more new parking spaces,
C. 12,000 or more gross square feet of commercial or industrial space, or
D. more than 500 square feet of landscaping in containers.

Washington DC's GAR program has a more substantial selection of potential practices and detailed definitions of qualifying practices that a developer could rely on for GAR points. The more substantial the options, the higher the likelihood of meeting the GAR requirements. As no two sites are equal, the consideration of GAR/GF points allows a designer the creativity and flexibility to meet both the site's

unique stormwater requirements and satisfy host municipality and public expectations for landscaping and aesthetics.

The Washington, DC GAR applies to all new buildings requiring a Certificate of Occupancy and to all existing buildings requiring a Certificate of Occupancy where any additions, alterations, or repairs within any twelve month (12) period exceed one hundred percent (100%) of the assessed value of the building as set forth in the records of the Office of Tax and Revenue as of the date of the building permit application; provided the cost basis for alterations or additions to an existing building shall be the amount indicated by the applicant on the application for a building permit; and the assessed value of the building shall be the value set forth in records of the Office of Tax and Revenue as of the date of the building permit application. This gives DC the ability to ensure that non-GAR-conforming properties in the city, can be brought to current standards.

The Green Area Ratio is a relatively revolutionary method of implementing landscaping and stormwater controls. With only two cities in the United States using it as the basis for guiding landscaping, it may be challenging to navigate the legislative steps needed and the public education to establish the program. However, both Seattle and Washington, DC, have established excellent resources that can be relied upon for host municipality to develop their own enabling legislation, public education, website and presentation content and resources for developers and landscape planner – similar to the resources the District has established at https://doee.dc.gov/service/green-area-ratio-overview

13.8 Model GAR Enabling Legislation

NOTICE OF PROPOSED RULEMAKING

(Comprehensive Zoning Regulations Revision: Green Area Ratio)

_____ (municipality) Board hereby gives notice of its intent to amend _____ Code to adopt a new chapter entitled "Green Area Ratio". If adopted, the proposed chapter will provide general rules for a Town-wide requirement for green site design standards. This chapter includes explanation of the system, methods of calculation, terms of measurement, and requirements for review.

More detailed information, discussion, and analysis for the proposed text can be found in the following documents, which may be accessed at (*Will need to be developed*)

The following new Chapter _____, **GREEN AREA RATIO**, is proposed.

§ 195-1 INTRODUCTION TO GREEN AREA RATIO

§ 195-2 RELATIONSHIP TO LAND USE SUBTITLES

§ 195-3 APPLICABILITY OF GREEN AREA RATIO STANDARDS

§ 195-4 CALCULATION OF GREEN AREA RATIO

§ 195-5 LANDSCAPE ELEMENT ELIGIBILITY CONDITIONS FOR GREEN AREA RATIO

§ 195-6 SUBMITTAL REQUIREMENTS FOR GREEN AREA RATIO

§ 195-7 SPECIAL EXCEPTIONS FOR GREEN AREA RATIO

§ 195-8 MAINTENANCE REQUIREMENTS FOR GREEN AREA RATIO

§ ___ Introduction to green area ratio

Green Area Ratio (GAR) is the ratio of the weighted value of landscape elements to land area. The GAR score relates to an increase in the quantity and quality of environmental performance of the urban landscape.

Green Area Ratio sets integrated environmental requirements for landscape elements and site design that contribute to the reduction of stormwater runoff, the improvement of air quality, and the mitigation of the urban heat island effect.

The purposes of the GAR regulations are to:

- Implement a value-based system of requirements for environmental site design that provides flexibility in meeting environmental performance standards; and
- Promote attractive and environmentally functional landscapes.

The purpose of this chapter is to:

- Provide general guidance about the regulation of GAR requirements;
- Define the applicability of GAR;
- Set forth the formula for calculating the GAR and define its component parts;
- Identify those landscape elements that are included in the GAR, explain how their area is measured, and set forth eligibility requirements;
- Establish multipliers for each eligible landscape element;

- Indicate what plans and certifications must accompany an application submitted to demonstrate proof of GAR compliance; and
- Establish maintenance requirements for the landscape elements that are counted toward a property's GAR requirement.

§____ Relationship to land use subtitles

The GAR regulations of this chapter apply to all zones in all land use subtitles. Each land use subtitle also includes development standards tables containing GAR standards specific to zones within that subtitle.

§____ Applicability of green area ratio standards

The GAR applies to all new buildings requiring a Certificate of Occupancy and to all existing buildings requiring a Certificate of Occupancy where any additions, alterations, or repairs within any twelve month (12) period exceed one hundred percent (100%) of the assessed value of the building as set forth in the records of the Office of Tax and Revenue as of the date of the building permit application; provided:

The cost basis for alterations or additions to an existing building shall be the amount indicated by the applicant on the application for a building permit; and

The assessed value of the building shall be the value set forth in (Needs to be identified)

§ ___ CALCULATION OF GREEN AREA RATIO

The GAR shall be calculated using the following formula:

$$\text{GAR} = \frac{\begin{array}{c}(\text{area of landscape element 1 x multiplier})+\\(\text{area of landscape element 2 x multiplier})+\ldots\end{array}}{\text{Lot Area}}$$

For the purposes of this formula and the remainder of this section:

- The term "landscape element" refers to one of the elements listed in the left hand column of Table B, and will be hereafter referred to as "landscape element" or "element;"
- The term "multiplier" refers the number listed in the right hand column of the Table B that corresponds to a "landscape element"; and
- The term "area of landscape element" means the square feet of a landscape element, unless the element is a tree or large shrub, in which case "area of landscape area" refers to the element's equivalent square footage as indicated in Table B.

The process for calculating a property's GAR under the formula is as follows:

- The area of each landscape element is multiplied by its corresponding multiplier;
- The resulting numbers for all landscape elements are added together;
- The resulting point total is then divided by the total land area of the lot; and
- The product of the equation equals the property's GAR.

The total points for all *permeable paving* and *enhanced tree growth* credits may not count for more than one third (1/3) of the GAR score for a lot.

If multiple landscape elements occupy the same area, for example groundcover under a tree, the full square footage or equivalent square footage of each element may be counted.

All landscape elements must meet the eligibility requirements of **Table B: "GREEN AREA RATIO LANDSCAPE ELEMENTS"**

Equivalent square feet of tree and large shrubs are identified in **Table A: "GREEN AREA RATIO LANDSCAPE ELEMENTS"**

"Table A: GREEN AREA RATIO LANDSCAPE ELEMENTS"	EQUIVALENT SQUARE FOOTAGE*
Plants at least 2 feet tall at maturity	9 square feet per plant
Tree canopy for trees 2.5 inches to 6 inches in diameter	50 square feet per tree
Tree canopy for trees 6 inches to 12 inches in diameter	250 square feet per tree
Tree canopy for trees 12 inches to 18 inches in diameter	600 square feet per tree
Tree canopy for trees 18 inches to 24 inches in diameter	1300 square feet per tree
Tree canopy for trees larger than 24 inches in diameter	2000 square feet per tree

**to be determined by host municipality*

Landscape elements of the GAR shall be measured in the following ways:

- All trees shall be measured for diameter at a height four feet, six inches (4 ft. 6 in.) above grade when planted. Use the square footage equivalent based on diameter in the table in Table "B: GREEN AREA RATIO LANDSCAPE ELEMENTS"
- For *vegetated walls*, use the vertical square footage of the portion of the wall covered by vegetation; and
- For all other elements other than trees, large shrubs, perennials, and vegetated walls, square footage is determined by the area of a horizontal plane that is over the element.

Eligible landscape elements are identified in the table below:

Table B: GREEN AREA RATIO LANDSCAPE ELEMENTS	MULTIPLIER*
Landscaped area (select one of the following for each area)	
Landscaped areas with a soil depth of less than 24 inches	0.3
Landscaped areas with a soil depth of 24 inches or more	0.6
Bioretention facilities	0.4
Plantings	
Ground covers, or other plants less than 2 feet tall at maturity	0.2
Plants at least 2 feet tall at maturity	0.3
Tree canopy for all trees 2.5 inches to 6 inches in diameter	0.5
Tree canopy for new trees 6 inches in diameter or larger	0.6
Tree canopy for preservation of existing trees 6 inches to 24 inches in diameter	0.7
Tree canopy for preservation of existing trees 24 inches diameter or larger	0.8
Vegetated wall, plantings on a vertical surface	0.6

Table B: GREEN AREA RATIO LANDSCAPE ELEMENTS	MULTIPLIER*
Vegetated roofs	
Extensive vegetated roof over at least 2 inches but less than 8 inches of growth medium	0.6
Intensive vegetated roof over at least 8 inches of growth medium	0.8
Water features (using at least 50% recycled water)	0.2
Permeable paving	
Permeable paving over at least 6 inches and less than 2 feet of soil or gravel	0.4
Permeable paving over at least 2 feet of soil or gravel	0.5
Enhanced tree growth systems	0.4
Renewable energy generation (area of)	0.5
Bonuses	
Native plant species	0.1
Landscaping in food cultivation	0.1
Harvested stormwater irrigation	0.1

**to be determined by host municipality*

§ ___ Landscape element eligibility conditions for green area ratio

No landscape element may be counted towards a property's GAR unless it meets the applicable eligibility condition stated in this section.

Plantings over the specified soil depths shall meet the required conditions listed in the Table of Landscape Elements and Multipliers in Table B: "GREEN AREA RATIO LANDSCAPE ELEMENTS"

Bioretention facilities shall be landscaped areas that receive rainwater from surrounding areas and use plants and soils to slow, filter, and infiltrate stormwater runoff. These do not include structures made of cement or concrete alone.

Trees shall meet the following conditions:

- All trees shall be at least two and one half (2.5) inches in diameter measured at a height four feet, six inches (4 ft. 6 in.) above grade when planted and shall be replaced if damaged or killed by any cause; and
- All trees shall meet the American Standard for Nursery stock, as set forth by the American Nursery and Landscape Association.

Vegetated walls shall meet the following conditions:

- The maximum calculated vertical dimension shall not exceed thirty feet (30 ft.) unless the vegetated wall features a built-in growth medium;
- The area calculated for the vegetated wall features shall be fully covered within a period of two (2) to five (5) years from planning;
- The area calculated is the ground coverage area, not the total plant growth area;

- The walls shall be at least *five feet (5 ft.*)* from a side or rear lot line; and
- Where stormwater harvesting for irrigation is proposed, vegetated walls shall contain a connection to the proposed irrigation system.

Green roofs shall meet the following conditions:

- Designs for vegetated roofs must include plans to provide supplemental water for a minimum of two (2) growing seasons;
- Where stormwater harvesting for irrigation is proposed, vegetated roofs shall contain a connection to the proposed irrigation system; and
- The vegetation on a vegetated roof is not additionally eligible for groundcover value towards GAR requirements.

Water features shall meet the following conditions:

- Water features must use harvested rainwater for at least fifty percent (50%) of the annual flow; and
- The water features must be under water for at least six (6) months out of twelve (12).

Enhanced tree growth systems shall meet the following conditions:

- Be at least twenty-four inches (24 in.) deep, under pavement, and adjacent to planting areas; and
- Made up of soils that are not considered contaminated or compacted according to federal Superfund legislation.

Native plant species shall meet the following conditions:

- The plants are not listed in the NYSDEC "New York State Prohibited and Regulated Invasive Plants"
- The Applicant provides two (2) references in current publications showing that the plant is native to the region; and

Food cultivation shall meet the following conditions:

- All food cultivation areas must be easily accessible to at least one (1) occupant of the building;
- All food cultivation areas must have a source of water that can reach all portions of the food cultivation area; and
- The cultivation of animals for food is not eligible for GAR credits.

Submittal requirements for green area ratio:

This section lists the submittal requirements for demonstrating compliance with a GAR requirement. For the purposes of this section, the term Certified Landscape Expert means a person who is a:

- New York State certified landscape architect;
- International Society of Arboriculture Certified Arborist;
- New York State certified Professional Horticulturist; or
- Certified U.S. Green Building Council professional.

Applicants shall submit a GAR score sheet with the GAR calculated for the given lot at the time of building permit application.

Applicants shall provide a landscape plan prepared by a Certified Landscape Expert that includes the following information:

- *Green Area Ratio* elements called out by category and area, which may be provided as a part of the landscape plan or as a separate document;
- Lot dimension and size;
- Location and areas of all landscape elements with dimensions;
- Location, size, and species of all plants used to meet requirements;
- Both common and botanical names of all plant material;
- Identification of all existing trees that are to be preserved, with their location, trunk diameter at four feet, six inches (4 ft. 6 in.) above grade, canopy radius, and species;
- Plans indicating how preserved trees and other plants will be protected during demolition and construction;
- Location and dimensions of wheel stops, curbs, or other devices to protect landscaping for landscaped areas adjacent to driveways;
- A schematic irrigation and drainage plan and the size and depth of all plant containers for rooftop or container landscaping or areas to be irrigated with rainwater;
- Location and size of any trees to be removed;
- Specifications for soil improvement; and
- Signature of the certified landscape expert who prepared the plans together as verification that plantings and other landscape elements meet the requirements of this chapter.

Applicants shall provide a landscape maintenance plan prepared and signed by a Certified Landscape Expert that describes how the plantings with be cared for and maintained including:

- Soil preparation;
- Use of compost;
- Plant replacement;
- Irrigation;
- Weed and pest control;
- Control of noxious or invasive species, and;
- Care and maintenance of water and hardscape features.

The following modifications or substitutions to the landscape elements of an approved landscape plan require a plan revision and approval:

- Number of trees, shrubs, or groundcovers;
- Location of required plantings or landscape features;
- Substitution of species; or
- Revisions of any feature than could decrease planting area or lower the GAR score.

Except as provided below, approved landscape elements shall be installed in accordance with the approved plan prior to the issuance of the Certificate of Occupancy.

Prior to the issuance of the certificate of occupancy, a landscape checklist must be signed by a Certified Landscape Expert, verifying that that landscaping was installed according to the building permit approved by host municipality.

The Zoning Administrator may grant a temporary certificate of occupancy when installation of the required landscaping is not currently possible due to weather, season or site construction subject to the condition that landscaping must be installed within four (4) months after the date the temporary certificate is issued.

The temporary certificate of occupancy may be extended up to two (2) times by four (4) month periods by the Zoning Administrator.

Maintenance requirements for green area ratio

All plantings and landscape elements used to calculate a property's GAR must be maintained for the life of the project. If, for any reason, the installed landscape elements fall below the minimum required GAR score, new eligible landscape elements shall be added to compensate and result in the required ratio. These elements are not required to be the same as the submitted plans, so long as the GAR achieved is equivalent.

Appendices

Appendix A: Draft Watershed Rules and Regulations

Proposed Revision to the NYS Department of Health Watershed Rules and Regulations for the Watervliet Reservoir Watershed.

CITY OF WATERVLIET
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RULES AND REGULATIONS
FOR
PROTECTION FROM CONTAMINATION
OF THE
PUBLIC WATER SUPPLY
OF THE
WATERVLIET RESERVOIR
ALBANY COUNTY

Promulgated by the New York State Commissioner of Health
Under Section 1100 of the Public Health Law

Original March 1993

June 2002 Watershed Rules and Regulations Prepared by:
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7 South Church Street
Schenectady, NY 12305
518/382-1774

July 2022 Revisions by CDRPC

Pursuant to the authority vested in me as State Commissioner of Health by Section 1100 of the Public Health Law, I hereby repeal Section _____of Part_____, Title 10 (Health) of the Official Compilation of codes, Rules and Regulations of the State of New York, this _____day of_____, 2022 to be effective on filing in the Office of the Department of State, and add a new section to read as follows:

Section_____; City of Watervliet

A. Application: The rules and regulations set forth in this section, duly made and enacted in accordance with the provisions of Sections 1100-1107 of the Public Health Law shall apply to Watervliet Reservoir and all watercourses tributary thereto or which may ultimately discharge into said Watervliet Reservoir or which may be developed in the future to serve as sources of the water supply to the City of Watervliet, Albany County, New York. The location of boundaries designated for the protection zones, which comprise the Normans Kill, Black Creek and Bozenkill Watersheds to the Watervliet Reservoir are illustrated on the watershed protection zone map, dated_____, 2022 and filed with the New York State Commissioner of Health, Albany, New York, and with the City Clerk of the City of Watervliet, Albany, County, New York, and included as Appendix A of these Rules. Definitions

1. Agriculturally associated animal waste shall mean manure obtained from agricultural industries.

2. Agriculturally associated animal waste area shall mean land used for the deposition of agriculturally associated animal waste on the surface of the ground for fertilization purposes.

3. Chloride salt shall mean any bulk quantities of chloride compounds and other deicing compounds intended for application to roads, including mixtures of sand and chloride compounds in any proportion where the chloride compounds constitute over eight percent of the mixture. A bulk quantity of chloride compounds means a quantity of one thousand pounds or more but does not include any chloride compounds in a solid form, including granules, which are packaged in waterproof bags or containers which do not exceed one hundred pounds each.

4. Commissioner of Health, unless otherwise noted, shall be the Commissioner of Health of the State of New York.

5. Disposal shall mean the discharge, deposit, injection, dumping, spilling, leaking or placing of any solid waste, radioactive material, hazardous waste or wastewater into or on any land or water so that such solid waste, radioactive material, hazardous waste or wastewater will remain on the land or water and will not be removed.

6. Environmental assessment form shall be a form used by an agency to assist it in determining the environmental significance or nonsignificance of actions as defined in 6 NYCRR, Part 617.

7. Fertilizers shall be any commercially produced mixture generally containing phosphorous, nitrogen and potassium which is applied to the ground to increase nutrients to paints.

8. Flood plain shall be the land contiguous to streams, ponds, estuaries and lakes which would be inundated by the flood having a

one percent chance of being equaled or exceeded in any given year.

9. Groundwater shall be any water beneath the land surface in the saturated zone.

10. Hazardous material shall mean any substance listed in or exhibited characteristics identified in either 6 NYCRR Part 371 or 6 NYCRR Part 597.

11. Herbicides shall mean any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any weed and being those substances defined as herbicides pursuant to Environmental Conservation Law Section 33-0101.

12. Human excreta shall mean human feces and urine.

13. Junkyard shall mean an area where two or more unregistered, old or secondhand motor vehicles are being accumulated for purposes of disposal, resale or used parts or reclaiming certain materials such as metal, glass, fabric and/or the like.

14. Linear distance shall mean the shortest horizontal distance from the nearest point of a structure or object to the high water mark of a reservoir or to the edge, margin or steep bank forming the ordinary high water line of watercourse.

15. Manure shall mean animal feces and urine.

16. Non-agriculturally associated animal waste shall mean manure obtained from non-agricultural industries.

17. Non-point discharge shall mean discharges of pollutants not subject to SPDES (State Pollutant Discharge Elimination System) permit requirements.

18. Open storage shall mean the holding of a material in a way that the material is exposed to the elements of nature.

19. Pest shall mean (1) any insect, rodent, fungus, weed or (2) any other form of terrestrial or aquatic plant or animal life or virus, bacteria or other micro-organism (except viruses, bacteria or micro-organisms on or in living man or other living animals) which the Commissioner of Environmental Conservation declares to be a pest as provided by Environmental conservation Law Section 33-0101.

20. Pesticide shall mean any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest, and any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant and being those substances defined as pesticides pursuant to Environmental Conservation law Section 33-0101 et seq.

21. Point Source discharge shall mean pollutants discharge from a point source as defined in Environmental Conservation Law Section 17-0105.

22. Pollutant shall mean dredge, spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, chemical waste, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water.

23. Protection zone shall mean any of the watershed management zones, as delineated on the watershed protection zone map, dated 2022 and included as Appendix A of these Rules and described herein. These zones shall be designated Zone I, Zone II and Zone III.

24. Radiation shall mean ionizing radiation; that is, any alpha particle, beta particle, gamma ray, x-ray, neutron, high-speed proton, and any other atomic particle producing ionization, but shall not mean any sound or radio wave, or visible, infrared, or ultraviolet light.

25. Radioactive material shall mean any material in any form that emits radiation spontaneously, excluding those radioactive materials or devices containing radioactive materials whose receipt, possession, use and transfer are exempt from licensing and regulatory control pursuant to regulations of the New York State Department of Labor or United States Nuclear Regulatory Commission.

26. Recyclables handling and recovery facility shall mean a solid waste management facility, other than pickup and transfer vehicles, at which recyclables are separated from the solid waste stream, or at which previously separated recyclables are collected, for collection, storage and off-site shipment.

27. Reservoir shall mean any natural or artificial lake or pond which is tributary to or serves as a source of the public water supply of the City of Watervliet.

28. Septage shall be the contents of a septic tank, cesspool, or other individual wastewater treatment work which receives domestic sewage wastes.

29. Sludge, or biosolids shall be the solid, semi-solid or liquid waste generated from a waste processing facility, but does not include the liquid stream of effluent.

30. Solid waste shall mean all putrescible and nonputrescible materials or substances discarded or rejected as being spent, useless, worthless or in excess to the owners at the end of such discard or rejection, including, but not limited to, garbage, refuse, industrial and commercial waste, sludges from air or water control facilities, rubbish, ashes, contained gaseous material, incinerator residue, demolition and construction debris, discarded automobiles and offal but not including sewage and other highly diluted water carried material or substances and those in gaseous form, and being those wastes defined as solid waste pursuant to Environmental Conservation Law Section 27-0701.

31. Solid waste management facility means any facility employed beyond the initial waste collection process including, but not limited to, transfer stations, bailing facilities, rail haul facilities, processing systems, including recycling and resource recovery facilities or other facilities for reducing solid waste volume, sanitary landfills, sewage sludge or biosolids disposal facilities, facilities for the disposal of construction and demolition debris, plants and facilities for compacting, composting or pyrolization of solid wastes, incinerators and other solid waste disposal, reduction or conversion facilities, as defined in Environmental Conservation Law Section 27-0701, et seq.

32. Spill shall mean any escape of a substance from the containers employed in storage, transfer, processing or use.

33. State Pollutant Discharge Elimination System (SPDES) shall mean the system established pursuant to Article 17, Title 8 of Environmental Conservation Law for issuance of permits authorizing discharges to the waters of the State of New York.

34. Storm water runoff recharge basins shall mean a man-made device capable of retaining surface water runoff to induce

groundwater infiltration.

35. Toxic substance shall mean any substance which is listed in the latest printed edition of the National Institute for Occupational Safety and Health Registry of Toxic Effects of Chemical Substances, or which has yielded positive evidence of acute or chronic health hazards in human, or animal or biological testing.

36. Wastewater treatment works shall mean any treatment plant, sewer, disposal field, lagoon, pumping station, septic system, collection and distribution pipes, on-site disposal systems and seepage units, constructed drainage ditch or surface water intercepting ditch, or other works not specifically mentioned in this paragraph, installed for the purpose of transport, treatment, neutralization, stabilization, storage or disposal of wastewater.

37. Wastewater shall mean aqueous carried waste including, but not limited to dredge spoil, solid waste, hazardous waste, incinerator ash and residue, septage, garbage, refuse, sludge, chemical waste, infectious waste, biological material, radioactive materials, heat, and industrial, municipal and agricultural waste.

38. Water Reservoir Protection Zone shall mean the total land area, known as Zone, I, delineated on the map, dated _____ ___, 2022 and filed with the New York State Commissioner of Health and with the City Clerk of the City of Watervliet and included as Appendix A of these Rules. The Water Reservoir Protection Zone includes the Watervliet Reservoir and all city-owned lands bordering the reservoir.

39. Water Supply Protection Zone shall mean the land area, known as Zone II, delineated on the map, dated_____2022 and

filed with the New York State Commissioner of Health and with the City Clerk of the City of Watervliet and included as Appendix A of these Rules. The Water Supply Protection Zone includes all primary and secondary watercourses flowing directly or indirectly into the Watervliet Reservoir and all lands within 200 feet of primary and secondary watercourses.

40. Watershed Protection Zone shall mean the land area, known as Zone III, which is tributary to Zone I and Zone II and is the tributary surface area from which the reservoir is replenished by runoff. The Watershed Protection Zone is delineated on the map, dated_____2022 and filed with the New York State Commissioner of Health and with the City Clerk of the City of Watervliet and included as Appendix A of these Rules.

41. Water supply shall mean the public water supply of the City of Watervliet.

42. Watercourses shall mean every spring, stream, marsh or channel of water of any kind which flows or may flow into the indicated water supply.

a. Primary watercourses will be classified as those flowing directly into the Watervliet Reservoir. Primary watercourses of the watershed include the Bozenkill, Normans Kill and Black Creek.

b, Secondary watercourses include all watercourses within the watershed not classified as primary watercourses as well as state and federal wetlands.

43. Watershed shall mean the entire drainage area contributing water to the City of Watervliet water supply and shall include the three designated protection zones knows as Zone I, Zone II and Zone III.

C. General Provisions:

1. No person, including State agencies or political subdivisions having jurisdiction, shall perform any act or grant any permit or approval which may result in the contravention of the standards for raw water quality as contained in Part 170, Title 10 (Health) of the official Compilation of Codes, Rules and Regulations of the State of New York (10 NYCRR Part 170). In addition to observing the specific requirements set forth herein, all individuals or entities occupying land on or adjacent to the Watervliet Reservoir or any watercourse tributary thereto shall refrain from any activity, including those not specifically mentioned herein, which may result in contamination of the public water supply.
2. The maintenance of the water supply source shall be subject to the approval and enforcement authority of the Albany and Schenectady County Health Departments, NYSDEC and New York State Department of Health (NYSDOH) so as to eliminate the opportunity for pollution to enter the water sources.
3. Recreation Restrictions:
    a. Bathing and swimming: No bathing and/or swimming shall be allowed in the Watervliet Reservoir, or any watercourse owned by the City of Watervliet.
    b. Boating: No boating shall be allowed in or upon the waters of the Watervliet Reservoir or in any watercourse owned by the City of Watervliet except by duly authorized employees of the City of Watervliet in the performance of their duties of supervision and maintenance of the water supply.
    c. Fishing and Trespassing: No fishing and/or trespassing shall be allowed in or upon any reservoir watercourse owned by the City of Watervliet within 1000 foot linear distance of water supply intakes except by duly authorized employees of

the City of Watervliet in the performance of their duties of supervision and maintenance of the water supply. Public fishing will be permitted only in areas specifically designated for such a purpose.

d. Motorized vehicles: No motorized vehicles will be allowed on the water, or on the ice, of the Watervliet Reservoir, or any watercourse tributary thereto, except by duly authorized employees of the City of Watervliet in the performance of their duties of supervision and maintenance of the water supply.

e. Public notification: Notification of the public of these restrictions shall be made by posting signs in appropriate places. Regular patrols shall be made during recreation season(s) to enforce this restriction.

4. Other Zone I Regulations: In addition to the above-described regulations, all of the following regulations for Watershed Zones II and III also apply to Zone I.

E. Specific Regulations for Watershed Zone II (Primary and Secondary Watercourses):

1. On-site Disposal Systems:

a. No human excreta or sewage shall be deposited or allowed to escape into any reservoir or primary or secondary watercourse on the watershed.

b. All wastewater treatment works discharging to groundwater and receiving wastewater without the admixture of industrial or other wastes, as those terms are defined in Environmental Conservation Law, Section 17-0701, in quantities of less than 1,000 gallons per day shall be designed, installed and maintained in accordance with the sanitary code and standards established in 10 NYCRR Part 75 (Appendix 75A) and any wastewater disposal standards promulgated by the Albany or

Schenectady County Health Departments where such standards are more stringent.

c. A permit is required prior to the installation of any subsurface disposal system. This permit must be obtained from the County Health Department or from the Town or Village office having local jurisdiction. Conditions for a permit shall include an approved engineering plan, verification of the percolation rate by a disinterested party and inspection of the installation prior to backfilling. Permits are renewable on a five-year basis. All septic tanks shall be pumped clean every five years or more often if conditions warrant.

d. The applicable standards and permit requirements of the NYS Department of Environmental Conservation shall apply to systems with flows in excess of 1,000 gallons per day or those which contain industrial wastewater.

e. No portion of the seepage unit shall be constructed, placed or rebuilt within 50 feet linear distance of a lake, reservoir, impoundment, stream or their tributary watercourses.

f. Prior to any conveyance of real property in the Watershed Zone II (Primary and Secondary Watercourses) where the property utilizes an on-site wastewater treatment system (OWTS), the OWTS must be inspected by the Municipal Building and Codes Enforcement Officer (herein referred to as the "Building and Codes Enforcement Office") from the municipality in which the property is located if the host municipality has enacted a septic inspection requirement. The inspection shall include a septic tank pump out by a NYSDEC registered septic hauler and all seepage pits and septic drainfield distribution boxes (D-box) accepting effluent from a septic tank must be uncovered and opened by the property owner or their agent prior to inspection. The property transfer inspection and pump out shall be arranged by the property owner as early in the conveyance of real

property process as possible in order to obtain an accurate and timely assessment of the OWTS. Upon submission of a complete application to the Building and Codes Enforcement Officer and payment of the applicable fee, the property owner must make arrangements to schedule the inspection with no less than 48 hours' advance notice and shall coordinate with the septic hauler to be on site simultaneously. The cost of the inspection, as set forth in the Municipalities; Fee Schedule Ordinance, shall be paid to the host municipality prior to the inspection. Inspections must be undertaken within one year of the application or a renewal application with payment of the associated fee will be required.

2. Point of source discharges, other than storm water runoff conduits, are prohibited except pursuant to an authorization issued by the New York State Department of Environmental Conservation.

   a. Storm sewer outlets shall not be made directly to lakes, reservoirs, impoundments, streams or their tributary watercourses. Provisions shall be made to discharge to the surface at least 100 feet from lakes, reservoirs, impoundments, streams and their tributary watercourses.

3. Animal Wastes:

a. No concentration of animal wastes from an agricultural operation, including but not limited to: Manure piles, feedlots, barnyards and yarding areas, shall be located within a 100 feet linear distance from any lake, reservoir, impoundment or watercourse. Areas utilized for the storage or stockpiling of manure and agriculturally associated animal waste shall be constructed and maintained such that seepage, leachate and runoff from storage or stockpiling of animal waste cannot adversely impact the quality of the groundwater or surface water.

b. Barnyards, feedlots, yarding areas and manure piles shall be separated from streams and water bodies by ditches or surface grading to prevent their runoff from entering streams and water bodies.

c. Drainage from barnyards, feedlots, yarding areas and manure piles shall not be discharged directly to a lake, reservoir, impoundment or watercourse. Such drainage shall be dispersed over the surface of the ground at a minimum distance of 250 feet linear distance from any lake, reservoir, impoundment or watercourse.

d. Provisions shall be made for satisfactory disposal of milk house waste either by surface or subsurface irrigation that prevents any discharge to any lake, reservoir, impoundment or watercourse. Such facilities shall be located at least 100 feet linear distance from any lake, reservoir, impoundment or watercourse.

e. Manure shall not be spread on frozen ground if there is any likelihood that surface runoff will be carried into adjacent lakes, reservoirs, impoundments or watercourses. No manure shall be spread on land within 250 feet of a lake, impoundment or watercourse from November 1 through March 31.

f. No structures of any kind for the purpose of sheltering or corralling animals shall be constructed within a 100 foot linear distance of any reservoir or watercourse.

g. No animal shall be allowed to stand, wallow, wade or swim in any reservoir or watercourse.

h. Pet owners in urban areas must provide for animal waste disposal on an individual basis.

i. Farm tillage practices shall be in conformance to the degree practicable with “Agricultural Best Management Practice Systems Catalogue,” NYS Soil and Water Conservation Committee, dated April 2021, and included as Appendix B of these Watershed Rules

and Regulations.

4. Fertilizer and Manure Use:

   a. Open storage of fertilizers for nonfarm and nonresidential use is prohibited.

   b. Agricultural use of fertilizers and land application of manure shall be in conformance with best management practices and to the degree practicable with "Agricultural Best Management Practice Systems Catalogue," dated 2021 and included as Appendix B of these Rules.

   c. Fertilizer use for non-farm and non-residential usage shall not be applied in a manner or at rates which would contaminate the water supply.

5. Pesticide and Herbicide Use:

   a. All pesticide and herbicide storage, use, application and disposal shall be under permit as provided in Environmental Conservation Law, Article 33, subject to the approval and enforcement authority of the NYSDEC.

   b. Disposal of water used for make-up water or for washing of equipment is prohibited except pursuant to an authorization issued by the NYSDEC.

   c. Use of lakes, reservoirs or streams as a source of water or for make-up water or washing of equipment used in conjunction with pesticides and herbicides is prohibited.

6. Solid Waste Management Facilities:

   a. Not junkyard shall be located with a 500 foot linear distance of any lake, impoundment, reservoir or watercourse.

b. The establishment or continued operation of solid waste management facilities shall conform to 6 NYCRR Part 360, and be under valid permit from, or other authorization by, the NYSDEC.

c. No refuse shall be deposited either on or beneath the surface of the ground within a 250 foot linear distance of any reservoir or watercourse.

d. Waste disposal areas (including, but not limited to, landfills, compost, recycling, resource recovery, transfer stations, sludge construction and demolition landfills, waste tire, medical wastes or incineration facilities) are prohibited except for the solid waste generated from a single-family residence or farm, provided that the disposal area is located within the property boundaries of the single-family residence or farm and the refuse disposal area is not located within a 500 foot linear distance of any reservoir or watercourse.

e. Land application (including storage) of septage and sludge is prohibited except by permit issued per 6 NYCRR Part 360 by the NYSDEC.

f. Abandoned landfills and dumps shall be investigated, and they shall be monitored when data warrant, and remedial action shall be undertaken if undesirable conditions are present.

7. Radioactive Material: Storage, use and disposal of radioactive material is subject to the approval and enforcement authority of the NYSDEC, the NYSDOH and any other State or Federal agencies having jurisdiction. No radioactive material shall be disposed of by burial in soil at any point within the watershed.

8. Hazardous Material:

a. Storage and use of hazardous materials are subject to the approval and enforcement authority of the NYSDEC or other agency having jurisdiction.

b. No container used for the storage of toxic chemicals or substances shall be stored or deposited on the ground within a 1000 foot linear distance of any reservoir or watercourse.

c. Disposal of hazardous or toxic chemicals and substances will be prohibited at all points within the watershed.

9. Bulk Storage:

a. Above ground or underground petroleum storage tanks, including design, installation and maintenance, are subject to the approval and enforcement authority of the NYSDEC as per Environmental Conservation Law Sections 17-0303 and 17-1001 et seq.

b. No above ground or underground petroleum storage tanks shall be installed within a 100 foot linear distance of the reservoir or the reservoir intake.

c. No above ground or underground petroleum storage tanks shall be installed within a 200 foot linear distance of any watercourse.

b. Abandoned petroleum tanks are subject to the closure requirements of 6 NYCRR, Section 613.9.

c. Storage of chloride salts is prohibited except in structures designed to minimize contact with precipitation, constructed on low permeability pads designed to control seepage and runoff, and at least 500 foot linear distance from any reservoir of watercourse.

10. Spills:

    a. Spills. Within any of the herein-defined protection zones, any person who is the owner of or in actual or constructive possession or control of a hazardous substance or any agent or employee thereof or any person in a contractual relationship therewith who is responsible for or has knowledge of any spill, as defined above, of any petroleum, hazardous material, toxic substance or radioactive material to the ground surface or any water body, which is likely to have an adverse effect on water quality or quantity, shall notify the City of Watervliet and Municipality in which the spill occurred.

    b. The NYSDEC shall be advised of any spills within two hours by phoning 1-800-457-7362.

    c. The State Department of Health shall be advised of any spills within 12 hours.

    d. Periodic spill response drills should be conducted to ensure preparedness for spill containment and clean-up.

11. Deicing Salts and Snow Disposal:

    a. Deicing salt application is restricted to the minimum amount needed for public safety in accordance with best management practices as developed by the New York State Department of Transportation. Calcium chloride shall be used instead of sodium chloride where possible to limit sodium input to area waters.

    b. Snow disposal of snow removed from streets, roads or parking areas is prohibited from being dumped or deposited within a 1000 foot linear distance of the reservoir or a 200 foot linear distance of any watercourse.

    c. Storage of chloride salts within 500-feet from any watercourse is prohibited. Municipal stockpiles shall be stored within structures designed to minimize contact with precipitation and constructed on low permeability pads designed to control

seepage and runoff.

12. Sediment Generation:

    a. Farm tillage practices shall be in conformance to the degree practicable with "Agricultural Best Management Practice Systems Catalogue" dated 2021 and included as Appendix B of these Rules.

    b. Land disturbing activities which may result in deterioration of the quality or quantity of the public water supply source, including general construction, highway construction, access road construction and maintenance are prohibited except where measures have been put in place to prevent erosion and sediment production.

13. Cemeteries: Not interment of human body shall be made within a 250 foot linear distance of a lake, reservoir, impoundment or watercourse.

14. Atmospheric Fallout: Appropriate monitoring of the constituents of precipitation shall be undertaken by the water supply agency and the NYSDOH and NYSDEC, and where data indicate, appropriate action shall be taken.

15. Land Use Management:

    a. Where surface water deterioration is likely to be caused by land development, the water supplier, municipal officials and the NYSDOH shall insure that appropriate zoning and other controls are implemented to protect the surface water.

    b. All lands or tributary streams draining to public water supply reservoirs, lakes, or impoundments, shall be so identified on land use maps and in zoning regulations.

16. Recreational land use shall be so managed to prevent any adverse impact on water quality.

F. Specific Regulations for Watershed Zone III (Remaining Watershed Lands):

1. The specific regulations of Watershed Zone II also apply to Watershed Zone III, except that the linear setback distances referred to generally apply only to Watershed Zone 1 and II areas. Where the linear setback distances exceed the boundaries of Watershed Zone II, or I the specific regulation also applies to Watershed Zone III.

2. Surveillance: Maintain Information on any system, facility or activity that could pose a pollution threat to the water source.

3. Compliance: Require compliance with general water pollution control program and related environmental protection programs.

G. Inspection: The General Manager of the City of Watervliet or any persons charges with the maintenance or supervision of the public water supply system by its officers or their duly appointed representative, shall make regular and thorough inspections of the identified protection zones to ascertain compliance with the rules and regulations set forth in this section. It shall be the duty of the aforesaid officials to cause copies of any rules and regulations violated to be served upon the persons violating the same, together with notices of such violations. If such persons served do not immediately comply with the rules and regulations, it shall be the further duty of the aforesaid officials to notify the NYS Commissioner of Health or his designee of such violations.

H. Penalties for Violations: Any person, firm or corporation who violates any provisions of these Watershed Rules and Regulations shall be subject to those penalties specified in Section 1103 of the New York State Public Health Law. Any such violation may be enjoined subject to Section 1104 and 1005 of the New York State Public Health Law.

The rules and regulations for the protection from contamination of the public water supply of the City of Watervliet, promulgated by the NYS Commissioner of Health on the 15th day of June 1962, are hereby repealed and the foregoing rules and regulations for the protection from contamination of the public water supply of the City of Watervliet are hereby duly made, ordained and established on this____day of _____, 2022, pursuant to Section 1100 of the Public Health Law effective upon filing in the office of the Department of State.

_____

Commissioner of Health of the State of New York

_____, 2022

Appendix A: City of Watervliet – Watershed Protection Zone Map, ____. 2022

Appendix B: Agricultural Best Management Practice Systems Catalogue, NYS Soil and Water Conservation Committee. Dated April 2021

Appendix B: Current Watershed Rules and Regulations

New York Codes, Rules and Regulations (/)

Title: Section 100.2 - City of Watervliet

Printer-friendly version (/book/export/html/47190)

100.2 City of Watervliet. (a) Application. The rules and regulations hereinafter given, duly made and enacted in accordance with the provisions of sections 70, 71, 72 and 73 of chapter 45 of the Consolidated Laws (Public Health Law) as heretofore set forth shall apply to all natural and artificial reservoirs on the Normanskill and to all HEALTH 10B watercourses tributary thereto or ultimately discharging into said reservoirs, these bodies of water being sources of the public water supply of the city of Watervliet, Albany County, New York.

(b) Definitions (1) The term reservoir wherever used in this section is intended to mean and refer to all storage and impounding reservoirs on the Normanskill which are tributary to or which serve as sources of this public water supply or to any additional reservoir which may be constructed or used for the purpose of this public water supply.

(2) The term watercourse wherever used in this section is intended to mean and include every spring, pond (other than the artificial reservoirs and filter basins), stream, ditch, gutter or other channel of any kind the waters of which, when running whether continuously or occasionally, eventually flow or may flow into the public water supply of the city of Watervliet.

(3) Wherever a linear distance of a structure or object from a reservoir or from a watercourse is mentioned in this section, it is intended to mean the shortest horizontal distance from the nearest point of the structure or object to the high-water mark of a reservoir or to the edge, margin or precipitous bank forming the ordinary high-water mark of such watercourse.

(c) Privies adjacent to any reservoir or watercourse. (1) No privy, privy vault, pit, cesspool or any other receptacle of any kind used for either the temporary storage or the permanent deposit of human excreta shall be constructed, placed, maintained or allowed to remain within 100 feet of any reservoir or within 50 feet of any watercourse tributary to the public water supply of the city of Watervliet.

(2) No privy, privy vault, pit, cesspool or any other receptacle used for the permanent deposit of human excreta shall be constructed, located, placed, maintained or allowed to remain within 300 feet of any reservoir or within 100 feet of any watercourse tributary to the public water supply of the city of Watervliet.

(3) No cesspool, pit or other receptacle of any kind used for the temporary storage of human excreta or sewage shall be constructed, located, maintained or allowed to remain between the limiting distances prescribed by paragraph (1) of this subdivision and the limiting distances prescribed by paragraph (2) of this subdivision unless said cesspool, pit or other receptacle is so arranged and equipped that the said excreta or sewage are at once removed by pump or other satisfactory means through watertight pipes or conduits to some proper place of ultimate disposal, as hereinafter provided, or unless suitable removable vessels or receptacles for the temporary storage of said human excreta or sewage are provided and at all times maintained in an absolutely watertight condition and in such manner as to permit of convenient removal of said excreta or sewage to some place of ultimate disposal as hereinafter set forth.

(4) The excreta collected in the aforesaid removable receptacles permitted under paragraph (3) of this subdivision shall be removed and the receptacles thoroughly cleaned and deodorized as often as may be found necessary to maintain the privy in proper sanitary condition and to effectually prevent any overflow upon the soil or upon the foundation or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape while being transferred from the privy to the place of disposal hereinafter specified and that the contents, while being transferred from the privy to the place of disposal, shall be thoroughly covered and that the least possible annoyance and inconvenience be cause to occupants of the premises and the adjacent premises.

(5) Unless otherwise specially ordered or permitted by the State Department of Health, the excreta collected in the aforesaid removable receptacles permitted under paragraph (3) of this subdivision shall, when removed, be disposed of by burying in trenches or pits at a depth of not less than 18 inches below the surface and at a distance not less than 500 feet from any reservoir or watercourse tributary to the public water supply of the city of Watervliet.

(6) Whenever, owing to the character of the soil or of the surface of the ground or owing to the height or flow of subsoil or surface water or other special local conditions, it is considered by the State Commissioner of Health that excremental matter from any privy or aforesaid receptacle or from any trench or place of disposal or the garbage or wastes from any dump may be washed over the surface or through the soil in an imperfectly purified condition into any reservoir or watercourse, then the said privy or receptacle for excreta or the trench or place of disposal or the said garbage or waste dump shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health. (d) Sewage, house slops, sink wastes, etc. (1) No house slops, bath water, sewage or other excretal matter from any water closet, privy, cesspool or other source, except the purified effluent from a properly constructed sewage disposal plant approved by the State Department of Health, as required by law, shall be thrown, placed, led, conducted, discharged or allowed to escape or flow in any manner either directly or indirectly into any reservoir or any watercourse tributary to the public water supply of the city of Watervliet, nor shall any such matters be thrown, placed, led, discharged or allowed to escape beneath the surface except into watertight receptacles, the contents of which are to be removed as provided by paragraph (4) of subdivision (c), within 300 feet of any reservoir or within 100 feet of any watercourse tributary to the public water supply of the city of Watervliet.

(2) No garbage, putrescible matter, kitchen or sink wastes, refuse or waste matter from any creamery, cheese factory or laundry nor water in which milk cans, utensils, clothing, bedding, carpets or harness have been washed or rinsed nor any polluted water or liquid of any kind shall be thrown or discharged directly or indirectly into any reservoir or watercourse, nor shall any such liquid or solid refuse or waste be thrown, discharged or allowed to

escape or remain upon the surface of the ground or to percolate into or through the ground below the surface in any manner whereby the same may flow into any reservoir or watercourse within a distance of 200 feet from any reservoir or within 50 feet from any watercourse tributary to the public water supply of the city of Watervliet.

(3) No clothing, bedding, carpets, harnesses, vehicle, receptacles, utensils nor anything that pollutes water shall be washed, rinsed or placed in any reservoir or watercourse.

(e) Bathing, animals, manure, compost, etc. (1) No person shall be allowed to bathe in any reservoir nor shall any animals or poultry be allowed to stand, wallow, wade or swim in any reservoir nor be washed therein. The watering of animals or poultry in any reservoir of the public water supply of the city of Watervliet is prohibited. No watering place shall be maintained in such a way as to pollute with muddy leachings or excretal matters any streams tributary to the public water supply of the city of Watervliet.

(2) No stable for cattle or horses, barnyard, hogyard, pigpen, poultry house or yard, hitching place or standing place for horses or other animals, manure pile or compost heap shall be constructed, placed, maintained or allowed to remain with its nearest point less than 100 feet from any reservoir or within 25 feet of any watercourse tributary to the public water supply of the city of Watervliet, and none of the above named objects or sources of pollution shall be so constructed, placed, maintained or allowed to remain where or in such a manner that the drainings, leachings or washings from the same may enter any such reservoir or watercourse without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that proper purification has been secured unless the above drainings, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form and not concentrated in perceptible lines of drainage for a distance of not less than 100 feet from any reservoir or 25 feet from any watercourse tributary to the public water supply of the city of Watervliet.

(3) No human excreta and no compost or other matter containing human excreta shall be thrown, placed or allowed to escape into any reservoir or watercourse nor to be placed, piled or spread upon the surface of the ground at any point on the watershed tributary to the public water supply of the city of Watervliet, nor shall such human excreta or compost or other matter containing human excreta be dug or buried in the soil at a less depth than 18 inches below the surface nor within a distance of 500 feet from any reservoir nor within 100 feet of any watercourse tributary to the public water supply of the city of Watervliet, and no manure or compost of any kind shall be placed, piled or spread upon the ground within a distance of 200 feet from any reservoir or within 25 feet from any watercourse tributary to the public water supply of the city of Watervliet.

(4) No decayed or fermented fruit or vegetables, cider mill wastes, roots, grain or other vegetable refuse of any kind shall be thrown, placed, discharged or allowed to escape or pass into any reservoir or watercourse, nor shall they be thrown, placed, piled, maintained or allowed to remain in such places that the drainage, leachings or washings therefrom may flow by open, blind or covered drains or channels of any kind into any reservoir or watercourse without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that sufficient purification has been secured unless the above mentioned drainings, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form and not concentrated in perceptible lines of drainage for a distance of not less than 100 feet before entering any reservoir or 25 feet before entering any watercourse tributary to the public water supply of the city of Watervliet. (f) Dead animals, offal, manufacturing wastes, etc. No dead animals, bird, fish or any part thereof nor any offal or waste matter of any kind shall be thrown, placed, discharged or allowed to escape or to pass into any reservoir or watercourse. Nor shall any such material or refuse be so located, placed, maintained or allowed to remain that the drainage, leachings or washings therefrom may reach any such reservoir or watercourse without having first percolated over or through the soil in a scattered, dissipated form and not concentrated in perceptible lines of drainage for a distance of 200 feet from any reservoir or 100 feet from any watercourse tributary to the public water supply of the city of Watervliet.

(g) Fishing, boating and ice cutting. No boating of any kind or fishing from boats or through the ice and no ice cutting or any trespassing whatever shall be allowed in or upon the waters or ice of the reservoirs.

(h) Labor camps. No temporary camp, tent, building or other structures for housing laborers engaged on construction work or for other purposes shall be located, placed or maintained within a distance of 500 feet from any reservoir or 100 feet from any watercourse tributary to the public water supply of the city of Watervliet.

(i) Cemeteries. No interment of a human body shall be made within a distance of 300 feet from any reservoir or 100 feet from any watercourse tributary to the public water supply of the city of Watervliet.

(j) Inspections. The board of water commissioners of the city of Watervliet shall make regular and thorough inspections of the reservoirs, streams and drainage areas tributary thereto for the purpose of ascertaining whether the above rules and regulations are being complied with, and it shall be the duty of said board of water commissioners to cause copies of any rules and regulations violated to be served upon the persons violating the same with notices of such violations; and if such persons served do not immediately comply with the rules and regulations, it shall be the further duty of the board of water commissioners to promptly notify the State Commissioner of Health of such violations. The board of water commissioners shall report in writing annually, on the first day of January, the results of the regular inspections made during the preceding year, stating the number of inspections which have been made, the number of violations found, the number of notices served and the general condition of the watershed at the time of the last inspection.

(k) Penalties. In accordance with section 70 of chapter 45 of the Consolidated Laws (Public Health Law), the penalty for each and every violation of or noncompliance with any of these rules and regulations which relate to a permanent source or act of contamination is hereby fixed at $100.

Volume

VOLUME B (Title 10)

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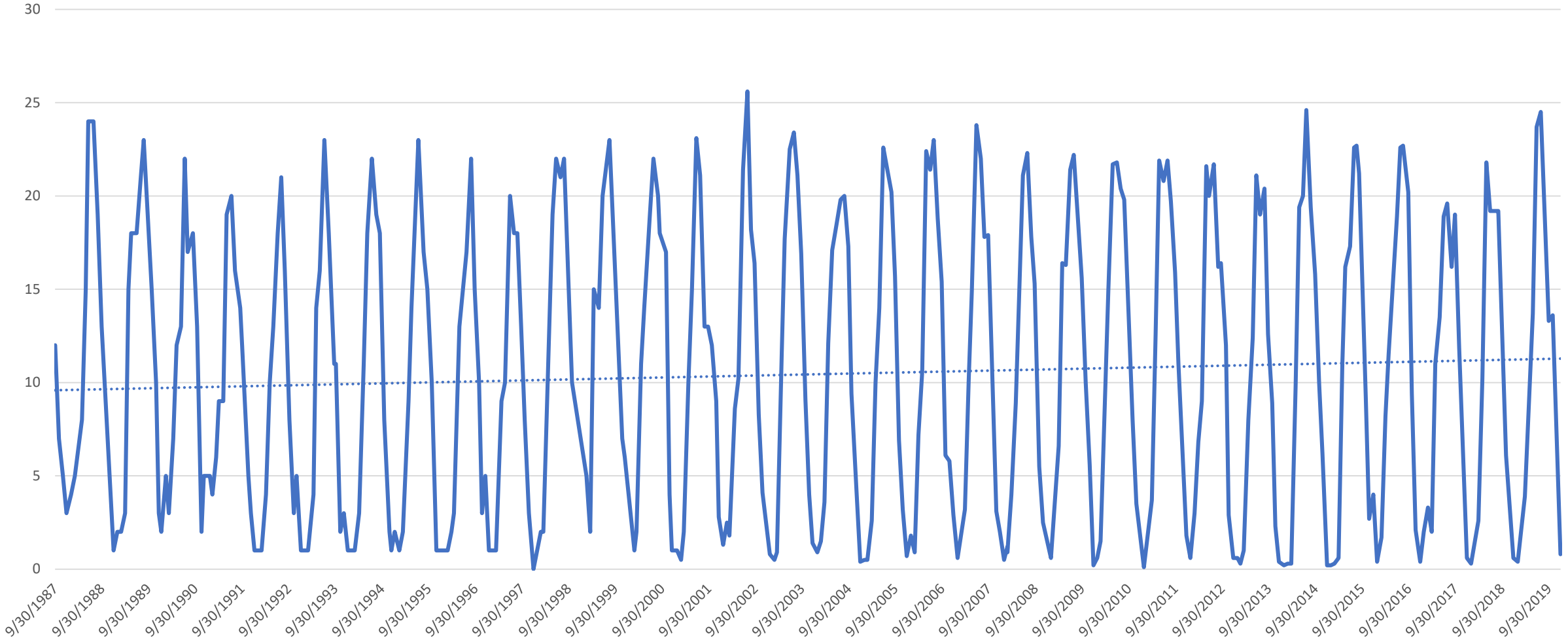
Emergency Regulations (/regulations/emergency)

Recently Adopted Regulations (/regulations/recently-adopted)

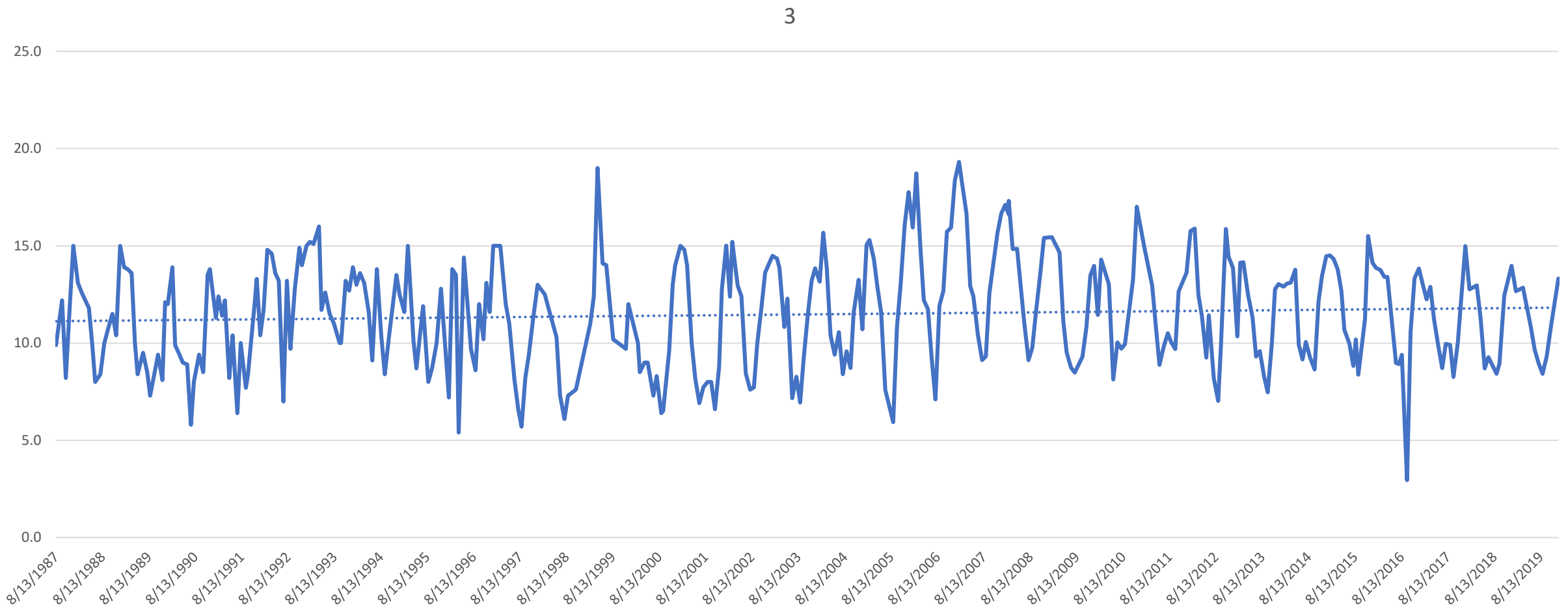
Three, Five, Ten and Fifteen Year Regulation Review (/regulations/five-ten-fifteen-review)

Appendix C: Raw Reservoir and Tributary Sampling Data

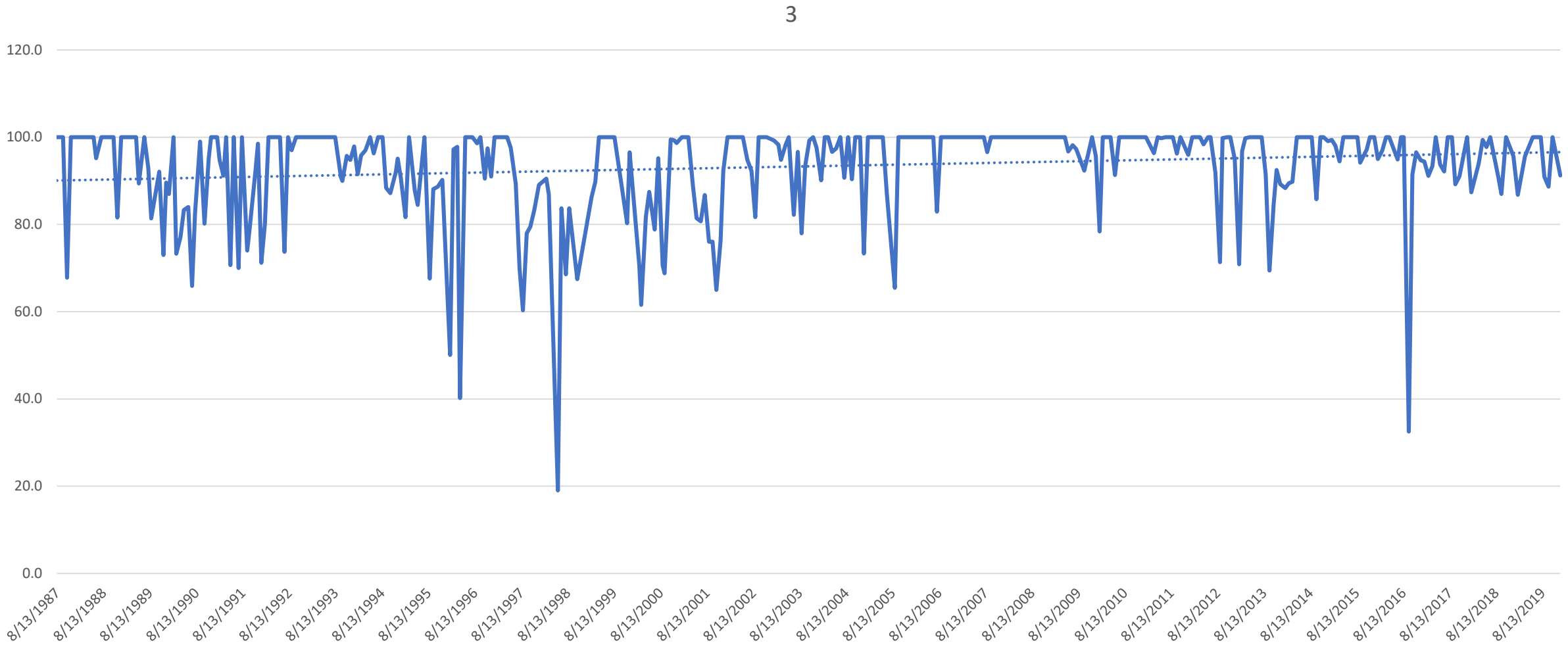
Black Creek at Route 158
Temperature



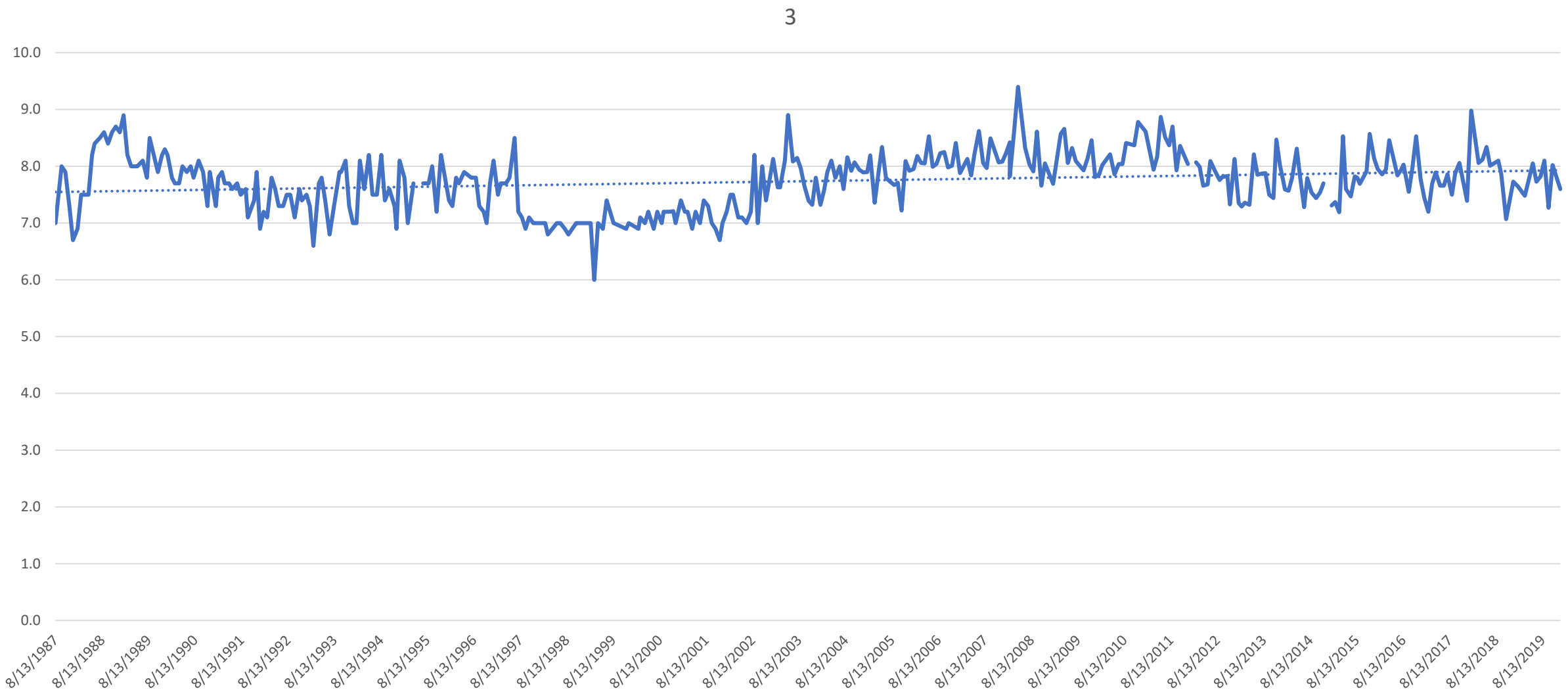
Black Creek at Route 158
Dissolved Oxygen



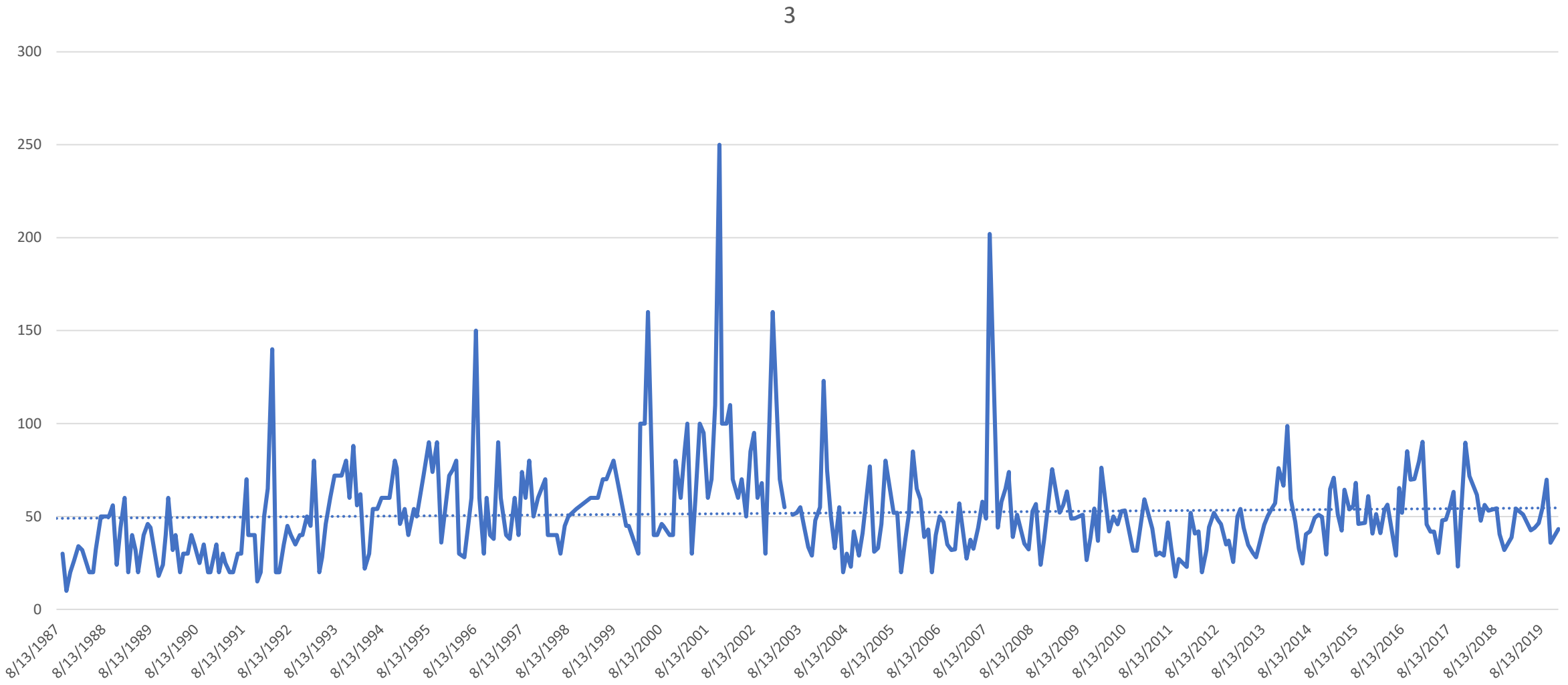
Black Creek at Route 158
Oxygen Saturation



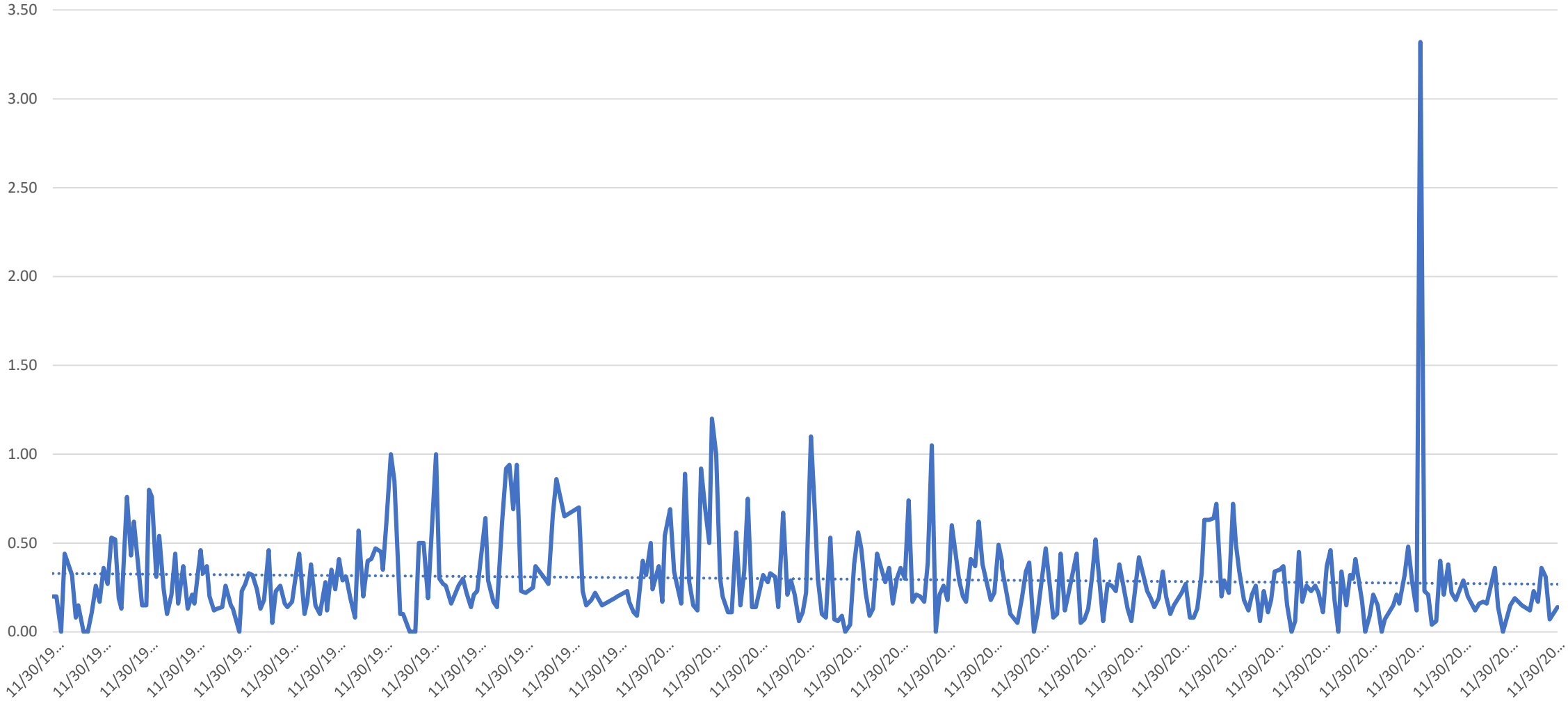
Black Creek at Route 158
pH



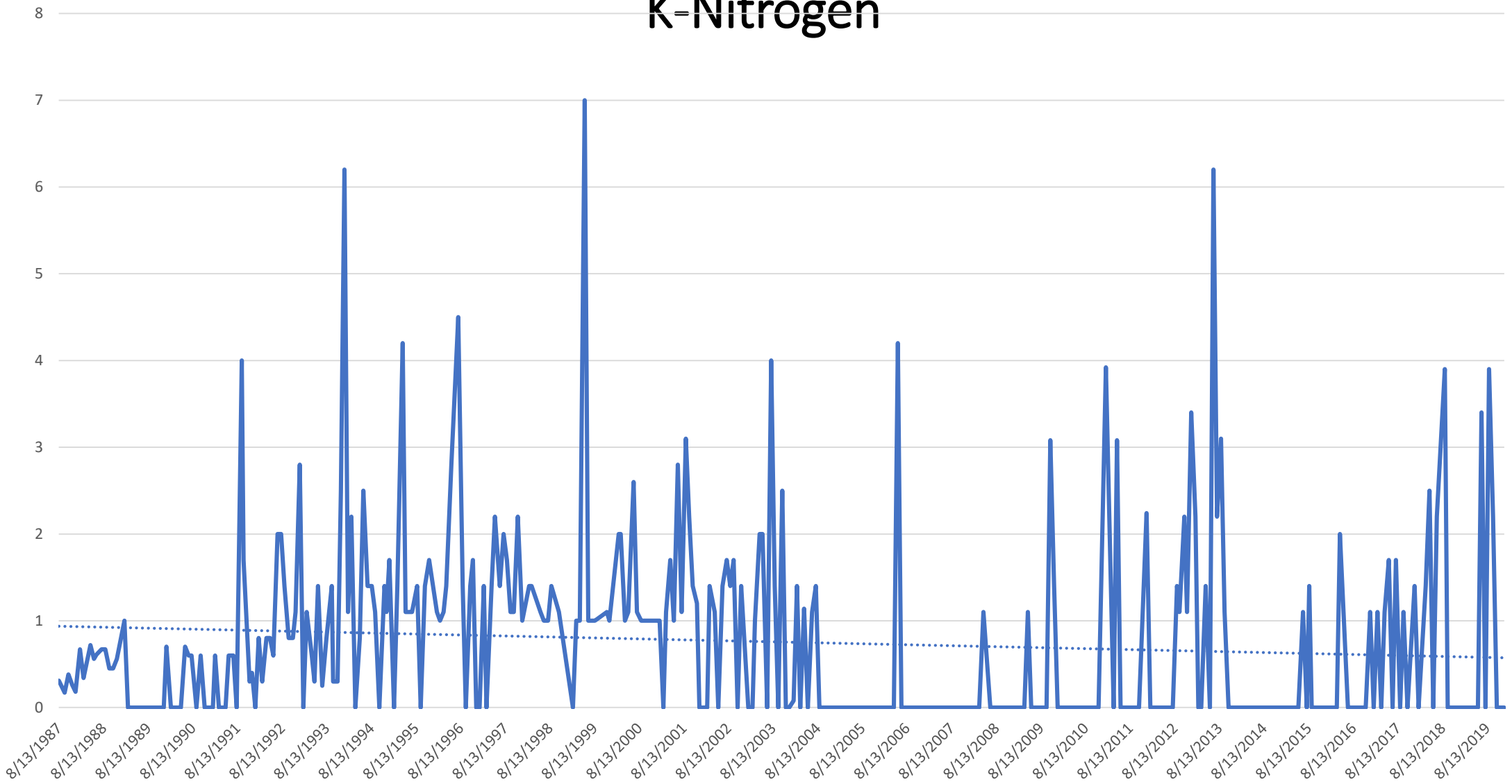
Black Creek at Route 158
Chlorides



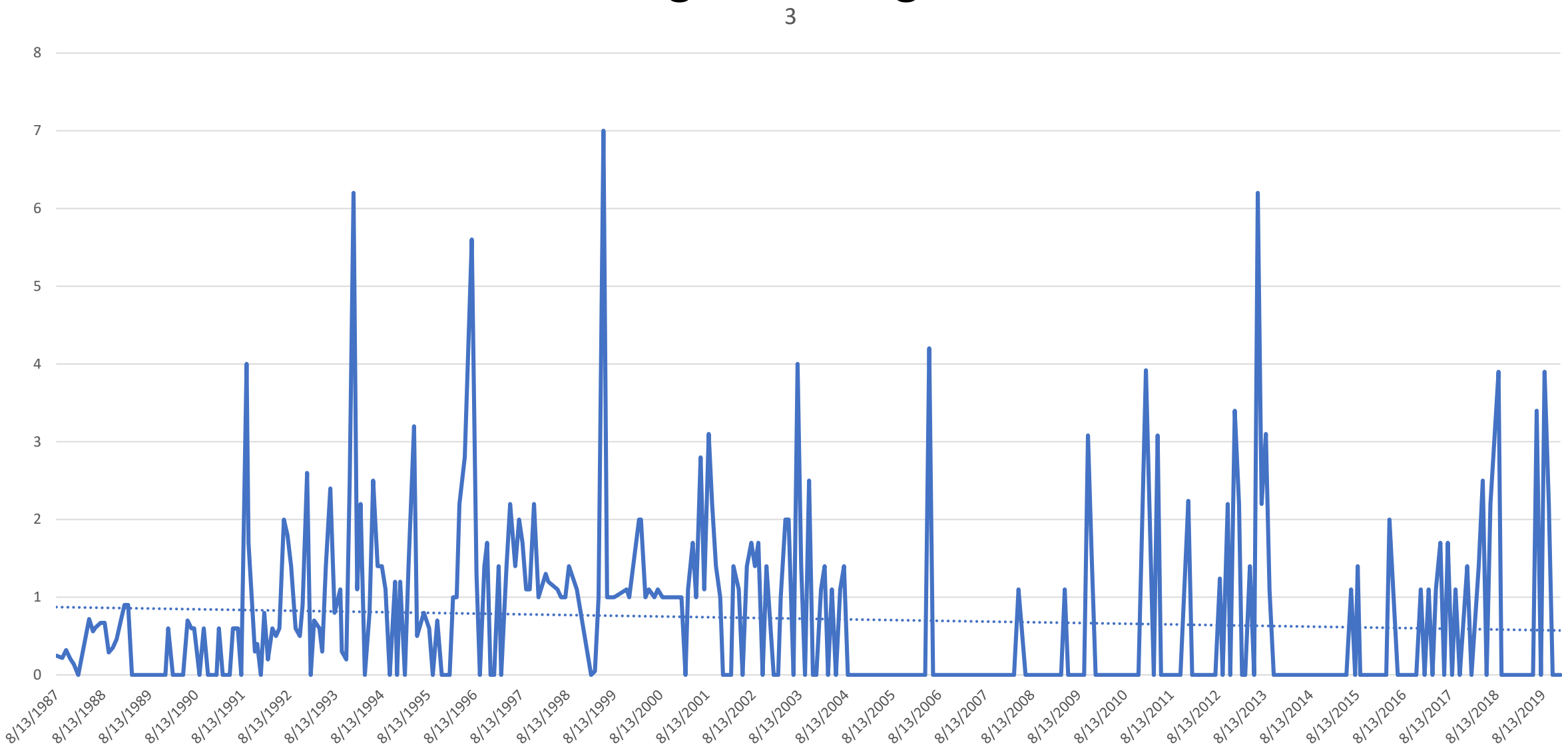
Black Creek at Route 158
Nitrates



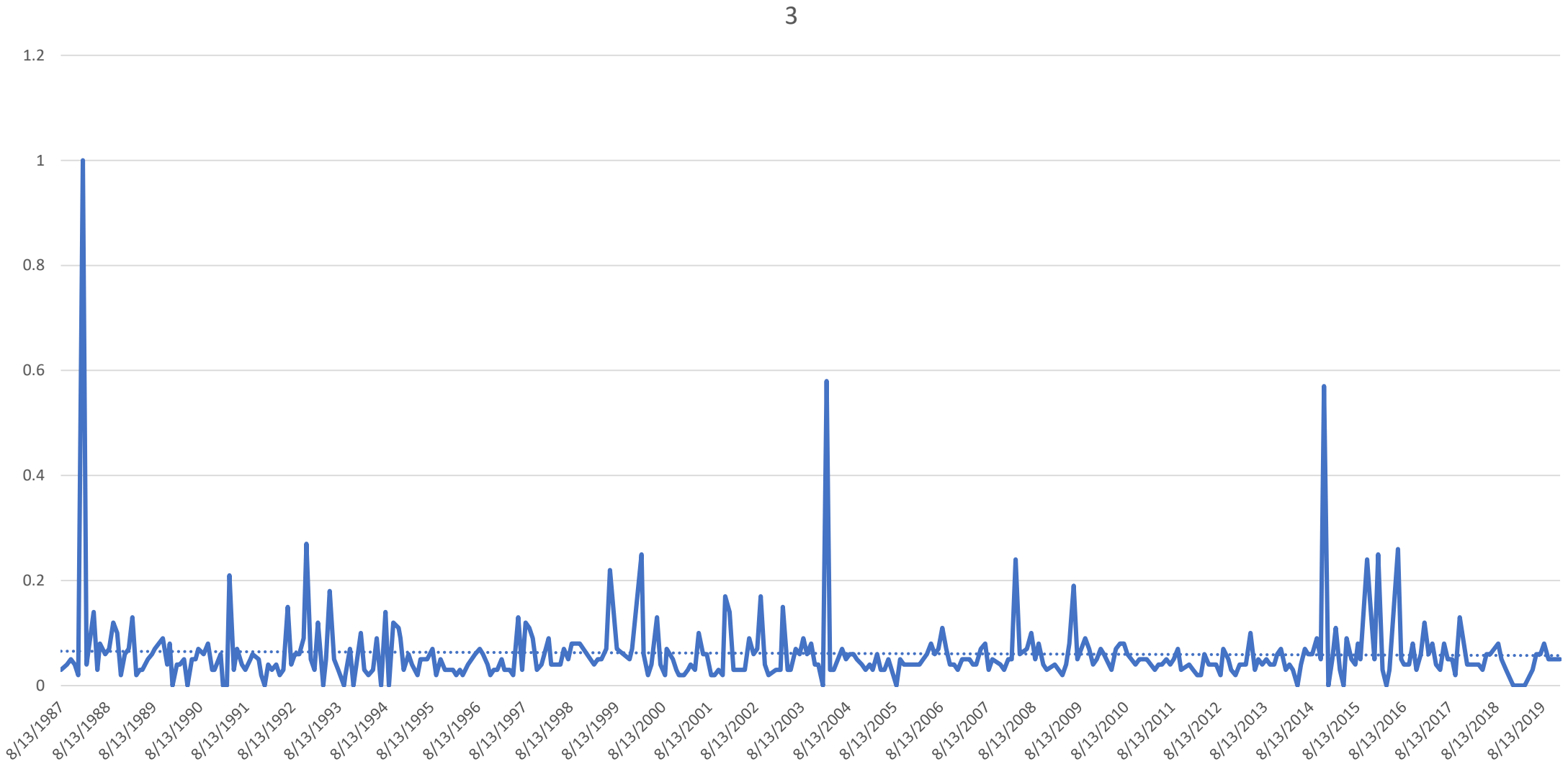
Black Creek at Route 158
K-Nitrogen



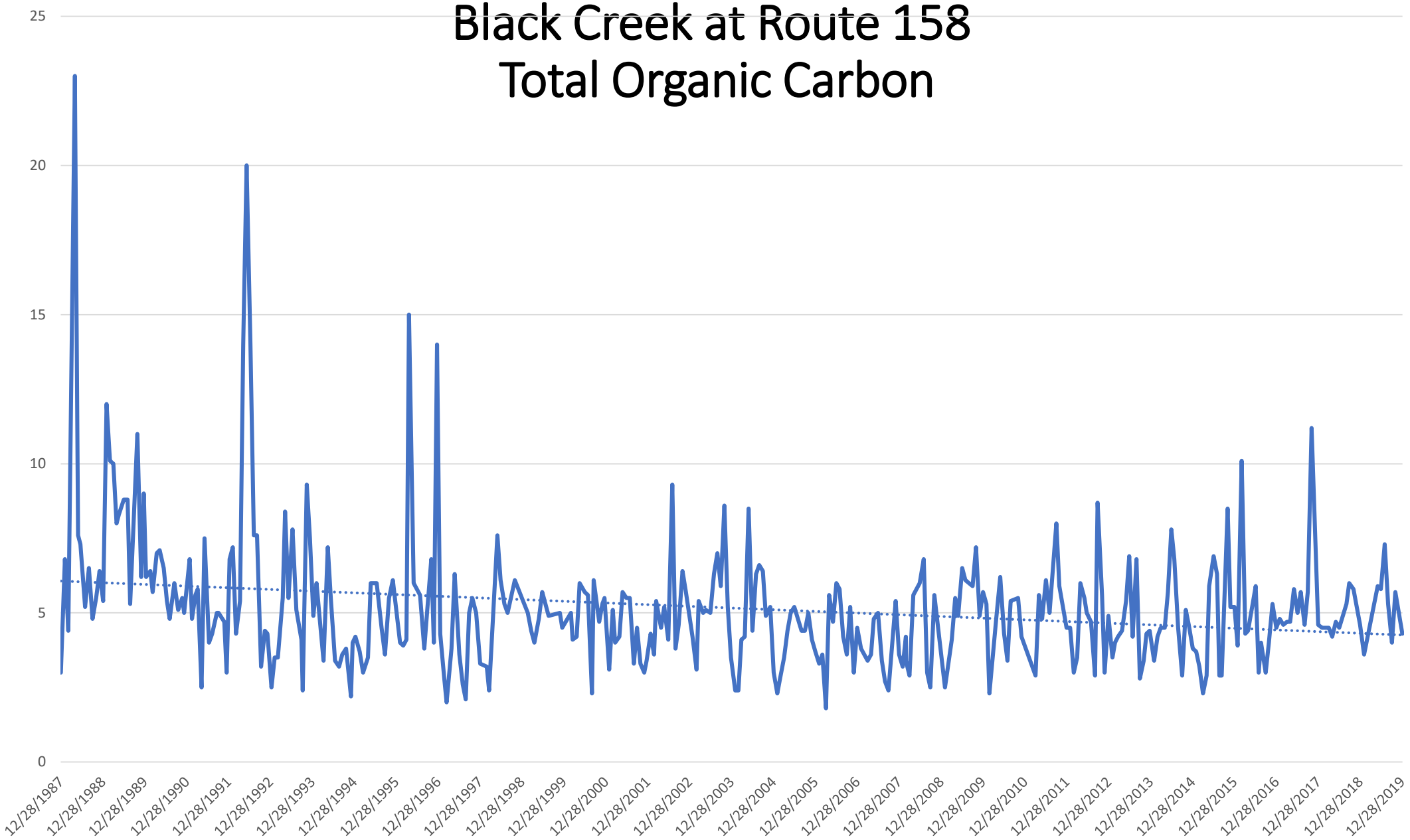
Black Creek at Route 158
Organic Nitrogen



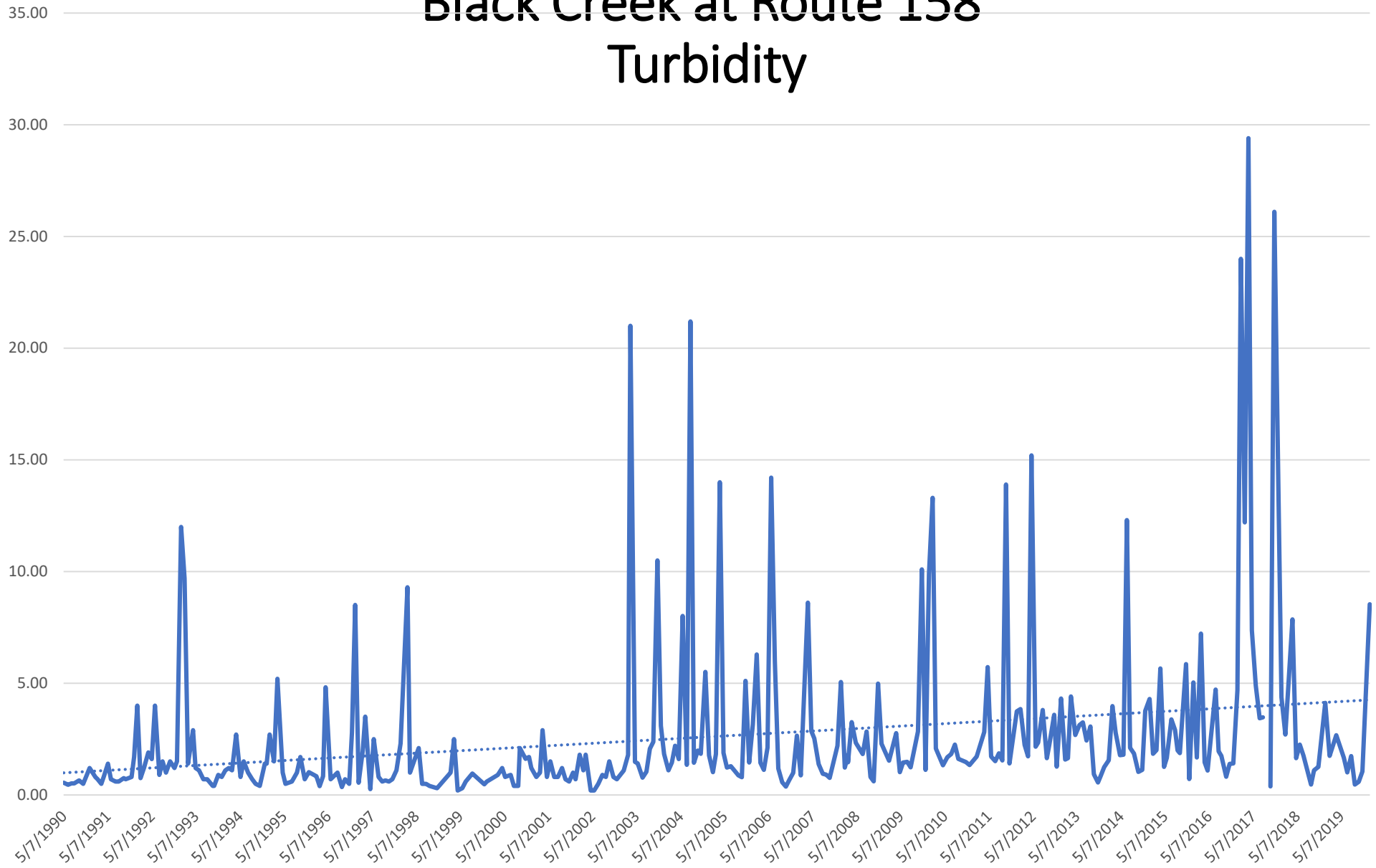
Black Creek at Route 158
Total Phosphate



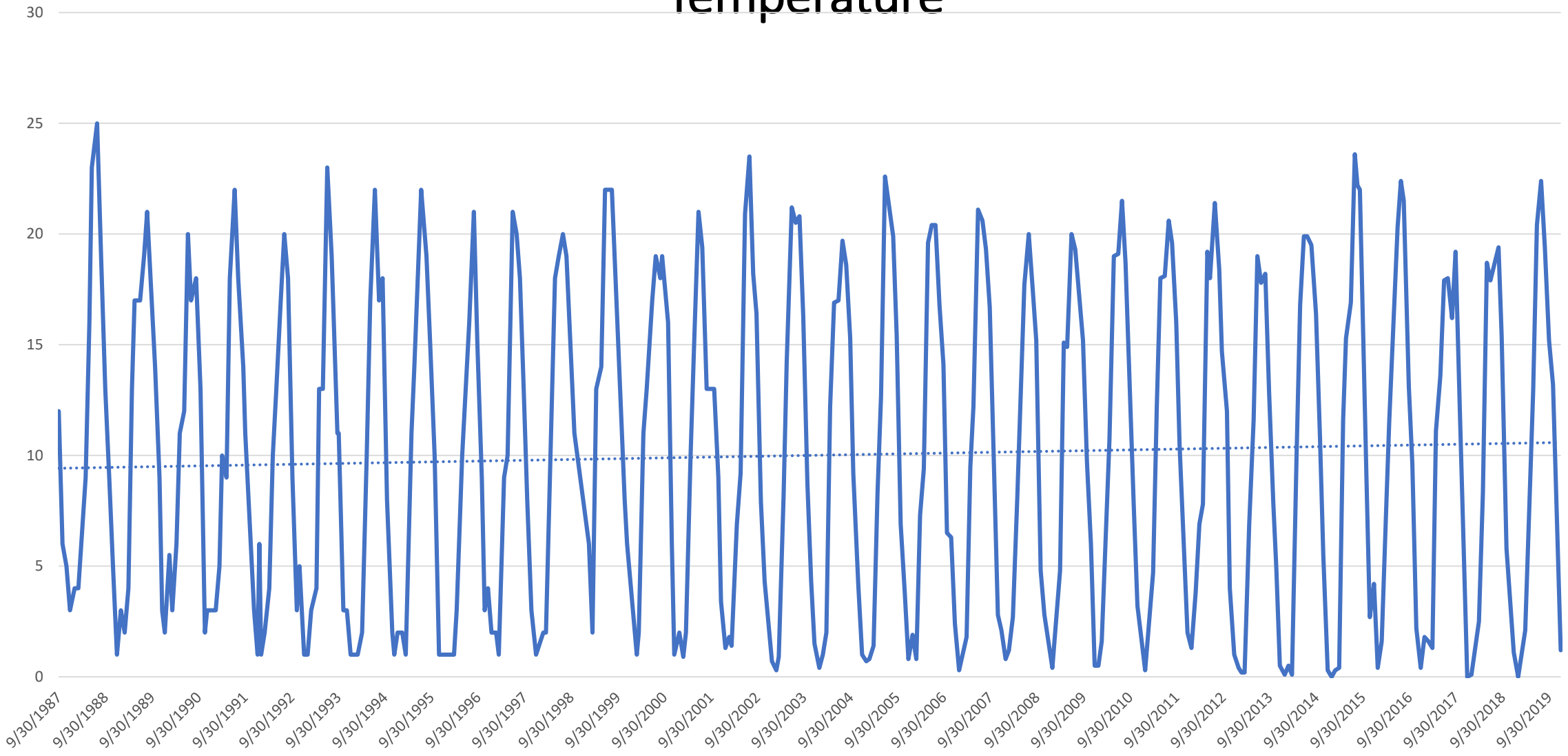
Black Creek at Route 158
Total Organic Carbon



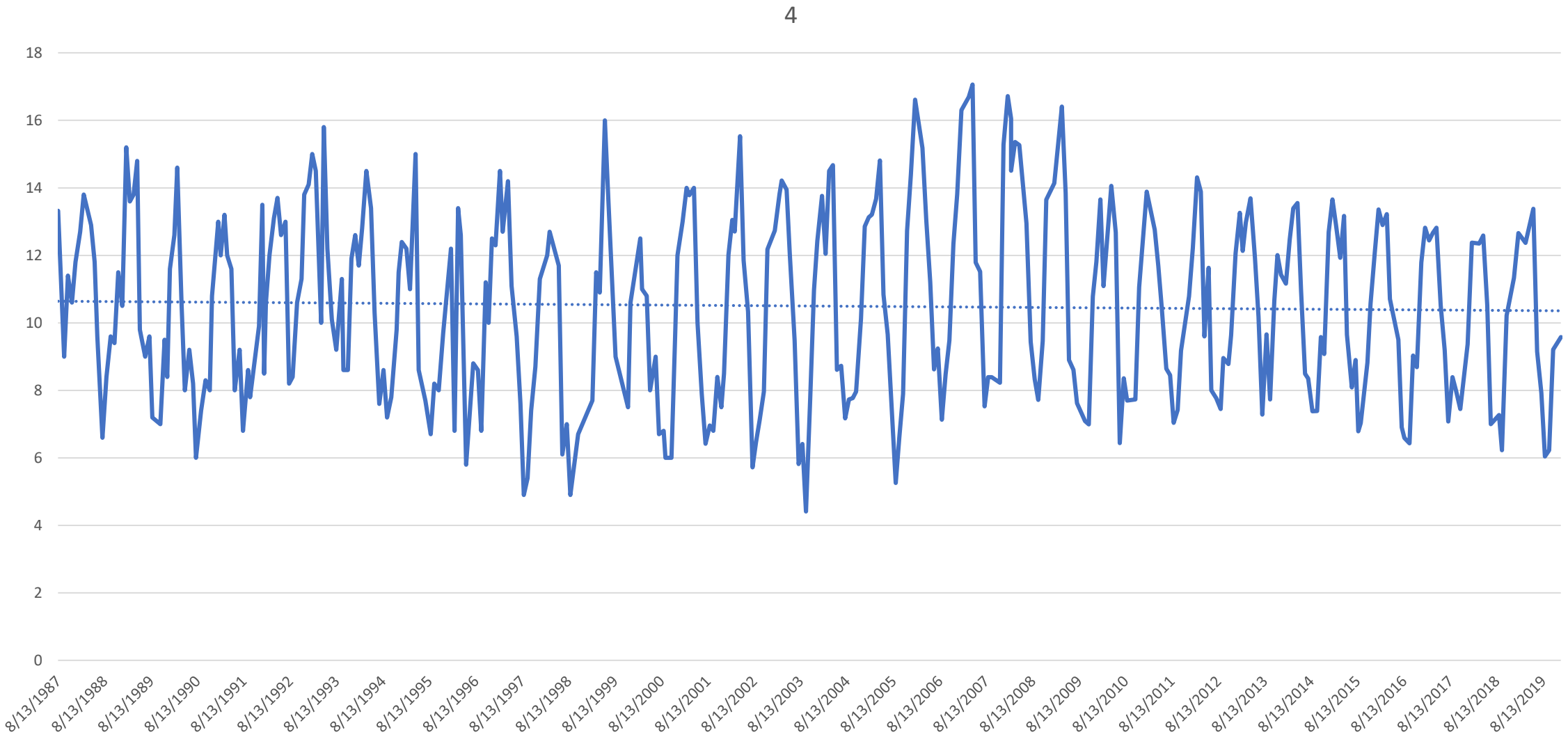
Black Creek at Route 158
Turbidity



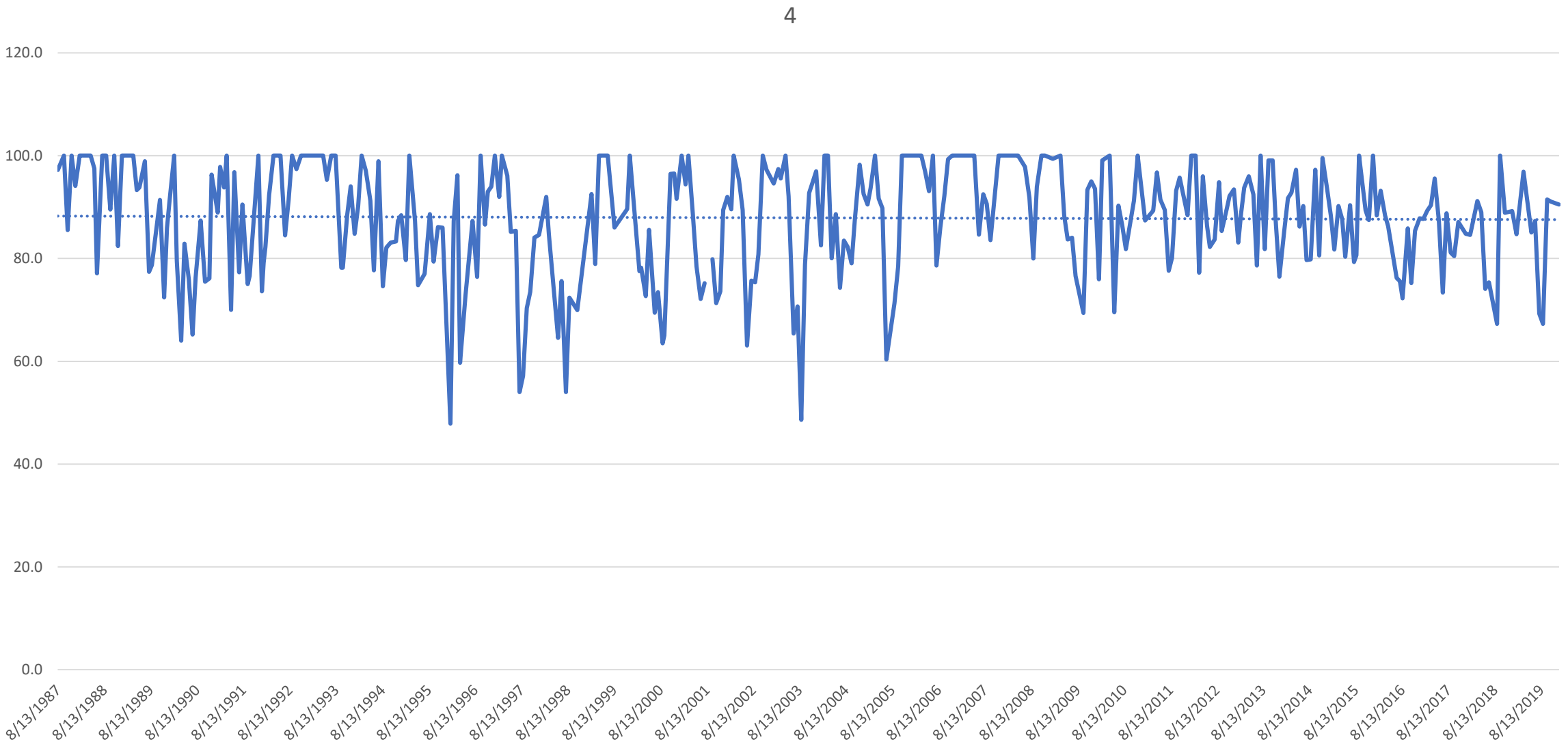
Normans Kill at Route 20
Temperature



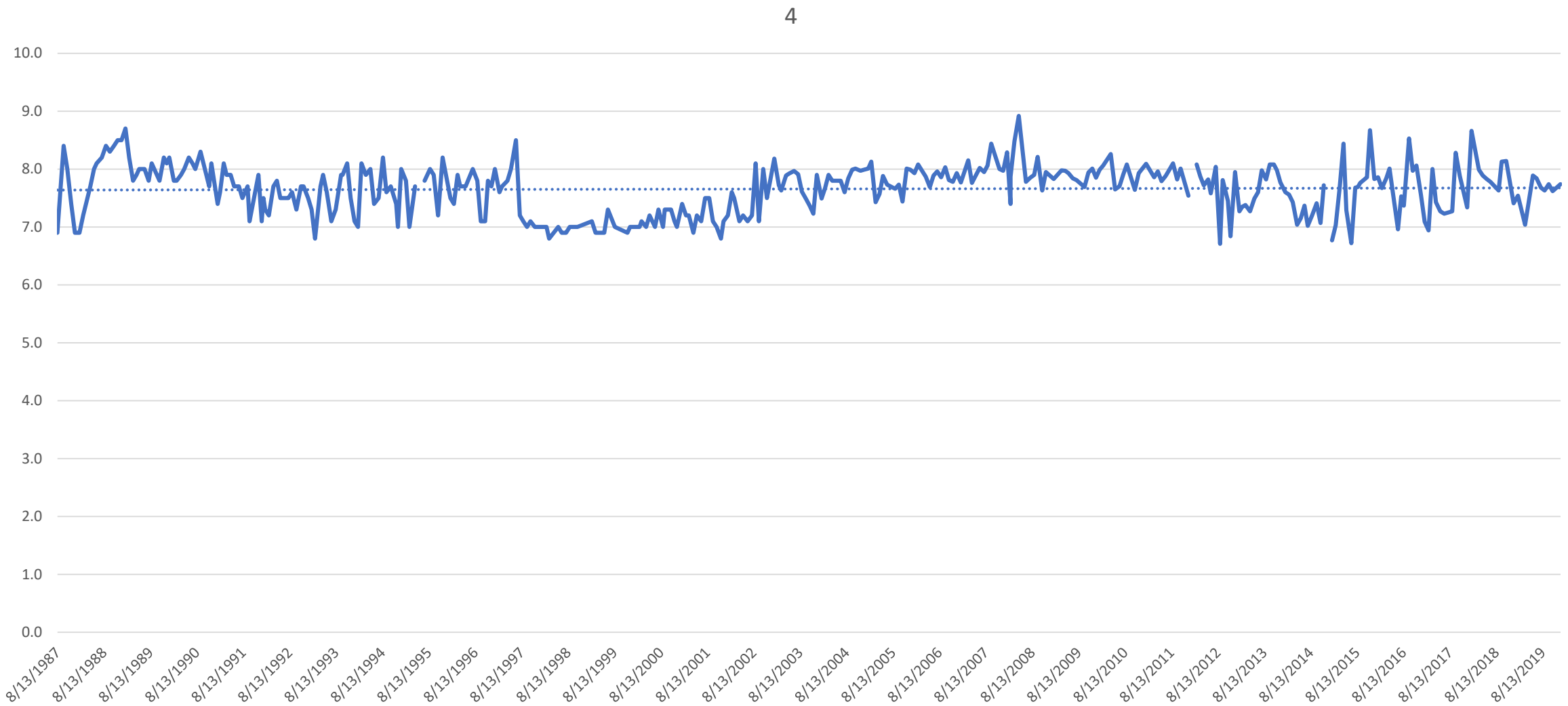
Normans Kill at Route 20
Dissolved Oxygen



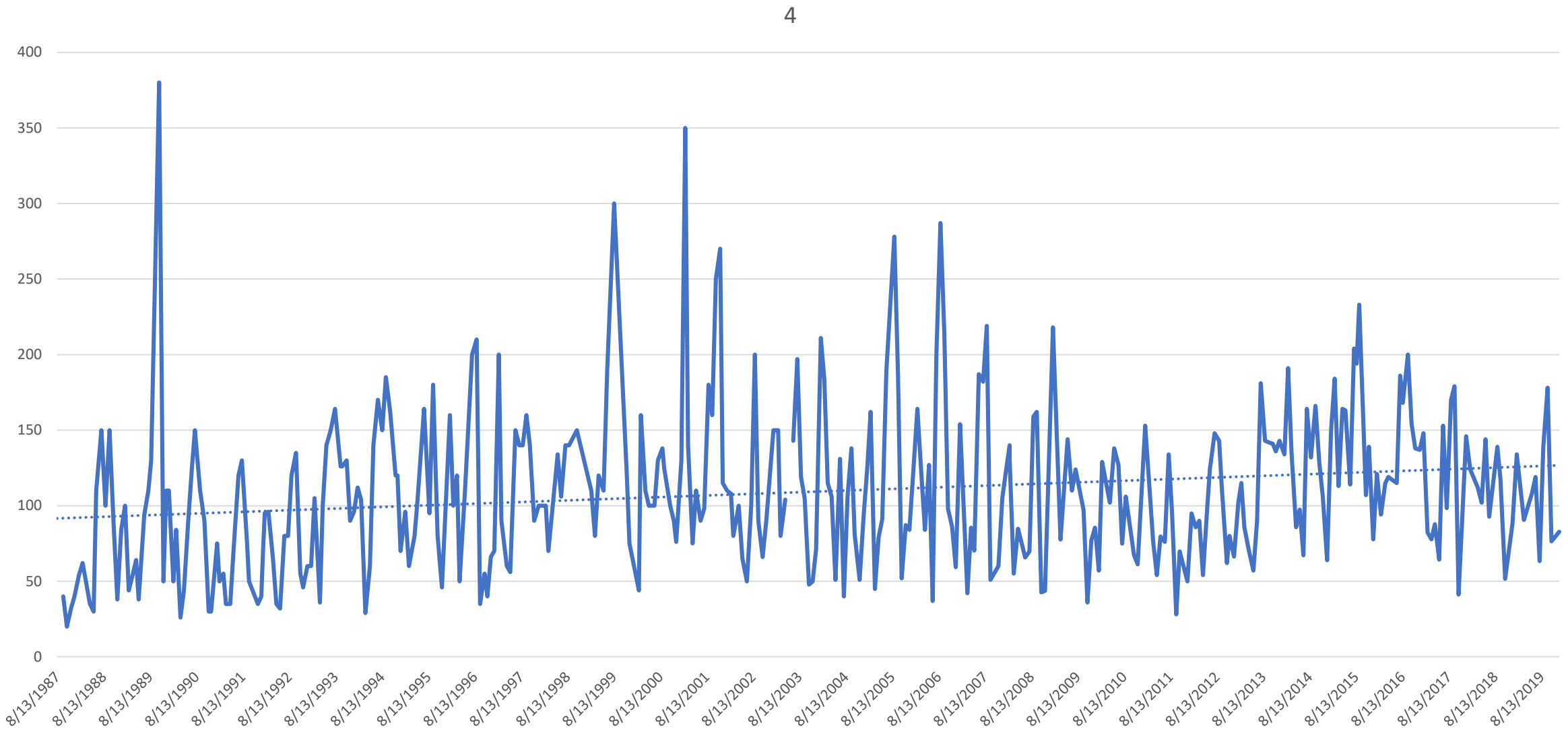
Normans Kill at Route 20
Oxygen Saturation



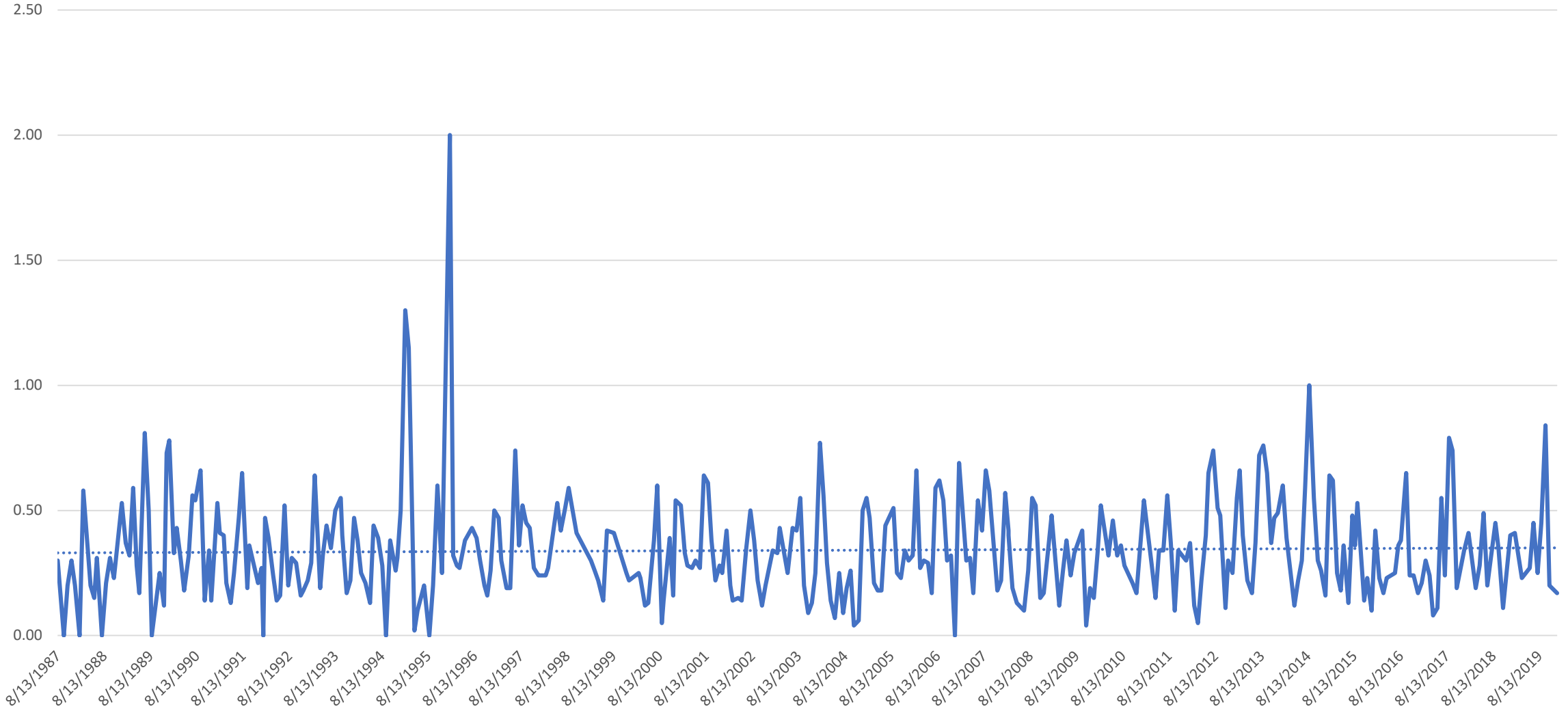
Normans Kill at Route 20
pH



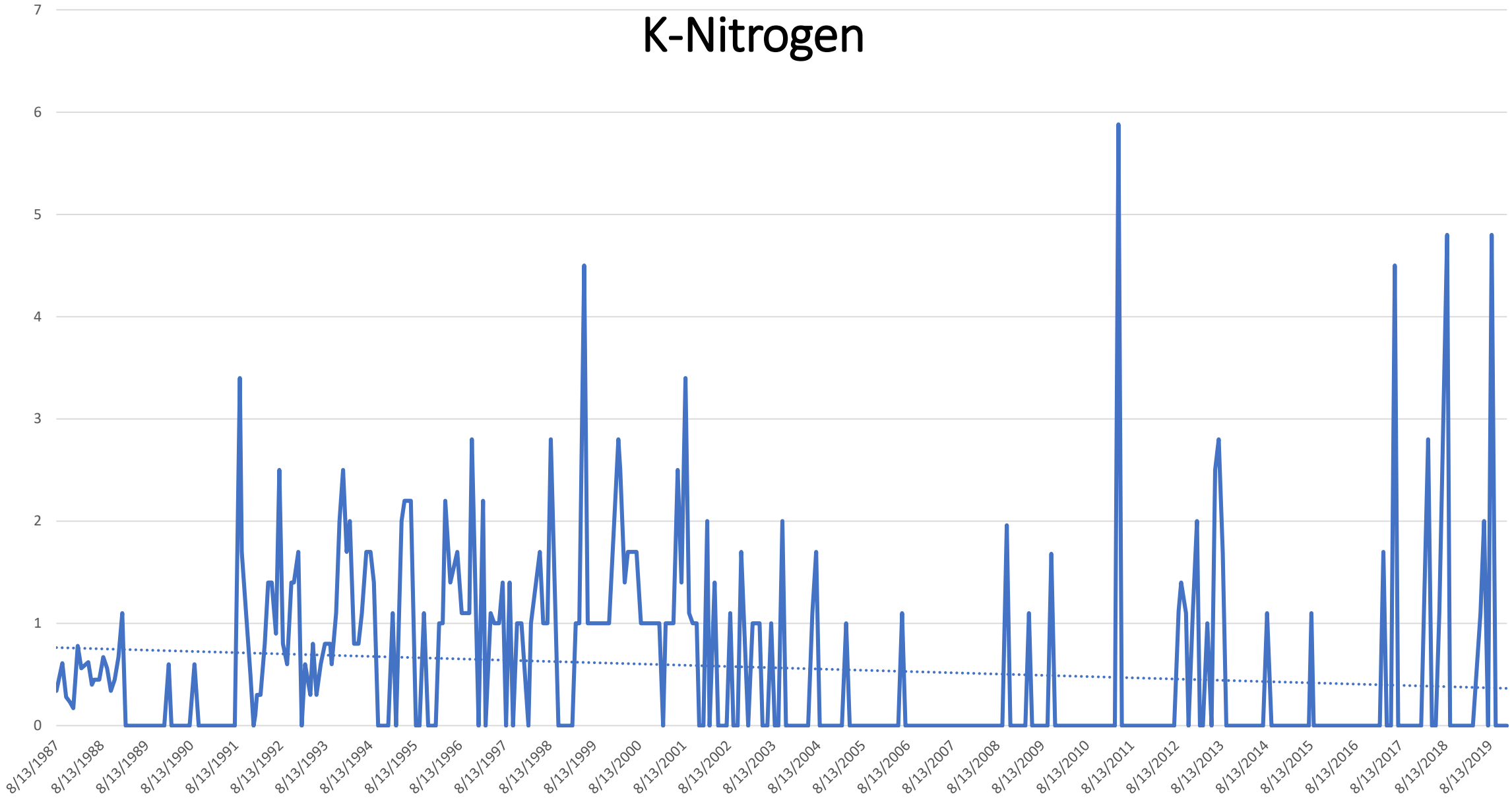
Normans Kill at Route 20
Chlorides



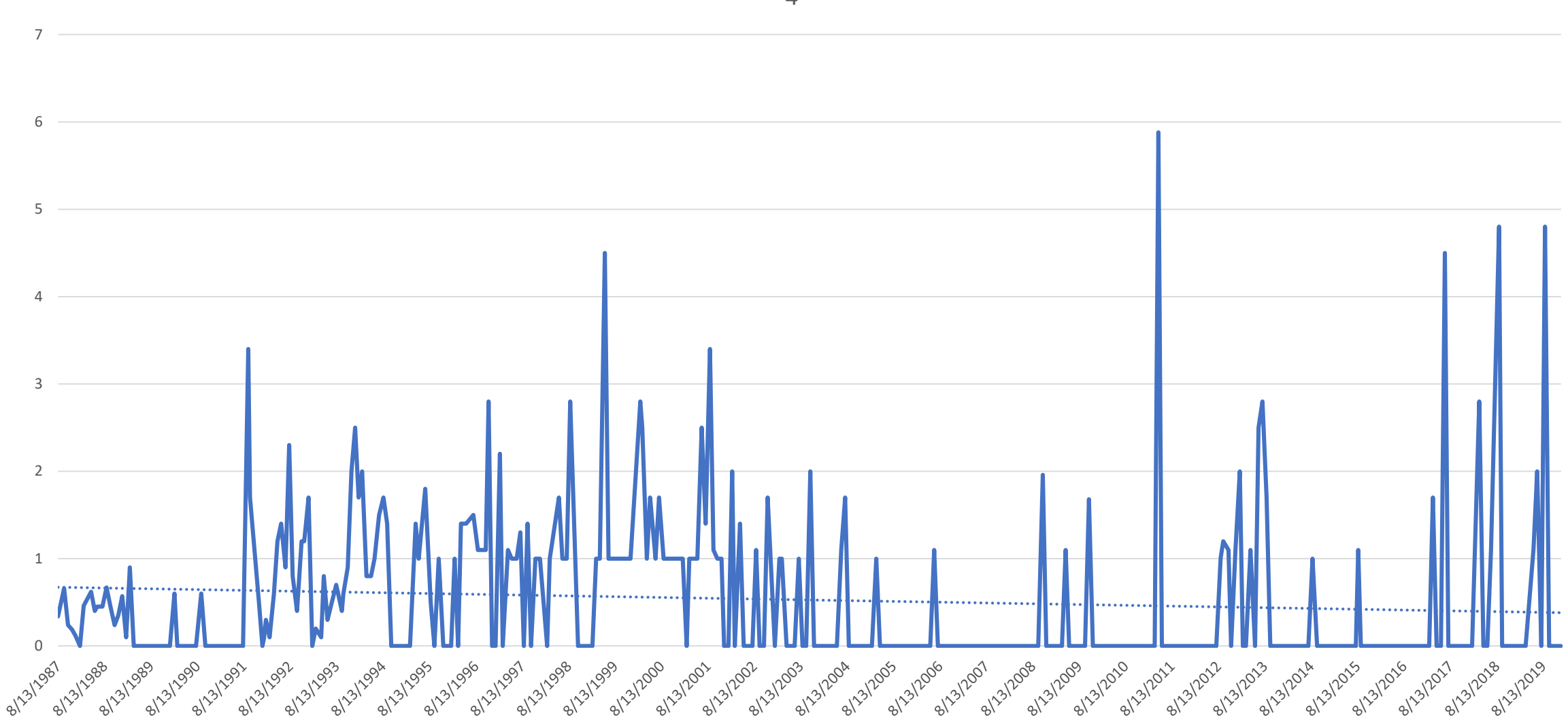
Normans Kill at Route 20
Nitrates



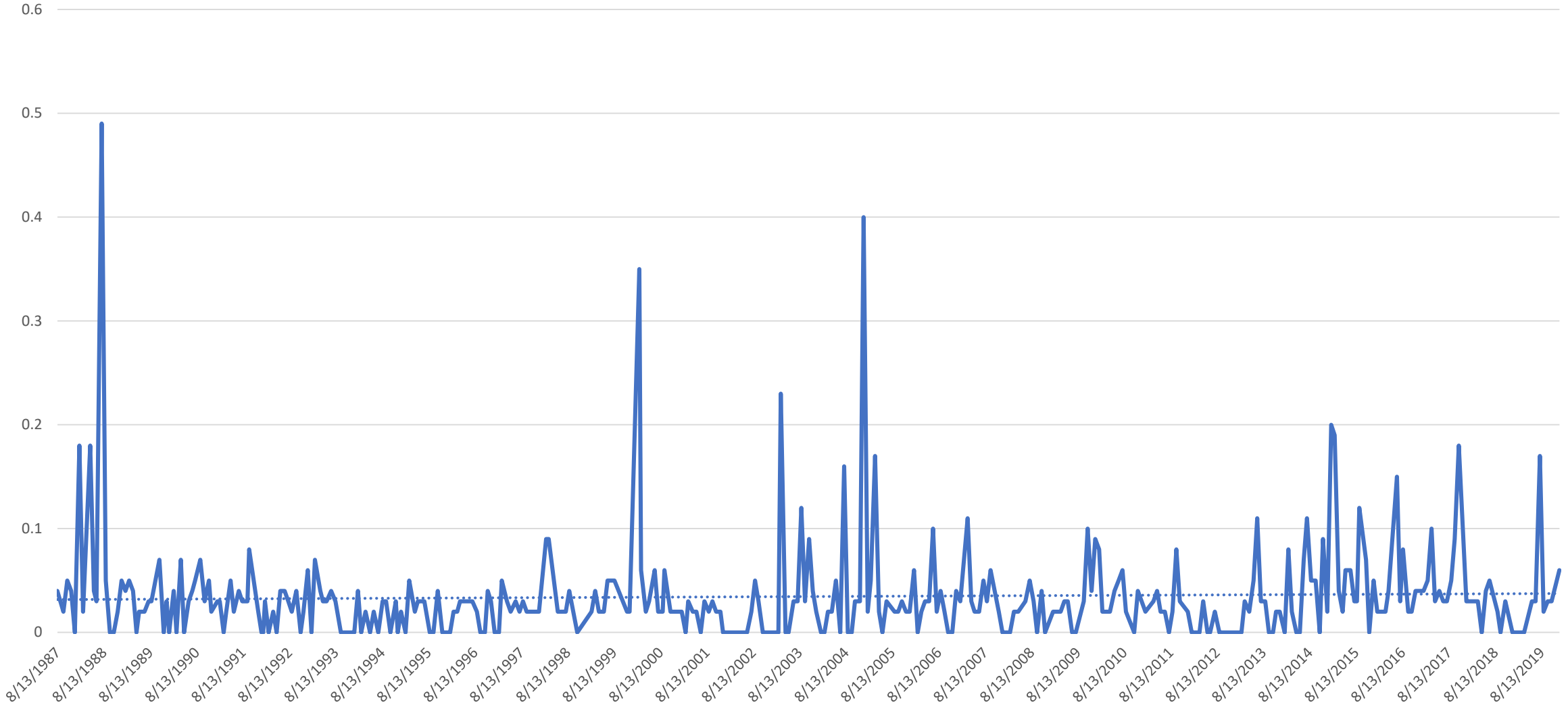
Normans Kill at Route 20
K-Nitrogen



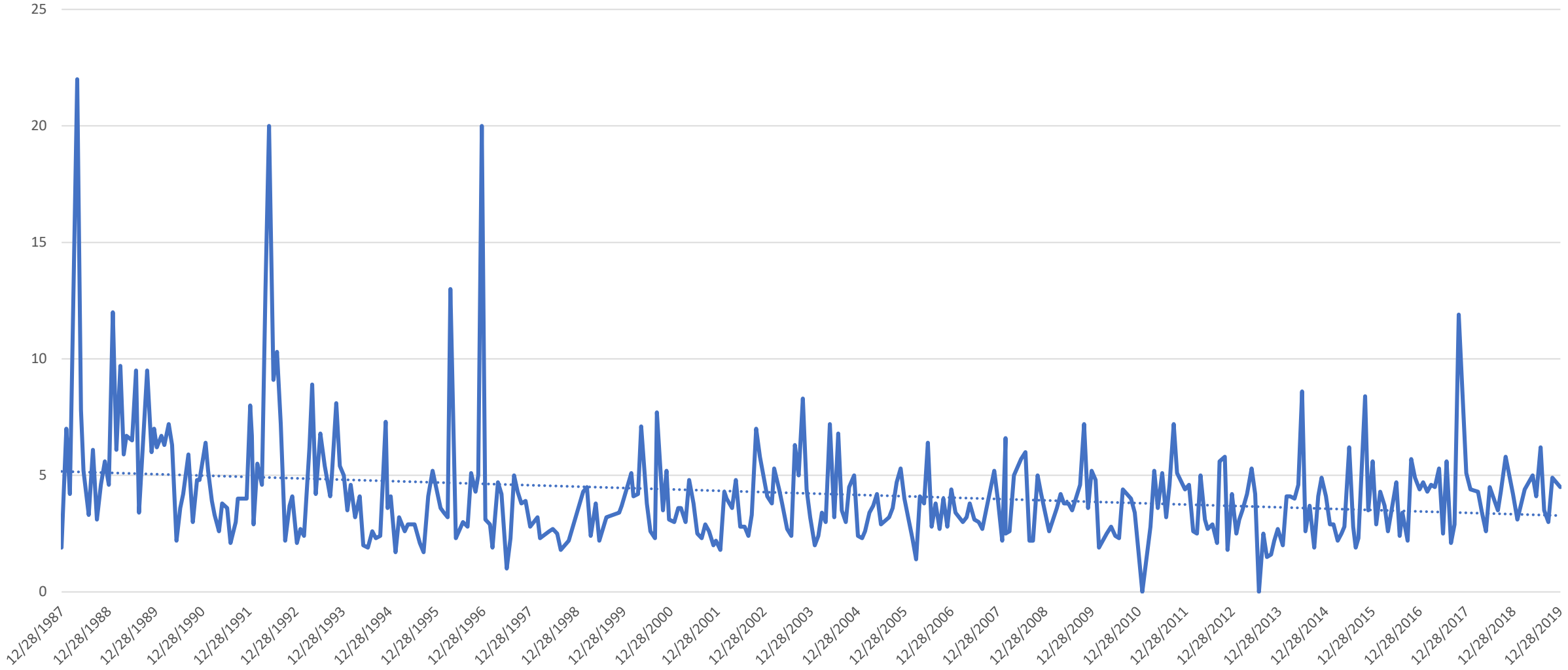
Normans Kill at Route 20
Organic Nitrogen



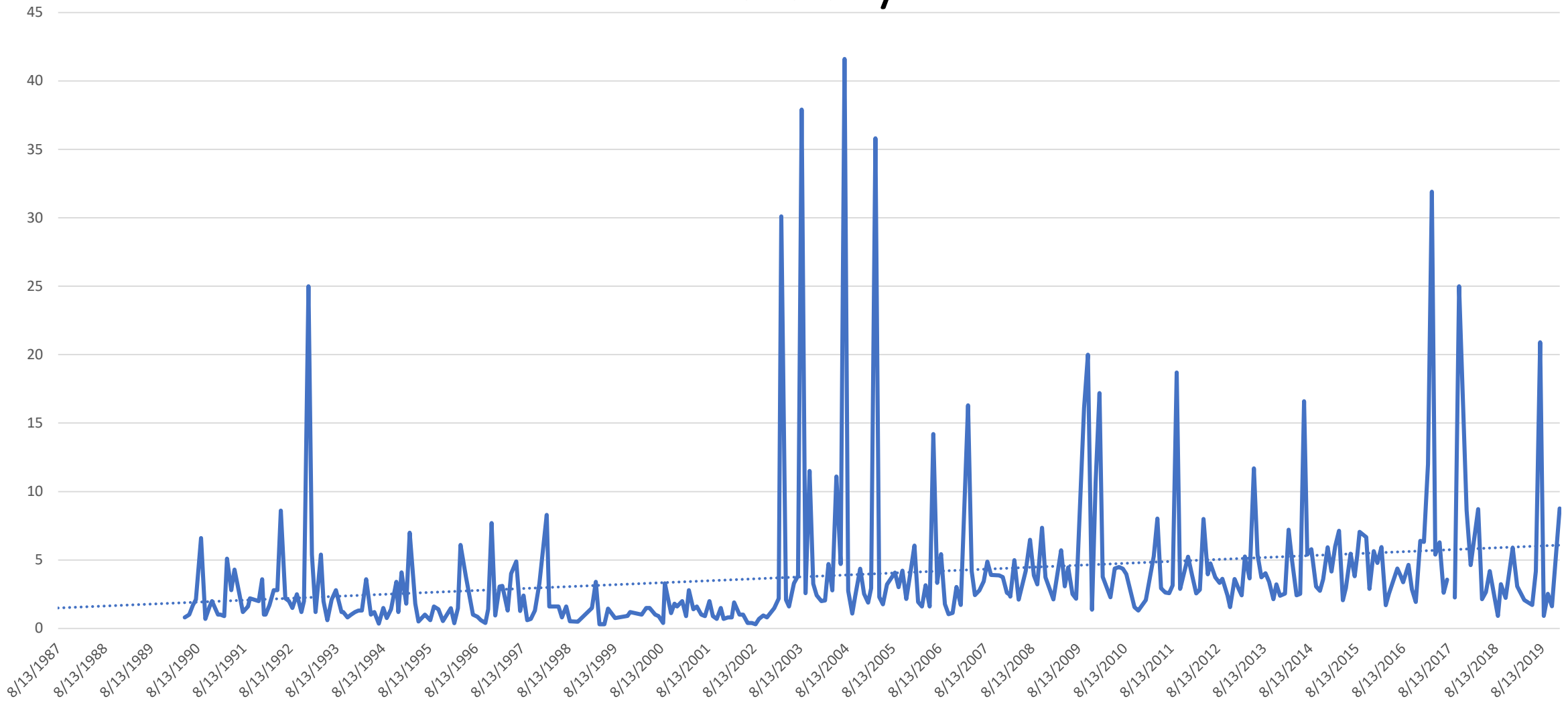
Normans Kill at Route 20
Total Phosphate



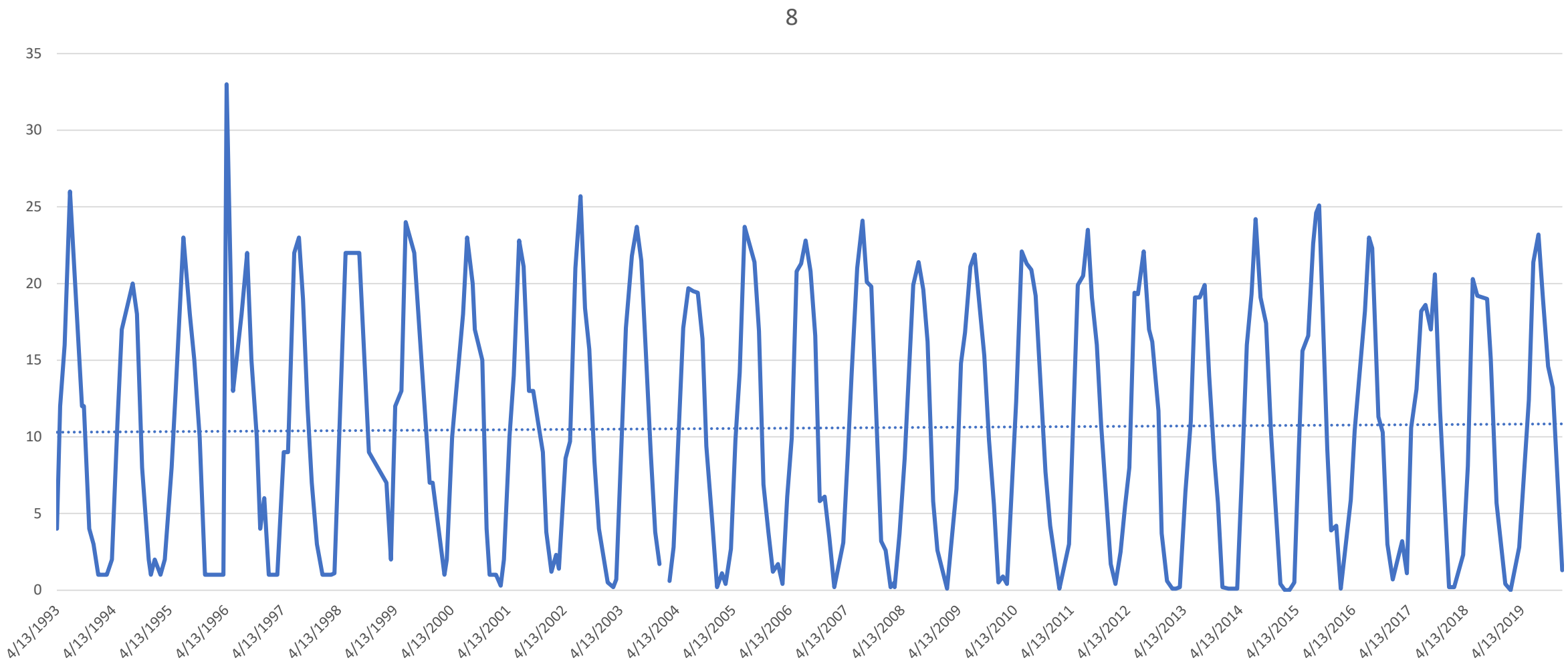
Normans Kill at Route 20
Total Organic Carbon



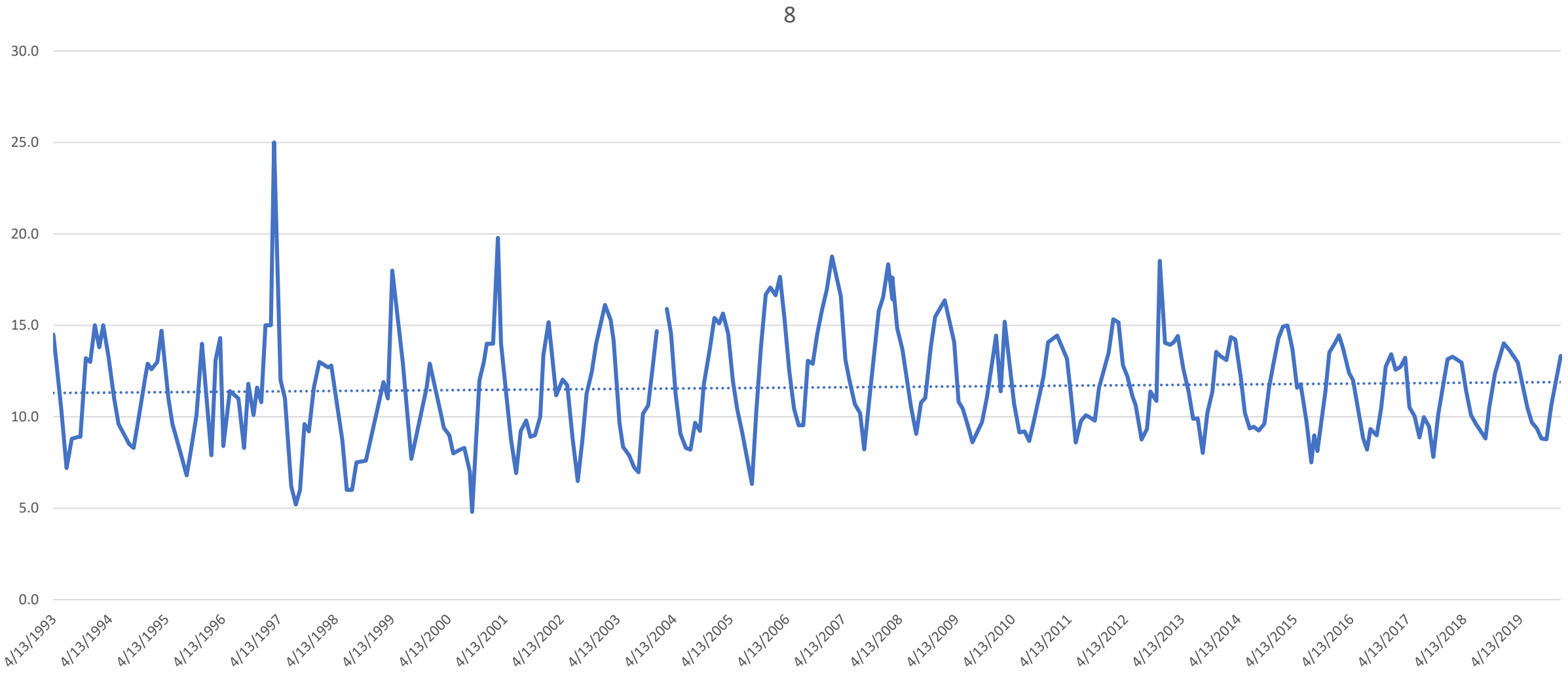
Normans Kill at Route 20
Turbidity



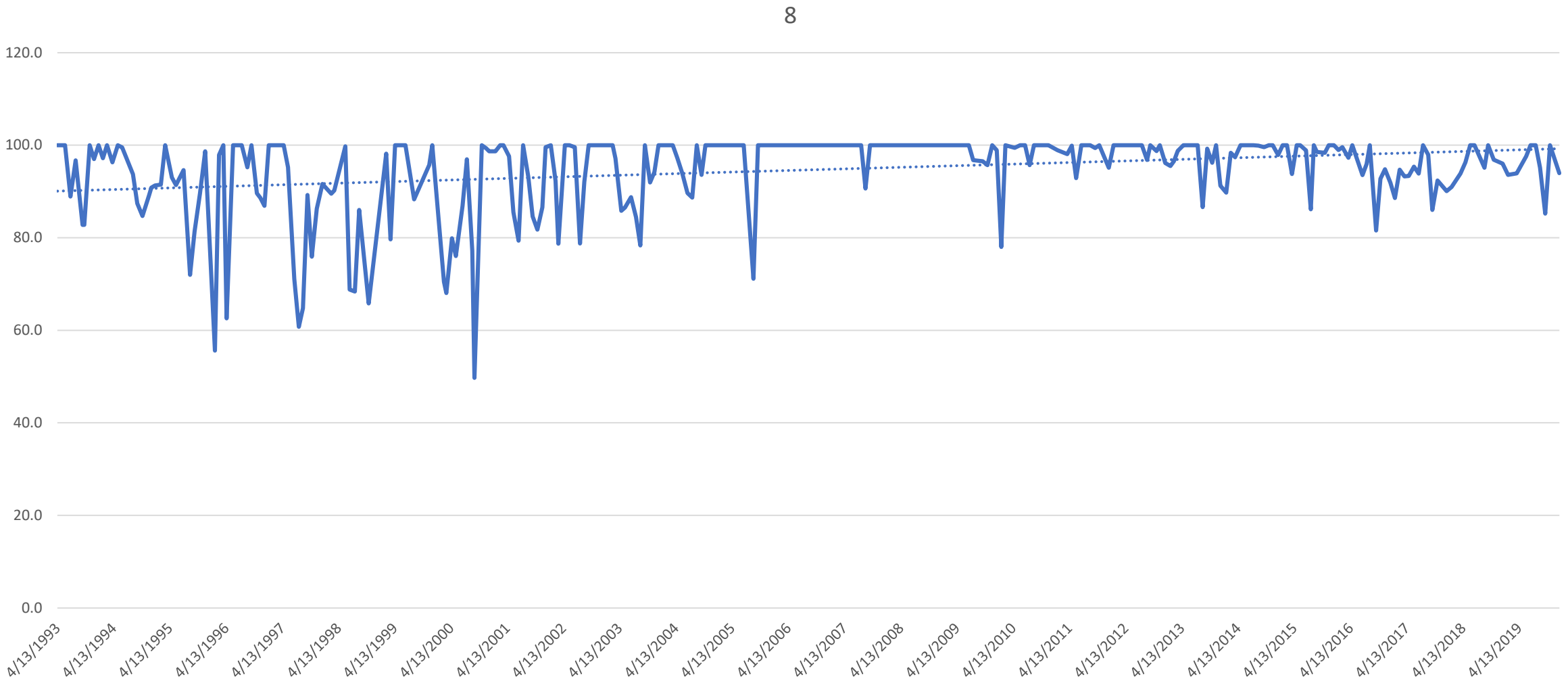
Bozen Kill at Route 397 Temperature



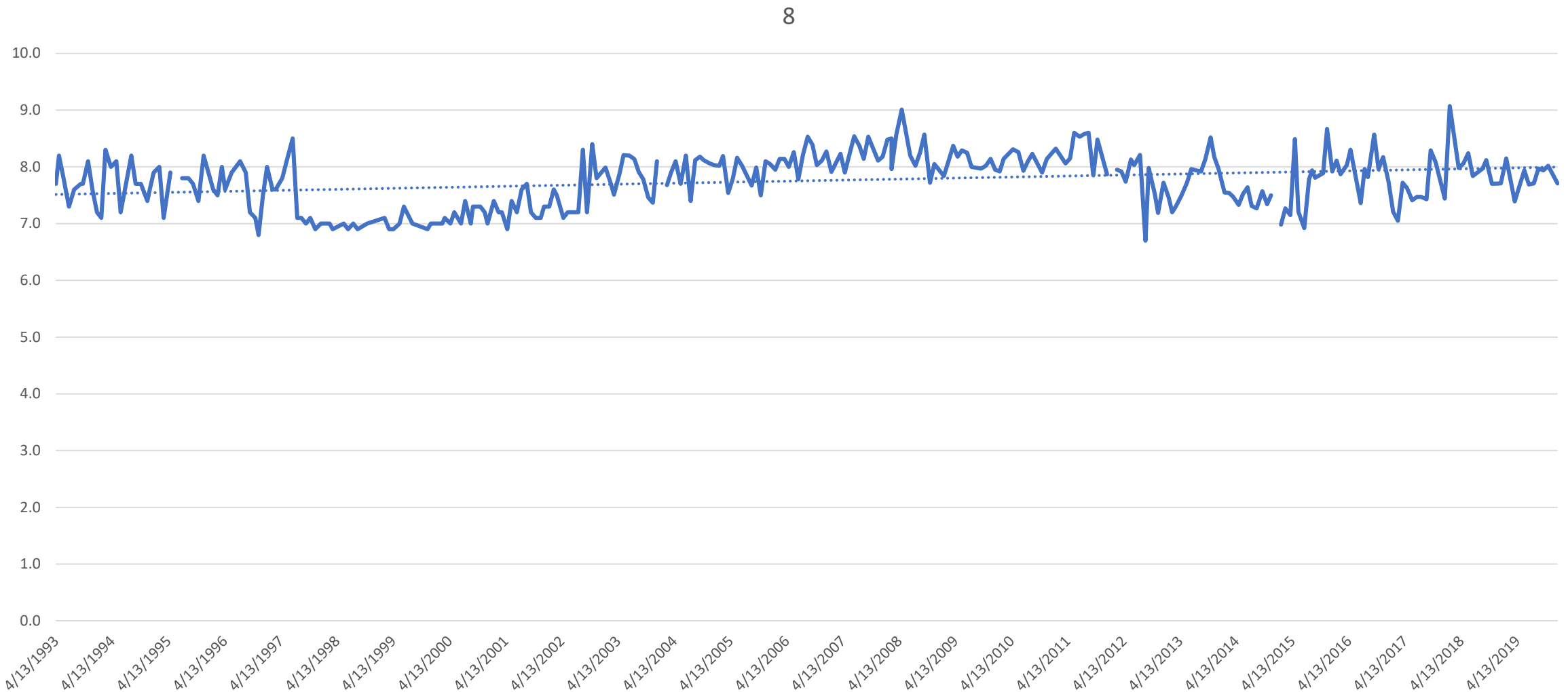
Bozen Kill at Route 397
Dissolved Oxygen



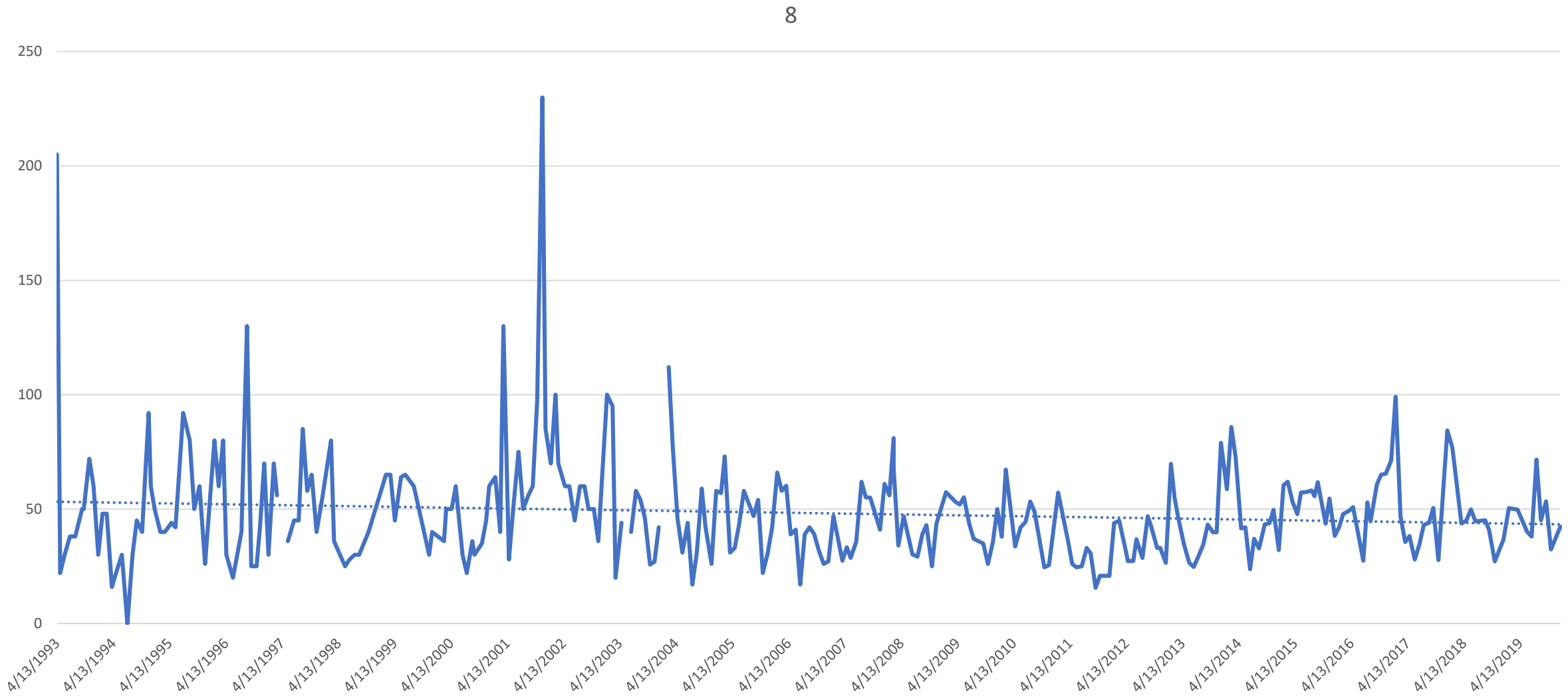
Bozen Kill at Route 397
Oxygen Saturation



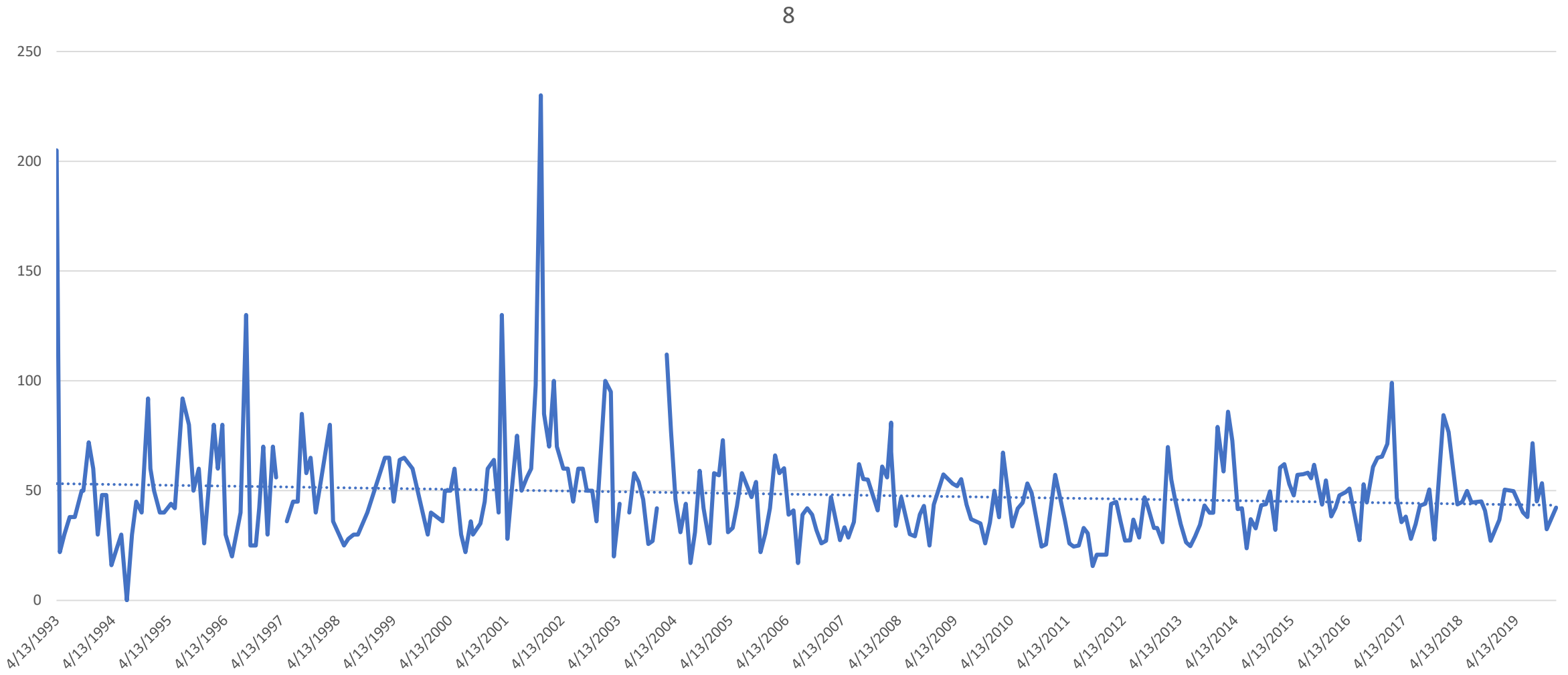
Bozen Kill at Route 397
pH



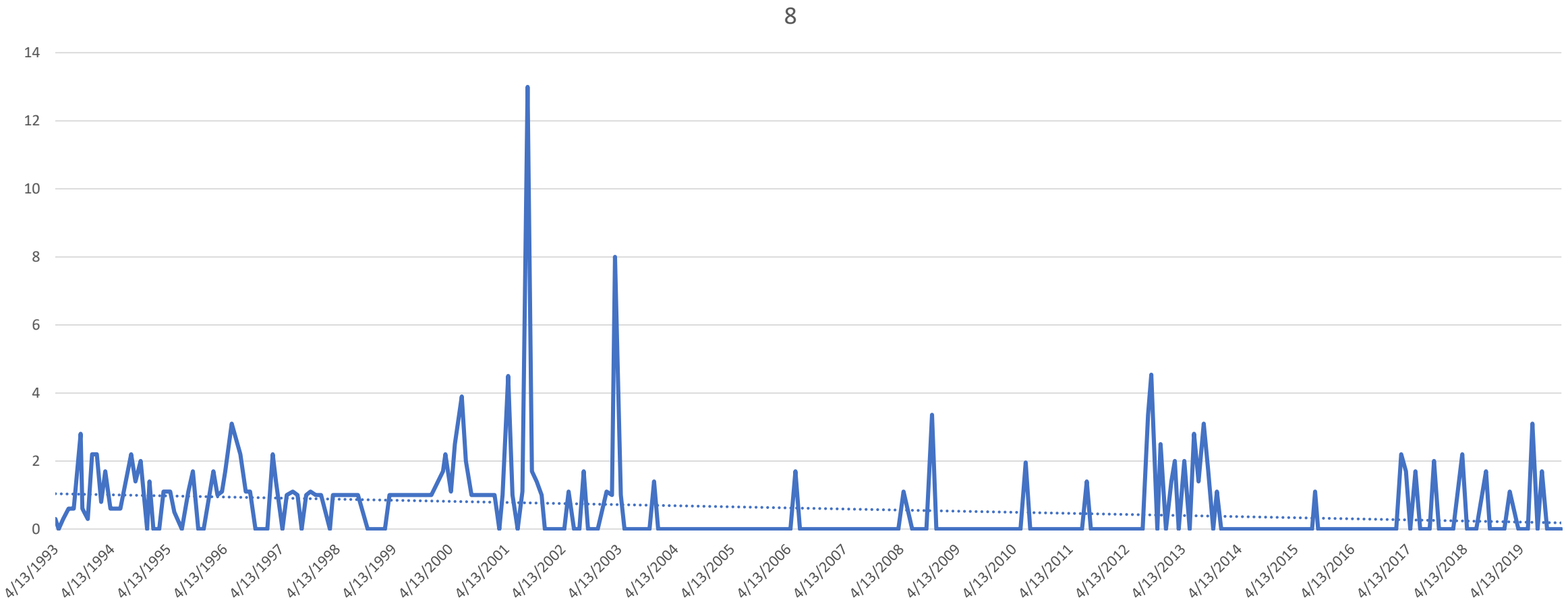
Bozen Kill at Route 397
Chlorides



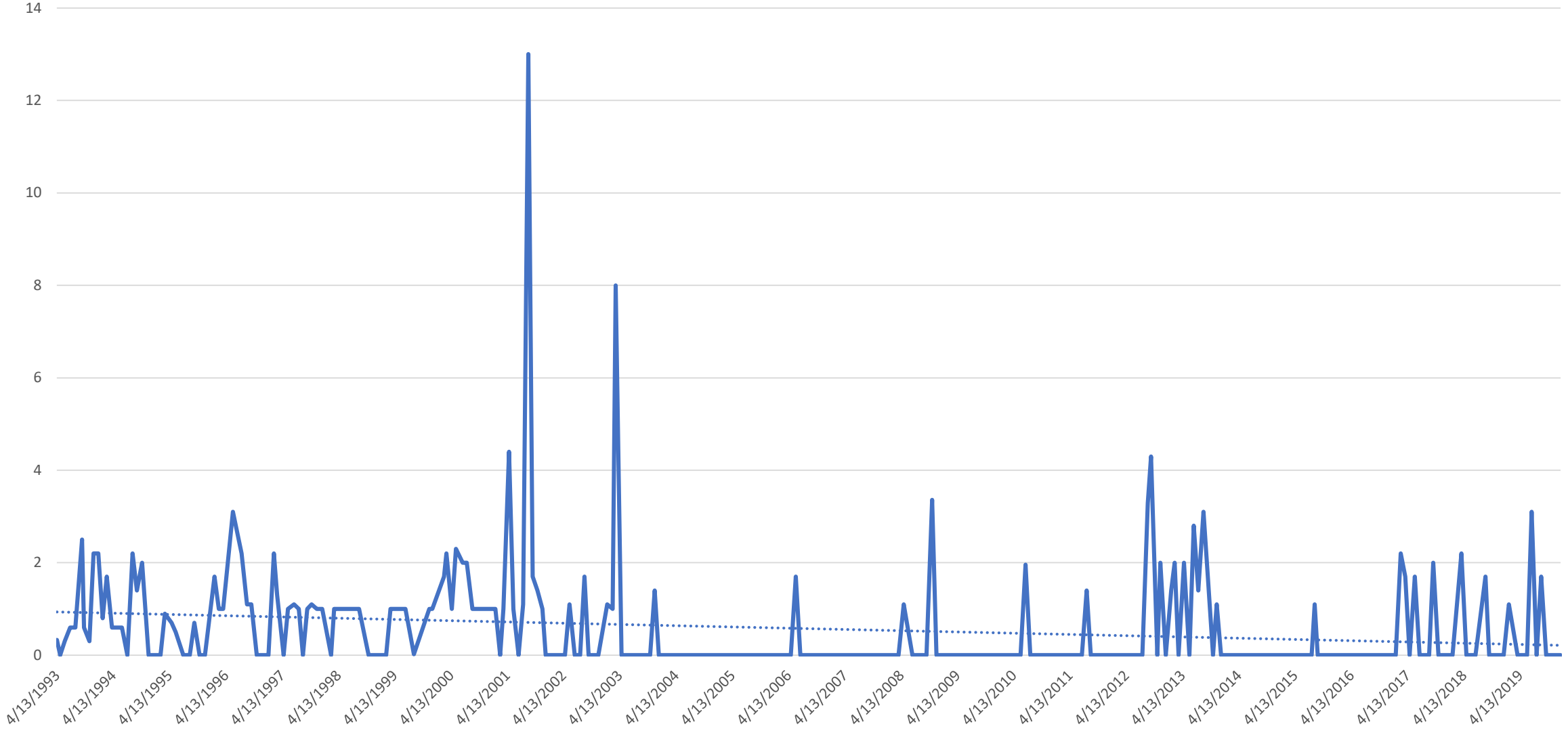
Bozen Kill at Route 397 Nitrates



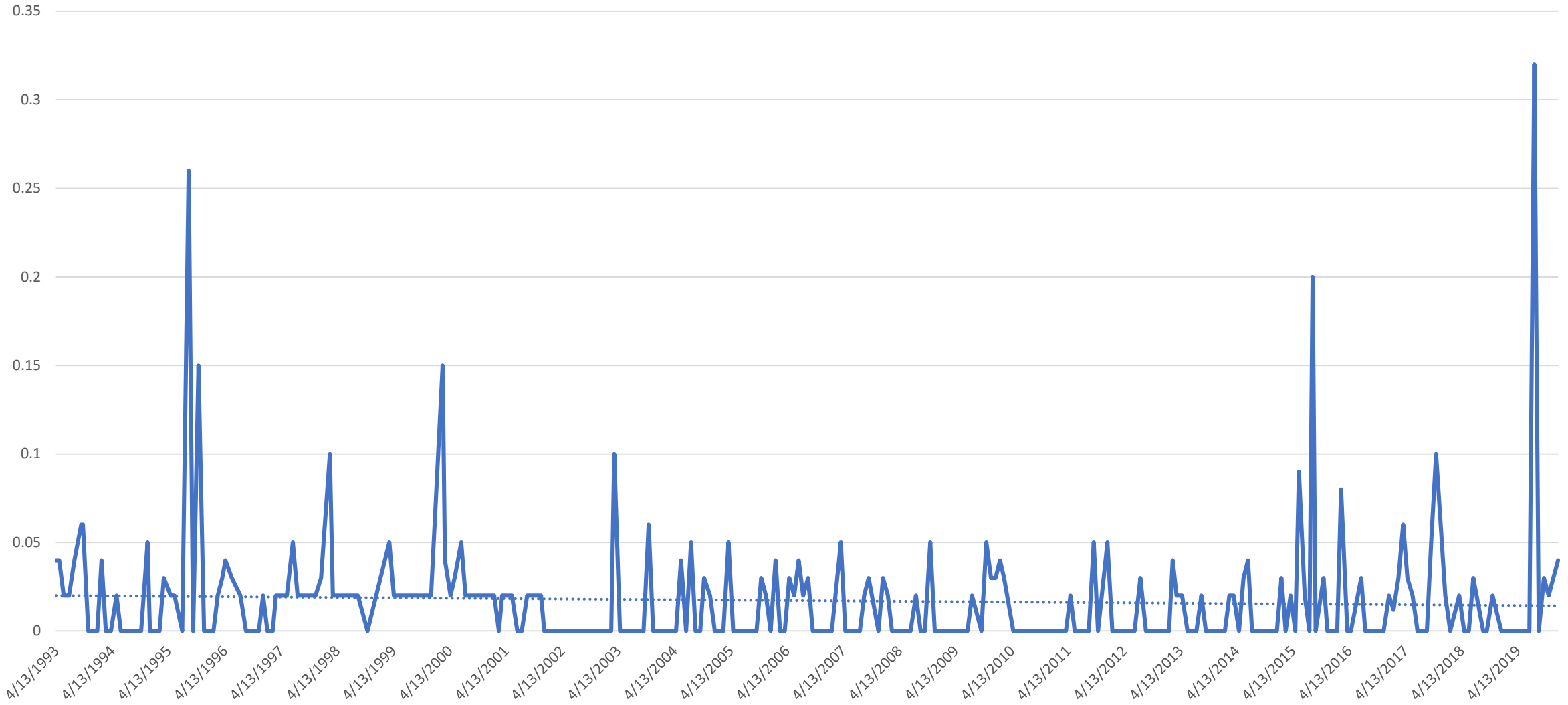
Bozen Kill at Route 397
K-Nitrogen



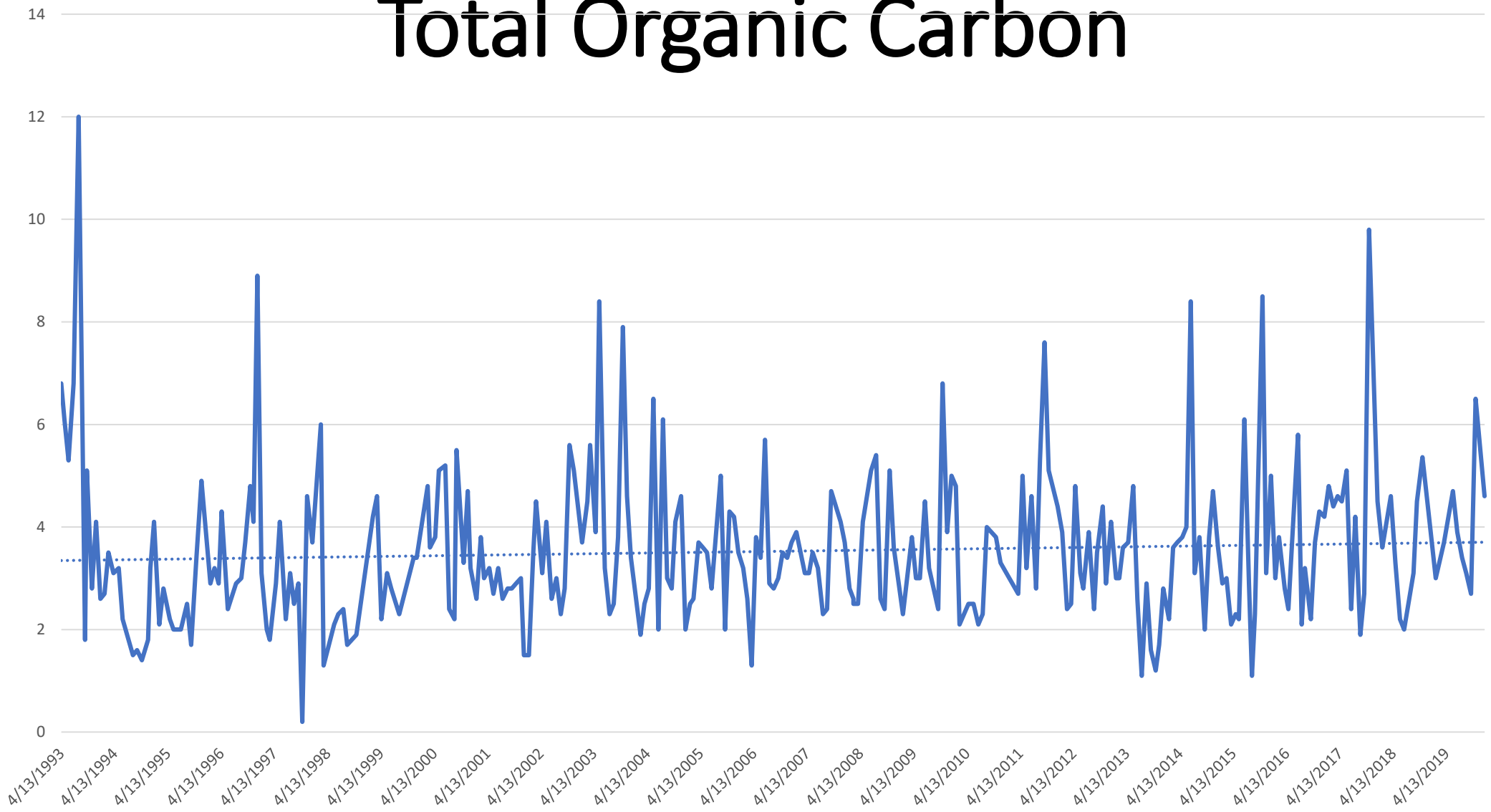
Bozen Kill at Route 397
Organic Nitrogen



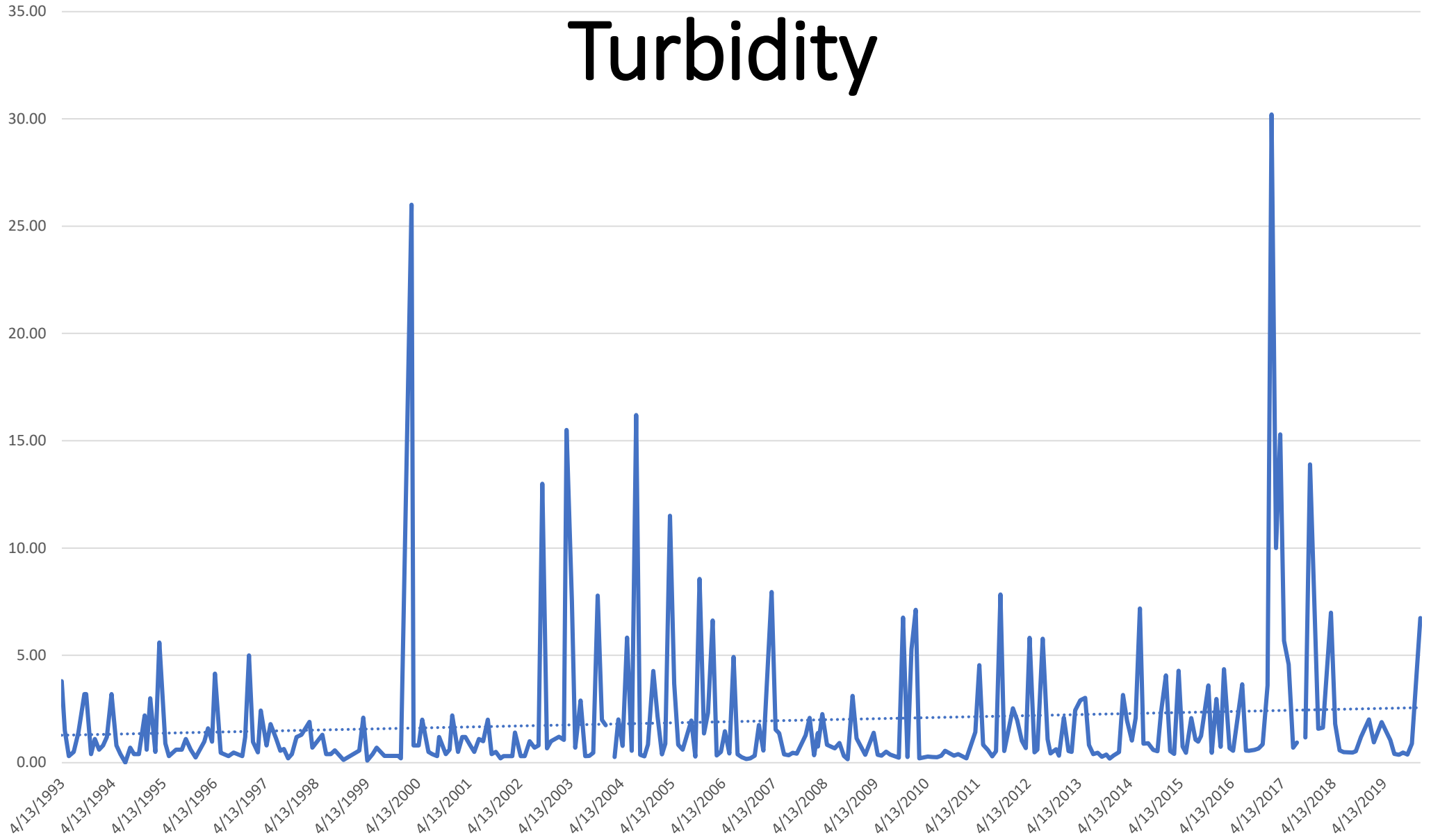
Bozen Kill at Route 397
Total Phosphate



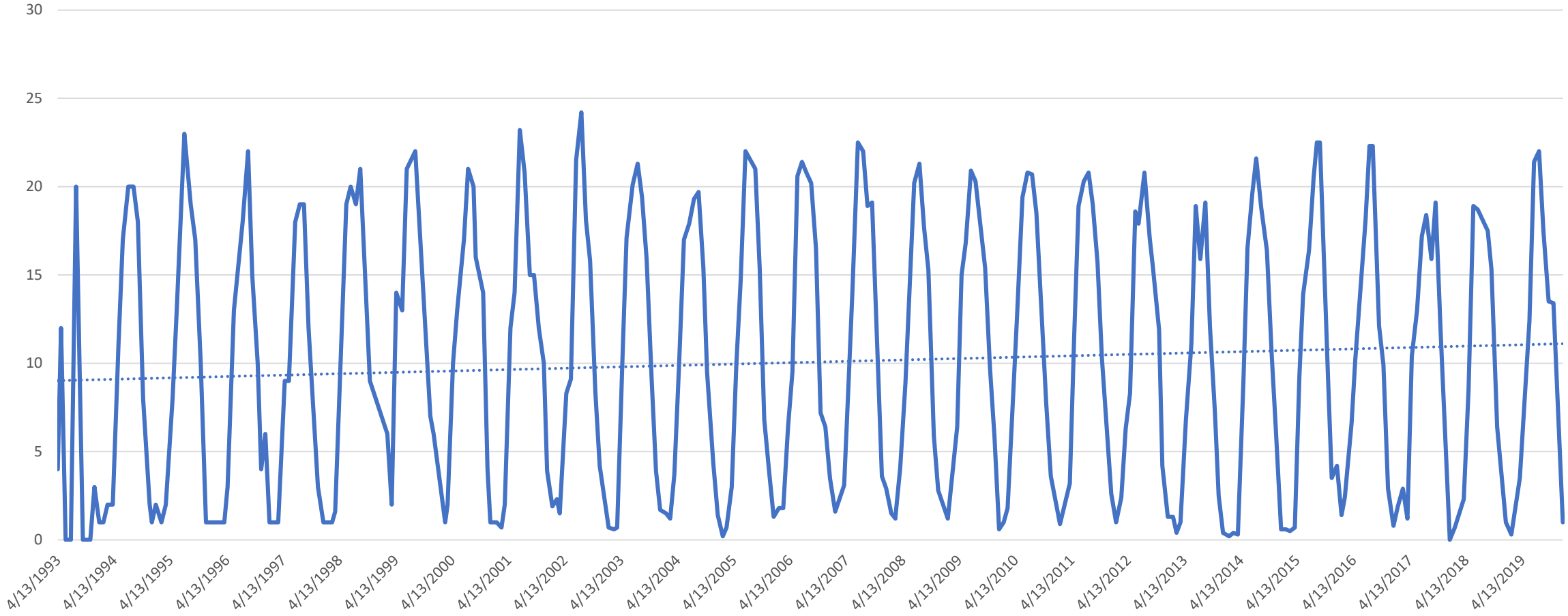
Bozen Kill at Route 397
Total Organic Carbon



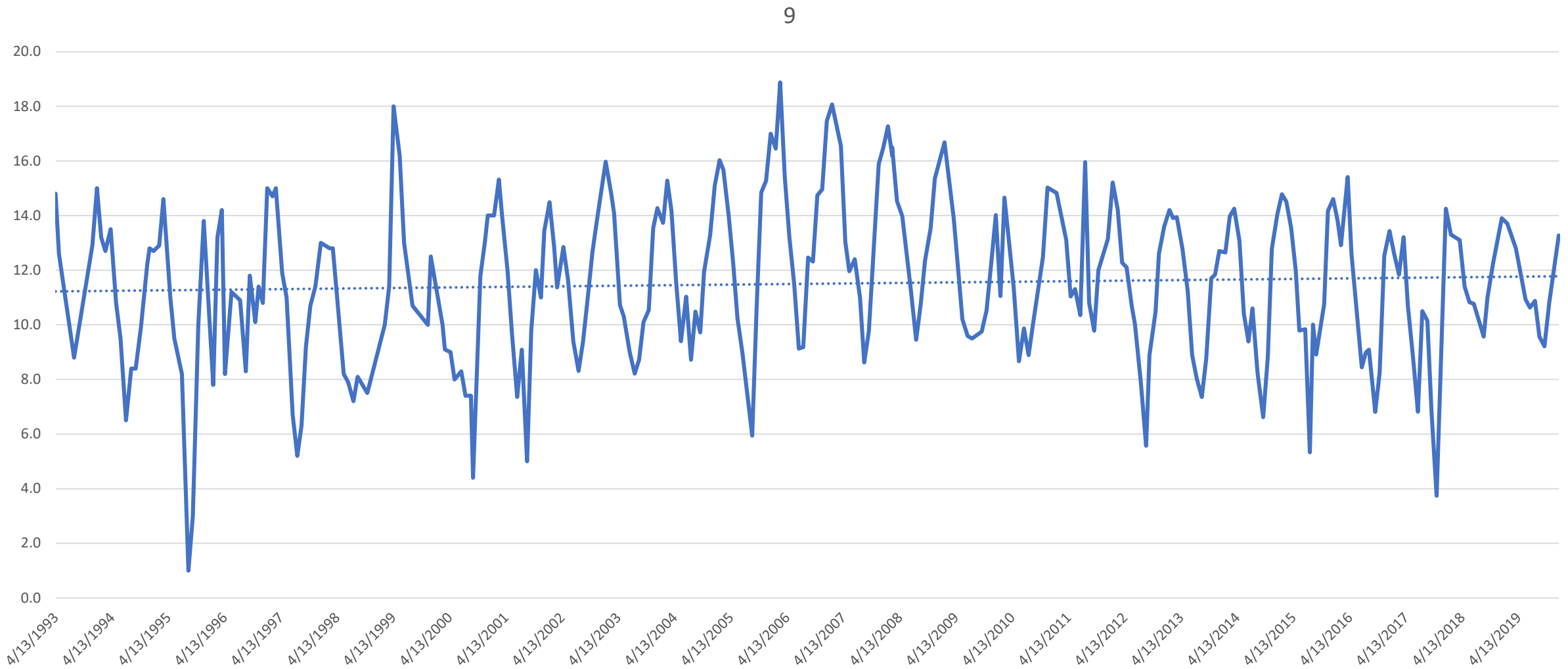
Bozen Kill at Route 397 Turbidity



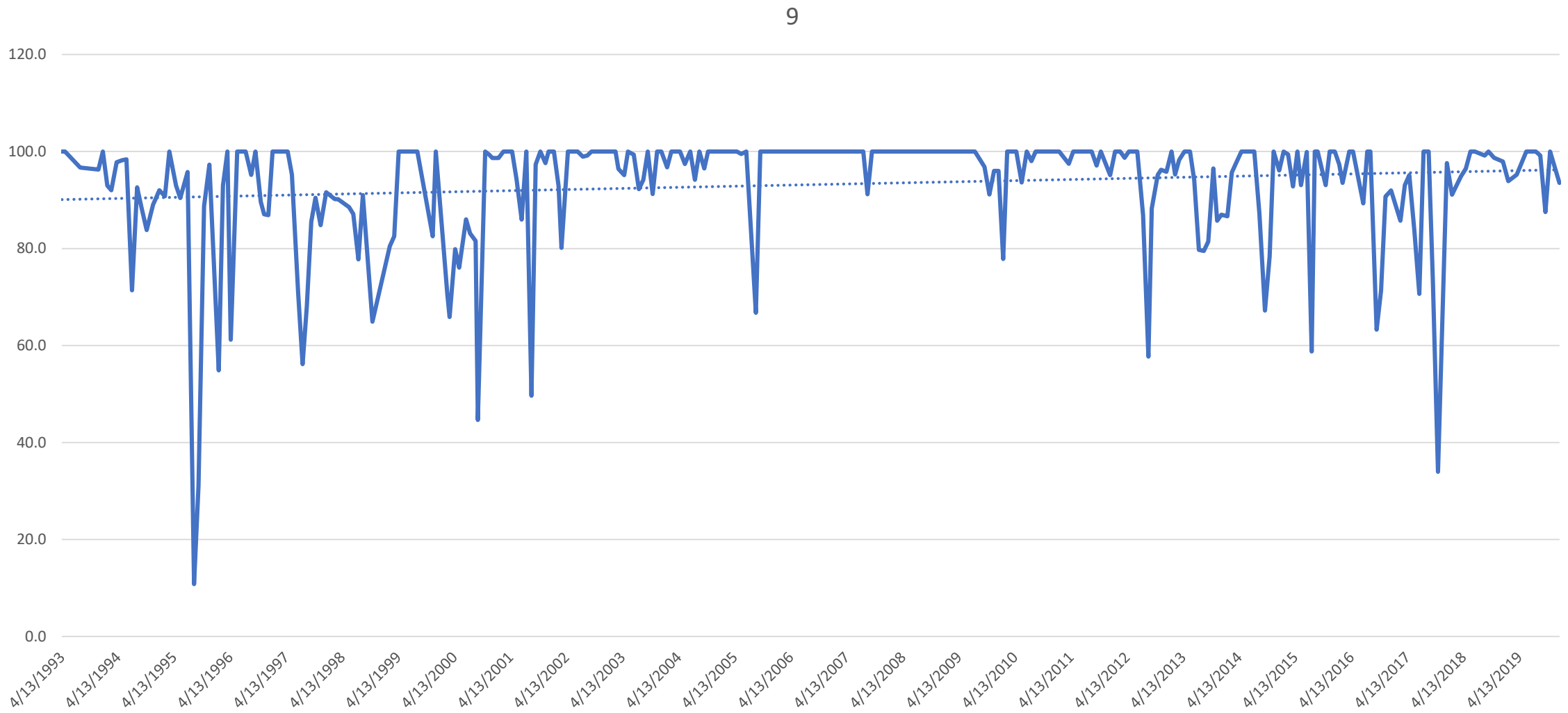
Bozen Kill Downstream of Altamont Waste Water Treatment Plant Temperature



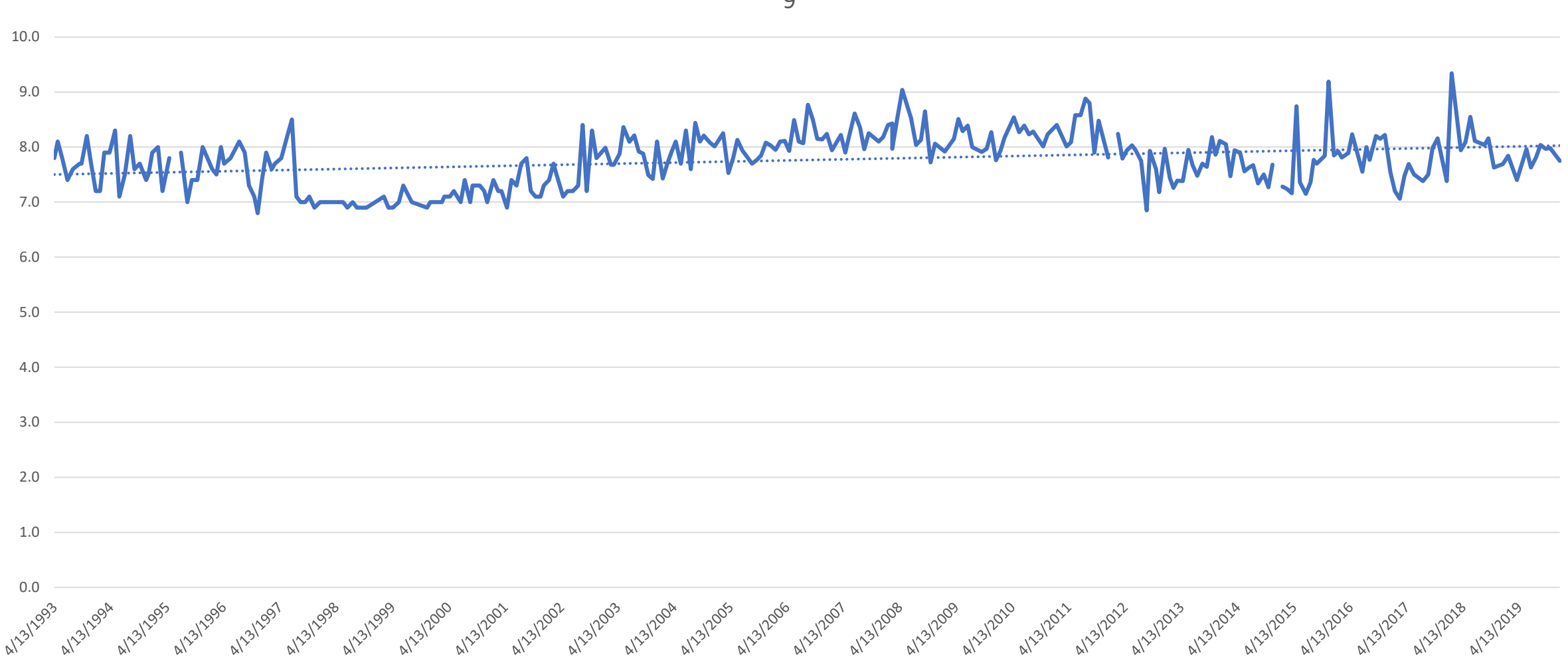
Bozen Kill Downstream of Altamont Waste Water Treatment Plant
Dissolved Oxygen



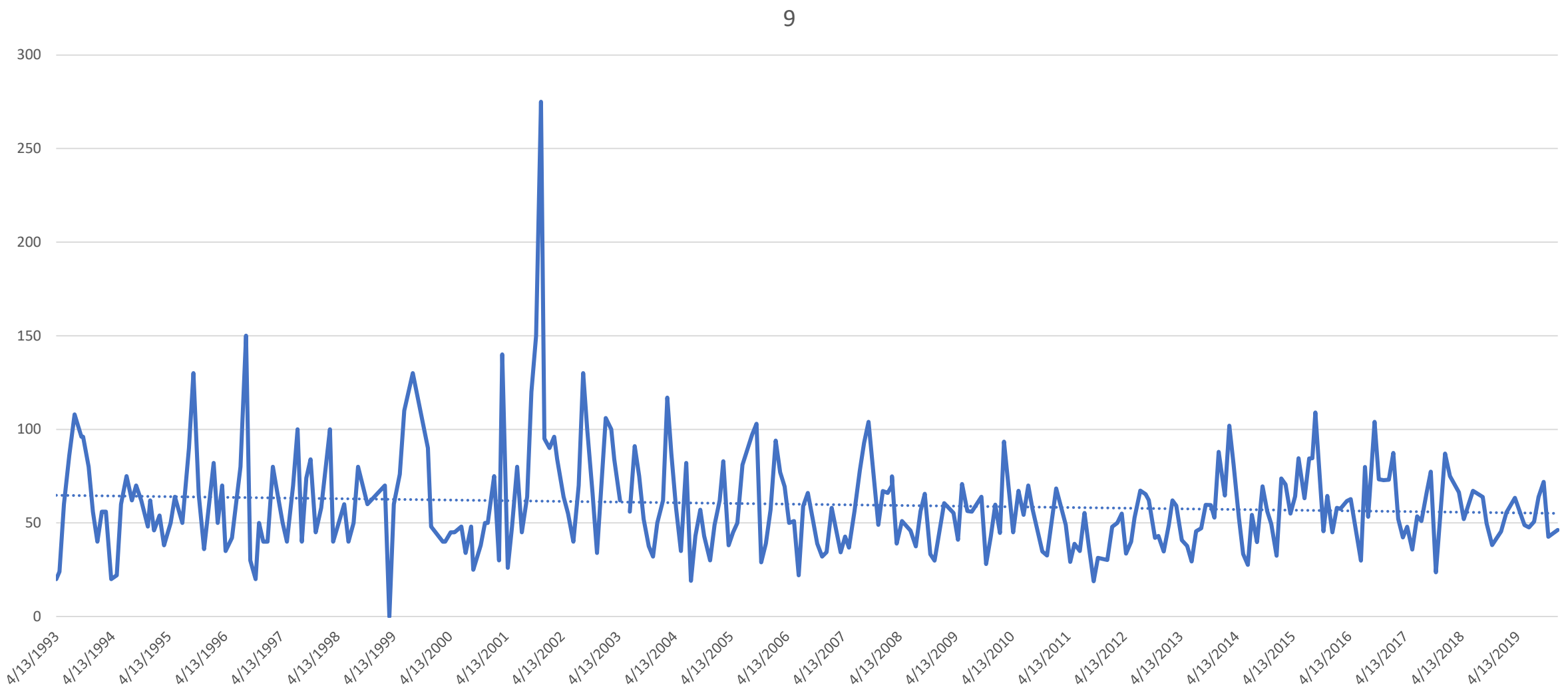
Bozen Kill Downstream of Altamont Waste Water Treatment Plant Oxygen Saturation



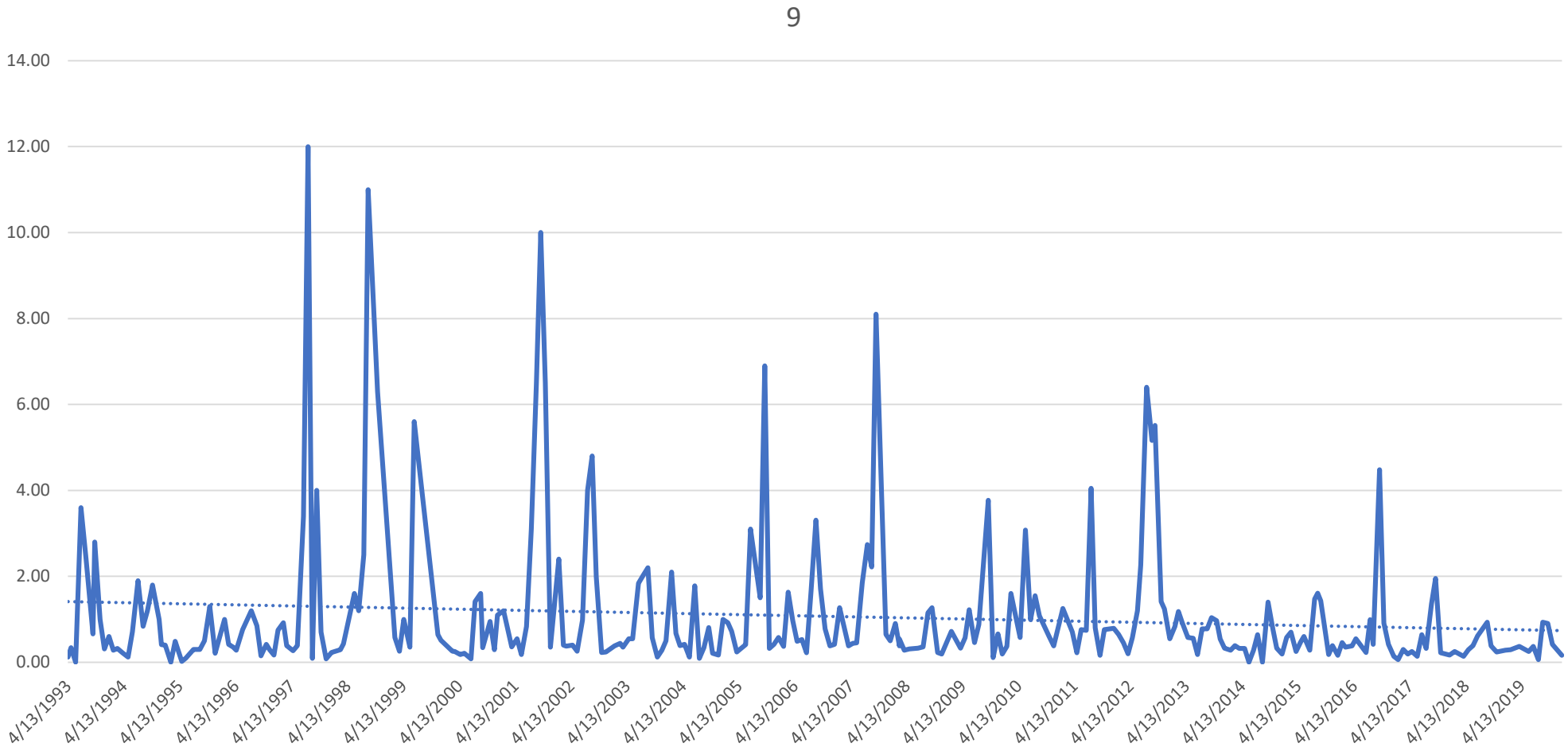
Bozen Kill Downstream of Altamont Waste Water Treatment Plant
pH



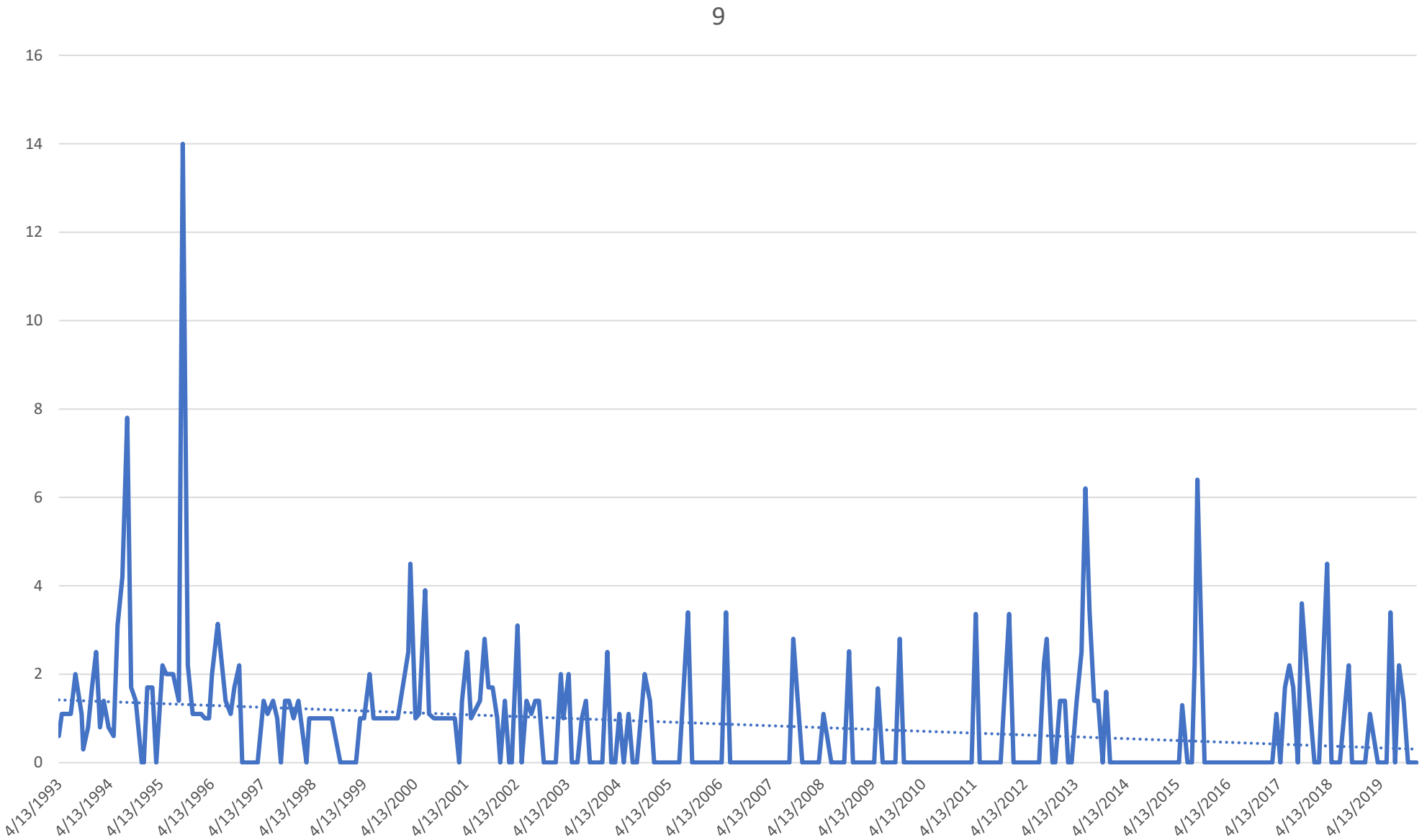
Bozen Kill Downstream of Altamont Waste Water Treatment Plant Chlorides



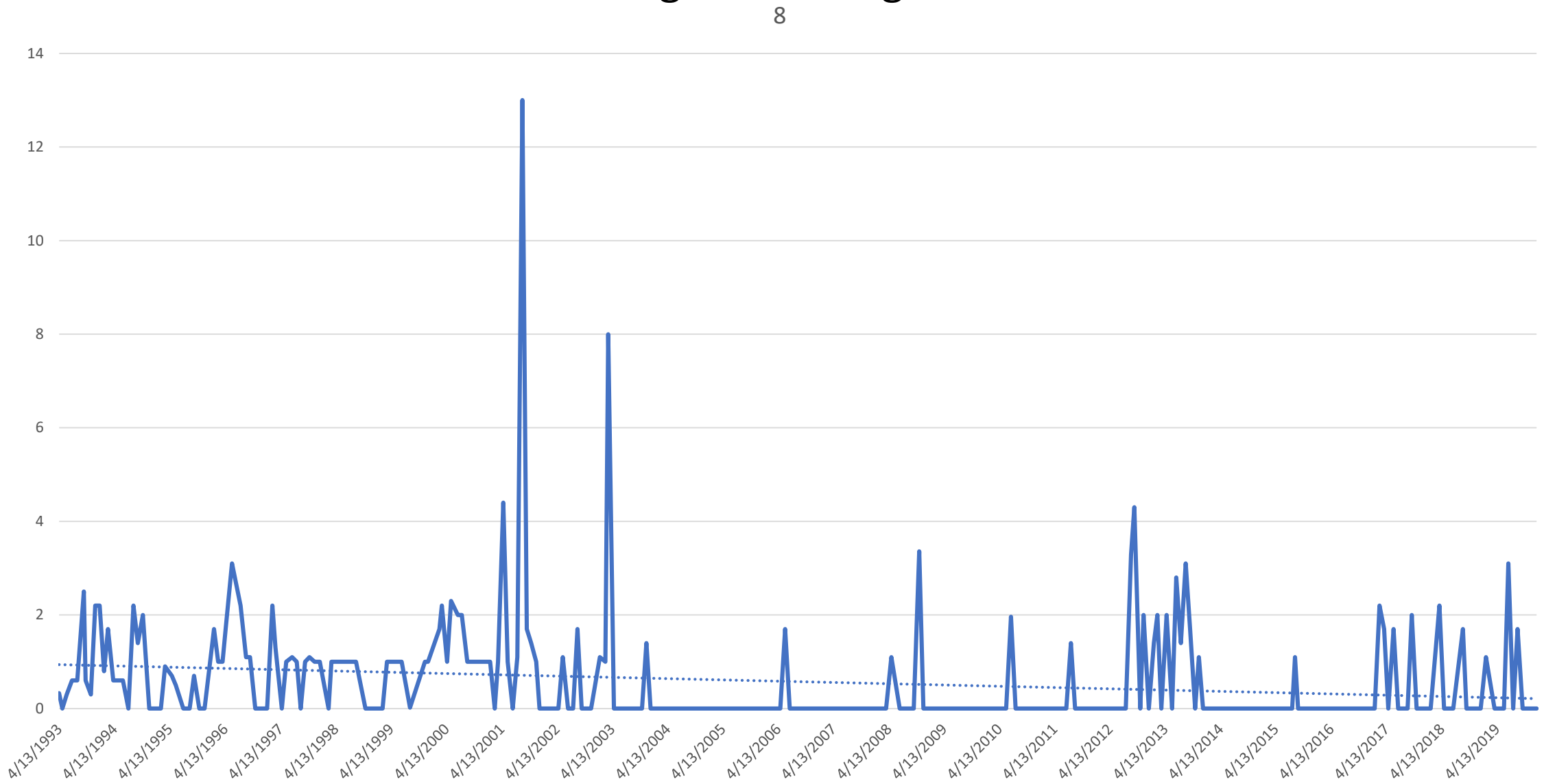
Bozen Kill Downstream of Altamont Waste Water Treatment Plant Nitrates



Bozen Kill Downstream of Altamont Waste Water Treatment Plant K-Nitrogen

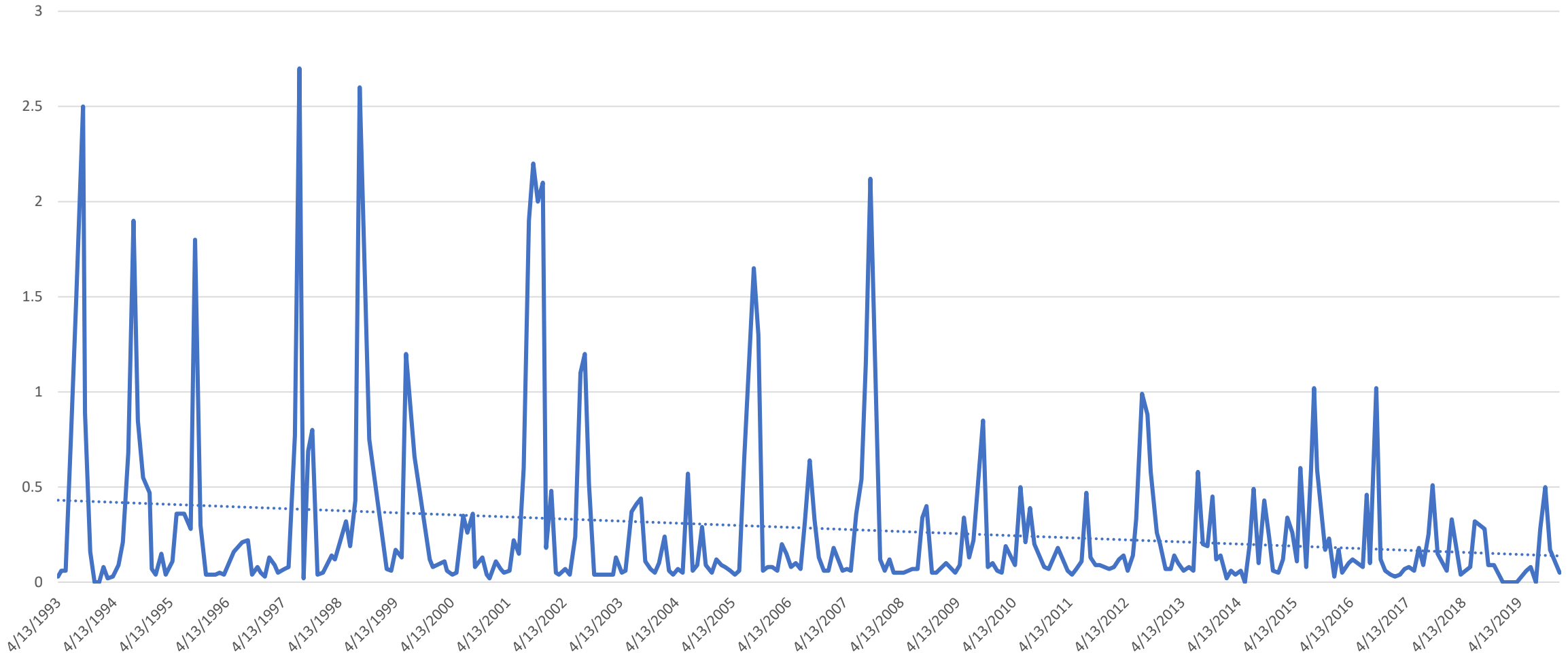


Bozen Kill Downstream of Altamont Waste Water Treatment Plant
Organic Nitrogen

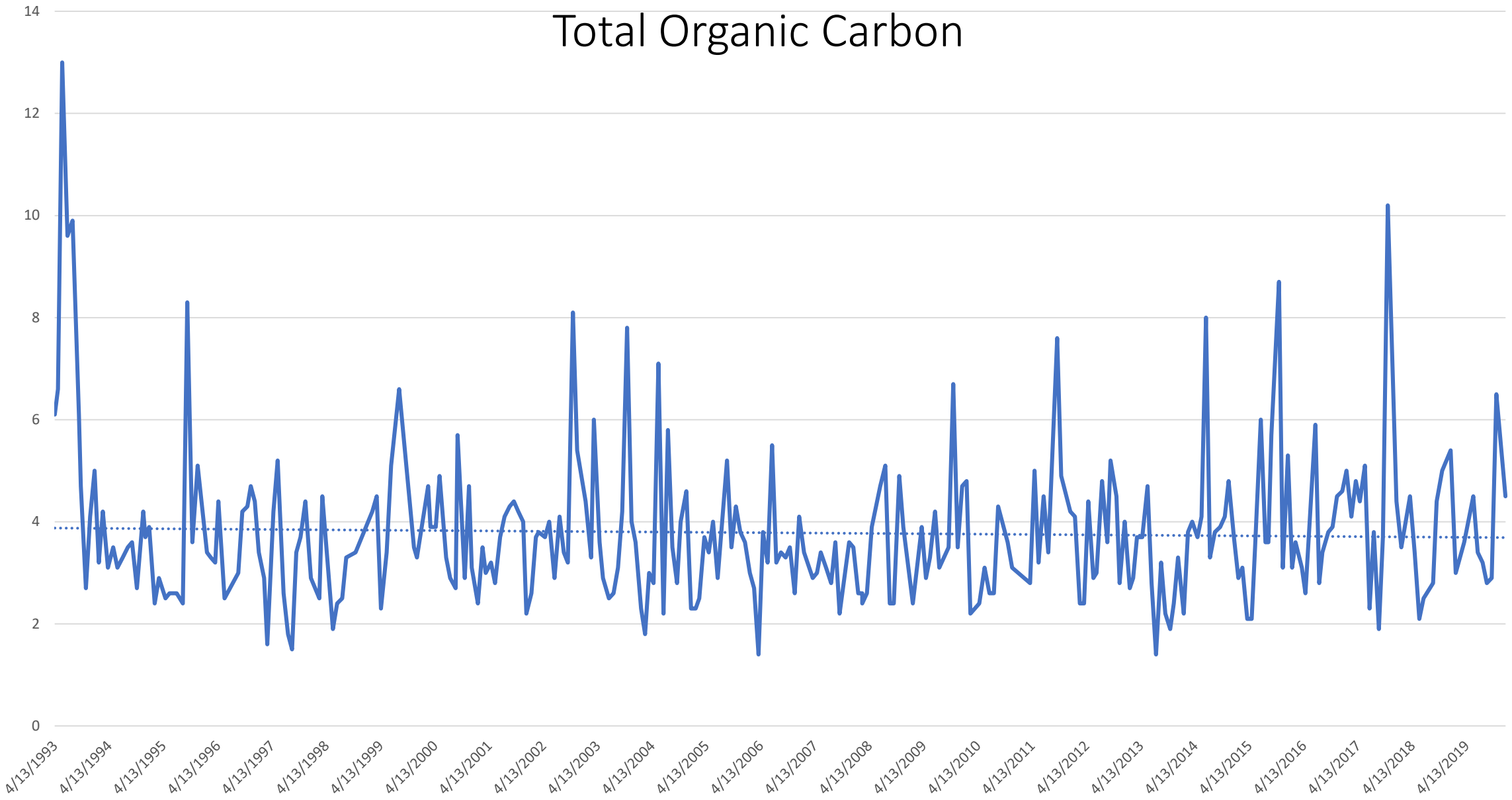


Bozen Kill Downstream of Altamont Waste Water Treatment Plant
Total Phosphate

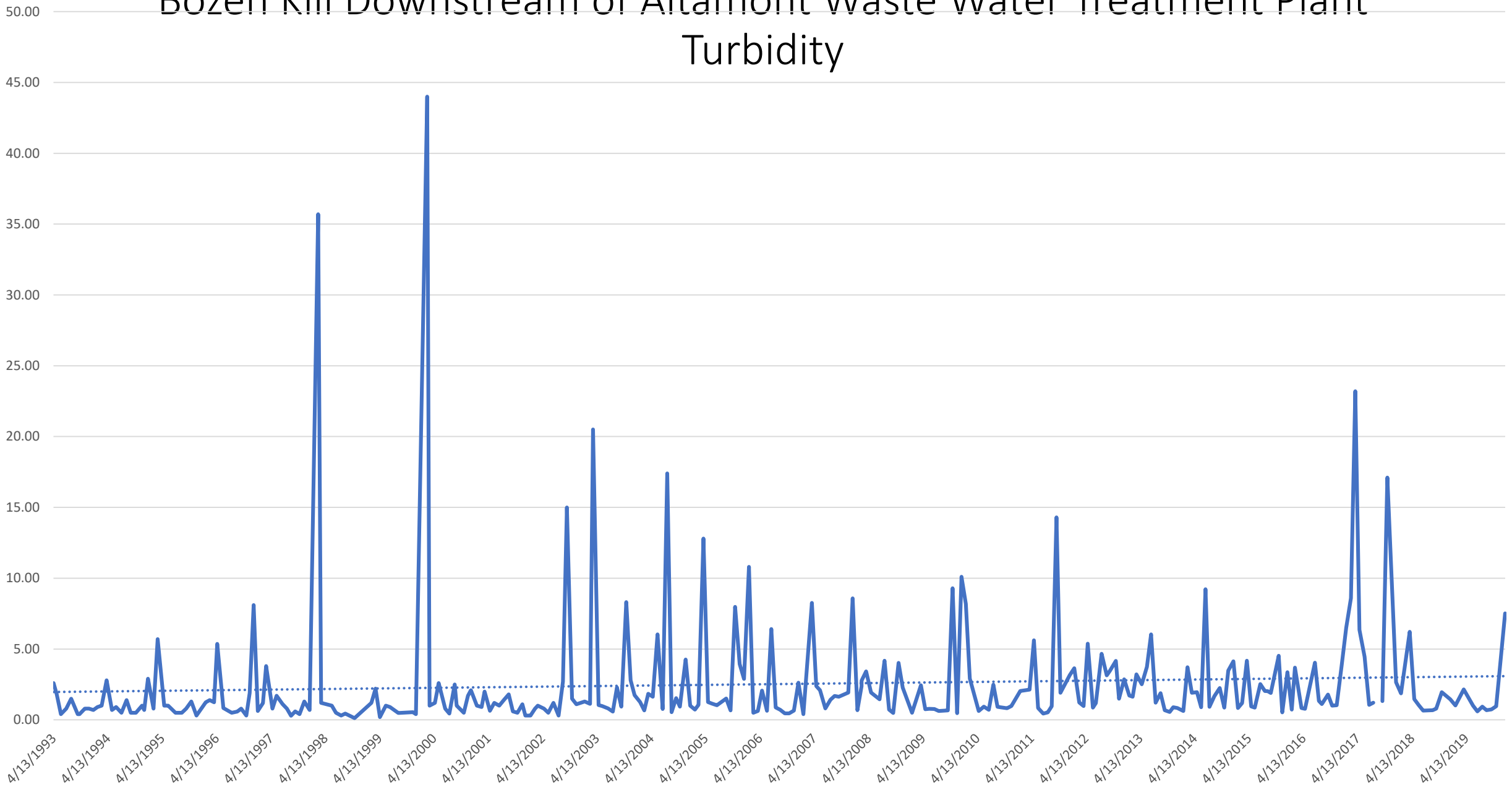
9



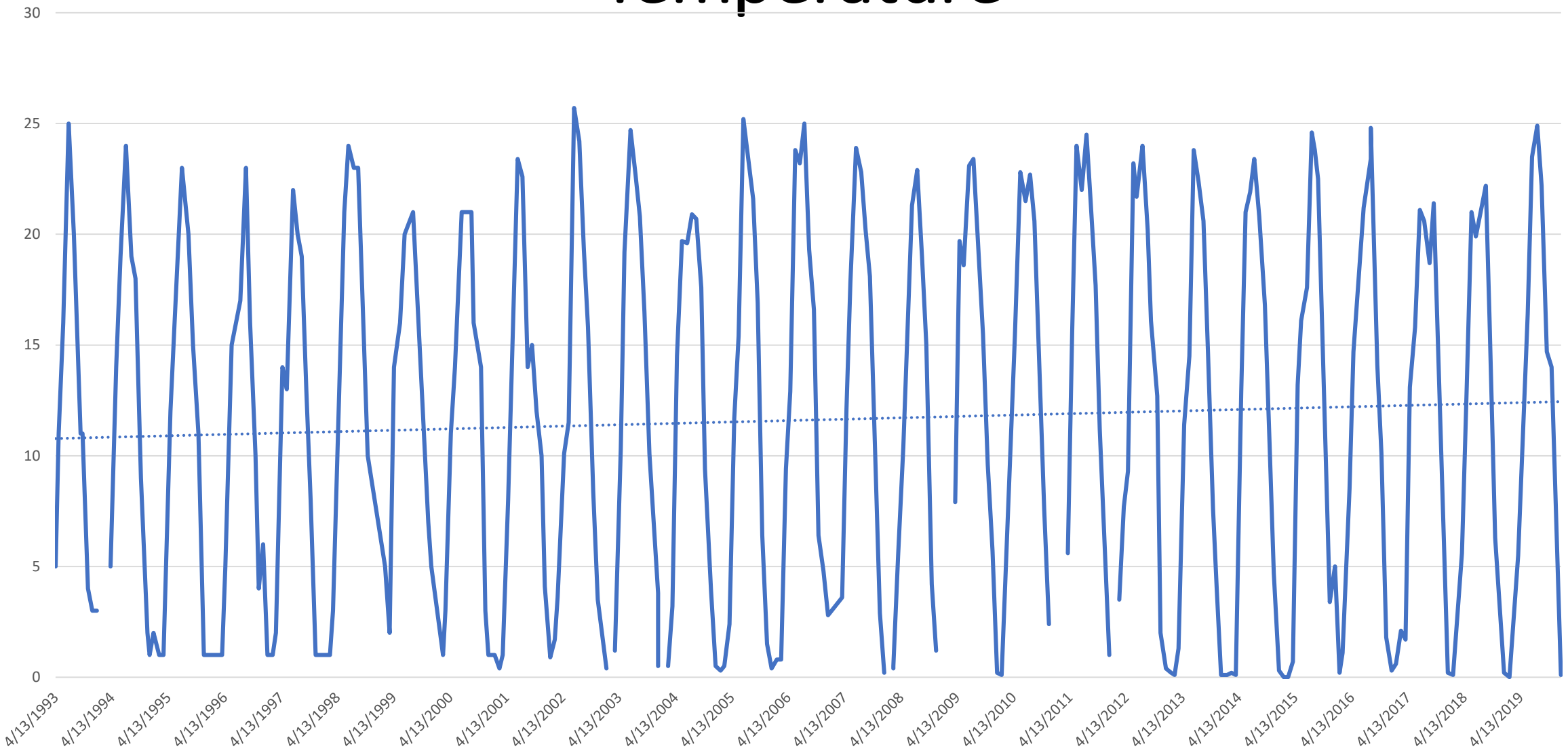
Bozen Kill Downstream of Altamont Waste Water Treatment Plant
Total Organic Carbon



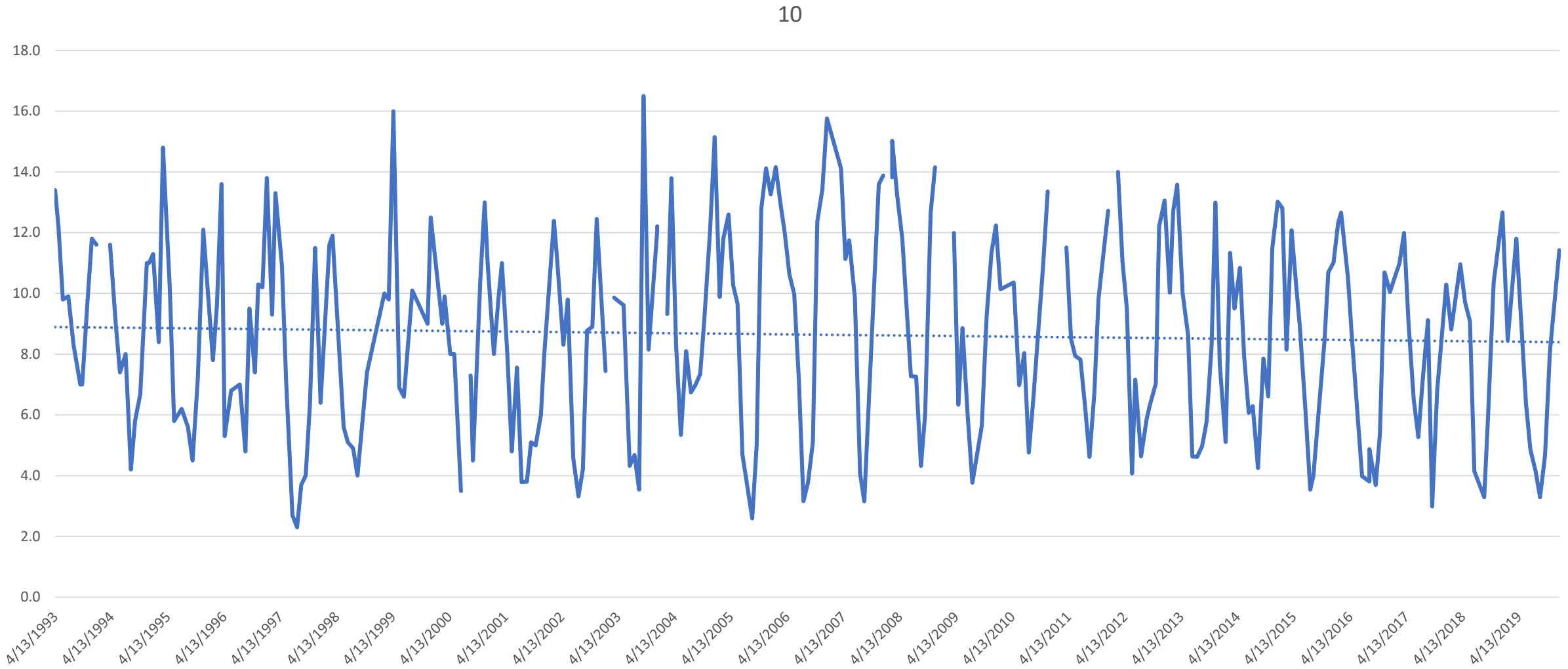
Bozen Kill Downstream of Altamont Waste Water Treatment Plant Turbidity



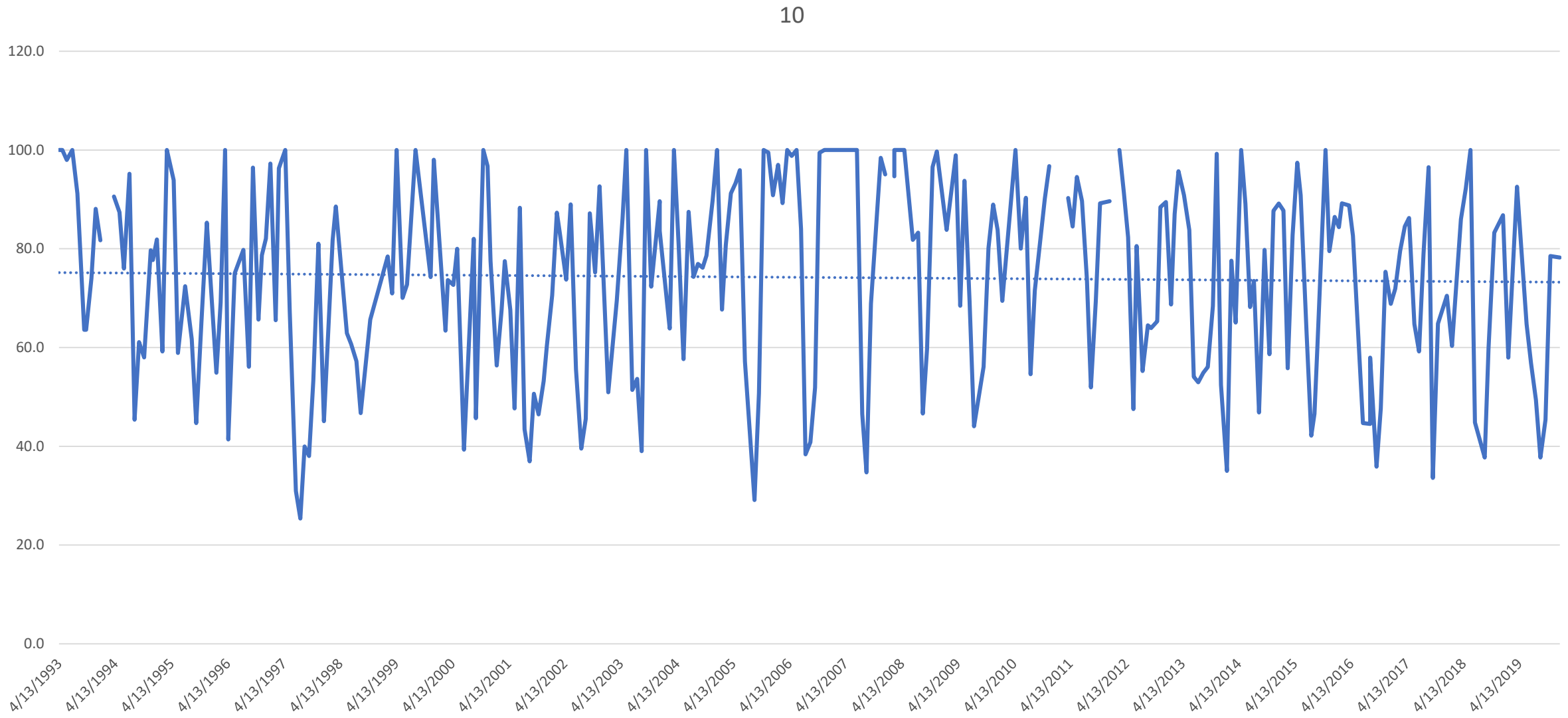
Black Creek at Weaver Road Temperature



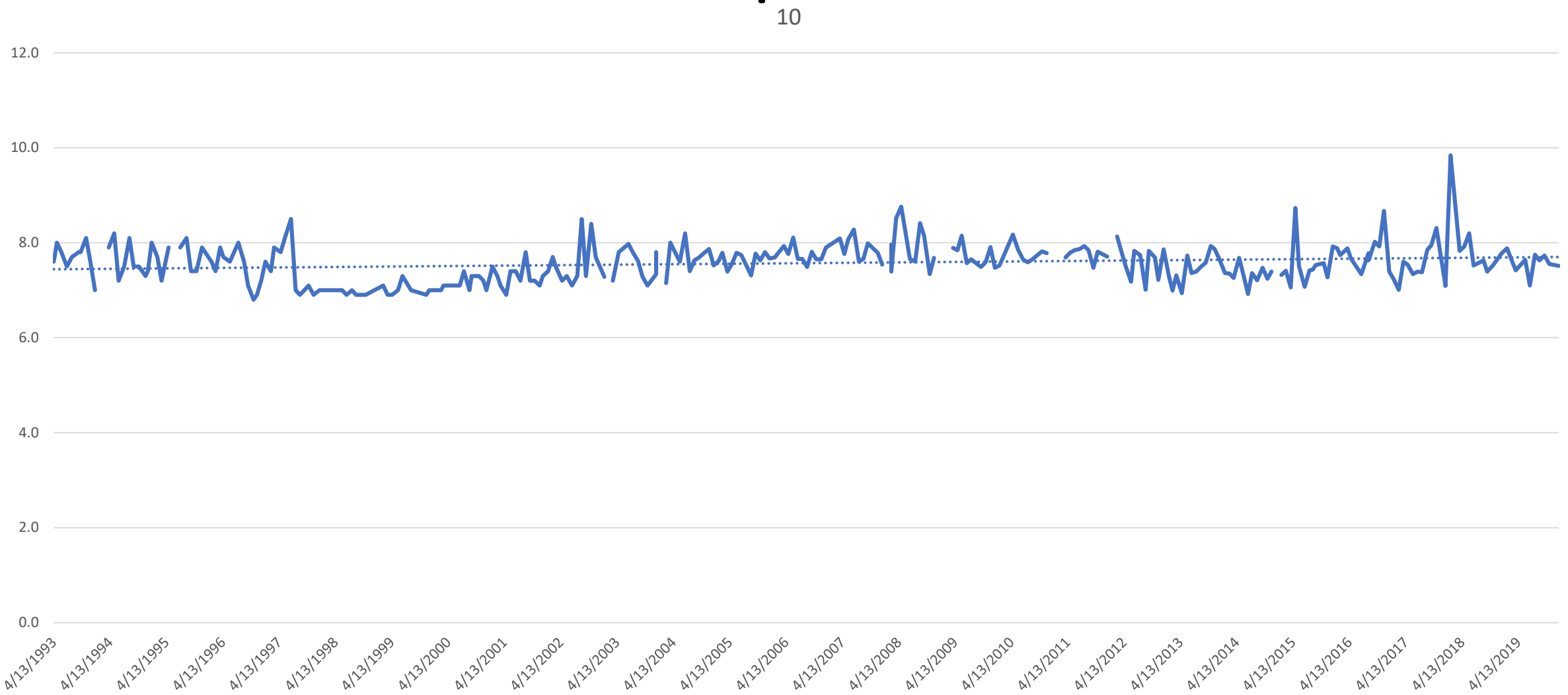
Black Creek at Weaver Road
Dissolved Oxygen



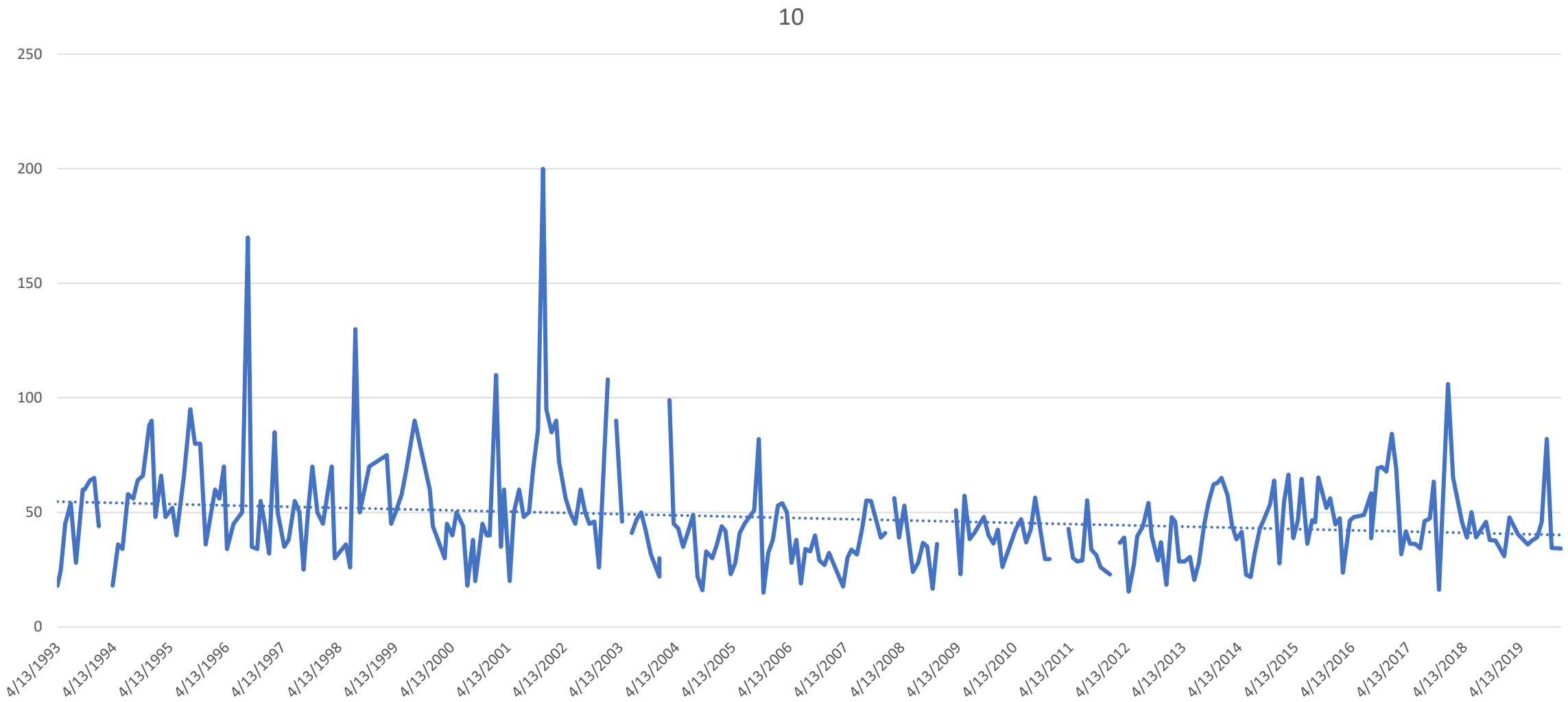
Black Creek at Weaver Road
Oxygen Saturation



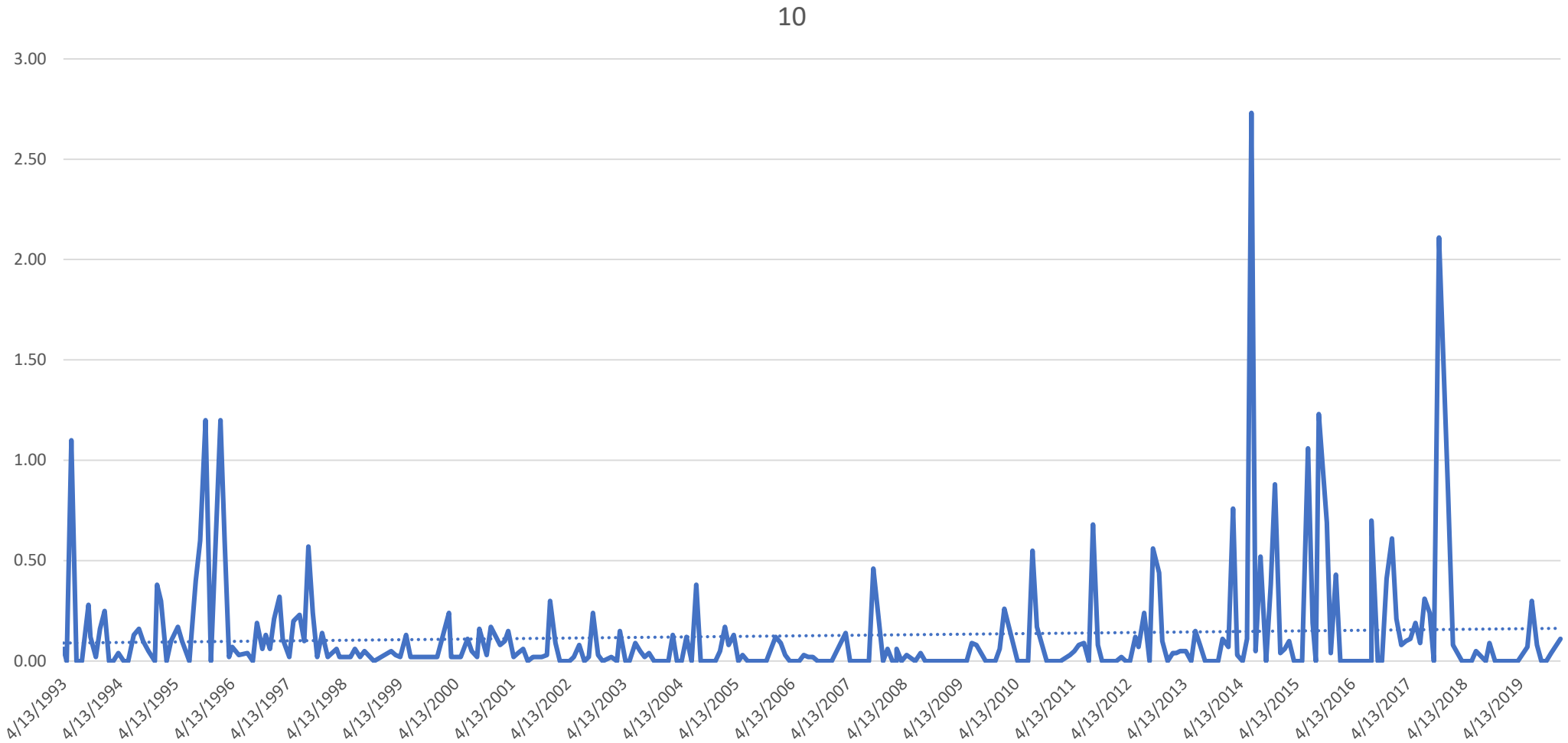
Black Creek at Weaver Road
pH



Black Creek at Weaver Road Chlorides



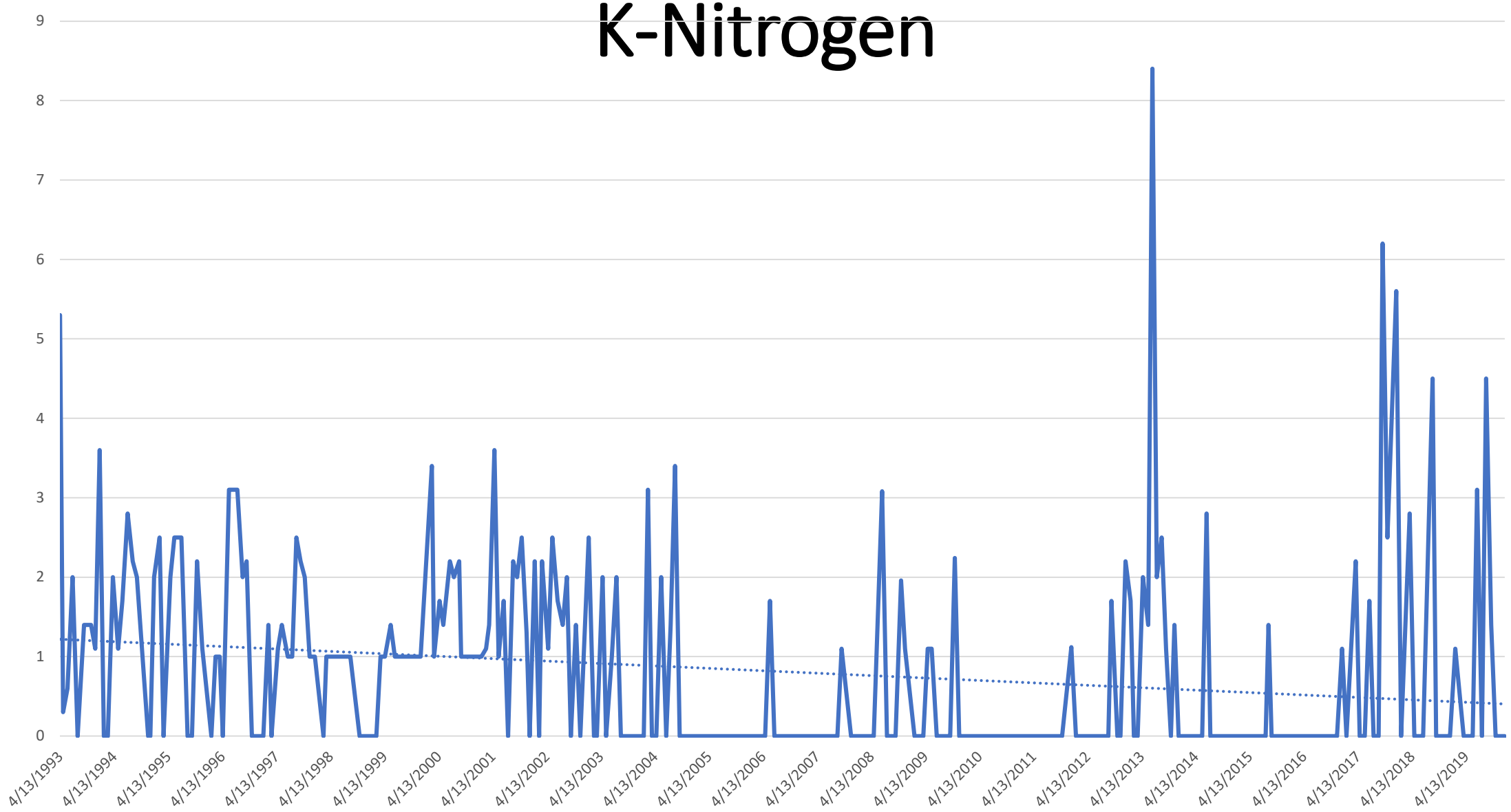
Black Creek at Weaver Road Nitrates



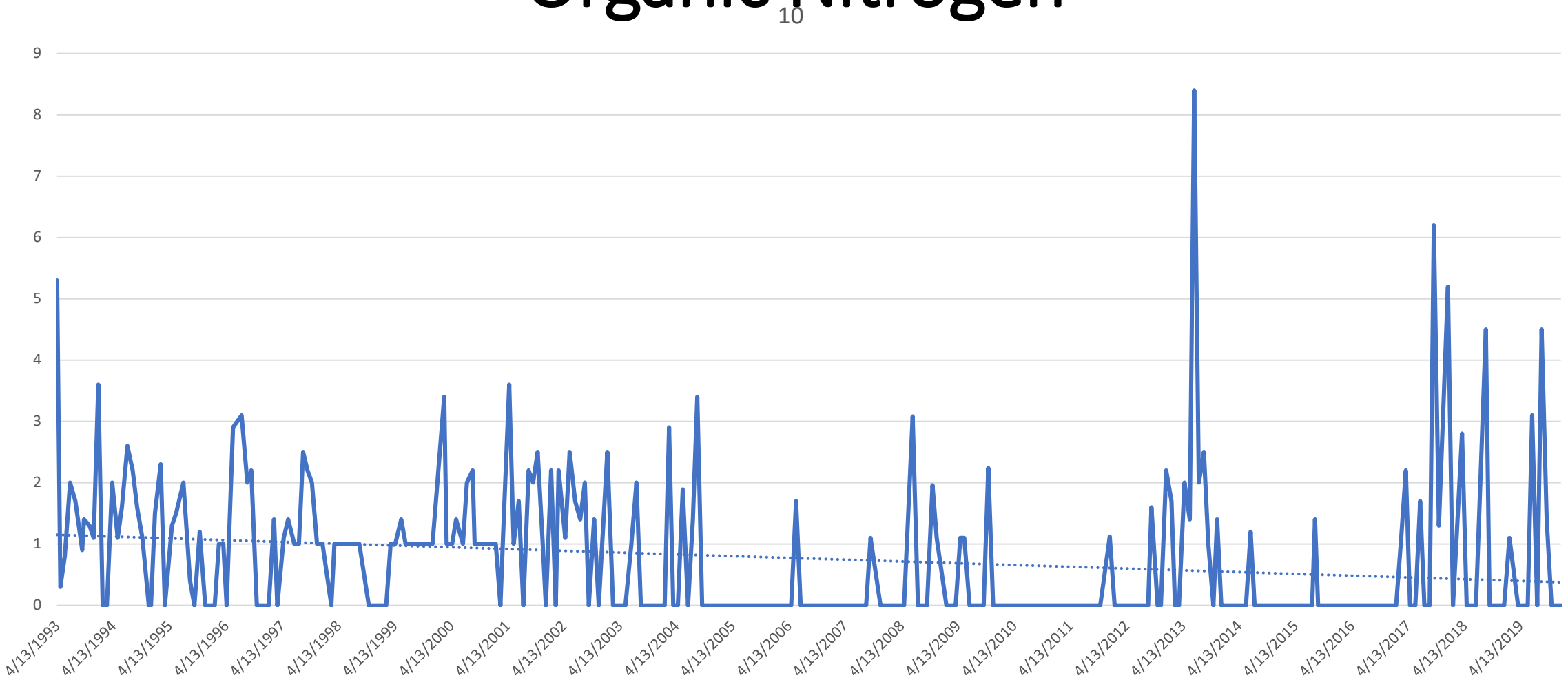
Black Creek at Weaver Road

10

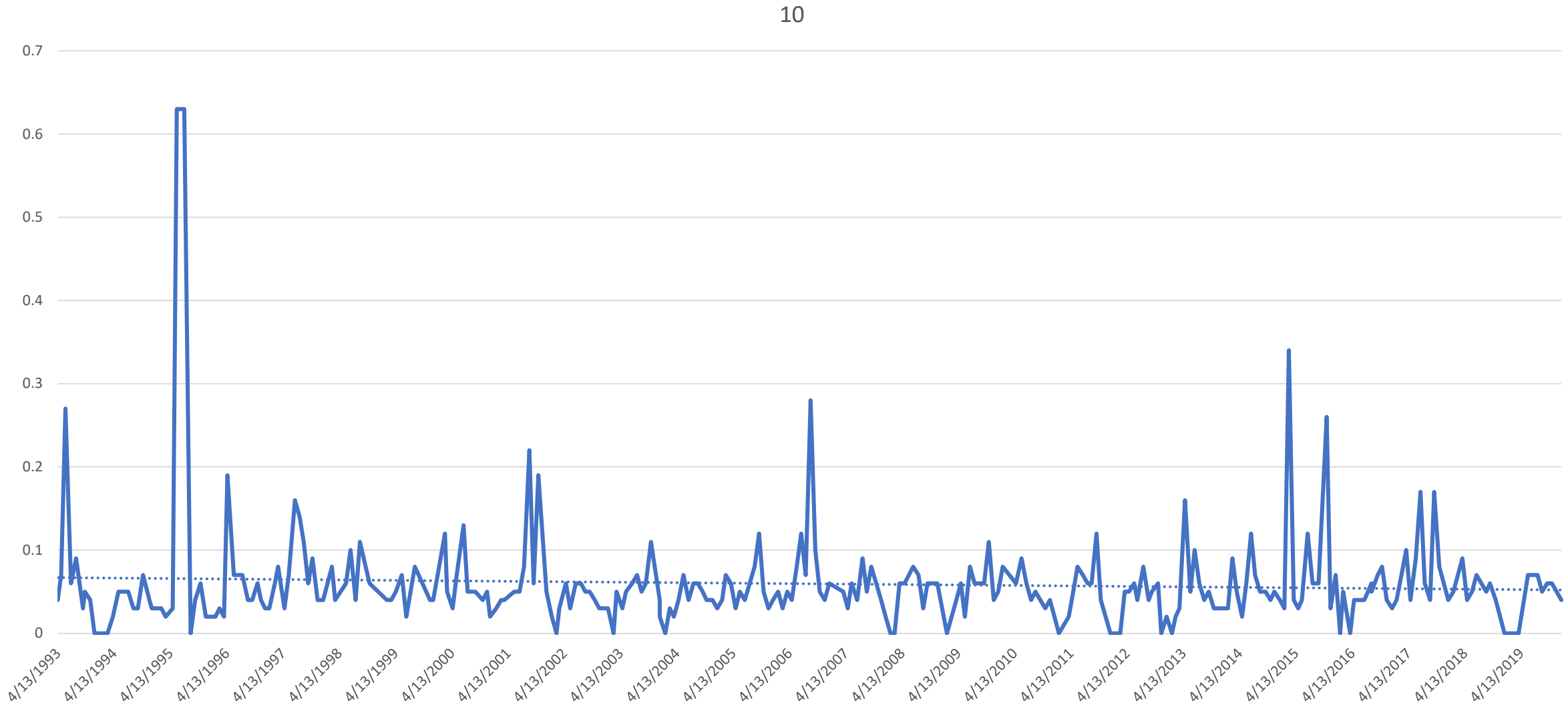
K-Nitrogen



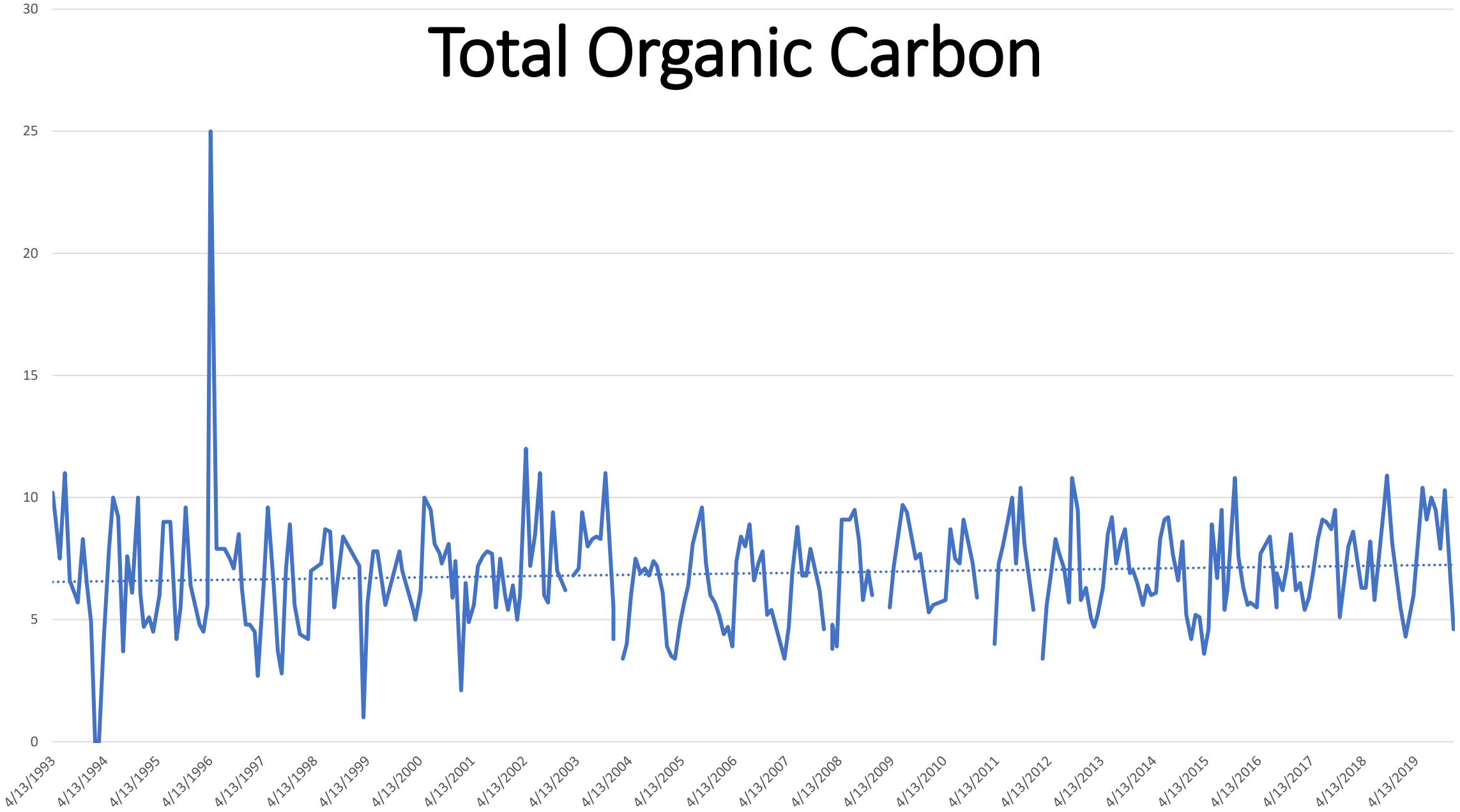
Black Creek at Weaver Road
Organic Nitrogen



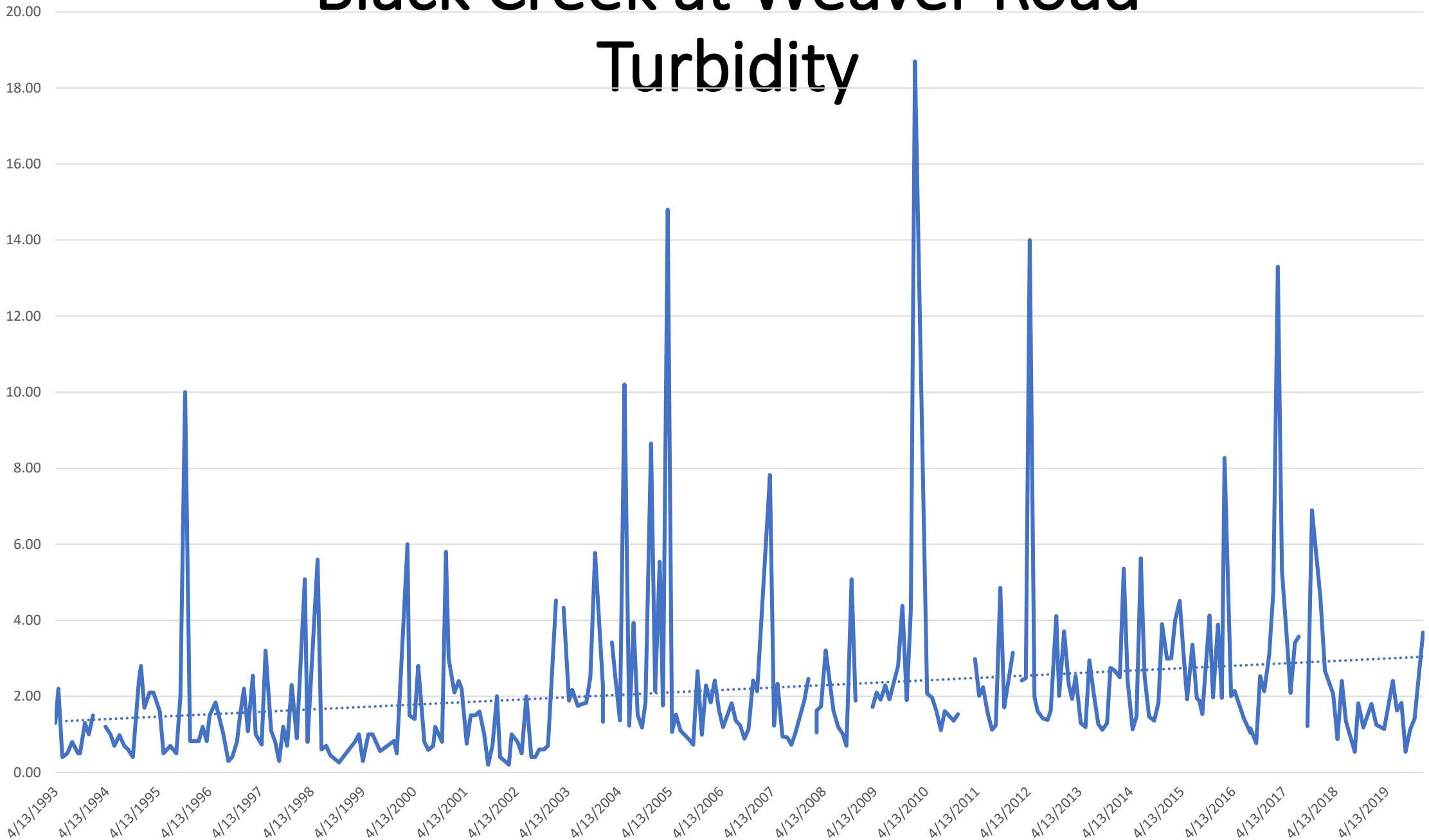
Black Creek at Weaver Road
Total



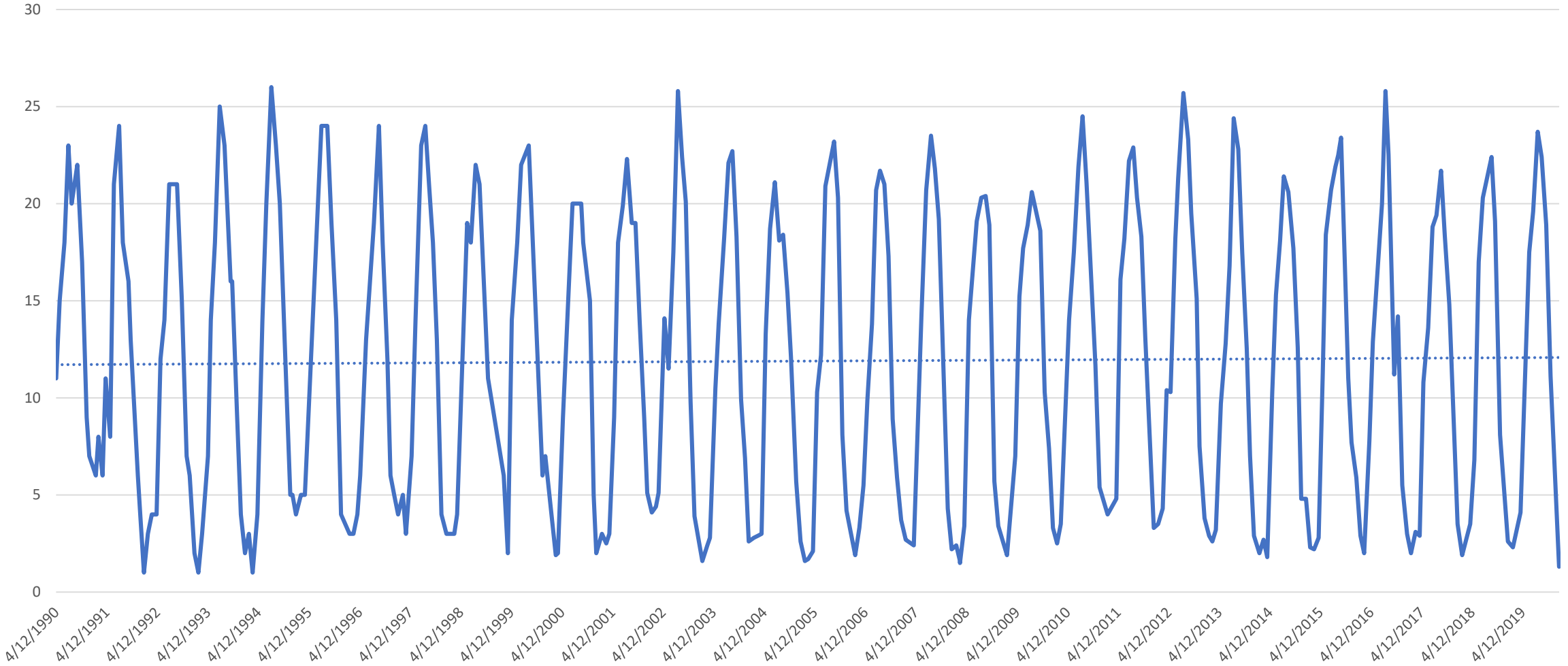
Black Creek at Weaver Road
Total Organic Carbon



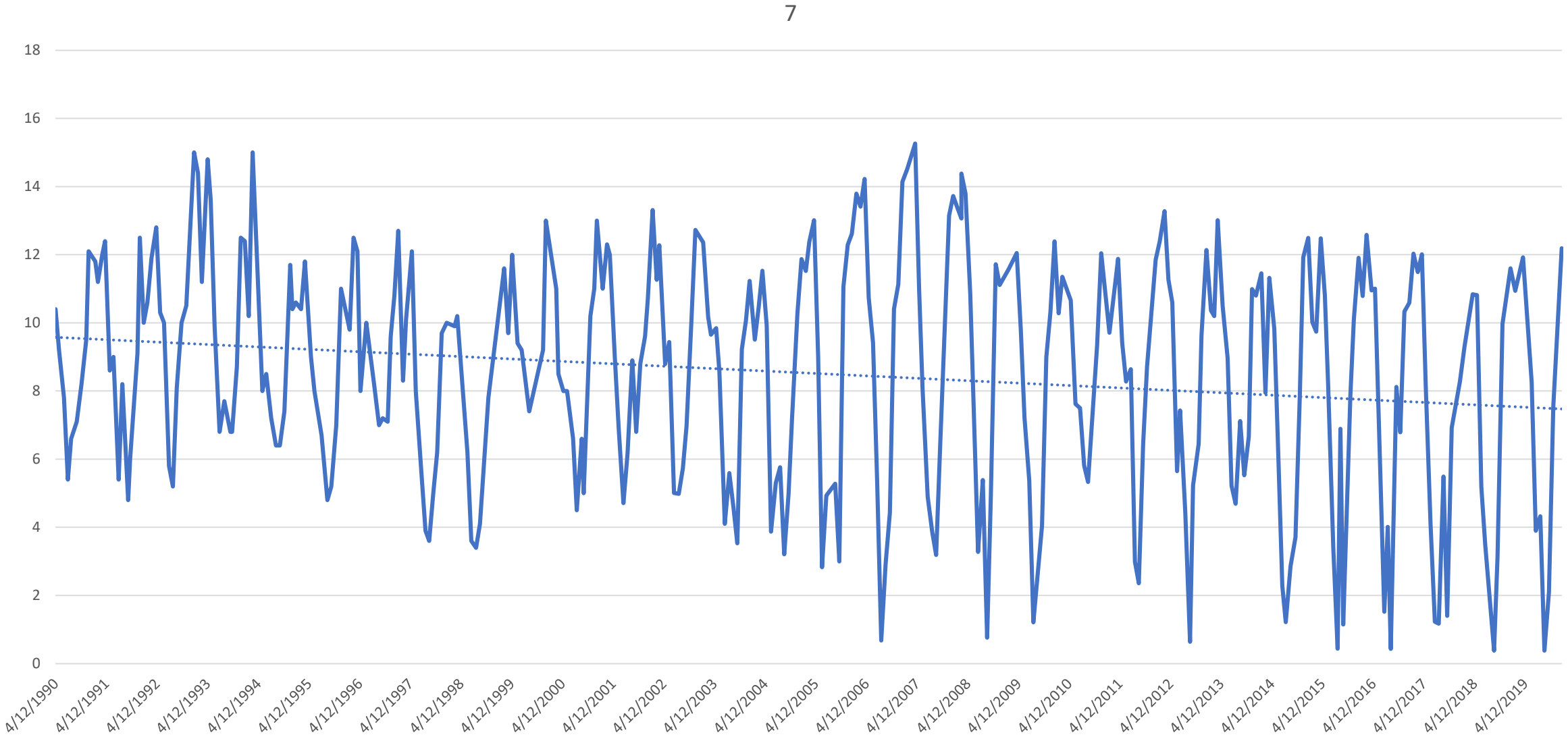
Black Creek at Weaver Road Turbidity



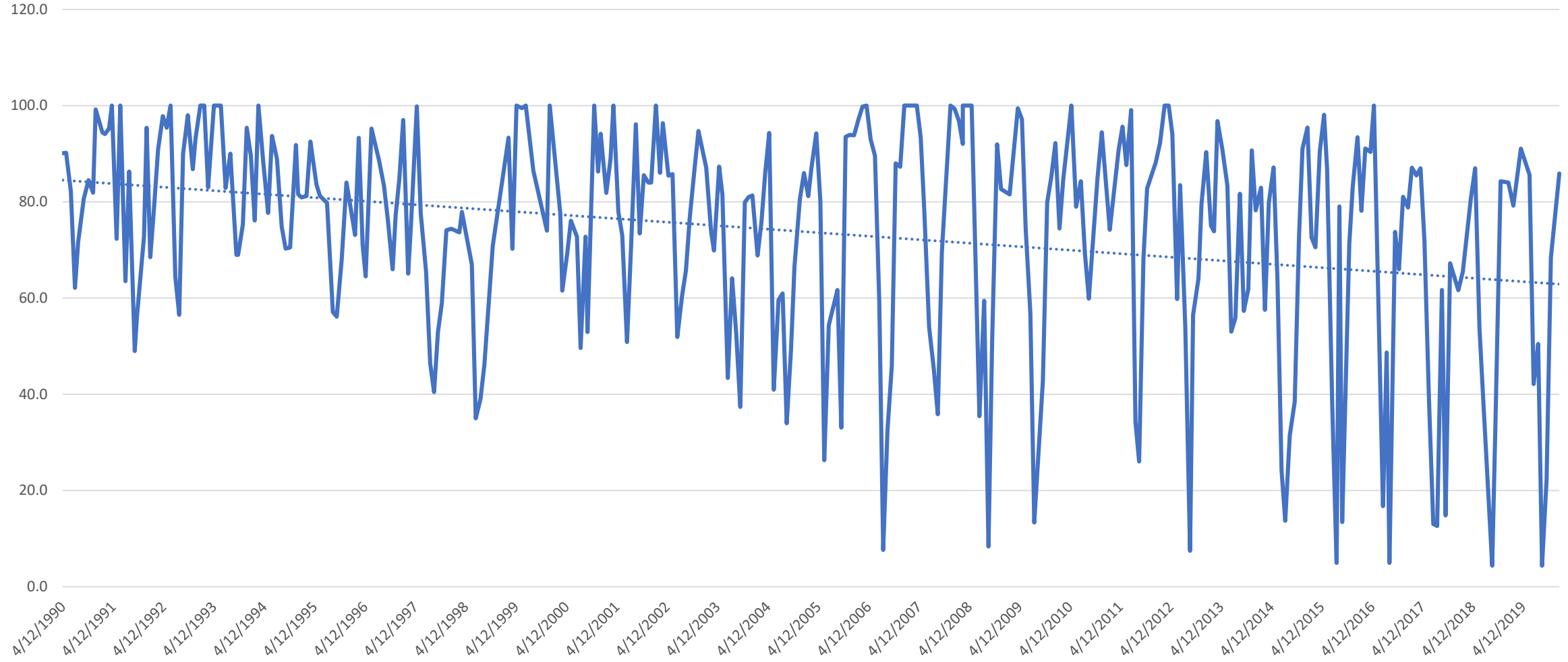
Watervliet Reservoir Intake Temperature



Watervliet Reservoir Intake Dissolved Oxygen

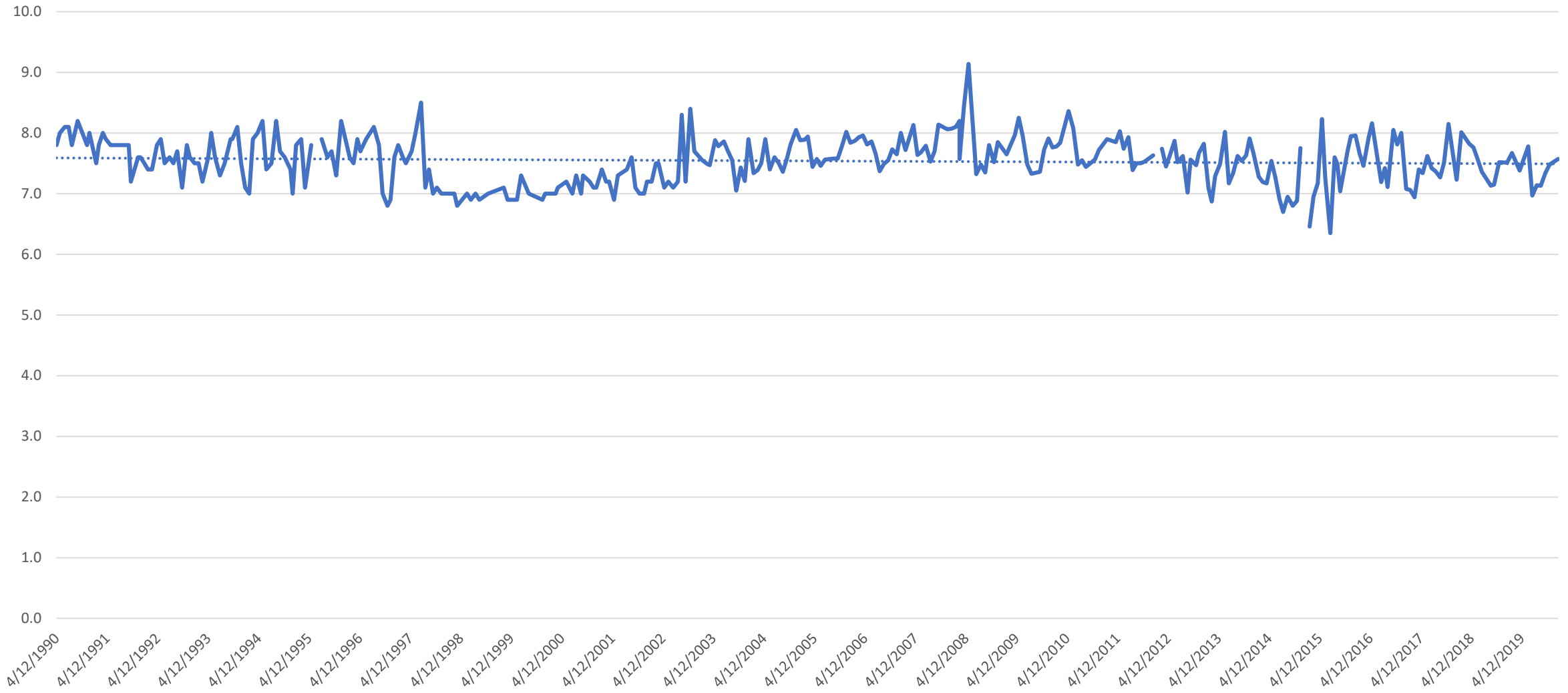


Watervliet Reservoir Intake Oxygen Saturation

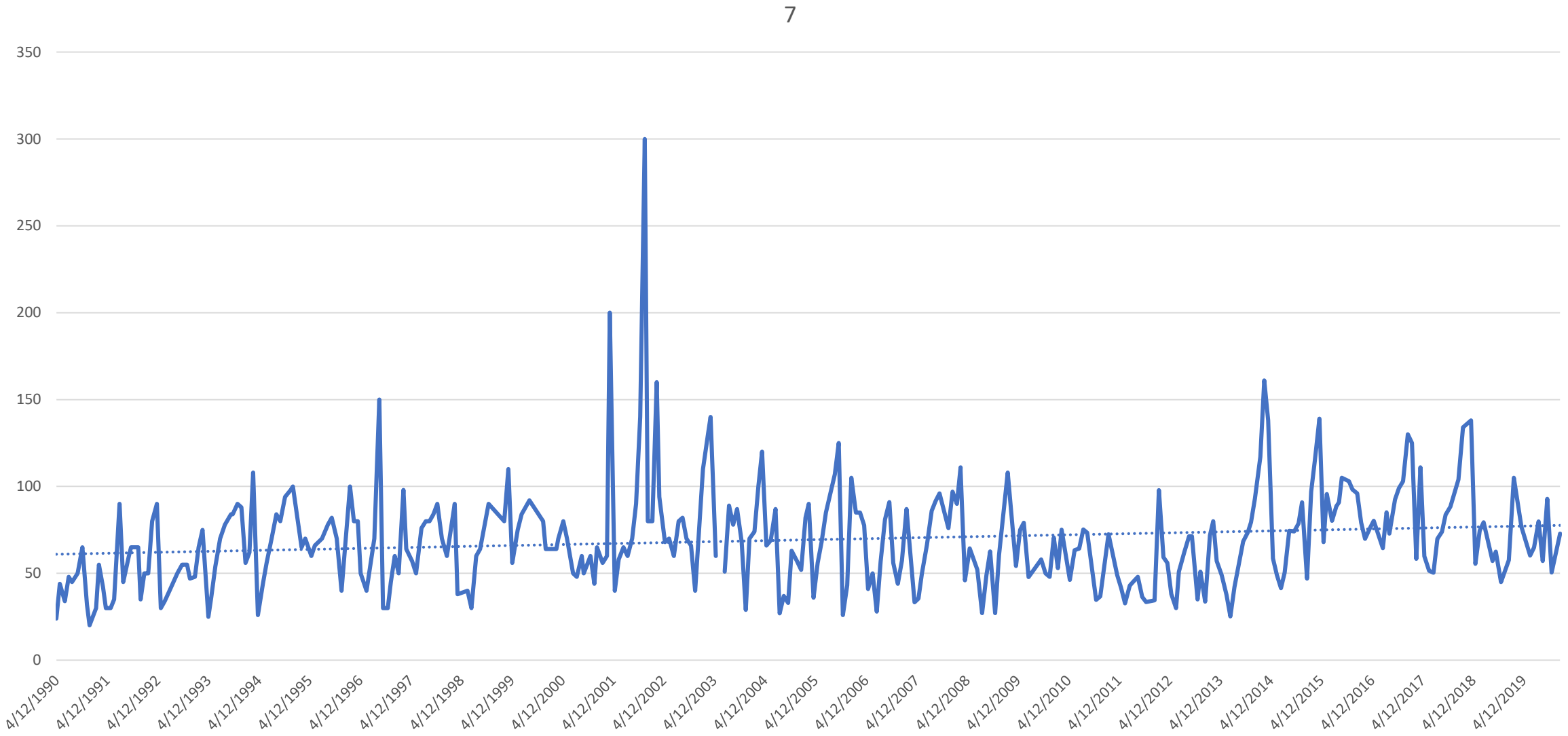


Watervliet Reservoir Intake

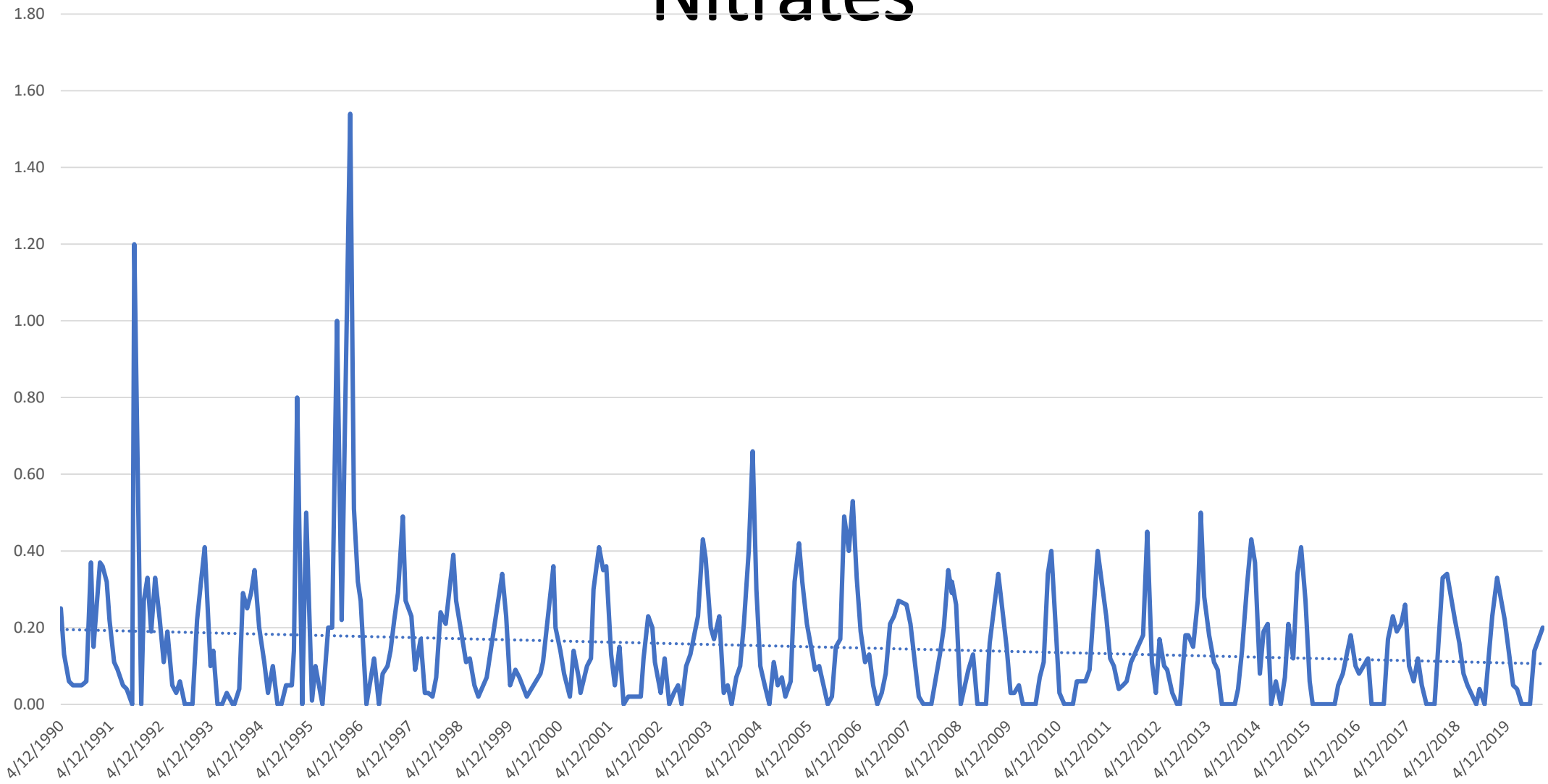
pH



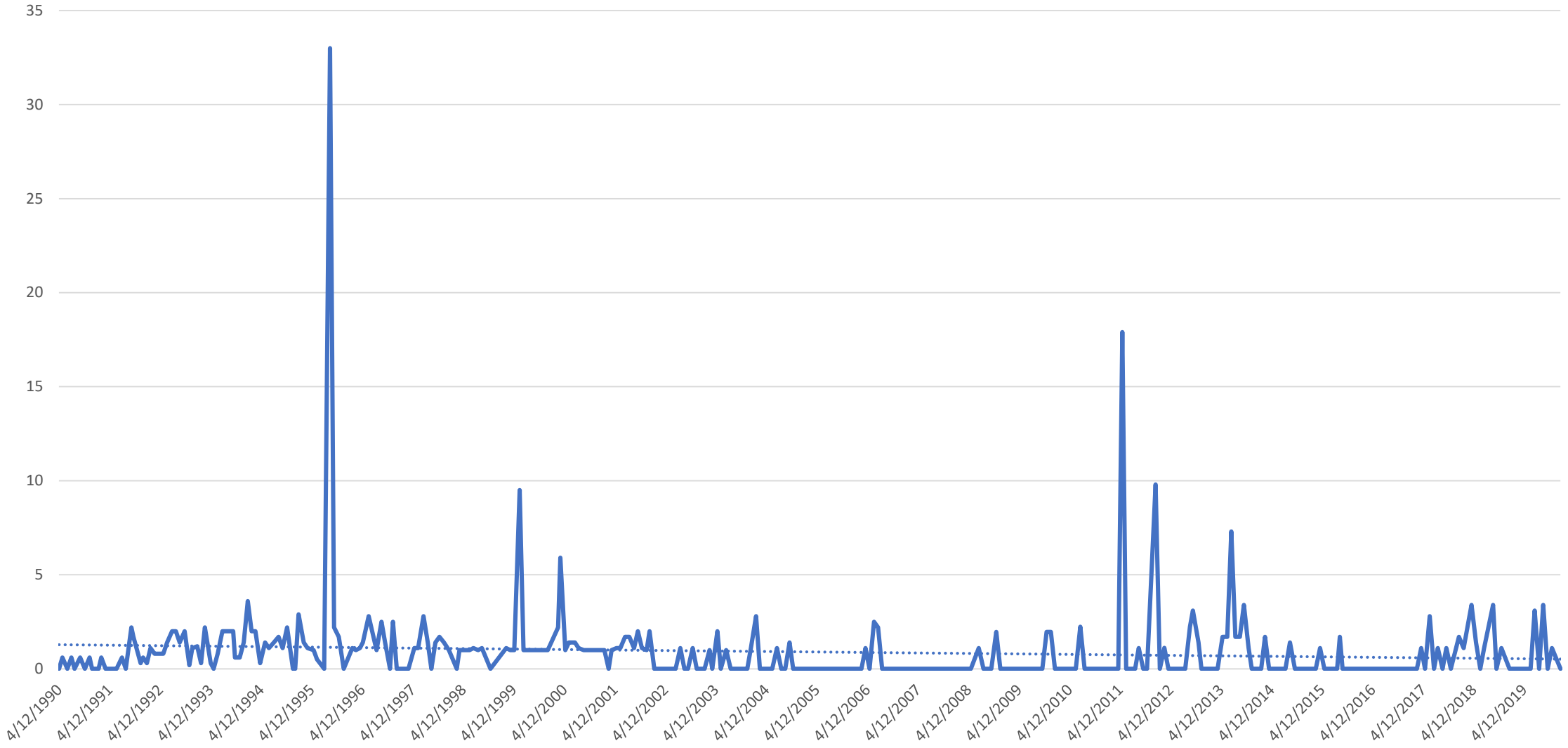
Watervliet Reservoir Intake Chlorides



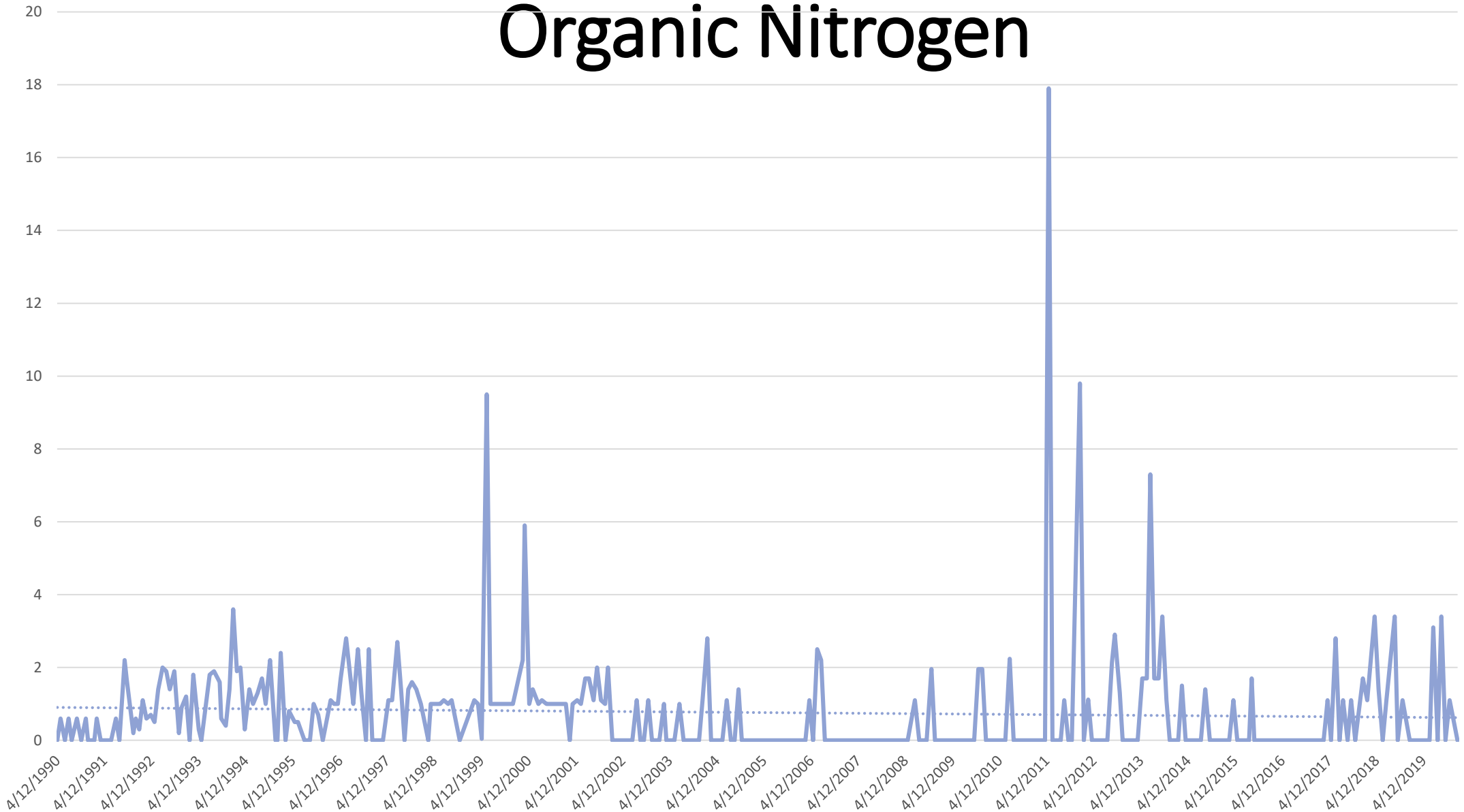
Watervliet Reservoir Intake Nitrates



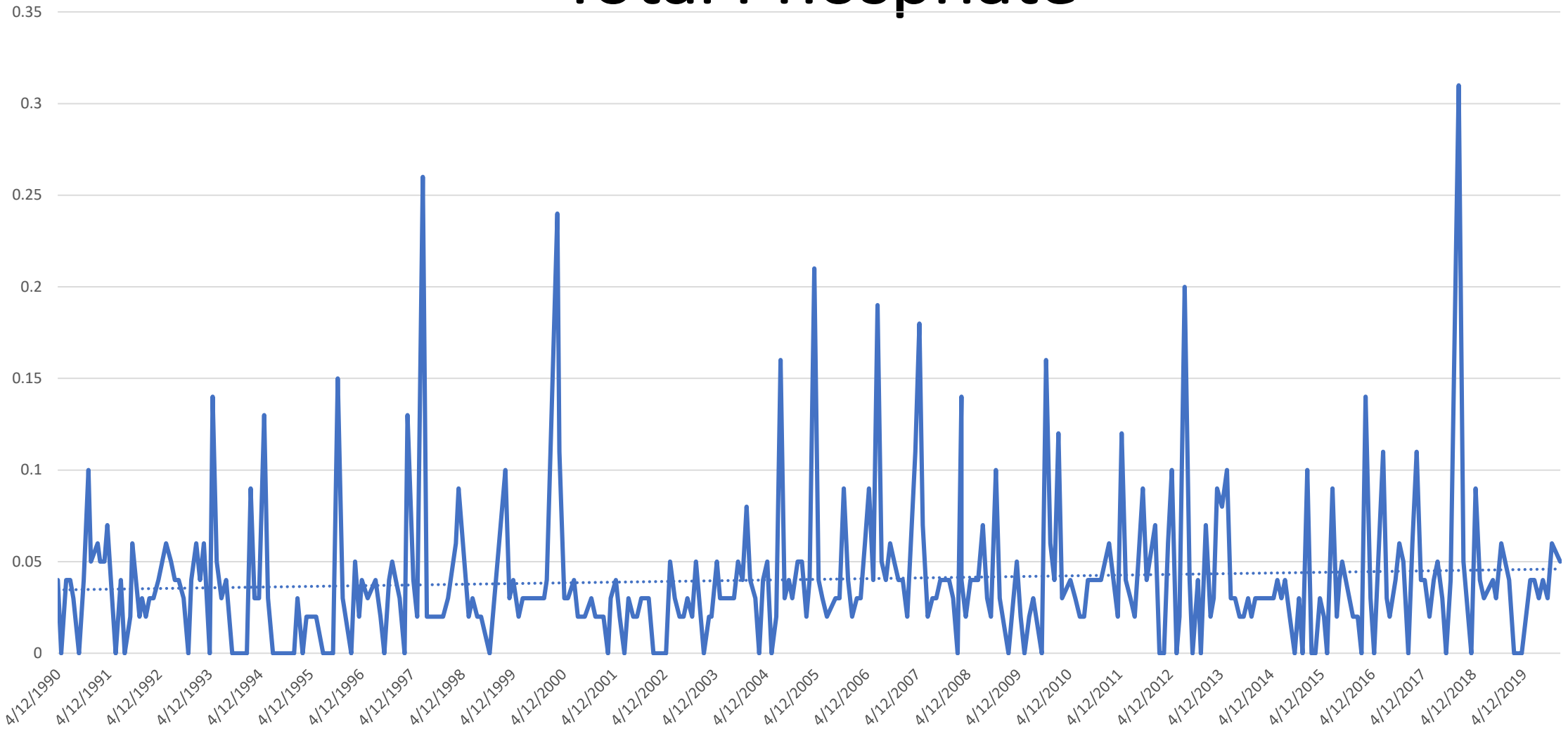
Watervliet Reservoir Intake
K-Nitrogen



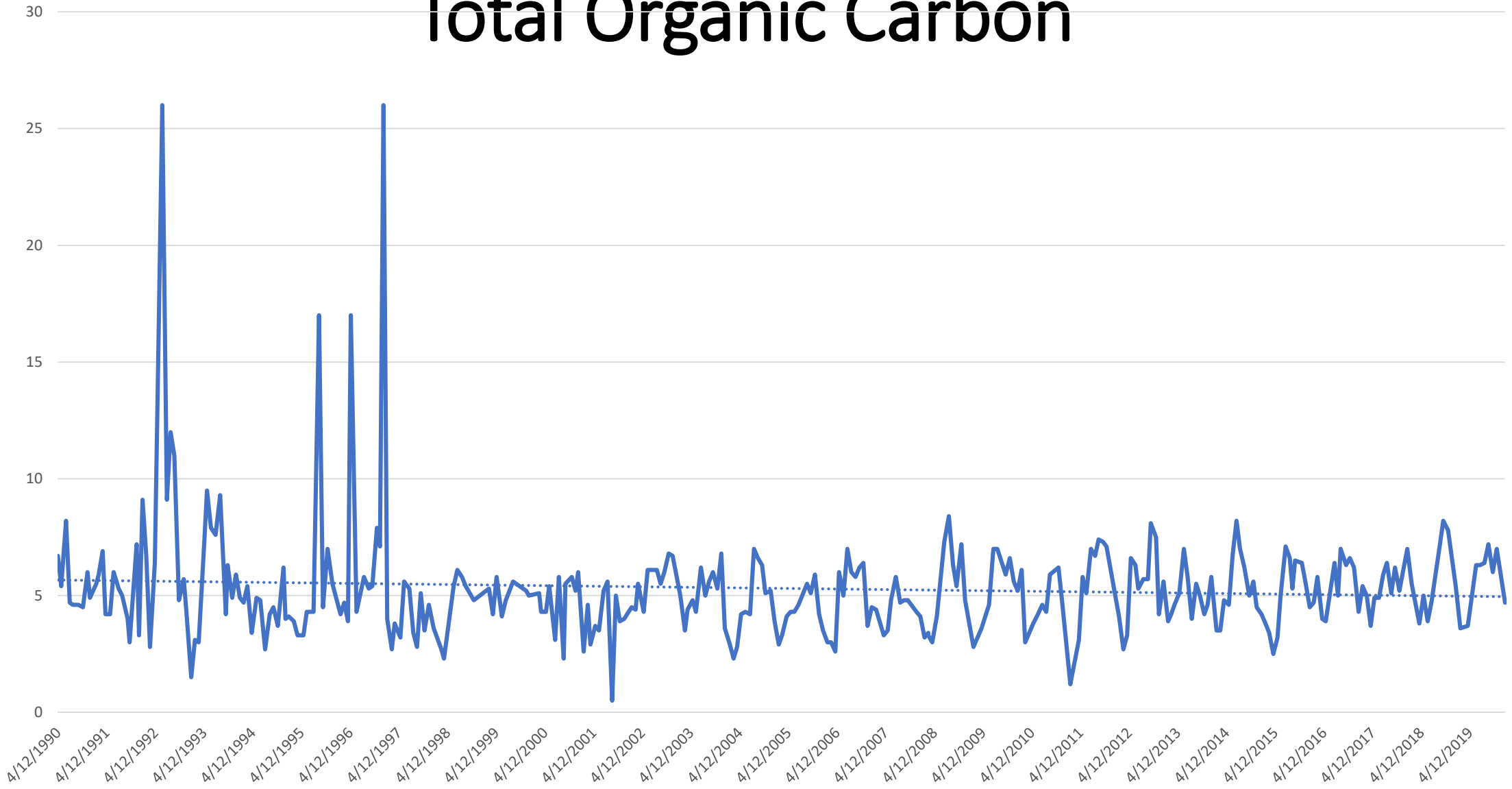
Watervliet Reservoir Intake
Organic Nitrogen



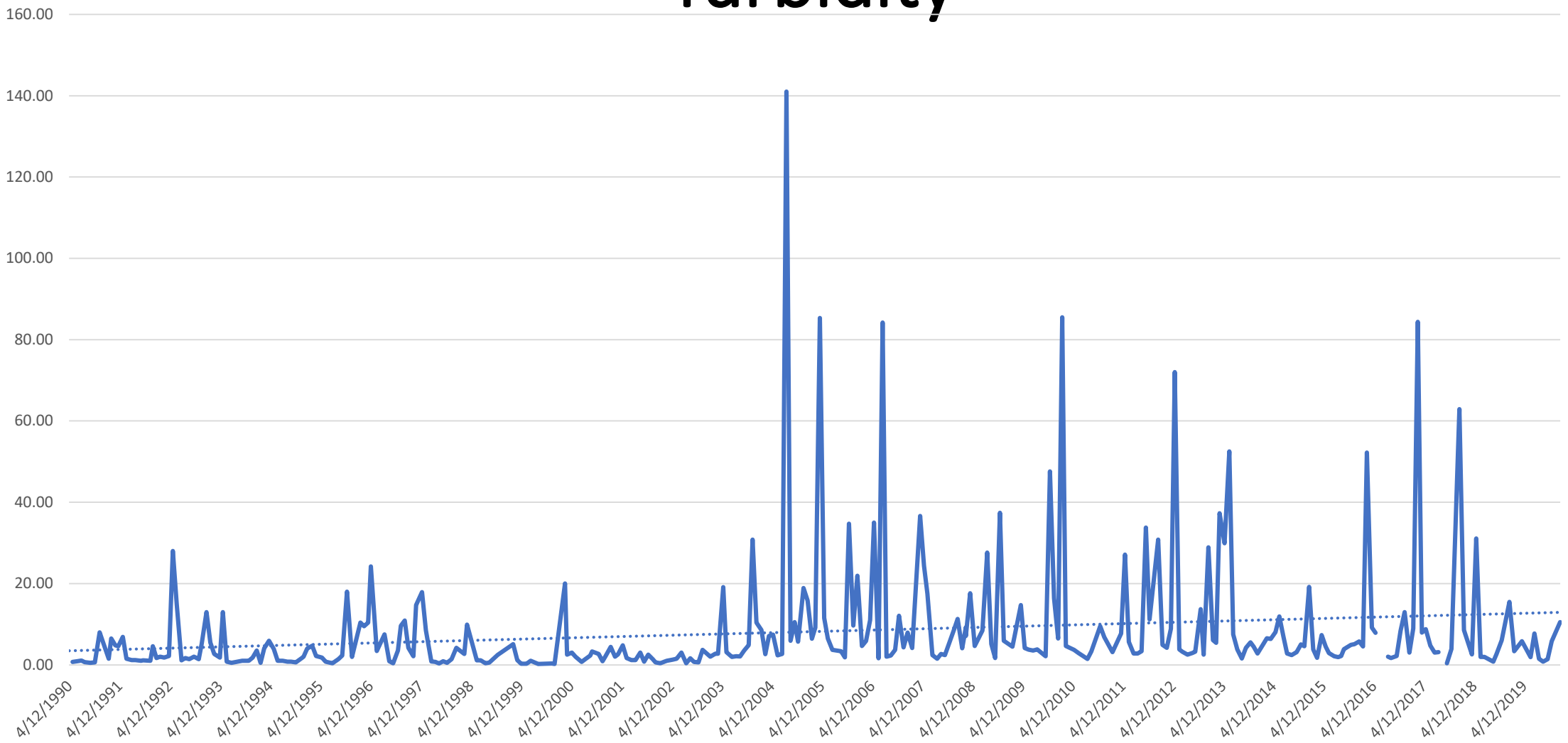
Watervliet Reservoir Intake
Total Phosphate



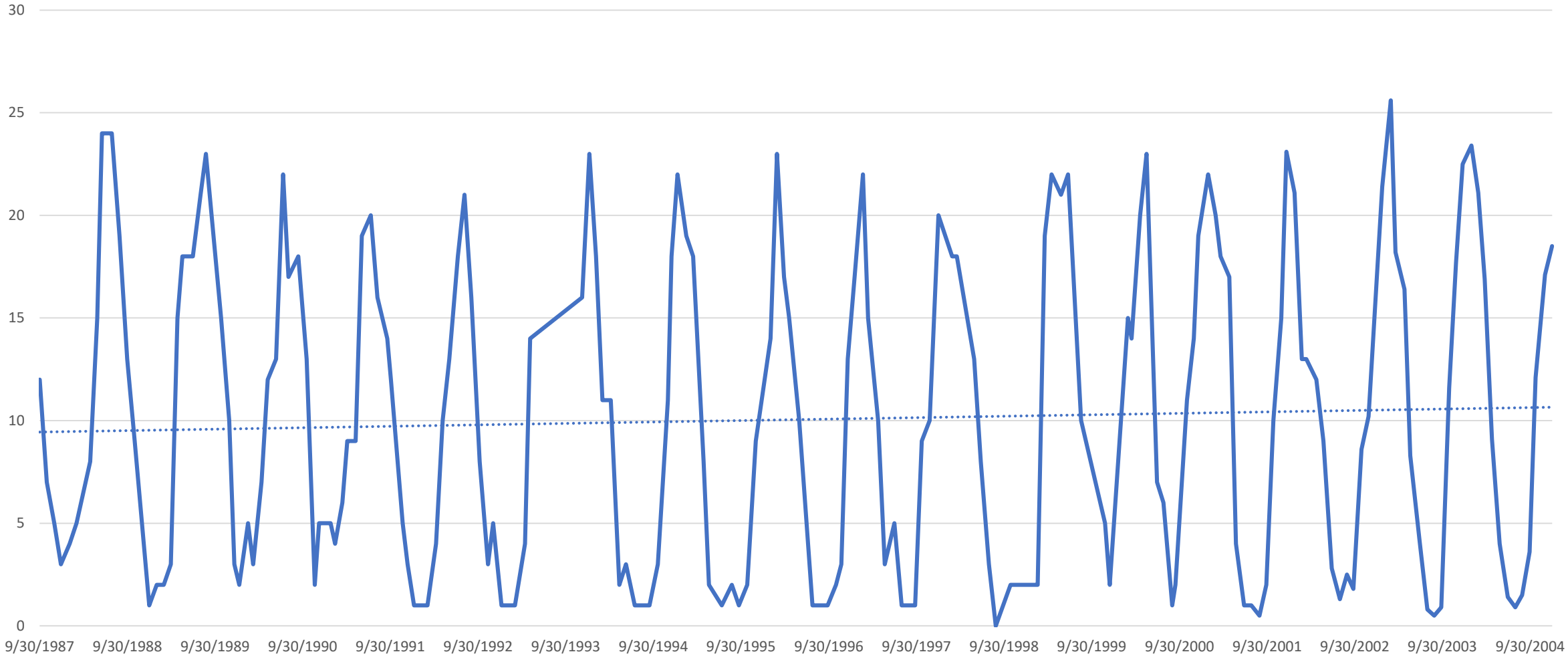
Watervliet Reservoir Intake
Total Organic Carbon



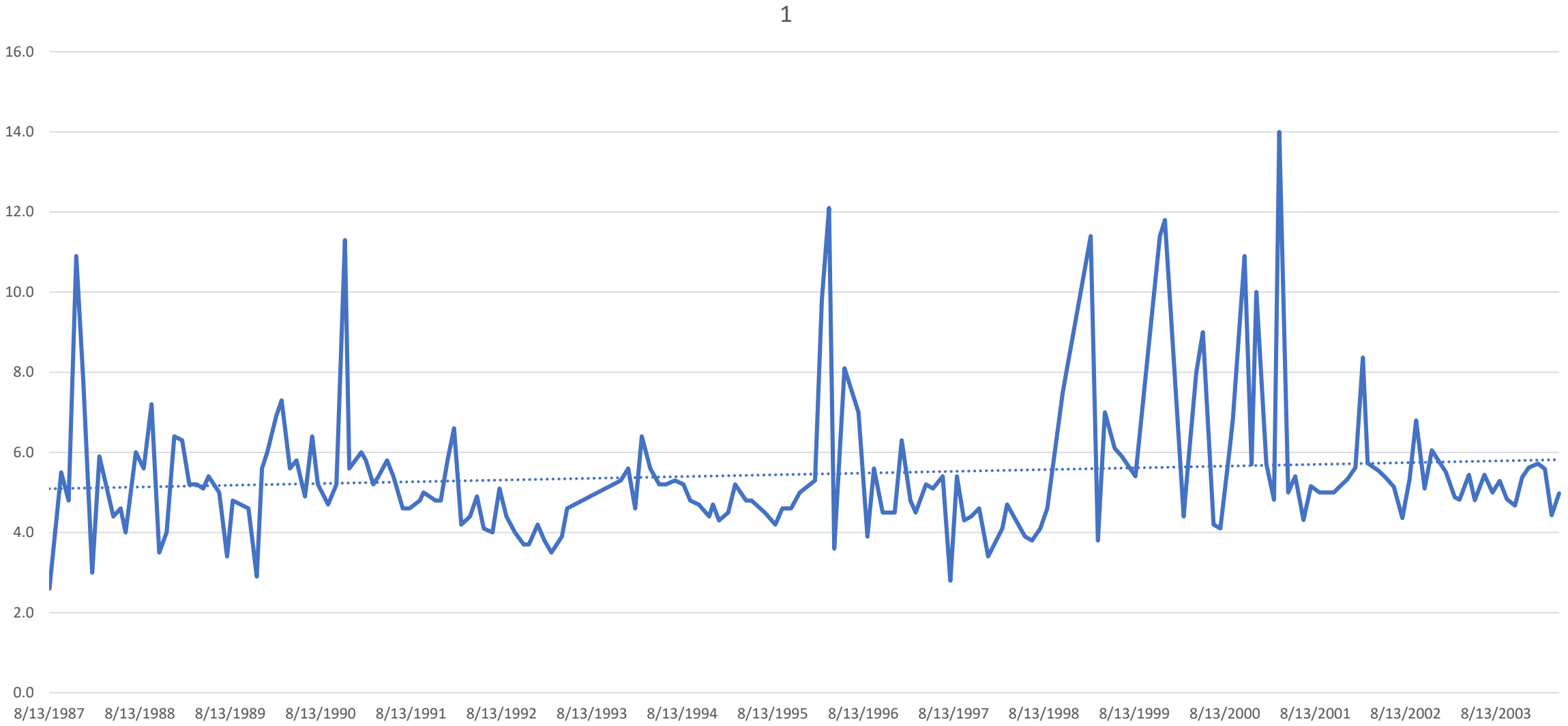
Watervliet Reservoir Intake Turbidity



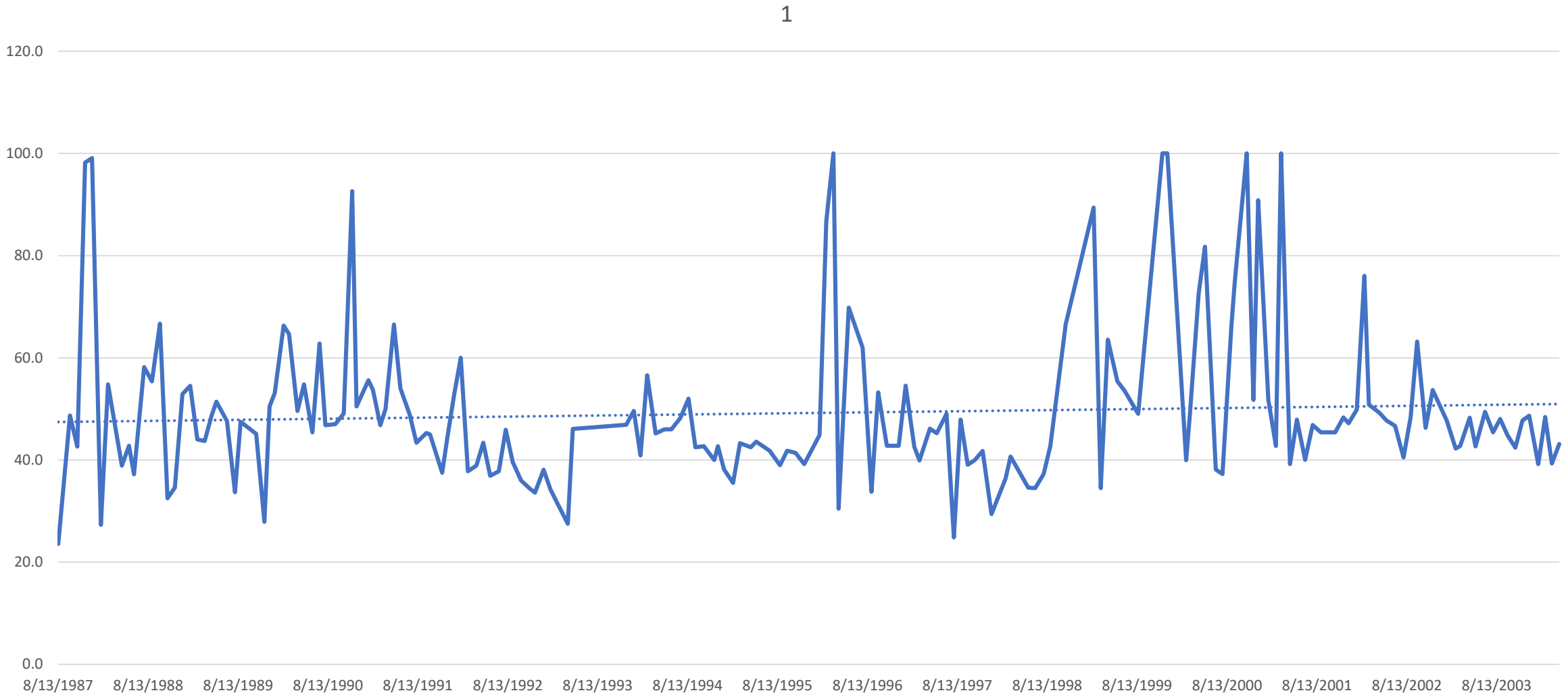
Shoreline of Reservoir at Unnamed Stream Temperature



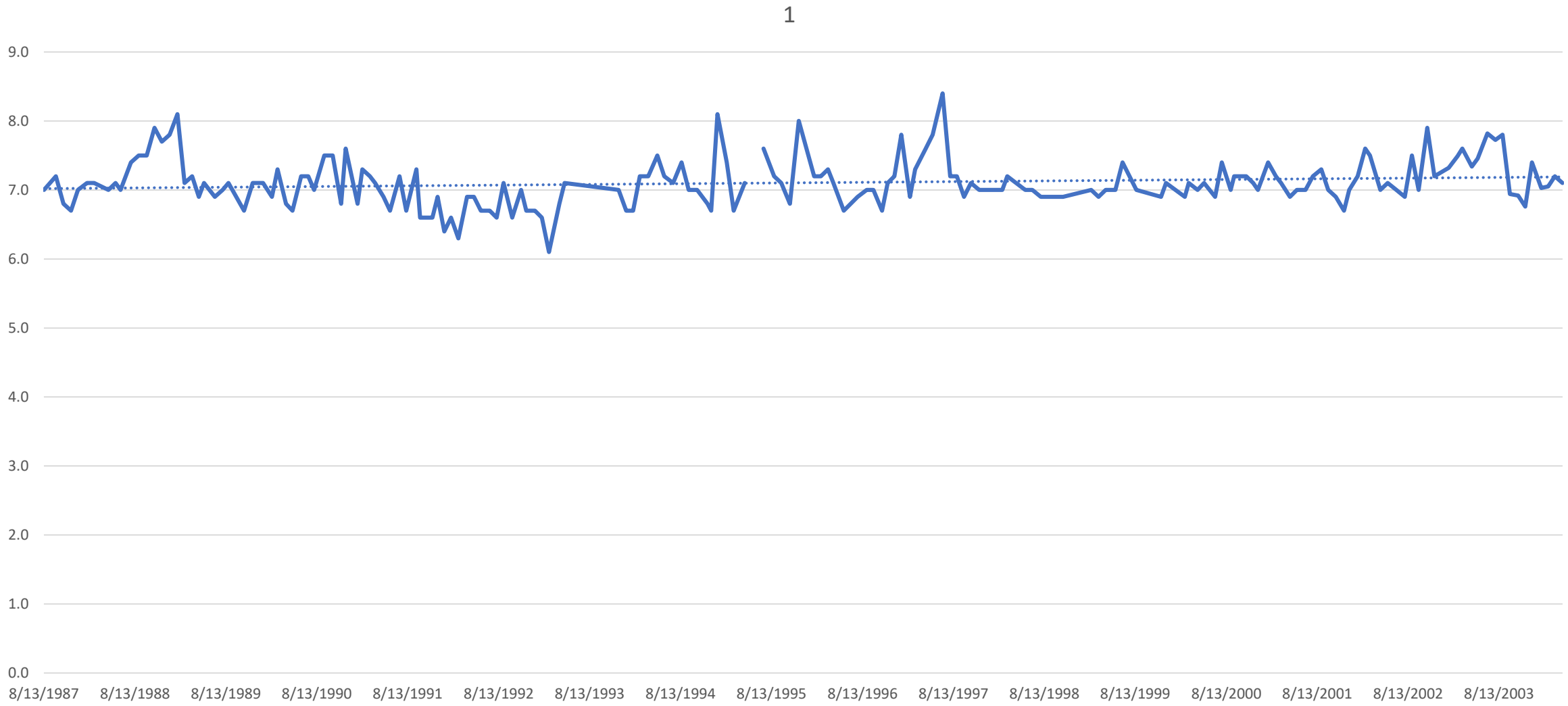
Shoreline of Reservoir at Unnamed Stream
Dissolved Oxygen



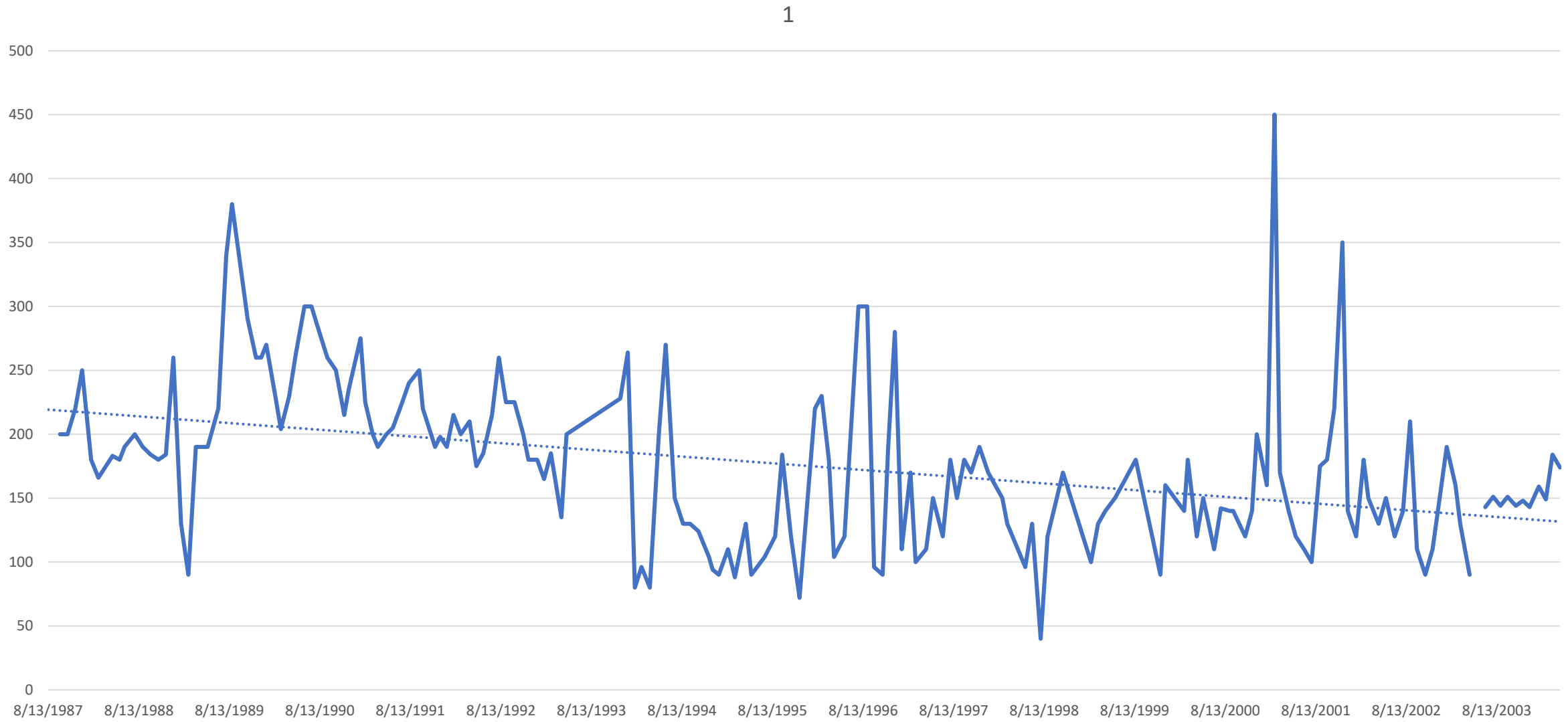
Shoreline of Reservoir at Unnamed
Oxygen Saturation



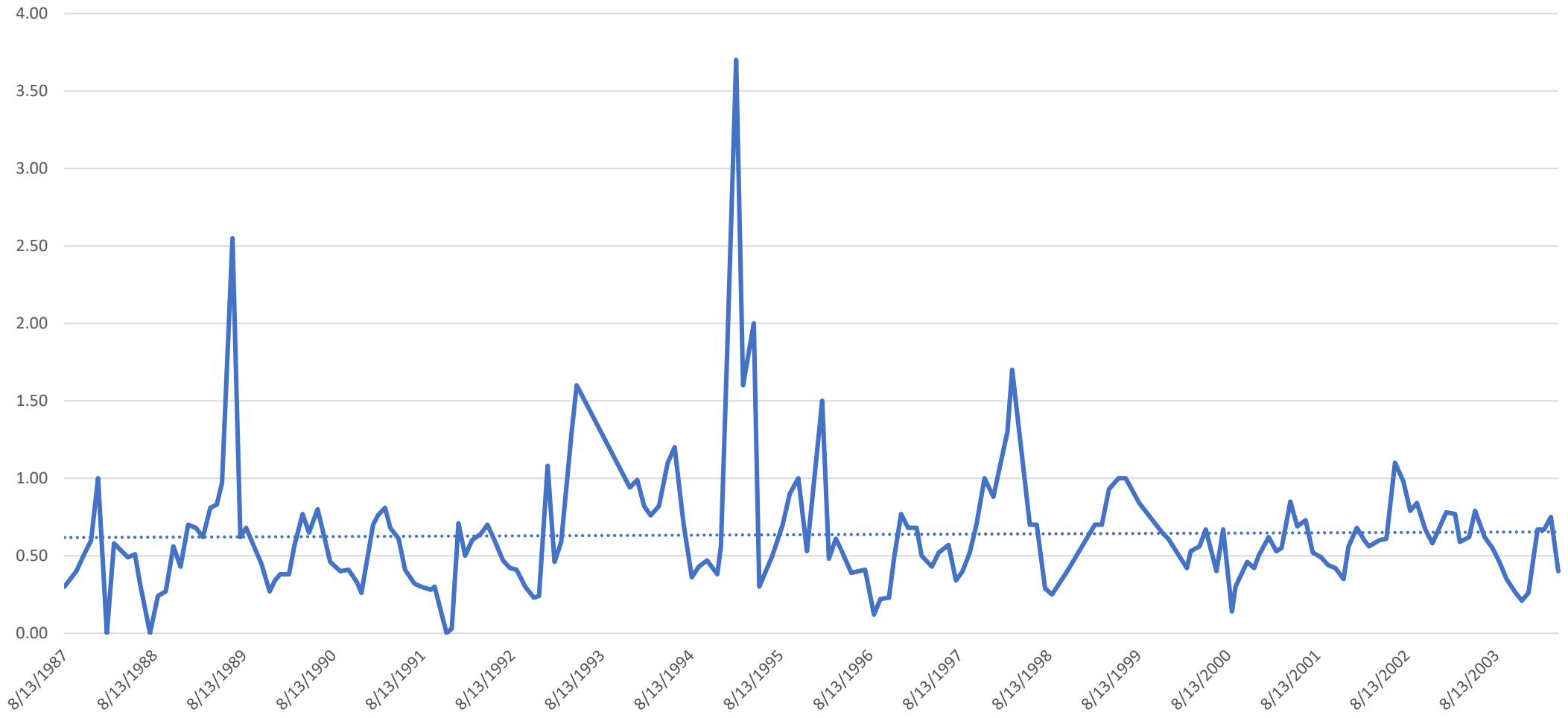
Shoreline of Reservoir at Unnamed Stream
pH



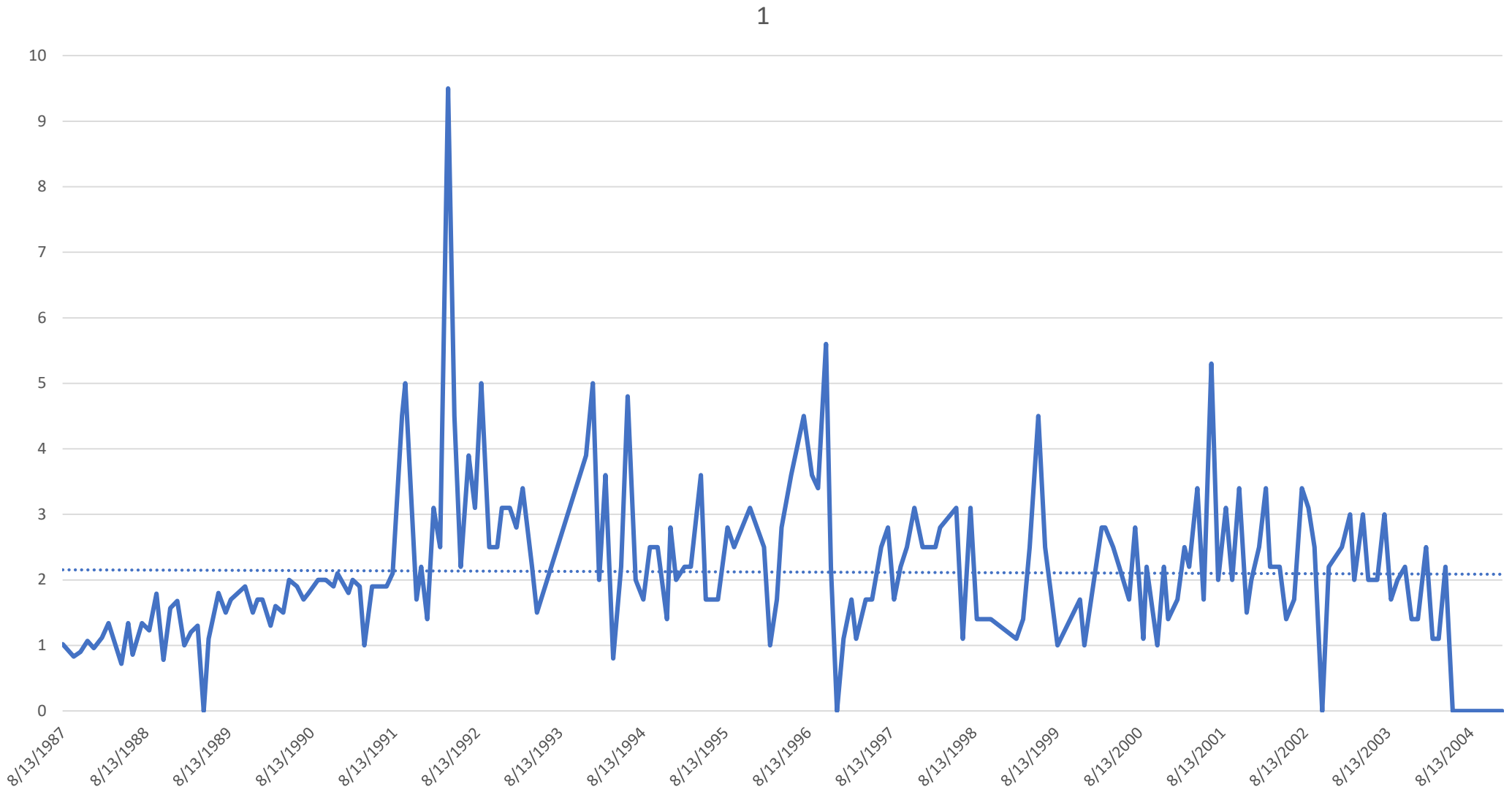
Shoreline of Reservoir at Unnamed Stream Chlorides



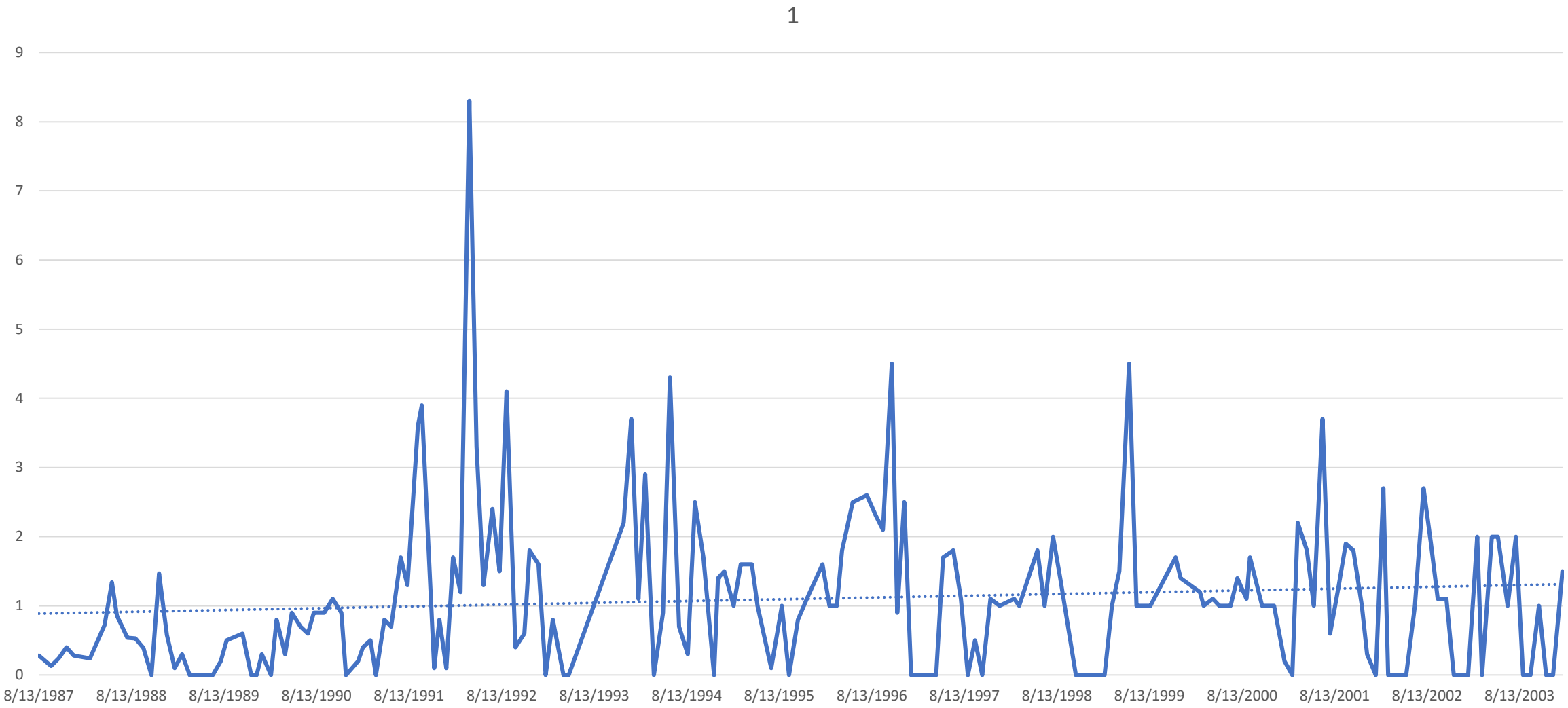
Shoreline of Reservoir at Unnamed Stream Nitrates



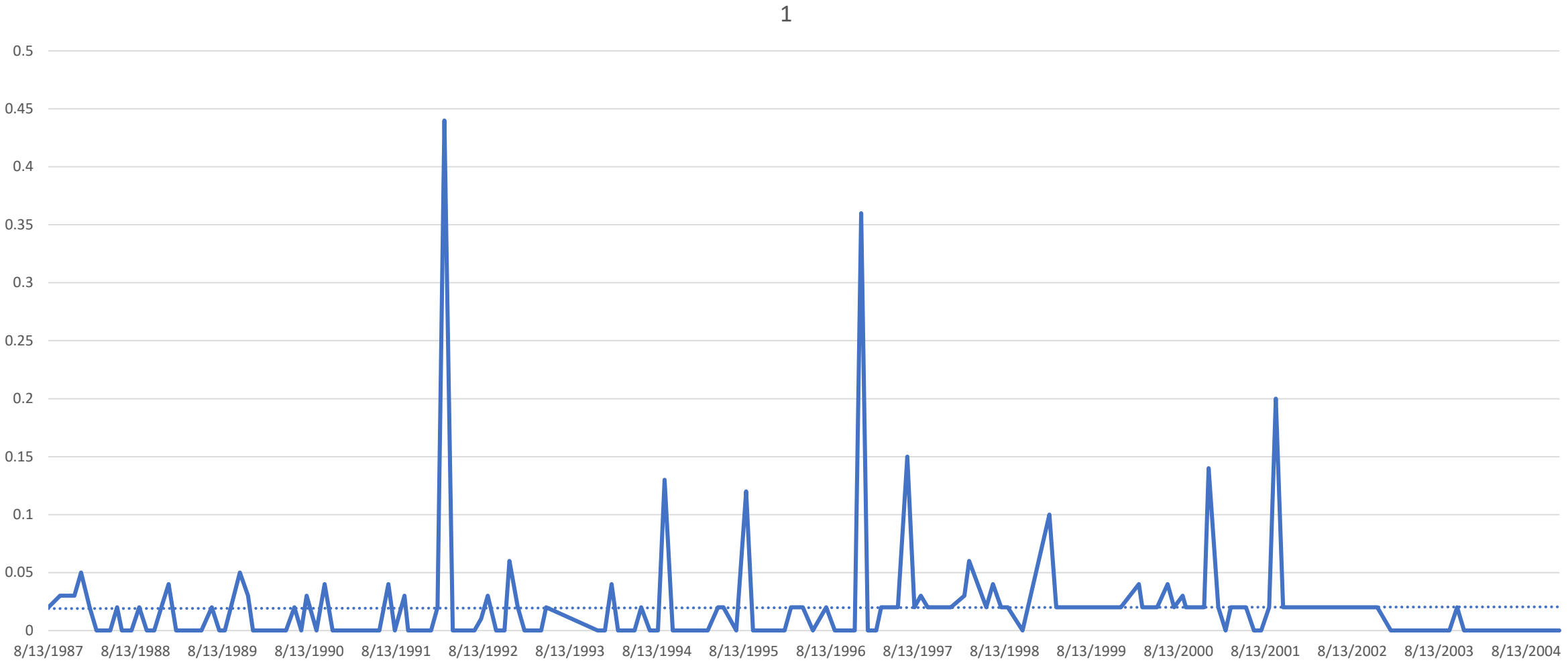
Shoreline of Reservoir at Unnamed Stream
K-Nitrogen



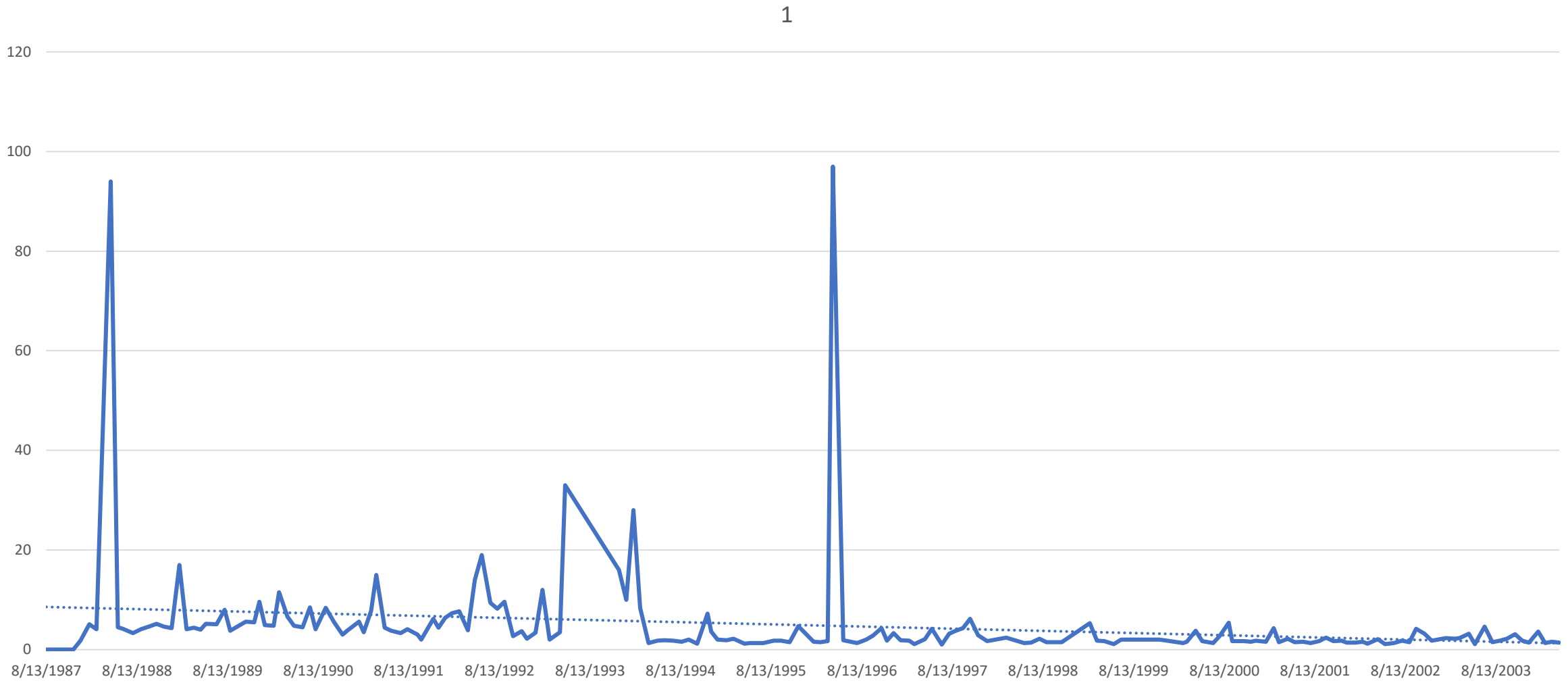
Shoreline of Reservoir at Unnamed Stream
Organic Nitrogen



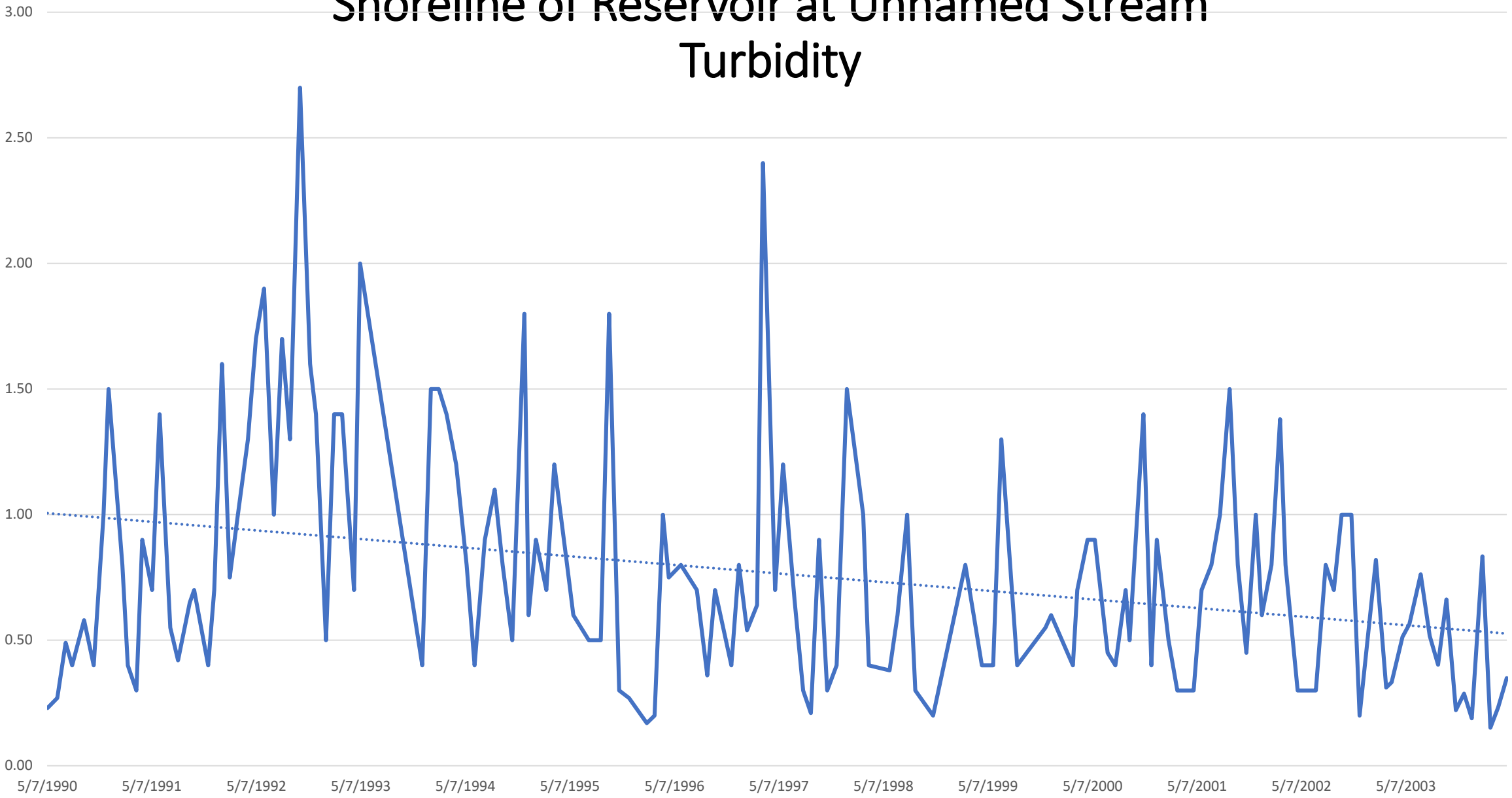
Shoreline of Reservoir at Unnamed Stream
Total Phosphate



Shoreline of Reservoir at Unnamed Stream
Total Organic Carbon



Shoreline of Reservoir at Unnamed Stream Turbidity



Appendix D: Growth Table

County	Census Tract	Block Groups	Municipality	1990	2000**	2010 Population by Block	2010 Total	2020 Population by Block	2020 Total	Net Change 2010 - 2020	% Change 2010 - 2020
Schenectady	331.02	1	Duanesburg & Delanson	2715	2833	1362	6122	1358	5863	-259	-4.23%
		2				1,264		1272			
		3				1437		1312			
		4				954		853			
		5				1105		1068			
Schenectady	331.01	2	Princetown	1360	1477	1490	1490	1410	1410	-80	-5.37%
Schenectady	326.02	2	Rotterdam	8700	9102	785	14216	804	14084	-132	-0.93%
Schenectady	326.01	1	Rotterdam			914		922			
		2				1490		1363			
Schenectady	330.02	1	Rotterdam			2303		2541			
Schenectady	327	1	Rotterdam			933		1064			
		3				1307		1348			
		4				691		797			
Schenectady	330.03	1	Rotterdam			1817		1920			
		2				1785		876			
Schenectady	330.04	1	Rotterdam			612		1010			
		2				1039		617			
		3				540		822			
Albany	147	1	Knox	1646	1685	1089	2692	1103	2635	-57	**-2.12%**
		2				1603		1532			
Albany	146.12	1	Altamont	1524	1737	1720	1720	1675	1675	-45	**-2.62%**
Albany	146.13	1	Guilderland	5891	6984	870	5119	379	5235	116	2.27%
		2				1165		548			
		3				828		436			
Albany	146.06	2	Guilderland			376		378			
		3				891		938			
Albany	146.07*	3	Guilderland			989		2556			
Albany	148.01	1	Berne	250	256	510	510	515	515	5	0.98%
Albany	145.03	1	Voorheesville	199	215	633	633	655	655	22	3.48%
Albay	145.01	2	New Scotland			2380	2380	2703	2703	323	11.95%
County	**Census Tract**	**Block Groups**	**Total**	**1990**	**2000****	**2010 Population by Block**	**2010 Total**	**2020 Population by Block**	**2020 Total**	**Net Change 2010 - 2020**	**% Change 2010 - 2020**
				22285	24289	34882	34882	34775	34775	-107	-0.31%

*Tract 146.07 is now broken up into 146.16 and 146.17

**The 2000 CDRPC report did not break the population grwth down by block, and isntead used total community population

Former Tract 146.07			New Scotland Tracts
Tracts	146.16	146.17	145.01
Block Group1	2493	1252	Block Group 1
Block Group 2	1165	1121	Block Group 2
Block Group 3	2556		

The forner tract 146.07 only used Block Group 3 for the watershed population which matches up to Tract 146.16 Block Group 3

Appendix E: Water Chestnut Report

Weston & Sampson

westonandsampson.com

Weston & Sampson PE, LS, LA, PC
1 Winners Circle, Suite 130
Albany, NY 12205
tel: 518.463.4400

REPORT

September 2019 - FINAL REPORT

WATERVLIET, NY

City of Watervliet

Normanskill Relicensing – Water Chestnut Control Study

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EXECUTIVE SUMMARY

The Watervliet Reservoir has become infested with invasive water chestnut (*Trapa natans*), resulting in a shift in species composition that is negatively impacting the native ecology of the reservoir. The reservoir contains 420 acres, 169 of which are infested with *T. natans* (refer to Figure 1). Water chestnut outcompetes a variety of other aquatic vegetation and creates nearly impenetrable mats across wide areas of water (Pfingsten et al, 2018). These mats can be as much as a foot thick, and reduce passage of light into the water, which in turn reduces dissolved oxygen levels and influences nutrient cycling (Pfingsten et al. 2018; Caraco & Cole, 2002). The thick mats offer little in terms of waterfowl habitat, can impede the use of small boats, and the sharp spines on the seed pods can cause injury when stepped on. Water chestnuts provide ideal habitat breeding conditions for mosquitos (CABI, 2018). Ultimately, *T. natans* detrimentally impact water quality and fisheries in the reservoir and downstream resources. They can also result in increased water treatment costs in areas used for municipal potable water supply (CABI, 2018). Numerous control methods exist for managing water chestnut, with variations in cost, effectiveness, and impact to other plants and fish species and overall ecosystem health. This document provides an overview of *T. natans* and options for mitigation and management.

Study Goals and Objectives

The goal of the Watervliet Reservoir Water Chestnut Control Study is to eradicate the invasive population of *T. natans*, with the purpose of improving and maintaining reservoir capacity, water quality, restoring aquatic habitats, and preserving fisheries. The objectives of this study are to create a comprehensive strategy for management options and techniques, monitoring, and control methods to remove the current population of water chestnut and prevent subsequent infestations in the Watervliet Reservoir.

Action Plan

A combination of methods are recommended to remove invasive populations of *T. natans.* These include mechanical harvesting, hand-pulling, and herbicide treatment. Factors such as depth of water, distribution of *T. natans*, estimated costs, and impacts to the reservoir informed management selections. Initial removal of *T. natans* should be performed over the entirety of the reservoir. If complete removal is not possible, a systematic approach of eradication from the north to south is advised, with the understanding that the seed bank will continue to proliferate in unmanaged sections.

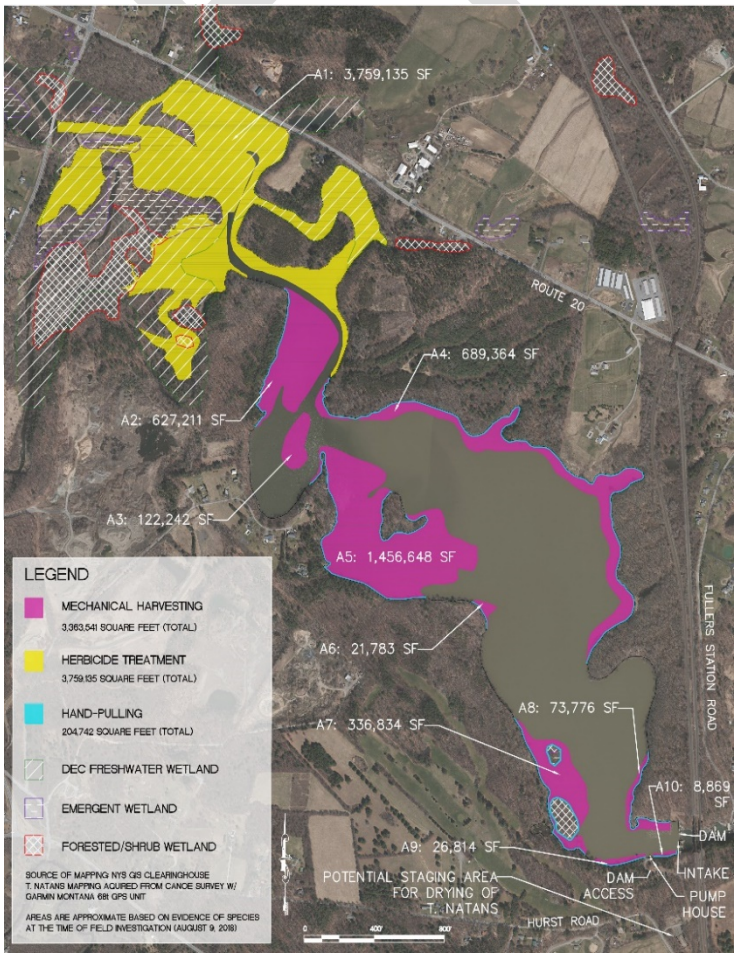

Figure 1: *Trapa natans* Distribution and Wetland Boundaries in the Watervliet Reservoir.

First Year Costs

The approximate costs for treating *T. natans* at the Watervliet Reservoir are $5,000 for hand-pulling, $195,000 for mechanical harvesting, and $70,000 for herbicide treatment. Based on the suggested methods detailed above, and the total area for each management strategy (refer to Appendix A), the overall cost for the initial treatment of *T. natans* in the Watervliet Reservoir would be approximately $270,000. Costs will decrease over time as populations of *T. natans* decrease. On-site disposal may help reduce expenses. Grant acquisition can also minimize overall costs. It will be necessary for the City of Watervliet to find a funding source for the removal of *T.natans*, in the first year and for subsequent yearly eradication efforts.** I rounded up here – to give a little buffer-especially since it appears implementation might be delayed*

Long-Term Management Considerations & Costs

T. natans will continue to be a management burden for many years to come. Seeds dropped in the sediment of the reservoir will remain viable for up to a decade, and there are water chestnut populations in upstream tributaries. Establishment of water chestnut control plans with the Town of Guilderland will be necessary to limit re-infestation. Education of the residents adjacent to water bodies and recreational users is critical to control the spread of this invasive aquatic plant.

Approximate costs to control *T. natans* over time will depend on which recommendation the City of Watervliet chooses. If the City chooses to purchase the Eco-Harvester, costs will be limited to operational labor, disposal fees, and maintenance of the machine. Removal rates are estimated at 1.5 acres per day, with additional time required for the safe disposal of plant materials. **must check with the produce manufacturer to get an idea of how populations decline over time*. If the City decides to contract the work to a mechanical harvesting company, costs per acre will remain the same year over year. Overall costs will decline as populations of *T. natans* decrease. Herbicide treatment may be able to be phased out after a few years, if re-infestation from upstream tributaries is controlled. Hand-pulling is recommended into perpetuity for shallow areas and populations close to the shore.

Conservative estimates of long-term removal costs are $75,000 per year **this is suggestion from Michele/Jeremy – not verified. Will check with the contractor this week.*

Removing *T. natans* in the northern portion of the reservoir presents a particularly challenging scenario, due to problem of suspended sediments. A watershed study is recommended to understand what upstream development and/or erosion conditions are occurring upstream to cause this influx of sediment. Partnerships with the Town of Guilderland and landowners adjacent to any tributary are recommended to correct erosion upstream. In addition, the restoration of wetlands with native species is highly recommended, to provide filtration and capture of sediment in the northern portion of the reservoir.

Table ES-1 Management Options & Recommendations

Management Options at the Watervliet Reservoir			
Management Option	Recommendation	Time of Year	Cost per acre (Approximate)
Hand-pulling	Recommended for use in small areas of infestation and along the banks in shallow waters. May be	July – early August	$1,000/acre (assuming a crew of 2 people)

	used as a follow-up treatment to mechanical harvesting.		
Eco-Harvester	Recommended for use at the Watervliet Reservoir at locations where depths are between 12 inches and 8 feet. Verify w/Supplier.	mid-July through mid-August	$75,00-$85,000 purchase of equipment (one-time) Operator labor (TBD)
Mechanical Harvesting	Recommended for use at the Watervliet Reservoir at locations where water depths are between 6 and 15 feet.	mid-July through mid-August	$1,233/acre $3,500 mobilization fee (one-time) $1,223 disposal fee/acre
Hydroraking	Not recommended for use at the Watervliet Reservoir due to slow pace and need for extensive unloading sites.	mid-July through mid-August	$10,000/acre
Drawdowns	Not recommended for use at the Watervliet Reservoir, due to unpredictability of recharge rates for drinking water supplies.	June-July	Pump & siphon materials and appurtenances vary. Labor, fuel, and monitoring costs vary.
Hydraulic Dredging	Not recommended for use at the Watervliet Reservoir due to prohibitive costs and permitting restrictions.	unknown-additional site-specific research required	$121,005/acre, not including mobilization or disposal fees (Based on an estimate of $15/cubic yard)
Benthic Barriers	Not recommended for use at the Watervliet Reservoir – not suitable for large areas.	early spring before plant growth or late summer after removal	$45,000-$65,000/acre installed
Herbicide Treatment	Recommended for use at the northern portion of the Watervliet Reservoir which are over a quarter mile from the reservoir intake.	mid-July through mid-August	$800/acre
Biological Controls	Not recommended at this time. Consider for future management when biological controls are approved for use in New York State.	unknown-additional research required	Costs not available at this time

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1.0 BACKGROUND

1.1 Taxonomy

Trapa natans (see Figure 2) is a member of the genus *Trapa* in the *Lythraceae* family. This study focuses on *Trapa natans*, which is an invasive species in North America (OARS, 2017). This aquatic macrophyte is distributed throughout Europe, southern Sweden, European Russian, Asa, and Africa. *T. natans* is also considered invasive in Australia (Gupta & Beentje, 2017).

Figure 2: *Trapa natans*

1.2 History

Trapa natans is indigenous to tropical and temperate regions of Africa and Eurasia. Water chestnut was introduced to North America in the 1870s. Historical records show the plant was cultivated in 1874 at the Asa Gray Botanical Garden in Cambridge, Massachusetts. From there *T. natans* was introduced to several ponds in Cambridge, including Fresh Pond, by a gardener from the botanical garden. It was intended to be an ornamental species, and its potential to become an invasive species was not recognized at the time, (OARS, 2017).

T. natans was independently introduced to upstate New York in 1886 when plants were placed in what is now known as Collins Lake in Scotia, NY. From there, water chestnut spread into the Mohawk and Hudson Rivers, and from eastern Massachusetts across the region. It was only in 1945 that *T. natans* was noted to have suddenly grown to undesirable levels in the Concord and Sudbury Rivers (OARS, 2017). Because there are no native species that feed on water chestnut populations in North America, it continues to proliferate unchecked (New York Invasive Species Clearinghouse, 2016). Accidental introductions of this plant to water bodies continue to spread it along waterways. Efforts to control *T. natans* have been in effect for several decades. Some have attributed the boom of water chestnut to an increase in alkaline sewage waste, observed as an increase of soluble nitrates in water bodies (OARS, 2017).

1.3 Biology

1.3.1 Anatomy

This floating aquatic plant is made up of leaves which float on the surface of the water and form rosettes by late July, ranging from 10” to 15” in diameter. Small white flowers can be found in the axils of the leaves. These leaves are triangular, alternate, and have toothed edges. The upper surface of the leaves are glossy, while the lower surface is covered with soft hairs. Rosettes surround a central stem and are kept afloat by petioles containing air bladders, while woody nuts develop beneath the rosettes. Each nut has four sharp barbs which can puncture the soles of shoes if stepped on (OARS, 2017; Swearingen & Bargeron, 2016).

1.3.2 Life Cycle and Habitat

Water chestnut is an annual; it grows from a nut each year and dies back by the end of the growing season. Generally, nuts produced in the growing season sink to the bottom of the water body and overwinter in the soft sediment, emerging the following spring. Those that do not germinate contribute

to a seed bank. These seeds are viable for 10 to 15 years and require a period of dormancy at temperatures below 8°C in order to germinate. Germination occurs in spring when water temperatures reach a range of 10°C to 24°C. Sources differ on the amount of sunlight needed by *T. natans* – some sources indicate a tolerance of partial shade while others state that the plant requires full sun (OARS, 2017).

Seeds germinate in May, and by early to mid-June the first flat leaves reach the water and begin forming a floating rosette. Rosettes and secondary branches appear when the first leaves reach the water and continue to form until around the end of July. As the stem elongates, new leaves are produced from the meristem. From late June to September, inconspicuous small white flowers with four petals can be found in the axils of floating leaves (one flower per axil) (Invasive Plant Atlas of New England, 2018). Pollination occurs via insects, cross-pollination, or self-pollination. Once the plant is fertilized, the peduncle containing the flower bends down into the water, and a green nut begins to form. Each rosette produces between 10 and 15 nuts; the plant continues to fruit and bloom into the fall. The fruits fall off when the seeds reach maturity, usually in early August. They sink down and lodge in the sediment, contributing to the seed bank. The outer fruit layer disintegrates, leaving a black, woody, hard nut with sharp spikes. Rosettes separated from roots can still produce nuts in limited capacities. If the main stem of *T. natans* is broken early in the summer, it can still branch and form new rosettes by late summer (OARS, 2017).

T. natans prefers pH levels between 6.7-8.2 and tolerates calcium carbonate, alkalinity levels of 12-128 mg/L, and salinity of up to 0.1%. (Department of Conservation and Recreation, 2017). This plant thrives in nutrient-rich, slow moving fresh water of lakes, ponds, and rivers with muddy bottoms, and can survive in tidal freshwater marshes. The stems are weak, and the plant is lightly rooted in the sediment by the empty nut hull and thin roots. *T. natans* rarely grows where there is a swift current, or where the substrate has low organic matter. Water chestnut can grow in depths of up to 5 meters but is most commonly found in water depths of about 2 meters.

Water chestnut in high-density plots (over 100 rosettes per square meter), are less productive and shorter-lived than *T. natans* found in low-density plots (5 to 15 rosettes per square meter). Plants found in low-density plots can be much more productive and result in 5 times as many rosettes as plants in high-density plots. Furthermore, rosettes of high-density plants have been seen to experience continuous mortality, while low-density plants have been observed with almost no mortality until September, when the whole plant senesced (OARS, 2017).

1.3.3 Natural Predators

The water chestnut has several natural enemies that could be potential biological controls for *T. natans* in North America. However, because these species are not native to North America, research must be carried out to determine if these species could have a detrimental effect on species other than *T. natans* in North America before it they could be considered a viable option for water chestnut control. These species include insects, mollusks, fungi, and other pathogens in Asia, as well as seven insects from Western Europe. Investigations have shown the beetle *Galerucella birmanica*, to be the most damaging to *T. natans* and the most promising for biological control (New York Invasive Species Clearinghouse, 2016). Research is currently being conducted on the effects of *G. birmanica* on *T. natans* at the Department of Natural Resources at Cornell University. *G. birmanica* is host-specific to *T. natans*, which make it a promising biological control candidate. Furthermore, studies have indicated that *G. birmanica* has a preference for the leaves of water chestnut even after the plant is almost entirely defoliated. Researchers hope to have USDA approval to release *G. birmanica* in the United States in the near future (OARS, 2017).

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1.3.4 Dispersal

Dispersal of water chestnut in New England has been primarily via human activity. Eleven states, including New York, have listed *T. natans* as an invasive, nuisance or noxious species, but this species is not yet listed at the federal level (OARS, 2017). Forty-three counties in New York have reported infestations of *T. natans*, with many reported in or near the Hudson River (New York State Department of Environmental Conservation, 2018). The nuts of this invasive plant continue to be distributed unintentionally when caught in nets, construction equipment, boats, and excavated sediments. The nuts of water chestnut are further spread when they are washed downstream during storm events. Downstream propagation occurs when broken fragments and rosettes float into new areas with appropriate growing conditions (OARS, 2017).

1.4 Impacts

1.4.1 Ecological Impacts

Floating mats of water chestnut are capable of covering the entire surface of the water (see Figure 3), intercepting more than 95% of the sunlight (OARS, 2017). This results in *T. natans* out-competing virtually all other species, as it shades out other submerged aquatic plants and can create large diurnal changes in the dissolved oxygen concentration of the water column (New York Invasive Species Clearinghouse, 2016). One study of a dense bed of water chestnut in a tidal section of the Hudson River reported dissolved oxygen values below 2.5 mg/L occurring up to 40% of the time in August and varying with tidal cycle. Despite anoxic conditions, impacts of dense *T. natans* populations on fish and macroinvertebrate communities are varied.

Figure 3: *T. natans* blanketing a large area of the Watervliet reservoir.

Some species of fish inhabit water chestnut beds. Species found to be in the greatest abundance are those with a higher tolerance for adverse conditions. Studies have reported that fish abundance in water chestnut beds in the Hudson was lower than in other vegetation types. *T. natans* has low food value for wildlife, which may contribute to shifts in fish abundance (Capital District Regional Planning Commission, 2003). Most of the macroinvertebrate and fish studies in North America have been conducted on tidal sections of the Hudson River; additional studies in non-tidal rivers must also be investigated, as water bodies not being flushed by tidal action can have longer periods of depleted oxygen conditions.

Large beds of *T. natans* result in deposition of sediments from reduced current velocity, which results in temporary water purification. Water chestnut accumulates cadmium, selenium, and copper in its leaves, nuts, shoots, and roots (OARS, 2017).

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2.0 EXISTING CONDITIONS AT THE WATERVLIET RESERVOIR

2.1 Water Chestnut Distribution in the Watervliet Reservoir

2.1.1 Current Distribution of Water Chestnut

Based on the growth cycle of *T. natans*, early August is an ideal time of year in this region to observe the extent of water chestnut as it is fully fledged at the surface of the water. On August 9, 2018 the Weston & Sampson study team measured the extent of *T. natans* at the Watervliet Reservoir. This was done by canoeing the outer extent of all visible areas at the water surface. It was determined that *T. natans* covered approximately 169 acres (40%) of the Watervliet Reservoir, consisting of ten distinct areas (refer to Appendix A: Mapping). The largest areas were located at the northernmost end of the reservoir where the water depths appear to consistently support ideal growing conditions. Areas of the southwestern banks were relatively clear of *T. natans* and any growth was fairly limited to the banks and expanded outward, if at all.

2.1.2 Management History

Water chestnut has long been a problem at the Watervliet Reservoir. In the application for the current license in 1981, a major infestation of *T. natans* covering 60 to 80 acres was documented. Water chestnut removal was performed regularly at the Watervliet Reservoir for several years, but management operations were suspended in 2010. Previous removal efforts were performed by Watervliet staff with a city-owned boat. Removal was conducted continuously throughout the summer months, and accumulated vegetative material was stored in a bay in the reservoir. The northern portion of the reservoir was not managed for *T.natans,* due to difficulty of access and sedimentation concerns. The presence of discarded *T. natans* and sustained presence of the species at the northern portion of the reservoir likely contributed to low removal success rates. Since operations ceased, a steady re-establishment of *T. natans* has occurred over the subsequent years (Capital District Regional Planning Commission, 2003).

2.1.3 Impacts to the Watervliet Reservoir

As *T. natans* decomposes, detritus buildup lowers the retention capacity of the reservoir over time and necessitates additional filtering of these particles from the water. This increases the overall treatment costs for the town and city. (Capital District Regional Planning Commission, 2003). Without appropriate management, *T. natans* will continue to thrive at the Watervliet Reservoir.

2.1.4 Native Plants

Special care should be taken to avoid negatively impacting native plants at the reservoir wherever possible. A full inventory of plant species was not performed for this study. The following species were noted during the field inventory in July of 2018, but should not be considered a comprehensive list:

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Lemna minor – Common Duckweed: Belonging to a group of plants known as free-floaters, *L. minor* (see Figure 4) reproduces by budding new leaves attached to the parent plant. Each small greenish-yellow leaf has a single root descending below the water. Very commonly found in eutrophic waters, *L. minor* requires adequate water nutrients to sustain its growth. An important dietary resource for wildlife, *L. minor* can provide up to 90% of the nutritional requirements for ducks and geese and is also an important source of food for muskrat, beaver, and fish. Dense clusters of the plant provide shade for fish and minimize mosquito breeding territory (Minnesota Wildflowers, 2018; Johnson, R.L.).

Figure 4: *L. minor* growing at the Watervliet Reservoir.

Nymphaea odorata – White Water Lily: This commonly found aquatic plant is easily identified by its characteristic round leaves and white, lotus-shaped flower (see Figure 5). Leaves can grow between 4" to 12" with veins radiating from a central axis. Fish enjoy the shade provided by the wide leaves of *N. odorata*, and waterfowl commonly eat the seeds. Rhizomes may be grazed upon by beaver, porcupine, muskrat, and deer (Minnesota Wildflowers, 2018; Johnson, R.L).

Figure 5: *N.odorata* growing along the banks of the Watervliet Reservoir.

Potamogeton foliosus – Leafy Pondweed: Found in a variety of habitats, *P. foliosus* (see Figure 6) prefers soft sediments but is also tolerant of eutrophic conditions. Leaves are narrow, up to 3" long, and extend from the stem in opposite pairs. The seeds grow in clusters of small flat nutlets and have an identifiable ridge on each seed. *P. foliosus* is an important source of forage for several species of ducks, and the fruits are grazed upon by muskrat, deer, and beaver. Young fish rely upon the plant for cover (Minnesota Wildflowers, 2018; Johnson, R.L).

Figure 6: *P. foliosus* at the Watervliet Reservoir.

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Potamogeton nodosus – Long-leaf Pondweed: More commonly found in flowing water than in lakes or ponds, *P. nodosus* (see Figure 7) can grow in a variety of sediments. It thrives in shady conditions and tolerates turbid water. Stems grow up to 6 feet with leaf stalks in alternate formation. Leaves found on the surface of the water may grow from 3" to up to 10" long. This macrophyte goes dormant in the fall and overwinters as a rhizome. Geese, ducks, fish, and invertebrates forage on *P. nodosus*. Beaver, muskrat, and deer will graze upon its fruits (Minnesota Wildflowers, 2018; Johnson, R.L).

Figure 7: *P. nodosus* at the Watervliet Reservoir.

Utricularia macrorhiza – Common Bladderwort: A commonly found, often overlooked carnivorous species, *U. vulgaris* (see Figure 8) fills up with air to keep it afloat during the bloom period and re-submerges into the water during dormancy. Yellow flowers resembling snap-dragons grow up to 8" above the water line. The flower is globular in shape, with fine red veins on the lower lip. *U. vulgaris* has no true roots, instead, the plant floats on a central stalk with alternating ¾" to 2" long leaves. The flowers are host to a variety of algae, bacteria, and diatoms, and seem to provide habitat for a variety of microorganisms (Minnesota Wildflowers, 2018).

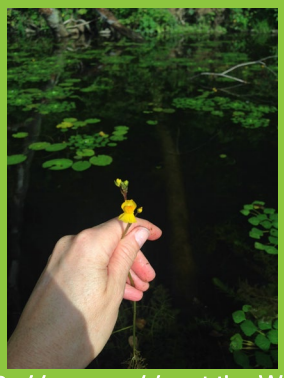

Figure 8: *U. macrorhiza* at the Watervliet Reservoir.

2.2 Other Concerns at the Watervliet Reservoir

2.2.1 Milfoil

Eurasian milfoil, *Myriophyllum spicatum* (see Figure 9) was observed throughout the Watervliet Reservoir, particularly in locations where *T. natans* was found in abundance. This aquatic invader appears to grow in a symbiotically with *T.natans* - rarely extending beyond the plants coverage of the Watervliet Reservoir.

Figure 9: *M. spicatum* growing near *T. natans* at the Watervliet Reservoir.

M. spicatum thrives in conditions similar to those favored by *T. natans,* in water depths ranging from 3.2 to 13 feet. *M. spicatum* grows in dense mats and reduces the amount of sunlight able to penetrate the water's surface early in the growing season, contributing to declines in native macrophytes. Fish and macroinvertebrates populations are also found to be negatively impacted by the presence of *M. spicatum*.

Mechanical harvesting is frequently used to control *M. spicatum* and may be combined with the removal of *T. natans.* Special care must be used to ensure fragments of *M. spicatum* do not float away from the harvester, as they will regrow into new plants. Harvested materials must be incinerated, buried, or composted off site, away from water resources to prevent the regrowth and spread of this species to

other water bodies. Promising biological controls include the release of the naturalized pyralid moth *Acentria ephemeralla*; however, further research is needed to ensure the release of the moth will not detrimentally impact native populations (New York Invasive Species Information, 2018).

2.2.2 Algal Blooms

Algal blooms occur when colonies of algae grow rapidly to form very large colonies. Blooms generally occur in areas with nutrient buildups - nitrogen, phosphorus, and carbon are the three principle nutrients that contribute to algal blooms. They accumulate via runoff from areas that use fertilizers and pesticides, such as lawns and farmlands. Algal blooms create dead zones in the water by outcompeting other aquatic vegetation for sunlight and nutrients (National Ocean Service, 2018). No algal blooms were observed in the Watervliet Reservoir at this time.

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3.0 WATER CHESTNUT MANAGEMENT

3.1 Management Options

There are a variety of methods for managing *T. natans*, including hand-pulling, mechanical harvesting, hydroraking, drawdowns, hydraulic dredging, benthic barriers, and herbicide treatment, and biological control.

3.1.1 Hand-pulling

Since water chestnut is rooted lightly in the sediment, the entire plant can be easily pulled by hand. Ideally, this should be done when rosettes first appear in mid-June to early July (New York Department of Environmental Conservation, 2018). This management method is commonly performed from small boats (i.e. kayaks, canoes), and is ideal for shallow water (see Figure 10). All parts of the plant should be removed from the site and properly disposed of by incineration or composting. Hand-pulling allows for highly selective control, limited impact to non-target species, and removes plants from the water column (OARS, 2017). Repeated annual hand-pulling of immature rosettes can be and effective means of population control if performed before seed drop (Lake Champlain Basin Program, 2015). For large, dense infestations, this method is not recommended as it is very labor intensive.

Figure 10: Hand-pulling to remove *T. natans*.[1]

Methods –

- Obtain proper permitting prior to commencement of the project.
- Appropriately train all personnel on boating safety, plant identification, harvesting techniques, and proper weed disposal. Provide safety equipment.
- Identify boundaries of the work area, and the distribution of water chestnut before treatment.
- Identify access points, disposal site, and disposal method.
- Harvest the entire stem, leaf rosettes, and seed husk. Harvesting must occur before August, when mature seeds begin to drop. Handle rosettes with care to avoid dropping parts of the plant back into the water, especially the immature nuts.
- Weed Disposal: Weeds may be piled near the harvest site and allowed to dry in order to kill the plants and reduce weight and volume of the pile. Refer to Appendix A for recommended location for storing harvested *T. natans* during the drying process. Allow plants to dry between a few days to a few weeks before final disposal. Make sure the pile is kept away from the edge of the water so that no parts of the plant are washed back into the water body. Bring dried water chestnut to a location that can properly incinerate them. If using the composting method, place piles so that the odor is minimized, and plant material will not drift. Composting is generally the most cost-effective disposal technique, if a suitable site is available.
- Use multiple pulls and monitoring to ensure eradication.
  (OARS, 2017)

Anticipated Cost: $1,000.00/acre (with a crew of two people) (SOLitude Lake Management, 2018).

[1]Source: http://www.lakecleanup.com

3.1.2 Eco Harvester

The Eco Harvester[1] aquatic plant removal machine pulls up vegetation by the roots, rather than cutting. The machine functions by creating a water current that pulls plant material up a conveyor into a storage drum (Shoretech Industries, 2019). It is operational in water depths from 1' to 8'. The machine can also be used to skim floating weeds and algae via an intake roller, which creates sufficient flow in when lowered only 6" to 12" below the surface of the water. Originally manufactured specifically for the removal of milfoil, the machine is now sold for the removal of many species of aquatic plants, including water chestnut, hydrilla, and celery grass. The Eco Harvester is non-specific; therefore, the risk of removal of native species must be considered. Since the machine removes the plant by its roots, disturbance of sediment and disruption of aquatic habitats may also be a concern. *check with supplier

Figure 11: Eco Harvester 1

Methods –

- Obtain appropriate permitting prior to commencement.
- Identify boundaries of the work area, and the distribution of water chestnut before treatment.
- Identify access points, disposal site, and disposal method (e.g. incineration, composting). Refer to Appendix A for recommended location for storing harvested *T. natans* during the drying process. Refer to weed disposal guidelines in the hand-pulling section.
- Develop a harvester maintenance plan.
- Ensure complete removal can be performed each year to reduce seed drop and reinfestation.
- Establish and enact methods for limiting turbidity when possible.
- Incorporate hand-pulling efforts with mechanical harvesting to manage areas of mixed native and invasive plant species and for edge areas.
- Avoid harvesting in areas of sensitive habitat during reproductive cycles.
- Monitor collection of non-target flora and fauna.
- Repeat as necessary and monitor to ensure eradication.
  (OARS, 2017).

Additional research into the efficacy and long-term expenses of the Eco Harvester is recommended.

Anticipated Costs: (Shoretech, 2019).

Eco Harvester
$68,500 machine cost (one time)
$6,500 delivery fee (one time)
Labor costs @ 1.5 acres of removal per day
(total acreage TBD)
$XXX disposal fee

[1] Source: http://www.lakeweedharvester.com/eco-harvester/

3.1.3 Mechanical Harvesting and Hydroraking

Mechanical harvesters cut off *T. natans* rosettes and can remove 1.5 acres of the plant per day. Generally, harvesters need 6 feet of water depth at a minimum. It can be difficult to get the harvester into the target water body, so a large access area (refer to Appendix A) and/or a crane may be required to place equipment and remove water chestnut, increasing overall costs. A second cutting may be necessary later in the season, as *T. natans* may resprout from cut stems.

Figure 12: Mechanical harvesting.[2]

Hydroraking uproots the entire plant, debris and sediment. A skilled technician can minimize the amount of sediment that is stirred up during the harvesting process. The hydrorake itself is essentially a floating barge supporting a piece of machinery that functions as an industrial-scale rake. Hydrorakes are appropriate for very shallow water (as little at 1.0 to 15 feet of depth) and can remove vegetation up to 10 feet of depth. Weeds must be deposited either on a barge or on-shore, as hydrorakes do not have the capacity to store removed plants (OARS, 2017).

Mechanical harvesting and hydro-raking can remove large, dense infestations of water chestnut (see Figure 11), and can also reduce milfoil populations. However, fragmentation is a concern as it may spread other invasives or impact other aquatic organisms (OARS, 2017). Mechanical harvesting is recommended at specified areas in the reservoir (refer to Appendix A). SOLitude Lake Management,[3] a water management company that specializes in the development and execution of customized management programs, noted that they would not recommend a hydrorake for this site, due to the slow pace, high expense, and constant need to unload plant material.

Methods –

- Obtain appropriate permitting prior to commencement.
- Identify boundaries of the work area, and the distribution of water chestnut before treatment.
- Identify access points, disposal site, and disposal method (e.g. incineration, composting). Refer to Appendix A for recommended location for storing harvested *T. natans* during the drying process. Refer to weed disposal guidelines in the hand-pulling section.
- Develop a harvester maintenance plan.
- Establish and enact methods for limiting turbidity when possible.
- Create a fragment control plan for non-target invasives that are likely to be spread by fragmentation (e.g. milfoil).
- Timing: Harvest must be performed before nuts mature in early August.
- Incorporate hand-pulling efforts with mechanical harvesting to manage areas of mixed native and invasive plant species and for edge areas.
- Avoid harvesting in areas of sensitive habitat during reproductive cycles.
- Monitor collection of non-target flora and fauna.
- Repeat as necessary and monitor to ensure eradication.

(OARS, 2017).

Anticipated Costs: (SOLitude Lake Management, 2018).

Mechanical Harvester
$1,233.00/acre
$3,500.00 mobilization fee
$1,233.00 disposal fee (per acre)

Hydroraking
$10,000.00/acre

3.1.4 Drawdowns

There are two options for drawdowns – via pump or via siphon. Pump drawdown transports water over dam crests at large flow rates and at most lift heights. Pumps require a reliable power source and adequate access to the dam. Siphon drawdowns generally require less equipment and material and are used in areas where access is more difficult. Several small siphons may be placed rather than one large system such as a pump (Morrison Maierle, Inc., 2012). Drawdowns for water chestnut management are usually conducted in the summer - winter drawdowns would allow the seeds to survive in the sediment. Both timing and duration of drawdowns are essential to successfully eradicate *T. natans*. Summer drawdowns should be conducted in late May or early June when the water chestnut has sprouted. Water levels should be drawn down far enough to dry the sediment and kill the water chestnut. This method can be cost effective but can also have wide-spread impacts on other species. Milfoil would also be impacted by drawdowns. The effectiveness of drawdowns has not been verified or adequately studied (OARS, 2017). Because the reservoir is a water supply source, may not be able to be recharged after drawdowns, and would result in a high degree of disturbance to other species, this is not a viable option for control of water chestnut at the Watervliet Reservoir.

Anticipated Cost: Unknown. Pump & siphon materials and appurtenances vary. Labor, fuel, and monitoring costs vary.

3.1.5 Hydraulic Dredging

Hydraulic dredging allows for the removal of sediment, which halts nutrient cycling and reduces the *T. natans* seed bank. It is used in water bodies that do not rapidly re-accumulate sediment. Water depth is also increased by dredging, as the soft sediments are removed, along with rooted aquatic plants. Hydraulic dredging fluidizes sediment, after which the material is pumped into a handling location. Fluidizing occurs when the dredge head mechanically agitates the sediment, drawing the slurry through a suction pipe. Hydraulic dredging is an economical option when large volumes of sediment need to be removed (IRTC, 2014).

Eurasian milfoil may also be removed with this management option. The suction action may reduce the likelihood of fragments escaping into the water body. However, as with drawdowns, hydraulic dredging can be very disruptive, is non-selective, and alters water flows during the management process (OARS, 2017). This method is not recommended as there is not adequate information to accurately calculate reservoir depths, and preliminary estimated costs are prohibitive.

Anticipated Cost: $121,005/acre (not including mobilization and disposal fees), based on an assumed 5’ average depth and $15/cubic yard (Hudson, 1998). Currently, there is not enough information available to calculate accurate cubic yardage of the Watervliet Reservoir.

[2] Source: https://upload.wikimedia.org
[3] SOLitude Lake Management was contacted regarding cost and methods of treating and removing *T. natans* from the Watervliet Reservoir.

3.1.6 Benthic Barriers

Benthic barriers are defined as a bottom cover or barrier placed on top of sediment to prevent the growth of rooted plants. Barriers can be made of gravel, sand, silt, clay, or sheets of polyethylene or other artificial materials. This method can be effective in small areas, where there is no significant water current or wave action. Benthic barriers result in complete elimination of rooted vegetation in the area, so any native species inhabiting the same areas as water chestnut would be impacted. Despite this high success rate, this is not an appropriate option for water chestnut control as the barriers are difficult and costly to install and maintain, are not suitable for large areas, and are non-selective (OARS, 2017).

Anticipated Cost: $45,000.00-$65,000.00/acre installed (SOLitude Lake Management, 2018).

3.1.7 Herbicide Treatment

Herbicide chemicals are absorbed into a plant's system or act on plant tissue to disrupt its metabolism. Herbicides can work quickly and be applied selectively, limiting damage to non-target species. Toxicity can be limited by reducing the concentration of herbicide and the timing of application. Negative impacts of using herbicides include the potential for adverse effects on aquatic fauna and non-target plant species, and increased oxygen demands resulting from decaying vegetation (OARS, 2017). Because the Watervliet Reservoir supplies drinking water, selected herbicides must be approved for use in potable water.

Clearcast has been shown to be an effective control measure for *T. natans*. It is approved at concentrations up to 500 ppb in potable water sources, to within a quarter mile of a functioning potable water intake. Clearcast may be applied within a quarter mile of an active potable water intake, but water concentrations of the herbicide may not exceed 50 ppb (SePRO, 2018).

Sonar is used primarily on milfoil (also found in the Watervliet Reservoir) but may only have suppressive effects on water chestnut. (SOLitude Lake Management, 2018). In New York State, Sonar PR is not permitted in waters less than two feet deep, except as permitted under FIFRA Section 24(c), Special Local Need registration. It may be applied at low rates within a quarter mile of a functioning potable water intake (SePRO, 2018).

Herbicide application is a viable treatment method for areas in the northern section of the reservoir, which are over half a mile from the intake point of the reservoir (refer to Appendix A). Herbicide treatment should be repeated in subsequent years as herbicides are not able to penetrate unsprouted seeds of *T. natans*. When seeds sprout the following spring, herbicide or hand-pulling should be conducted to remove new plants (SOLitude Lake Management, 2017; Cayuga County, 2018). With any chemical application, special care must be taken to minimize or avoid impacts to non-target species.

Methods –

- Obtain required permitting before starting project.
- Identify boundaries of the work area and the distribution of non-target species and water chestnut before treatment.
- Take inventory of aquatic organisms, paying special attention to sensitive species.
- Establish a treatment plan. Include areas to be treated, doses and concentrations, expected alteration of plant communities, notifications of water use restrictions, and follow-up activities after initial treatments.

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- Apply herbicide between mid-July through mid-August for maximum effectiveness. Control efforts are substantially weakened after seed drop, which occurs in late August through early September.
- Identify waterbody and downstream water uses that could be impacted by herbicide treatment.
- Use a licensed applicator and appropriate equipment.
- Monitor and reapply as needed.
  (OARS, 2017)

Anticipated Cost: $800.00/acre (SOLitude Lake Management, 2018).

3.1.8 Biological Control

Biological control involves introducing predator species known to feed selectively on the target species. Biological controls work by damaging the target species, or limit their ability to compete or reproduce, or by killing the target outright. The beetle *Galerucella birmanica* has been indicated as a potential biological control for water chestnut. Research has been promising; *G. birmanica* is very likely a host-specific species and may be highly effective for long-term control of water chestnut. This method would also be cost effective. Since it involves the introduction of a non-native species, more research is needed to confirm that the introduced species would not adversely affect native ecology (OARS, 2017). At this time biological control is not a recommended option but should be considered for the future.

Anticipated Cost: Unknown. Awaiting research and approval.

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4.0 WATER CHESTNUT MANAGEMENT AT THE WATERVLIET RESERVOIR

4.1 Recommendations

A combination of mechanical harvesting, hand-pulling, and herbicide treatments will be utilized to remove invasive populations of *T. natans*, beginning in the spring of the year that the project commences.

4.1.1 Eco-Harvester

An Eco-Harvester is recommended for areas of the reservoir with water depths ranging from 12" to 8' (refer to Appendix A: *this must be updated with new bathymetry information*). The Eco-harvester reduces the risk of fragmentation by creating a water current that pulls the plants up by their roots and onto a conveyer belt. The Eco-Harvester can also skim previously harvested areas, gathering any remaining pieces (Shoretech Industries, 2019). The machine was originally developed for the removal of milfoil, which was observed during project field analysis.

The Eco-harvester is currently available for a total cost of approximately $75,000 for the purchase and delivery of the boat. Removal rates are estimated at 1.5 acres per day, with additional time required for the safe disposal of plant materials. If these materials can be disposed of at a composting location near the reservoir, costs will be limited to labor and equipment to store the vegetation. If the harvested water chestnut must be disposed of off-site, transportation, labor, and disposal fees must be calculated.

As with all recommended removal methods, follow up harvests of *T. natans* must be conducted on an annual basis. Annual expenses for labor, disposal, maintenance, and eventual maintenance of machinery must be considered. Additional research and investigation into the costs and labor requirements associated with the Eco-harvester is recommended.

4.1.2 Mechanical Harvesting

For large areas of the reservoir with appropriate depths of 6 to 15 feet, control via mechanical harvesting is a recommended management strategy (refer to Appendix A). This method has had success on the Hudson River, in lakes in Cayuga County, and the Finger Lakes in New York. Despite concerns of fragmentation, non-selectivity in the harvesting process, and high cost, mechanical harvesting is a viable management option for the Watervliet Reservoir. There are large areas of water chestnut in the Watervliet Reservoir which cannot be effectively managed by hand-pulling efforts alone, and in these instances removal via mechanical harvester will have much greater impacts.

The following cost estimates were provided by SOLitude Lake Management (https://www.solitudelakemanagement.com). Mechanical harvesting would be a costly endeavor for a project area of this size. A mechanical harvester would operate at an estimated speed of 1.5 acres per day in shallow water (18" to a few feet), and up to 2.5 acres per day if the water is relatively deep. The billing rate is $1,233 per acre, in addition to a mobilization fee of $3,500 when transporting the harvester. This includes cleaning of equipment, transport of the harvester to the site, and other logistic steps. The disposal fee is approximately the same as the on-water fee per acre ($1,233 per acre). The overall cost for harvesting 77 acres of water chestnut, (refer to Appendix A) is approximately $195,000.

Since the reservoir will require monitoring and most likely re-treatment over multiple years, the expense involved in mechanical management of *T. natans* is considerable. However, mechanical harvesters bill per acre, and a decrease in acreage of water chestnut in subsequent years will result in a decrease in cost until a minimal level of maintenance is needed to keep the reservoir free of invasives. As populations of *T. natans* decline, it may be suitable to utilize hand-pulling as the primary method of control for areas that have been reduced to small patches.

4.1.3 Herbicide Application

Herbicides may be effective in shallow areas where a mechanical harvester cannot operate (refer to Appendix A). Clearcast and Sonar are two herbicides that may be appropriate for the northern areas of the reservoir, where water is shallow and has high turbidity, making it difficult for mechanical harvesters to operate in (SOLitude Lake Management, 2018). Management of *T. natans* via herbicide will also reduce overall cost of water chestnut removal. Foliar applications of an approved herbicide may be a viable approach for water chestnut management.

Herbicide application is approximately one-third the cost of mechanical harvesting. Some chemicals have been approved for use in potable water. At a cost of approximately $800 per acre, herbicide treatment would be far less expensive than mechanical harvesting but may not be feasible for all areas of the reservoir, such as those within a quarter mile of the reservoir intake (SOLitude Lake Management, 2018). The estimated overall cost for treating 87 acres of water chestnut with herbicide treatment in the recommended areas of the Watervliet Reservoir (refer to Appendix A) is approximately $70,000. Herbicide application would be most appropriate in the northern portion of the reservoir, (which is over a quarter mile from the intake point for the reservoir), where waters are relatively shallow and mechanical harvesting may not be practical. Herbicide application is also a more cost-effective means of control.

An integrative approach may reduce cost, if initial herbicide treatment is followed by hand-pulling. Repeated herbicide treatments will be necessary in following years, as herbicides are not able to penetrate the unsprouted nuts of *T. natans*. Costs will be reduced each consecutive year as *T. natans* populations decline.

4.1.4 Hand-pulling

Hand-pulling is advised for areas with small infestations of *T. natans*, as well as areas that are along banks where mechanical harvesting is not possible, such as along the northeastern edge and along the southernmost bank. Appropriate locations for hand-pulling efforts in the Watervliet Reservoir are those areas within approximately 10 feet of banks where mechanical harvesting is the primary method of treatment (refer to Appendix A). As water depths may be too shallow for a mechanical harvester to operate within 10 feet of shorelines at the Watervliet Reservoir, it is recommended that these areas be treated via hand-pulling efforts. Hand-pulling is also recommended as a follow-up practice to mechanical harvesting and herbicide treatments to remove any displaced fragments or individual plants.

Assuming a crew of two people, the cost per acre of hand-pulling *T. natans* is approximately $1,000 per acre. The estimated cost for hand-pulling 5 acres of water chestnut in the recommended areas of the Watervliet Reservoir (refer to Appendix A) is approximately $5,000. If *T. natans* density decreases sufficiently in the larger areas, it may be appropriate in the future to begin managing these areas with hand-pulling as well. Any new patches of *T. natans* should be hand-pulled as soon as possible and monitored closely to prevent further growth. Mechanical harvesting should be followed by hand-pulling of any debris or small patches of water chestnut that were not removed by the harvester.

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4.1.5 Estimated Overall Cost

Based on the suggested methods detailed above, and the total area for each management strategy (refer to Appendix A), the overall cost for the initial treatment of *T. natans* in the Watervliet Reservoir would be approximately $270,000. Costs will decrease over time as *T. natans* population density decreases. Grant acquisition can help minimize overall management costs.

Table 1: Overall Cost for Treating T. natans

First Year Cost for Treating *T. natans* at the Watervliet Reservoir		
Management Option	Acreage (Approximate)	Overall Cost (Approximate)
Eco Harvester	TBD-Bathymetry 12”-8’	$75,000 purchase & delivery Operational labor costs (TBD)
Mechanical Harvesting	87	$195,000
Herbicide Treatment	77	$70,000
Hand-pulling	5	$5,000
Follow Up Removal (Yearly)		
Management Option	Acreage (Approximate)	Overall Cost (Approximate)
Eco Harvester	TBD-expected decline	Operational labor costs (TBD) Disposal fees Maintenance costs
Mechanical Harvesting	TBD-expected decline	$1,233 per acre $3500 mobilization fee $1,233 per acre disposal fee
Herbicide Treatment	TBD-expected decline	$800 per acre
Hand-pulling	TBD-expected decline	$1,000 per acre
Total:	Approximately $75,000 per year	

Over time, the population of *T. natans* will be significantly reduced if management strategies are consistently implemented. Invasive aquatic macrophytes are not easily eradicated; therefore, proper planning and budgeting for ongoing management of *T. natans* and other invasive species at the Watervliet Reservoir must be conducted.

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4.1.6 Long-Term Considerations

Hydraulic Dredging

Significant accumulations of sediment are occurring in the northern portion of the reservoir, in areas with extensive concentrations of *T. natans*. Suspended sediments are visible just below the water's surface, and the depth of water is greatly reduced. Eventually, hydraulic dredging may be necessary in this portion of the site, not only to remove invasive species but to restore the capacity of the reservoir. Biological factors and existing aquatic fish, wildlife, and botanical communities must be evaluated before any dredging measures can be considered. Proper relocation and storage of sediment must be coordinated with regulatory agencies and stakeholders.

Engineering controls may be used to minimize the negative impacts of sediment removal. Turbidity/silt curtains may be installed to prevent downstream contamination of the water body. Turbidity curtains are flexible sedimentation barriers suspended from floats at the water's surface to a depth of 1 to 2 feet above the sediment bed. Turbidity curtains may also be considered to control existing sediment accumulations at the northern portion of the reservoir.

Wetland Restoration

In the past, populations of *T. natans* were left at the northern portion of the reservoir. Concerns that the removal of *T. natans* may increase downstream sediment accumulation are likely valid; however, there is little hope of successful long-term eradication and management of *T. natans* if this significant population is left intact.

Figure 13: *S. latifolia* growing near the banks of the Watervliet Reservoir.

The northern portion of the reservoir is a matrix of freshwater forested, shrub, and emergent wetlands (refer to Appendix A). These wetlands are dominated by *T. natans*, with few remaining pockets of cattails (*Typha spp.*) and broadleaf arrowhead (*Saggitaria latifolia*) (see Figure 12). Restoration of native wetland plants may be a viable method to control sediment levels and filter runoff pollutants entering the reservoir via the Normans Kill, Bozen Kill and other tributaries. Existing wetland native plant resources were not evaluated for this study, but more extensive field investigations may yield valuable information about what types of plant species may be suitable for this site.

The above long-term management considerations have not been evaluated for costs, as these potential strategies extend beyond the scope of this project.

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4.2 Permitting

The following permits will be required for the recommended management options listed below and were informed by a conversation with the NYSDEC (Baker, N., personal communication, October 12, 2018).

NYS DEC Article 24: Freshwater Wetlands General Permit – requires permits for certain activities in and within 100 feet of the boundary of wetlands that are shown on freshwater regulatory maps and are 12.4 acres or larger.

NYS DEC Article 15: Protection of Waters General Permit – prevents undesirable activities on water bodies by establishing and enforcing regulations that preserve, protect, and enhance current and potential values of water resources, are consistent with the social and economic development of New York State, and that protect public welfare and health.

NYS DEC Notice of Intent (NOI) – a request for coverage under the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities.

NYS DEC Water Quality Certification – certifies that proposed activities will not violate water quality standards (NYS DEC, 2018).

USACE Section 404 – Mechanized land clearing, filling, grading, ditching, other excavation, and piling installation in waters of the U.S. require a U.S. Army Corps of Engineers Section 404 Permit before commencing construction.

USACE Section 10 – regulated activities (including work involving dredging, disposal of dredged material, placement/removal of structures, filling, or excavation), conducted below the Ordinary High-Water elevation of navigable waters of the United States must be permitted/approved by the U.S. Army Corps of Engineers.

Hand-Pulling
NYS DEC Article 15: Protection of Waters General Permit
NYS DEC Article 24: Freshwater Wetlands General Permit

Eco Harvester
NYS DEC Article 15: Protection of Waters General Permit
NYS DEC Article 24: Freshwater Wetlands General Permit

Mechanical Harvesting
NYS DEC Article 15: Protection of Waters General Permit
NYS DEC Article 24: Freshwater Wetlands General Permit

Herbicide Treatment
NYS DEC Article 15 Permit
NYC DEC Notice of Intent (NOI)

Hydraulic Dredging
NYS DEC Article 15: Protection of Waters General Permit
NYS DEC Article 24: Freshwater Wetlands General Permit
NYS DEC Water Quality Certification
USACE Section 404 USACE Section 10

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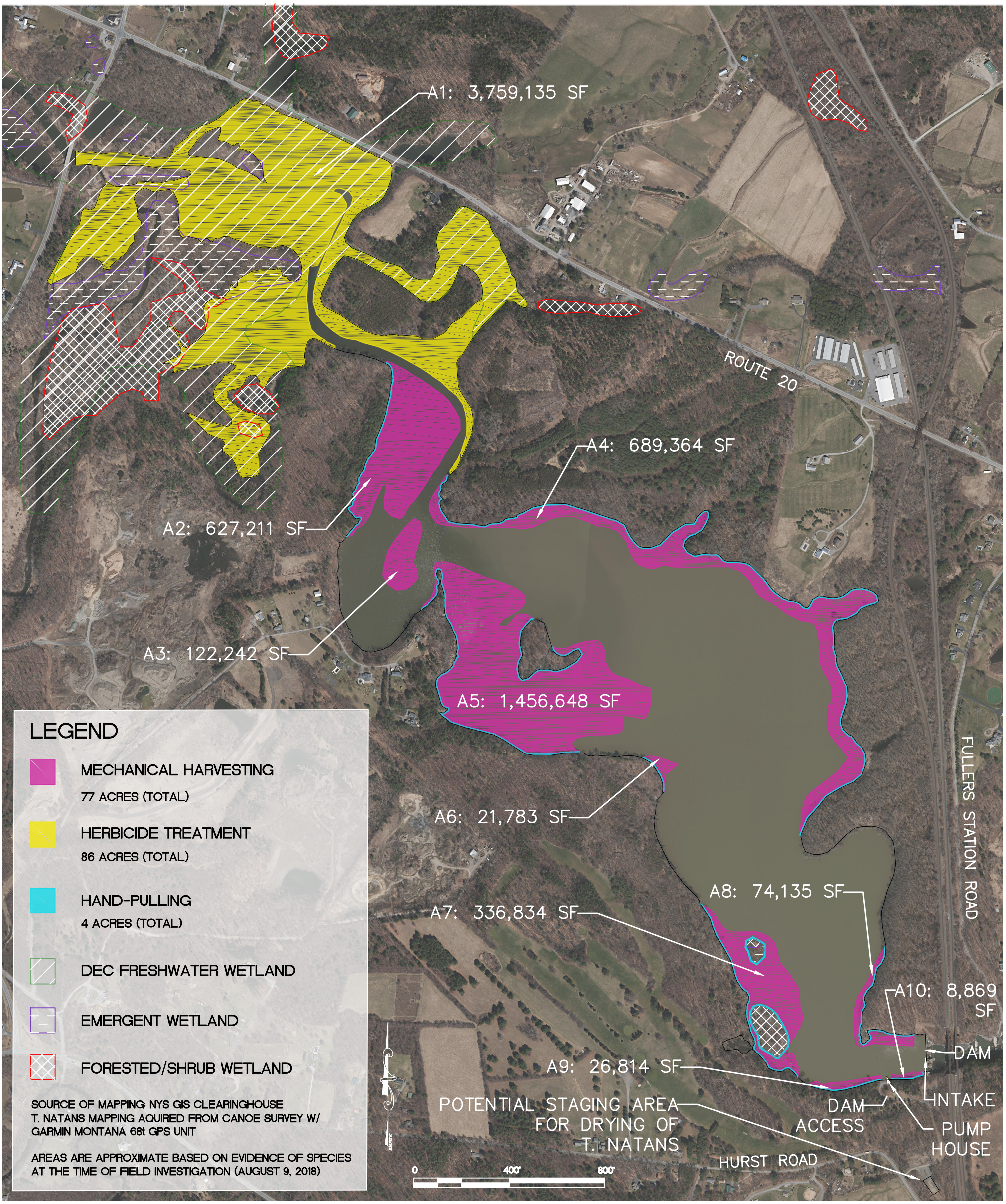
APPENDIX A

Mapping



Trapa Natans Distribution and Wetland Boundaries in the Watervliet Reservoir

Weston & Sampson
Weston & Sampson PE, LS, LA, P.C.
1 Winner's Circle, Suite 130, Albany, NY
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www.westonandsampson.com

Normanskill Relicensing - Water Chestnut Control Study

August 2019

Watervliet, New York

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APPENDIX B

Reference Materials

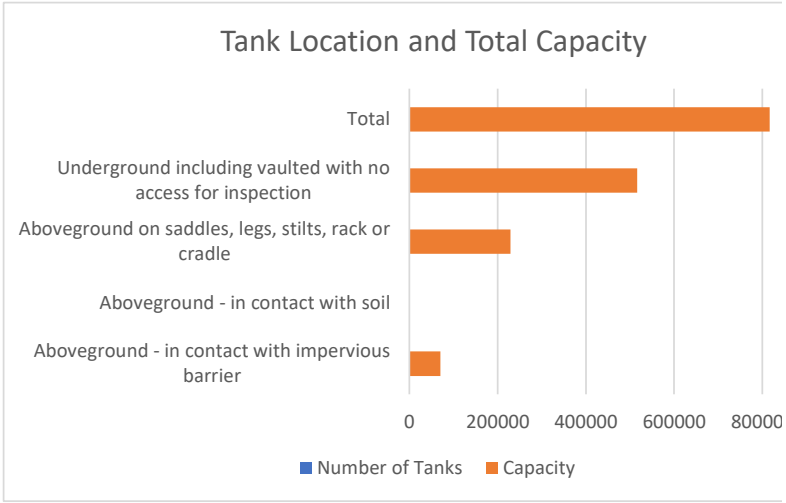
Appendix F: Petroleum Bulk Storage

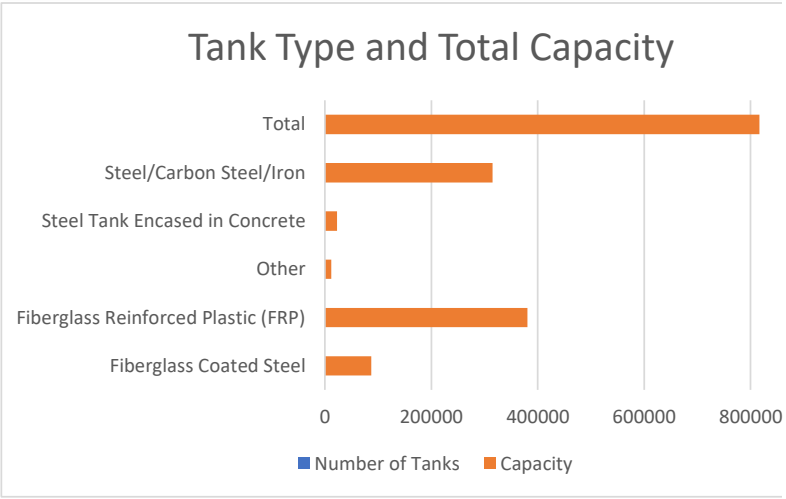
Tank Location	Number of Tanks	Capacity
Aboveground - in contact with impervious barrier	12	70400
Aboveground - in contact with soil	2	1000
Aboveground on saddles, legs, stilts, rack or cradle	69	228920
Underground including vaulted with no access for inspection	64	516415
Total	**147**	**816735**

Tank Type	Number of Tanks	Capacity
Fiberglass Coated Steel	8	87000
Fiberglass Reinforced Plastic (FRP)	45	380415
Other	3	12000
Steel Tank Encased in Concrete	6	22500
Steel/Carbon Steel/Iron	85	314820
Total	**147**	**816735**

Stored Material	Number of Tanks	Total Capacity
#2 fuel oil (on-site consumption)	18	71600
diesel	62	342285
Diesel (E-Gen) or Biodiesel	2	8500
gasoline	9	38500
gasoline/ethanol	35	290000
kerosene [#1 fuel oil] (on-site consumption)	6	6000
lube oil	6	4050
waste oil/used oil (incl. heating, on-site consumption)	9	55800
Total	147	**816735**

Facility	Number of Tanks	Total Capacity
Apartment Building/Office Building	6	21000
Manufacturing (Other than Chemical)/Processing	12	108250
Municipality (Incl. Waste Water Treatment Plants, Utilities, Swi	20	70000
Other	7	30500
Other Wholesale/Retail Sales	4	4130
Retail Gasoline Sales	49	380815
School	13	53150
Trucking/Transportation/Fleet Operation	36	148890
Total	147	**816735**





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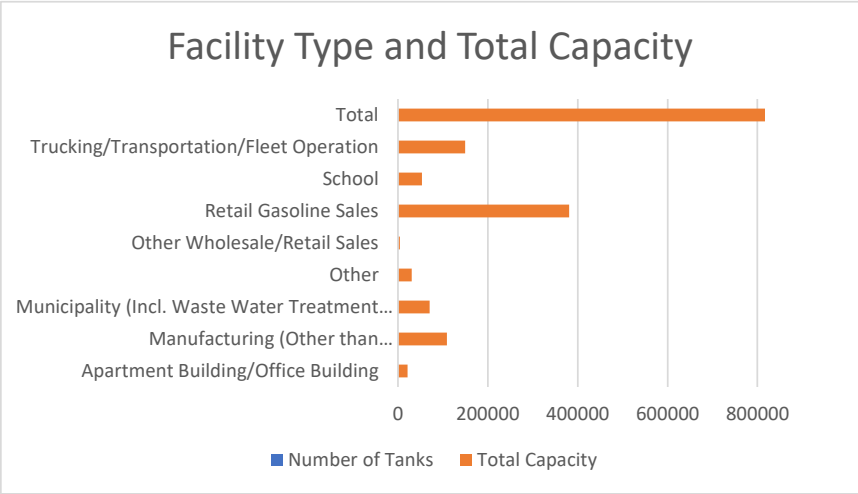
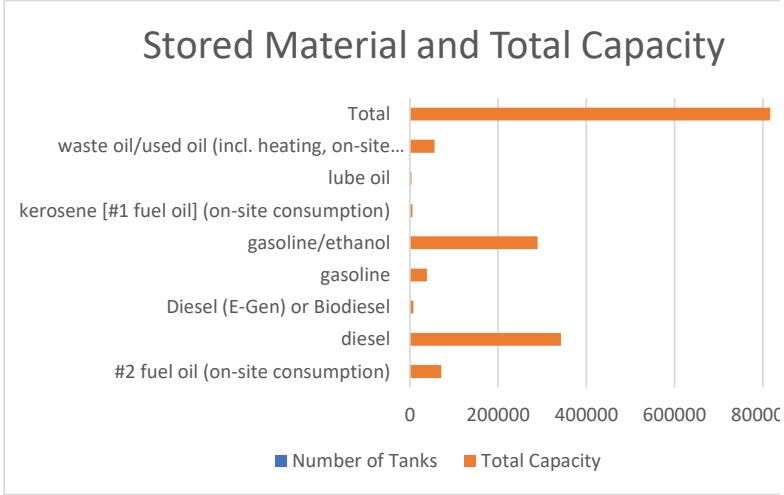
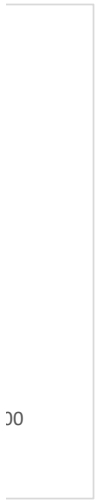

Facility Type and Total Capacity
Total
Trucking/Transportation/Fleet Operation
School
Retail Gasoline Sales
Other Wholesale/Retail Sales
Other
Municipality (Incl. Waste Water Treatment...
Manufacturing (Other than...
Apartment Building/Office Building
0
200000
400000
600000
800000
Number of Tanks
Total Capacity


Stored Material and Total Capacity
Total
waste oil/used oil (incl. heating, on-site...
lube oil
kerosene [#1 fuel oil] (on-site consumption)
gasoline/ethanol
gasoline
Diesel (E-Gen) or Biodiesel
diesel
#2 fuel oil (on-site consumption)
0
200000
400000
600000
80000
Number of Tanks
Total Capacity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Appendix G: Septic Locations dataset

Address	Municiplaity	SEWER_DESC	PropClsto	Prop Type	Subwatershed	SQFT_LIV	NBR_KITCHN	NBR_F_BATH	tch/Bath Tot	OWNER	MAIL_ADDR	MAIL_CITY	MAIL_STATE	MAIL_ZIP	ROLL_YR
10 Sky Ter	Village of Voorh	Private	210	One family year-round	Black Creek	3576	1	2	3	Scherer, Shirley C	10 Sky Ter	Voorheesville	NY	12186	2018
100 Duncan Ln Pr	Town of Guilder	Private	210	One family year-round	Black Creek	1132	1	1	2	Southworth, Nicholas S	2060 Baker Ave	Schenectady	NY	12309	2018
100 Ersham Ln Pr	Town of Guilder	Private	116	Other livestock: donke	Black Creek	1608	1	1	2	Oliver, Peter	100 Ersham Ln	Altamont	NY	12009	2018
100 McCarthy Ln Pr	Town of Guilder	Private	210	One family year-round	Black Creek	2344	1	2	3	Corbett, Christa Robin	100 McCarthy Ln	Altamont	NY	12009	2018
1042 Meadowdale Rd	Town of Guilder	Private	240	Rural residence with a	Black Creek	2894	1	2	3	Scrodanus, Robin L	1042 Meadowdale Rd	Altamont	NY	12009	2018
1095 Leesome Ln	Town of Guilder	Private	210	One family year-round	Black Creek	1736	1	2	3	Jackson, Howard E	1095 Leesome Ln	Altamont	NY	12009	2018
11 Ashman Dr	Town of Knox	Private	210	One family year-round	Black Creek	608	1	1	2	Kowalchyk Jack S	11 Ashman Dr	Voorheesville	NY	12086	2018
11 N Grandview Ter	Village of Voorh	Private	210	One family year-round	Black Creek	1333	1	1	2	Bishop, Jesse	11 N Grandview Terr	Voorheesville	NY	12186	2018
1104 Leesome Ln	Town of Guilder	Private	210	One family year-round	Black Creek	1686	1	1	2	Grant, Richard	1104 Leesome Ln	Altamont	NY	12009	2018
1108 County Line Rd	Town of Knox	Private	210	One family year-round	Black Creek	1488	1	2	3	Cook, Ralph M	1108 County Line Rd	Schenectady	NY	12306	2018
1127 Leesome Ln	Town of Guilder	Private	210	One family year-round	Black Creek	2889	1	3	4	Kaczkowski, David	1127 Leesome Ln	Altamont	NY	12009	2018
1128 Leesome Ln	Town of Guilder	Private	210	One family year-round	Black Creek	2879	1	2	3	Quinlan, Arthur	PO Box 159	Altamont	NY	12009	2018
1134 County Line Rd	Town of Knox	Private	210	One family year-round	Black Creek	1846	1	1	2	Woodrow, Mary C	402 Reutter Dr	Duanesburg	NY	12056	2018
1143 Leesome Ln	Town of Guilder	Private	210	One family year-round	Black Creek	2481	1	2	3	Jerominek, Michael A	1143 Leesome Ln	Altamont	NY	12009	2018
1150 Leesome Ln	Town of Guilder	Private	210	One family year-round	Black Creek	3544	1	3	4	Shatynski, Todd S	1150 Leesome Ln	Altamont	NY	12009	2018
116 Brandle Rd	Town of Guilder	Private	120	Field crops	Black Creek	1543	1	2	3	Castillo, Vernon	116 Brandle Rd	Altamont	NY	12009	2018
12 Koonz Rd	Town of New Sc	Private	210	One family year-round	Black Creek	1476	1	3	4	Kendall, Tracy	12 Koonz Rd	Voorheesville	NY	12186	2018
1200 Leesome Ln	Town of Guilder	Private	210	One family year-round	Black Creek	4513	1	3	4	Stewart, Kevin R	1200 Leesome Ln	Altamont	NY	12009	2018
1209 Leesome Ln	Town of Guilder	Private	240	Rural residence with a	Black Creek	2725	1	3	4	Walker, Newton F III	1209 Leesome Ln	Altamont	NY	12009	2018
124 Koonz Rd	Town of New Sc	Private	240	Rural residence with a	Black Creek	1954	1	1	2	Miller, Adam	124 Koonz Rd	Voorheesville	NY	12186	2018
1297 Thacher Park Rd	Town of Berne	Private	210	One family year-round	Black Creek	2376	1	1	2	Raber, Thomas R	1297 Thacher Park Rd	East Berne	NY	12059	2018
13 N Grandview Ter	Village of Voorh	Private	210	One family year-round	Black Creek	1272	1	2	3	Wittman, Andrew D	13 N Grandview Ter	Voorheesville	NY	12186	2018
1326 County Line Rd	Town of Knox	Private	210	One family year-round	Black Creek	1225	1	1	2	Sada, Michael	1326 County Line Rd	Schenectady	NY	12306	2018
149 Suto Rd	Town of Berne	Private	210	One family year-round	Black Creek	2553	1	2	3	Winn, Sandra K	149 Suto Rd	Voorheesville	NY	12186	2018
15 Fryer Ln	Town of New Sc	Private	210	One family year-round	Black Creek	2712	1	2	3	Rohan, Thomas J III	15 Fryer Lane	Altamont	NY	12209	2018
16 Bentley Dr	Town of New Sc	Private	210	One family year-round	Black Creek	1248	1	1	2	Hines Kenneth E	16 Bentley Dr	Troy	NY	121822713	2018
16 Orchard Path	Village of Voorh	Private	210	One family year-round	Black Creek	1792	1	2	3	Price, John	16 Orchard Path	Voorheesville	NY	12186	2018
167 Suto Rd	Town of Berne	Private	240	Rural residence with a	Black Creek	1470	1	1	2	Kentris, Michael S	167 Suto Rd	Voorheesville	NY	12186	2018
17 Anderson Ln	Town of New Sc	Private	240	Rural residence with a	Black Creek	281	1	0	1	Anderson, Dwight	17 Anderson Ln	Altamont	NY	12009	2018
180 Brandle Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1176	1	1	2	Jones, Allen L Jr	180 Brandle Rd	Altamont	NY	12009	2018
181 Suto Rd	Town of Berne	Private	210	One family year-round	Black Creek	2608	1	2	3	Flagler-Williams, Debra	181 Suto Rd	Voorheesville	NY	12186	2018
200 Duncan Ln Pr	Town of Guilder	Private	210	One family year-round	Black Creek	472	1	1	2	Southworth, Nicholas S	2060 Baker Ave	Schenectady	NY	12309	2018
200 La Grange Ln Pr	Town of Guilder	Private	240	Rural residence with a	Black Creek	1464	1	2	3	Treadgold, Karen S	200 La Grange Ln	Altamont	NY	12009	2018
200 McCarthy Ln Pr	Town of Guilder	Private	210	One family year-round	Black Creek	2938	1	2	3	Jones, Brian W	200 McCarthy Ln Pr	Altamont	NY	12009	2018
219 Tygert Rd	Town of New Sc	Private	241	Primary residential, als	Black Creek	3144	1	2	3	Ten Eyck, Peter G II	219 Tygert Rd	Voorheesville	NY	12186	2018
231 Suto Rd	Town of Knox	Private	210	One family year-round	Black Creek	2200	1	3	4	Bowman Thomas A	231 Suto Rd	Voorheesville	NY	12186	2018
26 Kling Ter	Village of Voorh	Private	210	One family year-round	Black Creek	2475	1	2	3	Laccetti, Geoffrey J	26 Kling Ter	Voorheesville	NY	12186	2018
26 Orchard Path	Village of Voorh	Private	210	One family year-round	Black Creek	1798	1	1	2	Meacham, Donald D	26 Orchard Path	Voorheesville	NY	12186	2018
300 La Grange Ln Pr	Town of Guilder	Private	240	Rural residence with a	Black Creek	2166	1	1	2	Fenner, Brian W	300 La Grange Ln	Altamont	NY	12009	2018
32 Fryer Ln Pr	Town of Guilder	Private	240	Rural residence with a	Black Creek	3687	1	4	5	Lampi, Mary C	32 Fryer Ln	Altamont	NY	12009	2018
3616 Guilderland Rd	Town of Knox	Private	210	One family year-round	Black Creek	1404	1	1	2	VanWie, Merton G	3616 Guilderland Rd	Schenectady	NY	12306	2018
3662 Guilderland Rd	Town of Knox	Private	210	One family year-round	Black Creek	1422	1	1	2	DeMartino, Nicholas J	3662 Guilderland Rd	Schenectady	NY	12306	2018
39 Ketcham Rd	Town of Knox	Private	210	One family year-round	Black Creek	1824	1	2	3	Reeves, Theresa D	39 Ketcham Rd	Voorheesville	NY	12186	2018
4268 Frederick Rd	Town of Guilder	Private	120	Field crops	Black Creek	3120	1	3	4	Rosenblum, Phyllis A	4268 Frederick Rd	Altamont	NY	12009	2018
4371 Weaver Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1743	1	1	2	Bub, Dennis	4371 Weaver Rd	Altamont	NY	12009	2018
4379 Frederick Rd	Town of Guilder	Private	240	Rural residence with a	Black Creek	3352	1	3	4	Rudd, Robert J	4379 Frederick Rd	Altamont	NY	12009	2018
4380 Weaver Rd	Town of Guilder	Private	210	One family year-round	Black Creek	2036	1	1	2	Redmond, Daryle	4380 Weaver Rd	Altamont	NY	12009	2018
4384 Weaver Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1159	1	1	2	Miller, William E	4384 Weaver Rd	Altamont	NY	12009	2018
4386 Weaver Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1280	1	1	2	Gerke, David	4386 Weaver Rd	Altamont	NY	12009	2018
4400 Weaver Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1115	1	1	2	Giarrusso, Michael A	4400 Weaver Rd	Altamont	NY	12009	2018
4402 Weaver Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1804	1	2	3	St Pierre, Robert C	4402 Weaver Rd	Altamont	NY	12009	2018
4410 Weaver Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1368	1	1	2	Mahar, Christopher	4410 Weaver Rd	Altamont	NY	12009	2018
4416 Frederick Rd	Town of Guilder	Private	210	One family year-round	Black Creek	3712	1	3	4	Bablin, Barry L	4416 Frederick Rd	Altamont	NY	12009	2018
4416 Weaver Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1609	1	1	2	Cole, Jamie T	4416 Weaver Rd	Altamont	NY	12009	2018
4420 Weaver Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1298	1	1	2	St Pierre, Elizabeth	4402 Weaver Rd	Altamont	NY	12009	2018
4434 Weaver Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1121	1	1	2	Ragone, Vincent J Jr	4434 Weaver Rd	Altamont	NY	12009	2018
4441 Weaver Rd	Town of Guilder	Private	240	Rural residence with a	Black Creek	1982	1	1	2	OConnor, Douglas D	4441 Weaver Rd	Altamont	NY	12009	2018
45-49 Brickyard Rd	Town of Knox	Private	210	One family year-round	Black Creek	1224	1	1	2	Brondolo, Ian M	45 Brickyard Rd	Troy	NY	12180	2018
47 Fryer Ln Pr	Town of Guilder	Private	240	Rural residence with a	Black Creek	1152	1	1	2	Sutherland, Scott	47 Fryer Ln	Altamont	NY	12009	2018
474 Meadowdale Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1220	1	1	2	Terhune, Amanda	443 Knox Gallopville Rd	Schoharie	NY	12157	2018
477 Meadowdale Rd	Town of Guilder	Private	210	One family year-round	Black Creek	3964	1	3	4	Gorka, Christopher M	477 Meadowdale Rd	Altamont	NY	12009	2018
500 Gipps Ln Pr	Town of Guilder	Private	240	Rural residence with a	Black Creek	1628	1	1	2	George, Thomas F	500 Gipps Ln	Voorheesville	NY	12186	2018
5041 Rt 9N	Town of Knox	Private	210	One family year-round	Black Creek	1712	1	1	2	Nordland, Gene D	5041 Rt 9N	Corinth	NY	12822	2018
525 Meadowdale Rd	Town of Guilder	Private	113	Cattle, calves, hogs	Black Creek	3104	1	1	2	Bates, Berta H	PO Box 772	Guilderland	NY	12084	2018
53 Mountain View Ln	Town of New Sc	Private	210	One family year-round	Black Creek	960	1	2	3	Wager, John B	53 Mountain View Ln	Voorheesville	NY	12186	2018
548 Rt 146	Town of Guilder	Private	220	Two family year-round	Black Creek	1925	1	3	4	Crupe, Benjamin J	548 Rt 146	Altamont	NY	12009	2018
5560 Gardner Rd	Town of Guilder	Private	210	One family year-round	Black Creek	2776	1	2	3	Weiss, Michael	5560 Gardner Rd	Altamont	NY	12009	2018
5589 Hennessey Rd	Town of Guilder	Private	210	One family year-round	Black Creek	3202	1	3	4	Sinkway, Lori A	5589 Hennessey Rd	Voorheesville	NY	12186	2018
5597 Gardner Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1282	1	2	3	Shutter, Robert W Jr	5597 Gardner Rd	Altamont	NY	12009	2018
5608 Gardner Rd	Town of Guilder	Private	210	One family year-round	Black Creek	2992	1	2	3	Hover, Jeffrey B	5608 Gardner Rd	Altamont	NY	12009	2018
5613 Gardner Rd	Town of Guilder	Private	210	One family year-round	Black Creek	2220	1	1	2	Nelson, Timothy	5613 Gardner Rd	Altamont	NY	12009	2018
5630 Compound Ln Pr	Town of Guilder	Private	240	Rural residence with a	Black Creek	1675	1	1	2	Byron, Gay B	5630 Compound Ln	Altamont	NY	12009	2018
5646 Gardner Rd	Town of Guilder	Private	210	One family year-round	Black Creek	2226	1	1	2	Flewelling, Gerald A	5646 Gardner Rd	Altamont	NY	12009	2018
5657 Depot Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1800	1	2	3	Griffin, Robert L	5657 Depot Rd	Voorheesville	NY	12186	2018
5659 Depot Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1358	1	2	3	Hull-Pease, Robin	5659 Depot Rd	Voorheesville	NY	12186	2018
5663 Depot Rd	Town of Guilder	Private	210	One family year-round	Black Creek	2227	1	3	4	Duncan, Michelle	5663 Depot Rd	Voorheesville	NY	12186	2018
5671 Depot Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1107	1	2	3	VanKuren, James L	5671 Depot Rd	Voorheesville	NY	12186	2018
5740 Gardner Rd	Town of Guilder	Private	113	Cattle, calves, hogs	Black Creek	2225	1	1	2	Ketterer, Helen M	5740 Gardner Rd	Altamont	NY	12009	2018
5749 Depot Rd	Town of Guilder	Private	110	Livestock and products	Black Creek	2632	1	1	2	Graziano, John A	3230 Spanish River Dr	Pompano Beach	FL	33062	2018
5789 Depot Rd	Town of Guilder	Private	210	One family year-round	Black Creek	2500	1	2	3	Vink, Michael D	5789 Depot Rd	Voorheesville	NY	12186	2018
5793 Depot Rd	Town of Guilder	Private	210	One family year-round	Black Creek	2124	1	2	3	Brunt, Scott	5793 Depot Rd	Voorheesville	NY	12186	2018
5795 Depot Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1542	1	1	2	Smith, Mary E	5795 Depot Rd	Voorheesville	NY	12186	2018
603 Meadowdale Rd	Town of Guilder	Private	210	One family year-round	Black Creek	2060	1	1	2	Zimmerman, Debora A	603 Meadowdale Rd	Altamont	NY	12009	2018
605 Rt 146	Town of Guilder	Private	210	One family year-round	Black Creek	894	1	1	2	Dederick, Harold V	605 Rt 146	Altamont	NY	12009	2018
609 Rt 146	Town of Guilder	Private	210	One family year-round	Black Creek	1998	1	1	2	Mercedes, Juan	609 Rt 146	Altamont	NY	12009	2018
6096 Hawes Rd	Town of Guilder	Private	120	Field crops	Black Creek	1800	2	2	4	Harrington, Beverly An	6146 Hawes Rd	Altamont	NY	12009	2018
6154 Hawes Rd	Town of Guilder	Private	240	Rural residence with a	Black Creek	2188	1	1	2	Heller, John O	6154 Hawes Rd	Altamont	NY	12009	2018
622 Altamont Rd	Town of New Sc	Private	210	One family year-round	Black Creek	1040	1	2	3	Jasinski, Daniel J	622 Voorheesville Alta Rd	Altamont	NY	12009	2018
6246 Depot Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1806	1	2	3	Ginder, Rebecca A	6246 Depot Rd	Altamont	NY	12009	2018
6266 Hawes Rd	Town of Guilder	Private	240	Rural residence with a	Black Creek	2676	1	2	3	Heller, Jane D	6266 Hawes Rd	Altamont	NY	12009	2018
6533 Rt 158	Town of Guilder	Private	210	One family year-round	Black Creek	624	1	1	2	Litz, Michael A	6533 Rt 158	Altamont	NY	12009	2018
6543 Rt 158	Town of Guilder	Private	210	One family year-round	Black Creek	2620	1	1	2	Schillinger, John	6543 Rt 158	Altamont	NY	12009	2018
6581 Rt 158	Town of Guilder	Private	210	One family year-round	Black Creek	2797	1	1	2	Bresney, Michael J	6581 Rt 158	Altamont	NY	12009	2018
6587 Rt 158	Town of Guilder	Private	210	One family year-round	Black Creek	1080	1	1	2	Joslin, Charles M	6587 Rt 158	Altamont	NY	12009	2018
6591 Rt 158	Town of Guilder	Private	210	One family year-round	Black Creek	1152	1	1	2	Ferber, Carolyn E	6591 Rt 158	Altamont	NY	12009	2018
6607 Rt 158	Town of Guilder	Private	210	One family year-round	Black Creek	1950	1	2	3	Wilber, Amanda S	6607 Rt 158	Altamont	NY	12009	2018
676 Plank Rd	Town of New Sc	Private	210	One family year-round	Black Creek	1852	1	1	2	Davies, Eudoxie Atlee	676 Plank Rd	Troy	NY	12182	2018
683 Plank Rd	Town of New Sc	Private	210	One family year-round	Black Creek	1196	1	1	2	Jannen Herta	683 Plank Rd	Troy	NY	12182	2018
700 Alt-Voorh Rd	Town of Guilder	Private	240	Rural residence with a	Black Creek	2681	1	3	4	Cowan, David E	700 Alt-Voorh Rd	Altamont	NY	12009	2018
705 Beaver Dam Rd	Town of Berne	Private	210	One family year-round	Black Creek	1304	1	1	2	Daniels, David	6 Summit Ave	Albany	NY	12209	2018
721 Alt-Voorh Rd	Town of Guilder	Private	210	One family year-round	Black Creek	2509	1	2	3	Edwards, Bernice B	721 Alt-Voorh Rd	Altamont	NY	12009	2018
721 Meadowdale Rd	Town of Guilder	Private	240	Rural residence with a	Black Creek	2854	1	3	4	Moore, Mark J	721 Meadowdale Rd	Altamont	NY	12009	2018
728 Alt-Voorh Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1440	1	1	2	Shutter, William	728 Alt-Voorh Rd	Altamont	NY	12009	2018
748 Alt-Voorh Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1352	1	1	2	Shutter Estate, Hazel	748 Alt-Voorh Rd	Altamont	NY	12009	2018
768 Beaver Dam Rd	Town of Berne	Private	240	+N1627Rural residence	Black Creek	2046	1	3	4	Abriel, Christopher	768 Beaver Dam Rd	East Berne	NY	12059	2018
768 Beaver Dam Rd	Town of Berne	Private	240	Rural residence with a	Black Creek	2046	1	3	4	Abriel, Christopher	768 Beaver Dam Rd	East Berne	NY	12059	2018
785 Alt-Voorh Rd	Town of Guilder	Private	240	Rural residence with a	Black Creek	1405	1	1	2	Sbardella, Mario	785 Alt-Voorh Rd PO Box 129	Altamont	NY	12009	2018
788 Alt-Voorh Rd	Town of Guilder	Private	240	Rural residence with a	Black Creek	2703	1	2	3	McCandless, Frederick	788 Alt-Voorh Rd	Altamont	NY	12009	2018
8 Sky Ter	Village of Voorh	Private	210	One family year-round	Black Creek	1808	1	2	3	O'Connor, Thomas G	8 Sky Ter	Voorheesville	NY	12186	2018
800 Overlook Ln Pr	Town of Guilder	Private	210	One family year-round	Black Creek	2983	1	3	4	Moore, Cynthia M	800 Overlook Ln	Altamont	NY	12009	2018
823 Alt-Voorh Rd	Town of Guilder	Private	240	Rural residence with a	Black Creek	2464	2	2	4	Spencer, Gary	823 Alt-Voorh Rd	Altamont	NY	12009	2018
843 Alt-Voorh Rd	Town of Guilder	Private	240	Rural residence with a	Black Creek	5908	1	5	6	Woods, Thomas H	843 Alt-Voorh Rd	Altamont	NY	12009	2018
865 Meadowdale Rd	Town of Guilder	Private	210	One family year-round	Black Creek	2845	1	2	3	Buess, Kenneth E	865 Meadowdale Rd	Altamont	NY	12009	2018
869 Meadowdale Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1456	1	1	2	Hoover, Carol	869 Meadowdale Rd	Altamont	NY	12009	2018
885 Meadowdale Rd	Town of Guilder	Private	210	One family year-round	Black Creek	2240	1	2	3	Terplak, Stephen P Jr	885 Meadowdale Rd	Altamont	NY	12009	2018
889 Meadowdale Rd	Town of Guilder	Private	114	Sheep and wool	Black Creek	1596	1	1	2	Canaday, Patricia	889 Meadowdale Rd	Altamont	NY	12009	2018
9 Sky Ter	Village of Voorh	Private	210	One family year-round	Black Creek	1908	1	2	3	Berger, Richard A	9 Sky Ter	Voorheesville	NY	12186	2018
91 Altamont Rd	Town of New Sc	Private	210	One family year-round	Black Creek	1976	1	1	2	Cavalieri, Michael A	91 Altamont Rd	Voorheesville	NY	12186	2018
928 Alt-Voorh Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1400	1	1	2	Tymchyn, Richard R	928 Alt-Voorh Rd	Altamont	NY	12009	2018
930 Alt-Voorh Rd	Town of Guilder	Private	210	One family year-round	Black Creek	864	1	2	3	VanAuken, Victoria E	930 Alt-Voorh Rd	Altamont	NY	12009	2018

933 Alt-Voorh Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1632	1	1	2	Dowling, Joel E	933 Alt-Voorh Rd	Altamont	NY	12009	2018
938 Alt-Voorh Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1260	1	1	2	LeClair, James A	938 Alt-Voorh Rd	Altamont	NY	12009	2018
944 Alt-Voorh Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1296	1	2	3	Seppa, Richard W	944 Alt-Voorh Rd	Altamont	NY	12009	2018
946 Alt-Voorh Rd	Town of Guilder	Private	210	One family year-round	Black Creek	1436	1	1	2	Paulsen, Rana L	946 Alt-Voorh Rd	Altamont	NY	12009	2018
948 Alt-Voorh Rd	Town of Guilder	Private	210	One family year-round	Black Creek	2165	1	2	3	Murphy, Michael	948 Alt-Voorh Rd	Altamont	NY	12009	2018
Cerutti Ln Pr	Town of Guilder	Private	220	Two family year-round	Black Creek	2635	2	2	4	Moak, Michael D	100 Cerutti Ln PO Box 224	Guilderland Cent	NY	12085	2018
Crounse Ln Pr	Town of Guilder	Private	120	Field crops	Black Creek	1575	3	3	6	Paonessa, Thomas	31 Pine St	Albany	NY	12203	2018
Depot Rd	Town of Guilder	Private	220	Two family year-round	Black Creek	3014	2	3	5	Schryver, George D	5667 Depot Rd	Voorheesville	NY	12186	2018
Gardner Rd	Town of Guilder	Private	220	Two family year-round	Black Creek	1628	2	2	4	Wilmington Savings Fu	9990 Richmond Ave Ste 400S	Houston	TX	77042	2018
Gardner Rd	Town of Guilder	Private	220	Two family year-round	Black Creek	2672	2	3	5	Wallace, Richard E	5612 Gardner Rd	Altamont	NY	12009	2018
Gardner Rd	Town of Guilder	Private	240	Rural residence with a	Black Creek	4110	1	2	3	Beckmann, Bernard J	2238 W Old State Rd	Altamont	NY	12009	2018
Overlook Ln Pr	Town of Guilder	Private	210	One family year-round	Black Creek	1096	1	1	2	Ensslin, Thomas	100 Overlook Ln	Altamont	NY	12009	2018
1004 Duanesburg Churches R	Delanson	Private			Bonny Brook-Normans Kill	2243	1	2	3	Peterson, Richard E	1004 Duanesburg Churche Rd	Delanson	NY	12053	2018
1026 Scotch Ridge Rd	Schenectady	Private			Bonny Brook-Normans Kill	1656	1	1	2	Beland, Joyce	1026 Scotch Ridge Rd	Schenectady	NY	12306	2018
10417 Duaneburg Rd	Delanson	Private			Bonny Brook-Normans Kill	2153	1	1	2	Acevedo, Adam R	1041 Duanesburg Rd	Delanson	NY	12053	2018
10426 Duanesburg Rd	Delanson	Private			Bonny Brook-Normans Kill	2209	1	1	2	Wenzel, William J	894 Duanesburg Churche Rd	Delanson	NY	12053	2018
10448 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1131	1	1	2	Foster, G. David	849 Ellery Ave	Jackson	MI	49202	2018
10523 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1834	1	1	2	Payne, Robert L II	10523 Duanesburg Rd PO Box263	Duanesburg	NY	12056	2018
10534 Duanesburg Rd	Delanson	Private			Bonny Brook-Normans Kill	3045	2	3	5	Whittaker, Lisa	10534 Duanesburg Rd	Delanson	NY	12053	2018
1058 Kelley Station Rd	Duanesburg	Private			Bonny Brook-Normans Kill	2264	1	2	3	Willoughby, Barbara C	1058 Kelley Station Rd	Duanesburg	NY	12056	2018
1061 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	1463	1	1	2	Gifford, Warren	1061 South Kelley Rd	Schenectady	NY	12306	2018
1083 Scotch Ridge Rd	Schenectady	Private			Bonny Brook-Normans Kill	1320	1	2	3	Miles-Stern, Susan L	1083 Scotch Ridge Rd	Schenectady	NY	12306	2018
10934 Duanesburg Rd	Delanson	Private			Bonny Brook-Normans Kill	878	1	1	2	Dolezsar, Marlene	10934 Duanesburg Rd	Delanson	NY	12053	2018
1096 Mt View Ln	Duanesburg	Private			Bonny Brook-Normans Kill	2162	1	2	3	Weisser, Timothy J	1096 Mt View Ln	Duanesburg	NY	12056	2018
10966 Duanesburg Rd	Delanson	Private			Bonny Brook-Normans Kill	1895	1	1	2	Green, William J	10966 Duanesburg Rd	Delanson	NY	12053	2018
113 Barton Hill Rd	Delanson	Private			Bonny Brook-Normans Kill	1833	1	1	2	Burnett, Anna	113 Barton Hill Rd	Delanson	NY	12053	2018
11560 Duanesburg Rd	Delanson	Private			Bonny Brook-Normans Kill	855	1	1	2	Nichols, Kevin	1156 Duanesburg Rd	Delanson	NY	12053	2018
11579 Duanesburg Rd	Delanson	Private			Bonny Brook-Normans Kill	1464	1	1	2	Wilcox, Reginald A	1157 Duanesburg Rd	Delanson	NY	12053	2018
1163 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	2978	1	2	3	Pezzuto, Angelo	1163 South Kelley Rd	Schenectady	NY	12306	2018
11658 Duanesburg Rd	Delanson	Private			Bonny Brook-Normans Kill	1096	1	1	2	Scavone, Kenneth M	11658 Duanesburg Rd	Delanson	NY	12053	2018
11687 Duanesburg Rd	Delanson	Private			Bonny Brook-Normans Kill	1800	1	1	2	Frank, Richard	11687 Duanesburg Rd	Delanson	NY	12053	2018
11698 Duanesburg Rd	Delanson	Private			Bonny Brook-Normans Kill	1544	1	2	3	Benson, Dean M	11698 Duanesburg Rd	Delanson	NY	12053	2018
11725 Duanesburg Rd	Delanson	None			Bonny Brook-Normans Kill	3264	1	3	4	Murphy, James	11725 Duanesburg Rd	Delanson	NY	12053	2018
1174 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	1300	1	1	2	Campagnano, Samuele	1174 South Kelley Rd	Schenectady	NY	12306	2018
118 Maple Ave	Delanson	Private			Bonny Brook-Normans Kill	1240	1	1	2	Brasmeister, Fredrick A	118 Maple Ave	Delanson	NY	12053	2018
11865 Duanesburg Rd	Delanson	Private			Bonny Brook-Normans Kill	960	1	1	2	Bala, Leonard J	11865 Duanesburg Rd	Delanson	NY	12053	2018
11939 Duanesburg Rd	Delanson	Private			Bonny Brook-Normans Kill	1142	1	1	2	Rafferty, Michael R	11939 Duanesburg Rd	Delanson	NY	12053	2018
1200 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	2090	1	1	2	Osielski, Mary Y	1200 South Kelley Rd	Schenectady	NY	12306	2018
1209 Cole Rd	Delanson	Private			Bonny Brook-Normans Kill	2113	1	2	3	Sowycz, John S	1209 Cole Rd	Delanson	NY	12053	2018
1228 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	1820	1	1	2	Skelly, Dayton D	1228 South Kelley Rd	Schenectady	NY	12306	2018
1240 Thousand Acre Rd	Delanson	Private			Bonny Brook-Normans Kill	1624	1	2	3	Cramer, Scott A	1240 Thousand Acre Rd	Delanson	NY	12053	2018
1249 Gallupville Rd	Delanson	Private			Bonny Brook-Normans Kill	1680	1	2	3	DeJesus, Javier G	1249 Gallupville Rd	Delanson	NY	12053	2018
1262 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	1368	1	2	3	Mackey, Joseph	1262 South Kelley Rd	Schenectady	NY	12306	2018
1284 Scotch Ridge Rd	Schenectady	Private			Bonny Brook-Normans Kill	2278	1	1	2	Manley, David L	1284 Scotch Ridge Rd	Schenectady	NY	12306	2018
1285 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	2330	1	1	2	Armstrong, Joseph L	1285 Skyline Dr	Schenectady	NY	12306	2018
131 Fidler Rd	Delanson	Private			Bonny Brook-Normans Kill	2933	1	1	2	Duffy, Lorraine A	131 Fidler Rd	Delanson	NY	12053	2018
1316 Thousand Acre Rd	Delanson	Private			Bonny Brook-Normans Kill	1456	1	1	2	O'Bryan, Aaron Patrick	1316 Thousand Acre Rd	Delanson	NY	12053	2018
1323 Suits Rd	Duanesburg	Private			Bonny Brook-Normans Kill	2020	1	2	3	Winters, Edward	1323 Suits Rd	Duanesburg	NY	12056	2018
133 Old Dare Rd	Delanson	Private			Bonny Brook-Normans Kill	1244	1	1	2	Warburton, Robert	133 Old Dare Rd	Delanson	NY	12053	2018
1335-1341 Scotch Ridge Rd	Schenectady	Private			Bonny Brook-Normans Kill	2301	1	3	4	Gazzillo, Kimberly A	1341 Scotch Ridge Rd	Schenectady	NY	12306	2018
134 Overlook Ln	Duanesburg	None			Bonny Brook-Normans Kill	2380	1	2	3	Greppo, Michael A	134 Overlook Ln	Duanesburg	NY	12056	2018
1355 Mudge Rd	Delanson	Private			Bonny Brook-Normans Kill	2464	1	2	3	Lenehan, William	1355 Mudge Rd	Delanson	NY	12053	2018
1377-1379 Scotch Ridge Rd	Schenectady	Private			Bonny Brook-Normans Kill	1728	2	3	5	Pierce, John C Jr	1377 Scotch Ridge Rd	Schenectady	NY	12306	2018
1403 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	1408	1	2	3	Flower, Kurt	1403 South Kelley Rd	Schenectady	NY	12306	2018
1404 Scotch Ridge Rd	Schenectady	Private			Bonny Brook-Normans Kill	2218	1	1	2	Herkel, Charles	1404 Scotch Ridge Rd	Schenectady	NY	12306	2018
1416 Thousand Acre Rd	Delanson	Private			Bonny Brook-Normans Kill	1340	1	1	2	Miller, Walter W	1416 Thousand Acre Rd	Delanson	NY	12053	2018
1434 Scotch Ridge Rd	Schenectady	Private			Bonny Brook-Normans Kill	2223	1	2	3	Polito, Thomas	1434 Scotch Ridge Rd	Schenectady	NY	12306	2018
1442 Thousand Acre Rd	Delanson	Private			Bonny Brook-Normans Kill	1708	1	1	2	Seeley, George R Jr.	1442 Thousand Acre Rd	Delanson	NY	12053	2018
1488 Suits Rd	Duanesburg	Private			Bonny Brook-Normans Kill	3308	1	3	4	Iveson, Jeffery A	1488 Suits Rd	Duanesburg	NY	12056	2018
149 Ash Ln	Duanesburg	Private			Bonny Brook-Normans Kill	1589	1	2	3	Ballad, Clifton R	149 Ash Ln	Duanesburg	NY	12056	2018
152 Humphrey Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1752	1	1	2	Lawrence, Alexander N	152 Humphrey Rd	Duanesburg	NY	12056	2018
154 Barton Hill Rd	Delanson	Private			Bonny Brook-Normans Kill	3127	1	2	3	Tkaczyk, John Eric	154 Barton Hill Rd	Delanson	NY	12053	2018
1543 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	2880	1	2	3	Magnano, Christopher	1543 South Kelley Rd	Schenectady	NY	12306	2018
1587 Thousand Acre Rd	Delanson	Private			Bonny Brook-Normans Kill	1594	1	1	2	Howard, John B	1587 Thousand Acre Rd	Delanson	NY	12053	2018
159 Currybush Connection	Schenectady	Private			Bonny Brook-Normans Kill	4606	1	2	3	Watrous, Elbert H Jr	159 Currybush Connecti	Schenectady	NY	12306	2018
1597 Suits Rd	Duanesburg	Private			Bonny Brook-Normans Kill	3427	1	2	3	Vanderpoel, Mark W	1597 Suits Rd	Duanesburg	NY	12056	2018
1602 Scotch Ridge Rd	Schenectady	Private			Bonny Brook-Normans Kill	2602	1	2	3	Ezequelle, Allison L	1602 Scotch Ridge Rd	Schenectady	NY	12306	2018
161 Newton St	Delanson	Private			Bonny Brook-Normans Kill	1198	1	1	2	Ash, Randall S	161 Newton St PO Box 131	Delanson	NY	12053	2018
1613 Thousand Acre Rd	Delanson	Private			Bonny Brook-Normans Kill	1863	1	1	2	Pantuosco, Michael V	1613 Thousand Acre Rd	Delanson	NY	12053	2018
164 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	1598	1	2	3	Tobiassen, John O	164 South Kelley Rd	Schenectady	NY	12306	2018
1641 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	1902	1	1	2	Harrington, Myron I	1641 Skyline Dr	Schenectady	NY	12306	2018
1663 Scotch Ridge Rd	Schenectady	Private			Bonny Brook-Normans Kill	1200	1	2	3	Farina, Michael A	1663 Scotch Ridge Rd	Schenectady	NY	12306	2018
1675 Thousand Acre Rd	Delanson	Private			Bonny Brook-Normans Kill	1397	1	1	2	St Louis, Darcijean	1675 Thousand Acre Rd	Delanson	NY	12053	2018
168 Charles St	Delanson	Private			Bonny Brook-Normans Kill	1878	1	2	3	Compton, Roy I	168 Charles St PO Box 56	Delanson	NY	12053	2018
168 Newton St	Delanson	Private			Bonny Brook-Normans Kill	2454	2	2	4	Merbler, William	168 Newton St PO Box 23	Delanson	NY	12053	2018
1696 Main St	Delanson	Private			Bonny Brook-Normans Kill	3226	1	2	3	O'Connor, Lawrence	1696 Main St	Delanson	NY	12053	2018
1699 Mudge Rd	Delanson	Private			Bonny Brook-Normans Kill	3126	1	2	3	Spor Family Revocable	1699 Mudge Rd	Delanson	NY	12053	2018
1701 Thousand Acre Rd	Delanson	Private			Bonny Brook-Normans Kill	1848	1	2	3	Cortese Andrew W	1701 Thousand Acre Rd	Delanson	NY	12053	2018
1703 Scotch Ridge Rd	Schenectady	Private			Bonny Brook-Normans Kill	1369	1	1	2	Pelton, Lawrence R	1703 Scotch Ridge Rd	Schenectady	NY	12306	2018
1724 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	1278	1	1	2	Harrington, Russell C	1791 Skyline Dr	Schenectady	NY	12306	2018
1725 Thousand Acre Rd	Delanson	Private			Bonny Brook-Normans Kill	2079	1	2	3	Lott, Delores J	1593 Joyce Cir	Tulare	CA	93274	2018
1727 Main St	Delanson	Private			Bonny Brook-Normans Kill	1769	1	1	2	Golen, Daniel S	1727 Main St PO Box 205	Delanson	NY	120530205	2018
1751 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	1800	1	2	3	Harrington, Kevin M	1751 Skyline Dr	Schenectady	NY	12306	2018
1767 Knight Rd	Delanson	Private			Bonny Brook-Normans Kill	1442	1	1	2	Diamond, Alan R	1767 Knight Rd	Delanson	NY	12053	2018
1771 Scotch Ridge Rd	Schenectady	Private			Bonny Brook-Normans Kill	1360	1	1	2	Sturm, Ann Marie	1771 Scotch Ridge Rd	Schenectady	NY	12306	2018
178 Elm St	Delanson	Private			Bonny Brook-Normans Kill	1354	1	1	2	Livingston, James A	178 Elm St PO Box 102	Delanson	NY	120530102	2018
1791 Mudge Rd	Delanson	Private			Bonny Brook-Normans Kill	1759	1	2	3	Barberis, Kevin J	1791 Mudge Rd	Delanson	NY	12053	2018
1791 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	2049	1	2	3	Harrington, Russell C	1791 Skyline Dr	Schenectady	NY	12306	2018
1796 Currybush Rd	Schenectady	Private			Bonny Brook-Normans Kill	2046	1	2	3	DiCarlo, Joseph A	1796 Currybush Rd	Schenectady	NY	12306	2018
182 Ash Ln	Duanesburg	Private			Bonny Brook-Normans Kill	1920	1	1	2	Cooper, Robert D	182 Ash Ln	Duanesburg	NY	12056	2018
183 Depot Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1350	1	2	3	Wnuk, Christopher R	183 Depot Rd	Duanesburg	NY	12056	2018
1859 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	1916	1	2	3	Harrington, Rick A	1859 Skyline Dr	Schenectady	NY	12306	2018
1867 Knight Rd	Delanson	Private			Bonny Brook-Normans Kill	1212	1	2	3	Lennox, Cheryl J	1867 Knight Rd	Delanson	NY	12053	2018
1868 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	1446	1	1	2	Harrington, Russell C	1791 Skyline Dr	Schenectady	NY	12306	2018
187 Shagbark Ct	Duanesburg	Private			Bonny Brook-Normans Kill	2746	1	2	3	Salamone, Samuel J	187 Shagbark Ct	Duanesburg	NY	12056	2018
1872 Currybush Rd	Schenectady	Private			Bonny Brook-Normans Kill	2560	1	2	3	Holub, David L	1872 Currybush Rd	Schenectady	NY	12306	2018
1877 Maben Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1988	1	1	2	Stewart, Patricia F	1877 Maben Rd	Duanesburg	NY	12056	2018
189 Charles St	Delanson	Private			Bonny Brook-Normans Kill	1032	1	1	2	Boggs, Ruby May	189 Charles St PO Box473	Delanson	NY	12053	2018
1893 Knight Rd	Delanson	Private			Bonny Brook-Normans Kill	2240	1	2	3	Rabideau, Curtis M	1893 Knight Rd	Delanson	NY	12053	2018
192 Crosier Rd	Duanesburg	Private			Bonny Brook-Normans Kill	2424	1	2	3	Edwards, Craig O	192 Crosier Rd	Duanesburg	NY	12056	2018
1926 Currybush Rd	Schenectady	Private			Bonny Brook-Normans Kill	1936	1	2	3	Stelline, Lisa Mae	1926 Currybush Rd	Schenectady	NY	12306	2018
194 Elm St	Delanson	Private			Bonny Brook-Normans Kill	1700	1	1	2	U.S. Bank National, As	53 Gibson St	Bay Shore	NY	11706	2018
1942 Main St	Delanson	None			Bonny Brook-Normans Kill	2856	1	2	3	Osborne, Victoria E	1942 Main St PO Box 182	Delanson	NY	12053	2018
1993 Mudge Rd	Delanson	Private			Bonny Brook-Normans Kill	2476	1	2	3	White, Thomas M	1993 Mudge Rd	Delanson	NY	12053	2018
200 Humphrey Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1627	1	1	2	Lestage Gary A	200 Humphrey Rd	Duanesburg	NY	12056	2018
2025 Mudge Rd	Delanson	Private			Bonny Brook-Normans Kill	2410	1	2	3	Pino, Kristen	2025 Mudge Rd	Delanson	NY	12053	2018
204 Elm St	Delanson	Private			Bonny Brook-Normans Kill	1763	1	1	2	Oldorff, William C	204 Elm St PO Box 4	Delanson	NY	12053	2018
2059 Mudge Rd	Delanson	Private			Bonny Brook-Normans Kill	1568	1	2	3	Bessette, Ricky R	2059 Mudge Rd	Delanson	NY	12053	2018
2115 Mudge Rd	Delanson	Private			Bonny Brook-Normans Kill	1772	1	1	2	Harbeck, Jason	2115 Mudge Rd	Delanson	NY	12053	2018
2144 Scotch Ridge Rd	Schenectady	Private			Bonny Brook-Normans Kill	1798	1	1	2	Bebb, David E	2144 Scotch Ridge Rd	Schenectady	NY	12306	2018
2179 Mudge Rd	Delanson	Private			Bonny Brook-Normans Kill	1540	1	2	3	Houck, Jeffrey E	2179 Mudge Rd	Delanson	NY	12053	2018
221 Brookside Dr	Duanesburg	None			Bonny Brook-Normans Kill	2246	1	3	4	Singer George	221 Brookside Dr	Duanesburg	NY	12056	2018
222 Knight Rd	Delanson	Private			Bonny Brook-Normans Kill	1000	1	1	2	Powell, Justin	222 Knight Rd	Delanson	NY	12053	2018
2228 Mudge Rd	Delanson	Private			Bonny Brook-Normans Kill	2549	1	2	3	O'Malley, Dennis M	2228 Mudge Rd	Delanson	NY	12053	2018
224 Barton Hill Rd	Delanson	Private			Bonny Brook-Normans Kill	1894	1	2	3	Kessler, Barbara A	224 Barton Hill Rd	Delanson	NY	12053	2018
227 Willow Run	Duanesburg	Private			Bonny Brook-Normans Kill	3269	1	2	3	Brucker, Jeffrey P	227 Willow Run	Duanesburg	NY	12056	2018
2274 Maben Rd	Duanesburg	Private			Bonny Brook-Normans Kill	864	1	1	2	Young, Lenora A	2274 Maben Rd	Duanesburg	NY	12056	2018
2296 Currybush Rd	Schenectady	Private			Bonny Brook-Normans Kill	3180	2	2	4	Toepfer, Timothy	2296 Currybush Rd	Schenectady	NY	12306	2018
2300 Mudge Rd	Delanson	Private			Bonny Brook-Normans Kill	1634	1	1	2	Griessler, David	2300 Mudge Rd	Delanson	NY	12053	2018
2362 Mudge Rd	Delanson	Private			Bonny Brook-Normans Kill	1960	1	1	2	Wooding, Richard Jr	2362 Mudge Rd	Delanson	NY	12053	2018
2378 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	1804	1	2	3	Dunn, Joseph J	2378 Skyline Dr	Schenectady	NY	12306	2018

240 Overlook Heights Rd	Delanson	Private			Bonny Brook-Normans Kill	3605	1	3	4	Johnson, Robert J	240 Overlook Heights Rd	Delanson	NY	12053	2018
2402 Mudge Rd	Delanson	Private			Bonny Brook-Normans Kill	1726	1	1	2	Stuebner, David M	2402 Mudge Rd	Delanson	NY	12053	2018
243 Knight Rd	Delanson	Private			Bonny Brook-Normans Kill	1183	1	2	3	Rockwell, Denise M	243 Knight Rd	Delanson	NY	12053	2018
2439 Putnam Rd	Schenectady	Private			Bonny Brook-Normans Kill	3739	1	4	5	Khan, Mahmood A	2439 Putnam Rd	Schenectady	NY	12306	2018
258 Darby Hill Rd	Delanson	Private			Bonny Brook-Normans Kill	1684	1	2	3	Demania, Joseph W	258 Darby Hill Rd PO Box 216	Delanson	NY	12053	2018
2605 Putnam Rd	Schenectady	Private			Bonny Brook-Normans Kill	1932	2	2	4	Laguardia, Brian C	2676 Putnam Rd	Schenectady	NY	12306	2018
2663 Duanesburg Churches R	Delanson	Private			Bonny Brook-Normans Kill	1960	1	1	2	Armstrong, Glenn W	2663 Duanesburg Churche Rd	Delanson	NY	12053	2018
2676 Putnam Rd	Schenectady	Private			Bonny Brook-Normans Kill	3498	1	2	3	Laguardia, Brian C	2676 Putnam Rd	Schenectady	NY	12306	2018
269 Mt View Ln	Duanesburg	Private			Bonny Brook-Normans Kill	1430	1	2	3	Briscoe, Clark III	269 Mt View Ln	Duanesburg	NY	12056	2018
272 Fiddler Rd	Delanson	Private			Bonny Brook-Normans Kill	2127	2	2	4	Fidler, Albert	272 Fiddler Rd	Delanson	NY	12053	2018
274 Tidball Rd	Schenectady	Private			Bonny Brook-Normans Kill	1554	1	1	2	Frost, Robert J	274 Tidball Rd	Schenectady	NY	12306	2018
2780 Duanesburg Churches R	Delanson	Private			Bonny Brook-Normans Kill	830	1	1	2	Wojtowicz, Walter A	2782 Duanesburg Churche Rd	Delanson	NY	12053	2018
2843 Currybush Rd	Schenectady	Private			Bonny Brook-Normans Kill	1430	1	2	3	Shafer, William M Sr	2843 Currybush Rd	Schenectady	NY	12306	2018
2845-2851 Currybush Rd	Schenectady	Private			Bonny Brook-Normans Kill	960	1	1	2	Shafer, William M Sr	2843 Currybush Rd	Schenectady	NY	12306	2018
286 Tidball Rd	Schenectady	Private			Bonny Brook-Normans Kill	3019	1	2	3	Frost, Robert J	286 Tidball Rd	Schenectady	NY	12306	2018
296 Kelley Station Rd	Duanesburg	None			Bonny Brook-Normans Kill	1577	1	2	3	Layton, Donald K	296 Kelley Station Rd	Duanesburg	NY	12056	2018
299 Delevan Rd	Delanson	Private			Bonny Brook-Normans Kill	2723	1	2	3	Asterino, Michael	299 Delevan Rd	Delanson	NY	12053	2018
303 Brookside Dr	Duanesburg	None			Bonny Brook-Normans Kill	3059	1	3	4	Zal, David R	303 Brookside Dr	Duanesburg	NY	12056	2018
318 Knight Rd	Delanson	Private			Bonny Brook-Normans Kill	2298	1	2	3	Holmes, Christopher S	318 Knight Rd	Delanson	NY	12053	2018
3189 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1413	1	1	2	Wilkinson, Derek	3189 Duanesburg Rd	Duanesburg	NY	12056	2018
3217 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	702	1	1	2	Gapczynski, Donald L	3217 Duanesburg Rd	Duanesburg	NY	12056	2018
3224 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	840	1	1	2	Conway, Gerald A	3224 Duanesburg Rd	Duanesburg	NY	12056	2018
3253 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	840	1	1	2	Kennison, Justin	3253 Duanesburg Rd	Duanesburg	NY	12056	2018
3265 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1092	1	1	2	DeCocco, Ralph H	3265 Duanesburg Rd	Duanesburg	NY	12056	2018
3328 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	936	1	1	2	DeCocco, Dominick	3328 Duanesburg Rd	Duanesburg	NY	12056	2018
334 Duanesburg Churches Rd	Delanson	Private			Bonny Brook-Normans Kill	3162	1	2	3	Manrell, Frances M	334 Duanesburg Churche Rd	Delanson	NY	12053	2018
3359 Lake Rd	Delanson	Private			Bonny Brook-Normans Kill	2135	1	2	3	Nardi, Jared R	3359 Lake Rd	Delanson	NY	12053	2018
337 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	1850	1	1	2	Haringa, Glenn E	337 South Kelley Rd	Schenectady	NY	12306	2018
3387 Lake Rd	Delanson	Private			Bonny Brook-Normans Kill	2665	1	3	4	Alex, James E	3387 Lake Rd	Delanson	NY	12053	2018
3431 Lake Rd	Delanson	None			Bonny Brook-Normans Kill	960	1	1	2	Kazmierczak, Kelsey A	3431 Lake Rd	Delanson	NY	12053	2018
345 W Shore Rd	Delanson	Private			Bonny Brook-Normans Kill	2664	1	4	5	Alvear, Jaime P	345 W Shore Rd	Delanson	NY	12053	2018
3467 Lake Rd	Delanson	Private			Bonny Brook-Normans Kill	1872	1	2	3	Durrant, David B	3467 Lake Rd	Delanson	NY	12053	2018
352 Thousand Acre Rd	Delanson	Private			Bonny Brook-Normans Kill	1162	1	1	2	Cobb, Frederick M Jr	352 Thousand Acre Rd	Delanson	NY	12053	2018
354 Delevan Rd	Delanson	None			Bonny Brook-Normans Kill	3265	1	2	3	Wiener, Donald	354 Delevan Rd	Delanson	NY	12053	2018
3559 Lake Rd	Delanson	Private			Bonny Brook-Normans Kill	1668	1	2	3	Satterlee, Norman F	3559 Lake Rd	Delanson	NY	12053	2018
3564-3566 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1064	1	1	2	Lomonaco, Joseph J	3564-3566 Scotch Ridge Rd	Duanesburg	NY	12056	2018
3593 Lake Rd	Delanson	Private			Bonny Brook-Normans Kill	1635	1	1	2	Vojnar, Thomas	3593 Lake Rd	Delanson	NY	12053	2018
3641 Lake Rd	Delanson	Private			Bonny Brook-Normans Kill	1905	1	2	3	Dixon, Walter V	3641 Lake Rd	Delanson	NY	12053	2018
366 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	2400	1	2	3	Wiederkehr, Brenda Ka	366 Skyline Dr	Schenectady	NY	12306	2018
369 Mt View Ln	Duanesburg	Private			Bonny Brook-Normans Kill	1610	1	1	2	Stigberg, Richard D	369 Mt View Ln	Duanesburg	NY	12056	2018
3717 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	2188	1	2	3	Proper, Victoria C	3717 Scotch Ridge Rd	Duanesburg	NY	12056	2018
3726 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	984	1	1	2	Keith, Laurie	3726 Duanesburg Rd	Duanesburg	NY	12056	2018
3781 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	864	1	1	2	DiCocco, Milio	3781 Scotch Ridge Rd	Duanesburg	NY	12056	2018
3798 Duanesburg Rd	Delanson	Private			Bonny Brook-Normans Kill	1279	1	1	2	Durrant Kathleen	687 Birchwood Dr	Duanesburg	NY	12056	2018
3811 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	2072	1	2	3	Denegar, Larry R	3811 Skyline Dr	Schenectady	NY	12306	2018
3853 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	1666	1	2	3	Hogan, Kevin D	3853 Skyline Dr	Schenectady	NY	12306	2018
387 Mudge Rd	Delanson	Private			Bonny Brook-Normans Kill	1646	1	1	2	Lineback, Denis J	387 Mudge Rd	Delanson	NY	12053	2018
393 Arquette Way	Duanesburg	Private			Bonny Brook-Normans Kill	2176	1	2	3	Arquette, Raymond J	393 Arquette Way	Duanesburg	NY	12056	2018
407 Shagbark Ct	Duanesburg	Private			Bonny Brook-Normans Kill	2006	1	2	3	Retajczyk, James E	407 Shagbark Ct	Duanesburg	NY	12056	2018
4088 Schoharie Tpke	Delanson	Private			Bonny Brook-Normans Kill	1550	1	1	2	Watt, Barbara A	4088 Schoharie Tpk	Delanson	NY	12053	2018
4124 Schoharie Tpke	Delanson	Private			Bonny Brook-Normans Kill	864	1	1	2	Beretz, Leonard P	4124 Schoharie Tpk	Delanson	NY	12053	2018
4136 Western Tpke	Delanson	Private			Bonny Brook-Normans Kill	2760	1	1	2	Putnam, Edward A	242 Duane Lake Rd	Duanesburg	NY	12056	2018
418 Thousand Acre Rd	Delanson	Private			Bonny Brook-Normans Kill	1513	1	1	2	Rose, Laurence L Jr.	418 Thousand Acre Rd	Delanson	NY	12053	2018
421 W Shore Rd	Delanson	Private			Bonny Brook-Normans Kill	1040	1	1	2	Macan, John W	421 W Shore Rd PO Box 27	Delanson	NY	12053	2018
4256 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1920	1	1	2	Reimann, William H	4256 Duanesburg Rd	Duanesburg	NY	12056	2018
4378 Schoharie Tpke	Delanson	Private			Bonny Brook-Normans Kill	1546	1	1	2	Ridgeway, Thomas J	4378 Schoharie Tpk	Delanson	NY	12053	2018
438 Knight Rd	Delanson	Private			Bonny Brook-Normans Kill	2608	1	2	3	Mullen, John V	438 Knight Rd	Delanson	NY	12053	2018
440 Main St	Delanson	Private			Bonny Brook-Normans Kill	1850	1	1	2	Farnum, Robert E	440 Main St	Delanson	NY	12053	2018
442 Van Patten Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1596	1	2	3	Zarcone, Nicholas A	442 Van Patten Rd	Duanesburg	NY	12056	2018
444 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	2467	1	2	3	Kucik, Richard	444 Skyline Dr	Schenectady	NY	12306	2018
4444 Schoharie Tpke	Delanson	Private			Bonny Brook-Normans Kill	1911	1	1	2	Thompson, Hollister	4444 Schoharie Tpk	Delanson	NY	12053	2018
4534 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1792	1	2	3	Kemp, Robert	4534 Scotch Ridge Rd	Duanesburg	NY	12056	2018
4553 Western Tpke	Duanesburg	Private			Bonny Brook-Normans Kill	927	1	1	2	Canastra, Charlotte	4553 Western Tpk	Duanesburg	NY	12056	2018
456 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	2918	1	2	3	McCumber, Mark R	456 South Kelley Rd	Schenectady	NY	12306	2018
4581 Western Tpke	Duanesburg	Private			Bonny Brook-Normans Kill	1248	1	1	2	Stephen Hover Living T	4581 Western Tpke PO Box 38	Duanesburg	NY	12056	2018
4584 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1703	1	2	3	Schreiber, Warren L	4584 Scotch Ridge Rd	Duanesburg	NY	12056	2018
4598-4616 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	2226	1	2	3	Vice, Charlene	4598 Duanesburg Rd	Duanesburg	NY	12056	2018
4605 Western Tpke	Delanson	Private			Bonny Brook-Normans Kill	1588	1	1	2	Smith, Bruce	3 Mount Marcy Circle	East Greenbus	NY	12061	2018
4623 Skyline Dr	Delanson	Private			Bonny Brook-Normans Kill	3200	1	3	4	Coffenberg, John P	4623 Skyline Dr	Delanson	NY	12053	2018
4655 Schoharie Tpke	Delanson	Private			Bonny Brook-Normans Kill	1456	1	2	3	Cornaire, Lawrence R	4655 Schoharie Tpk	Delanson	NY	12053	2018
466 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	1260	1	1	2	Baldwin, Ashley M	466 South Kelley Rd	Schenectady	NY	12306	2018
4662 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	2520	1	2	3	Fassett, Edward C Jr	4662 Duanesburg Rd	Duanesburg	NY	12056	2018
469 Thousand Acre Rd	Delanson	Private			Bonny Brook-Normans Kill	1688	1	1	2	Oldorff, Laurie S	469 Thousand Acre Rd	Delanson	NY	12053	2018
4722 Schoharie Tpke	Delanson	Private			Bonny Brook-Normans Kill	2116	1	2	3	Cornaire, Richard H	4722 Schoharie Tpk	Delanson	NY	12053	2018
475 Depot Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1804	2	2	4	Watrous, Peter	475 Depot Rd	Duanesburg	NY	12056	2018
475 Weaver Rd	Delanson	Private			Bonny Brook-Normans Kill	1671	1	2	3	Goldschmidt, David E	475 Weaver Rd	Delanson	NY	12053	2018
480 Old Dare Rd	Delanson	Private			Bonny Brook-Normans Kill	1804	1	2	3	Cook, Jerry	480 Old Dare Rd	Delanson	NY	12053	2018
4808 Skyline Dr	Delanson	Private			Bonny Brook-Normans Kill	2216	1	2	3	Frey, Kenneth R	4808 Skyline Dr	Delanson	NY	12053	2018
482 Weaver Rd	Delanson	Private			Bonny Brook-Normans Kill	3079	1	2	3	John F. Jr & Doris T. Ba	482 Weaver Rd	Delanson	NY	12053	2018
484 Knight Rd	Delanson	Private			Bonny Brook-Normans Kill	1700	1	2	3	Cestra, John	484 Knight Rd	Delanson	NY	12053	2018
486 Ash Ln	Duanesburg	Private			Bonny Brook-Normans Kill	1386	1	1	2	Ash, Stephen E	486 Ash Ln	Duanesburg	NY	12056	2018
488 Van Patten Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1500	1	1	2	LaCourse, Gary	488 Van Patten Rd	Duanesburg	NY	12056	2018
4894 Skyline Dr	Delanson	Private			Bonny Brook-Normans Kill	2464	1	2	3	Weaver, Carl J Jr	4894 Skyline Dr	Delanson	NY	12053	2018
494 Mt View Ln	Duanesburg	Private			Bonny Brook-Normans Kill	1904	1	1	2	Robles, Richard J	2698 Edgewood Ave	Schenectady	NY	12306	2018
511 Crow Hill Rd	Delanson	Private			Bonny Brook-Normans Kill	1787	1	1	2	Waddell, Laura J	511 Crow Hill Rd	Delanson	NY	12053	2018
5200 Skyline Dr	Delanson	Private			Bonny Brook-Normans Kill	2000	1	1	2	Koontz, Raymond E	5200 Skyline Dr	Delanson	NY	12053	2018
5223 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	2559	1	3	4	Krieger, Alan	5223 Scotch Ridge Rd	Duanesburg	NY	12056	2018
5261 Skyline Dr	Delanson	Private			Bonny Brook-Normans Kill	2099	1	1	2	Humphrey, Ward J	5261 Skyline Dr	Delanson	NY	12053	2018
531 W Shore Rd	Delanson	Private			Bonny Brook-Normans Kill	1677	1	1	2	Snyder, Christopher P	531 W Shore Rd	Delanson	NY	12053	2018
5356 Western Tpke	Duanesburg	Private			Bonny Brook-Normans Kill	935	1	1	2	Pachucki, David W	5356 Western Tpk	Duanesburg	NY	12056	2018
5358 Western Tpke	Duanesburg	Private			Bonny Brook-Normans Kill	2159	1	2	3	Molik, Nicholas	5358 Western Tpk	Duanesburg	NY	12056	2018
536 Delevan Rd	Delanson	Private			Bonny Brook-Normans Kill	2325	1	2	3	McGovern, Steven	536 Delevan Rd	Delanson	NY	12053	2018
537 Delevan Rd	Delanson	Private			Bonny Brook-Normans Kill	1716	1	2	3	Faucett, John	537 Delevan Rd	Delanson	NY	12053	2018
5375 Western Tpke	Duanesburg	Private			Bonny Brook-Normans Kill	1283	1	1	2	Cooper, Kelly M	5375 Western Tpk	Duanesburg	NY	12056	2018
5380 Western Tpke	Duanesburg	Private			Bonny Brook-Normans Kill	1286	1	1	2	Abdulla, Eshraq	5380 Western Tpk	Duanesburg	NY	120569701	2018
539 N Mansion Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1178	1	1	2	White, Debra E	539 N Mansion Rd	Duanesburg	NY	12056	2018
5390 Western Tpke	Duanesburg	Private			Bonny Brook-Normans Kill	2834	1	1	2	Coolidge, Carlie J	5390 Western Tpk	Duanesburg	NY	12056	2018
5392 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1645	1	2	3	Wood-Irvin, Teresa An	5392 Duanesburg Rd	Duanesburg	NY	12056	2018
5409 Western Tpke	Duanesburg	Private			Bonny Brook-Normans Kill	1050	1	1	2	Cooper, Douglas J	5409 Western Tpk	Duanesburg	NY	12056	2018
541 Darby Hill Rd	Delanson	Private			Bonny Brook-Normans Kill	1523	1	1	2	Inglese, Michael V	541 Darby Hill Rd	Delanson	NY	12053	2018
543 Van Patten Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1863	1	1	2	McCloud, Jared	543 Van Patten Rd	Duanesburg	NY	12056	2018
5434 Western Tpke	Duanesburg	Private			Bonny Brook-Normans Kill	720	1	1	2	Coolidge, Carlie J	5390 Western Tpk	Duanesburg	NY	12056	2018
545 Darby Hill Rd	Delanson	Private			Bonny Brook-Normans Kill	750	1	1	2	Luksa, Frank E	545 Darby Hill Rd	Delanson	NY	12053	2018
548 Knight Rd	Delanson	Private			Bonny Brook-Normans Kill	1456	1	2	3	Pellerin, Stephen	548 Knight Rd	Delanson	NY	12053	2018
5531 Western Tpke	Delanson	Private			Bonny Brook-Normans Kill	1809	1	1	2	Rowley, Scott E	5501 Scotch Ridge Rd	Duanesburg	NY	12056	2018
563 Mt View Ln	Duanesburg	Private			Bonny Brook-Normans Kill	2262	1	1	2	Pneuman, James F	719 Mt View Ln	Duanesburg	NY	12056	2018
5643 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1948	1	2	3	Carreau Gerald	5643 Scotch Ridge Rd	Duanesburg	NY	12056	2018
565 Van Patten Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1521	1	1	2	Kalinowski, Richard J	565 Van Patten Rd	Duanesburg	NY	12056	2018
5709 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	2569	2	2	4	Sells, Daniel B	5709 Duanesburg Rd	Duanesburg	NY	12056	2018
5727 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	2918	2	4	6	Slingerland, Robert J	5727 Duanesburg Rd	Duanesburg	NY	12056	2018
577 Kelley Station Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1854	1	1	2	Schaffer-Tinning, Glori	577 Kelley Station Rd	Duanesburg	NY	12056	2018
5778 Western Tpke	Duanesburg	Private			Bonny Brook-Normans Kill	1279	1	1	2	Van Wie, June E	5778 Western Tpk	Duanesburg	NY	12056	2018
579 Duanesburg Churches Rd	Delanson	Private			Bonny Brook-Normans Kill	2720	1	3	4	Kretzler, Robert J	579 Duanesburg Churches Rd	Delanson	NY	12053	2018
5791 Duanesburg Rd	Delanson	Private			Bonny Brook-Normans Kill	1114	1	1	2	Sharifipour Developme	1245 Milton Keynes Dr	Schenectady	NY	12309	2018
580 Weaver Rd	Delanson	Private			Bonny Brook-Normans Kill	2064	1	2	3	McCarthy, Terry	580 Weaver Rd	Delanson	NY	12053	2018
582 Van Patten Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1802	1	1	2	Tamer, Michael L	582 Van Patten Rd	Duanesburg	NY	12056	2018
5824 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1586	1	1	2	Whalen, Trisha	5824 Scotch Ridge Rd	Duanesburg	NY	12056	2018
5858 Skyline Dr	Delanson	Private			Bonny Brook-Normans Kill	1360	1	1	2	Coons, Michael	5858 Skyline Dr	Delanson	NY	12053	2018
5859 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1204	1	1	2	Gahan, Ryan	5859 Scotch Ridge Rd	Duanesburg	NY	12056	2018
5881 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1910	1	2	3	Ottendorf, Terry	5881 Scotch Ridge Rd PO Box 90	Duanesburg	NY	12056	2018
5909 Western Tpke	Duanesburg	Private			Bonny Brook-Normans Kill	1632	1	1	2	Ford, Eric P	5909 Western Tpk	Duanseburg	NY	12056	2018

5918 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1628	1	1	2	Mikus, John R	5918 Scotch Ridge Rd	Duanesburg	NY	12056	2018
5981 Western Tpke	Duanesburg	Private			Bonny Brook-Normans Kill	1842	1	2	3	Raffan, Ernest W	6010 Western Tpk	Duanesburg	NY	12056	2018
6010 Western Tpke	Duanesburg	Private			Bonny Brook-Normans Kill	1052	1	1	2	Raffan, Ernest	6010 Western Tpk	Duanesburg	NY	12056	2018
602 Depot Rd	Duanesburg	Private			Bonny Brook-Normans Kill	984	1	1	2	Malanowski, Howard A	602 Depot Rd	Duanesburg	NY	12056	2018
6189 Schoharie Tpke	Delanson	Private			Bonny Brook-Normans Kill	1620	1	2	3	Chrysler, Pamela	6189 Schoharie Tpk	Delanson	NY	12053	2018
619 Van Patten Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1169	1	1	2	Foltman, James E	619 Van Patten Rd	Duanesburg	NY	12056	2018
6204 Duanesburg Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1950	1	1	2	Vincent, David C	6204 Duanesburg Rd 129	Duanesburg	NY	12056	2018
6308 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1939	1	2	3	Dolatowski, Jared	6308 Scotch Ridge Rd	Duanesburg	NY	12056	2018
631 Darby Hill Rd	Delanson	Private			Bonny Brook-Normans Kill	1826	1	1	2	French, Jonathan	631 Darby Hill Rd	Delanson	NY	12053	2018
6349 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1374	1	1	2	Schworm, Nancy J	6349 Scotch Ridge Rd	Duanesburg	NY	12056	2018
636 Darby Hill Rd	Delanson	Private			Bonny Brook-Normans Kill	2900	1	2	3	Shaw, Leo M	636 Darby Hill Rd	Delanson	NY	12053	2018
6380 Scotch Ridge Rd	Duanesburg	Private			Bonny Brook-Normans Kill	2473	1	2	3	Borski, Max	6380 Scotch Ridge Rd	Duanesburg	NY	12056	2018
642 Littledale Farm Rd	Duanesburg	Private			Bonny Brook-Normans Kill	2906	1	1	2	Schworm, Harold C Tru	642 Liddledale Farm Rd	Duanesburg	NY	12056	2018
650 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	2174	1	2	3	Daversa Amy C	650 Skyline Dr	Schenectady	NY	12306	2018
651 Darby Hill Rd	Delanson	Private			Bonny Brook-Normans Kill	756	1	1	2	Wright, Arthur E	651 Darby Hill Rd	Delanson	NY	12053	2018
660 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	1470	1	1	2	Potanovic, Thomas J	660 Skyline Dr	Schenectady	NY	12306	2018
661 Mt View Ln	Duanesburg	Private			Bonny Brook-Normans Kill	2416	1	2	3	Howe, Thomas J	661 Mt View Ln	Duanesburg	NY	12056	2018
688 Kelley Station Rd	Duanesburg	Private			Bonny Brook-Normans Kill	1062	1	2	3	Florence, Chester E III	688 Kelley Station Rd	Duanesburg	NY	12056	2018
693 Darby Hill Rd	Delanson	Private			Bonny Brook-Normans Kill	976	1	1	2	Chicoine, Billy Joe	693 Darby Hill Rd	Delanson	NY	12053	2018
7180 Western Tpke	Delanson	Private			Bonny Brook-Normans Kill	1508	1	1	2	Trubridge, Dennis	7180 Western Tpk	Delanson	NY	12053	2018
7214 Western Tpke	Delanson	Private			Bonny Brook-Normans Kill	2000	2	2	4	LaBreck, Michael J	7214 Western Tpk	Delanson	NY	12053	2018
7256 Western Tpke	Delanson	Private			Bonny Brook-Normans Kill	1344	1	2	3	Coons, Pamela M	7256 Western Tpk	Delanson	NY	12053	2018
728 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	1841	1	2	3	Stella, Brian	728 Skyline Dr	Schenectady	NY	12306	2018
7289 Duanesburg Rd	Delanson	None			Bonny Brook-Normans Kill	840	1	1	2	Garg, Ajay P MD	8327 Tulpehocken Ave	Elkins Park	PA	19027	2018
731 Darby Hill Rd	Delanson	Private			Bonny Brook-Normans Kill	2000	1	2	3	Remling, Barbara	731 Darby Hill Rd	Delanson	NY	12053	2018
7338 Western Tpke	Delanson	Private			Bonny Brook-Normans Kill	1248	1	1	2	Sullivan, James M	7338 Western Tpk	Delanson	NY	12053	2018
7416 Western Tpke	Delanson	Private			Bonny Brook-Normans Kill	1712	2	2	4	Sommers, Carol J	7416 Western Tpk	Delanson	NY	12053	2018
7478 Western Tpke	Delanson	Private			Bonny Brook-Normans Kill	2372	1	1	2	Pettit, Link A	7478 Western Tpk	Delanson	NY	12053	2018
7648 Western Tpke	Delanson	Private			Bonny Brook-Normans Kill	2840	2	2	4	LaBier, Donald R Sr	7648 Western Tpke PO Box 245	Delanson	NY	12053	2018
775 Darby Hill Rd	Delanson	Private			Bonny Brook-Normans Kill	2745	1	1	2	Ceranski, Daniel S	775 Darby Hill Rd	Delanson	NY	12053	2018
780 Duanesburg Churches Rd	Delanson	Private			Bonny Brook-Normans Kill	1548	1	2	3	Wasial, Valerie F	780 Duanesburg Churche Rd	Delanson	NY	12053	2018
787 Mt View Ln	Duanesburg	Private			Bonny Brook-Normans Kill	2392	1	3	4	Black, Stephen H	787 Mt View Ln	Duanesburg	NY	12056	2018
790 Kelley Station Rd	Duanesburg	Private			Bonny Brook-Normans Kill	2030	1	2	3	Pangburn, Edward C	790 Kelley Station Rd	Duanesburg	NY	12056	2018
8044 Western Tpke	Delanson	Private			Bonny Brook-Normans Kill	1515	1	1	2	Hudson, Thomas J Jr.	8044 Western Tpk	Delanson	NY	12053	2018
8078 Western Tpke	Delanson	Private			Bonny Brook-Normans Kill	1506	1	1	2	Sellie, Thomas J	8078 Western Tpk	Delanson	NY	12053	2018
833 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	2380	1	1	2	Spirit & Truth Church	833 South Kelley Rd	Schenectady	NY	12306	2018
841 Mt View Ln	Duanesburg	Private			Bonny Brook-Normans Kill	1791	1	2	3	Archambeault, David A	841 Mt View Ln	Duanesburg	NY	12056	2018
868 Main St	Delanson	Private			Bonny Brook-Normans Kill	4342	1	2	3	Wilber, Charles H	868 Main St	Delanson	NY	12053	2018
894 Duanesburg Churches Rd	Delanson	Private			Bonny Brook-Normans Kill	1996	1	2	3	Wenzel, William Jr	894 Duanesburg Churche Rd	Delanson	NY	12053	2018
901 Skyline Dr	Schenectady	Private			Bonny Brook-Normans Kill	1494	1	1	2	Santabarbara, Gino	7815 Regol Heron Circle 20	Naples	FL	34104	2018
914 Duanesburg Churches Rd	Delanson	Private			Bonny Brook-Normans Kill	2164	1	4	5	Marks, John T	914 Duanesburg Churche Rd	Delanson	NY	12053	2018
921-923 South Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	2688	2	4	6	Vincent, Darrin	921 South Kelley Rd	Schenectady	NY	12306	2018
922 North Kelley Rd	Schenectady	Private			Bonny Brook-Normans Kill	1885	1	1	2	Daley Sean	922 North Kelley Rd	Schenectady	NY	12306	2018
956 Main St	Delanson	Private			Bonny Brook-Normans Kill	1568	1	1	2	Jarvis, Robert	956 Main St	Delanson	NY	12053	2018
957 Weaver Rd	Delanson	Private			Bonny Brook-Normans Kill	1635	1	1	2	Dykeman, Terry	957 Weaver Rd	Delanson	NY	12053	2018
996 Main St	Delanson	Private			Bonny Brook-Normans Kill	1000	1	1	2	Smith, Tracy E	996 Main St	Delanson	NY	12053	2018
1 Marian Ct	Town of Guilder	Private	210	One family year-round	Bozen Kill	1574	1	1	2	Hans, Matthew C	1 Marian Ct	Altamont	NY	12009	2018
1 Simons Ln Pr	Town of Guilder	Private	210	One family year-round	Bozen Kill	930	1	2	3	Simons, Vaughan	1 Simons Ln	Altamont	NY	12009	2018
100 Domanico's Way Pr	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	2041	1	2	3	Domanico, Louis N	100 Domanico's Way PO Box 311	Altamont	NY	12009	2018
100 Lewis Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1056	1	1	2	Usher Richard	PO Box 277	Altamont	NY	12009	2018
100 Maria Ct	Town of Knox	Private	260	Seasonal residences	Bozen Kill	2148	1	2	3	Motyka, George P Jr	100 Maria Ct	Schenectady	NY	12306	2018
100 Shady Creek Ln Pr	Town of Guilder	Private	210	One family year-round	Bozen Kill	1516	1	2	3	Stewart, Bruce R Jr	100 Shady Creek Ln Pr	Altamont	NY	12009	2018
100 Sisson Rd	Village of Altam	Private	210	One family year-round	Bozen Kill	1400	1	1	2	Lupo, Jason D	100 Sisson Rd	So Glens Fall	NY	12803	2018
10050 Mariaville Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1239	1	1	2	Smith, Ronald K	1005 Mariaville Rd	Pattersonvill	NY	12137	2018
1007 Leesome Ln	Town of Guilder	Private	210	One family year-round	Bozen Kill	3626	1	2	3	Whaley, Matthew C	1007 Leesome Ln	Altamont	NY	12009	2018
101 Maria Ct	Town of Knox	Private	260	Seasonal residences	Bozen Kill	2148	1	2	3	Fallat, Jeffrey	101 Maria Ct	Schenectady	NY	12306	2018
101 Pond Hill Ln Pr	Town of Guilder	Private	210	One family year-round	Bozen Kill	2233	1	2	3	Khoury, Virginia M	101 Pond Hill Ln	Altamont	NY	12009	2018
101 Villeneuve Dr	Town of Knox	Private	240	Rural residence with a	Bozen Kill	896	1	1	2	Curtis, Robert B Jr	1602 Township Rd	Altamont	NY	12009	2018
10149 Sthwy 30	Town of Guilder	Private	210	One family year-round	Bozen Kill	2540	1	2	3	Skinner, David R	1014 Sthwy 30	Pattersonvill	NY	12137	2018
1019 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1466	1	2	3	Miller, Arthur C	1019 W Duane Lake Rd	Duanesburg	NY	12056	2018
102 Colliton Rd	Town of Knox	Private	120	Field crops	Bozen Kill	1716	1	1	2	Dean, Carol A	102 Colliton Rd	Delanson	NY	12053	2018
1027 Leesome Ln	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	4350	1	1	2	Pollard, John III	1027 Leesome Ln PO Box 658	Altamont	NY	12009	2018
103 Betts Ln	Town of Berne	Private	210	One family year-round	Bozen Kill	2194	1	1	2	Fuss Frank A	103 Betts Ln	East Berne	NY	12059	2018
104 Maria Ct	Town of Knox	Private	260	Seasonal residences	Bozen Kill	2148	1	2	3	Coons, Allan	104 Maria Ct	Schenectady	NY	12306	2018
1043 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	3281	1	2	3	Tanzman, Jay M	1043 W Duane Lake Rd	Duanesburg	NY	12056	2018
10482 Sthwy 30	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	1359	1	1	2	Cameron, John W Jr	1048 State Highway 30	Amsterdam	NY	12010	2018
105 Betts Ln	Town of Berne	Private	210	One family year-round	Bozen Kill	1536	1	1	2	Conway, Robert M	105 Betts Ln	East Berne	NY	12059	2018
105 Liberty Rd	Town of Berne	Private	210	One family year-round	Bozen Kill	2190	1	2	3	Ryan, Todd R	105 Liberty Rd	Troy	NY	12180	2018
105 Maria Ct	Town of Knox	Private	210	One family year-round	Bozen Kill	2036	1	2	3	Sample, Jeanne A	105 Maria Ct	Schenectady	NY	12306	2018
1051 Scotch Bush Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	2521	1	1	2	Neznek, Judith S	1051 Scotch Bush Rd	Pattersonvill	NY	12137	2018
106 Maria Ct	Town of Knox	Private	260	Seasonal residences	Bozen Kill	2472	1	2	3	Urbanski, Joseph E	106 Maria Ct	Schenectady	NY	12306	2018
1067 Joshua Ln Pr	Town of Guilder	Private	210	One family year-round	Bozen Kill	2378	1	1	2	Shanklin, Elliott W	1067 Joshua Ln	Altamont	NY	12009	2018
107 Liberty Rd	Town of Berne	Private	210	One family year-round	Bozen Kill	1144	1	1	2	Miller Samuel J Jr	107 Liberty Rd	Troy	NY	121809534	2018
107 Maria Ct	Town of Knox	Private	260	Seasonal residences	Bozen Kill	2424	1	2	3	Trudell, Paul F	107 Maria Ct	Schenectady	NY	12306	2018
107 Middle Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1013	1	1	2	Miller, Debra D	107 Middle Rd	Altamont	NY	12009	2018
108 Lewis Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1772	1	1	2	Broomhall Daniel D	108 Lewis Rd	Altamont	NY	12009	2018
1080 Township Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	2080	1	1	2	Torrisi, Anthony J	1080 Township Rd	Altamont	NY	12009	2018
1083 Township Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	2506	1	2	3	Kleppel Gary S	1093 Township Rd	Altamont	NY	12009	2018
1087 Leesome Ln	Town of Guilder	Private	210	One family year-round	Bozen Kill	3945	1	2	3	Person, Thomas J	1087 Leesome Ln PO Box 752	Altamont	NY	12009	2018
1089 Berne Altamont Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1584	1	2	3	MacDonald, Ian	1089 Berne Altamont Rd	Altamont	NY	12009	2018
1089 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1144	1	1	2	Eliott, Cynthia B	1089 W Duane Lake Rd	Duanesburg	NY	12056	2018
109 Betts Ln	Town of Berne	Private	260	Seasonal residences	Bozen Kill	1176	1	1	2	O'Connor, Kevin	2673 Troy-Schenectady Rd	Niskayuna	NY	12309	2018
109 Maria Ct	Town of Knox	Private	260	Seasonal residences	Bozen Kill	2908	1	2	3	Viscusi, Dino	109 Maria Ct	Schenectady	NY	12306	2018
1093 Berne Altamont Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	3410	1	2	3	Johnson, William F	1093 Berne Altamont Rd	Altamont	NY	12009	2018
1096 Leesome Ln	Town of Guilder	Private	210	One family year-round	Bozen Kill	2208	1	1	2	Grant, Lawrence V	1096 Leesome Ln	Altamont	NY	12009	2018
1099 Township Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1138	1	1	2	Scott, Elizabeth A	PO Box 177	Altamont	NY	12009	2018
11 Barnes Ln	Town of Berne	Private	280	Residential	Bozen Kill	400	1	0	1	Hallenbeck, Everett	11 Barnes Ln	East Berne	NY	12059	2018
11 Callahan Ln	Town of Berne	None	260	Seasonal residences	Bozen Kill	930	1	1	2	Callahan, Joshua J	16 Home Ave	Albany	NY	12208	2018
110 Cedar Ln	Town of Knox	Private	260	Seasonal residences	Bozen Kill	1428	1	1	2	Oneil Joan L	832 Harris Dr	Schenectady	NY	12309	2018
110 Maria Ct	Town of Knox	Private	260	Seasonal residences	Bozen Kill	2450	1	3	4	McCafferty, Isabel	110 Maria Ct	Schenectady	NY	12306	2018
1104 Leesome Ln	Town of Guilder	Private	210	One family year-round	Bozen Kill	1686	1	1	2	Grant, Richard	1104 Leesome Ln	Altamont	NY	12009	2018
1106 Township Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1482	1	1	2	Doherty, David	1536 Knox Cave Rd	Delanson	NY	12053	2018
111 Pond Hill Ln Pr	Town of Guilder	Private	210	One family year-round	Bozen Kill	972	1	2	3	Connolly, Kevin	111 Pond Hill Ln	Altamont	NY	12009	2018
1119 Berne Altamont Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	3233	1	2	3	Porter, Frances M	1119 Berne Altamont Rd	Altamont	NY	12009	2018
112 Maria Ct	Town of Knox	Private	260	Seasonal residences	Bozen Kill	1720	1	2	3	Melillo, Angelo	112 Maria Ct	Schenectady	NY	12306	2018
1121 Township Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1416	1	1	2	Rice Robert E Jr	1121 Township Rd	Altamont	NY	12009	2018
1125 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1299	1	2	3	Grasek, David	1125 W Duane Lake Rd	Duanesburg	NY	12056	2018
1126 Township Rd	Town of Knox	Private	400	Commercial	Bozen Kill	3137	2	2	4	Mickle Gary	1126 Township Rd	Altamont	NY	12009	2018
1129 Berne Altamont Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	3980	1	2	3	Rutledge, Scott	1129 Berne Altamont Rd	Altamont	NY	12009	2018
1129 Giffords Church Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1204	1	1	2	Carman Thomas G	1129 Giffords Church Rd	Schenectady	NY	12306	2018
113 Betts Ln	Town of Berne	Private	260	Seasonal residences	Bozen Kill	1296	1	1	2	Keller, Joseph G Sr	34 Wiggand Dr	Glenmont	NY	12077	2018
113 Maria Ct	Town of Knox	Private	260	Seasonal residences	Bozen Kill	4508	1	3	4	Longo, Richard J	113 Maria Ct	Schenectady	NY	12306	2018
1130 Bozenkill Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1944	1	1	2	Shephard, Charles	1130 Bozenkill Rd	Delanson	NY	12053	2018
114 Craven Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	2100	1	1	2	Kirik Kenneth E	114 Craven Rd	Delanson	NY	12053	2018
1147 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1987	1	2	3	Wagner, Laurie M	1147 W Duane Lake Rd	Duanesburg	NY	12056	2018
115 Furbeck Rd	Duanesburg	Private			Bozen Kill	1513	1	1	2	Dunn, William H	115 Furbeck Rd	Duanesburg	NY	12056	2018
1153 Schoharie Tpke	Duanesburg	Private			Bozen Kill	1732	1	3	4	Hickey, John E	1153 Schoharie Tpk	Duanesburg	NY	12056	2018
116 Cedar Lane Rd	Town of Knox	Private	260	Seasonal residences	Bozen Kill	680	1	1	2	Boehm, Frederick T	131 Main St Apt 701	S. Burlington	VT	5401	2018
1160 Berne Altamont Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	4488	1	7	8	Roman, Marc	1160 Berne Altamont Rd	Altamont	NY	12009	2018
1170 Township Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1586	1	1	2	O'Donnell, Travis	1170 Township Rd	Altamont	NY	12009	2018
118 Anders Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1568	1	1	2	Clum Doyle L	118 Anders Rd	Johnsonville	NY	120940152	2018
118 Cedar Ln	Town of Knox	Private	260	Seasonal residences	Bozen Kill	748	1	1	2	Teevan John R Jr	16 Bedford Ct	Delmar	NY	12054	2018
118 Witter Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	2650	1	1	2	Godenzi, Theresa K	118 Witter Rd	Altamont	NY	12009	2018
1189 Berne Altamont Rd	Town of Guilder	None	210	One family year-round	Bozen Kill	1890	1	2	3	Perlee, Jeffrey S	PO Box 475	Altamont	NY	12009	2018
119 Betts Ln	Town of Berne	Private	260	Seasonal residences	Bozen Kill	1344	1	1	2	Christian, George	119 Betts Ln	East Berne	NY	12059	2018
1190 Berne Altamont Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1620	1	1	2	Doyle, Barbara E	1190 Berne Altamont Rd	Altamont	NY	12009	2018
1193 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1568	1	2	3	Freeman, Ward Olmste	1193 W Duane Lake Rd	Duanesburg	NY	12056	2018
121 Pine Hill Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1764	1	1	2	Seifert Ronald	121 Pine Hill Rd	Buskirk	NY	120289609	2018
1215 Berne Altamont Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	5347	2	4	6	Cowan Canetto, Lisa H	PO Box 443	Altamont	NY	12009	2018
1217 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1173	1	1	2	Haight, William & Colle	20 Glenmore Dr	Niskayuna	NY	12309	2018
122 Cedar Ln	Town of Knox	Private	210	One family year-round	Bozen Kill	704	1	1	2	Dickson, Harvey C Jr	122 Cedar Ln	Voorheesville	NY	12186	2018

122 Harrison Ave	Village of Altam	Private	210	One family year-round	Bozen Kill	1688	1	1	2	Strieble, Ivan M Jr	122 Harrison Ave	So Glens Fall	NY	12803	2018
1237 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1477	1	2	3	Hyrny, C. Michael	1237 W Duane Lake Rd	Duanesburg	NY	12056	2018
125 Quay Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1850	1	1	2	Elble, Nathan E	125 Quay Rd	Delanson	NY	12053	2018
1276 Thompsons Lake Rd	Town of Berne	Private	411	Apartments	Bozen Kill	1248	1	1	2	Thompsons Lake Enter	1274 Thomsons Lake Rd	East Berne	NY	12059	2018
1278 Thompsons Lake Rd	Town of Berne	Private	210	One family year-round	Bozen Kill	1768	1	1	2	Pangburn, Marcia	1278 Thompsons Lake Rd	East Berne	NY	12059	2018
1280 Knox Cave Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1120	1	1	2	Rickard Marilyn	1280 Knox Cave Rd	Delanson	NY	12053	2018
1282 N Mansion Rd	Duanesburg	Private			Bozen Kill	2384	1	2	3	Murray, Daniel J	1282 N Mansion Rd	Duanesburg	NY	12056	2018
1283 Thompsons Lake Rd	Town of Berne	Private	210	One family year-round	Bozen Kill	1924	1	2	3	Tasso, Lorenzo	21st St 15C	Long Island City	NY	11106	2018
1283 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1270	1	1	2	Thomas, Daniel C	1283 W Duane Lake Rd	Duanesburg	NY	12056	2018
1284 Scotch Ridge Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2278	1	1	2	Manley, David L	1284 Scotch Ridge Rd	Schenectady	NY	12306	2018
1286 Thompsons Lake Rd	Town of Berne	Private	210	One family year-round	Bozen Kill	798	1	1	2	Hand, Eileen T	3 Stonehedge Ln 7A	Albany	NY	12203	2018
1289 Thompsons Lake Rd	Town of Berne	Private	280	Residential	Bozen Kill	1576	1	1	2	Bradt, George T	1289 Thompsons Lake Rd	East Berne	NY	12059	2018
1297 Thacher Park Rd	Town of Berne	Private	210	One family year-round	Bozen Kill	2376	1	1	2	Raber, Thomas R	1297 Thacher Park Rd	East Berne	NY	12059	2018
1299 Schoharie Tpke	Duanesburg	Private			Bozen Kill	2572	1	2	3	Shannon, James M	1299 Schoharie Tpk	Duanesburg	NY	12056	2018
1315 Bozenkill Rd	Town of Knox	None	210	One family year-round	Bozen Kill	1300	1	2	3	Woessner, Delores	1315 Bozenkill Rd	Delanson NY	NY	12053	2018
1315 Township Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1064	1	1	2	Saddlemire, as Trustee	1315 Township Rd	Altamont	NY	12009	2018
132 Pattersonville-Rynex Cor	Town of Knox	Private	210	One family year-round	Bozen Kill	833	1	0	1	Gifford, Edward N	132 Pattersonville-Ryn Rd	Schenectady	NY	12306	2018
133 Middle Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1500	1	2	3	Czebiniak, James M	133 Middle Rd	Altamont	NY	12009	2018
1339 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	810	1	0	1	Runion, Kenneth D	1265 91st Terrace Rd	Summerfield	FL	34491	2018
1347 Berne Altamont Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2999	1	2	3	Fuss Frank A	1347 Berne Altamont Rd	Altamont	NY	12009	2018
1369 Thompsons Lake Rd	Town of Berne	Private	220	Two family year-round	Bozen Kill	3258	2	2	4	Richardson, Geoffrey	1370 Thompsons Lake Rd	East Berne	NY	12059	2018
1370 Thompsons Lake Rd	Town of Berne	Private	210	One family year-round	Bozen Kill	624	1	1	2	Richardson, Geoffrey	1370 Thompsons Lake Rd	East Berne	NY	12059	2018
1379 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1840	1	1	2	Lepore, Kathleen	1379 W Duane Lake Rd	Duanesburg	NY	12056	2018
1386 Thompsons Lake Rd	Town of Berne	Private	210	One family year-round	Bozen Kill	1428	1	2	3	Burke, Joseph L Jr	PO Box 161	East Berne	NY	12059	2018
140 Quay Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1166	1	1	2	Hall, Stephen D III	140 Quay Rd	Delanson	NY	12053	2018
1416 Thompsons Lake Rd	Town of Berne	Private	210	One family year-round	Bozen Kill	720	1	1	2	Fazzolari, Dominick	134 W Houston St	New York	NY	10012	2018
1417 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	2580	1	2	3	Roberts, Mary	1417 W Duane Lake Rd	Duanesburg	NY	12056	2018
1427 Schoharie Tpke	Duanesburg	Private			Bozen Kill	1249	1	1	2	Marx, Joan M	1427 Schoharie Tpk	Duanesburg	NY	12056	2018
1429 Bozenkill Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1130	1	1	2	House of Equus LLC	5 Southside Dr Ste 290	Clifton Park	NY	12065	2018
1443 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	2368	2	3	5	Hotaling, Kathleen	1443 W Duane Lake Rd	Duanesburg	NY	12056	2018
1451 Berne-Altamont Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2128	1	3	4	Varbero Mary A	1451 Berne-Altamont Rd	Altamont	NY	12009	2018
1463 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1658	1	2	3	Elliott David	410 Bond Rd	Altamont	NY	12009	2018
1465 Schoharie Tpke	Duanesburg	None			Bozen Kill	1624	1	2	3	Huth, Holly R	1465 Schoharie Tpk	Duanesburg	NY	12056	2018
1468 Township Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1892	1	1	2	Sheroka John E Jr	1468 Township Rd	Altamont	NY	12009	2018
1472 Bozenkill Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1600	1	1	2	Murphy Laura	1472 Bozenkill Rd	Delanson	NY	12053	2018
1483 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1400	1	1	2	Amorosi, Toni M	1483 W Duane Lake Rd	Duanesburg	NY	12056	2018
1497 Putnam Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2298	1	2	3	Woodzell, George W	1497 Putnam Rd	Schenectady	NY	12306	2018
15 Barber Ln	Town of Berne	Private	280	Residential	Bozen Kill	512	1	1	2	Thompson, Joseph D	15 Barber Ln	East Berne	NY	12059	2018
1516 Berne Altamont Rd	Town of Knox	None	210	One family year-round	Bozen Kill	1624	1	2	3	McDonnell, Robert	1516 Berne Altamont Rd	Altamont	NY	12009	2018
1523 Schoharie Tpke	Duanesburg	Private			Bozen Kill	2438	1	1	2	Lounsbury, Todd F	1523 Schoharie Tpk	Duanesburg	NY	12056	2018
1523 Thompsons Lake Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1456	1	1	2	Charlebois Donna L	1523 Thompsons lake Rd	East Berne	NY	12059	2018
1526 Knox Cave Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1716	1	2	3	Courneen Danielle	1526 Knox Cave Rd	Delanson	NY	12053	2018
153 Pine Hill Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1694	1	2	3	Seifert, Kyle A	153 Pine Hill Rd	Buskirk	NY	12028	2018
153 Quay Rd	Town of Knox	Private	280	Residential	Bozen Kill	624	1	1	2	Heitzman Beth A	153 Quay Rd	Delanson	NY	12053	2018
1536 Knox Cave Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1932	1	2	3	Doherty David	1536 Knox Cave Rd	Delanson	NY	12053	2018
1549 Bozenkill Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2138	1	2	3	Bates Thomas A	1549 Bozenkill Rd	Delanson	NY	12053	2018
1549 Knox Cave Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	2632	1	2	3	Nava, Sean	1549 Knox Cave Rd	Delanson	NY	12053	2018
155 Hadley Hill Rd	Town of Knox	None	920	Private hunting and fis	Bozen Kill	368	1	0	1	Zawilinski, Terry A	442 Mc Quade Rd	Amsterdam	NY	120107137	2018
155 Middle Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2100	1	0	1	Blanck, Arnold D III	155 Middle Rd	Altamont	NY	12009	2018
1562 Bozenkill Rd	Town of Knox	None	210	One family year-round	Bozen Kill	1875	1	1	2	Paige Steven E	1562 Bozenkill Rd	Delanson	NY	12053	2018
1568 Berne Altamont Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1763	1	2	3	Whitlock Donald A	1568 Berne Altmont Rd	Altamont	NY	12009	2018
1576 Township Rd	Town of Knox	Private	120	Field crops	Bozen Kill	1706	1	1	2	Coulter Walter	1576 Township Rd	Altamont	NY	12009	2018
16 Shingle Hollow Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1456	1	1	2	Margiotta, Thomas J	16 Shingle Hollow Rd	Petersburg	NY	12138	2018
16 Sturgess Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1184	1	1	2	Gardner James	16 Sturgess Rd	Altamont	NY	12009	2018
160 Ketcham Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1008	1	1	2	Salisbury, Gary W	184 Ketcham Rd	Voorheesville	NY	12186	2018
160 Middle Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1224	1	1	2	Perrotti, Lawrence N	PO Box 188	Sloansville	NY	121600188	2018
1611 Currybush Rd	Town of Knox	Private	220	Two family year-round	Bozen Kill	2052	1	2	3	Wilkie, Robert G	1611 Currybush Rd	Schenectady	NY	12306	2018
162 Davignon Rd	Town of Berne	None	210	One family year-round	Bozen Kill	1168	1	1	2	Hoy, Edwin J	26 Wixon Rd	Camel	NY	10512	2018
1623 Thompsons Lake	Town of Knox	None	240	Rural residence with a	Bozen Kill	1801	1	2	3	Thomas, Colin J	1623 Thompsons Lake Rd	East Berne	NY	12059	2018
1627 Bozenkill Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	2312	1	2	3	Curry, William O	1627 Bozenkill Rd	Delanson	NY	12053	2018
1628 Bozenkill Rd	Town of Knox	None	240	Rural residence with a	Bozen Kill	2400	1	2	3	Mentiply, Donald	1628 Bozenkill Rd	Delanson	NY	12053	2018
164 Quay Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2436	1	2	3	Iarusso, Virginia	164 Quay Rd	Delanson	NY	12053	2018
164 Verbeck Ave	Town of Knox	Private	210	One family year-round	Bozen Kill	1304	1	1	2	Bova James A	164 Verbeck Ave	Schaghticoke	NY	12154	2018
1652 Warners Lake Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	3600	1	3	4	Allen Timothy P	1652 Warners Lake Rd	Altamont	NY	12009	2018
166 Whipple Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1758	1	2	3	Ashby Terry K	166 Whipple Rd	East Berne	NY	12059	2018
167 Gray Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	3050	1	2	3	Masullo, Carmine L	167 Gray Rd	Altamont	NY	12009	2018
1672 Bozenkill Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1767	1	1	2	Roberts Marion	1672 Bozenkill Rd	Altamont	NY	12009	2018
168 Quay Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	2780	1	1	2	Quinn, Jonathan	168 Quay Rd	Delanson	NY	12053	2018
1697 Thompsons Lake Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	2620	1	1	2	Novello Peter	1697 Thompsons Lake Rd	East Berne	NY	12059	2018
172 Verbeck Ave	Town of Knox	Private	220	Two family year-round	Bozen Kill	768	1	1	2	Roy, Amiee	172 Verbeck Ave	Schaghticoke	NY	12154	2018
1724 Warners Lake Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2368	1	2	3	Drake Robert E	1724 Warners Lake Rd	East Berne	NY	12059	2018
1727 Thompsons Lake Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1624	1	1	2	Chapman Verna E	1727 Thompsons Lake Rd	East Berne	NY	12059	2018
173 Gray Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	2999	1	2	3	Masullo, Steven M	173 Gray Rd	Altamont	NY	12009	2018
1761 Schoharie Tpke	Duanesburg	Private			Bozen Kill	1833	2	2	4	Will Mar Development	1761 Schoharie Tpk	Duanesburg	NY	12056	2018
1779 Currybush Rd	Town of Knox	Private	241	Primary residential, als	Bozen Kill	1400	1	1	2	Coons, Joseph C	1779 Currybush Rd	Schenectady	NY	12306	2018
178 Verbeck Ave	Town of Knox	Private	210	One family year-round	Bozen Kill	1948	1	2	3	Privett, Brad A	178 Verbeck Ave	Schaghticoke	NY	121549719	2018
1782 Schoharie Tpke	Duanesburg	Private			Bozen Kill	1308	1	1	2	Tubb, Lou-Ann	1782 Schoharie Tpk	Duanesburg	NY	12056	2018
179 Nick Mush Rd	Town of Knox	Private	270	Mobile home	Bozen Kill	1996	1	1	2	Goossen Eugene C	179 Nick Mush Rd	Buskirk	NY	120289611	2018
1804 Thompsons Lake Rd	Town of Knox	Private	260	Seasonal residences	Bozen Kill	768	1	0	1	Hunter, Janice M	15 Rosemont St	Albany	NY	12203	2018
1824 Berne Altamont Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1456	1	1	2	Kolanchick, Mark	9 Spruce Point Rd	Kittery	ME	3904	2018
1824 Schoharie Tpke	Duanesburg	Private			Bozen Kill	1536	1	1	2	Vunk, Scott T	1824 Schoharie Tpk	Duanesburg	NY	12056	2018
183 Bell Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1008	1	1	2	Vinehout, Charles	183 Bell Rd	Altamont	NY	12009	2018
184 Gray Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	2100	1	2	3	Villeneuve, Gary	184 Gray Rd	Altamont	NY	12009	2018
184 Ketcham Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2079	1	1	2	Salisbury Gary W	184 Ketcham Rd	Voorheesville	NY	12186	2018
1856 Schoharie Tpke	Duanesburg	Private			Bozen Kill	1452	1	1	2	Doty, Arthur J	1856 Schoharie Tpk	Duanesburg	NY	120569802	2018
1892 Knox Cave Rd	Town of Knox	None	240	Rural residence with a	Bozen Kill	2800	1	2	3	Hoffman George	1160 Central Ave	Albany	NY	12205	2018
1924 Schoharie Tpke	Duanesburg	Private			Bozen Kill	1440	1	2	3	Vunk, Betty C	1924 Schoharie Tpk PO Box 4	Duanesburg	NY	12056	2018
194 Quay Rd	Town of Knox	Private	220	Two family year-round	Bozen Kill	2780	2	2	4	Sherman Daniel A	194 Quay Rd # 1	Delanson	NY	12053	2018
195 Bozenkill Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1783	1	1	2	Ullman, Joseph P	PO Box 23	Altamont	NY	12009	2018
1953 Thompsons Lake Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	2250	1	2	3	Koch, Harry J	1953 Thompsons Lake Rd	Altamont	NY	12009	2018
197 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	2082	1	1	2	Donaldson, William M	197 W Duane Lake Rd	Duanesburg	NY	12056	2018
20 Callahan Ln	Town of Berne	Private	260	Seasonal residences	Bozen Kill	918	1	1	2	Novak, Michael G	389 Raccoon Rd	The Villages	FL	32163	2018
20 Reservoir Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1752	1	1	2	Parella, Alfred B	PO Box 448	Altamont	NY	12009	2018
200 Gray Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1858	1	1	2	Ramundo, Tracey Jo	200 Gray Rd	Altamont	NY	12009	2018
204 Bell Rd	Town of Knox	Private	241	Primary residential, als	Bozen Kill	2020	1	1	2	McCauley, Eleanor	204 Bell Rd	Altamont	NY	12009	2018
2076 Schoharie Tpke	Duanesburg	Private			Bozen Kill	2034	1	1	2	Krouse, Jason P	2076 Schoharie Tpk	Duanesburg	NY	12056	2018
210 Main St	Village of Altam	Private	240	Rural residence with a	Bozen Kill	3640	1	2	3	Clark, Douglas S	210 Main St	Altamont	NY	12009	2018
2126 Schoharie Tpke	Duanesburg	Private			Bozen Kill	1872	1	1	2	Colon-Guasp, Herminio	2126 Schoharie Tpk	Duanesburg	NY	12056	2018
2186 Schoharie Tpke	Delanson	Private			Bozen Kill	1337	1	1	2	White, Beverly A	146 Bullock Rd	Slingerlands	NY	12159	2018
224 Bozenkill Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1421	1	3	4	Guettler, Jason M	224 Bozenkill Rd	Altamont	NY	12009	2018
228 Bell Rd	Town of Knox	Private	241	Primary residential, als	Bozen Kill	2324	1	2	3	Edwards, Robert C	228 Bell Rd	Altamont	NY	12009	2018
228 Drumm Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1681	1	1	2	Sherman Dana A	228 Drumm Rd	Delanson	NY	12053	2018
230 Settles Hill Rd	Town of Guilder	Private	120	Field crops	Bozen Kill	1588	1	1	2	Hahn, Harold E	230 Settles Hill Rd	Altamont	NY	12009	2018
234 Duane Lake Rd	Duanesburg	Private			Bozen Kill	600	1	1	2	May, Richard Gerard	68 Forest Ave	Albany	NY	12208	2018
240 Brandle Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1571	1	1	2	McCormick, Kyle M	240 Brandle Rd	Altamont	NY	12009	2018
242 Brandle Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1540	1	2	3	Levesque, Donald G	242 Brandle Rd	Altamont	NY	12009	2018
242 Duane Lake Rd	Duanesburg	Private			Bozen Kill	1068	1	1	2	Putnam, Edward	242 Duane Lake Rd	Duanesburg	NY	12056	2018
243 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	2291	1	2	3	Pezzuto, Marco P	243 W Duane Lake Rd	Duanesburg	NY	12056	2018
244 Brandle Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	999	1	1	2	OBryan, Nancy Christir	244 Brandle Rd	Altamont	NY	12009	2018
246 Brandle Rd	Village of Altam	Private	210	One family year-round	Bozen Kill	936	1	1	2	McCoy, Terri L	16 McKinley St	Albany	NY	12206	2018
25 Middle Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	888	1	1	2	Duell Stanley	25 Middle Rd	Altamont	NY	12009	2018
252 Duane Lake Rd	Duanesburg	Private			Bozen Kill	2200	1	2	3	Huff, Patricia L	252 Duane Lake Rd	Duanesburg	NY	12056	2018
256 Duane Lake Rd	Delanson	Private			Bozen Kill	500	1	0	1	Bratt, Drew Elihue	2905 West Old State Rd	Schenectady	NY	12303	2018
26 Callahan Ln	Town of Berne	Private	260	Seasonal residences	Bozen Kill	1084	1	1	2	Zarro, Sarah E	31 Island Way Apt 106	Clearwater	FL	33767	2018
26 Debbie Dr	Town of Knox	Private	210	One family year-round	Bozen Kill	1650	1	1	2	Pelton, Joseph D	3 Debbie Dr	Altamont	NY	12009	2018
26 Old Stage Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1144	1	2	3	Gordam, Robert M	26 Old Stage Rd	East Berne	NY	12059	2018
2765 Furbeck Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	1722	1	2	3	Olsen, Paul R	2765 Furbeck Rd	Altamont	NY	12009	2018
2794 Pangburn Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1764	1	2	3	McClaine, Douglas	2794 Pangburn Rd	Duanesburg	NY	12056	2018
2804 Pangburn Rd	Town of Knox	Private	220	Two family year-round	Bozen Kill	3900	2	3	5	DeMarco, Paul M	2804 Pangburn Rd	Duanesburg	NY	12056	2018
282 Duane Lake Rd	Duanesburg	Private			Bozen Kill	2673	1	1	2	Rowbo, Alexander J	282 Duane Lake Rd	Duanesburg	NY	12056	2018
2841 Currybush Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1176	1	1	2	Coons, Robert J	2841 Currybush Rd	Schenectady	NY	12306	2018

2843 Currybush Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1430	1	2	3	Shafer, William M Sr	2843 Currybush Rd	Schenectady	NY	12306	2018
2850 Furbeck Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	2800	1	2	3	Heller, Jeffery	2850 Furbeck Rd	Altamont	NY	12009	2018
2871 Currybush Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1939	1	2	3	Koskey, Thomas J	2871 Currybush Rd	Schenectady	NY	12306	2018
292 Lower Pine Valley Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1408	1	1	2	Cornell David W	292 Lower Pine Valley Rd	Hoosick Falls	NY	12090	2018
2933 Schoharie Tpke	Delanson	Private			Bozen Kill	2534	1	1	2	Merenberg, Ellen	2933 Schoharie Tpk	Delanson	NY	12053	2018
2951 Furbeck Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1248	1	1	2	Elliott, Andree H	2951 Furbeck Rd	Altamont	NY	12009	2018
2969 Furbeck Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1532	1	1	2	Marino, Michael A	2969 Furbeck Rd	Altamont	NY	12009	2018
2970 Pangburn Rd	Town of Knox	Private	416	Mobile home parks (tr	Bozen Kill	1858	1	1	2	Gershon, Gary C	2970 Pangburn Rd	Duanesburg	NY	12056	2018
299 Ketcham Rd	Town of Knox	None	210	One family year-round	Bozen Kill	960	1	1	2	Milner, Dawn	PO Box 243	Westerlo	NY	12193	2018
3 Freight House Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1024	1	1	2	Grogan, Daniel P	3 Freight House Rd	Corinth	NY	12822	2018
30 Middle Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2072	1	3	4	Fazzone, Tracy L	30 Middle Rd	Altamont	NY	12009	2018
300 Duane Lake Rd	Duanesburg	Private			Bozen Kill	1337	1	1	2	LaRowe, Raymond C	300 Duane Lake Rd	Duanesburg	NY	12056	2018
300 Ketcham Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1752	1	2	3	Bates Oren R	300 Ketcham Rd	Voorheesville	NY	12186	2018
300 Sumac Ridge Ln Pr	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	2936	1	3	4	Renz, David H	PO Box 637	Altamont	NY	12009	2018
3012 Pangburn Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1928	1	2	3	Carnevale, Nora	3012 Pangburn Rd	Duanesburg	NY	12056	2018
3021 Schoharie Tpke	Delanson	Private			Bozen Kill	2604	1	1	2	Christman, Joseph F	3021 Schoharie Tpk	Delanson	NY	120533504	2018
3069 Furbeck Rd	Town of Guilder	Private	220	Two family year-round	Bozen Kill	3509	2	4	6	Din, Qadir	3069 Furbeck Rd	Altamont	NY	12009	2018
307 W Duane Lake Rd	Schenectady	Private			Bozen Kill	1907	1	1	2	Clean Waters Trust	307 W Duane Lake Rd PO Box 3211	Schenectady	NY	12303	2018
31 Middle Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1350	1	1	2	Murrell Elwood L Jr	31 Middle Rd	Altamont	NY	12009	2018
315 Quay Rd	Town of Knox	None	240	Rural residence with a	Bozen Kill	1400	1	2	3	Luciano, Nicholas	PO Box 212	Delanson	NY	12053	2018
3151 Furbeck Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	600	1	1	2	Morhous, Theodore E	298 Currybush Rd	Schenectady	NY	12306	2018
320 Duane Lake Rd	Delanson	Private			Bozen Kill	564	1	0	1	Reynolds, Patricia E	7 Frederick Dr	Ulster	NY	12449	2018
325 Duanesburg Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1980	1	1	2	Maple Pine Manor, LLC	325 Duanesburg Rd 46	Schenectady	NY	12306	2018
333 Bond Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	2272	1	1	2	Dahlhaus, Joseph F	333 Bond Rd	Altamont	NY	12009	2018
336 Duane Lake Rd	Duanesburg	Private			Bozen Kill	1085	1	0	1	Gammans, Michael	6044 East Old State Rd	Schenectady	NY	12303	2018
337 Bond Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	2088	1	2	3	Defeo, Andrew E	337 Bond Rd	Altamont	NY	12009	2018
34 White Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2202	1	2	3	Bopp David E	34 White Rd	Altamont	NY	12009	2018
35 Arnold Rd	Town of Knox	Private	280	Residential	Bozen Kill	693	1	1	2	Lane, Jonathan	35 Arnold Rd	Delanson	NY	120539611	2018
350 North Kelley Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2884	1	2	3	Cooper, Vernon	350 North Kelley Rd	Schenectady	NY	12306	2018
3592 Mariaville Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1838	1	2	3	Bliss, Shirley J	3592 Mariaville Rd	Schenectady	NY	12306	2018
3606 Putnam Rd	Town of Knox	Private	651	Highway garage	Bozen Kill	1248	1	1	2	VanDenburgh, John H	3606 Putnam Rd	Schenectady	NY	12306	2018
362 Duane Lake Rd	Duanesburg	Private			Bozen Kill	1021	1	1	2	Dise, Kayla	362 Duane Lake Rd	Duanesburg	NY	12056	2018
3621 Guilderland Rd	Town of Knox	Private	961	State-owned public pa	Bozen Kill	1120	1	1	2	Aldershoff, Vernon R	108 Fabian Dr	Schenectady	NY	12306	2018
3624 Guilderland Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2300	1	2	3	Renaud, Joseph P	3624 Guilderland Ave	Schenectady	NY	12306	2018
364 Settles Hill Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	2618	1	2	3	Traegler, Alfred A	364 Settles Hill Rd	Altamont	NY	12009	2018
3650 Mariaville Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1552	1	1	2	Gamache, Judith L	3650 Mariaville Rd	Schenectady	NY	12306	2018
37 Craven Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	3625	1	3	4	Foley Sean M	37 Craven Rd	Delanson	NY	12059	2018
370 Settles Hill Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	2300	1	2	3	Trapasso, Matthew J	370 Settles Hill Rd	Altamont	NY	12009	2018
381 Bond Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	2400	1	2	3	Pearce, Stephen R	381 Bond Rd	Altamont	NY	12009	2018
382 Duane Lake Rd	Duanesburg	Private			Bozen Kill	1741	1	1	2	DeCelli, Dennis R	382 Duane Lake Rd	Duanesburg	NY	12056	2018
384 Old Stage Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	2117	1	1	2	Sager, Carl R	PO Box 603	Altamont	NY	12009	2018
385 Old Stage Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1521	1	1	2	Whipple, Melissa J	385 Old Stage Rd	Altamont	NY	12009	2018
385 Quay Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	2160	1	2	3	James Morgan B Jr	385 Quay Rd	Altamont	NY	12009	2018
389 Skyline Dr	Town of Knox	Private	210	One family year-round	Bozen Kill	1067	1	1	2	James, Julia L	1182 Taia Ln	Lakeside	CA	92040	2018
4 Debbie Dr	Town of Knox	Private	210	One family year-round	Bozen Kill	1968	1	2	3	Brown, Alan R	4 Debbie Dr	Altamont	NY	12009	2018
4 Nash Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	704	1	1	2	Oneill Kathleen	4 Nash Rd	Delanson	NY	12053	2018
40 Middle Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	904	1	1	2	Bradley, Matthew	40 Middle Rd	Altamont	NY	12009	2018
403 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	4047	2	4	6	Korotkin, Paul H	403 W Duane Lake Rd	Duanesburg	NY	12056	2018
4066 Becker Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	2300	1	1	2	Barker, Edward Glenn	4066 Becker Rd	Altamont	NY	12009	2018
41 Bell Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1120	1	1	2	Walter, Patrick J	266 Craven Rd	Delanson	NY	12053	2018
41 Lewis Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1824	1	1	2	Duncan John	41 Lewis Rd	Altamont	NY	12009	2018
4138 Mariaville Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1820	1	1	2	Mann, Elizabeth Corne	4138 Mariaville Rd	Schenectady	NY	12306	2018
415 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1800	1	2	3	Bittner, Thomas	415 W Duane Lake Rd	Duanesburg	NY	12056	2018
4219 Becker Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1176	1	1	2	Deso, Jeffrey S Jr	10 John St	Selkirk	NY	12158	2018
4220 Becker Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1296	1	1	2	Cranker, Lynn M	4220 Becker Rd	Altamont	NY	12009	2018
4222 Becker Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1796	1	2	3	Andritz, Jeffrey J	4222 Becker Rd	Altamont	NY	12009	2018
4233 Becker Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1288	1	1	2	Maynard, James P	4233 Becker Rd	Altamont	NY	12009	2018
424 Duane Lake Rd	Duanesburg	Private			Bozen Kill	1280	1	2	3	Salisburg, Barbara A	5970 Schoharie Tpk	Delanson	NY	12053	2018
4250 Becker Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	2794	1	2	3	Catalano, Edmund J	4250 Becker Rd	Altamont	NY	12009	2018
428 Scotch Ridge Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1304	1	1	2	Cookingham, Ronald J	428 Scotch Ridge Rd	Schenectady	NY	12306	2018
43 Crow Hill Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	4318	2	3	5	Afzali, Javid	43 Crow Hill Rd	Delanson	NY	12053	2018
433 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1749	1	2	3	Flores, Linda A	433 W Duane Lake Rd	Duanesburg Rd		12056	2018
439 Quay Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1849	1	1	2	Morseman David D	439 Quay Rd	Altamont	NY	12009	2018
449 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1674	1	2	3	Oppelt, Harold T	449 W Duane Lake Rd	Duanesburg	NY	12056	2018
457 North Kelley Rd	Town of Knox	Private	270	Mobile home	Bozen Kill	1960	1	2	3	Korowajezyk, Paul J	457 North Kelley Rd	Schenectady	NY	12306	2018
46 Lakeside Ln	Town of Berne	Private	210	One family year-round	Bozen Kill	2186	1	1	2	Merwin Michael L	46 Lakeside Ln	East Berne	NY	12059	2018
46 Middle Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1032	1	2	3	Beauharnois, Todd	46 Middle Rd	Altamont	NY	12009	2018
477 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1491	1	1	2	Uffmann, Henry	26 East Avenue	Hicksville	NY	11801	2018
48 Agawam Ln Pr	Town of Guilder	Private	210	One family year-round	Bozen Kill	2728	1	3	4	Blizzard, Brian	48 Agawam Ln	Altamont	NY	12009	2018
48 Quay Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1827	1	1	2	Dwyer, John	48 Quay Rd	Delanson	NY	12053	2018
48 Witter Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	3347	1	2	3	Martin, Sheila M	48 Witter Rd	Altamont	NY	12009	2018
483 Bozenkill Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1020	1	1	2	Park, Jong Jin	151 Simons Rd	Altamont	NY	12009	2018
484 Settles Hill Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	2820	1	1	2	Bates, Steven M	484 Settles Hill Rd	Altamont	NY	12009	2018
485 Bond Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	1540	1	1	2	Neigel, Deborah A	112 Mile Creek Rd	Old Lyme	CT	6371	2018
485 Bozenkill Rd	Town of Knox	None	240	Rural residence with a	Bozen Kill	1814	1	0	1	Spencer James S	485 Bozenkill Rd	Altamont	NY	12009	2018
49 Two House La	Town of Knox	Private	240	Rural residence with a	Bozen Kill	2025	1	2	3	Coons, Christine	49 Two House Ln	Altamont	NY	12009	2018
491 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1007	1	1	2	McClenahan, Thomas \	52 Craven Rd	Delanson	NY	12053	2018
493 Bozenkill Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2000	1	1	2	Stevens Ricky J	493 Bozenkill Rd	Altamont	NY	12009	2018
5 Barber Ln	Town of Berne	Private	280	Residential	Bozen Kill	418	1	1	2	Bannon, Peter	5 Barber Ln	East Berme	NY	12059	2018
50 Jay Herrington Rd	Town of Knox	Private	270	Mobile home	Bozen Kill	1781	1	2	3	Gifford, Barbara A	50 Jay Herrington Rd	Buskirk	NY	120289624	2018
500 Bozenkill Rd	Town of Knox	None	210	One family year-round	Bozen Kill	496	1	0	1	Van Denburg Ronald K	PO Box 535	Altamont	NY	12009	2018
504 Bozenkill Rd	Delanson	Private			Bozen Kill	2300	1	2	3	Ahearn, Susan	504 Bozenkill Rd	Delanson	NY	12053	2018
5053 Rt 9N	Town of Knox	Private	210	One family year-round	Bozen Kill	480	1	0	1	Baker, Bruce	5051 Rt 9N	Corinth	NY	12822	2018
51 Bell Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	912	1	1	2	Ostrander, Sally	PO Box 202	Altamont	NY	12009	2018
510 Bozenkill Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	912	1	1	2	Shaw Funding LP	195 West Rd	Berne	NY	12023	2018
518 Bozenkill Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	512	1	0	1	Filippone, Dominic	514 Bozenkill Rd	Altamont	NY	12009	2018
52 Craven Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1152	1	1	2	Mc Clenahan Thomas	52 Craven Rd	Delanson	NY	12053	2018
52 Lakeside Ln	Town of Berne	Private	280	Residential	Bozen Kill	738	1	1	2	Jordan, Susan	276 S Manning Blvd	Albany	NY	12208	2018
529 Duane Lake Rd	Duanesburg	Private			Bozen Kill	1912	1	2	3	Raymo, Daniel	529 Duane Lake Rd	Duanesburg	NY	12056	2018
542 Duane Lake Rd	Duanesburg	Private			Bozen Kill	2053	1	1	2	Smith, Robert D	542 Duane Lake Rd	Duanesburg	NY	12056	2018
564 Duane Lake Rd	Duanesburg	Private			Bozen Kill	1600	1	1	2	Evans, Gerald J	564 Duane Lake Rd	Duanesburg	NY	12056	2018
586 Duane Lake Rd	Duanesburg	Private			Bozen Kill	1325	1	1	2	Quickenton, David L Jr	586 Duane Lake Rd	Duanesburg	NY	12056	2018
596 South Kelley Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	3704	1	2	3	Zingoni, Richard	596 South Kelley Rd	Schenectady	NY	12306	2018
60 Helderberg Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1436	1	2	3	Choiniere Stephen	60 Helderberg Rd	East Berne	NY	12059	2018
60 Lewis Rd	Town of Knox	None	240	Rural residence with a	Bozen Kill	2250	1	2	3	Gutowski James J	60 Lewis Rd	Altamont	NY	12009	2018
600 N Mansion Rd	Duanesburg	Private			Bozen Kill	1365	1	1	2	Doran, Cathy	600 N Mansion Rd PO Box 103	Duanesburg	NY	12056	2018
600 South Kelley Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1966	1	3	4	Sharron, Daniel P	600 South Kelley Rd	Schenectady	NY	12306	2018
600 Upper Gregg Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1232	1	1	2	Montgomery, George	600 Upper Gregg Rd	Schenectady	NY	12306	2018
604 Duane Lake Rd	Duanesburg	Private			Bozen Kill	1307	1	1	2	Mallory, James L	604 Duane Lake Rd	Duanesburg	NY	12056	2018
606 N Mansion Rd	Duanesburg	Private			Bozen Kill	440	1	0	1	DeForest, Jonathan	1236 McGuire School Rd	Delanson	NY	12053	2018
61 Old Stage Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1797	1	1	2	Fanning, Eli J	61 Old Stage Rd	E Berne	NY	12059	2018
62 Singer Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1268	1	1	2	Fogel Jay	62 Singer Rd	East Berne	NY	12059	2018
621 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1744	1	1	2	Pachucki, Michael	621 W Duane Lake Rd	Duanesburg	NY	12056	2018
622 Bozenkill Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1921	1	1	2	Pulliam, Darcy	622 Bozenkill Rd	Altamont	NY	12009	2018
624 Duane Lake Rd	Duanesburg	Private			Bozen Kill	2448	1	2	3	Stewart, Norman	624 Duane Lake Rd	Duanesburg	NY	12056	2018
633 Giffords Church Rd	Town of Knox	Private	260	Seasonal residences	Bozen Kill	2941	1	2	3	Amedore, George A Jr	633 Giffords Church Rd	Schenectady	NY	12306	2018
6384 Gun Club Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	924	1	1	2	VanWoert, Stephen J	6384 Gun Club Rd	Altamont	NY	12009	2018
64 Lakeside Ln	Town of Berne	Private	210	One family year-round	Bozen Kill	2233	1	2	3	Martin, Todd	27 Reynolds Ct	Delmar	NY	12054	2018
6492 Dunnsville Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1942	1	2	3	Smith, Robert C Jr	1327 Hodgsan St	Schenectady	NY	12303	2018
6497 Dunnsville Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1200	1	1	2	Pratt, George P	PO Box 511	Altamont	NY	12009	2018
65 Bell Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1352	1	2	3	Farrar Robert	65 Bell Rd	Altamont	NY	12009	2018
65 Betts Ln	Town of Berne	Private	210	One family year-round	Bozen Kill	1440	1	1	2	Robert, Michael	851 Knox Cave Rd	Altamont	NY	12009	2018
6519 Dunnsville Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1196	1	1	2	Putnam, Daniel L	6519 Dunnsville Rd	Altamont	NY	12009	2018
6520 Dunnsville Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	2102	1	2	3	Armstrong, Shawn M	6520 Dunnsville Rd	Altamont	NY	12009	2018
6522 Westfall Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	1830	1	2	3	Fletcher, Janelle M	6522 Westfall Rd	Altamont	NY	12009	2018
6523 Dunnsville Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	720	1	1	2	Laduke, Brian	6523 Dunnsville Rd	Altamont	NY	12009	2018
6527 Dunnsville Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1536	1	1	2	Huggins, Mark J	6527 Dunnsville Rd	Altamont	NY	12009	2018
6535 Lainhart Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	2100	1	1	2	Goodknight, Brenda A	6535 Lainhart Rd	Altamont	NY	12009	2018
6553 Lainhart Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	3120	1	2	3	Corradi, Anthony H	6553 Lainhart Rd	Altamont	NY	12009	2018
6559 Dunnsville Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1395	1	1	2	Rafalik, Robert	6559 Dunnsville Rd	Altamont	NY	12009	2018
656 Beebe Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1134	1	1	2	Hanley Tracy M	656 Beebe Rd	Delanson	NY	12053	2018

6561 Dunnsville Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	896	1	1	2	Mohr, Sharon P	6561 Dunnsville Rd	Altamont	NY	12009	2018
6575 Westfall Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	1800	1	1	2	Devenpeck, Linda M	6575 Westfall Rd	Altamont	NY	12009	2018
660 Currybush Connection	Town of Knox	None	210	One family year-round	Bozen Kill	2100	1	1	2	Lawrence, Gregory P	660 Currybush Connecti	Schenectady	NY	12306	2018
6604 Dunnsville Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	4344	1	3	4	Muia Estate, Teresa	6604 Dunnsville Rd PO 59	Altamont	NY	12009	2018
661 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1191	1	1	2	Kennedy, Bernard L	661 W Duane Lake Rd	Duanesburg	NY	12056	2018
6626 Lainhart Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1680	1	2	3	Olivares, Susan	6626 Lainhart Rd	Altamont	NY	12009	2018
663 Bozenkill Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1446	1	2	3	Cole Michele A	663 Bozenkill Rd	Altamont	NY	12009	2018
6634 Rt 158	Town of Guilder	Private	210	One family year-round	Bozen Kill	682	1	0	1	Patnode, Kathleen A	14 Penny Ln	State College	PA	16803	2018
6654 Rt 158	Town of Guilder	Private	210	One family year-round	Bozen Kill	1550	1	1	2	Donato, Peter	6654 Rt 158	Altamont	NY	12009	2018
6655 Rt 158	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	2802	2	3	5	Green, James M	6655 Rt 158	Altamont	NY	12009	2018
67 Sturgess Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1920	1	2	3	Gardner James E Jr	67 Sturgess Rd	Altamont	NY	12009	2018
6715 Westfall Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	1712	1	2	3	Anderson, Devin J	6715 Westfall Rd	Altamont	NY	12009	2018
6755 Lainhart Rd	Town of Guilder	Private	120	Field crops	Bozen Kill	2155	1	1	2	Lainhart Estate, Sue Ba	6755 Lainhart Rd	Altamont	NY	12009	2018
6775 Westfall Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1104	1	1	2	Schultz, Russell F	6775 Westfall Rd	Altamont	NY	12009	2018
6778 Rt 158	Town of Guilder	Private	220	Two family year-round	Bozen Kill	3632	2	2	4	Peters, Kerry M	6778 Rt. 158	Altamont	NY	12009	2018
6782 Rt 158	Town of Guilder	Private	210	One family year-round	Bozen Kill	1634	1	1	2	Flood, John G	6782 Rt 158	Altamont	NY	12009	2018
6786 Rt 158	Town of Guilder	Private	210	One family year-round	Bozen Kill	1713	1	1	2	Kennedy, Jessica S	6786 Rt 158	Altamont	NY	12009	2018
679 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	865	1	1	2	Page, Steven M	615 Eastwood Park Rd	Sunset Beach	NC	28468	2018
68 Lewis Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2069	1	2	3	Cassidy Paul	68 Lewis Rd	Altamont	NY	12009	2018
6879 Dunnsville Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	3134	1	2	3	Ryan, Barbara A	6879 Dunnsville Rd	Altamont	NY	12009	2018
69 Middle Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1311	1	1	2	Houck Scott	69 Middle Rd	Altamont	NY	12009	2018
6902 Dunnsville Rd	Town of Guilder	Private	210	One family year-round	Bozen Kill	1414	1	2	3	Powers, Robert F	48 Eagle St	Pittsfield	MA	1201	2018
6964 Dunnsville Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	2364	1	1	2	Marciano, Gerard A	6964 Dunnsville Rd	Altamont	NY	12009	2018
697 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1893	1	1	2	Wiedemann, Carl P	697 W Duane Lake Rd	Duanesburg	NY	12056	2018
725 Duane Lake Rd	Duanesburg	Private			Bozen Kill	3070	1	3	4	Barrantes, Christopher	725 Duane Lake Rd	Duanesburg	NY	12056	2018
73 Lewis Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	3988	1	3	4	Marco John J	73 Lewis Rd	Altamont	NY	12009	2018
74 Sheffer Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1296	1	2	3	Sheffer's Grassland	74 Sheffer Rd	Hoosick Falls	NY	12090	2018
742 Duane Lake Rd	Duanesburg	Private			Bozen Kill	1377	1	1	2	Kennedy, Richard J	742 Duane Lake Rd	Duanesburg	NY	12056	2018
749 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	980	1	1	2	Pollard, Gordon W	749 W Duane Lake Rd	Duanesburg	NY	12056	2018
75 Two House La	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1536	1	1	2	Milham, Raymond S Jr	75 Two House Ln	Altamont	NY	12009	2018
76 Whippet Ln Pr	Town of Guilder	Private	210	One family year-round	Bozen Kill	3965	1	3	4	Adkins, Bruce	76 Whippet Ln	Altamont	NY	12009	2018
768 Rt 146	Town of Guilder	Private	210	One family year-round	Bozen Kill	1440	1	2	3	Rosenberg, Julian N	768 Rt 146	Altamont	NY	12009	2018
78 Old Stage Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2276	1	2	3	Kernozer Alexander	78 Old Stage Rd	East Berne	NY	12059	2018
78 Quay Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1251	1	2	3	West Robert C	78 Quay Rd	Delanson	NY	12053	2018
79 Lewis Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1573	1	1	2	Strnad Martin F	79 Lewis Rd	Altamont	NY	12009	2018
8 Fortuin Ln	Town of Knox	Private	210	One family year-round	Bozen Kill	1128	1	1	2	Willsey, Carol	8 Fortuin Ln	Altamont	NY	12009	2018
806 Duane Lake Rd	Duanesburg	Private			Bozen Kill	988	1	1	2	Bray, Edith D	806 Duane Lake Rd	Duanesburg	NY	12056	2018
816 Bozenkill Rd	Town of Knox	None	210	One family year-round	Bozen Kill	1136	1	1	2	Murphy Tara L	816 Bozenkill Rd	Altamont	NY	12009	2018
819 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	2199	1	1	2	Rapant, Madeline M	819 W Duane Lake Rd	Duanesburg	NY	12056	2018
83 Betts Ln	Town of Berne	Private	210	One family year-round	Bozen Kill	1848	1	2	3	Hathaway, Robert A	PO Box 101	East Berne	NY	12059	2018
83 Drumm Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1777	1	2	3	Gwin Robert	83 Drumm Rd	Delanson	NY	12053	2018
836 Duane Lake Rd	Duanesburg	Private			Bozen Kill	1283	1	1	2	Smith, Raynard Sean	836 Duane Lake Rd	Duanesburg	NY	12056	2018
841 Township Rd	Town of Guilder	Private	240	Rural residence with a	Bozen Kill	1846	1	2	3	Breitenbach, Tuesday	841 Township Rd	Altamont	NY	12009	2018
85 Middle Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1664	1	1	2	Taber, Steven J	85 Middle Rd	Altamont	NY	12009	2018
87 Betts Ln	Town of Berne	Private	260	Seasonal residences	Bozen Kill	1128	1	2	3	Parisi, Peter T	365 Chain-O-Hills Rd	Colonia	NJ	7067	2018
87 Sisson Rd	Village of Altam	Private	210	One family year-round	Bozen Kill	1684	1	2	3	Olden, Christopher T	87 Sisson Rd	So Glens Fall	NY	12803	2018
884 Schoharie Tpke	Duanesburg	Private			Bozen Kill	2235	1	2	3	Schaefer, David	884 Schoharie Tpk	Duanesburg	NY	12056	2018
90 Middle Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1442	1	1	2	Quay David J	90 Middle Rd	Altamont	NY	12009	2018
903 Bozenkill Rd	Town of Knox	None	210	One family year-round	Bozen Kill	1568	1	2	3	Bisnett, Torry M	903 Bozenkill Rd	Altamont	NY	12009	2018
917 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	2404	1	2	3	Newport, Thomas A	917 W Duane Lake Rd	Duanesburg	NY	12056	2018
92 Sisson Rd	Village of Altam	Private	210	One family year-round	Bozen Kill	1400	1	1	2	Sargent, Gary John M	92 Sisson Rd	So Glens Fall	NY	12803	2018
93 Sisson Rd	Village of Altam	Private	220	Two family year-round	Bozen Kill	1684	1	2	3	Hymes, Karen	93 Sisson Rd	So Glens Fall	NY	12803	2018
932 Bozenkill Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	1386	1	1	2	Shafer, Richard	932 Bozenkill Rd	Altamont	NY	12009	2018
957 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	2100	1	2	3	Felton, Henry D	1417 Creek Rd	Esperance	NY	12066	2018
96 Old Stage Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	2992	1	2	3	Raiti John	96 Old Stage Rd	East Berne	NY	12059	2018
96 Sisson Rd	Village of Altam	Private	210	One family year-round	Bozen Kill	1400	1	1	2	Rathbun, Christopher	96 Sisson Rd	So Glens Fall	NY	12803	2018
964 Scotch Ridge Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1296	1	2	3	Looman, Douglas I	964 Scotch Ridge Rd	Schenectady	NY	12306	2018
98 Sisson Rd	Village of Altam	Private	210	One family year-round	Bozen Kill	1684	1	2	3	Davis, Zachary	98 Sisson Rd	So Glens Fall	NY	12803	2018
984 Bozenkill Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1392	1	2	3	Hofmann William	984 Bozenkill Rd	Altamont	NY	12009	2018
99 Bell Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1056	1	1	2	Dockey Alan D	99 Bell Rd	Altamont	NY	12009	2018
99 Sisson Rd	Village of Altam	Private	210	One family year-round	Bozen Kill	1688	1	1	2	Emery, Lori L	99 Sisson Rd	So Glens Fall	NY	12803	2018
997 W Duane Lake Rd	Duanesburg	Private			Bozen Kill	1635	1	2	3	Pearsall, Kenneth A	997 W Duane Lake Rd	Duanesburg	NY	12056	2018
Becker Rd	Town of Guilder	Private	220	Two family year-round	Bozen Kill	1133	1	1	2	Mastriana, Alfred B	4234 Becker Rd	Altamont	NY	12009	2018
Knox Cave Rd	Town of Knox	Private	240	Rural residence with a	Bozen Kill	3660	1	4	5	Klebieko Alicja	55 Main St	Cohoes	NY	12047	2018
Middle Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1643	1	2	3	Crupe Michael A	PO Box 11	Altamont	NY	12009	2018
Mt Presentation Way Pr	Town of Guilder	Private	620	Religious	Bozen Kill	1456	1	1	2	Sisters of the Presenta	11 Haswell Rd	Watervliet	NY	12189	2018
Quay Rd	Town of Knox	Private	210	One family year-round	Bozen Kill	1313	1	1	2	Murphy Karen L	456 Quay Rd	Altamont	NY	12009	2018
Rt 146	Town of Knox	Private	210	One family year-round	Bozen Kill	396	1	1	2	Shafer Loren S Jr	1461 Township Rd	Altamont	NY	12009	2018
100 Miller Rd	Town of Guilder	Private	112	Dairy products: milk, b	Hunger Kill-Normans Kill	2112	1	1	2	Knaggs Oakland Realty	4645 Western Tpke	Altamont	NY	12009	2018
101 Miller Rd	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	1774	1	1	2	Keys, Edith L	101 Miller Rd	Schenectady	NY	12306	2018
2487 W Old State Rd	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	1160	1	1	2	Crounse, Gordon John	428 Mudge Rd	Delanson	NY	12053	2018
2488 W Old State Rd	Town of Guilder	Private	113	Cattle, calves, hogs	Hunger Kill-Normans Kill	1620	1	1	2	Spink, Howard J	2488 W Old State Rd	Schenectady	NY	12306	2018
2495 W Old State Rd	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	2144	1	2	3	Markham, Aaron D	2495 W Old State Rd	Schenectady	NY	12306	2018
25 Hoffmans Way Private	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	1140	1	1	2	Kelley, Katherine L	PO Box 45	Hadley	NY	12835	2018
2505 W Old State Rd	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	756	1	1	2	Zelezniak, Stephen	100 Ewing Ln	Schenectady	NY	12306	2018
2554 W Old State Rd	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	2075	1	2	3	Maki, Brian E	2554 W Old State Rd	Schenectady	NY	12306	2018
2717 W Lydius St	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	2878	1	3	4	Good, Brandon S	2717 W Lydius St	Schenectady	NY	12306	2018
2749 W Old State Rd	Town of Guilder	Private	120	Field crops	Hunger Kill-Normans Kill	3397	2	2	4	Carpenter, David O	2749 W Old State Rd	Schenectady	NY	12303	2018
32 Quarry St	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	876	1	1	2	Brock, Michael J	32 Quarry St	Hoosick Falls	NY	12090	2018
35 Scott St	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	1582	1	1	2	Popson, Patricia Anne	35 Scott St	Hoosick Falls	NY	12090	2018
42 Quarry St	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	840	1	1	2	Bisson, Alonzo J	3164 Route 346	Pownal	VT	5261	2018
4489 Western Tpke	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	2816	1	2	3	Masterson, Joseph	4489 Western Tpke	Altamont	NY	12009	2018
4645 Western Tpke	Town of Guilder	Private	112	Dairy products: milk, b	Hunger Kill-Normans Kill	960	1	1	2	Knaggs Oakland Realty	4645 Western Tpke	Altamont	NY	12009	2018
4656 Western Tpke	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	1116	1	1	2	Darling, Christopher	4656 Western Tpke	Altamont	NY	12009	2018
4670 Western Tpke	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	1048	1	1	2	Simpkins, Laura W	4670 Western Tpke	Altamont	NY	12009	2018
4678 Western Tpke	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	927	1	1	2	Jubrey, Emil A	4678 Western Tpke	Altamont	NY	12009	2018
4755 Western Tpke	Town of Guilder	None	210	One family year-round	Hunger Kill-Normans Kill	2816	1	4	5	VanWormer, Edward	4755 Western Tpke	Altamont	NY	12009	2018
6626 Stitt Rd Pr	Town of Guilder	Private	120	Field crops	Hunger Kill-Normans Kill	2730	1	2	3	Wilson, Stephen O	6626 Stitt Rd	Altamont	NY	12009	2018
6642 Stitt Rd Pr	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	2200	1	3	4	Dover, Jeffrey S	6642 Stitt Rd	Altamont	NY	12009	2018
6652 Stitt Rd Pr	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	2540	1	2	3	Batista, Paul	6660 Stitt Rd	Altamont	NY	12009	2018
6660 Stitt Rd Pr	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	5085	1	4	5	Batista, Paul A	6660 Stitt Rd	Altamont	NY	12009	2018
6668 Stitt Rd Pr	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	3281	1	2	3	Gillenwalters, Dana	6668 Stitt Rd	Altamont	NY	12009	2018
6817 Rt 158	Town of Guilder	Private	116	Other livestock: donke	Hunger Kill-Normans Kill	2810	2	2	4	Alexson, Warren D	6817 Rt 158	Altamont	NY	12009	2018
6876 Fuller Station Rd	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	2792	1	2	3	Ferguson, Charlotte M	6876 Fuller Station Rd	Schenectady	NY	12303	2018
6919 Rt 158	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	1120	1	1	2	Sebast, David	6919 Rt 158	Altamont	NY	12009	2018
6966 Fuller Station Rd	Town of Guilder	None	210	One family year-round	Hunger Kill-Normans Kill	2758	1	2	3	VanOort, John	6966 Fuller Station Rd	Schenectady	NY	12303	2018
6974 Fuller Station Rd	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	2656	1	2	3	Conner, Christopher S	6974 Fuller Station Rd	Schenectady	NY	12303	2018
7016 Fuller Station Rd	Town of Guilder	Private	210	One family year-round	Hunger Kill-Normans Kill	3969	1	4	5	Tremblay, John M	7016 Fuller Station Rd	Schenectady	NY	12303	2018
10 S Westcott Rd	Schenectady	Private			Indian House Creek-Normans Kill	2029	1	1	2	Sindoni, John A	10 S Westcott Rd	Schenectady	NY	12306	2018
101 Gray Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	972	1	1	2	VanWormer, Donald	101 Gray Rd	Altamont	NY	12009	2018
1012 Country Brook Ct	Schenectady	Private			Indian House Creek-Normans Kill	2016	1	1	2	Tur, Vincent R	1012 Country Brook Ct	Schenectady	NY	12306	2018
1014 Country Brook Ct	Schenectady	Private			Indian House Creek-Normans Kill	1652	1	1	2	St. John, Robert R	1014 Country Brook Ct	Schenectady	NY	12306	2018
1015 Country Brook Ct	Schenectady	Private			Indian House Creek-Normans Kill	1356	1	1	2	Herndon, David A	1015 Country Brook Ct	Schenectady	NY	12306	2018
1016 Country Brook Ct	Schenectady	Private			Indian House Creek-Normans Kill	2572	1	2	3	Przybylo, David	1016 Country Brook Ct	Schenectady	NY	12306	2018
1018 Country Brook Ct	Schenectady	Private			Indian House Creek-Normans Kill	2088	1	2	3	Sherman, Brian D	1018 Country Brook Ct	Schenectady	NY	12306	2018
102 Diamond Pl	Schenectady	Private			Indian House Creek-Normans Kill	1814	1	2	3	Thompson, Leslie	102 Diamond Pl	Schenectady	NY	12306	2018
1020 Country Brook Ct	Schenectady	Private			Indian House Creek-Normans Kill	3065	2	3	5	Helmandi, Dawood	20 Pitch Pine	Albany	NY	12203	2018
1022 Country Brook Ct	Schenectady	Private			Indian House Creek-Normans Kill	2576	1	2	3	Coker, Richard	1022 Country Brook Ct	Schenectady	NY	12306	2018
1024 Country Brook Ct	Schenectady	Private			Indian House Creek-Normans Kill	2140	1	4	5	Anderson, Brian C	1024 Country Brook Ct	Schenectady	NY	12306	2018
1032 Gates Dr	Schenectady	Private			Indian House Creek-Normans Kill	2176	1	2	3	Bass, Brian	1032 Gates Dr	Schenectady	NY	12306	2018
1034 Gates Dr	Schenectady	Private			Indian House Creek-Normans Kill	2176	1	1	2	Otis, Donald L	1034 Gates Dr	Schenectady	NY	12306	2018
104 Horizon Blvd	Schenectady	Private			Indian House Creek-Normans Kill	2196	1	2	3	Pirro, Norman	104 Horizon Blv	Schenectady	NY	12306	2018
1040 Currybush Rd	Schenectady	Private			Indian House Creek-Normans Kill	2943	1	1	2	Feuz, Marjorie	1040 Currybush Rd	Schenectady	NY	12306	2018
1043 Muriel Peterson Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1848	1	2	3	Coolidge, Kelvin D	1043 Muriel Peterson Dr	Duanesburg	NY	12056	2018
1047 Darrow Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2004	1	2	3	Horwedel, Christopher	1047 Darrow Rd	Duanesburg	NY	12056	2018
105 Horizon Blvd	Schenectady	Private			Indian House Creek-Normans Kill	1820	1	2	3	McLea, Tony	105 Horizon Blv	Schenectady	NY	12306	2018
107 Horizon Blvd	Schenectady	Private			Indian House Creek-Normans Kill	1848	1	1	2	Tierney, Thomas H Jr	107 Horizon Blv	Schenectady	NY	12306	2018
108 Horizon Blvd	Schenectady	Private			Indian House Creek-Normans Kill	1574	1	1	2	Carney, Kyle A	108 Horizon Blv	Schenectady	NY	12306	2018
109 Horizon Blvd	Schenectady	Private			Indian House Creek-Normans Kill	1652	1	1	2	Hughes, William D	109 Horizon Blv	Schenectady	NY	12306	2018
109 Lake Dr	Schenectady	Private			Indian House Creek-Normans Kill	916	1	1	2	Lagasse, James	109 Lake Dr	Schenectady	NY	12306	2018
1100 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1770	1	2	3	Besenval, Richard J Jr	1266 Quackenbush Rd	Schenectady	NY	12306	2018

111 Lake Dr	Schenectady	Private			Indian House Creek-Normans Kill	1040	1	1	2	D'Arcangelo, Dawn M	111 Lake Dr	Schenectady	NY	12306	2018
1146 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1904	1	2	3	Coppola, Clyde J	1146 Quackenbush Rd	Schenectady	NY	12306	2018
116 Horizon Blvd	Schenectady	Private			Indian House Creek-Normans Kill	2460	1	2	3	O'Connor, Patrick E	116 Horizon Blv	Schenectady	NY	12306	2018
1163 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1352	1	1	2	Smith , Gary	1163 Quackenbush Rd	Schenectady	NY	12306	2018
1167 Pangburn Rd	Schenectady	Private			Indian House Creek-Normans Kill	1600	1	1	2	Knutti, Elizabeth M	1209 Pangburn Rd	Schenectady	NY	12306	2018
1169 N Mansion Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1144	1	2	3	Warner, Jeffrey A	1169 N Mansion Rd	Duanesburg	NY	12056	2018
1173 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1299	1	1	2	Knapp, Douglas A	1173 Quackenbush Rd	Schenectady	NY	12306	2018
1175 Darrow Rd	Duanesburg	None			Indian House Creek-Normans Kill	2086	1	2	3	Rea, Kim	1175 Darrow Rd	Duanesburg	NY	12056	2018
118 Horizon Blvd	Schenectady	Private			Indian House Creek-Normans Kill	1470	1	2	3	Friello, Christopher	118 Horizon Blv	Schenectady	NY	12306	2018
118 Lake Dr	Schenectady	Private			Indian House Creek-Normans Kill	1314	1	1	2	Keith, Stephen J	118 Lake Dr	Schenectady	NY	12306	2018
1183 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1198	1	2	3	Griesbeck, Ruth A	1183 Quackenbush Rd	Schenectady	NY	12306	2018
1184 Western Tpke	Duanesburg	Private			Indian House Creek-Normans Kill	3541	1	1	2	Jewett Family Trust, D	1184 Western Tpk	Duanesburg	NY	12056	2018
119 Schoharie Tpke	Delanson	Private			Indian House Creek-Normans Kill	1061	1	1	2	Laurence, Larry E	2311 Skyline Dr	Schenectady	NY	12306	2018
12 S Westcott Rd	Schenectady	Private			Indian House Creek-Normans Kill	2310	1	2	3	Callahan, Jared	12 S Westcott Rd	Schenectady	NY	12306	2018
120 Fisher Rd	Schenectady	Private			Indian House Creek-Normans Kill	2324	1	2	3	Gerstman, Seth	1330 Rosewood Ave	Schenectady	NY	12306	2018
120 Horizon Blvd	Schenectady	Private			Indian House Creek-Normans Kill	1724	1	2	3	Masi, John A	120 Horizon Blv	Schenectady	NY	12306	2018
120 Lake Dr	Schenectady	Private			Indian House Creek-Normans Kill	2292	1	2	3	Mattice, Jeffrey M	120 Lake Dr	Schenectady	NY	12306	2018
1205 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1092	1	1	2	McBride, Miriam J	1205 Quackenbush Rd	Schenectady	NY	12306	2018
1209 Pangburn Rd	Schenectady	Private			Indian House Creek-Normans Kill	1560	1	1	2	Knutti, David John	1209 Pangburn Rd	Schenectady	NY	12306	2018
121 Fisher Rd	Schenectady	Private			Indian House Creek-Normans Kill	2248	1	2	3	Suflita, Andrew P	121 Fisher Rd	Schenectady	NY	12306	2018
1219 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1120	1	1	2	DeBell, Margie	1219 Quackenbush Rd	Schenectady	NY	12306	2018
122 Horizon Blvd	Schenectady	Private			Indian House Creek-Normans Kill	1555	1	2	3	Opalka, Mark J	122 Horizon Blv	Schenectady	NY	12306	2018
1222 N Mansion Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2729	1	3	4	Phillips, Thomas B	1222 N Mansion Rd	Duanesburg	NY	12056	2018
123 Darrow Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2150	1	2	3	Fortune, Richard P	123 Darrow Rd	Duanesburg	NY	12056	2018
124 Fisher Rd	Schenectady	Private			Indian House Creek-Normans Kill	2552	1	2	3	Gahan, John W Jr	124 Fisher Rd	Schenectady	NY	12306	2018
1243 Darrow Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1281	1	1	2	Brimlow, Brett	1243 Darrow Rd	Duanesburg	NY	12056	2018
1243 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	744	1	1	2	Haws, Charles G Sr	3040 Cox Ave	Schenectady	NY	12306	2018
1247 Muriel Peterson Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1525	1	2	3	Smith, Susan L	1247 Muriel Peterson Dr	Duanesburg	NY	12056	2018
1253 N Mansion Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2687	2	2	4	Ross, Kenneth T. J.	1253 N Mansion Rd	Duanesburg	NY	12056	2018
1266 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	2384	2	2	4	Besenval, Richard J Jr.	1266 Quackenbush Rd	Schenectady	NY	12306	2018
1267 Darrow Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2396	1	2	3	Galvin , John L Jr.	1267 Darrow Rd	Duanesburg	NY	12056	2018
1278 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1388	1	1	2	Olszowy, Richard	1278 Quackenbush Rd	Schenectady	NY	12306	2018
1287 Pangburn Rd	Schenectady	Private			Indian House Creek-Normans Kill	1336	1	1	2	Santoro, Gary M	1287 Pangburn Rd	Schenectady	NY	12306	2018
1295 Western Tpke	Duanesburg	Private			Indian House Creek-Normans Kill	1679	1	1	2	Thompson, Wayne E	1295 Western Tpk	Duanesburg	NY	12056	2018
1310 Currybush Rd	Schenectady	Private			Indian House Creek-Normans Kill	5132	1	5	6	Kaufman, Renee	3672 Carlton Pl	Boca Raton	FL	33496	2018
1314 Quackenbush Rd	Schenectady	None			Indian House Creek-Normans Kill	1814	1	2	3	Gregory, James A	1314 Quackenbush Rd	Schenectady	NY	12306	2018
132 Horizon Blvd	Schenectady	Private			Indian House Creek-Normans Kill	1440	1	1	2	Willey, Robert M	15 Maple Dr	Albany	NY	12205	2018
1323 Currybush Rd	Schenectady	Private			Indian House Creek-Normans Kill	2458	1	3	4	Thorsland, Craig R	1323 Currybush Rd	Schenectady	NY	12306	2018
1352 Quackenbush Rd	Schenectady	None			Indian House Creek-Normans Kill	1561	1	1	2	Bishop, Diane L	1352 Quackenbush Rd	Schenectady	NY	12306	2018
1378 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1806	1	2	3	Gifford, Donald I	1378 Quackenbush Rd	Schenectady	NY	12306	2018
1400 Currybush Rd	Schenectady	Private			Indian House Creek-Normans Kill	2017	1	1	2	Kaufman, Renee	3672 Carlton Pl	Boca Raton	FL	33496	2018
1417 N Mansion Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1512	1	2	3	Bryant, Mark	1417 N Mansion Rd	Duanesburg	NY	12056	2018
1429 Darrow Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2760	1	2	3	McGregor, Catherine N	1429 Darrow Rd	Duanesburg	NY	12056	2018
143 Old Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1941	1	1	2	Peterson, Richard	1004 Duanesburg Churche Rd	Delanson	NY	12053	2018
1436 Duanesburg Rd	Schenectady	Private			Indian House Creek-Normans Kill	1168	1	1	2	Walthers, Mark	1436 Duanesburg Rd	Schenectady	NY	12306	2018
1449 N Mansion Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1650	1	2	3	Tygert, Alan W	1449 N Mansion Rd	Duanesburg	NY	12056	2018
146 Scotch Ridge Rd	Schenectady	Private			Indian House Creek-Normans Kill	1584	1	1	2	Hallak, Steven	146 Scotch Ridge Rd	Schenectady	NY	12306	2018
1463 Duanesburg Rd	Schenectady	Private			Indian House Creek-Normans Kill	1212	1	1	2	Fick, Walter	1463 Duanesburg Rd	Schenectady	NY	12306	2018
1465 N Mansion Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1342	1	1	2	DeLuke, William J	1465 N Mansion Rd	Duanesburg	NY	12056	2018
1488 Duanesburg Rd	Schenectady	Private			Indian House Creek-Normans Kill	1520	1	1	2	Walthers, Marilyn A	1488 Duanesburg Rd	Schenectady	NY	12306	2018
1491 Darrow Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1400	1	2	3	Harrison, Glenn R	1491 Darrow Rd	Duanesburg	NY	12056	2018
1502 Duanesburg Rd	Schenectady	Private			Indian House Creek-Normans Kill	528	1	1	2	JJ & TA White Properti	1502 Duanesburg Rd	Schenectady	NY	12306	2018
1517 N Mansion Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1361	1	1	2	Bradt, Frederick E III	1517 N Mansion Rd	Duanesburg	NY	12056	2018
1632 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1564	1	1	2	McGregor, Leon D	1632 Pangburn Rd	Duanesburg	NY	12056	2018
1687 Duanesburg Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2704	1	2	3	Coonley, Danielle	1687 Duanesburg Rd	Duanesburg	NY	12056	2018
172 Old Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	942	1	1	2	Peterson, Richard	229 Old Pangburn Rd	Duanesburg	NY	12056	2018
1744 Darrow Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1693	1	1	2	Blanton, Gary S	1744 Darrow Rd	Duanesburg	NY	12056	2018
1748 Currybush Rd	Schenectady	Private			Indian House Creek-Normans Kill	2345	1	2	3	Dunn, Vincent J	1748 Currybush Rd	Schenectady	NY	12306	2018
1773 Darrow Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2892	1	2	3	Hart, Russell	1773 Darrow Rd	Duanesburg	NY	12056	2018
1807 Duanesburg Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1934	1	2	3	Karandy, Mark A	1807 Duanesburg Rd	Duanesburg	NY	12056	2018
181 Suits Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2098	1	2	3	Booth, Daniel	181 Suits Rd	Duanesburg	NY	12056	2018
1810-1812 Duanesburg Rd	Delanson	Private			Indian House Creek-Normans Kill	1764	2	2	4	Armstrong, Mark F	2188 Helderberg Ave	Schenectady	NY	12306	2018
1860 Darrow Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2787	1	1	2	Solomon, Anthony N	1860 Darrow Rd	Duanesburg	NY	120560204	2018
1862-1864 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2280	1	3	4	Johnson, Jack R	1862 Pangburn Rd	Duanesburg	NY	12056	2018
1865 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1555	1	2	3	Mansfield, Walter P	1865 Pangburn Rd	Duanesburg	NY	12056	2018
1918 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2520	1	2	3	Hart James	1918 Pangburn Rd	Duanesburg	NY	12056	2018
198 Reutter Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1801	1	3	4	McDuffee, Donald L	198 Reutter Dr	Duanesburg	NY	12056	2018
1985 W Old State Rd	Town of Guilder	Private	113	Cattle, calves, hogs	Indian House Creek-Normans Kill	1597	1	1	2	Pachucki, Raymond	1985 W Old State Rd	Altamont	NY	12009	2018
2004 W Old State Rd	Town of Guilder	Private	240	Rural residence with a	Indian House Creek-Normans Kill	4734	1	3	4	Reutter, Stephen J	2004 W Old State Rd	Altamont	NY	12009	2018
202 Springdale Way	Schenectady	Private			Indian House Creek-Normans Kill	1648	1	1	2	Farina, Frank S	202 Springdale Way	Schenectady	NY	12306	2018
202 Wendy Ct	Schenectady	Private			Indian House Creek-Normans Kill	2250	1	2	3	Zasada, James M	202 Wendy Ct	Schenectady	NY	12306	2018
204 Springdale Way	Schenectady	Private			Indian House Creek-Normans Kill	1992	1	2	3	Bunn, Raymond C Jr	204 Springdale Way	Schenectady	NY	12306	2018
204 Wendy Ct	Schenectady	Private			Indian House Creek-Normans Kill	3091	1	2	3	Ferrari, Anthony	204 Wendy Ct	Schenectady	NY	12306	2018
205 Springdale Way	Schenectady	Private			Indian House Creek-Normans Kill	1728	1	1	2	Kitchner, Timothy	205 Springdale Way	Schenectady	NY	12306	2018
206 Springdale Way	Schenectady	Private			Indian House Creek-Normans Kill	1774	1	2	3	Gromoll, Jason E	206 Springdale Way	Schenectady	NY	12306	2018
2064 W Old State Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	840	1	1	2	Pitts, Nicole J	2064 W Old State Rd	Altamont	NY	12009	2018
2079 W Old State Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1456	1	1	2	Keppler, Kevin J	2079 W Old State Rd	Altamont	NY	12009	2018
208 Springdale Way	Schenectady	Private			Indian House Creek-Normans Kill	1844	1	2	3	Molina, Adrian	208 Springdale Way	Schenectady	NY	12306	2018
208 Wendy Ct	Schenectady	Private			Indian House Creek-Normans Kill	2250	1	2	3	Smith, Robert F	208 Wendy Ct	Schenectady	NY	12306	2018
2089 W Old State Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	2476	1	2	3	Smith, Gretchen Chase	2089 W Old State Rd	Altamont	NY	12009	2018
2090 W Old State Rd	Town of Guilder	Private	120	Field crops	Indian House Creek-Normans Kill	1820	1	2	3	MacIntosh, Earl A	2090 W Old State Rd	Altamont	NY	12009	2018
210 Wendy Ct	Schenectady	Private			Indian House Creek-Normans Kill	3974	1	2	3	Larned, Timothy S	210 Wendy Ct	Schenectady	NY	12306	2018
2109 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	1640	1	2	3	Kwiatkowski, John J	2109 Giffords Church Rd	Schenectady	NY	12306	2018
2111 W Old State Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	2087	1	2	3	Beliveau, Pierre J	2111 W Old State Rd	Altamont	NY	12009	2018
2153 W Old State Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	2652	1	2	3	Masi, Michelle Elizabet	2147 W Old State Rd	Altamont	NY	12009	2018
2154 W Old State Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	2080	1	2	3	Beliveau, Daniel F	2154 W Old State Rd	Altamont	NY	12009	2018
2157 W Old State Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1296	1	2	3	Beliveau, Andree	2157 W Old State Rd	Altamont	NY	12009	2018
2191 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	1708	1	2	3	Gunn, Jacqueline N	2191 Giffords Church Rd	Schenectady	NY	12306	2018
2210 Giffords Church Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2022	1	2	3	Vosburgh, Mark A	2210 Gifford Church Rd	Schenectady	NY	12306	2018
2210 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	2022	1	2	3	Vosburgh, Mark A	2210 Gifford Church Rd	Schenectady	NY	12306	2018
2232 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2178	1	2	3	Benson, Paul G	2232 Pangburn Rd	Duanesburg	NY	12056	2018
224 Birchwood Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1232	1	2	3	Powers, Duane	224 Birchwood Dr	Duanesburg	NY	12056	2018
224 Old Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1041	1	1	2	Peterson, Richard E	1004 Duanesburg Churche Rd	Delanson	NY	12053	2018
227 Normanskill Dr	Duanesburg	Private			Indian House Creek-Normans Kill	2764	1	2	3	Townsend, Michael S	227 Normanskill Dr	Duanesburg	NY	12056	2018
2273 W Old State Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1804	1	1	2	Vadney, Robert H	2273 W Old State Rd	Altamont	NY	12009	2018
229 Old Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1337	1	1	2	Peterson, Richard	1004 Duanesburg Churche Rd	Delanson	NY	12053	2018
2301 Ghents Rd	Schenectady	Private			Indian House Creek-Normans Kill	2080	1	1	2	Gerstenberger Irrevoc	2301 Ghents Rd	Schenectady	NY	12306	2018
2382 Western Tpke	Duanesburg	Private			Indian House Creek-Normans Kill	2313	1	2	3	Johnson, Ashley	2382 Western Tpk	Duanesburg	NY	12056	2018
2401 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2068	1	1	2	Urbano Vito	2401 Pangburn Rd	Duanesburg	NY	12056	2018
2403 W Old State Rd	Town of Guilder	Private	113	Cattle, calves, hogs	Indian House Creek-Normans Kill	2916	1	2	3	Kirchhof, Darrin G	2403 W Old State Rd	Schenectady	NY	12306	2018
248 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	2488	1	2	3	Aldi, Craig W	248 Dunnsville Rd	Schenectady	NY	12306	2018
252 County Line Rd	Schenectady	Private			Indian House Creek-Normans Kill	2424	1	2	3	Brunt, Paul W	252 County Line Rd	Schenectady	NY	12306	2018
254 Vernon Dr	Duanesburg	Private			Indian House Creek-Normans Kill	2444	1	2	3	Viscusi Family Trust	14 Avalon Way	Altamont	NY	12009	2018
2556 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1292	1	1	2	Kocak, Frank	2556 Pangburn Rd	Duanesburg	NY	12056	2018
2557 Western Tpke	Duanesburg	Private			Indian House Creek-Normans Kill	1597	1	1	2	Powers, Betty	2557 Western Tpke PO Box 89	Duanesburg	NY	12056	2018
258 Reutter Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1650	1	2	3	Bemis, Carolyn M	258 Reutter Dr	Duanesburg	NY	12056	2018
2583 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1708	1	2	3	Shear, Jaime L	2583 Pangburn Rd	Duanesburg	NY	12056	2018
2588-2602 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1689	1	2	3	Pachuki, Michael J	2588 Pangburn Rd	Duanesburg	NY	12056	2018
2597 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1008	1	1	2	Murphy, Michael B	2597 Pangburn Rd	Duanesburg	NY	12056	2018
2597 Western Tpke	Duanesburg	Private			Indian House Creek-Normans Kill	1911	1	1	2	Rose, John Edward	2597 Western Tpk	Duanesburg	NY	12056	2018
2607 Western Tpke	Duanesburg	Private			Indian House Creek-Normans Kill	1828	1	2	3	Thomas, Robert	2607 Western Tpk	Duanesburg	NY	12056	2018
261 Parkers Corners Rd	Schenectady	Private			Indian House Creek-Normans Kill	1540	1	2	3	Coonradt, Sherman L	261 Parkers Corners Rd	Schenectady	NY	12306	2018
2646 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	891	1	1	2	Askew, Arthur H	1445 Mariaville Rd	Schenectady	NY	12306	2018
2654 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1696	1	1	2	Kiernan, Brian T	2654 Pangburn Rd	Duanesburg	NY	12056	2018
268 Birchwood Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1608	1	2	3	Vosburgh, Gary A	268 Birchwood Dr	Duanesburg	NY	12056	2018
268 Normanskill Dr	Duanesburg	Private			Indian House Creek-Normans Kill	2331	1	1	2	Higgins, Timothy M	268 Normanskill Dr	Duanesburg	NY	12056	2018
2685-2695 Western Tpke	Delanson	Private			Indian House Creek-Normans Kill	808	1	1	2	Busch, Dwayne	1043 Western Tpk	Delanson	NY	12053	2018
269 Bonnyview Ln	Schenectady	Private			Indian House Creek-Normans Kill	2824	1	2	3	Sturgess, Keith A	269 Bonnyview Ln	Schenectady	NY	12306	2018
271 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	1570	1	2	3	Quinn, Barbara R	271 Dunnsville Rd	Schenectady	NY	12306	2018
2767 W Lydius St	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1523	1	1	2	Dittmer, Matthew	2767 W Lydius St	Schenectady	NY	12306	2018
2794 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1764	1	2	3	McClaine, Douglas	2794 Pangburn Rd	Duanesburg	NY	12056	2018

28 Ronnie Ct	Schenectady	Private			Indian House Creek-Normans Kill	4472	1	3	4	Sementilli, Amy M	28 Ronnie Ct	Schenectady	NY	12306	2018
2804 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	3900	2	3	5	DeMarco, Paul M	2804 Pangburn Rd	Duanesburg	NY	12056	2018
2805 Duanesburg Rd	Duanesburg	Private			Indian House Creek-Normans Kill	960	1	1	2	Starker, Gregory	2805 Duanesburg Rd	Duanesburg	NY	12056	2018
2829 Duanesburg Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1760	1	1	2	Lamp, Robert W	2829 Duanesburg Rd	Duanesburg	NY	12056	2018
2851 Duanesburg Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1110	1	1	2	Brown, Daniel S	2851 Duanesburg Rd	Duanesburg	NY	12056	2018
288 Parkers Corners Rd	Schenectady	Private			Indian House Creek-Normans Kill	1464	1	1	2	Sabourin, Brian	288 Parkers Corners Rd	Schenectady	NY	123065492	2018
2888 Pangburn Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1340	1	1	2	Caputo, Michael	2888 Pangburn Rd	Duanesburg	NY	12056	2018
2899 Giffords Church Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1456	1	2	3	Colvin, Joshua L	2899 Giffords Church Rd	Duanesburg	NY	12056	2018
295 Masullo Pkwy	Schenectady	Private			Indian House Creek-Normans Kill	1832	1	2	3	Hardnett, Rhonda J	295 Masullo Pkw	Schenectady	NY	12306	2018
299 Jeanette Dr	Schenectady	Private			Indian House Creek-Normans Kill	1664	1	1	2	Bigley, Deborah	299 Jeanette Dr	Schenectady	NY	12306	2018
300 Dawn Dr	Schenectady	Private			Indian House Creek-Normans Kill	1800	1	2	3	Zimmerman, Gregory	300 Dawn Dr	Schenectady	NY	12306	2018
300 Jeanette Dr	Schenectady	Private			Indian House Creek-Normans Kill	1014	1	1	2	Albee Irrev Trust, Robe	300 Jeanette Dr	Schenectady	NY	12306	2018
300 Masullo Pkwy	Schenectady	Private			Indian House Creek-Normans Kill	2118	1	2	3	DeAngelo, Anthony D	300 Masullo Pkw	Schenectady	NY	12306	2018
301 Jeanette Dr	Schenectady	Private			Indian House Creek-Normans Kill	1136	1	2	3	Gresham, Richard D	301 Jeanette Dr	Schenectady	NY	12306	2018
301 W Lucille Ln	Schenectady	Private			Indian House Creek-Normans Kill	1008	1	1	2	McGeough, Lisa	301 Lucille Ln W	Schenectady	NY	12306	2018
302 Dawn Dr	Schenectady	Private			Indian House Creek-Normans Kill	1736	1	2	3	Rickmyre, Daniel R	302 Dawn Dr	Schenectady	NY	12306	2018
303 Dawn Dr	Schenectady	Private			Indian House Creek-Normans Kill	1514	1	1	2	Regels, Richard J	303 Dawn Dr	Schenectady	NY	12306	2018
304 Dawn Dr	Schenectady	Private			Indian House Creek-Normans Kill	1592	1	1	2	Knoblauch, Robert	304 Dawn Dr	Schenectady	NY	12306	2018
304 Masullo Pkwy	Schenectady	Private			Indian House Creek-Normans Kill	1960	1	1	2	Torres, Ricky S	304 Masullo Pkw	Schenectady	NY	12306	2018
305 Dawn Dr	Schenectady	Private			Indian House Creek-Normans Kill	1903	1	2	3	Williams, Timothy	305 Dawn Dr	Schenectady	NY	12306	2018
305 Jeanette Dr	Schenectady	Private			Indian House Creek-Normans Kill	1312	1	1	2	Geier, Edward C	305 Jeanette Dr	Schenectady	NY	12306	2018
306 Dawn Dr	Schenectady	Private			Indian House Creek-Normans Kill	2238	1	1	2	Warner, David L	306 Dawn Dr	Schenectady	NY	12306	2018
307 Dawn Dr	Schenectady	Private			Indian House Creek-Normans Kill	1510	1	1	2	Manzella, Kristen	307 Dawn Dr	Schenectady	NY	12306	2018
308 Dawn Dr	Schenectady	Private			Indian House Creek-Normans Kill	1574	1	1	2	Hatfield, Richard W III	308 Dawn Dr	Schenectady	NY	12306	2018
308 Masullo Pkwy	Schenectady	Private			Indian House Creek-Normans Kill	1380	1	1	2	Ordon Family Trust, St	308 Masullo Pkw	Schenectady	NY	12306	2018
309 Jeanette Dr	Schenectady	Private			Indian House Creek-Normans Kill	1536	1	1	2	Linderman, Robert A	309 Jeanette Dr	Schenectady	NY	12306	2018
310 Dawn Dr	Schenectady	Private			Indian House Creek-Normans Kill	2072	1	2	3	Baltazar, Raymond	310 Dawn Dr	Schenectady	NY	12306	2018
3101 Duanesburg Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1144	1	1	2	Lee, Nancy Ann	3101 Duanesburg Rd	Duanesburg	NY	12056	2018
312 Normanskill Dr	Duanesburg	Private			Indian House Creek-Normans Kill	2931	1	3	4	White, Andrew J	312 Normanskill Dr	Duanesburg	NY	12056	2018
313 Jeanette Dr	Schenectady	Private			Indian House Creek-Normans Kill	1432	1	1	2	Helm, Julian A	313 Jeanette Dr PO Box 4002	Schenectady	NY	12303	2018
3131 Duanesburg Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2306	1	2	3	Miller, Bernard	3131 Duanesburg Rd	Duanesburg	NY	12056	2018
314 Shelly Ct	Schenectady	Private			Indian House Creek-Normans Kill	1924	1	2	3	Armstrong, Michael A	314 Shelly Ct	Schenectady	NY	12306	2018
3143 Giffords Church Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2559	1	2	3	Wright Michael J	3143 Giffords Church Rd	Duanesburg	NY	12056	2018
316 Shelly Ct	Schenectady	Private			Indian House Creek-Normans Kill	2039	1	2	3	Litts, William P	316 Shelly Ct	Schenectady	NY	12306	2018
317 Jeanette Dr	Schenectady	Private			Indian House Creek-Normans Kill	1968	2	1	3	Schraa, Robert J	317 Jeanette Dr	Schenectady	NY	12306	2018
318 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	1882	1	1	2	Aldi, Alan C	318 Dunnsville Rd	Schenectady	NY	12306	2018
318 Jeanette Dr	Schenectady	Private			Indian House Creek-Normans Kill	2540	1	3	4	Jackey, Lisa A	318 Jeanette Dr	Schenectady	NY	12306	2018
318 Shelly Ct	Schenectady	Private			Indian House Creek-Normans Kill	2633	2	3	5	Byrnes, Scott J	318 Shelly Ct	Schenectady	NY	12306	2018
318 Vernon Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1800	1	2	3	Bishop, Patricia L	318 Vernon Dr	Duanesburg	NY	12056	2018
319 Mott Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1152	1	2	3	Proctor, Charles F	319 Mott Rd	Duanesburg	NY	12056	2018
3193 Giffords Church Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2452	1	2	3	Gentile Daniel A	3193 Giffords Church Rd	Duanesburg	NY	12056	2018
32 Memory Ln	Schenectady	Private			Indian House Creek-Normans Kill	2210	1	2	3	Tanno, William G	32 Memory Ln	Schenectady	NY	12306	2018
320 Debbie Dr	Schenectady	Private			Indian House Creek-Normans Kill	2343	1	2	3	Emmons, Robert J	320 Debbie Dr	Schenectady	NY	12306	2018
321 Jeanette Dr	Schenectady	Private			Indian House Creek-Normans Kill	1778	1	2	3	DiClemente, Anthony F	321 Jeanette Dr	Schenectady	NY	12306	2018
322 Donald Dr	Schenectady	Private			Indian House Creek-Normans Kill	1628	1	2	3	Cronk, Earl Jr	322 Donald Dr	Schenectady	NY	12306	2018
323 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	1531	1	2	3	Drislane, John E	323 Dunnsville Rd	Schenectady	NY	12306	2018
323 Jeanette Dr	Schenectady	Private			Indian House Creek-Normans Kill	2198	1	2	3	Frodyma, Mark A	323 Jeanette Dr	Schenectady	NY	12306	2018
3249 Giffords Church Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2036	1	2	3	Pallas, Carol A	3249 Giffords Church Rd	Duanesburg	NY	12056	2018
325 Jeanette Dr	Schenectady	Private			Indian House Creek-Normans Kill	2926	1	2	3	Langley, Todd M	325 Jeanette Dr	Schenectady	NY	12306	2018
327 Jeanette Dr	Schenectady	Private			Indian House Creek-Normans Kill	2660	1	2	3	Welch, Joan	327 Jeanette Dr	Schenectady	NY	12306	2018
329 Jeanette Dr	Schenectady	Private			Indian House Creek-Normans Kill	1720	1	1	2	Audi, Joseph	329 Jeanette Dr	Schenectady	NY	12306	2018
3315 Giffords Church Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2200	1	2	3	Wissick, Ryan	3315 Giffords Church Rd	Duanesburg	NY	12056	2018
3315 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	2032	1	1	2	Lancto, Kenneth M	3315 Guilderland Ave	Schenectady	NY	12306	2018
3323 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	2304	1	1	2	Le Roy , Joseph M	3323 Guilderland Rd	Schenectady	NY	12306	2018
3330 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1336	1	1	2	Marx, Grace G	3330 Guilderland Rd	Schenectady	NY	12306	2018
3334 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1278	1	1	2	Brogan, Kristin	3334 Guilderland Rd	Schenectady	NY	12306	2018
3337 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	996	1	1	2	Sakacs, Edward	3337 Guilderland Rd	Schenectady	NY	12306	2018
3341 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1971	1	1	2	Harvey, Gregory	3341 Guilderland Rd	Schenectady	NY	12306	2018
3345 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	2212	1	2	3	Adamec, Julie M	3345 Guilderland Rd	Schenectady	NY	12306	2018
3349 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	3216	1	2	3	Haider, Ghulam	3349 Guilderland Rd	Schenectady	NY	12306	2018
3360 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	2470	1	2	3	Golden, Sean	3360 Guilderland Ave	Schenectady	NY	12306	2018
3361 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1760	1	1	2	Quick, Graig B	3361 Guilderland Rd	Schenectady	NY	12306	2018
3363 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	4898	3	4	7	Hoeffner, Douglas	1 Shaker El	Loudonville	NY	12211	2018
3365 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1610	1	1	2	Hannigan, Gordon K	3365 Guilderland Rd	Schenectady	NY	12306	2018
34 Memory Ln	Schenectady	Private			Indian House Creek-Normans Kill	1764	1	1	2	Manikas, Paul	34 Memory Ln	Schenectady	NY	12306	2018
341 Hewett Dr	Schenectady	Private			Indian House Creek-Normans Kill	2506	1	2	3	Litz, Michael F	341 Hewett Dr	Schenectady	NY	12306	2018
341 Settles Hill Rd	Town of Guilder	Private	240	Rural residence with ac	Indian House Creek-Normans Kill	1824	1	2	3	Kryzak, Delphine T	341 Settles Hill Rd	Altamont	NY	12009	2018
3410 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	2044	1	1	2	Tiberio, Thomas A	3410 Guilderland Rd	Schenectady	NY	12306	2018
342 Parkers Corners Rd	Schenectady	Private			Indian House Creek-Normans Kill	2170	1	2	3	Syron, Jeffrey B	342 Parkers Corners Rd	Schenectady	NY	12306	2018
343 Hewett Dr	Schenectady	Private			Indian House Creek-Normans Kill	2292	1	2	3	DiCocco Lawrence D Jr	343 Hewett Dr	Schenectady	NY	12306	2018
344 Normanskill Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1539	1	2	3	Jones, Robert J	344 Normanskill Dr	Duanesburg	NY	12056	2018
346 W Lucille Ln	Schenectady	Private			Indian House Creek-Normans Kill	1122	1	1	2	Di Giandomenico John	1818 East Indian Wells Ln	Draper	UT	84020	2018
349 W Lucille Ln	Schenectady	Private			Indian House Creek-Normans Kill	1632	1	2	3	Murray, Donald F	349 Lucille Ln W	Schenectady	NY	12306	2018
3507 Giffords Church Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2028	1	1	2	Laraway, Carver	494 Western Tpk	Altamont	NY	12009	2018
353 Mott Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1851	1	1	2	Smith, Ryan	353 Mott Rd	Duanesburg	NY	12056	2018
3540 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1821	1	2	3	Delmonaco, Steven	3540 Guilderland Rd	Schenectady	NY	12306	2018
3544 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1799	1	2	3	Laczo, Dezsi Jr	3544 Guilderland Rd	Schenectady	NY	12306	2018
3551 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1358	1	1	2	Denny, Albert W	3551 Guilderland Rd	Schenectady	NY	12306	2018
3553 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1782	1	1	2	Cirigliano, Leonard C	3553 Guilderland Rd	Schenectady	NY	12306	2018
3554 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1582	1	1	2	Papasso, Michael	3554 Guilderland Rd	Schenectady	NY	12306	2018
3558 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1728	1	2	3	Pardi, Patrick A	3558 Guilderland Rd	Schenectady	NY	12306	2018
3562 Guilderland Ave	Schenectady	Private			Indian House Creek-Normans Kill	1428	1	2	3	O'Bray, Eileen P	3562 Guilderland Ave	Schenectady	NY	12306	2018
3566 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1530	1	1	2	Goodwin, Charles H	3566 Guilderland Rd	Schenectady	NY	12306	2018
3570 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1764	1	1	2	Panetti, Cosimina	3570 Guilderland Rd	Schenectady	NY	12306	2018
3574 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1452	1	1	2	Marotta, Arthur	3574 Guilderland Rd	Schenectady	NY	12306	2018
3578 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1796	1	1	2	Olshefsky, Joan Kusek	3578 Guilderland Rd	Schenectady	NY	12306	2018
358 Mott Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2845	1	3	4	Gentile, John M	358 Mott Rd	Duanesburg	NY	12056	2018
3582 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1000	1	1	2	Olshefsky, Frank A	3578 Guilderland Rd	Schenectady	NY	12306	2018
36 Memory Ln	Schenectady	Private			Indian House Creek-Normans Kill	2406	1	1	2	Saccocio, Patrick J	36 Memory Ln	Schenectady	NY	12306	2018
3601 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1840	1	2	3	Blessing, Welton	6199 Gardner Rd	Altamont	NY	12009	2018
3602 Giffords Church Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1265	1	1	2	Adair, Kenneth	3602 Giffords Church Rd	Duanesburg	NY	12056	2018
3604 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	2664	1	2	3	Griesemer, Michael H	3604 Guilderland Rd	Schenectady	NY	12306	2018
3605 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	2396	2	2	4	DiCaprio, Kathleen	3605 Guilderland Ave	Schenectady	NY	12306	2018
3616 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1404	1	1	2	VanWie, Merton G	3616 Guilderland Rd	Schenectady	NY	12306	2018
3617 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1188	1	1	2	Livingston, John	3617 Guilderland Rd	Schenectady	NY	12306	2018
362 Birchwood Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1312	1	1	2	Maura, Nicholas J	382 Birchwood Dr	Duanesburg	NY	12056	2018
364 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	1990	1	2	3	Stankavage, Donald R	364 Dunnsville Rd	Schenectady	NY	12306	2018
3642 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1540	1	1	2	Balga, Edward A	3642 Guilderland Rd	Schenectady	NY	12306	2018
365 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	1600	1	2	3	Belles, Michael J	365 Dunnsville Rd	Schenectady	NY	12306	2018
3657 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	2736	1	2	3	Backes, William J	3657 Guilderland Rd	Schenectady	NY	12306	2018
3662 Guilderland Rd	Schenectady	Private			Indian House Creek-Normans Kill	1422	1	1	2	DeMartino, Nicholas J	3662 Guilderland Rd	Schenectady	NY	12306	2018
3711 Western Tpke	Town of Guilder	Private	117	Horse farms	Indian House Creek-Normans Kill	2628	1	2	3	ATSLA LLC	1245 Viewmont Dr	Schenectady	NY	12309	2018
3749 Western Tpke	Town of Guilder	None	117	Horse farms	Indian House Creek-Normans Kill	1792	1	2	3	Seminary, John L	3749 Western Tpke	Altamont	NY	12009	2018
378 Normanskill Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1444	1	2	3	Donofrio, Janis	378 Normanskill Dr	Duanesburg	NY	12056	2018
38 Cindy Crest Dr	Schenectady	Private			Indian House Creek-Normans Kill	2292	1	2	3	Ryan, Glenna L	38 Cindy Crest Dr	Schenectady	NY	12306	2018
38 Memory Ln	Schenectady	Private			Indian House Creek-Normans Kill	1906	1	2	3	Sagan, Mark	38 Memory Ln	Schenectady	NY	12306	2018
384 Parkers Corners Rd	Schenectady	Private			Indian House Creek-Normans Kill	2046	1	2	3	Diamond, Jodi	382 Parkers Corners Rd	Schenectady	NY	12306	2018
3893 Western Tpke	Town of Guilder	Private	220	Two family year-round	Indian House Creek-Normans Kill	1586	2	2	4	VanWormer, Richard H	3893 Western Tpke	Altamont	NY	12009	2018
3903 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1269	1	1	2	Rau, Ernest W	461 Settles Hill Rd	Altamont	NY	12009	2018
3911 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1426	1	1	2	Jacobson, Michael F	3911 Western Tpke	Altamont	NY	12009	2018
3917 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1617	1	1	2	Ward , William H &Eliz	3917 Western Tpke	Altamont	NY	12009	2018
3925 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1238	1	1	2	Clemente, Lucas V	3925 Western Tpke	Altamont	NY	12009	2018
3929 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	948	1	1	2	Federal National Mort	1422 Dallas Pkwy Ste 1000	Dallas	TX	75254	2018
393 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	2052	2	2	4	Livingston, Joan	393 Giffords Church Rd	Schenectady	NY	12306	2018
3935 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1876	1	1	2	Ketchum, Thomas J	3935 Western Tpke	Altamont	NY	12009	2018
3949 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1908	1	3	4	Voss, Nicholas A	3949 Western Tpke	Altamont	NY	12009	2018
3971 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1744	1	1	2	Stewart, Bruce	3971 Western Tpke	Altamont	NY	12009	2018
398 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	1281	1	1	2	Kasmauskas, Dominick	398 Giffords Church Rd	Schenectady	NY	12306	2018
3981 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1920	1	1	2	Stonbely, Alison	3981 Western Tpke	Altamont	NY	12009	2018
3982 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	960	1	1	2	Grant, James J	3982 Western Tpke	Altamont	NY	12009	2018
3985 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1008	1	1	2	Chase, Matthew R	3985 Western Tpke	Altamont	NY	12009	2018

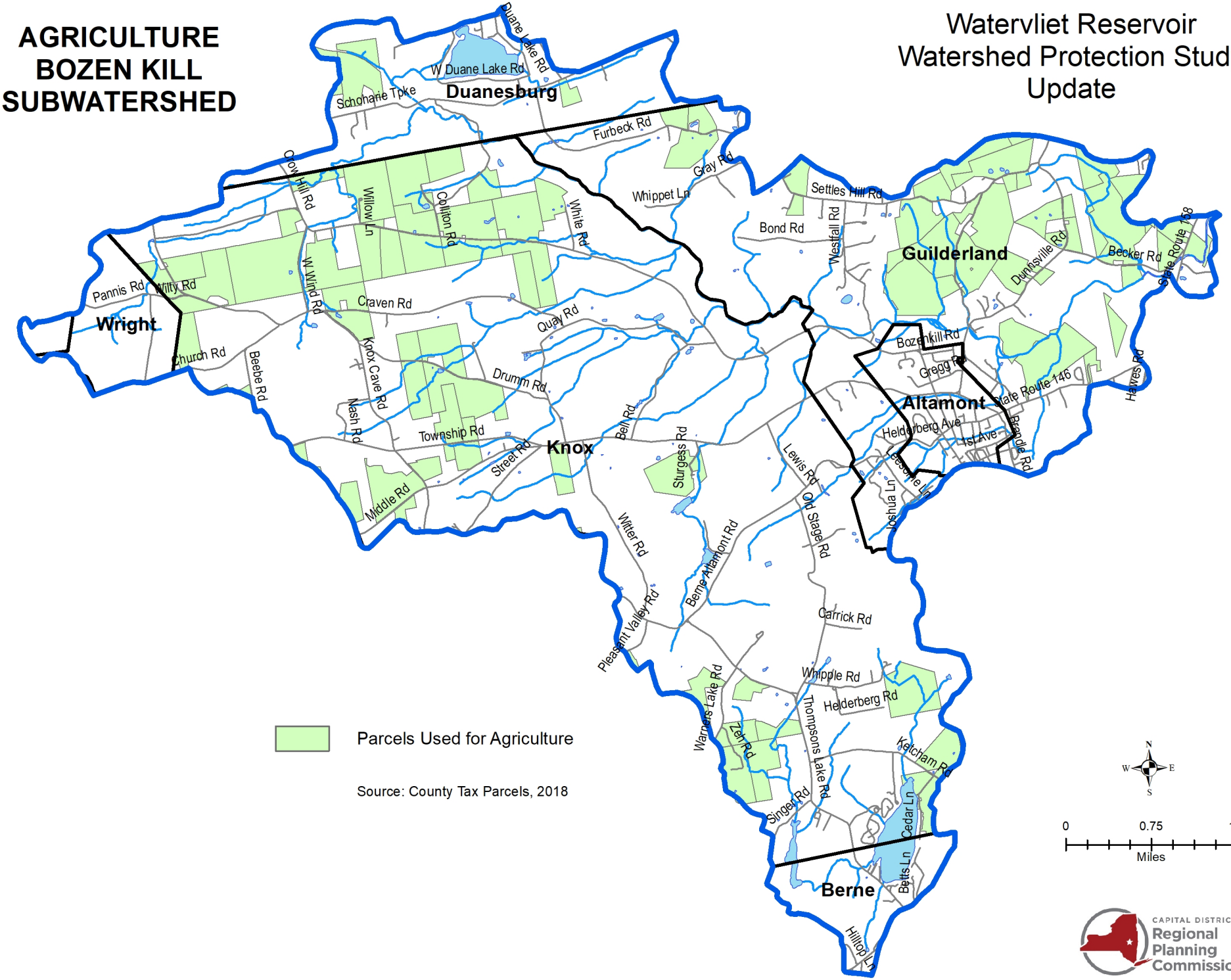
3990 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1561	1	1	2	Allgaier, Charles N	3990 Western Tpke	Altamont	NY	12009	2018
3994 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	2203	1	2	3	Nieves, Robin	3994 Western Tpke	Altamont	NY	12009	2018
4 Haymaker Ln Pr	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	940	1	2	3	Settle, Thomas L	4 Haymaker Ln	Altamont	NY	12009	2018
40 Cindy Crest Dr	Schenectady	Private			Indian House Creek-Normans Kill	2292	1	2	3	Perrone, Jason	40 Cindy Crest Dr	Schenectady	NY	12306	2018
40 Memory Ln	Schenectady	Private			Indian House Creek-Normans Kill	2170	1	2	3	Deforge, Bradford J	40 Memory Ln	Schenectady	NY	12306	2018
400 Donald Dr	Schenectady	Private			Indian House Creek-Normans Kill	2145	1	2	3	Bourque, Debra A	400 Donald Dr	Schenectady	NY	12306	2018
401 County Line Rd	Town of Guilder	None	240	Rural residence with a	Indian House Creek-Normans Kill	2916	1	2	3	Cardinal, Albert	401 County Line Rd	Schenectady	NY	123062543	2018
4011 Western Tpke	Town of Guilder	Private	220	Two family year-round	Indian House Creek-Normans Kill	3196	2	2	4	Rau, Ernest	461 Settles Hill Rd	Altamont	NY	12009	2018
402 Donald Dr	Schenectady	Private			Indian House Creek-Normans Kill	2029	1	2	3	Franco, Mario	402 Donald Dr	Schenectady	NY	12306	2018
404 Donald Dr	Schenectady	Private			Indian House Creek-Normans Kill	1924	1	2	3	Fiorillo, Thomas A	404 Donald Dr	Schenectady	NY	12306	2018
4055 Western Tpke	Town of Guilder	Private	240	Rural residence with a	Indian House Creek-Normans Kill	3272	1	2	3	Maine, Justin	4055 Western Tpke	Altamont	NY	12009	2018
406 Donald Dr	Schenectady	Private			Indian House Creek-Normans Kill	1879	1	2	3	Tremante, Patricia	406 Donald Dr	Schenectady	NY	12306	2018
408 Donald Dr	Schenectady	Private			Indian House Creek-Normans Kill	2545	1	2	3	Older, Jeffrey J	408 Donald Dr	Schenectady	NY	12306	2018
4098 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1272	1	1	2	Radzewicz, Ruthann	4022 Western Tpke	Altamont	NY	12009	2018
410 Donald Dr	Schenectady	Private			Indian House Creek-Normans Kill	1924	1	2	3	Curiano, Charles P	410 Donald Dr	Schenectady	NY	12306	2018
411 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	1036	1	1	2	Veeder, Deline	411 Giffords Church Rd	Schenectady	NY	12306	2018
412 Donald Dr	Schenectady	Private			Indian House Creek-Normans Kill	1930	1	2	3	Mau, William	412 Donald Dr	Schenectady	NY	12306	2018
4122 Western Tpke	Town of Guilder	Private	120	Field crops	Indian House Creek-Normans Kill	2578	1	2	3	Radzewicz, Paul A	4022 Western Tpke	Altamont	NY	12009	2018
4129 Western Tpke	Town of Guilder	Private	240	Rural residence with a	Indian House Creek-Normans Kill	4178	1	2	3	Roddy, Bernard	4129 Western Tpke	Altamont	NY	12009	2018
414 Donald Dr	Schenectady	Private			Indian House Creek-Normans Kill	2478	1	2	3	Ranieri, Dominick J	414 Donald Dr	Schenectady	NY	12306	2018
416 Donald Dr	Schenectady	Private			Indian House Creek-Normans Kill	2250	1	2	3	Pierce, William	416 Donald Dr	Schenectady	NY	12306	2018
416 Normanskill Dr	Duanesburg	Private			Indian House Creek-Normans Kill	2947	1	2	3	Siver, Ernestina S	416 Normanskill Dr	Duanesburg	NY	12056	2018
4177 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	2168	1	2	3	Settle, Joan E	4177 Western Tpke	Altamont	NY	12009	2018
418 Donald Dr	Schenectady	Private			Indian House Creek-Normans Kill	1640	1	2	3	Bartlett, John H	418 Donald Dr	Schenectady	NY	12306	2018
419 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	1418	2	2	4	Guilz, Roland J	419 Dunnsville Rd	Schenectady	NY	12306	2018
420 Donald Dr	Schenectady	Private			Indian House Creek-Normans Kill	1786	1	2	3	Longshore, Judith A	420 Donald Dr	Schenectady	NY	12306	2018
424 Jenie Ct	Schenectady	Private			Indian House Creek-Normans Kill	2250	1	2	3	Richards, Timothy S	424 Jenie Ct	Schenectady	NY	12306	2018
426 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	1216	1	1	2	Bigley, Robert T	426 Giffords Church Rd	Schenectady	NY	12306	2018
426 Jenie Ct	Schenectady	Private			Indian House Creek-Normans Kill	2178	1	2	3	DiCarlo, Anthony	426 Jenie Ct	Schenectady	NY	12306	2018
429 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	1634	1	1	2	Torre, Sebastian	429 Giffords Church Rd	Schenectady	NY	12306	2018
43 S Westcott Rd	Schenectady	Private			Indian House Creek-Normans Kill	1144	1	1	2	Griesbeck, Aaron	43 S Westcott Rd	Schenectady	NY	12306	2018
4319 Western Tpke	Town of Guilder	None	240	Rural residence with a	Indian House Creek-Normans Kill	2912	1	2	3	Roddy, Bernard	4129 Western Tpke	Altamont	NY	12009	2018
4333 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	960	1	1	2	Richards, Elizabeth A	4333 Western Tpke	Altamont	NY	12009	2018
4348 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	2230	1	1	2	Anthony, Kenneth Rob	4348 Western Tpke	Altamont	NY	12009	2018
4355 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1296	1	2	3	Reisinger, William J Jr	4355 Western Tpke	Altamont	NY	12009	2018
4382 Western Tpke	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	3140	1	2	3	Coughtry, Timohty E	4382 Western Tpke	Altamont	NY	12009	2018
44 Cindy Crest Dr	Schenectady	Private			Indian House Creek-Normans Kill	1995	1	1	2	Larsen, Paul E	44 Cindy Crest Dr	Schenectady	NY	12306	2018
45 Cindy Crest Dr	Schenectady	Private			Indian House Creek-Normans Kill	2170	1	2	3	Heigel, Frederick J III	45 Cindy Crest Dr	Schenectady	NY	12306	2018
45 Memory Ln	Schenectady	Private			Indian House Creek-Normans Kill	1618	1	1	2	Gaus Family Trust, Ray	45 Memory Ln	Schenectady	NY	12306	2018
45 S Westcott Rd	Schenectady	Private			Indian House Creek-Normans Kill	2720	2	3	5	Greklek, Michael	45 S Westcott Rd	Schenectady	NY	12306	2018
455 Pangburn Rd	Schenectady	Private			Indian House Creek-Normans Kill	1680	1	1	2	Jensen, James	455 Pangburn Rd	Schenectady	NY	12306	2018
458 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	1368	1	1	2	Barker, Edward G II	458 Giffords Church Rd	Schenectady	NY	12306	2018
46 Cindy Crest Dr	Schenectady	Private			Indian House Creek-Normans Kill	2212	1	2	3	Houseknecht, William	46 Cindy Crest Dr	Schenectady	NY	12306	2018
469 Giffords Church Rd	Duanesburg	Private			Indian House Creek-Normans Kill	920	1	1	2	Stanisiewski, Margaret	47 Wedgewood Ave	Schenectady	NY	12303	2018
474 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	2058	1	2	3	Ferrara, John A	474 Giffords Church Rd	Schenectady	NY	12306	2018
474 Normanskill Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1984	1	1	2	Hewitt, Robert T	474 Normanskill Dr	Duanesburg	NY	12056	2018
476 Currybush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1888	1	1	2	Mills, Marcia A	476 Currybush Rd	Schenectady	NY	12306	2018
48 Cindy Crest Dr	Schenectady	Private			Indian House Creek-Normans Kill	2212	1	1	2	Payne, Joanne E	48 Cindy Crest Dr	Schenectady	NY	12306	2018
487 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	1776	1	1	2	Palazeke, Jonathan M	487 Giffords Church Rd	Schenectady	NY	12306	2018
49 S Westcott Rd	Schenectady	Private			Indian House Creek-Normans Kill	1776	1	1	2	La Rue, Anthony J III	49 S Westcott Rd	Schenectady	NY	12306	2018
492 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	2840	1	2	3	McBride, Peter J	492 Giffords Church Rd	Schenectady	NY	12306	2018
5 S Westcott Rd	Schenectady	None			Indian House Creek-Normans Kill	2781	1	2	3	Brown, Jeffrey D	5 S Westcott Rd	Schenectady	NY	12306	2018
500 Normanskill Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1947	1	2	3	NYSARC, INC	214 State St	Schenectady	NY	12320	2018
51 S Westcott Rd	Schenectady	Private			Indian House Creek-Normans Kill	1502	1	1	2	Ducharme Irrevocable	51 S Westcott Rd	Schenectady	NY	12306	2018
517 Viewpointe	Schenectady	Private			Indian House Creek-Normans Kill	1768	1	2	3	Klein, James G	517 Viewpointe	Schenectady	NY	12306	2018
518 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	2260	1	1	2	Masick Family Irrevoca	518 Quackenbush Rd	Schenectady	NY	12306	2018
520 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	2254	1	2	3	Masick, James P	520 Quackenbush Rd	Schenectady	NY	12306	2018
520 Viewpointe	Schenectady	Private			Indian House Creek-Normans Kill	1804	1	2	3	Silvestri, Sante Jr	520 Viewpointe	Schenectady	NY	12306	2018
524 Mariaville Scotch Church	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1452	1	1	2	O'Brien, Maureen M	524 Mariaville Scotch Rd	Pattersonvill	NY	12137	2018
525 Settles Hill Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1864	1	2	3	Ruede, Edward J	525 Settles Hill Rd	Altamont	NY	12009	2018
53 S Westcott Rd	Schenectady	Private			Indian House Creek-Normans Kill	1472	1	2	3	Wania, Frank J	53 S Westcott Rd	Schenectady	NY	12306	2018
535 County Line Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	608	1	1	2	Gilch, Roy A	535 County Line Rd	Schenectady	NY	12306	2018
541 Normanskill Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1104	1	2	3	Siegal, David C	541 Normanskill Dr	Duanesburg	NY	12056	2018
544 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	866	1	1	2	Doherty, Edward P	544 Dunnsville Rd	Schenectady	NY	12306	2018
549 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	2318	1	2	3	Dhiman, Dimple	549 Dunnsville Rd	Schenectady	NY	12306	2018
554 Mott Rd	Duanesburg	Private			Indian House Creek-Normans Kill	2200	1	1	2	Kniese, Robert C	554 Mott Rd	Duanesburg	NY	12056	2018
558 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	2556	1	2	3	JVC Masick Family Ltd	558 Quackenbush Rd	Schenectady	NY	12306	2018
559 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	3120	1	3	4	Reutter, James	559 Giffords Church Rd	Schenectady	NY	12306	2018
57 S Westcott Rd	Schenectady	Private			Indian House Creek-Normans Kill	1008	1	1	2	Brown, Eric Q	57 S Westcott Rd	Schenectady	NY	12306	2018
570 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	2172	1	2	3	Babiarz, Jason Paul	570 Dunnsville Rd	Schenectady	NY	12306	2018
59 Crestwood Dr	Schenectady	Private			Indian House Creek-Normans Kill	1926	1	2	3	Kowalczyk, Randolph P	59 Crestwood Dr	Schenectady	NY	12306	2018
595 Currybush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1772	1	1	2	Capital Gun Group, Inc	1702 Central Ave	Albany	NY	12205	2018
605 Becker Xing	Schenectady	Private			Indian House Creek-Normans Kill	3124	1	2	3	Verenini, Barry M	605 Becker Xin	Schenectady	NY	12306	2018
61 Crestwood Dr	Schenectady	Private			Indian House Creek-Normans Kill	2142	1	3	4	Davidson, James M	61 Crestwood Dr	Schenectady	NY	12306	2018
610 Becker Xing	Schenectady	Private			Indian House Creek-Normans Kill	2148	1	2	3	Pascarella, Randy M	610 Becker Xin	Schenectady	NY	12306	2018
618 Becker Xing	Schenectady	Private			Indian House Creek-Normans Kill	2411	1	2	3	Ericson, John E Jr	618 Beckers Xin	Schenectady	NY	12306	2018
638 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1980	1	1	2	Masick, Lawrence R	638 Quackenbush Rd	Schenectady	NY	12306	2018
667 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	4149	1	2	3	Amedore, George A	667 Giffords Church Rd	Schenectady	NY	12306	2018
669 County Line Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1225	1	1	2	Neverman, Ernest J	669 County Line Rd	Schenectady	NY	12306	2018
679 Schoharie Tpke	Duanesburg	Private			Indian House Creek-Normans Kill	1128	1	1	2	Vedder, Matthew	679 Schoharie Tpk	Duanesburg	NY	12056	2018
679-681 Birchwood Dr	Duanesburg	Private			Indian House Creek-Normans Kill	2208	1	1	2	Snow, Jeffrey	679 Birchwood Dr	Duanesburg	NY	12056	2018
687 County Line Rd	Town of Guilder	Private	240	Rural residence with a	Indian House Creek-Normans Kill	1531	1	1	2	Neverman, Ernest J	669 County Line Rd	Schenectady	NY	12306	2018
687 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1728	1	1	2	Knapp, Douglas A	687 Quackenbush Rd	Schenectady	NY	12306	2018
693 Birchwood Dr	Duanesburg	Private			Indian House Creek-Normans Kill	1318	1	2	3	Ackerly, Michael	693 Birchwood Dr	Duanesburg	NY	12056	2018
70 Crestwood Dr	Schenectady	Private			Indian House Creek-Normans Kill	1995	1	1	2	Craig, Diana	70 Crestwood Dr	Schenectady	NY	12306	2018
702 Quackenbush Rd	Schenectady	Private			Indian House Creek-Normans Kill	1230	1	1	2	DeLapp, Palma C	702 Quackenbush Rd	Schenectady	NY	12306	2018
703 George Palmer Ct	Schenectady	Private			Indian House Creek-Normans Kill	2431	1	2	3	Miranda, Patrick C	703 George Palmer Ct	Schenectady	NY	12306	2018
7059 Dunnsville Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	2237	1	2	3	Wright, Mary E	3 Valerie Ln	Loudonville	NY	12211	2018
707 George Palmer Ct	Schenectady	Private			Indian House Creek-Normans Kill	2326	1	2	3	Sobieski, John A Jr	707 George Palmer Ct	Schenectady	NY	12306	2018
7073 Dunnsville Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	2844	1	2	3	Shearing, Scott C	7073 Dunnsville Rd	Altamont	NY	12009	2018
7077 Dunnsville Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1344	1	2	3	Laraway, Deborah L	7077 Dunnsville Rd	Altamont	NY	12009	2018
710 George Palmer Ct	Schenectady	Private			Indian House Creek-Normans Kill	2861	1	2	3	Frank, Kevin W	710 George Palmer Ct	Schenectady	NY	12306	2018
711 George Palmer Ct	Schenectady	Private			Indian House Creek-Normans Kill	2386	1	2	3	Boyd, James M	711 George Palmer Ct	Schenectady	NY	12306	2018
711 Vista Blvd	Schenectady	Private			Indian House Creek-Normans Kill	1982	1	2	3	Hughes, Brian T	711 Vista Blv	Schenectady	NY	12306	2018
713 Vista Blvd	Schenectady	Private			Indian House Creek-Normans Kill	1532	1	2	3	Witkowski, Donald F	1786 Union St 23	Niskayuna	NY	12309	2018
7168 Rt 158	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1614	1	2	3	Souvenir Farms Inc	7160 Rt 158	Schenectady	NY	12306	2018
7186 Rt 158	Town of Guilder	Private	240	Rural residence with a	Indian House Creek-Normans Kill	1822	1	1	2	Zimmerman, William V	7186 Rt 158	Schenectady	NY	12306	2018
72 Crestwood Dr	Schenectady	Private			Indian House Creek-Normans Kill	1924	1	2	3	Earls, William G	72 Crestwood Dr	Schenectady	NY	12306	2018
7211 Rt 158	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1512	1	2	3	Frederick, Daniel R	7211 Rt 158	Schenectady	NY	12306	2018
7230 Rt 158	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1440	1	1	2	Haver, Howard R	7230 Rt 158	Schenectady	NY	12306	2018
725 County Line Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1872	1	2	3	Dagostino, Vincent	725 County Line Rd	Schenectady	NY	12306	2018
7291 Rt 158	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1092	1	1	2	Sefcovic, Anthony A Jr	7291 Rt 158	Schenectady	NY	12306	2018
7296 Rt 158	Town of Guilder	Private	117	Horse farms	Indian House Creek-Normans Kill	1568	1	1	2	VanNostrand, Peter C	7296 Rt 158	Schenectady	NY	12306	2018
730 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	1296	1	1	2	O'Connor, Patrick E	116 Horizon Blv	Schenectady	NY	12306	2018
7307 Rt 158	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1422	1	2	3	McMillen, Patricia A	7307 Rt 158	Schenectady	NY	12306	2018
7385 Church Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1285	1	2	3	Watson, Tony J	7385 Church Rd	Schenectady	NY	12306	2018
7392 Church Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1004	1	1	2	Spinnler, Gerard E	1852 Fawn Run Ln	Houston	TX	77084	2018
7404 Church Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1250	1	1	2	Hilson, Charles R	7404 Church Rd	Schenectady	NY	12306	2018
7407 Church Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1652	1	1	2	Barrett, Joseph J	7407 Church Rd	Schenectady	NY	12306	2018
7411 Church Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	2121	1	2	3	Turek, Barbara A	7411 Church Rd	Schenectady	NY	12306	2018
7412 Church Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1645	1	2	3	FitzGibbon, John T	7412 Church Rd	Schenectady	NY	12306	2018
7415 Church Rd	Town of Guilder	Private	210	One family year-round	Indian House Creek-Normans Kill	1904	1	1	2	Huber, Ryan	7415 Church Rd	Schenectady	NY	12306	2018
743 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	704	1	1	2	Feulner, Joseph D	743 Giffords Church Rd	Schenectady	NY	12306	2018
748-750 Duanesburg Rd	Rotterdam	Private			Indian House Creek-Normans Kill	2376	2	2	4	Lavalley Family Trust, A	15 Abby Rd	Latham	NY	12110	2018
752 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	1504	1	1	2	LeTarte, Herbert P Jr	752 Dunnsville Rd	Schenectady	NY	12306	2018
754 Duanesburg Rd	Schenectady	Private			Indian House Creek-Normans Kill	1476	1	1	2	Bradshaw, Richard J	754 Duanesburg Rd	Schenectady	NY	12306	2018
765 County Line Rd	Town of Guilder	None	117	Horse farms	Indian House Creek-Normans Kill	1408	1	2	3	Masters, Martha E	765 County Line Rd	Schenectady	NY	12306	2018
771 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	1652	1	1	2	Pustolka, Michael L Sr	747 Dunnsville Rd	Schenectady	NY	12306	2018
776 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	1554	1	1	2	LeTarte, Herbert P IV	776 Dunnsville Rd	Schenectady	NY	12306	2018
8 S Westcott Rd	Schenectady	Private			Indian House Creek-Normans Kill	2102	1	1	2	Neach, Harvey C	8 S Westcott Rd	Schenectady	NY	12306	2018
800 Vista Blvd	Schenectady	Private			Indian House Creek-Normans Kill	1400	1	2	3	Palmer Jeffrey L	800 Vista Blv	Schenectady	NY	12306	2018

801 North Crest Ct	Schenectady	Private			Indian House Creek-Normans Kill	2014	1	2	3	Keogh, Michael J	801 North Crest Ct	Schenectady	NY	12306	2018
802 Vista Blvd	Schenectady	Private			Indian House Creek-Normans Kill	1606	1	2	3	Ziomek, Alexis R	802 Vista Blv	Schenectady	NY	12306	2018
803 North Crest Ct	Schenectady	Private			Indian House Creek-Normans Kill	1874	1	2	3	Pierson, Benjamin G	803 North Crest Ct	Schenectady	NY	12306	2018
803 Vista Blvd	Schenectady	Private			Indian House Creek-Normans Kill	1939	1	2	3	Locke, Kevan T	803 Vista Blv	Schenectady	NY	12306	2018
804 Al Constantino Dr	Schenectady	Private			Indian House Creek-Normans Kill	2368	1	2	3	MacDonald, Ian M	804 Al Constantino Dr	Schenectady	NY	12306	2018
804 North Crest Ct	Schenectady	Private			Indian House Creek-Normans Kill	2586	1	1	2	Marra, Daniel A	804 North Crest Ct	Schenectady	NY	12306	2018
805 North Crest Ct	Schenectady	Private			Indian House Creek-Normans Kill	2550	1	1	2	Madia, Mario A	805 North Crest Ct	Schenectady	NY	12306	2018
806 Al Constantino Dr	Schenectady	Private			Indian House Creek-Normans Kill	1580	1	2	3	Carusone, Louis	806 Al Constantino Dr	Schenectady	NY	12306	2018
806 North Crest Ct	Schenectady	Private			Indian House Creek-Normans Kill	1572	1	2	3	Atkins, Jeffery C	806 North Crest Ct	Schenectady	NY	12306	2018
807 North Crest Ct	Schenectady	Private			Indian House Creek-Normans Kill	1742	1	1	2	Toma, Joseph	807 North Crest Ct	Schenectady	NY	12306	2018
808 Al Constantino Dr	Schenectady	Private			Indian House Creek-Normans Kill	2457	1	2	3	Fisher, Neal C	808 Al Constantino Dr	Schenectady	NY	12306	2018
809 Al Constantino Dr	Schenectady	Private			Indian House Creek-Normans Kill	2230	1	2	3	Stagnitti, James M	809 Al Constantino Dr	Schenectady	NY	12306	2018
810 Al Constantino Dr	Schenectady	Private			Indian House Creek-Normans Kill	2900	1	2	3	Bauer, Douglas E	810 Al Constantino Dr	Schenectady	NY	12306	2018
814 Al Constantino Dr	Schenectady	Private			Indian House Creek-Normans Kill	2353	1	2	3	Snyder, Ryan G	814 Al Constantino Dr	Schenectady	NY	12306	2018
816 Al Constantino Dr	Schenectady	Private			Indian House Creek-Normans Kill	2368	1	2	3	Palmer, Gerard	816 Al Constantino Dr	Schenectady	NY	12306	2018
818 Al Constantino Dr	Schenectady	Private			Indian House Creek-Normans Kill	2850	1	2	3	Mathurin, Wigens	818 Al Constantino Dr	Schenectady	NY	12306	2018
820 Western Tpke	Delanson	Private			Indian House Creek-Normans Kill	2184	1	1	2	Rau, Ernie	461 Settles Hill Rd	Altamont	NY	12009	2018
821 Al Constantino Dr	Schenectady	Private			Indian House Creek-Normans Kill	2481	1	2	3	DeMeo, Paul J	821 Al Constantino Dr	Schenectady	NY	12306	2018
841 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	2680	1	2	3	Devine, Jeffrey M	841 Dunnsville Rd	Schenectady	NY	12306	2018
843 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	2468	1	2	3	Longo, Scott R	843 Giffords Church Rd	Schenectady	NY	12306	2018
870 Currybush Rd	Schenectady	Private			Indian House Creek-Normans Kill	2720	1	2	3	Levey Irrevocable Trust	870 Currybush Rd	Schenectady	NY	12306	2018
883 Dunnsville Rd	Schenectady	Private			Indian House Creek-Normans Kill	1750	1	2	3	Cianfarani, Bruno V	883 Dunnsville Rd	Schenectady	NY	12306	2018
884 Schoharie Tpke	Duanesburg	Private			Indian House Creek-Normans Kill	2235	1	2	3	Schaefer, David	884 Schoharie Tpk	Duanesburg	NY	12056	2018
905 Shardon Ct	Schenectady	Private			Indian House Creek-Normans Kill	2008	1	2	3	Ryan, Scott K	905 Shardon Ct	Schenectady	NY	12306	2018
907 Shardon Ct	Schenectady	Private			Indian House Creek-Normans Kill	3477	1	2	3	Pasquarella, Michael	907 Shardon Ct	Schenectady	NY	12306	2018
915 Shardon Ct	Schenectady	Private			Indian House Creek-Normans Kill	3204	1	2	3	Aragosa, Peter V	915 Shardon Ct	Schenectady	NY	12306	2018
917 Shardon Ct	Schenectady	Private			Indian House Creek-Normans Kill	2407	1	2	3	Gallo, John A	917 Shardon Ct	Schenectady	NY	12306	2018
919 Shardon Ct	Schenectady	Private			Indian House Creek-Normans Kill	3268	1	4	5	Tommasone, Daniel R	919 Shardon Ct	Schenectady	NY	12306	2018
921 Shardon Ct	Schenectady	Private			Indian House Creek-Normans Kill	2852	1	2	3	Ryan, Daniel P	921 Shardon Ct	Schenectady	NY	12306	2018
922 Shardon Ct	Schenectady	Private			Indian House Creek-Normans Kill	3075	1	2	3	Capitummino, Stepher	922 Shardon Ct	Schenectady	NY	12306	2018
924 Shardon Ct	Schenectady	Private			Indian House Creek-Normans Kill	2486	1	2	3	Masick, Donald V	924 Shardon Ct	Schenectady	NY	12306	2018
962 Darrow Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1878	1	2	3	Reed, Francis A	962 Darrow Rd	Duanesburg	NY	12056	2018
971 Darrow Rd	Duanesburg	Private			Indian House Creek-Normans Kill	1248	1	1	2	Krajewski, Edward R	971 Darrow Rd	Duanesburg	NY	12056	2018
978 Schoharie Tpke	Duanesburg	Private			Indian House Creek-Normans Kill	2341	1	2	3	McEachron, Thomas M	978 Schoharie Tpk	Duanesburg	NY	12056	2018
994 Giffords Church Rd	Schenectady	Private			Indian House Creek-Normans Kill	1801	1	1	2	Jewett, LeRoy D	994 Giffords Church Rd	Schenectady	NY	12306	2018

Appendix H: Subwatershed maps for the Bozen Kill

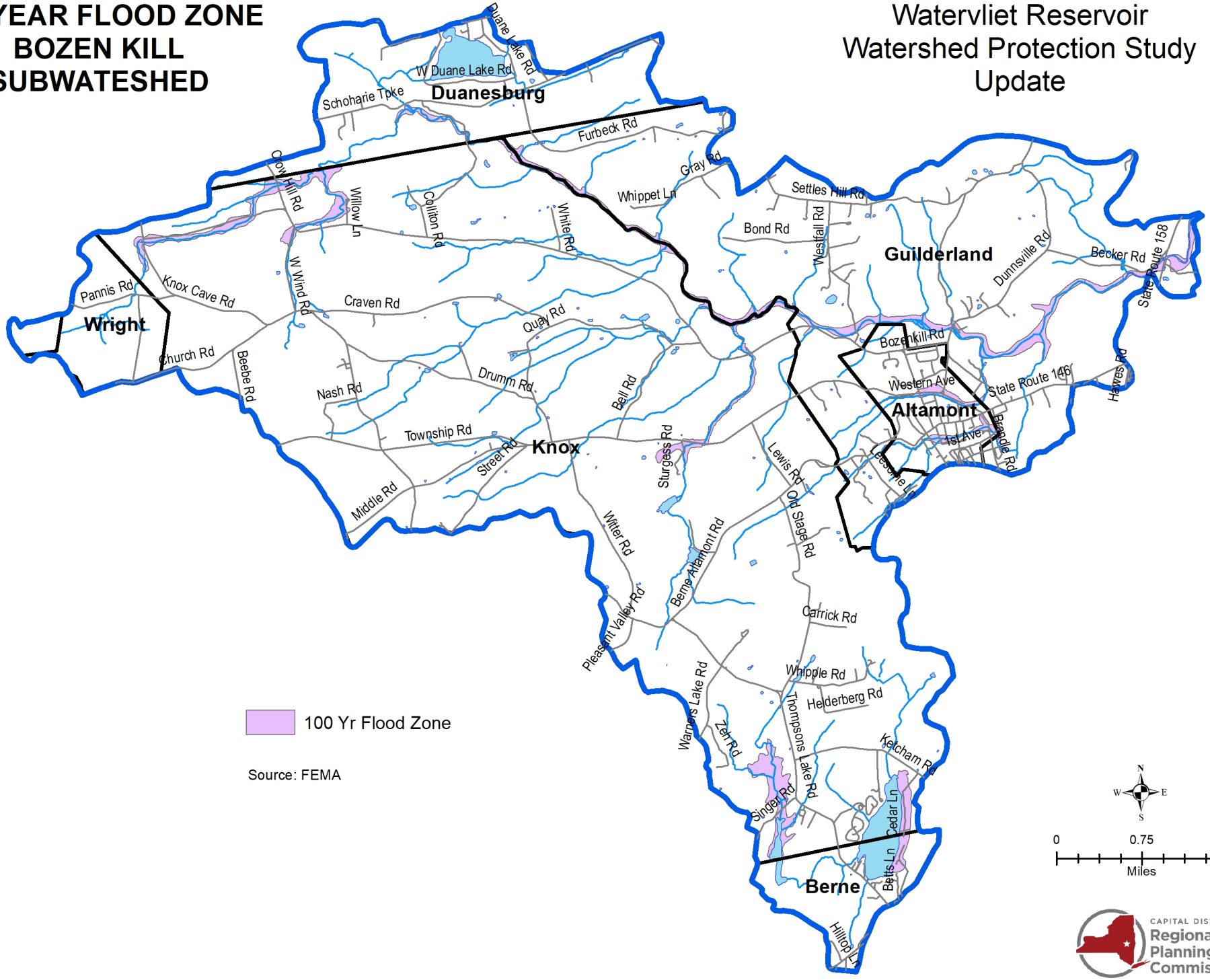
AGRICULTURE BOZEN KILL SUBWATERSHED

Watervliet Reservoir Watershed Protection Study Update



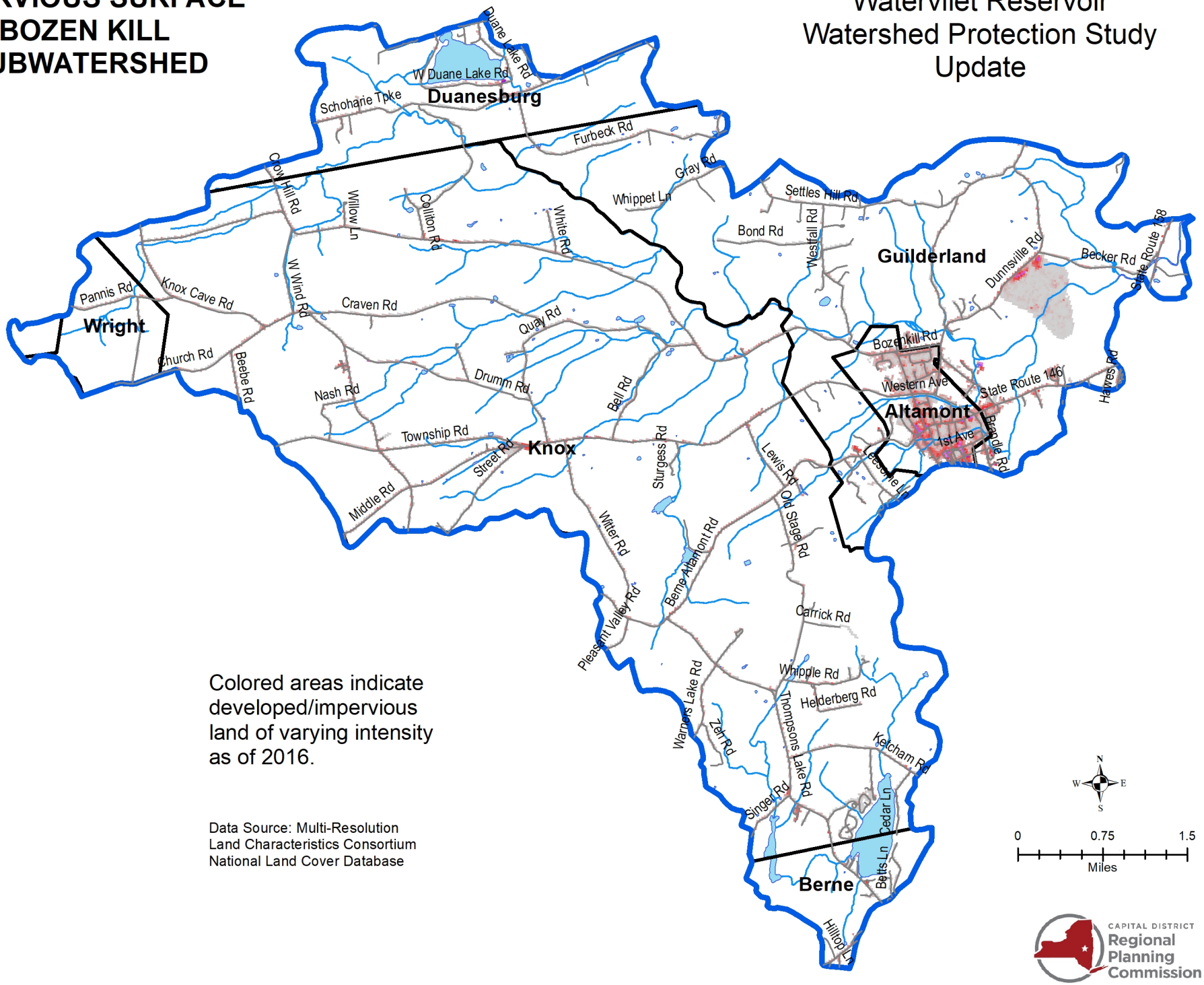
100 YEAR FLOOD ZONE
BOZEN KILL
SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update



IMPERVIOUS SURFACE BOZEN KILL SUBWATERSHED

Watervliet Reservoir Watershed Protection Study Update



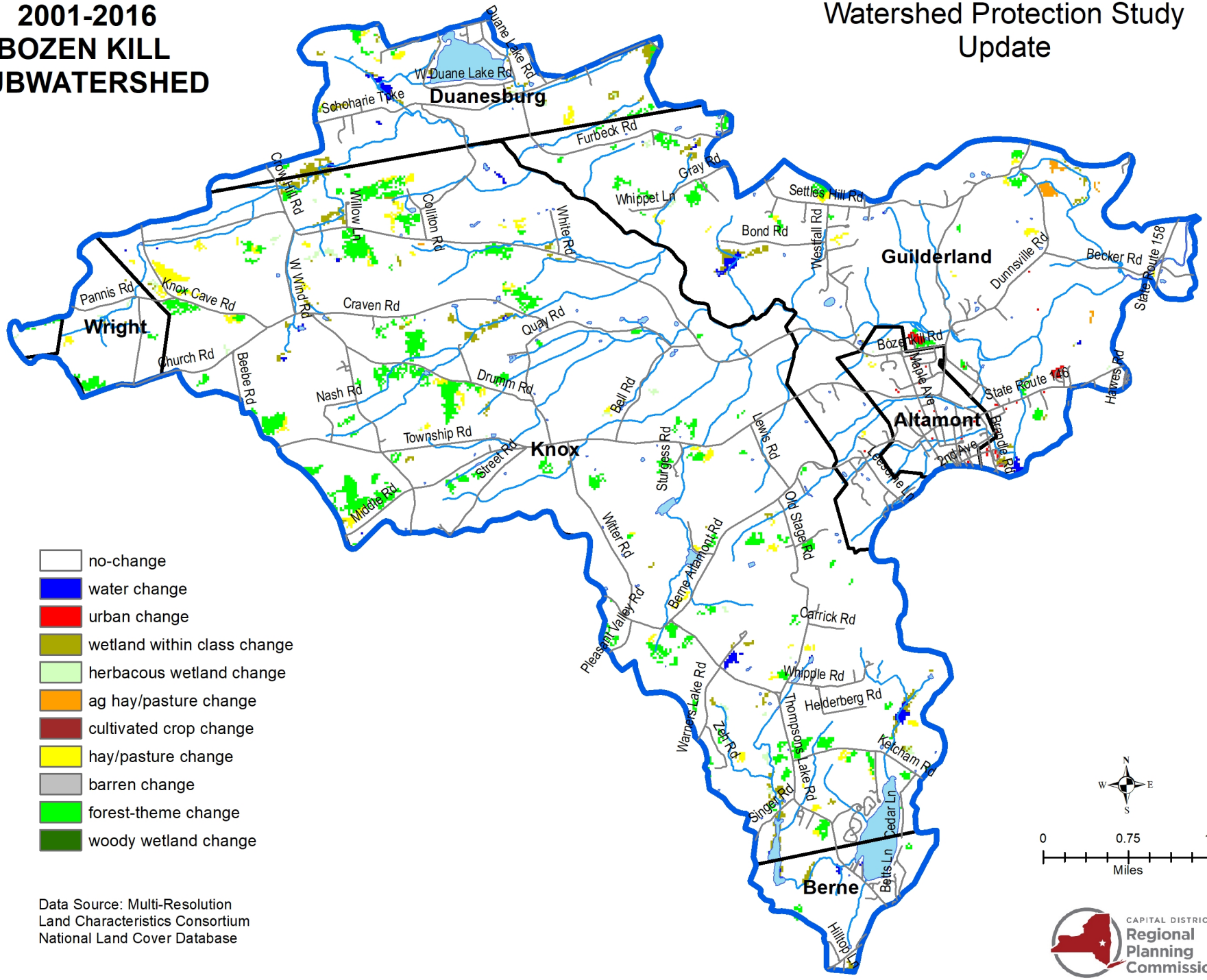
Colored areas indicate developed/impervious land of varying intensity as of 2016.

Data Source: Multi-Resolution Land Characteristics Consortium National Land Cover Database

CAPITAL DISTRICT Regional Planning Commission

LAND COVER CHANGE
2001-2016
BOZEN KILL
SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update

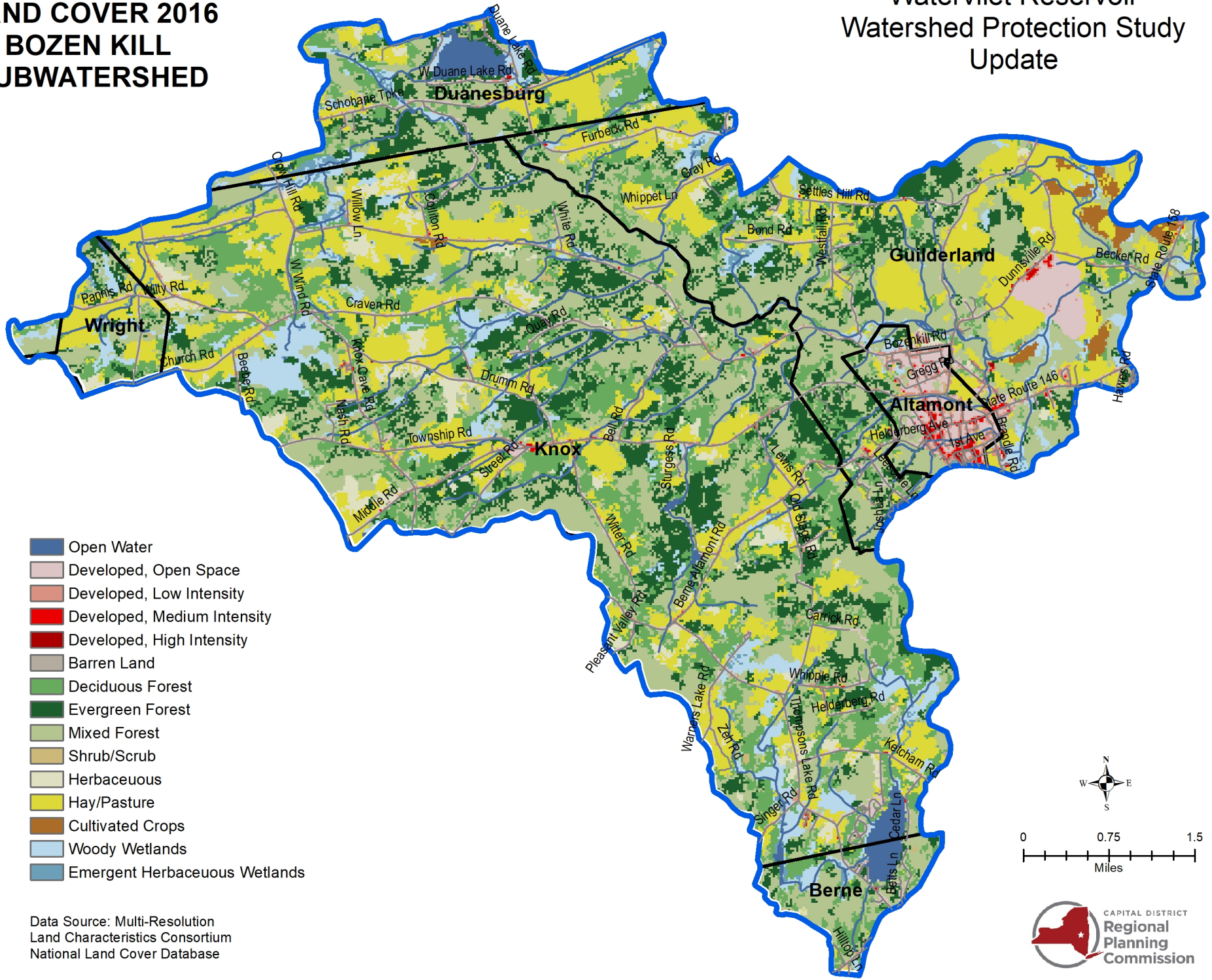


Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database

CAPITAL DISTRICT
Regional
Planning
Commission

LAND COVER 2016
BOZEN KILL
SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update

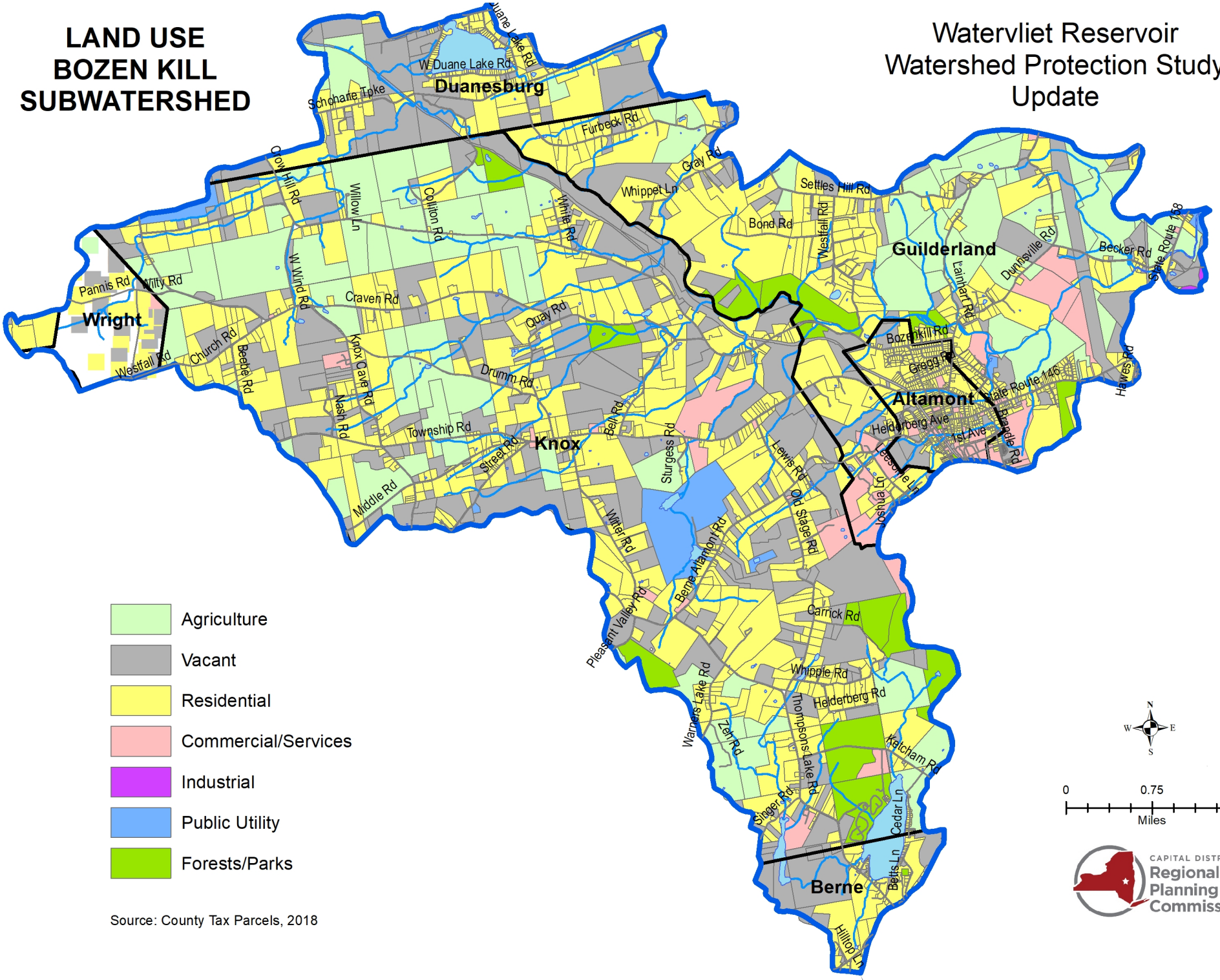


Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database

CAPITAL DISTRICT
Regional
Planning
Commission

LAND USE BOZEN KILL SUBWATERSHED

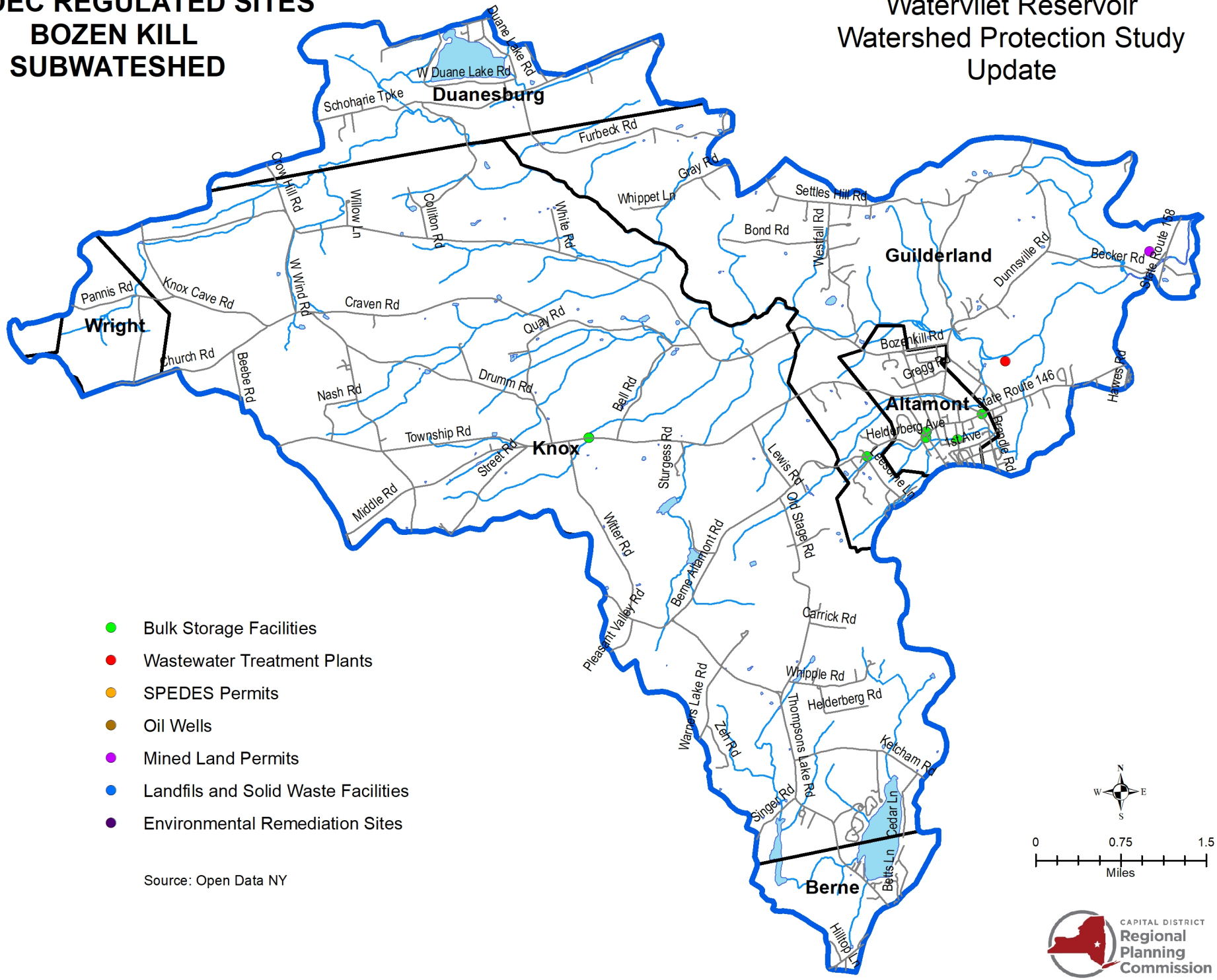
Watervliet Reservoir Watershed Protection Study Update

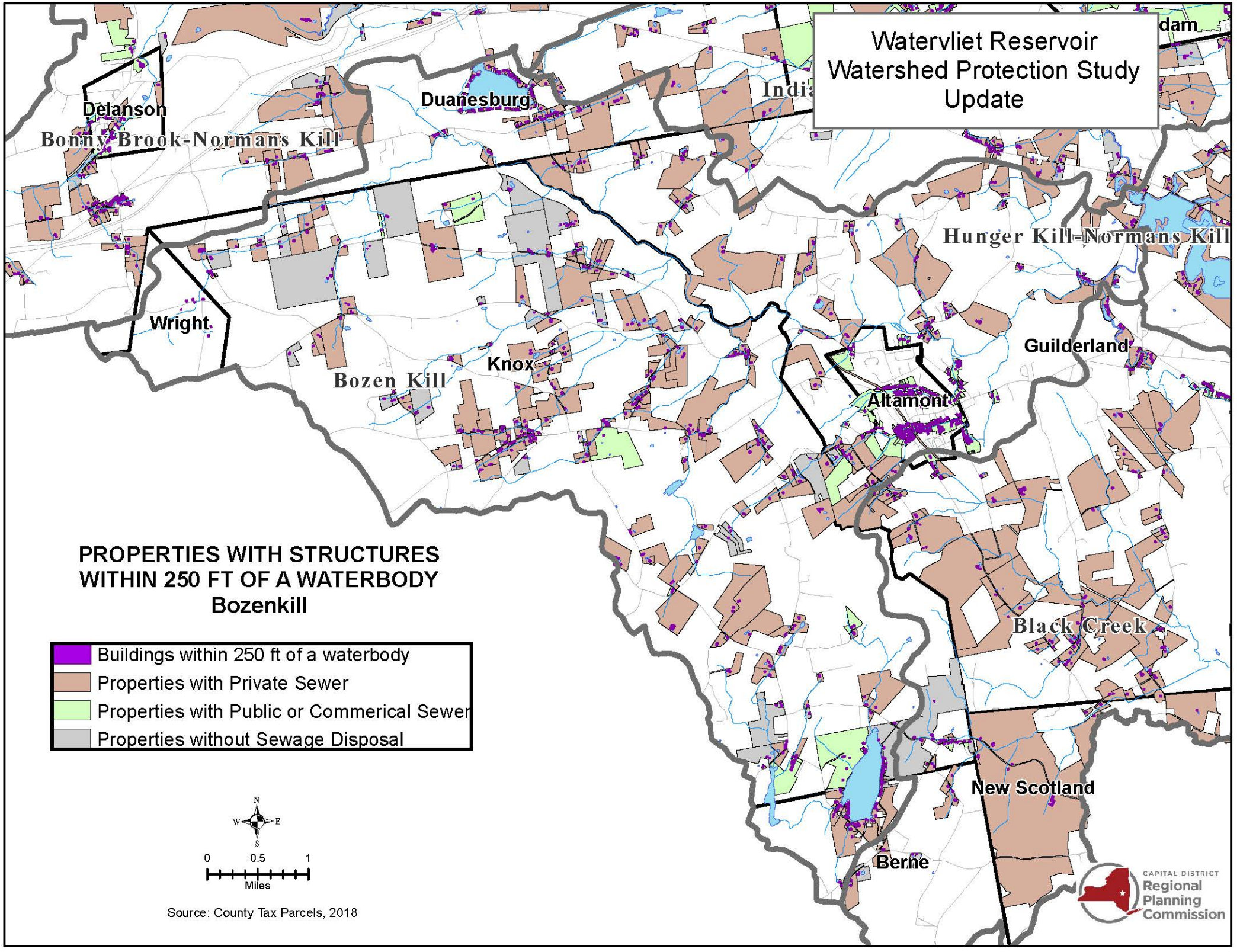


Source: County Tax Parcels, 2018

NYS DEC REGULATED SITES
BOZEN KILL
SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update




Watervliet Reservoir
Watershed Protection Study
Update
Delanson
Bonny Brook-Normans Kill
Duanesburg
Hunger Kill-Normans Kill
Wright
Knox
Bozen Kill
Guilderland
Altamont
Black Creek
New Scotland
Berne
PROPERTIES WITH STRUCTURES
WITHIN 250 FT OF A WATERBODY
Bozenkill
Buildings within 250 ft of a waterbody
Properties with Private Sewer
Properties with Public or Commerical Sewer
Properties without Sewage Disposal
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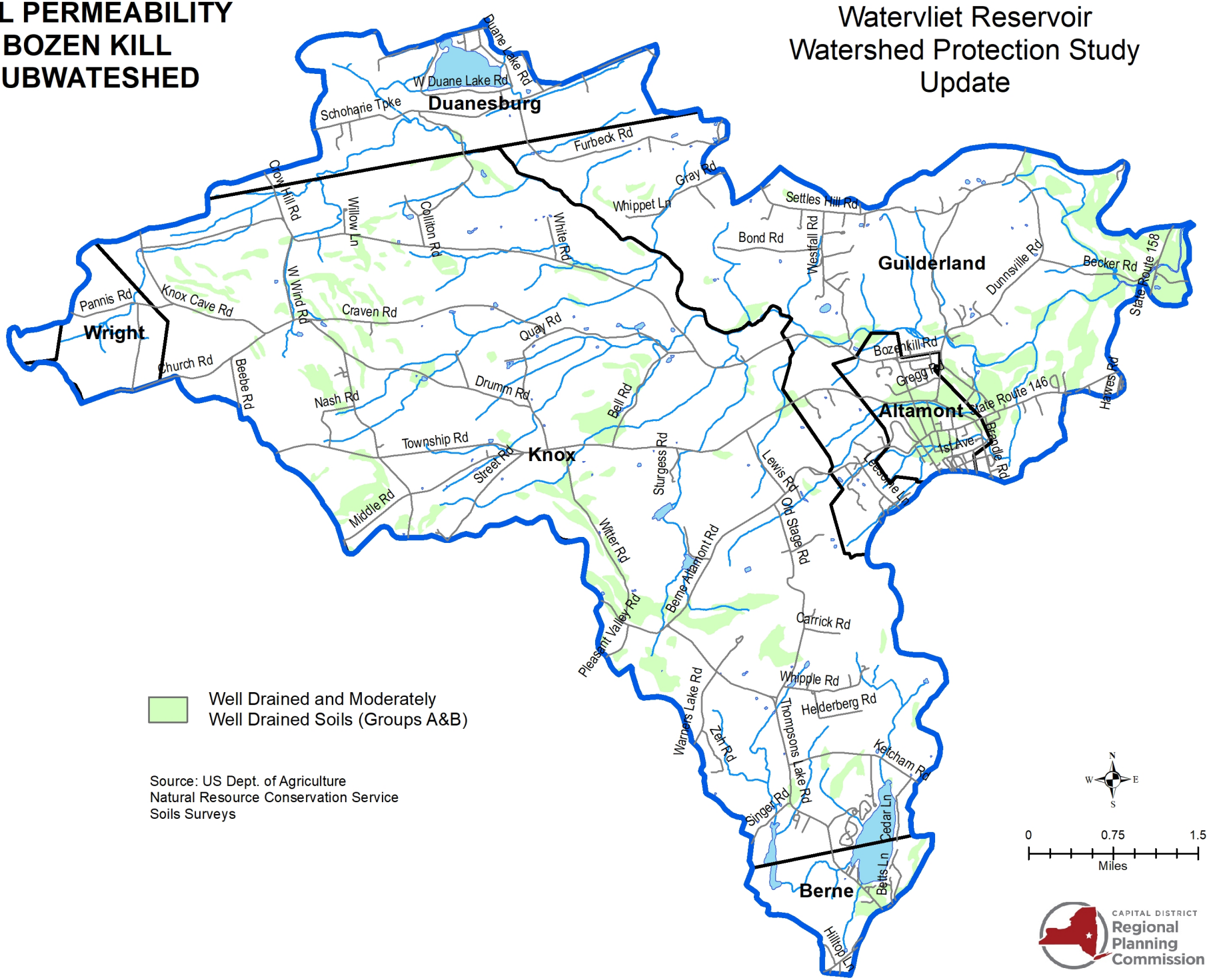
Miles
Source: County Tax Parcels, 2018
CAPITAL DISTRICT
Regional
Planning
Commission

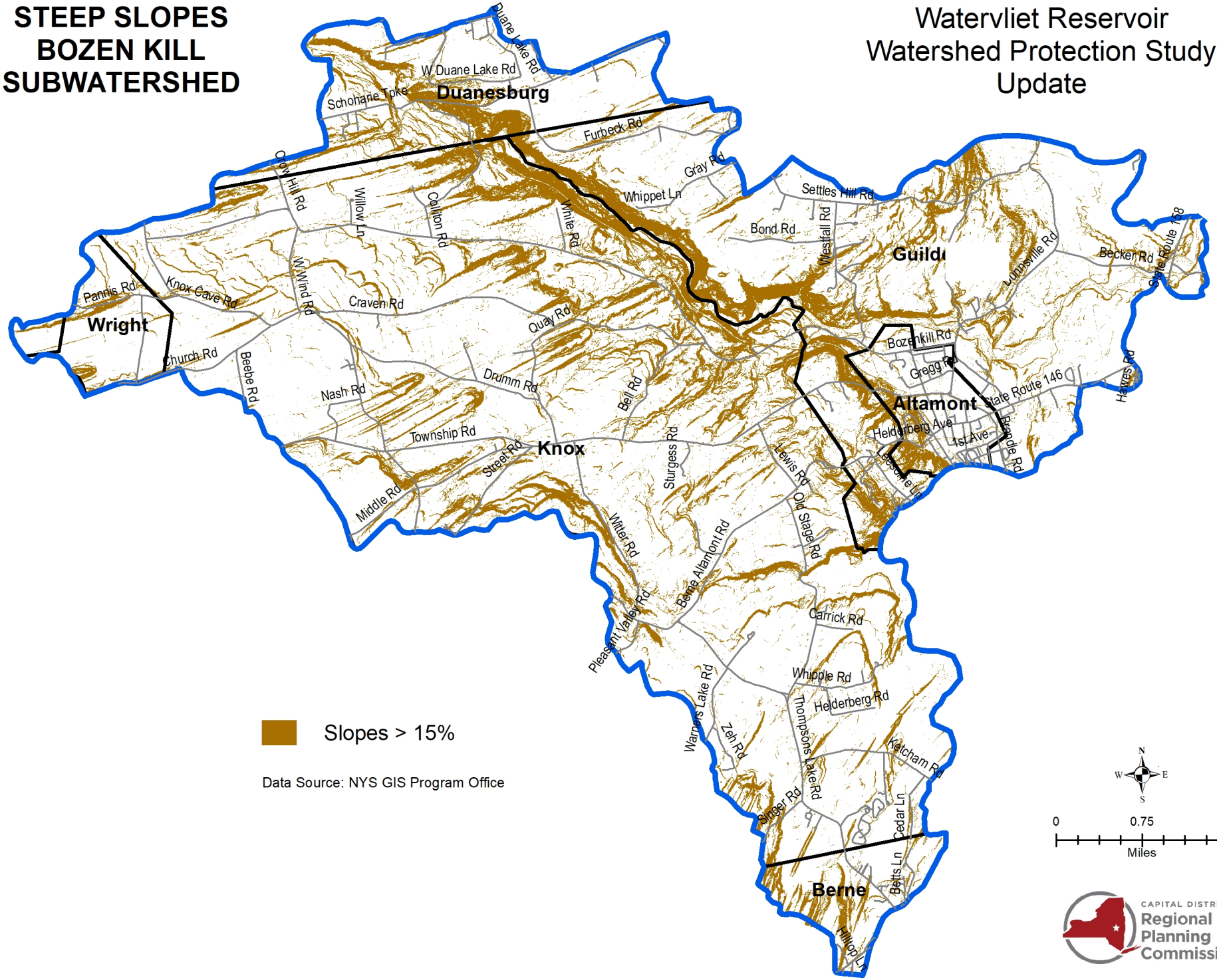
SOIL PERMEABILITY
BOZEN KILL
SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update



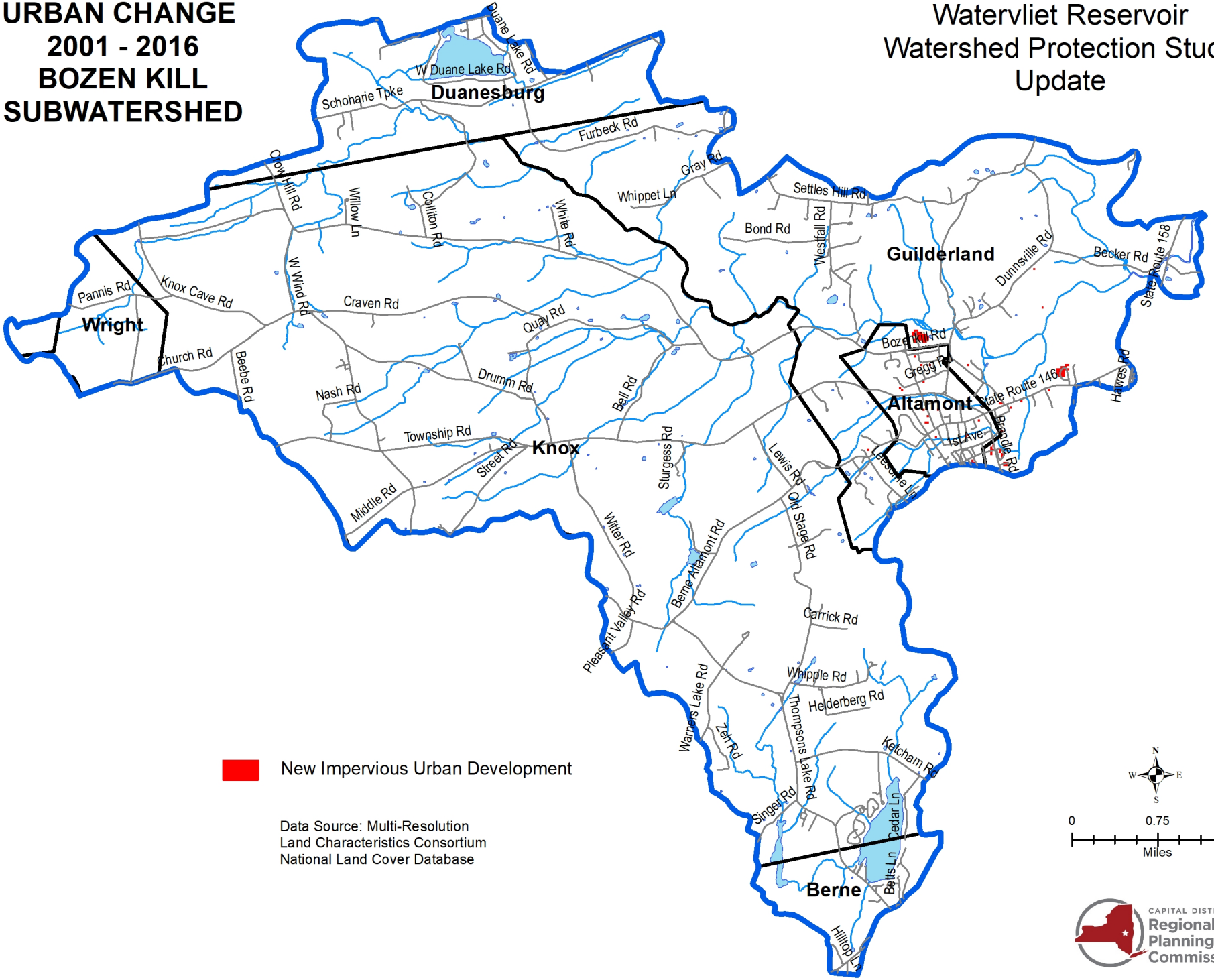
STEEP SLOPES BOZEN KILL SUBWATERSHED

Watervliet Reservoir Watershed Protection Study Update



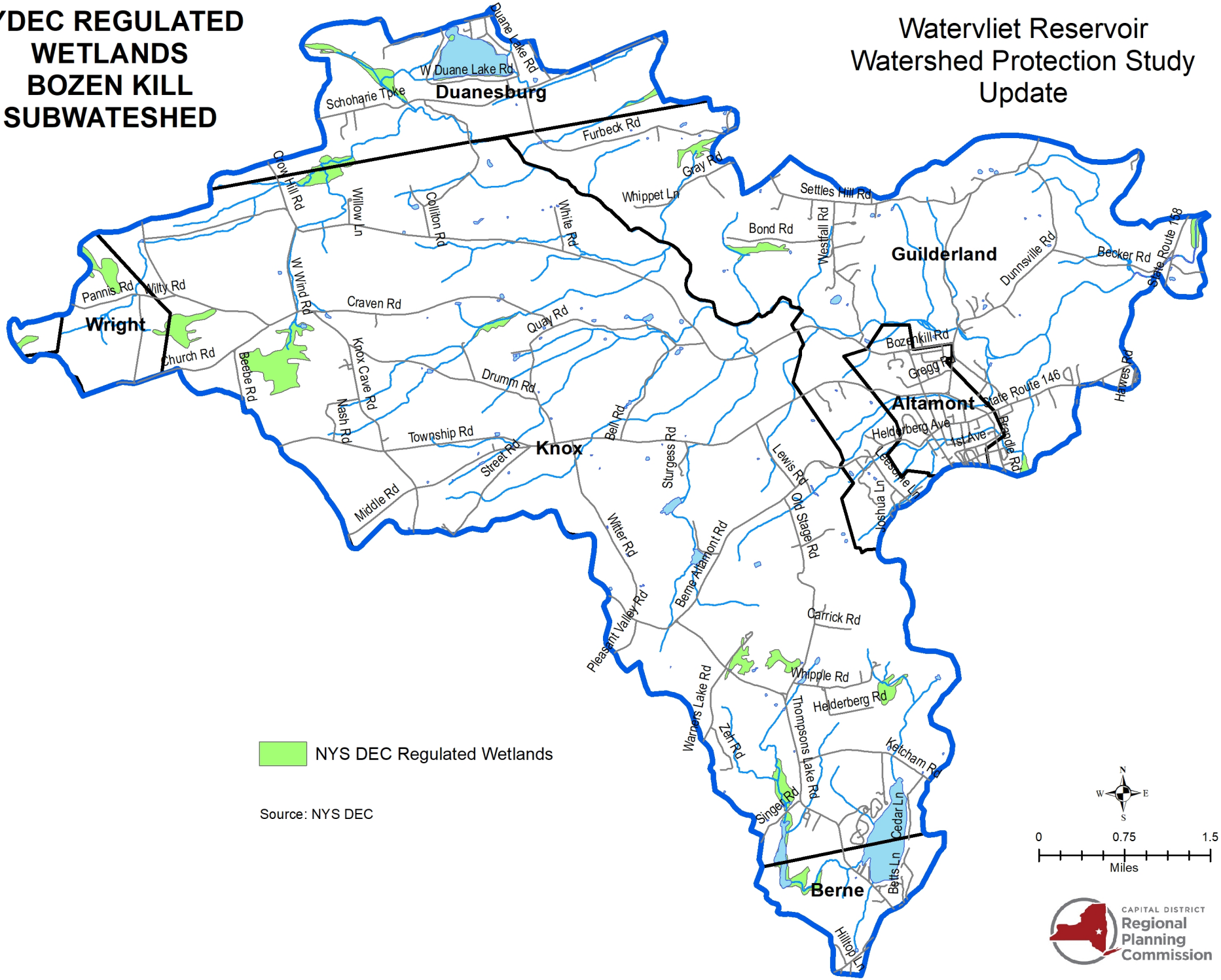
URBAN CHANGE 2001 - 2016 BOZEN KILL SUBWATERSHED

Watervliet Reservoir Watershed Protection Study Update



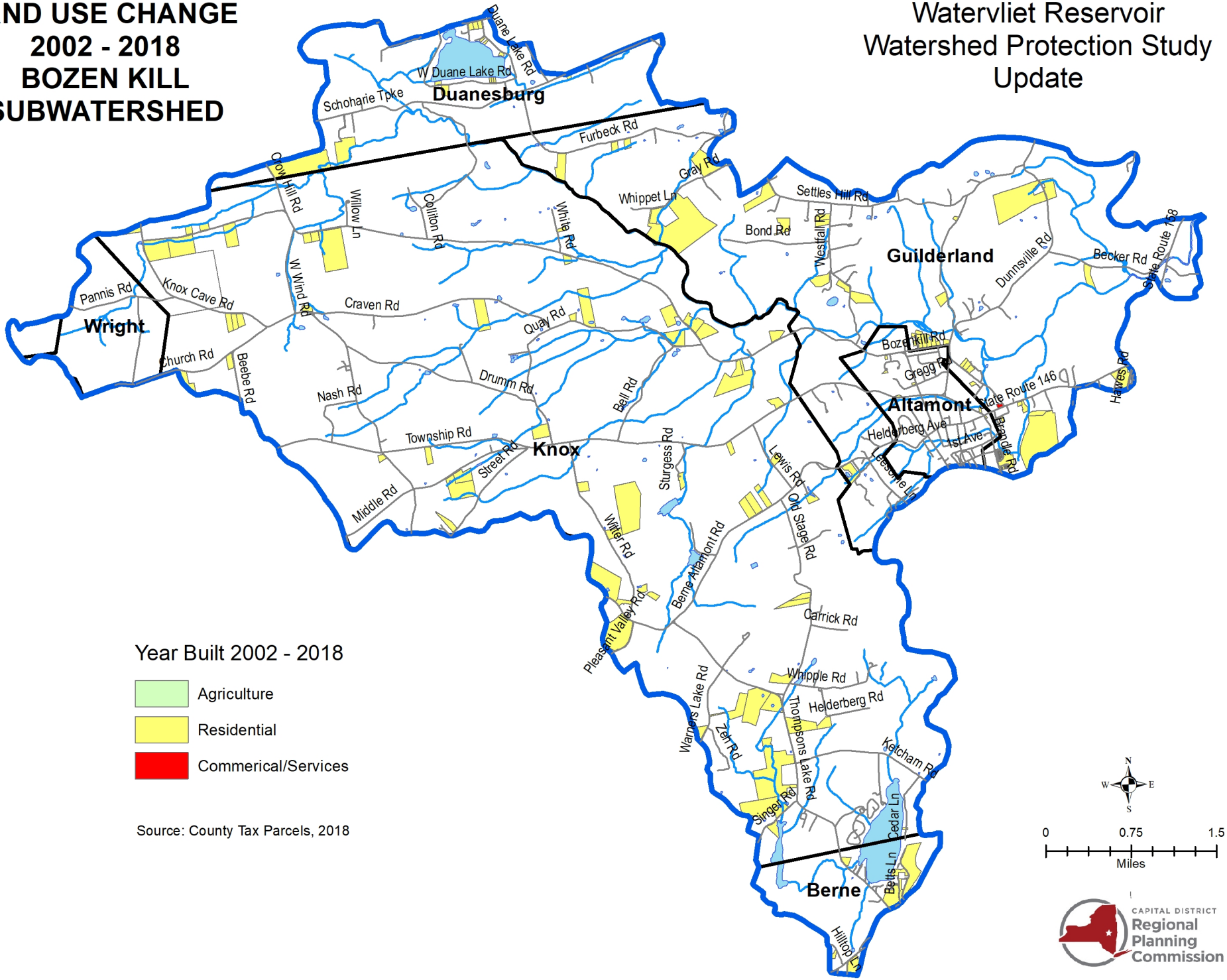
NYDEC REGULATED WETLANDS BOZEN KILL SUBWATESHED

Watervliet Reservoir Watershed Protection Study Update



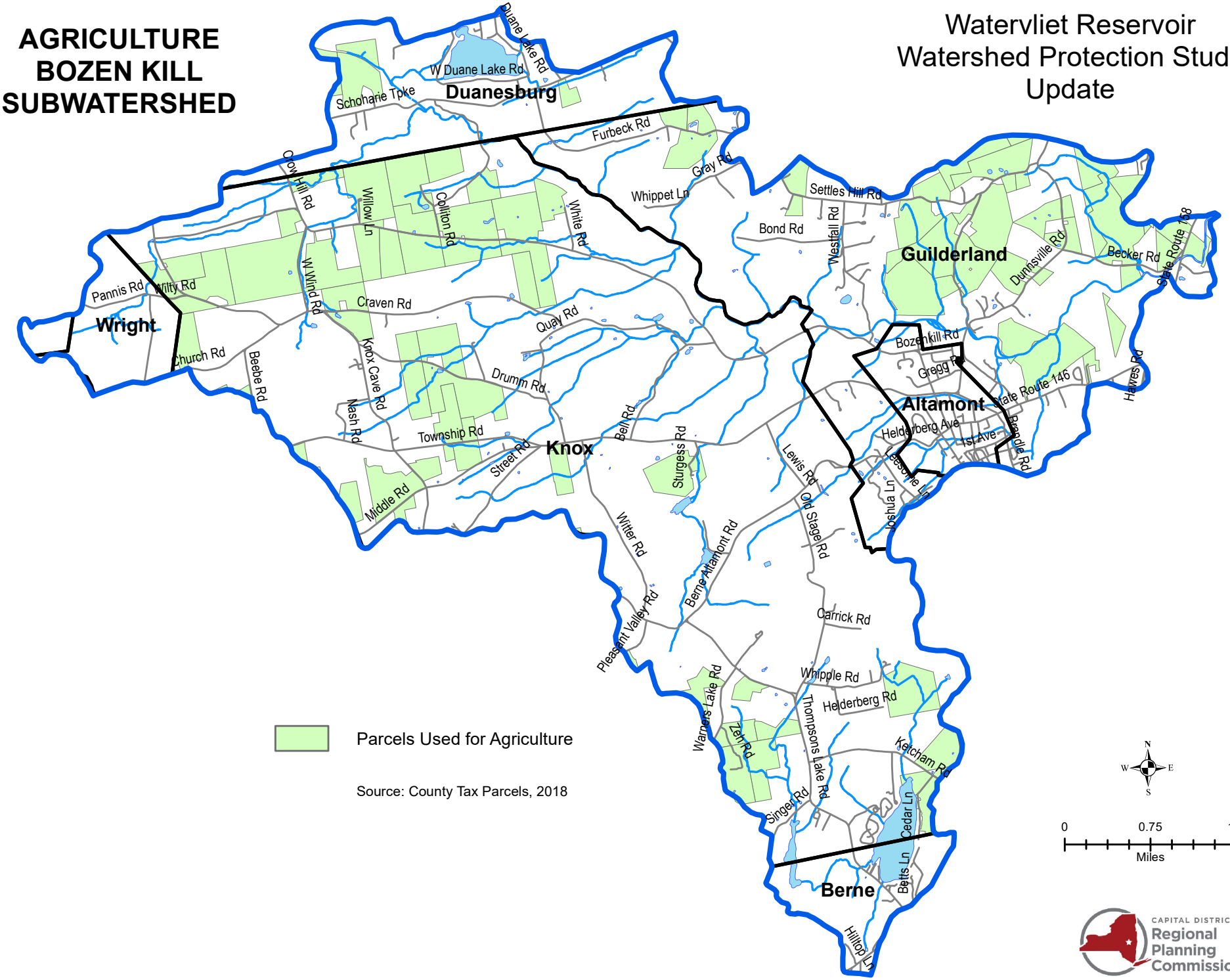
LAND USE CHANGE 2002 - 2018 BOZEN KILL SUBWATERSHED

Watervliet Reservoir Watershed Protection Study Update



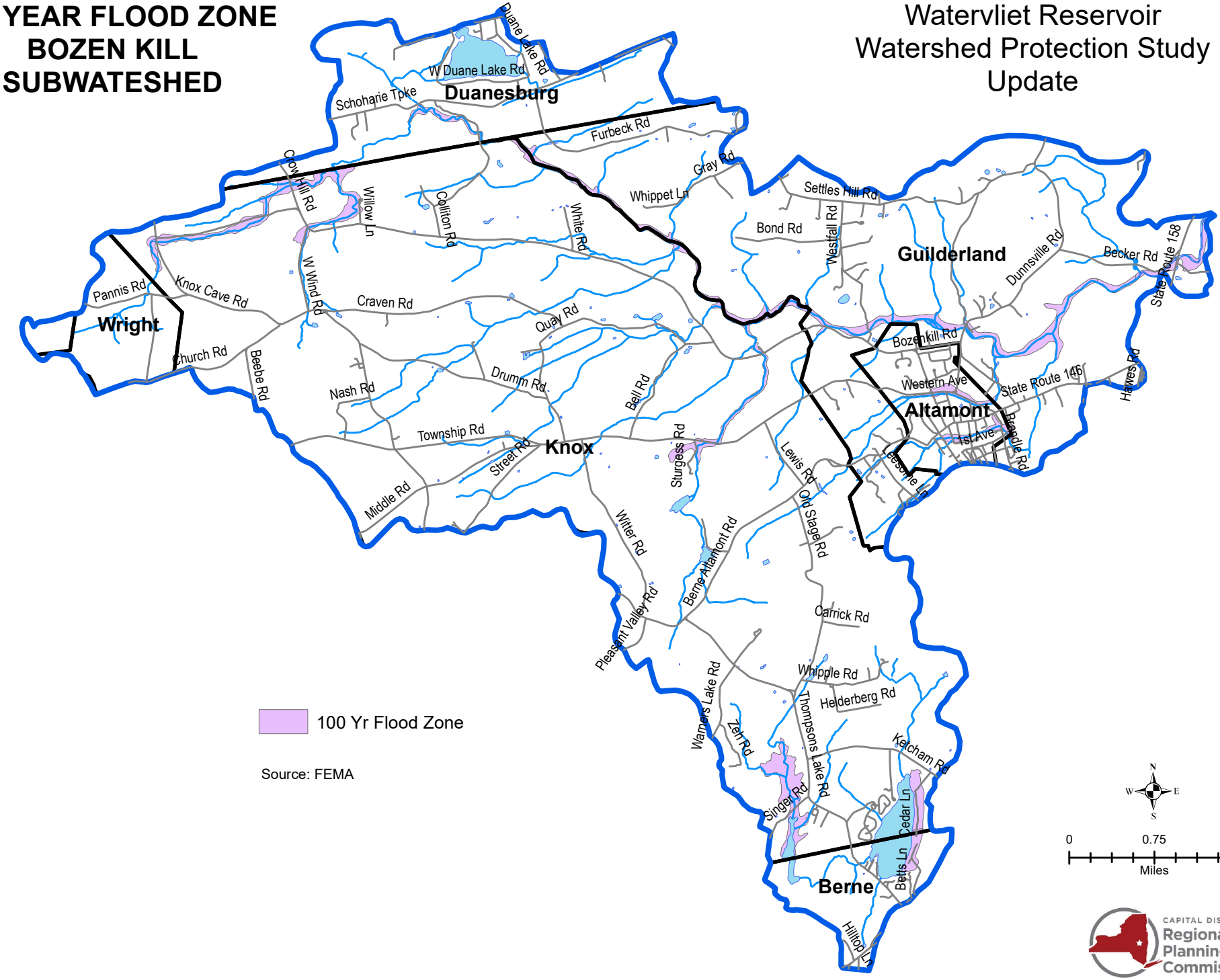
AGRICULTURE BOZEN KILL SUBWATERSHED

Watervliet Reservoir Watershed Protection Study Update



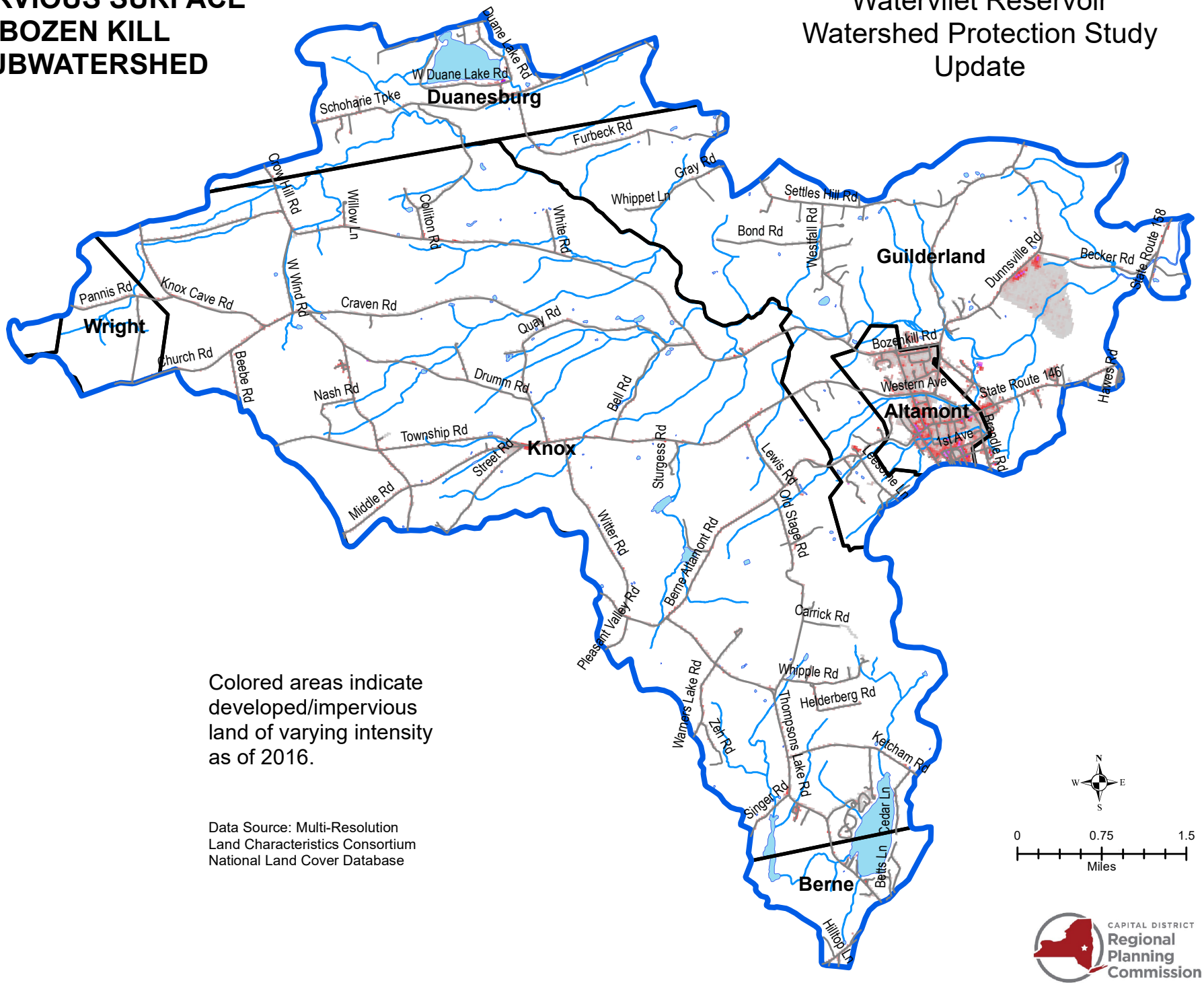
100 YEAR FLOOD ZONE
BOZEN KILL
SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update



IMPERVIOUS SURFACE
BOZEN KILL
SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



Colored areas indicate developed/impervious land of varying intensity as of 2016.

Data Source: Multi-Resolution Land Characteristics Consortium National Land Cover Database

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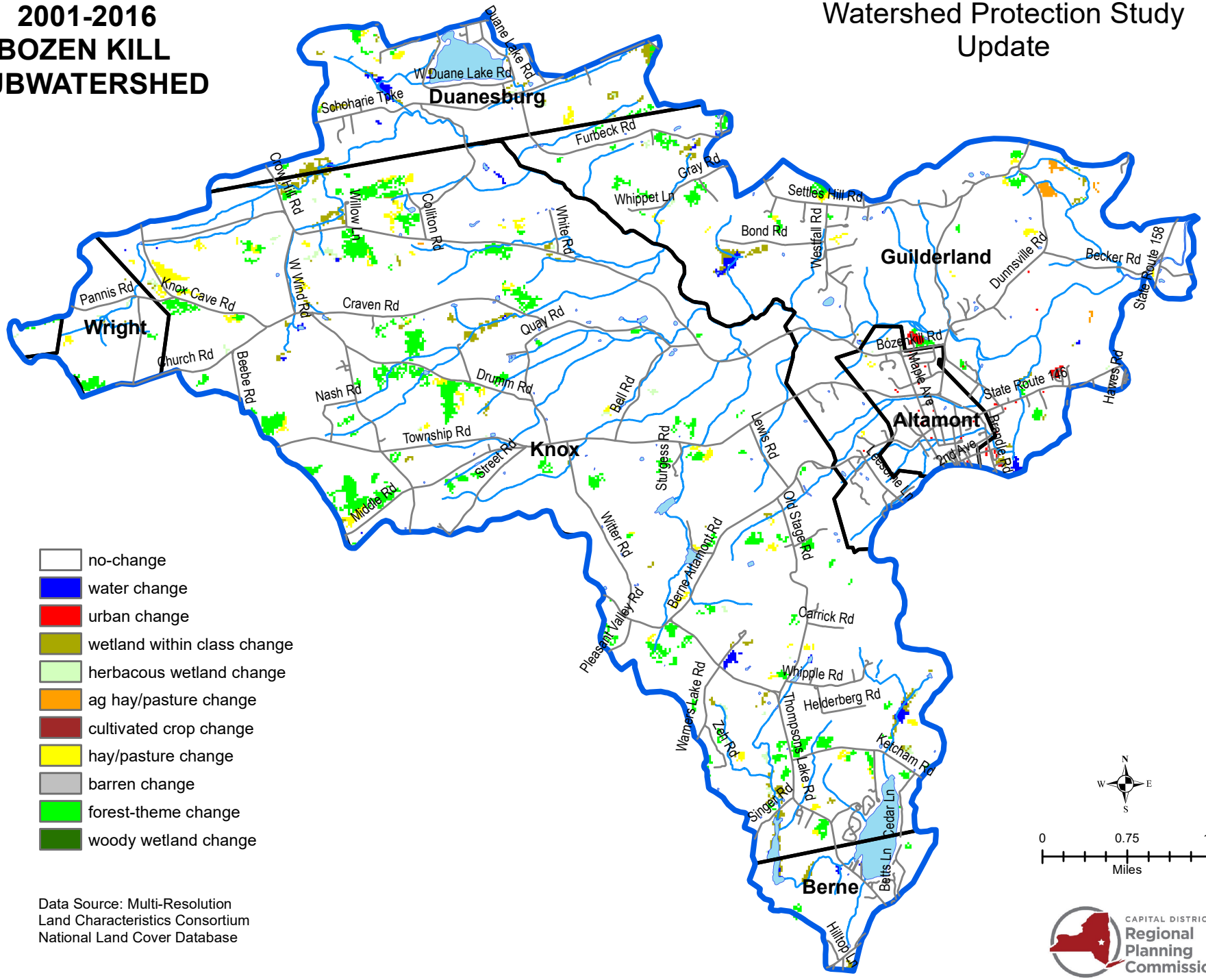
CAPITAL DISTRICT
Regional Planning Commission

LAND COVER CHANGE 2001-2016 BOZEN KILL SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update

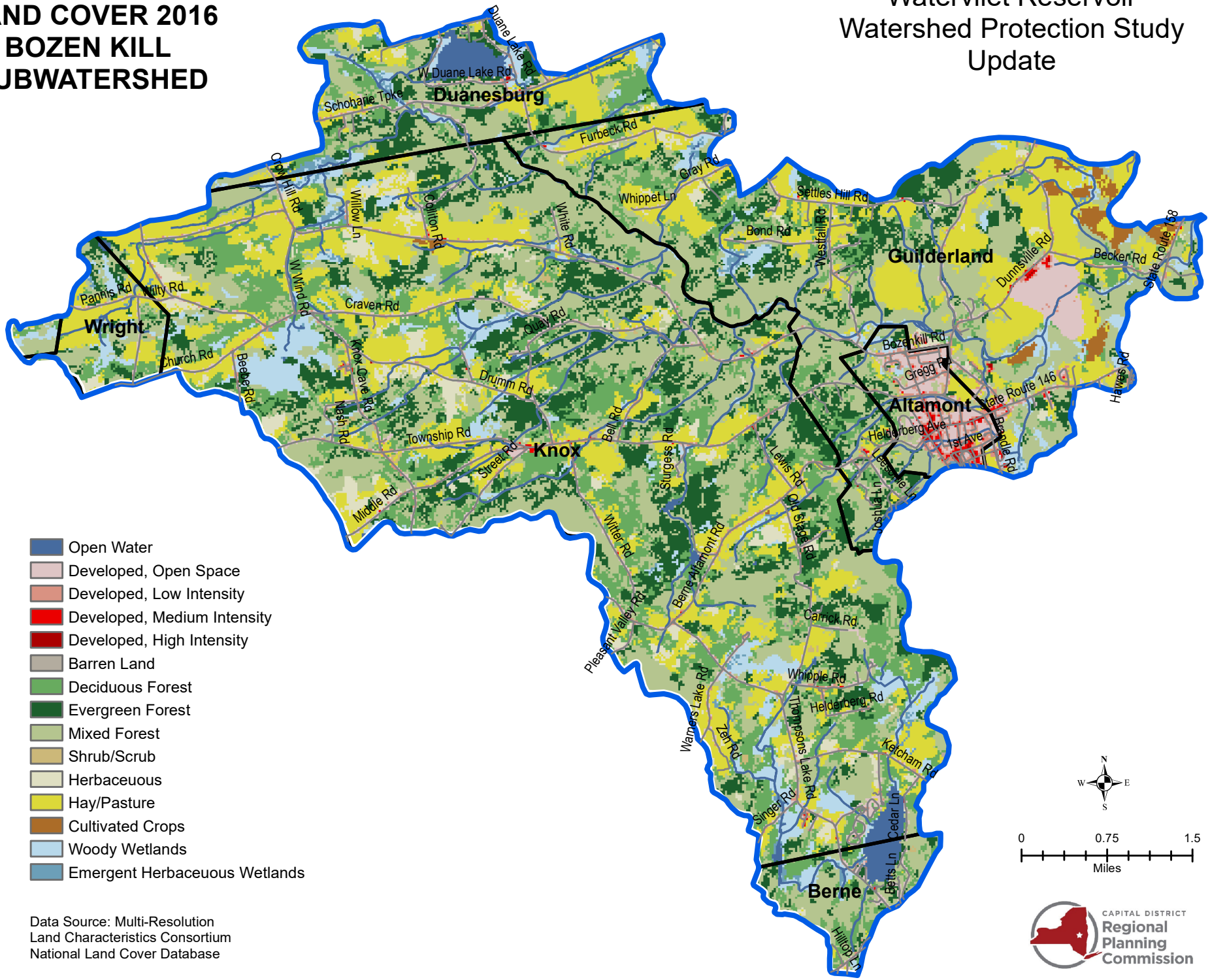


Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database

CAPITAL DISTRICT
Regional
Planning
Commission

LAND COVER 2016
BOZEN KILL
SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update

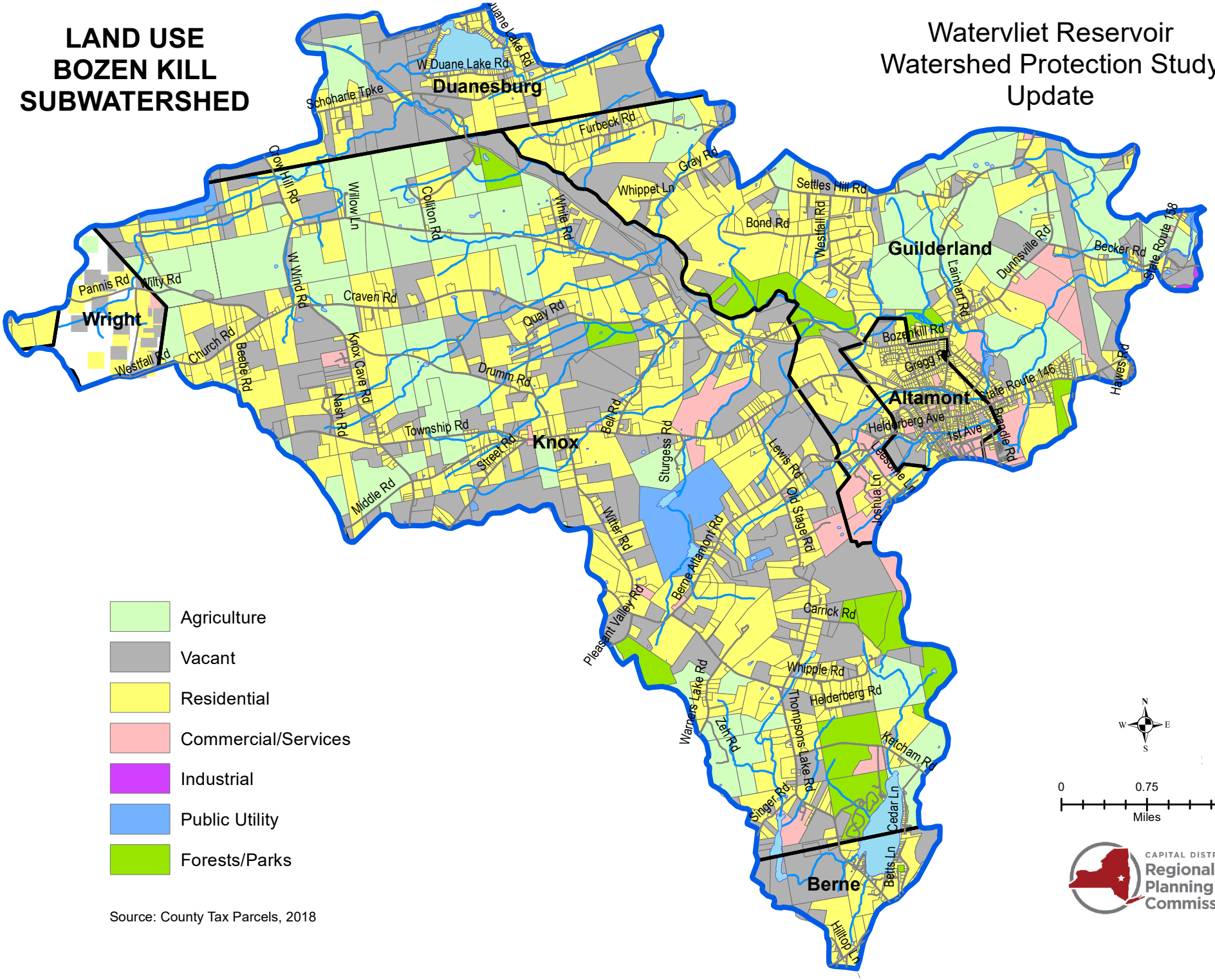


Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database

CAPITAL DISTRICT
Regional
Planning
Commission

LAND USE BOZEN KILL SUBWATERSHED

Watervliet Reservoir Watershed Protection Study Update



- Agriculture
- Vacant
- Residential
- Commercial/Services
- Industrial
- Public Utility
- Forests/Parks

Source: County Tax Parcels, 2018

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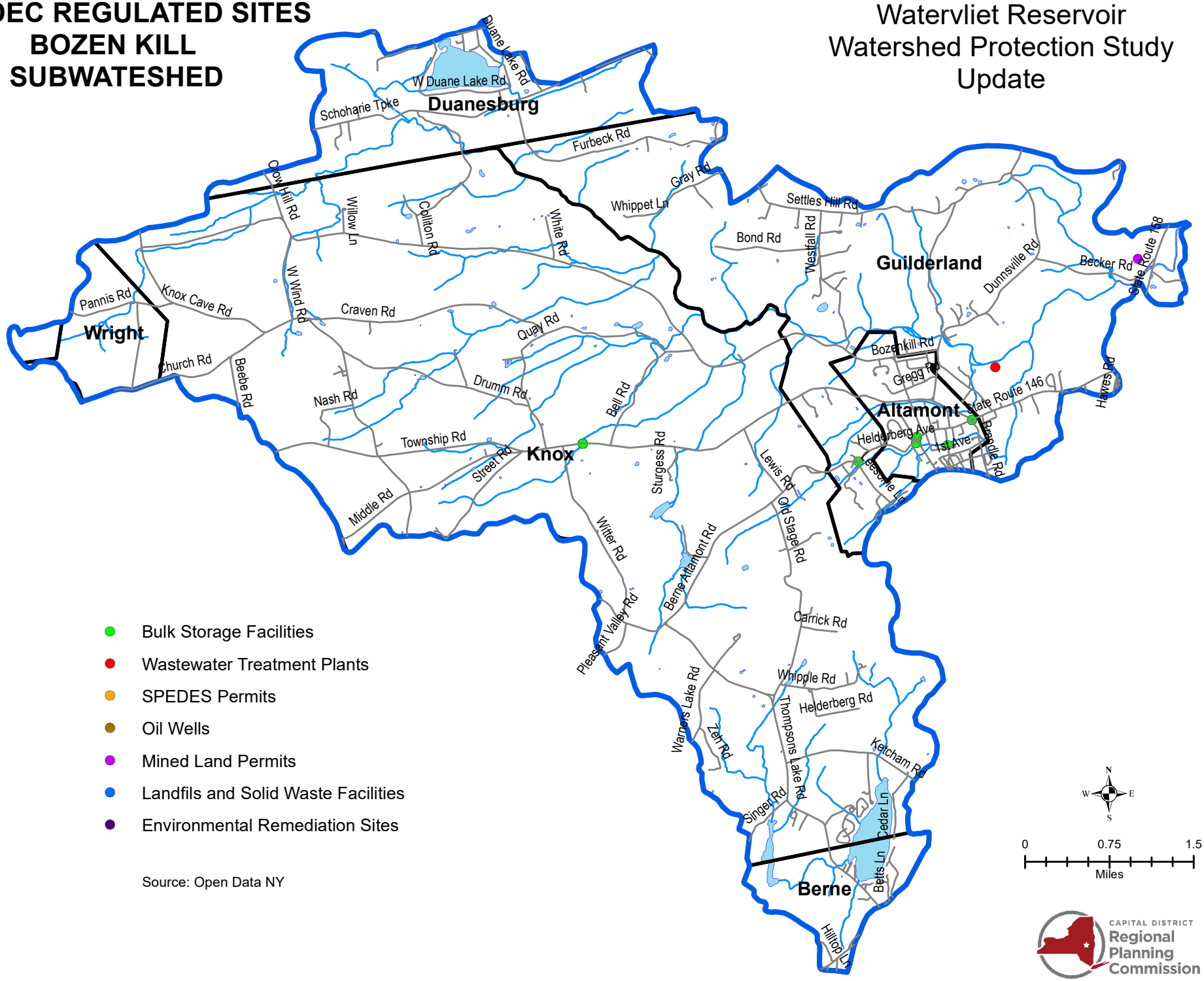
CAPITAL DISTRICT Regional Planning Commission

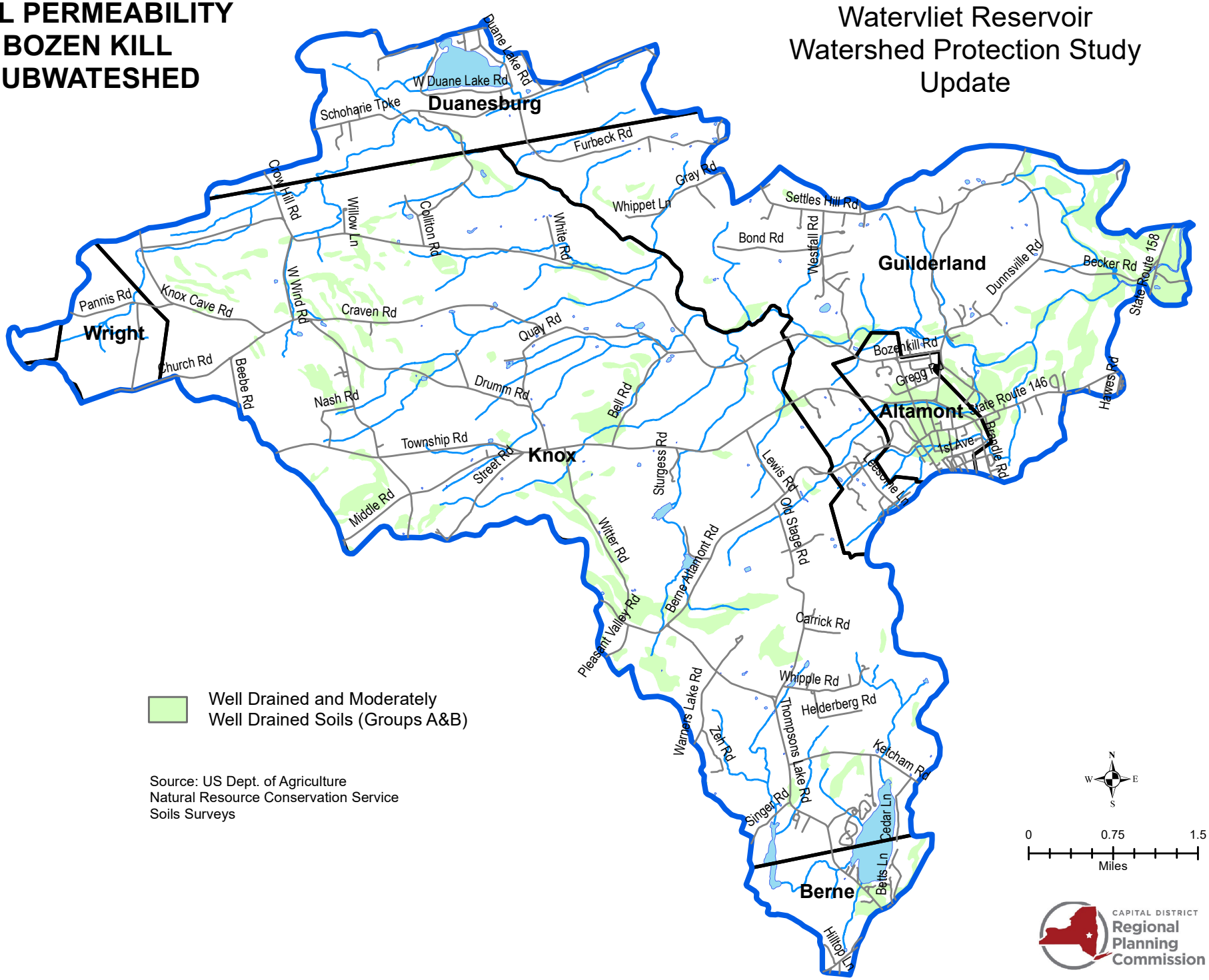
NYS DEC REGULATED SITES
BOZEN KILL
SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update



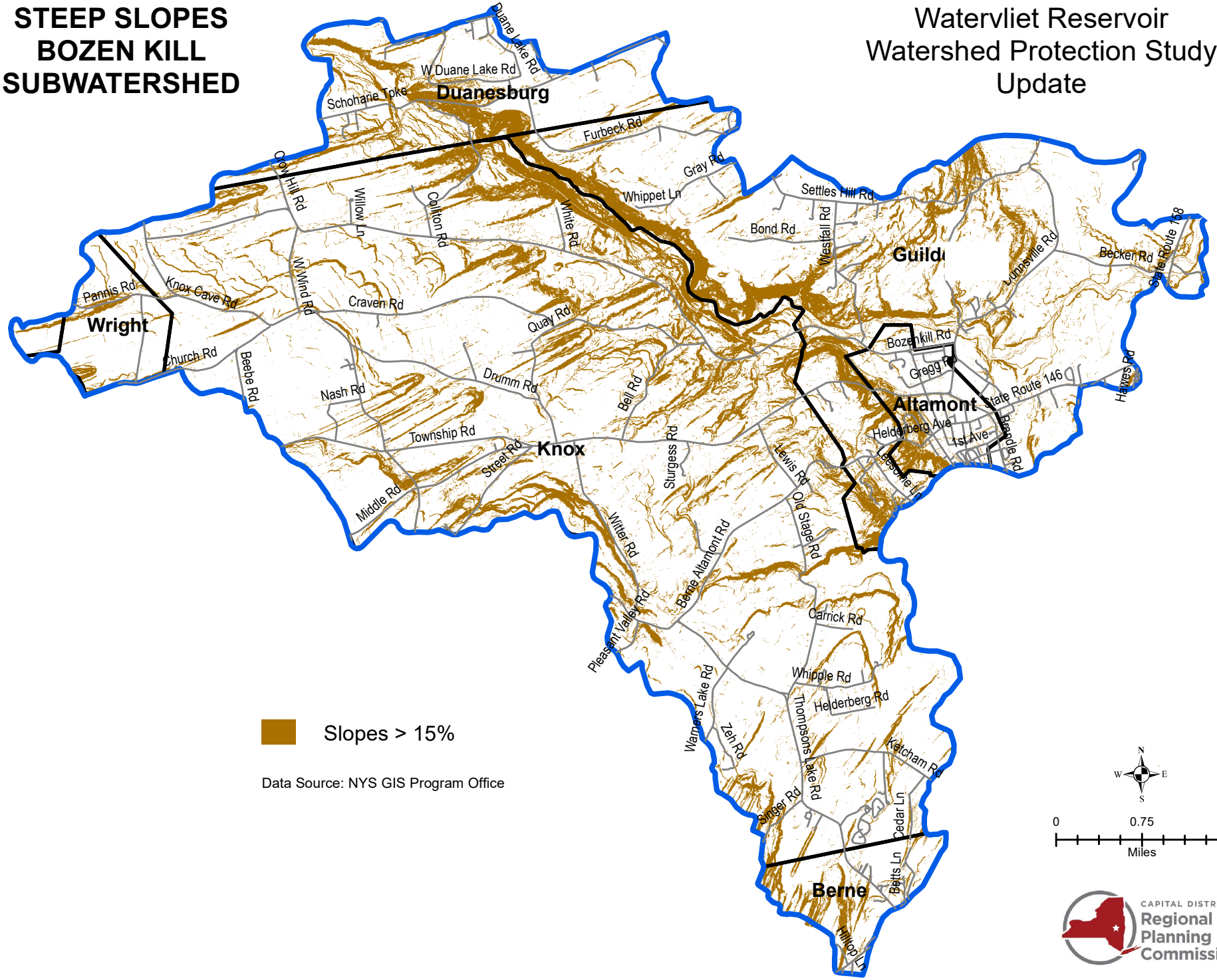
SOIL PERMEABILITY BOZEN KILL SUBWATESHED

Watervliet Reservoir Watershed Protection Study Update

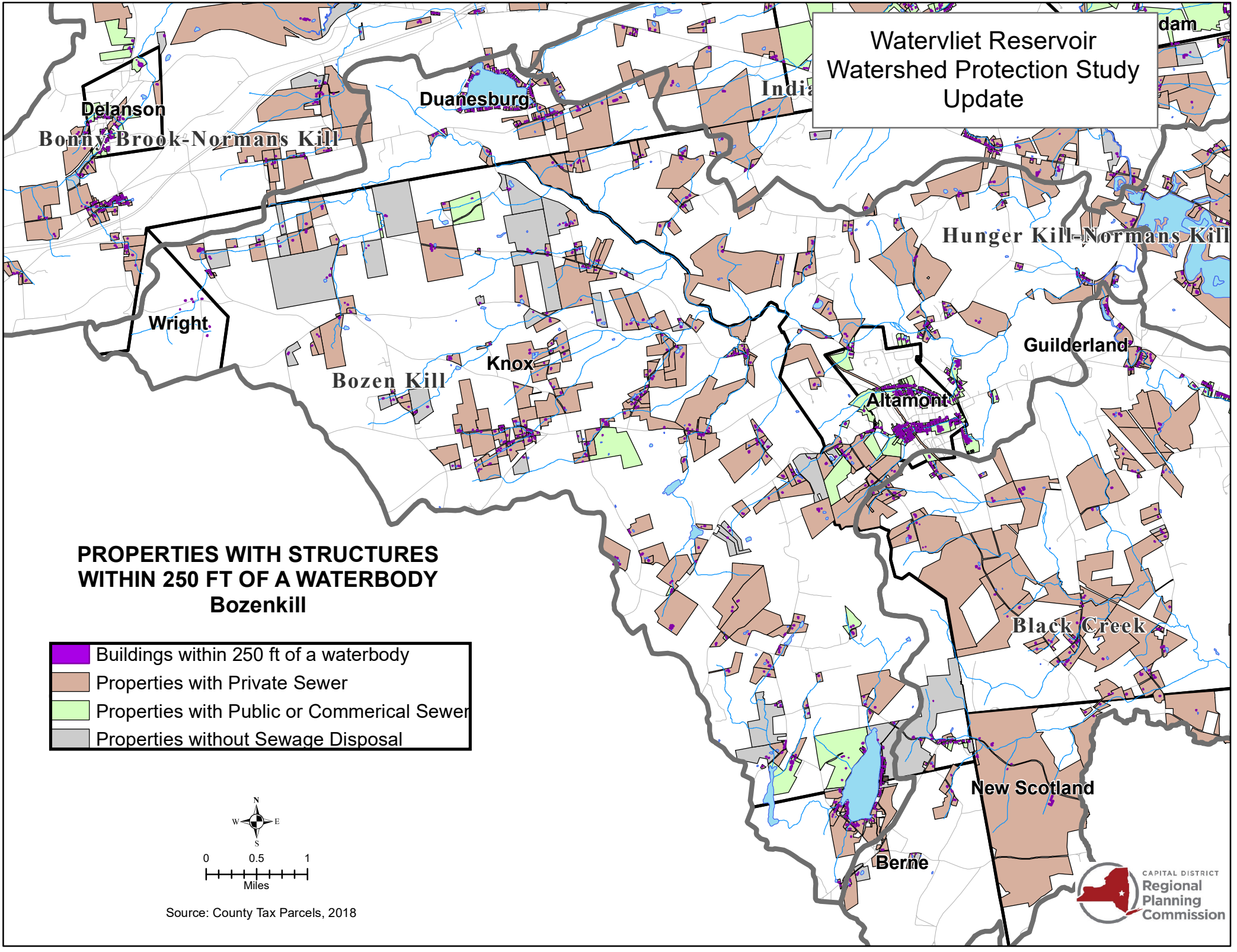


STEEP SLOPES BOZEN KILL SUBWATERSHED

Watervliet Reservoir Watershed Protection Study Update



CAPITAL DISTRICT Regional Planning Commission


Watervliet Reservoir
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WITHIN 250 FT OF A WATERBODY
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Buildings within 250 ft of a waterbody
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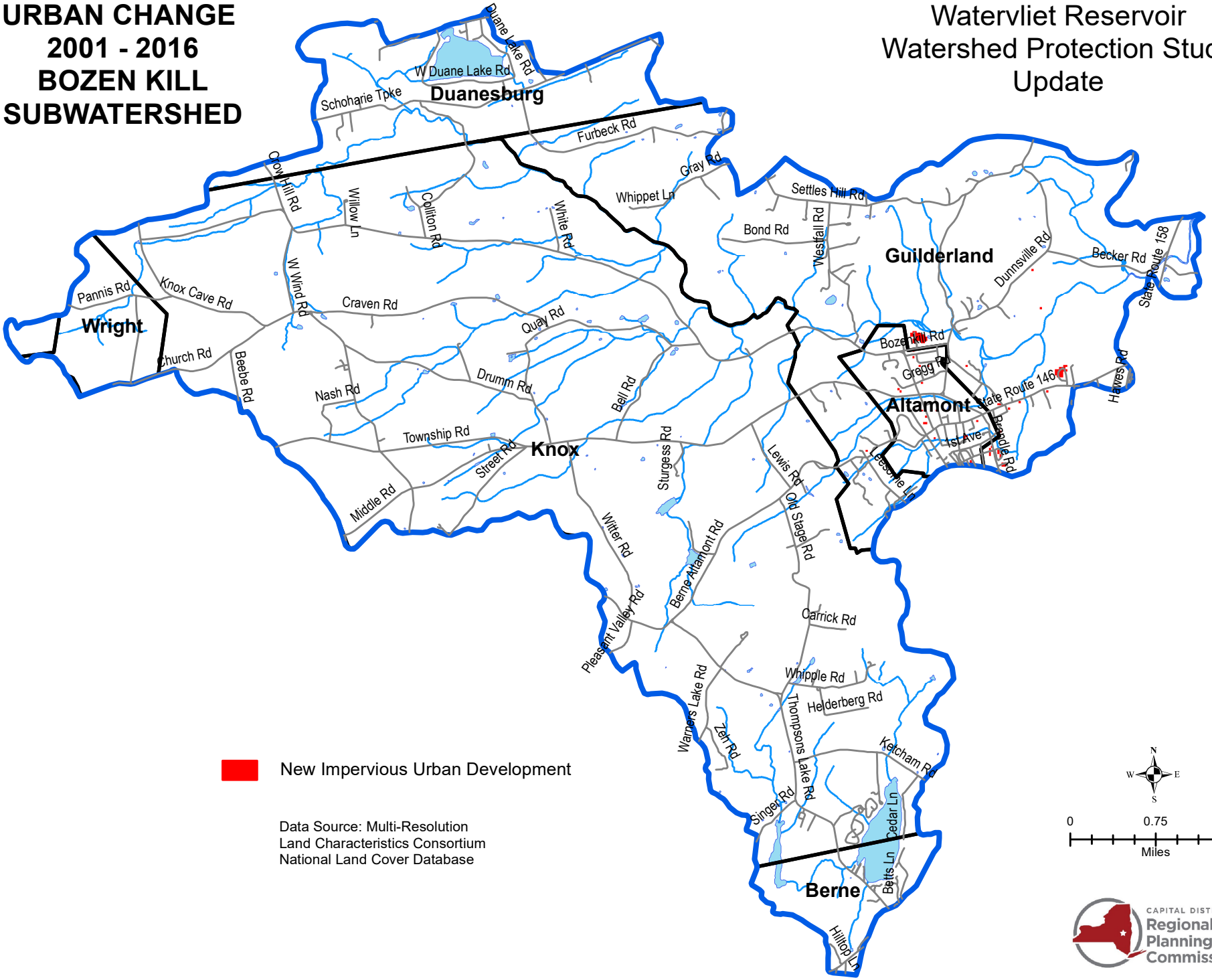
Source: County Tax Parcels, 2018
CAPITAL DISTRICT
Regional
Planning
Commission

URBAN CHANGE 2001 - 2016 BOZEN KILL SUBWATERSHED

Watervliet Reservoir Watershed Protection Study Update



New Impervious Urban Development

Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database

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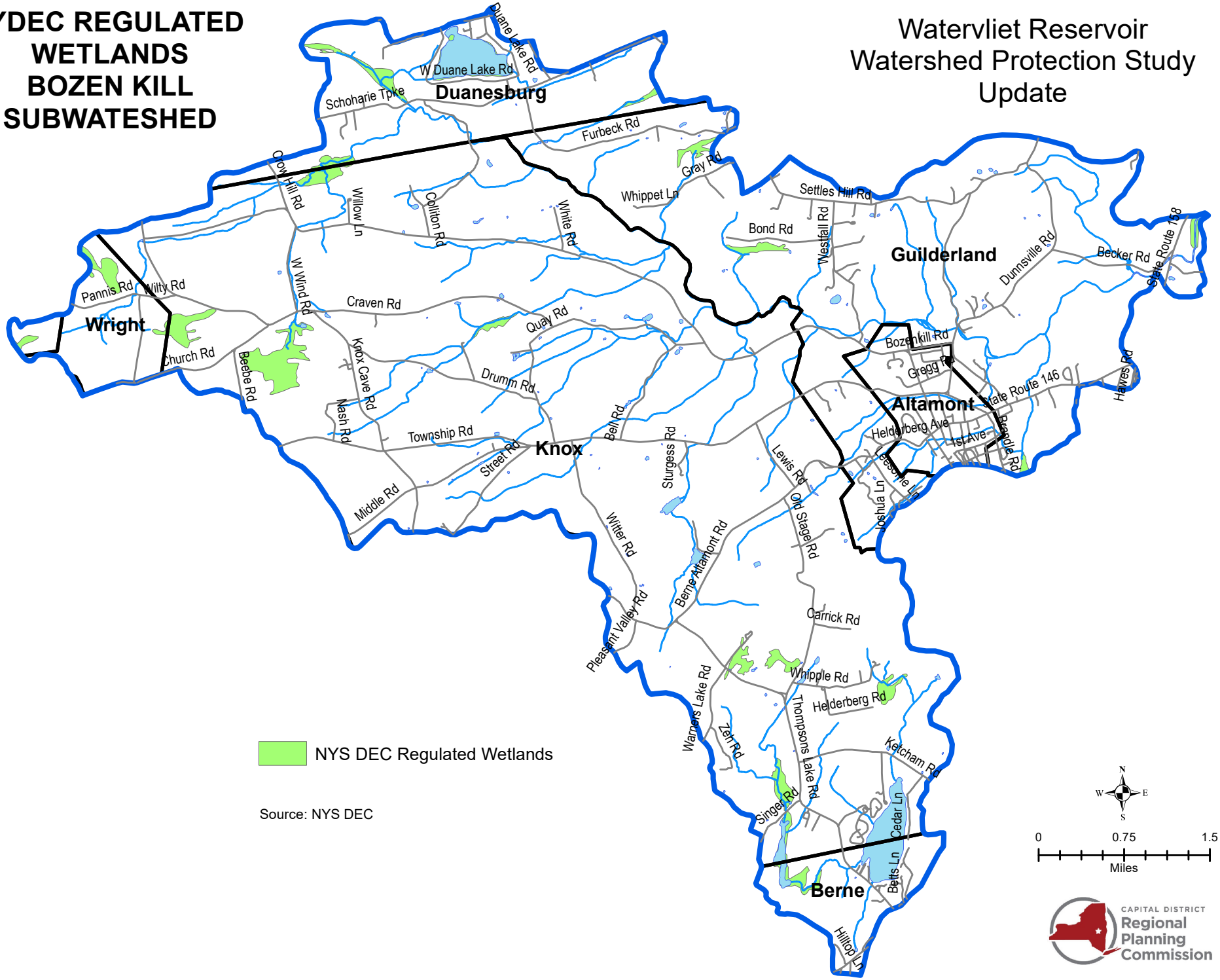
CAPITAL DISTRICT
Regional
Planning
Commission

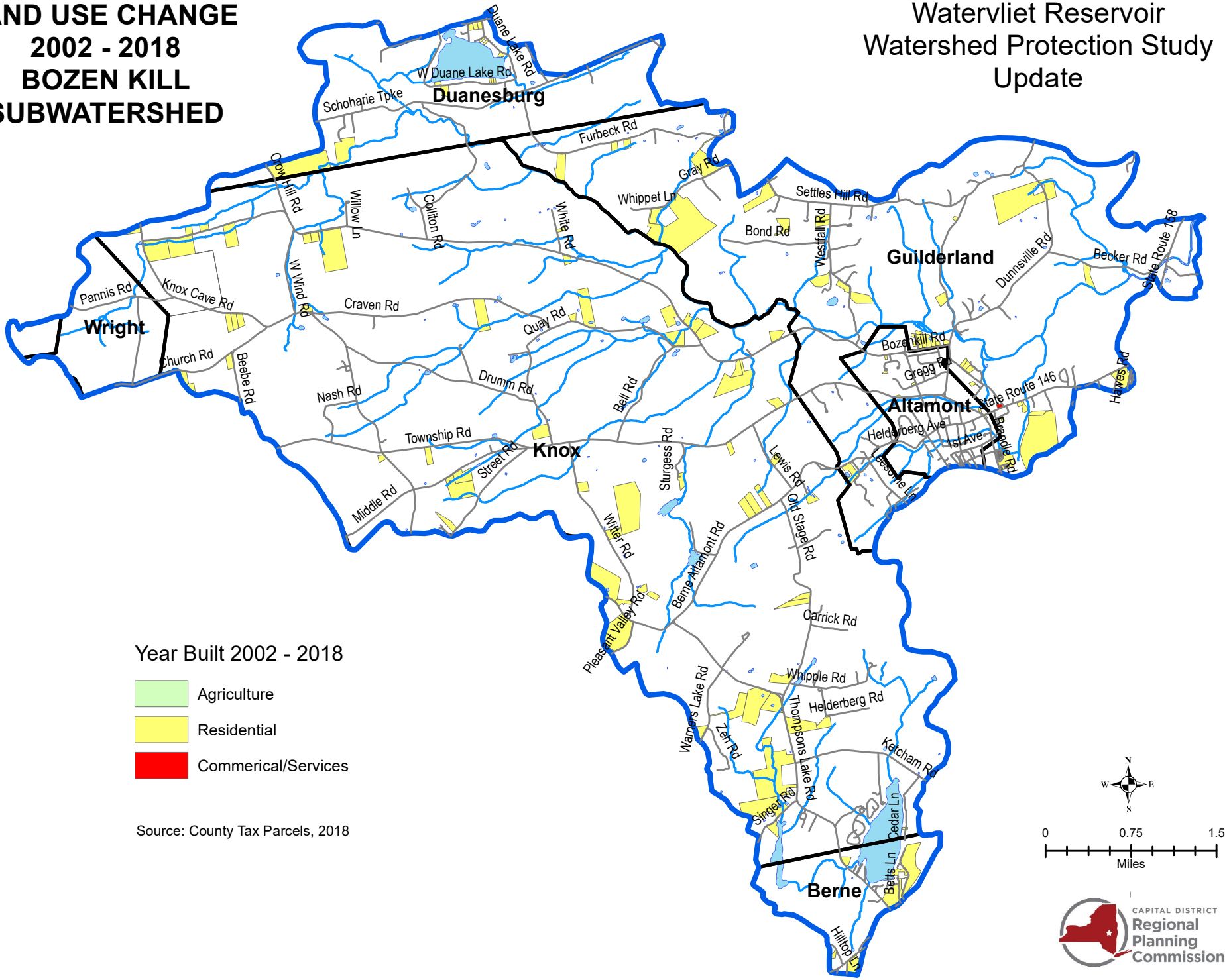
NYDEC REGULATED WETLANDS BOZEN KILL SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update



LAND USE CHANGE 2002 - 2018 BOZEN KILL SUBWATERSHED

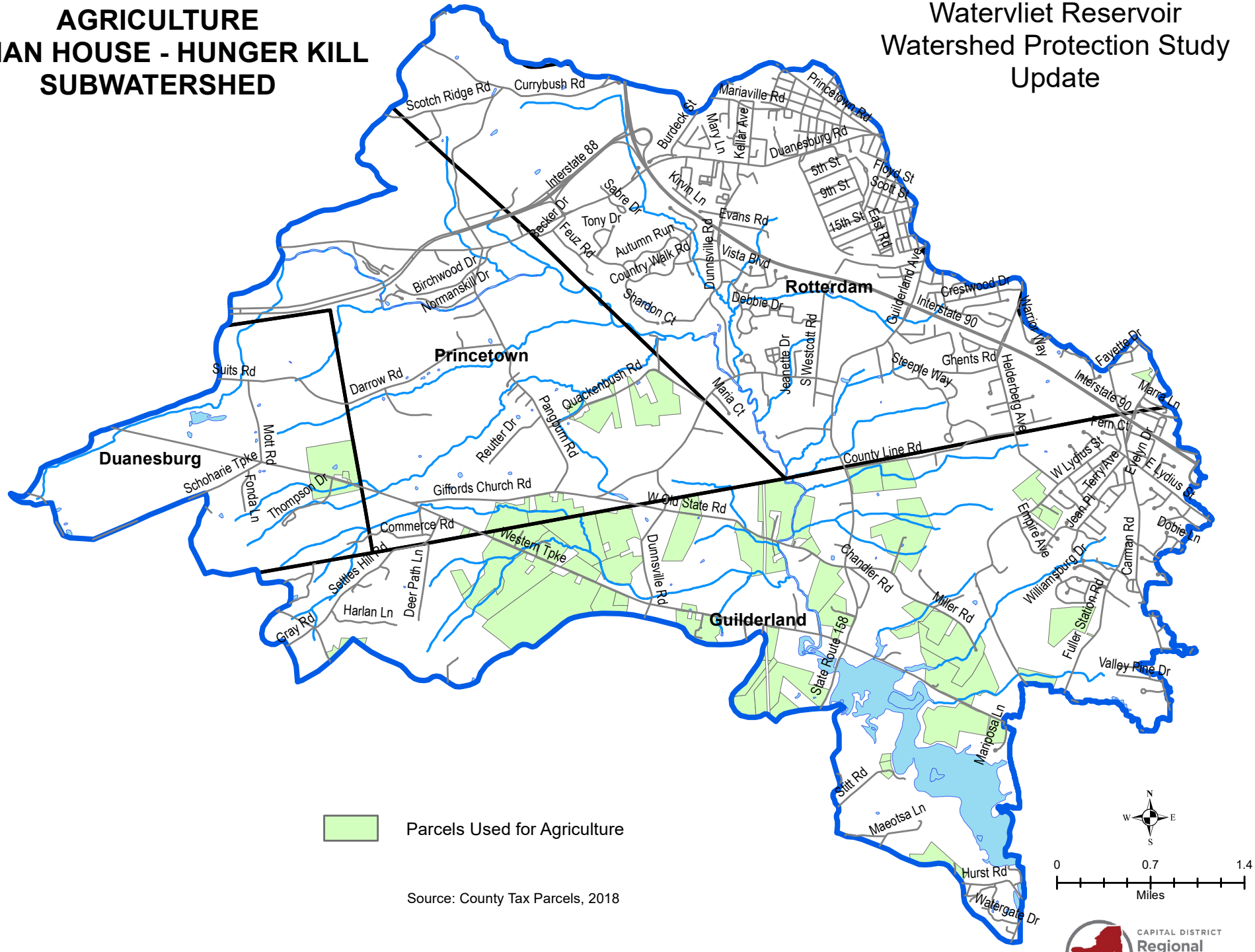
Watervliet Reservoir Watershed Protection Study Update



Appendix I: Subwatershed maps for the Normanskill/Indian House Creek

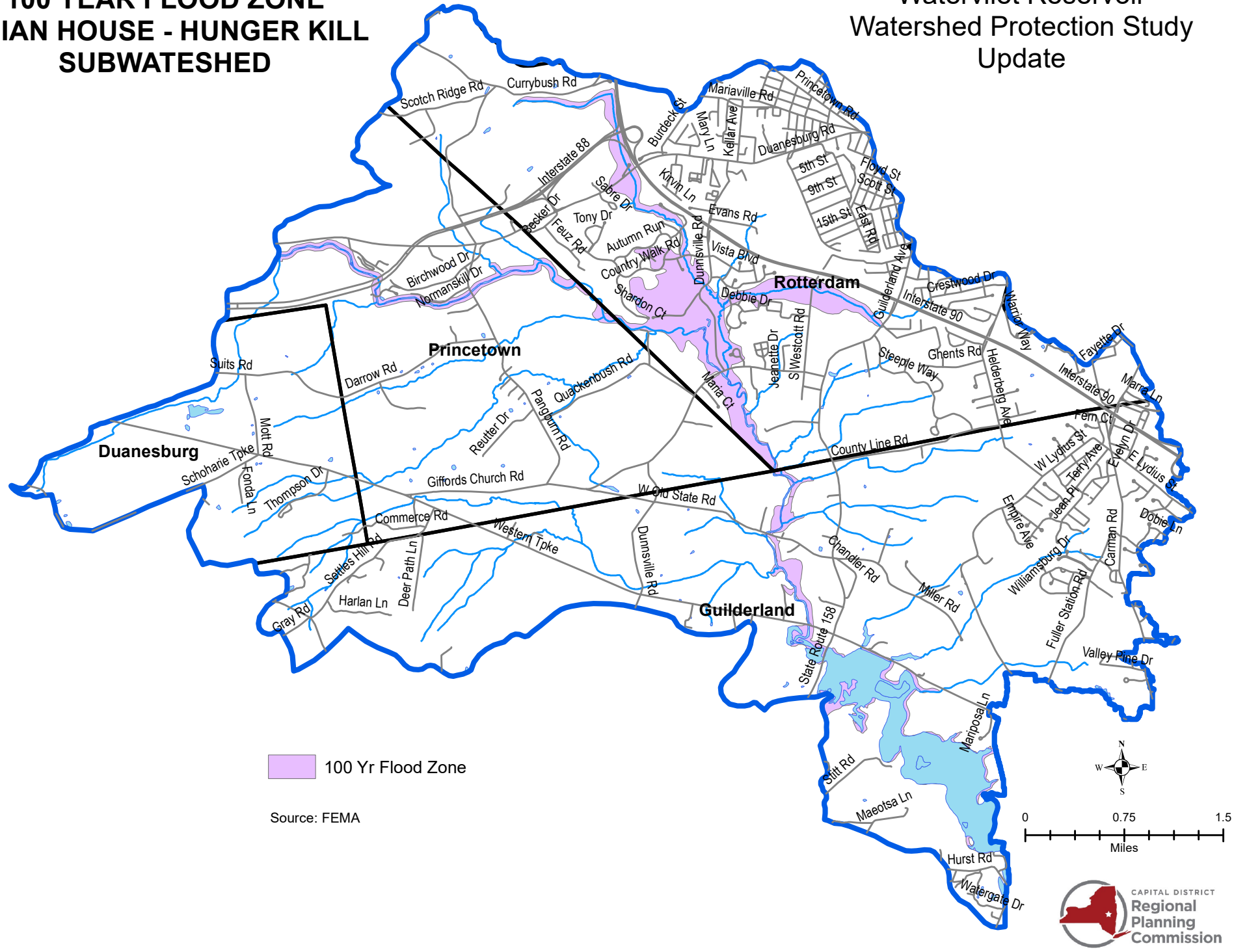
AGRICULTURE
INDIAN HOUSE - HUNGER KILL SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



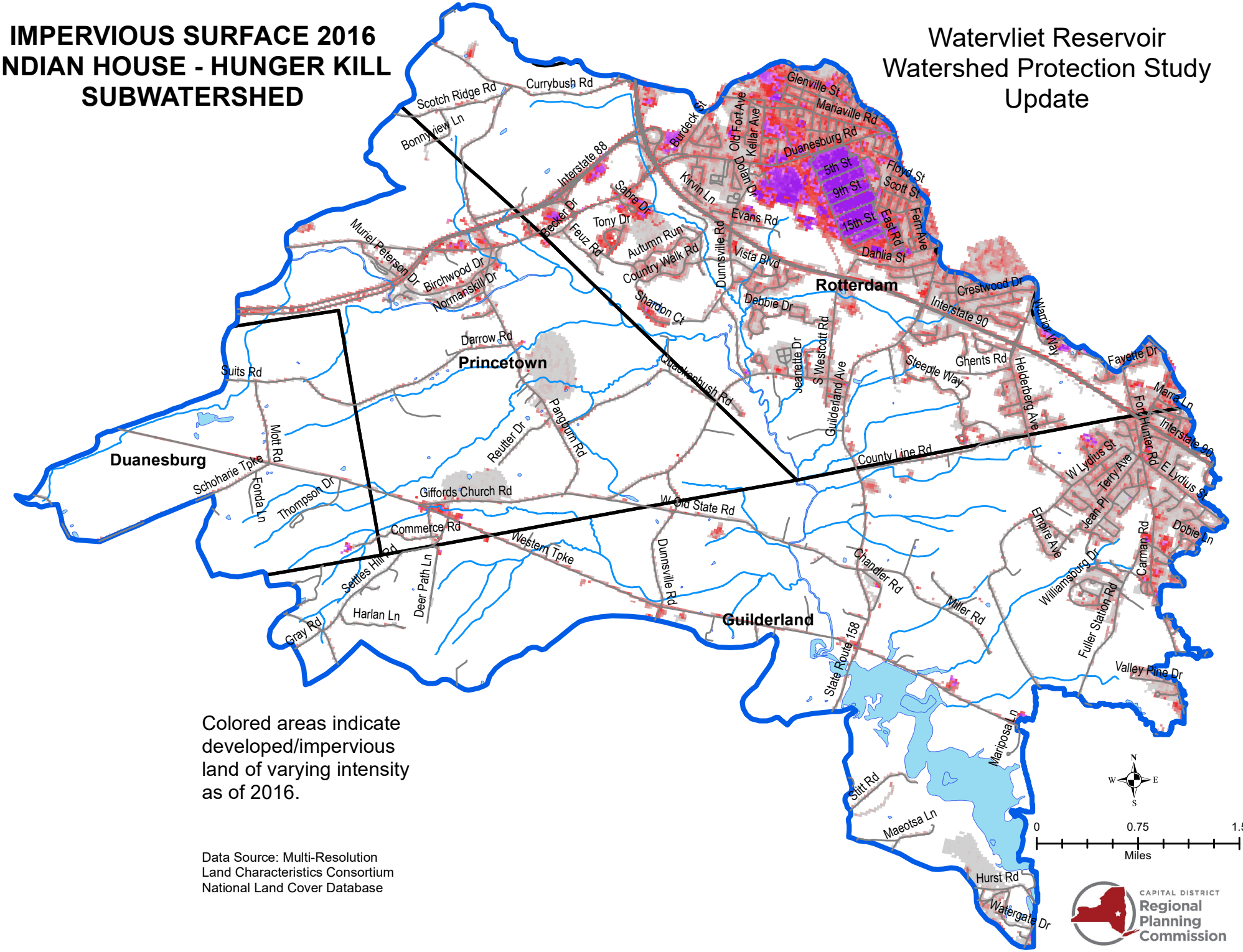
100 YEAR FLOOD ZONE
INDIAN HOUSE - HUNGER KILL SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update



IMPERVIOUS SURFACE 2016
INDIAN HOUSE - HUNGER KILL SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



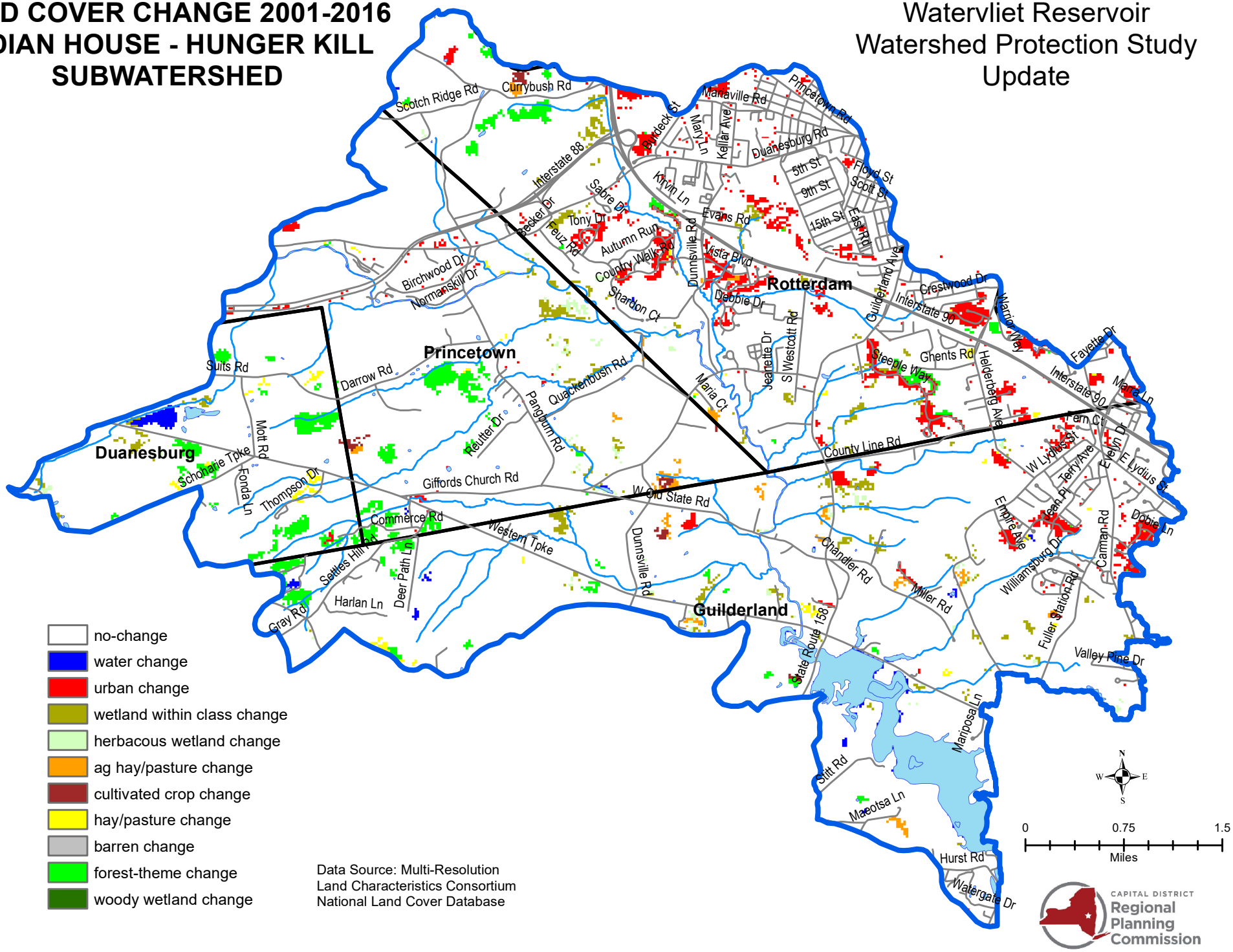
Colored areas indicate developed/impervious land of varying intensity as of 2016.

Data Source: Multi-Resolution Land Characteristics Consortium National Land Cover Database

CAPITAL DISTRICT Regional Planning Commission

LAND COVER CHANGE 2001-2016
INDIAN HOUSE - HUNGER KILL SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



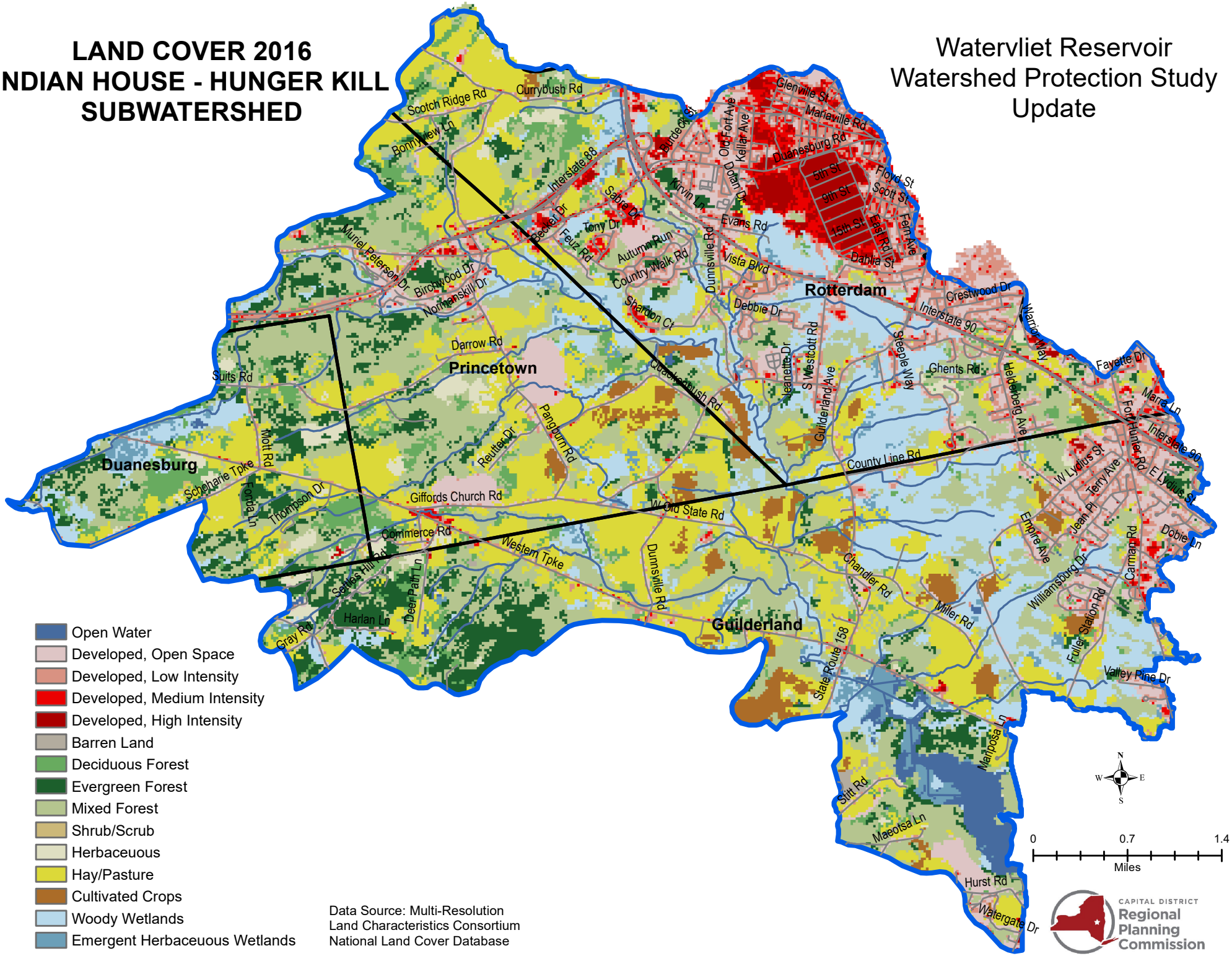
- no-change
- water change
- urban change
- wetland within class change
- herbacous wetland change
- ag hay/pasture change
- cultivated crop change
- hay/pasture change
- barren change
- forest-theme change
- woody wetland change

Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database

CAPITAL DISTRICT
Regional
Planning
Commission

LAND COVER 2016
INDIAN HOUSE - HUNGER KILL SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



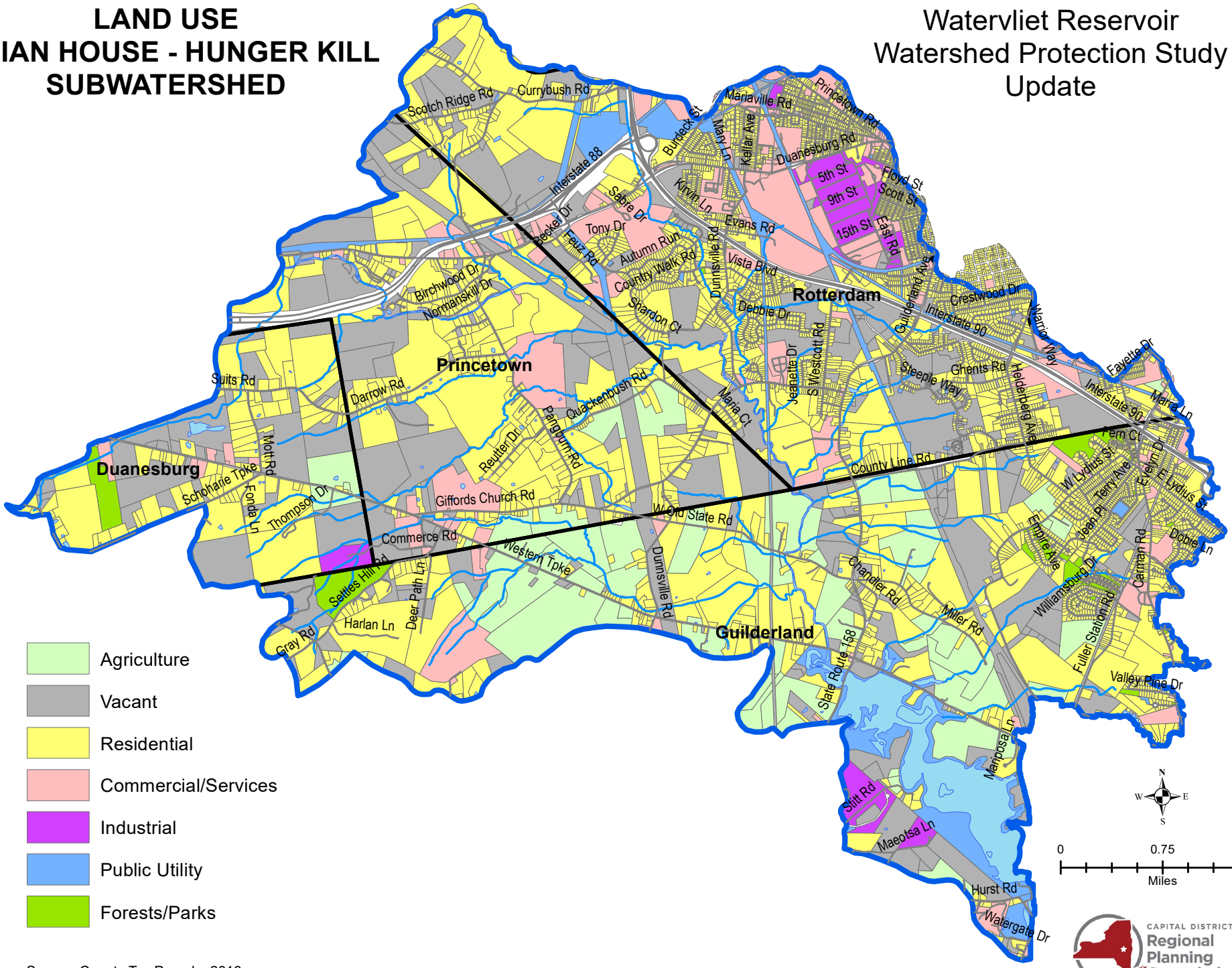
- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Herbaceuous
- Hay/Pasture
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceuous Wetlands

Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database

CAPITAL DISTRICT
Regional
Planning
Commission

LAND USE
INDIAN HOUSE - HUNGER KILL SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update

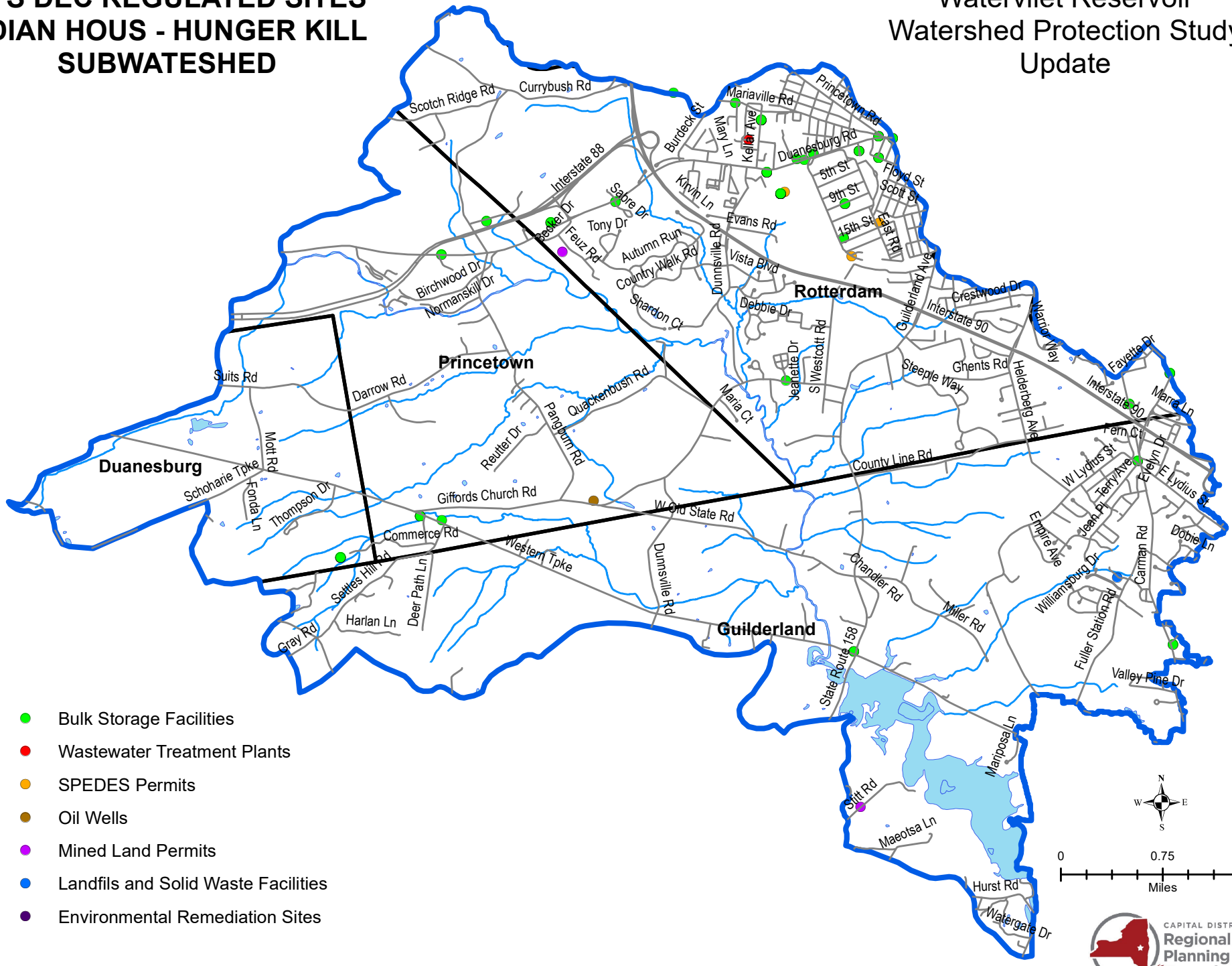


Source: County Tax Parcels, 2018

CAPITAL DISTRICT
Regional
Planning
Commission

NYS DEC REGULATED SITES
INDIAN HOUS - HUNGER KILL SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update



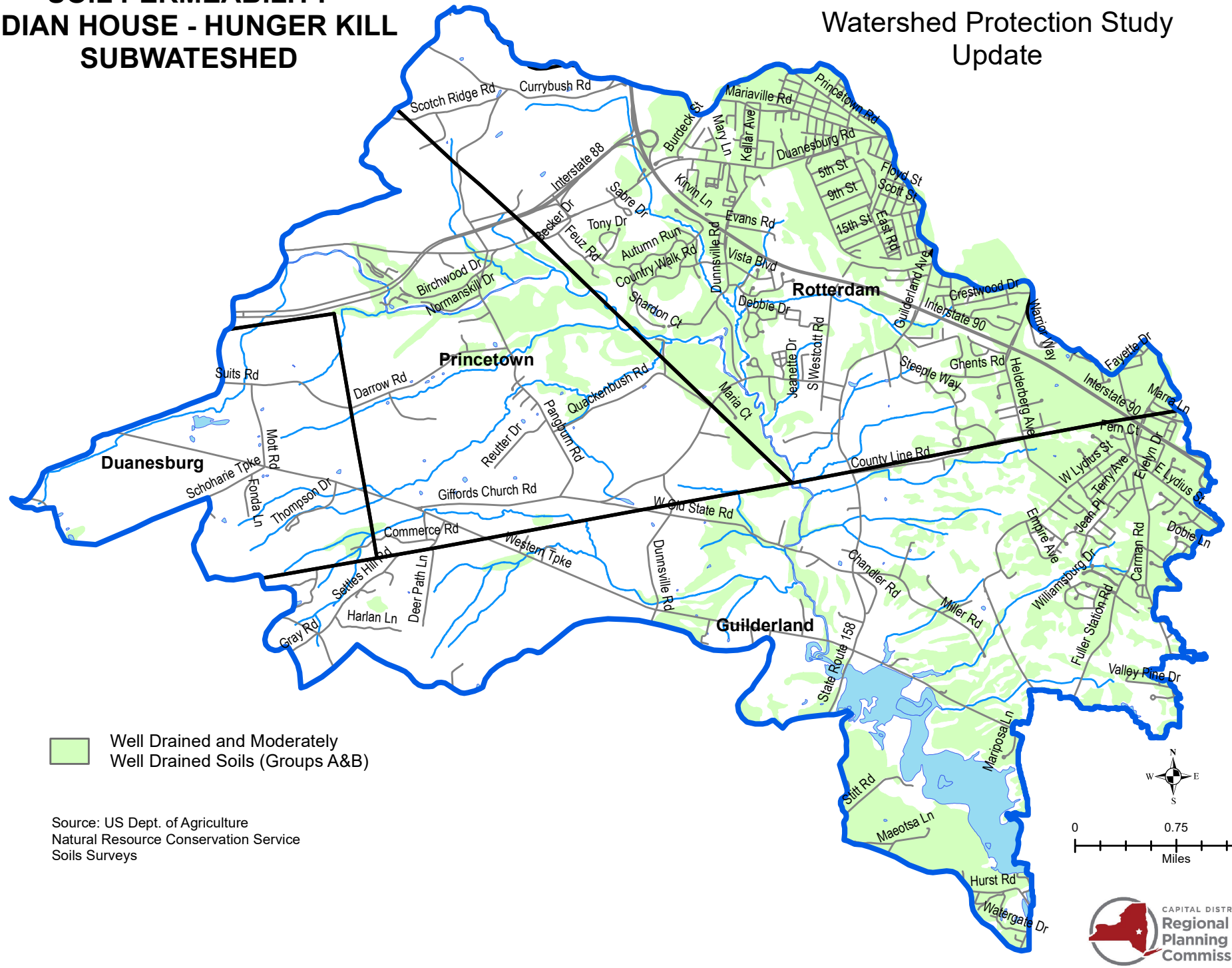
- Bulk Storage Facilities
- Wastewater Treatment Plants
- SPEDES Permits
- Oil Wells
- Mined Land Permits
- Landfils and Solid Waste Facilities
- Environmental Remediation Sites

Source: Open Data NY

CAPITAL DISTRICT Regional Planning Commission

SOIL PERMEABILITY
INDIAN HOUSE - HUNGER KILL SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update

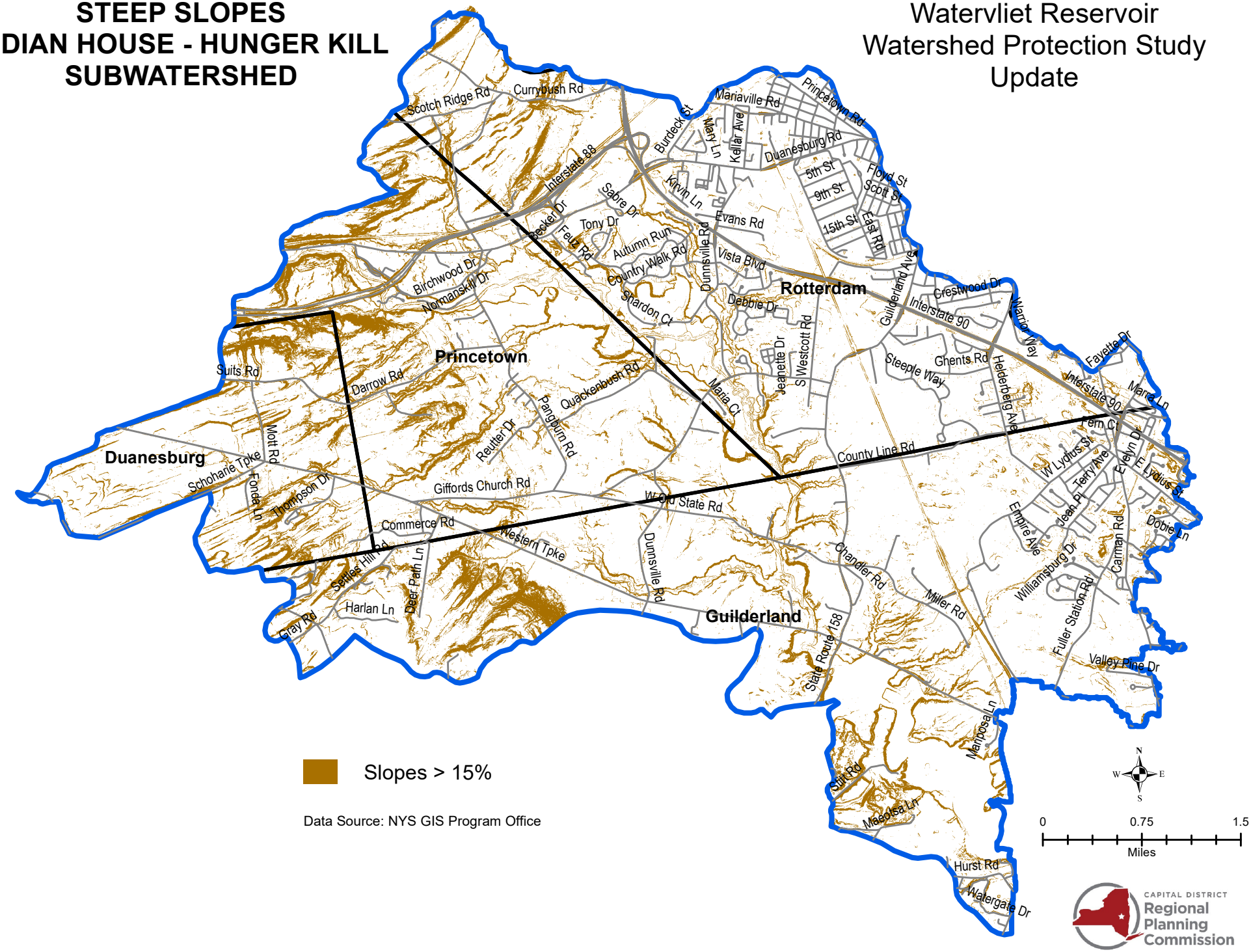


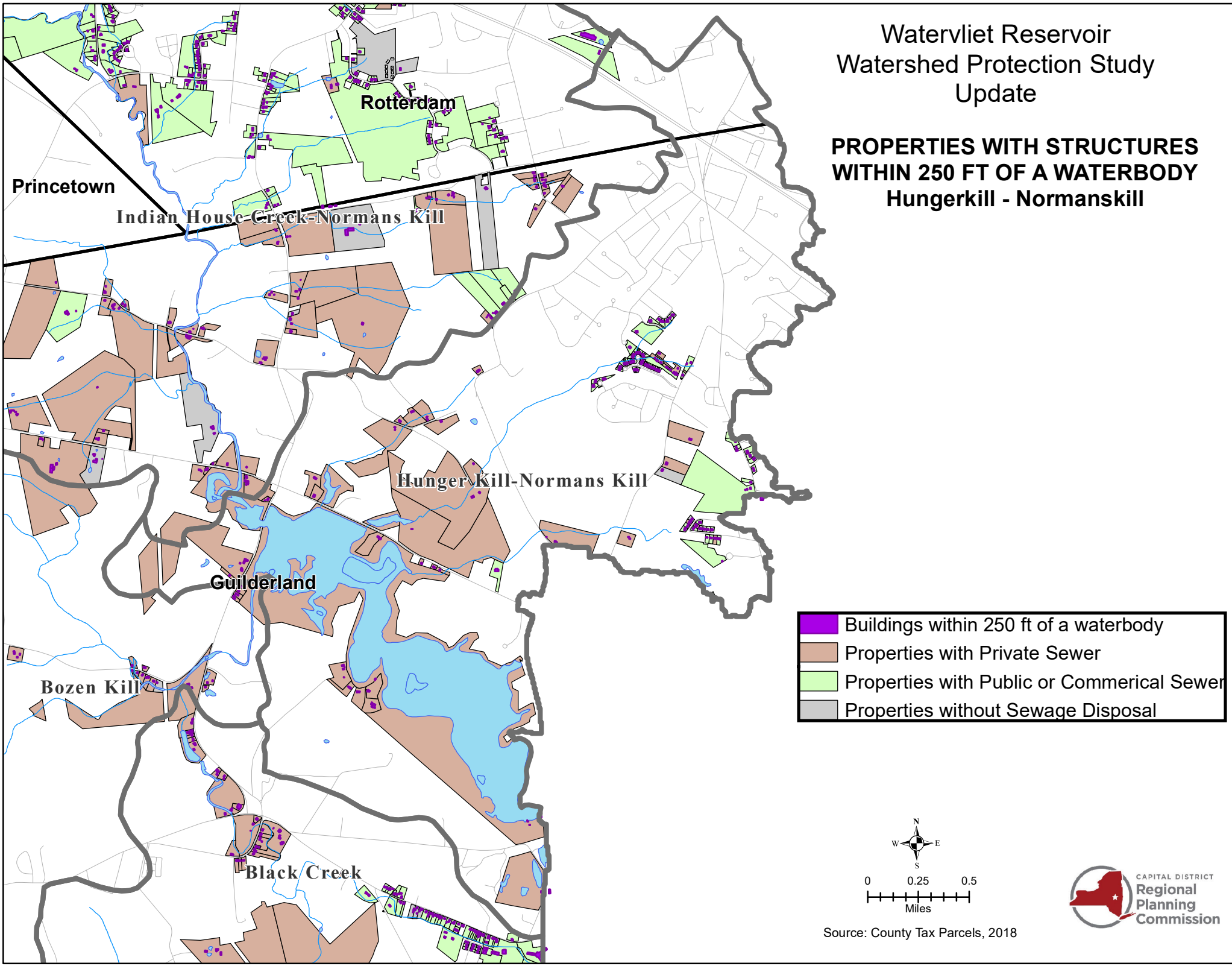
Source: US Dept. of Agriculture
Natural Resource Conservation Service
Soils Surveys

CAPITAL DISTRICT
Regional Planning Commission

STEEP SLOPES
INDIAN HOUSE - HUNGER KILL
SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update




Watervliet Reservoir
Watershed Protection Study
Update
PROPERTIES WITH STRUCTURES
WITHIN 250 FT OF A WATERBODY
Hungerkill - Normanskill
Rotterdam
Princetown
Indian House Creek-Normans Kill
Hunger Kill-Normans Kill
Guilderland
Bozen Kill
Black Creek
Buildings within 250 ft of a waterbody
Properties with Private Sewer
Properties with Public or Commerical Sewer
Properties without Sewage Disposal
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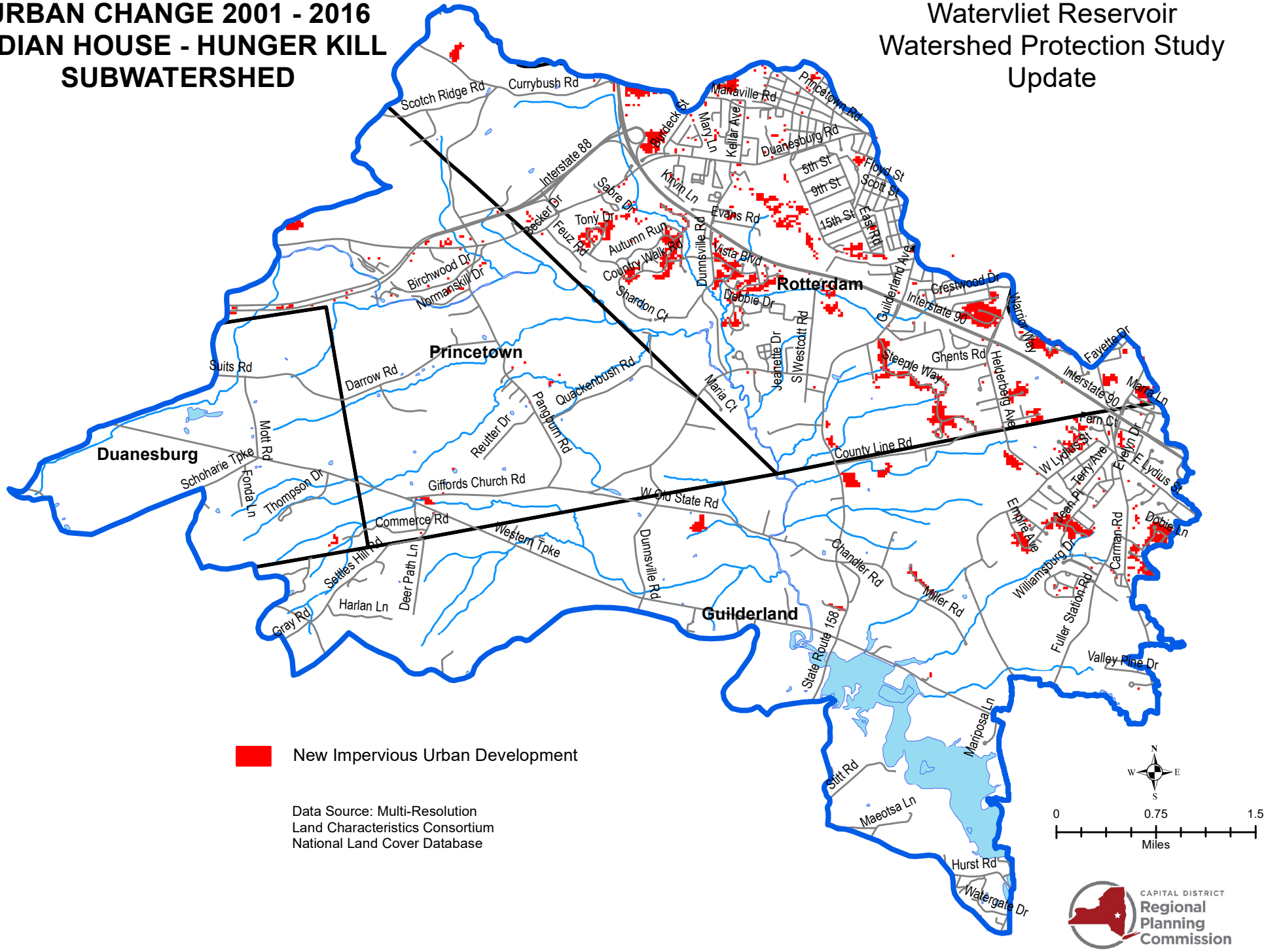
Miles
Source: County Tax Parcels, 2018
CAPITAL DISTRICT
Regional
Planning
Commission

URBAN CHANGE 2001 - 2016
INDIAN HOUSE - HUNGER KILL SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



New Impervious Urban Development

Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database

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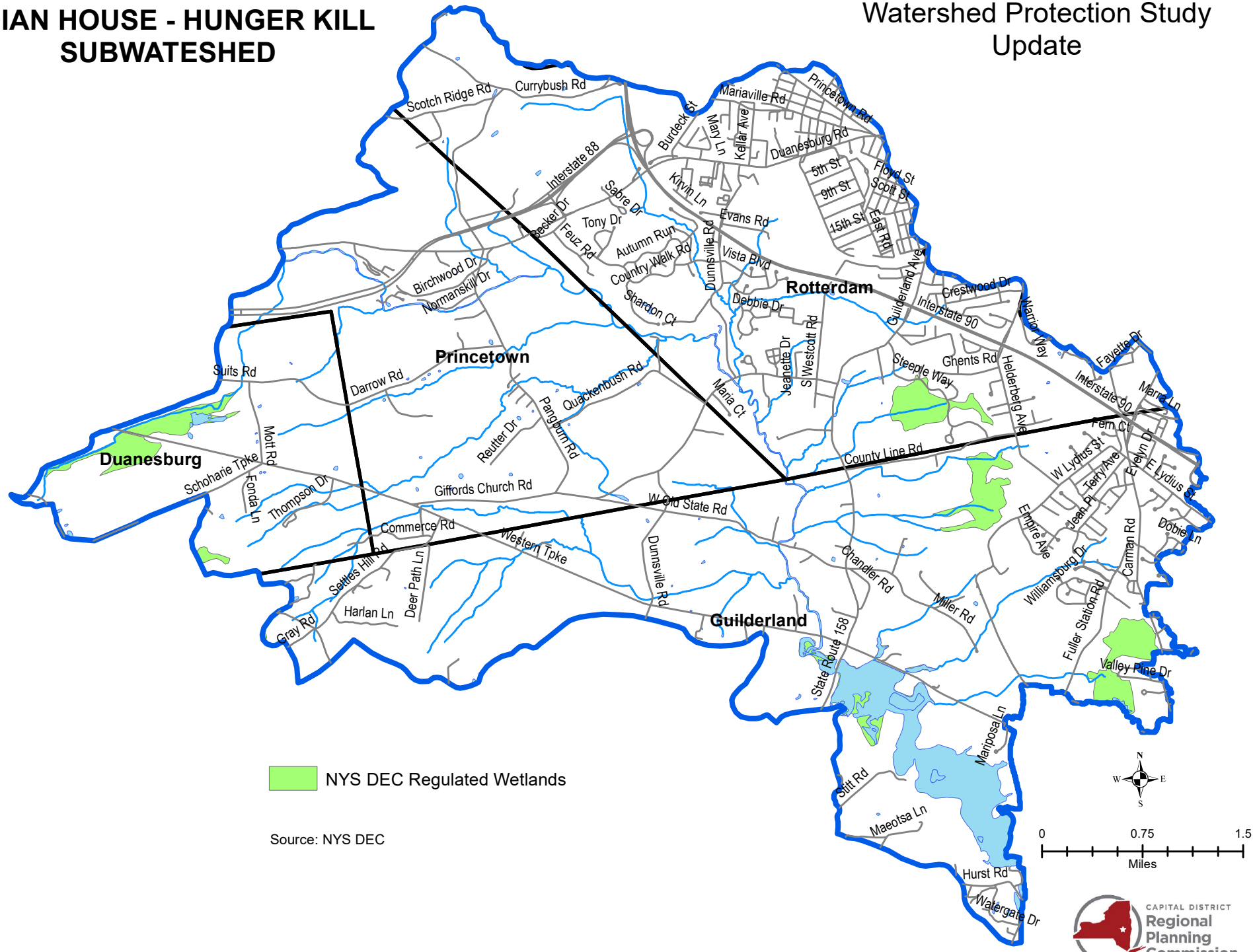
CAPITAL DISTRICT
Regional
Planning
Commission

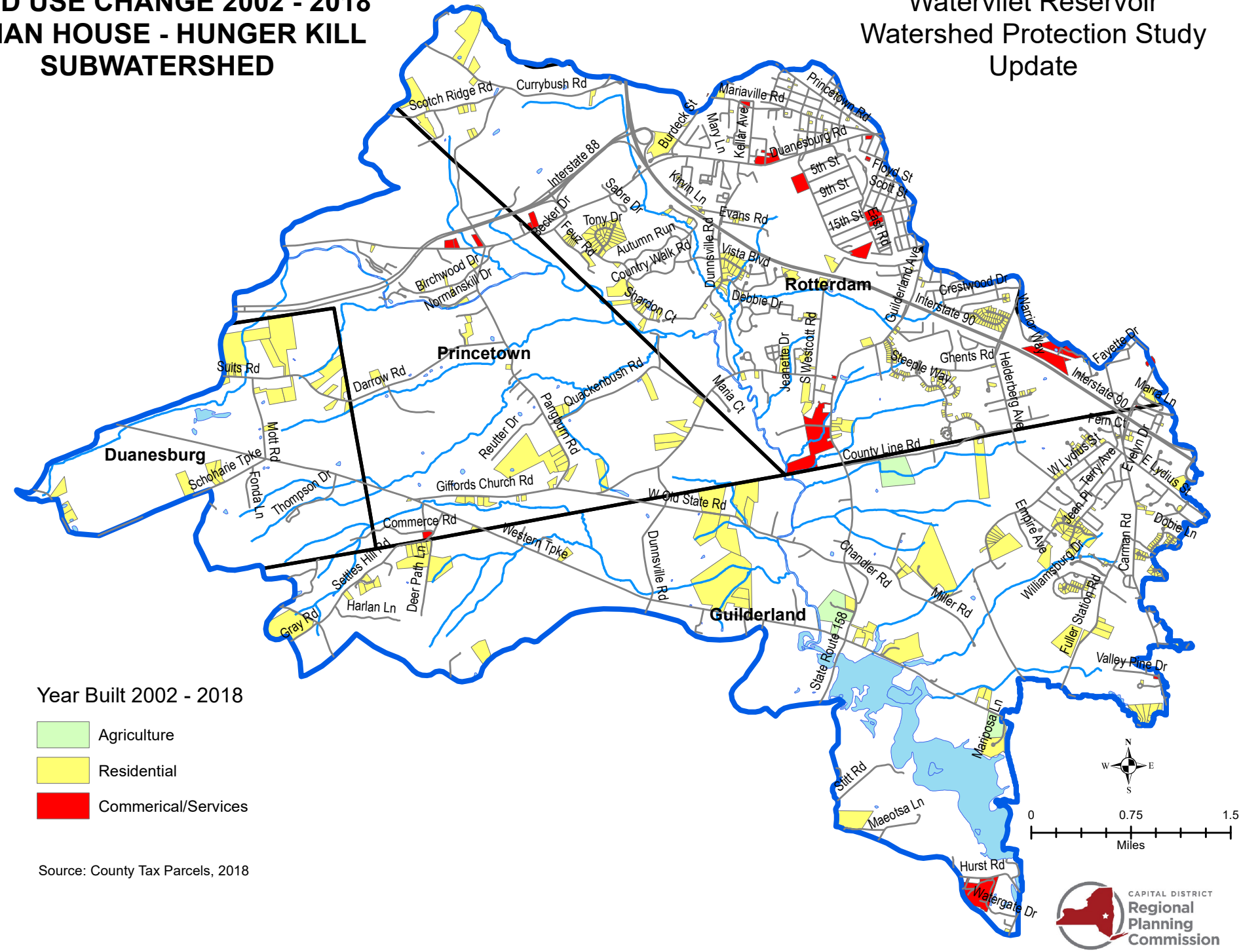
NYDEC REGULATED WETLANDS
INDIAN HOUSE - HUNGER KILL SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update



LAND USE CHANGE 2002 - 2018
INDIAN HOUSE - HUNGER KILL SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



Year Built 2002 - 2018

- Agriculture
- Residential
- Commerical/Services

Source: County Tax Parcels, 2018

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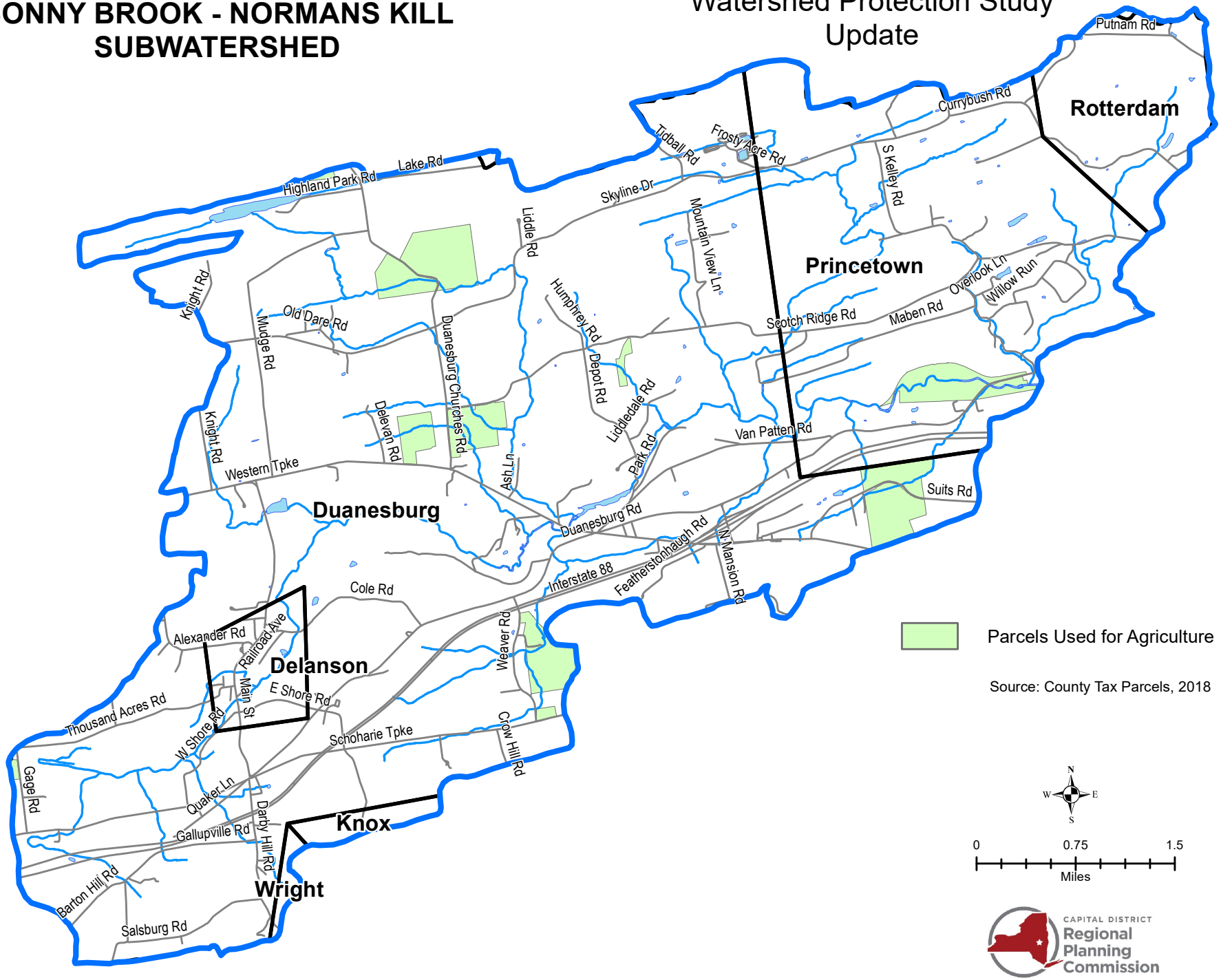
Regional
Planning
Commission

Appendix J: Subwatershed maps for the Bonny Brook - Normans Kill

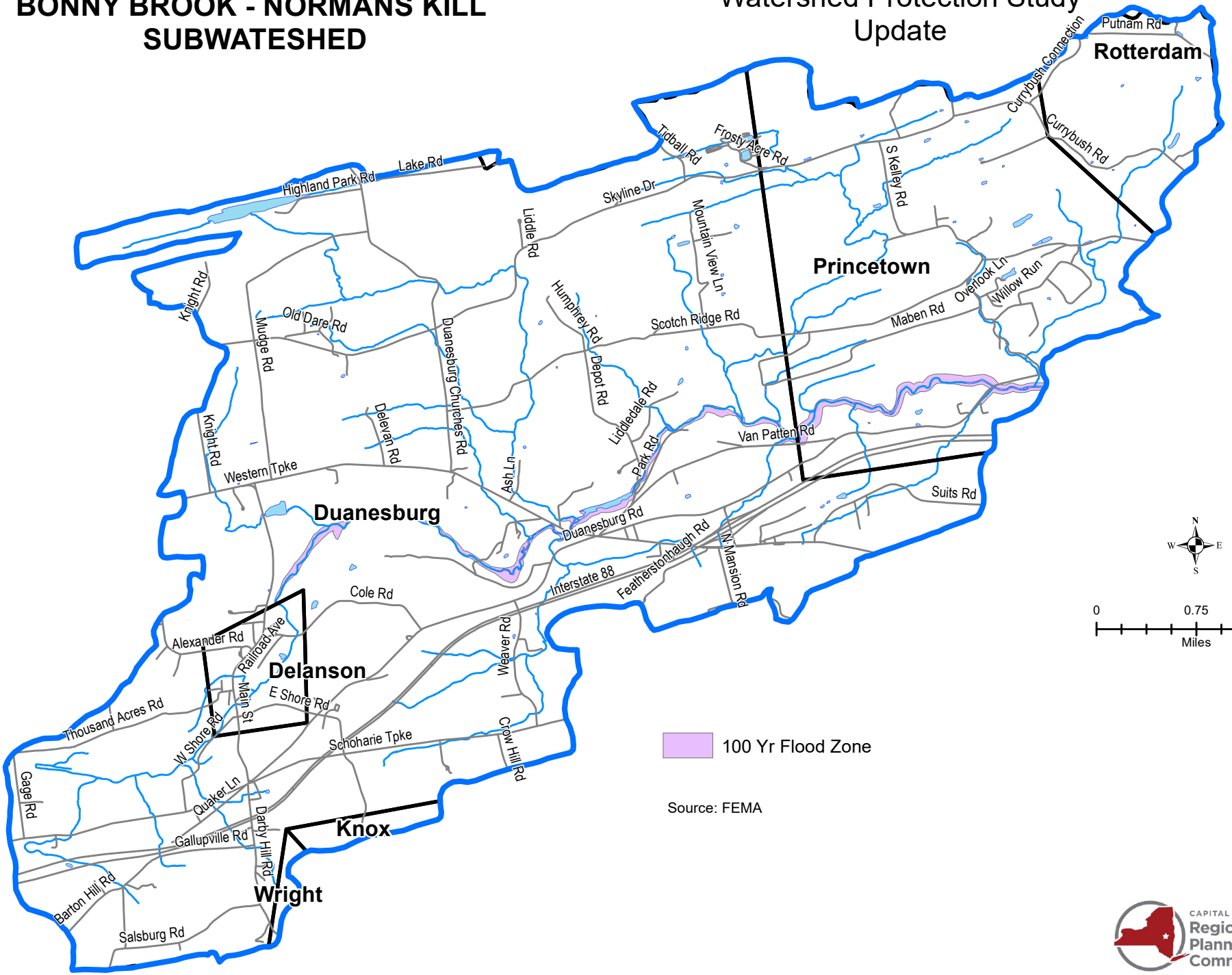
AGRICULTURE
BONNY BROOK - NORMANS KILL SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



100 YEAR FLOOD ZONE
BONNY BROOK - NORMANS KILL SUBWATESHED

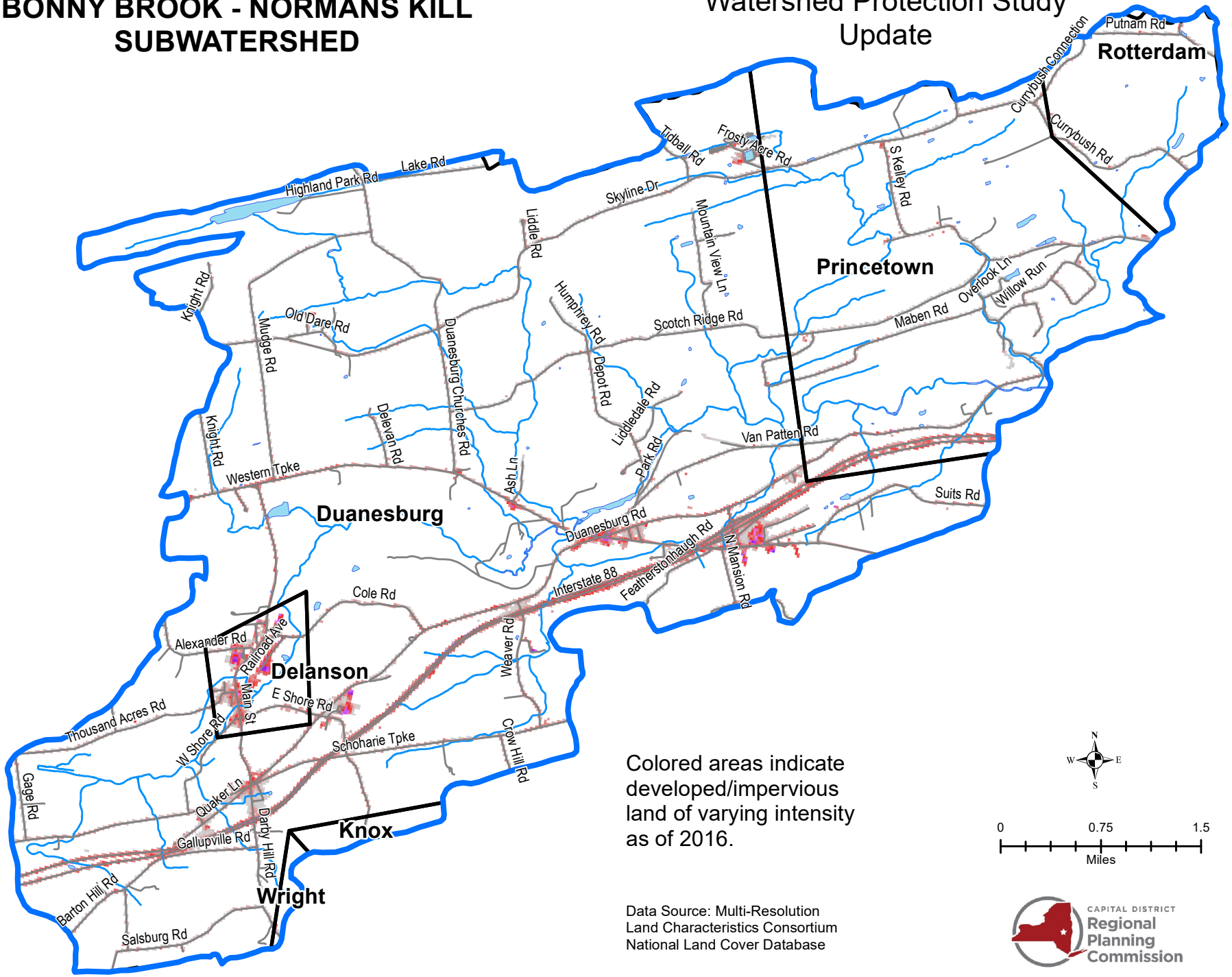
Watervliet Reservoir Watershed Protection Study Update



CAPITAL DISTRICT Regional Planning Commission

IMPERVIOUS SURFACE 2016
BONNY BROOK - NORMANS KILL SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



Colored areas indicate developed/impervious land of varying intensity as of 2016.

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Miles

Data Source: Multi-Resolution Land Characteristics Consortium National Land Cover Database

CAPITAL DISTRICT Regional Planning Commission

LAND COVER CHANGE 2001-2016
BONNY BROOK - NORMANS KILL SUBWATERSHED

Watervliet Reservoir
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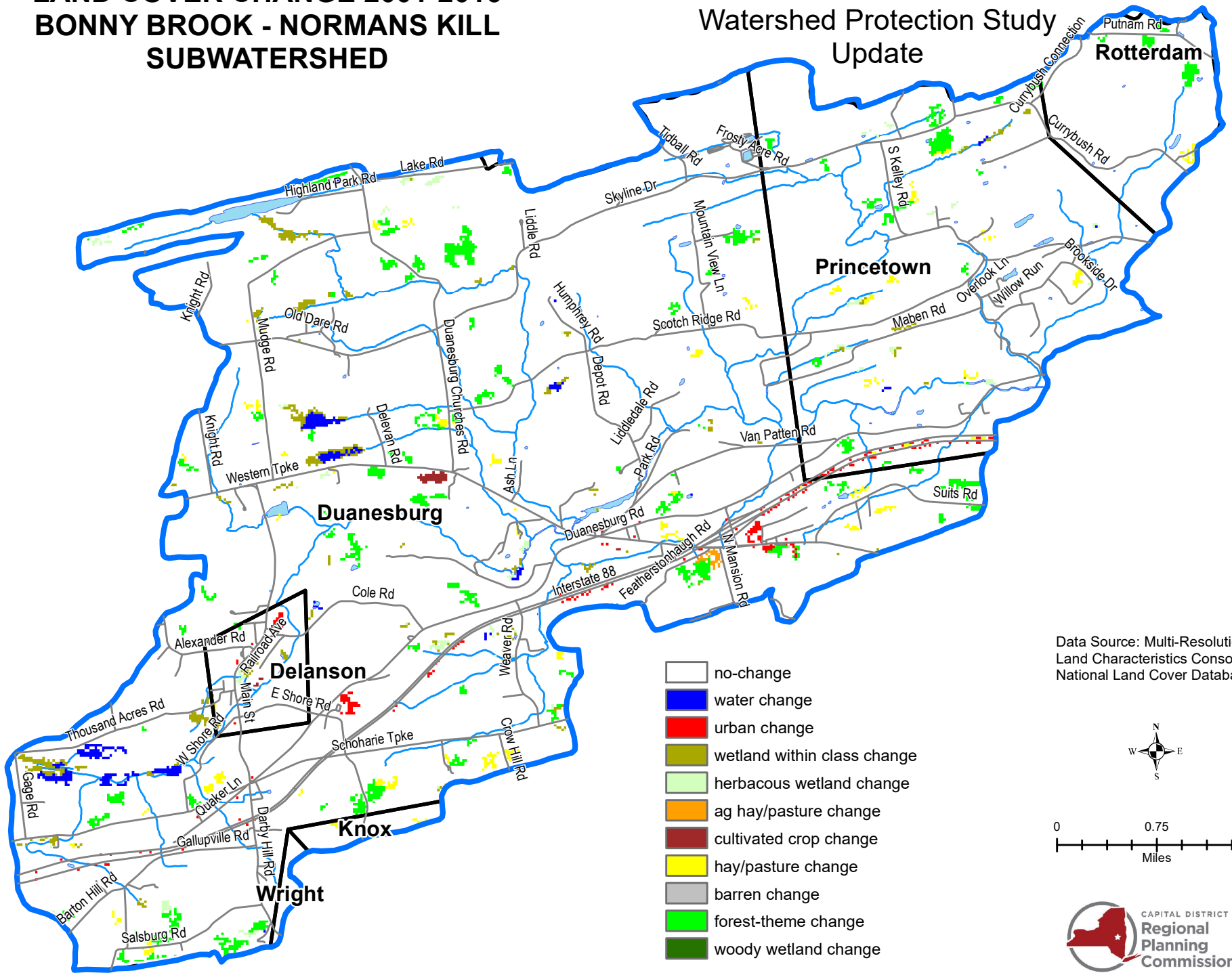

Data Source: Multi-Resolution
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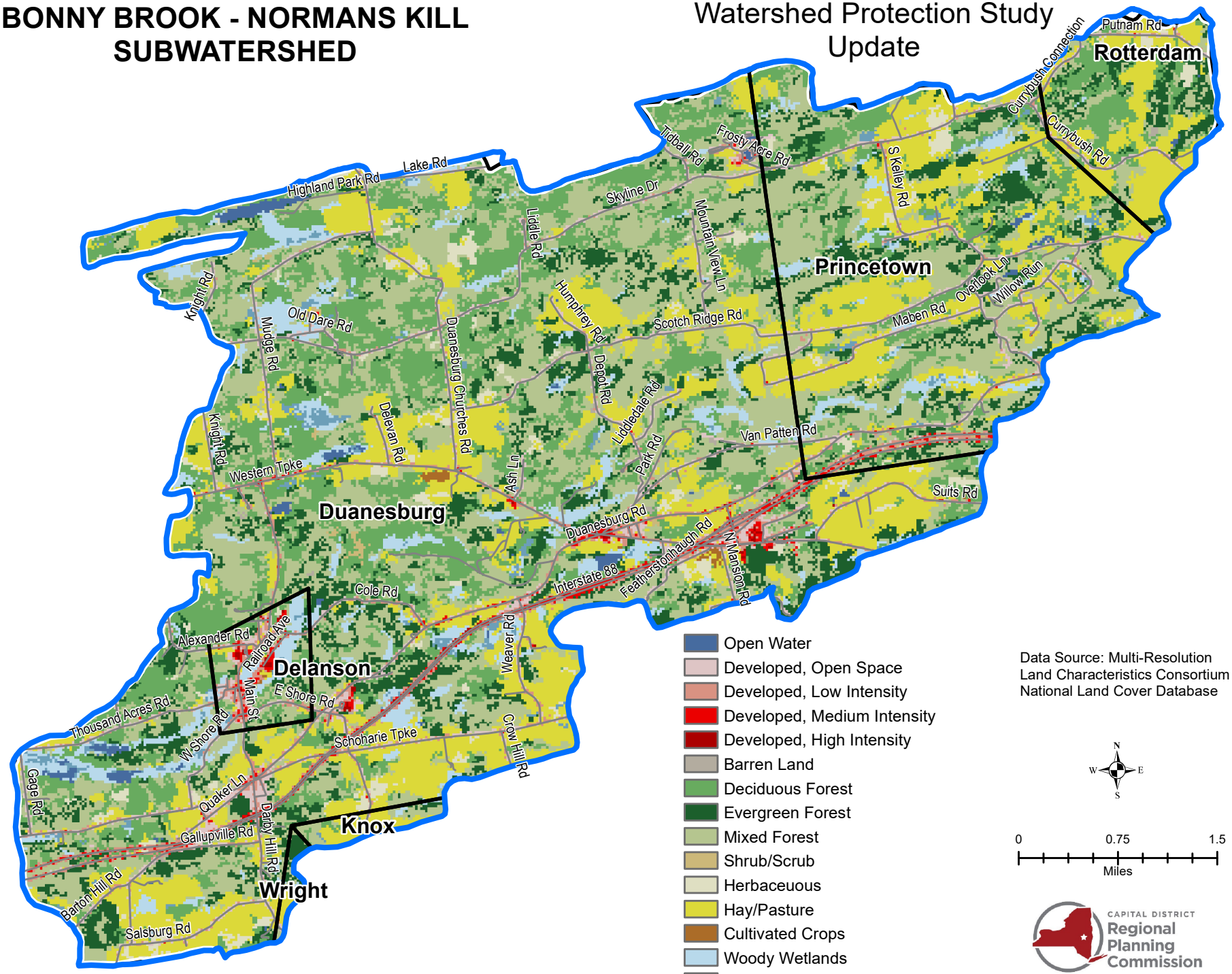
CAPITAL DISTRICT
Regional
Planning
Commission

LAND COVER 2016
BONNY BROOK - NORMANS KILL SUBWATERSHED

Watervliet Reservoir Watershed Protection Study Update



- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Herbaceuous
- Hay/Pasture
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceuous Wetlands

Data Source: Multi-Resolution Land Characteristics Consortium National Land Cover Database

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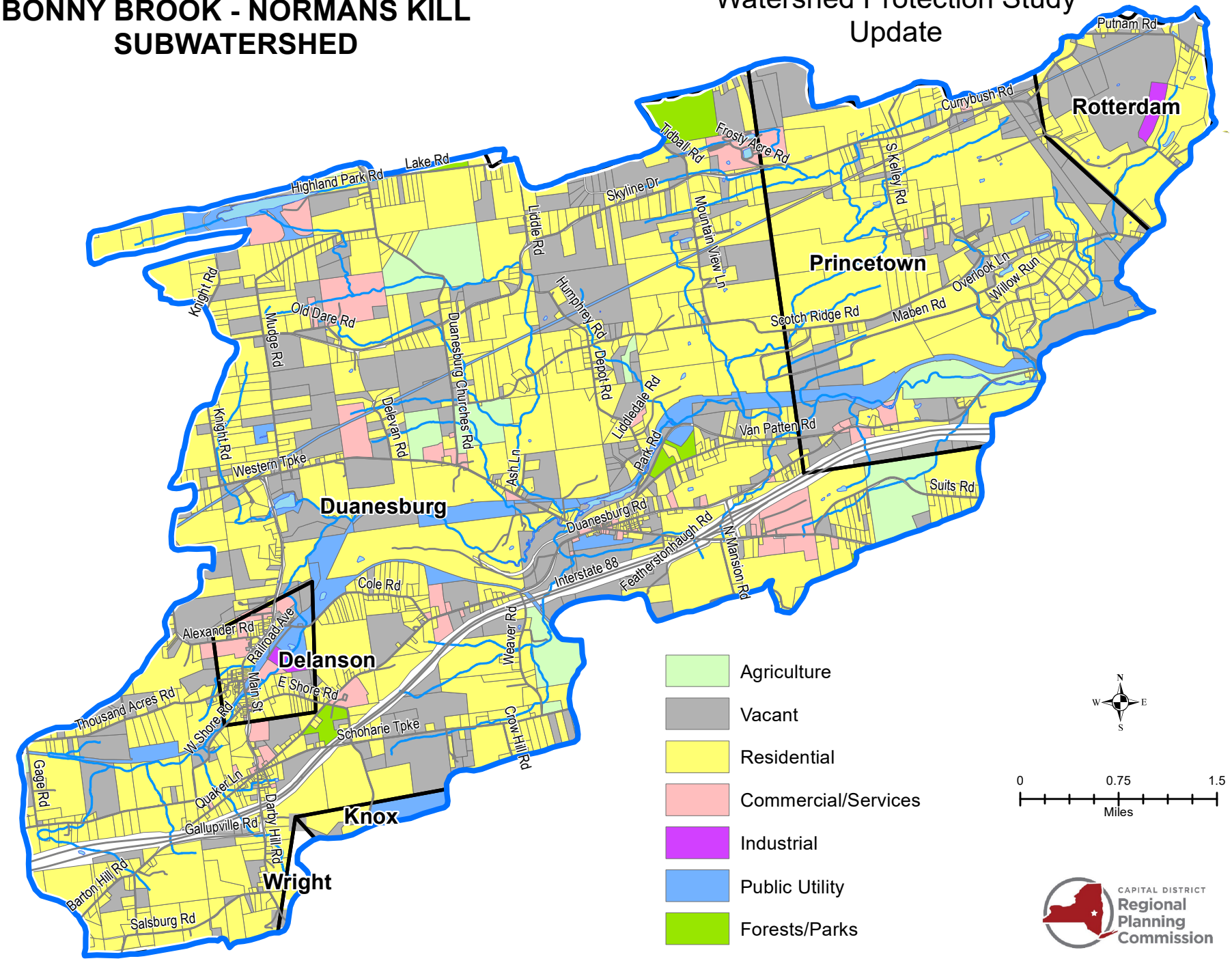
CAPITAL DISTRICT Regional Planning Commission

LAND USE
BONNY BROOK - NORMANS KILL SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update

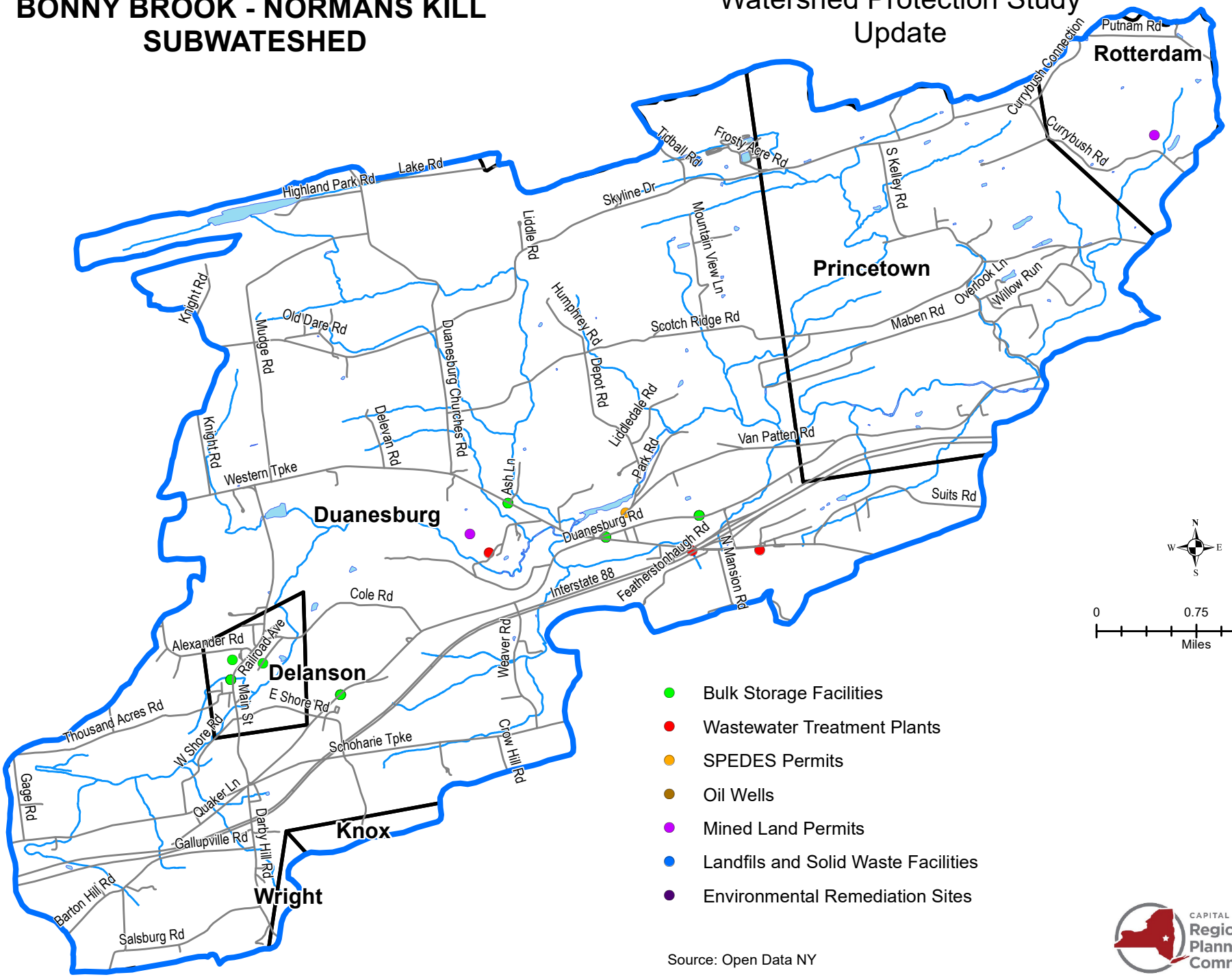


Source: County Tax Parcels, 2018

CAPITAL DISTRICT
Regional
Planning
Commission

NYS DEC REGULATED SITES
BONNY BROOK - NORMANS KILL SUBWATESHED

Watervliet Reservoir Watershed Protection Study Update

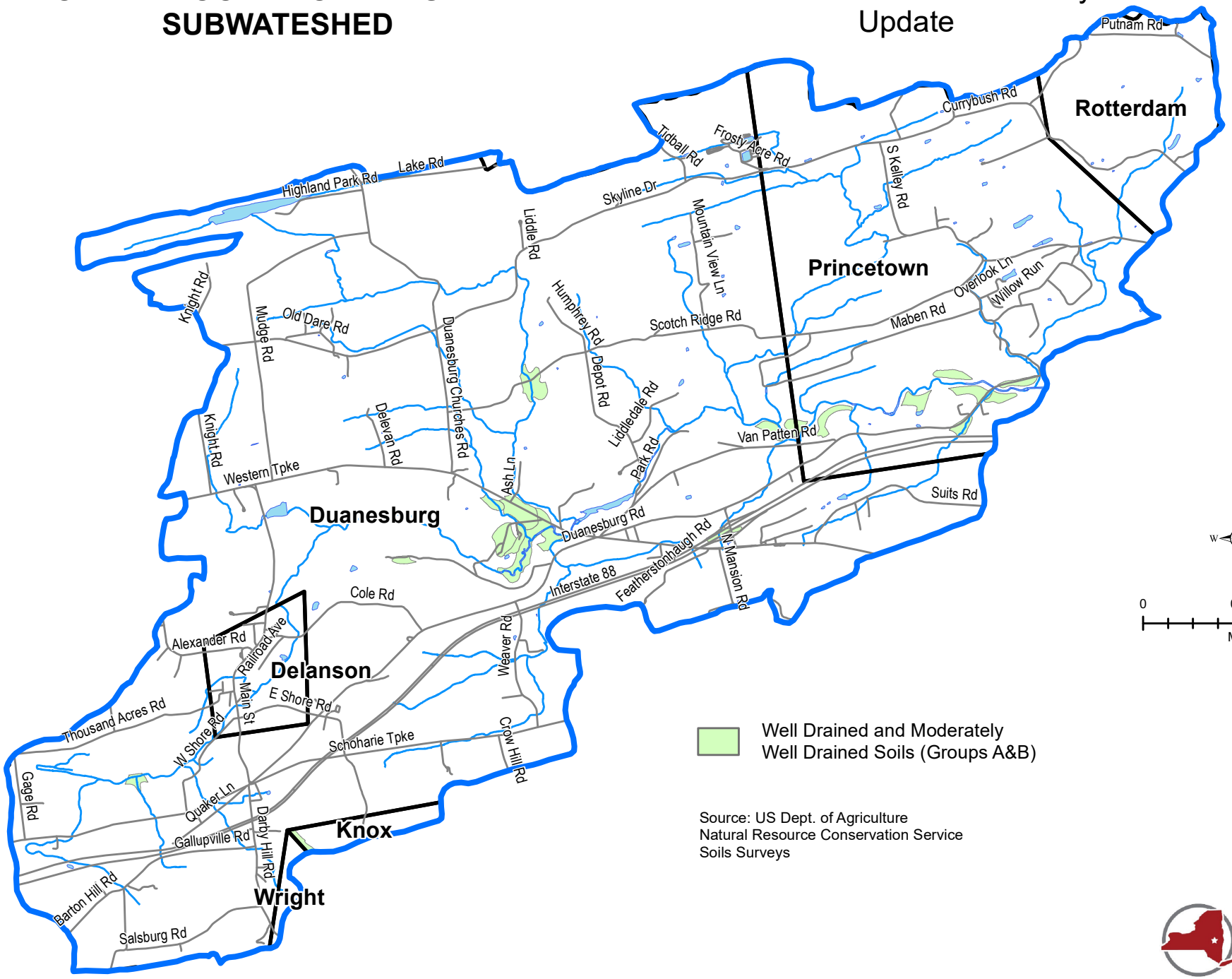


Source: Open Data NY

CAPITAL DISTRICT Regional Planning Commission

SOIL PERMEABILITY
BONNY BROOK - NORMANS KILL
SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update

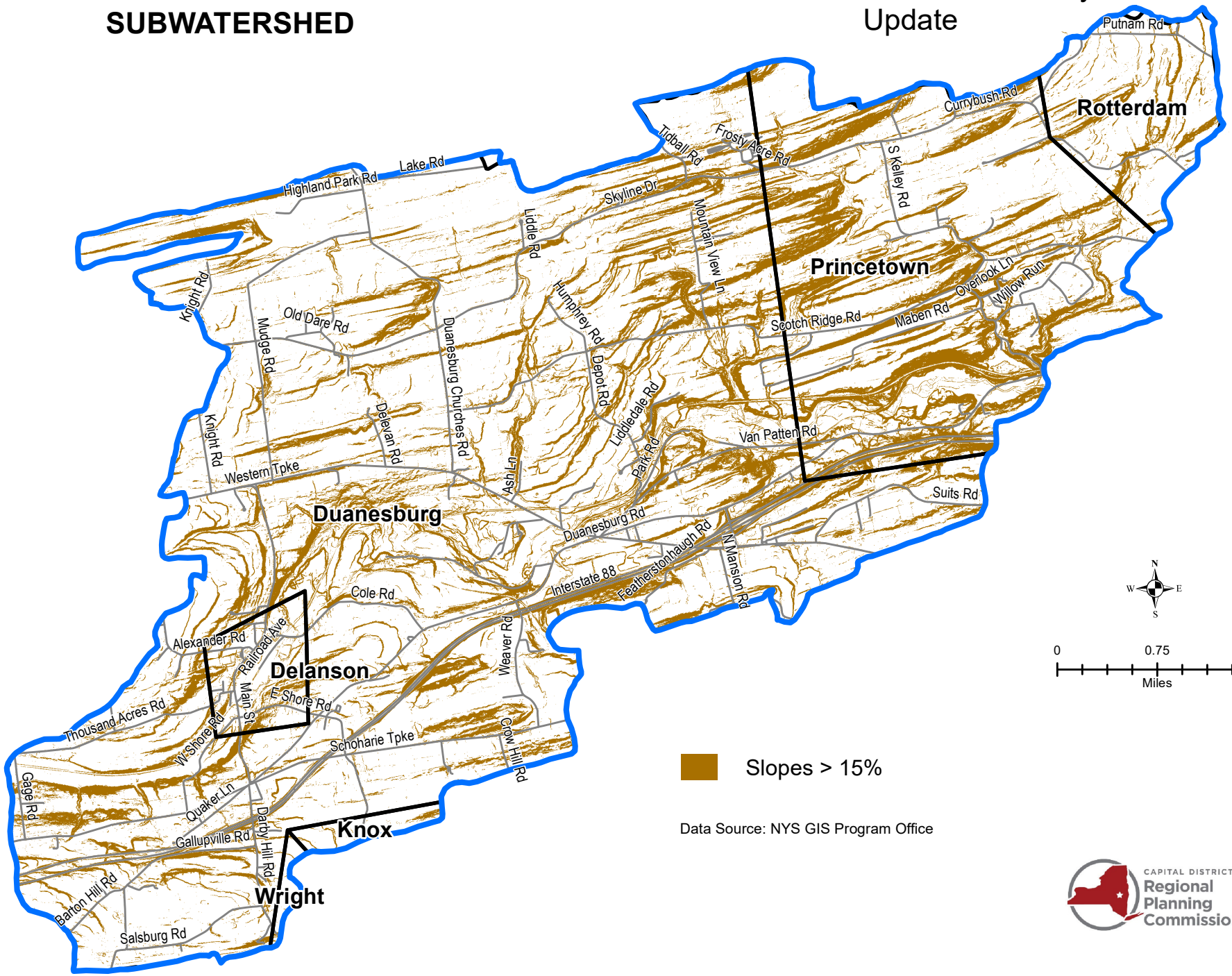


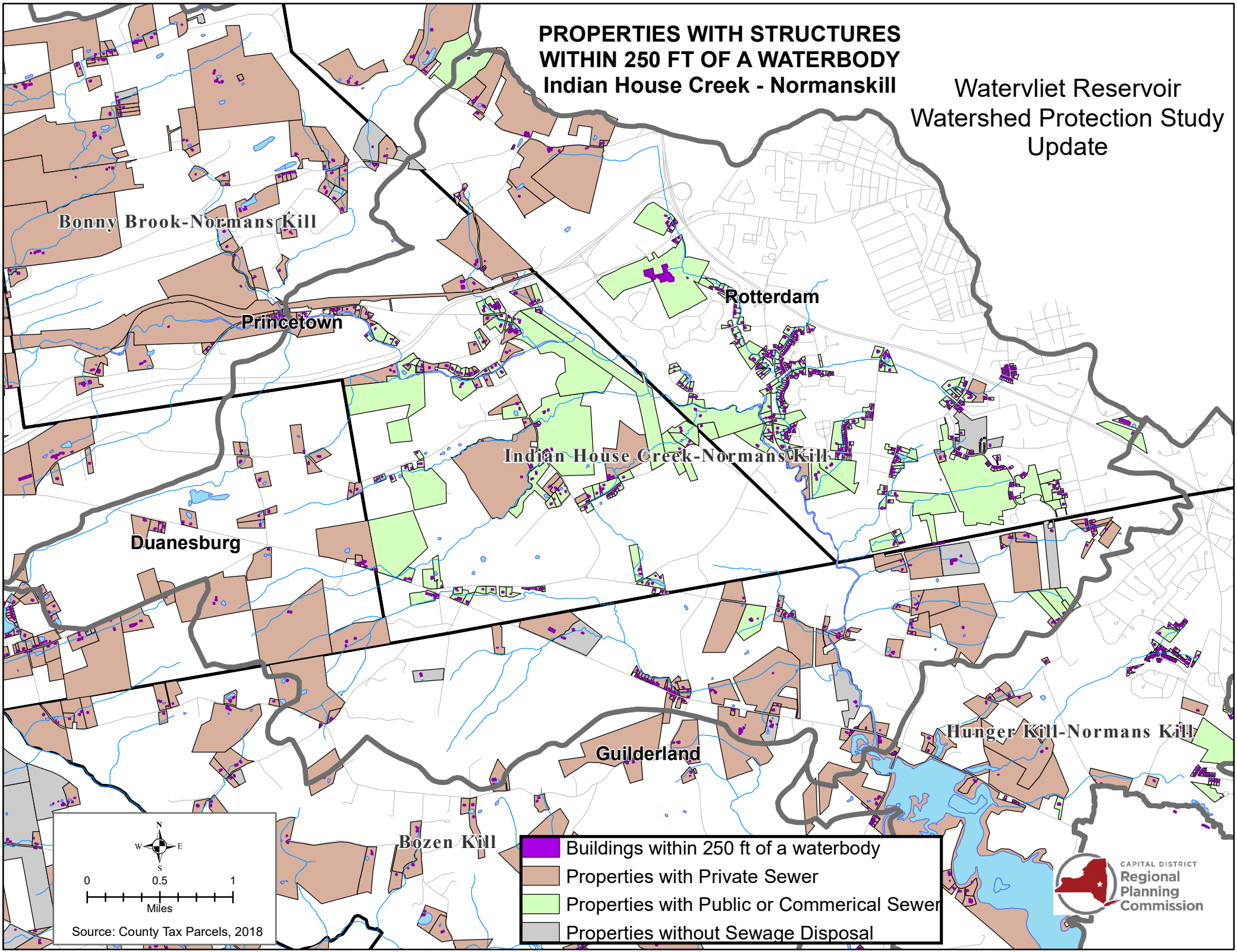
Source: US Dept. of Agriculture
Natural Resource Conservation Service
Soils Surveys

CAPITAL DISTRICT
Regional
Planning
Commission

STEEP SLOPES
BONNY BROOK - NORMANS KILL SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update




PROPERTIES WITH STRUCTURES
WITHIN 250 FT OF A WATERBODY
Indian House Creek - Normanskill
Watervliet Reservoir
Watershed Protection Study
Update
Bonny Brook-Normans Kill
Princetown
Rotterdam
Indian House Creek-Normans Kill
Duanesburg
Guilderland
Hunger Kill-Normans Kill
Bozen Kill
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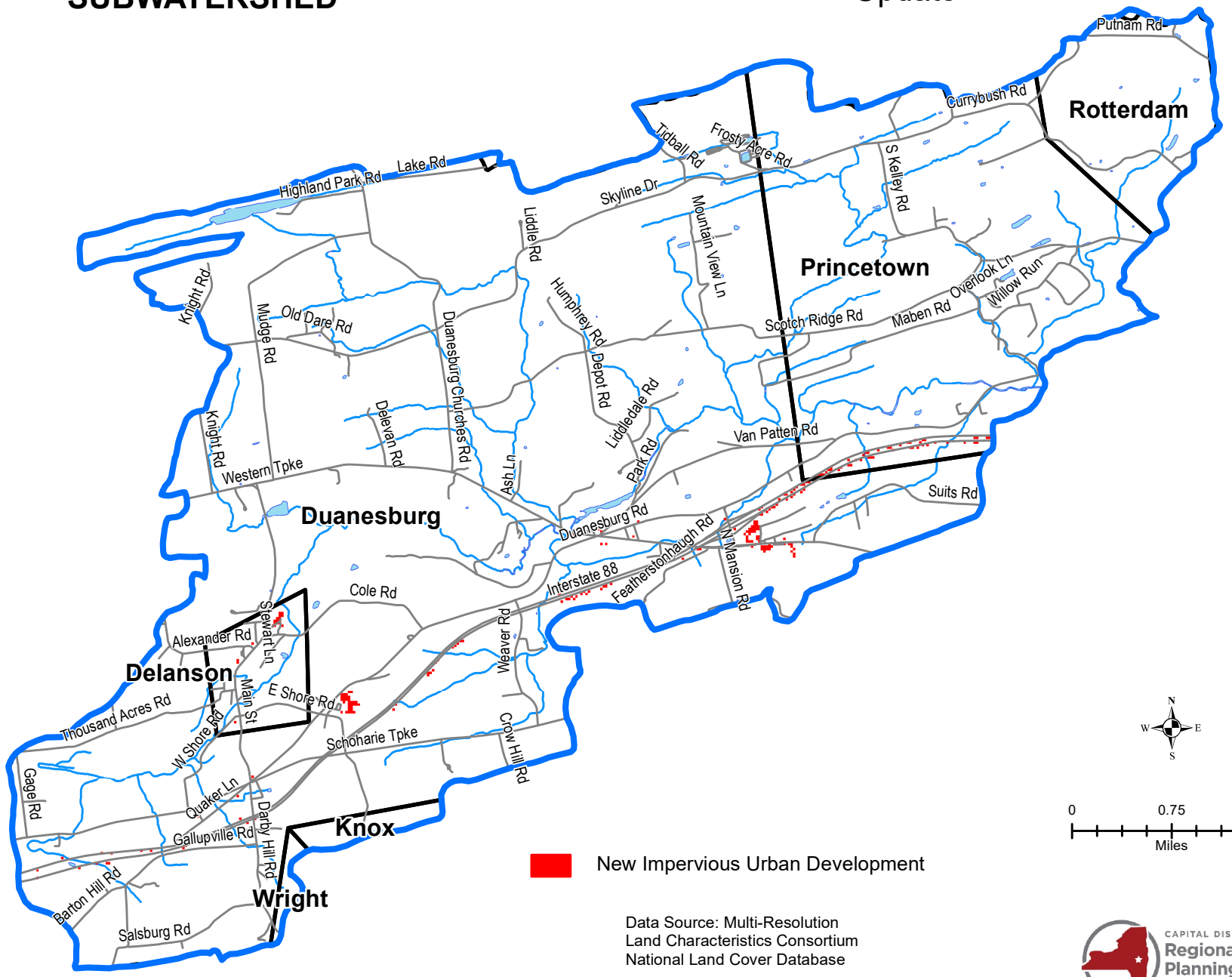
Miles
Source: County Tax Parcels, 2018
Buildings within 250 ft of a waterbody
Properties with Private Sewer
Properties with Public or Commerical Sewer
Properties without Sewage Disposal
CAPITAL DISTRICT
Regional
Planning
Commission

URBAN CHANGE 2001 - 2016
BONNY BROOK - NORMANS KILL SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update

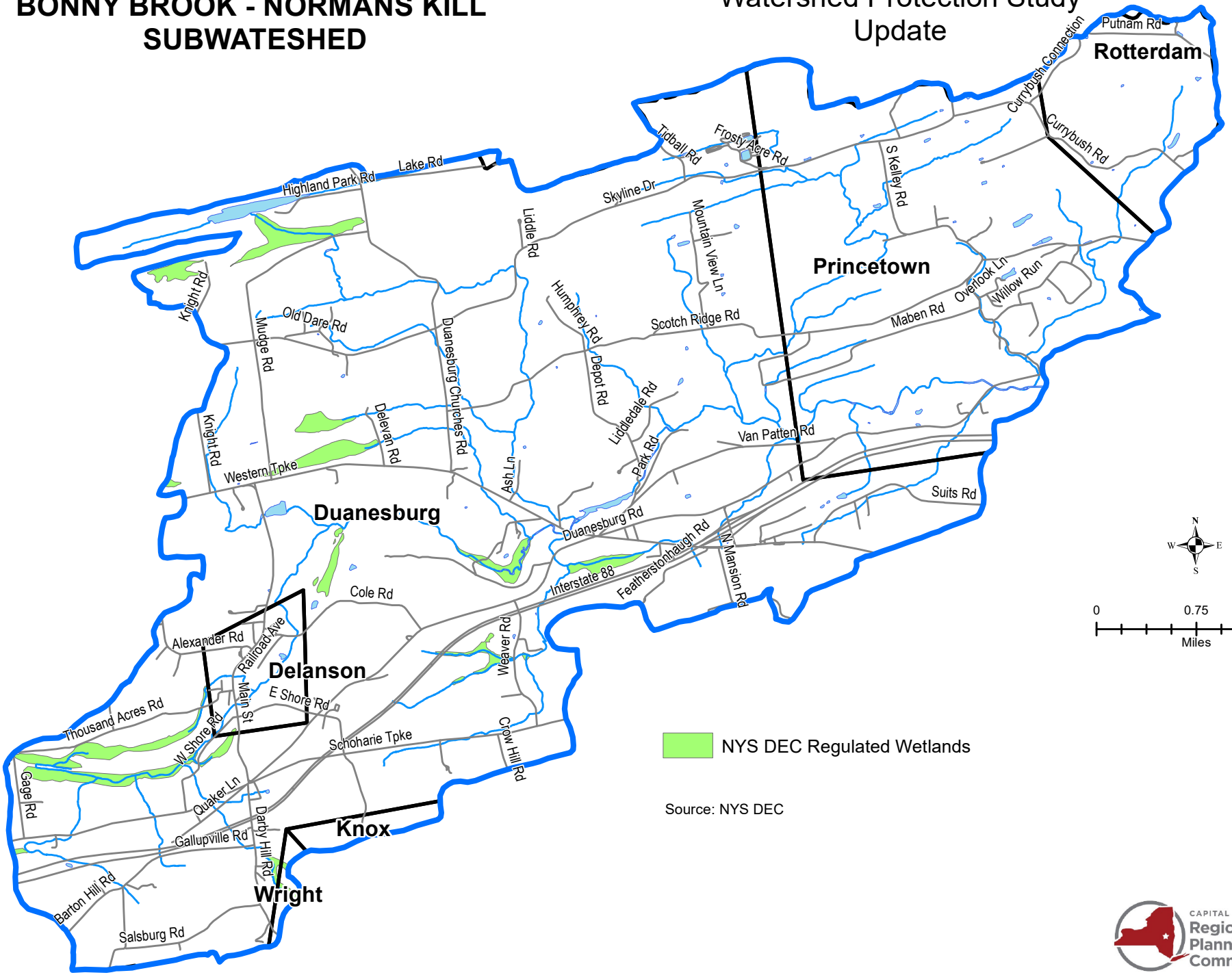


Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database

CAPITAL DISTRICT
Regional
Planning
Commission

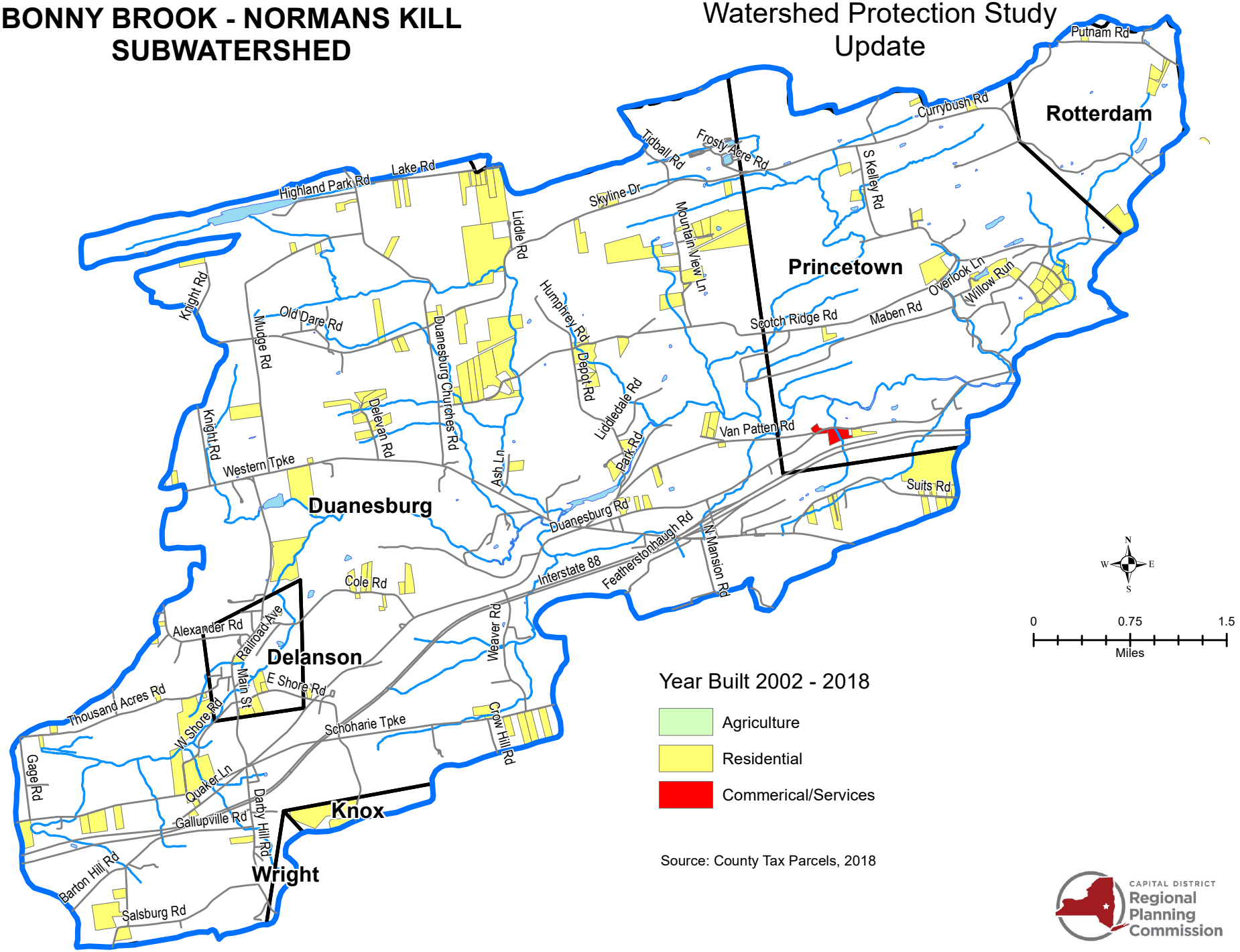
NYDEC REGULATED WETLANDS
BONNY BROOK - NORMANS KILL SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update



LAND USE CHANGE 2002 - 2018
BONNY BROOK - NORMANS KILL SUBWATERSHED

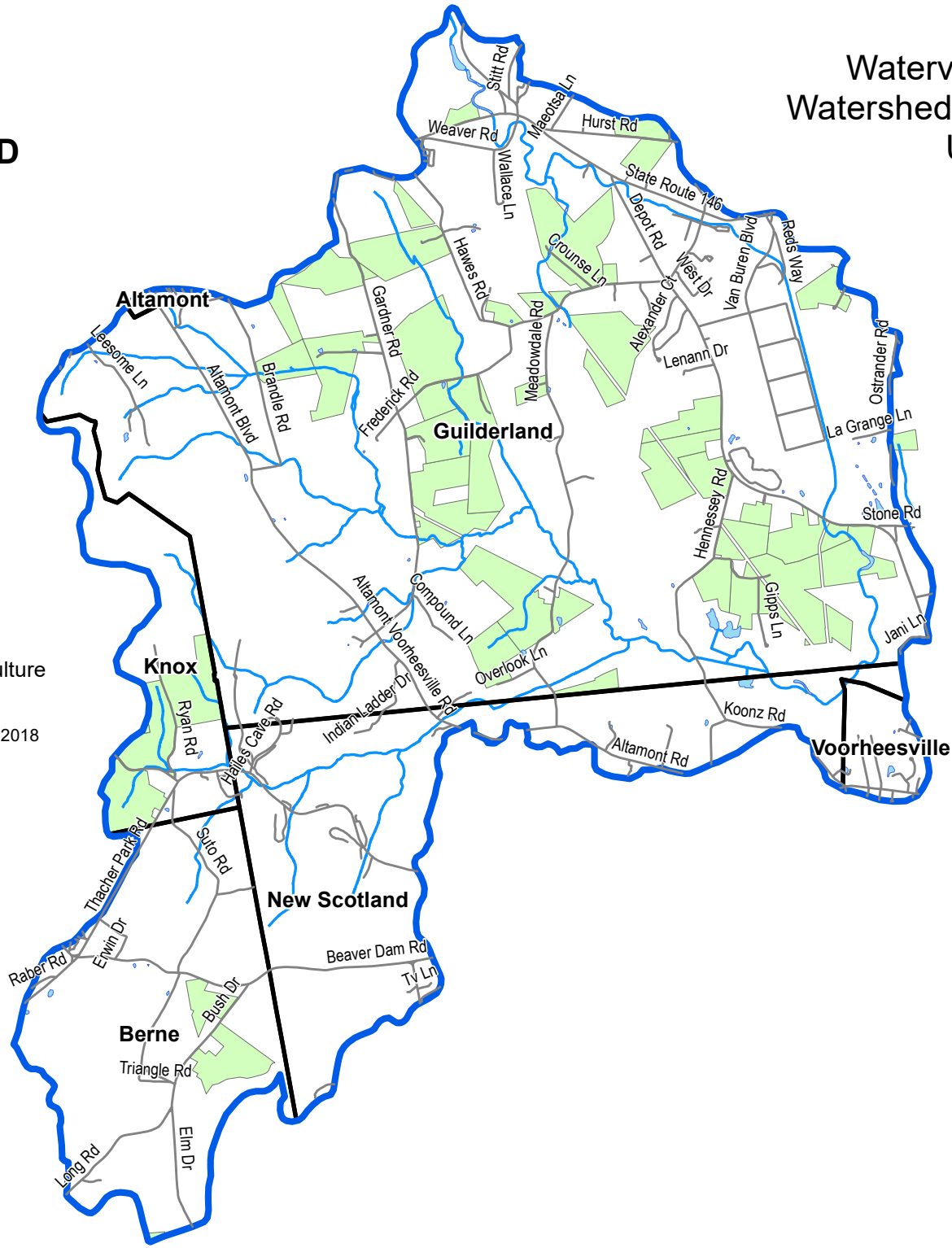
Watervliet Reservoir Watershed Protection Study Update



Appendix K: Subwatershed maps for the Black Creek

AGRICULTURE BLACK CREEK SUBWATERSHED

Watervliet Reservoir Watershed Protection Study Update



Parcels Used for Agriculture

Source: County Tax Parcels, 2018

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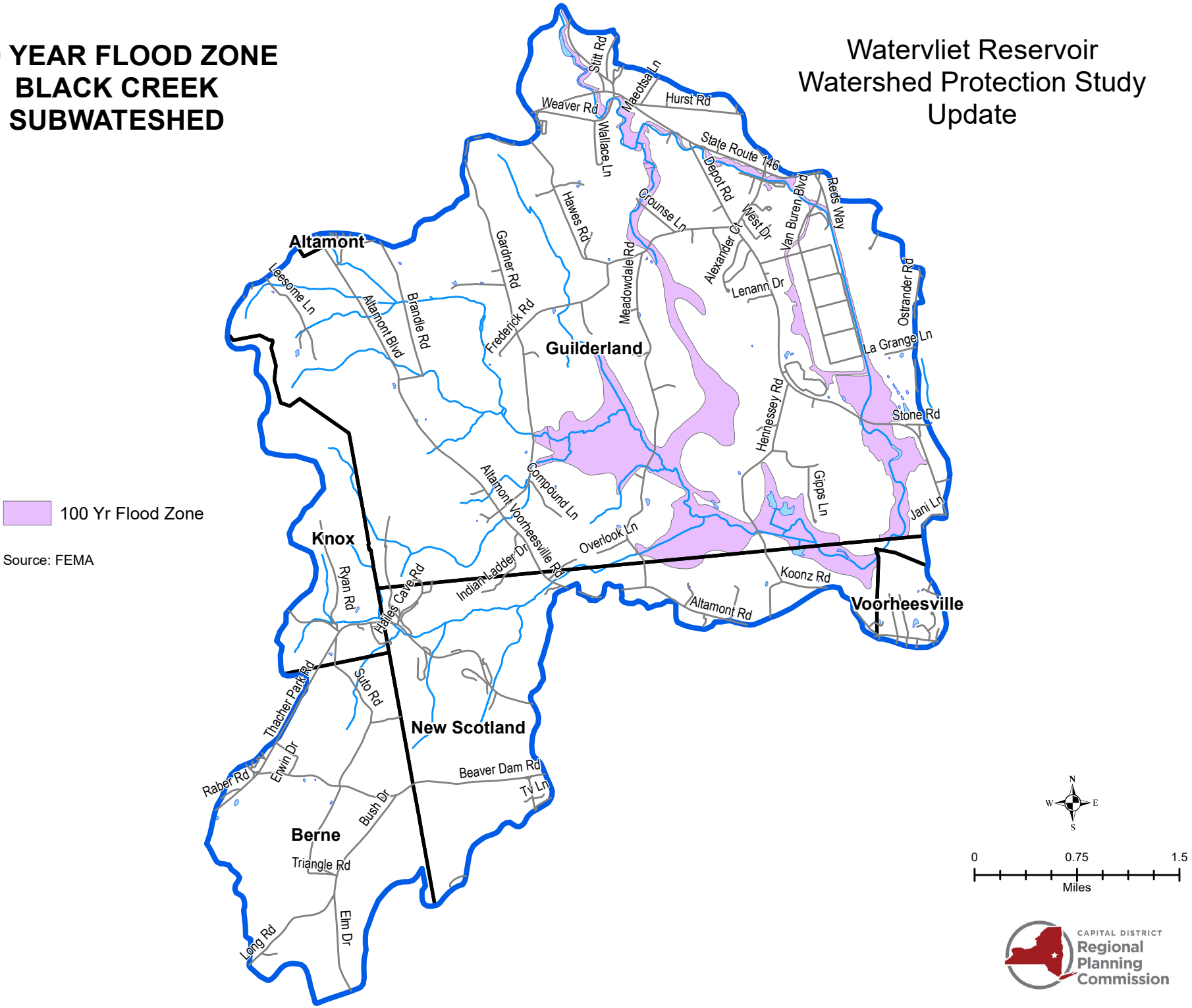
Miles

CAPITAL DISTRICT Regional Planning Commission

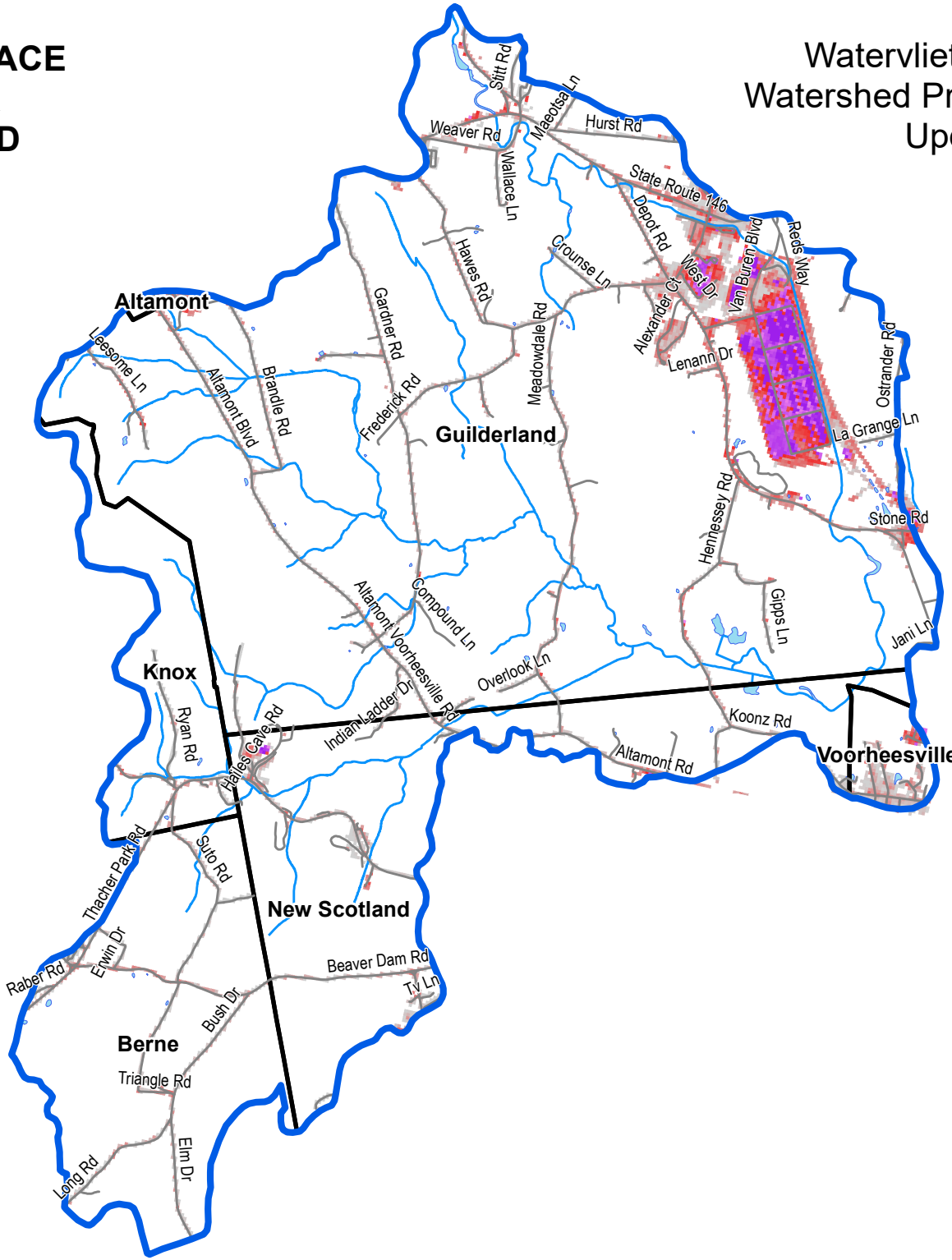
100 YEAR FLOOD ZONE
BLACK CREEK
SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update



IMPERVIOUS SURFACE BLACK CREEK SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



Colored areas indicate developed/impervious land of varying intensity as of 2016.

Data Source: Multi-Resolution Land Characteristics Consortium National Land Cover Database

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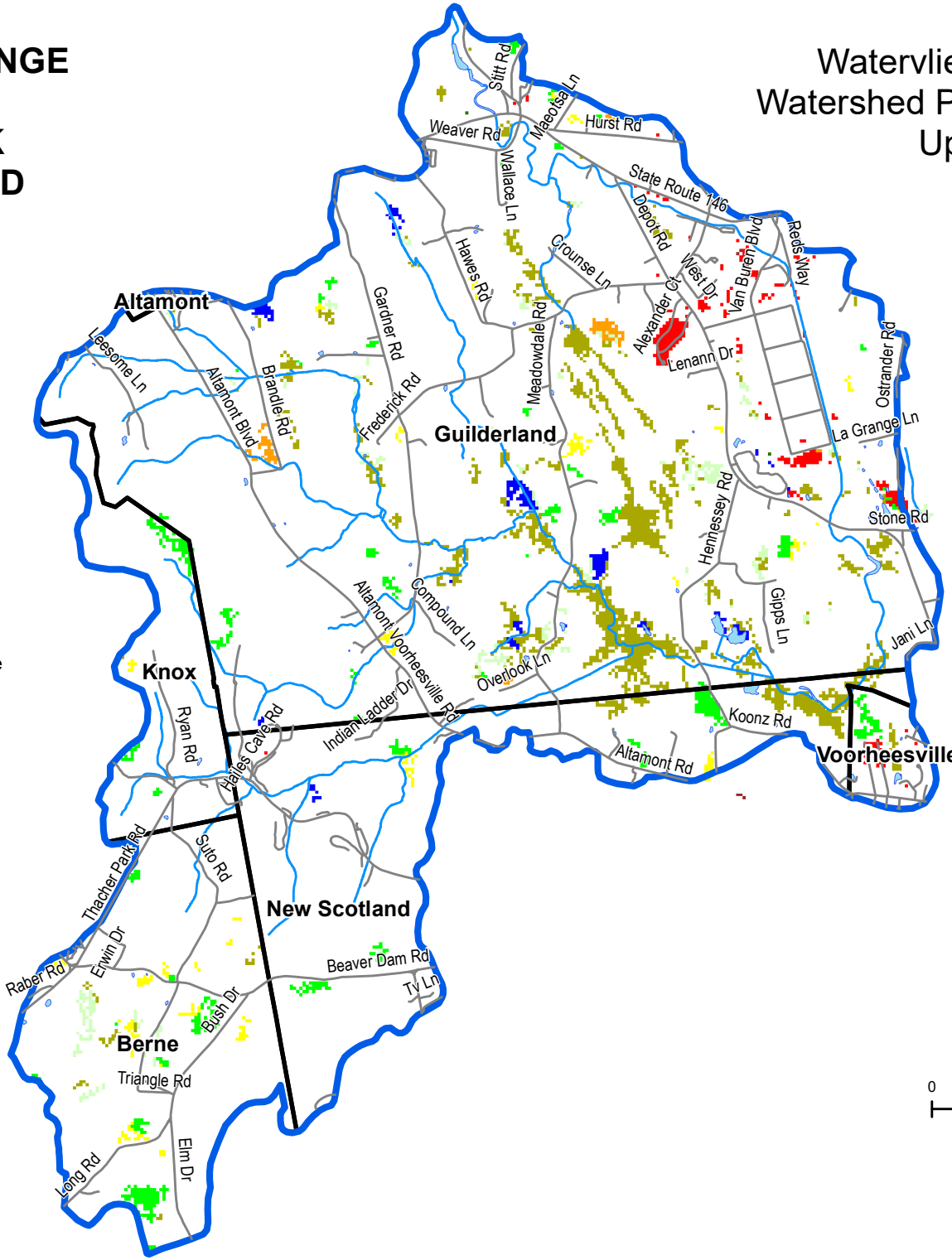
CAPITAL DISTRICT
Regional Planning Commission

LAND COVER CHANGE
2001-2016
BLACK CREEK
SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



- no-change
- water change
- urban change
- wetland within class change
- herbacous wetland change
- ag hay/pasture change
- cultivated crop change
- hay/pasture change
- barren change
- forest-theme change
- woody wetland change

Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database

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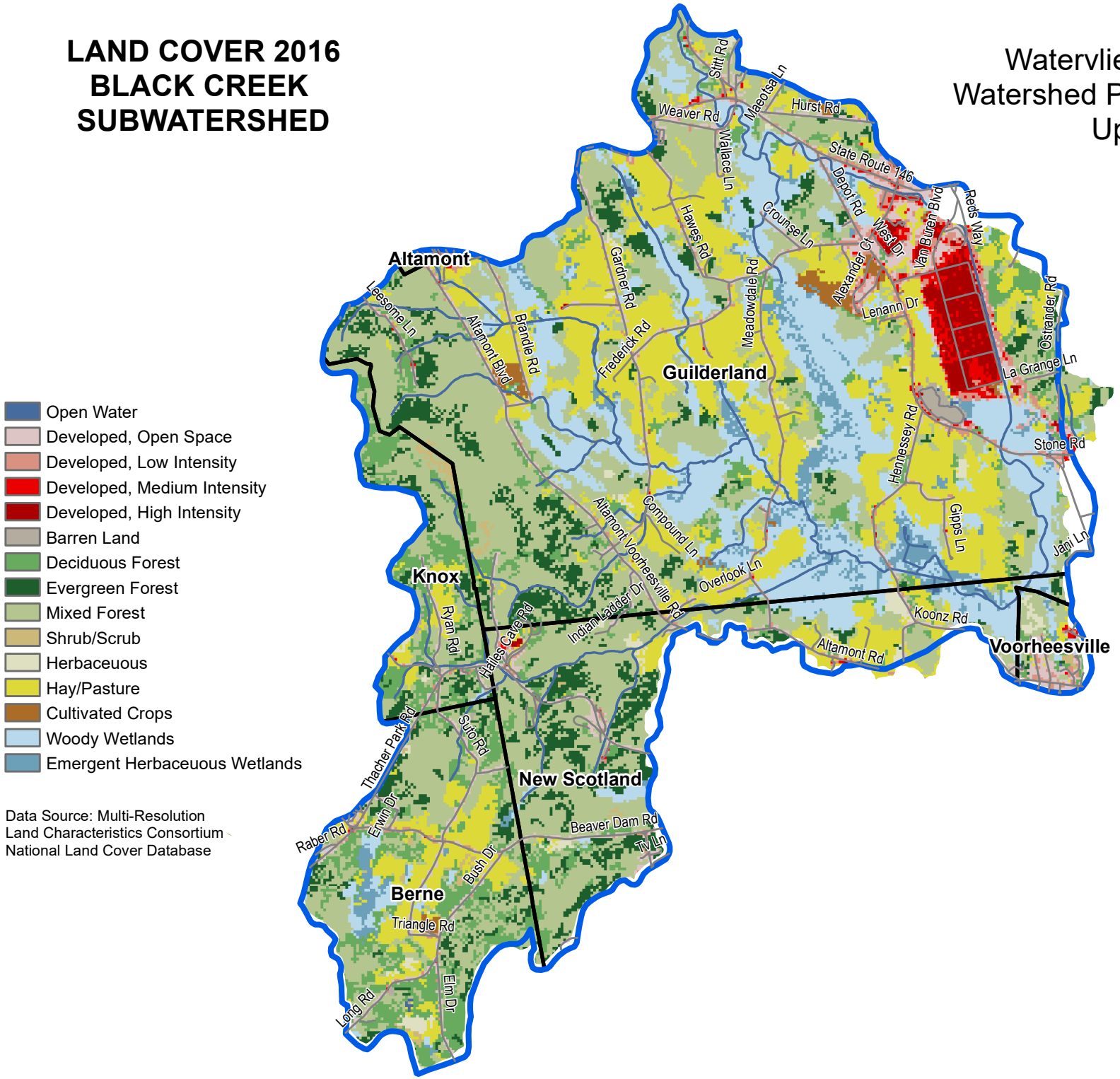
CAPITAL DISTRICT
Regional
Planning
Commission

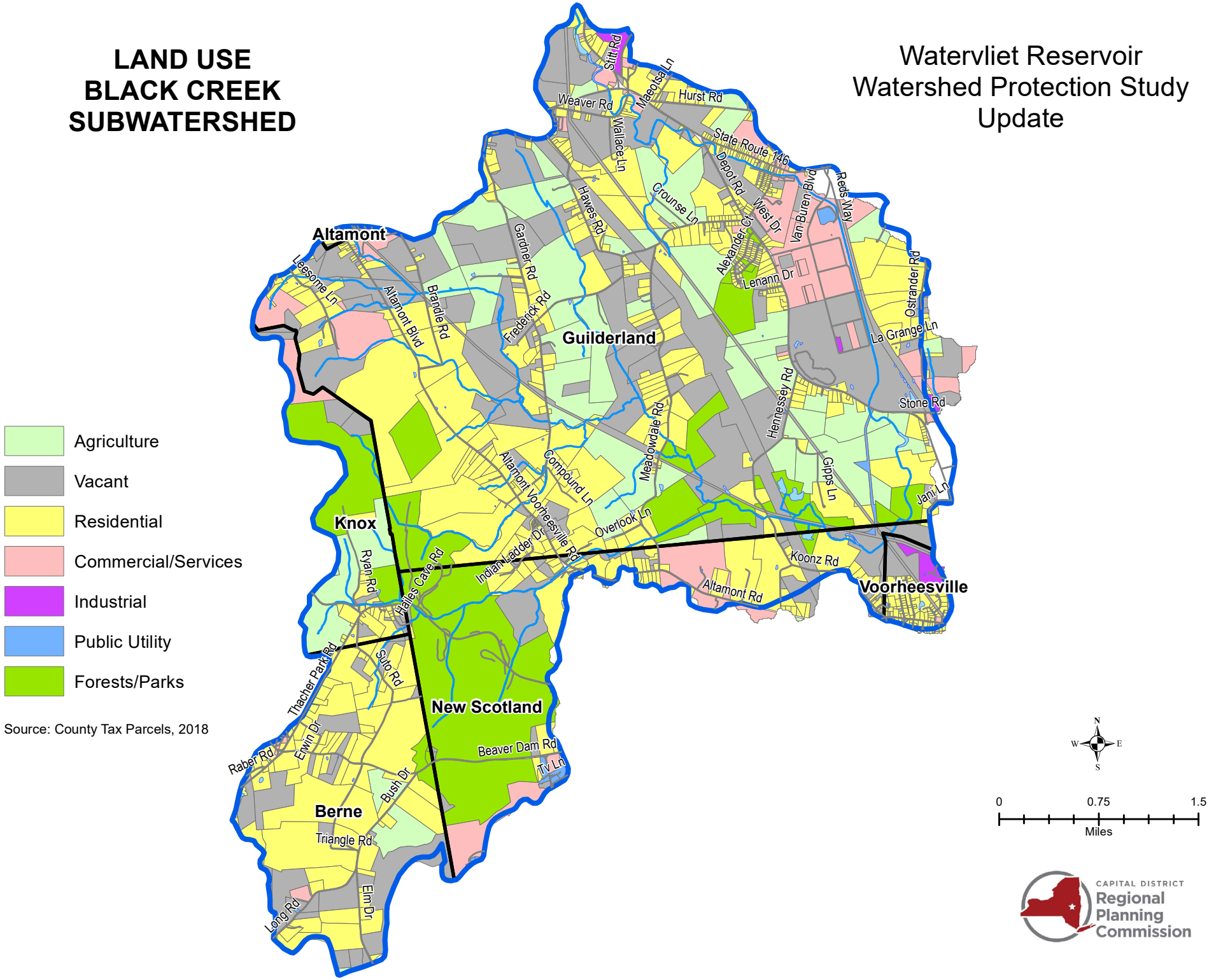
LAND COVER 2016
BLACK CREEK SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



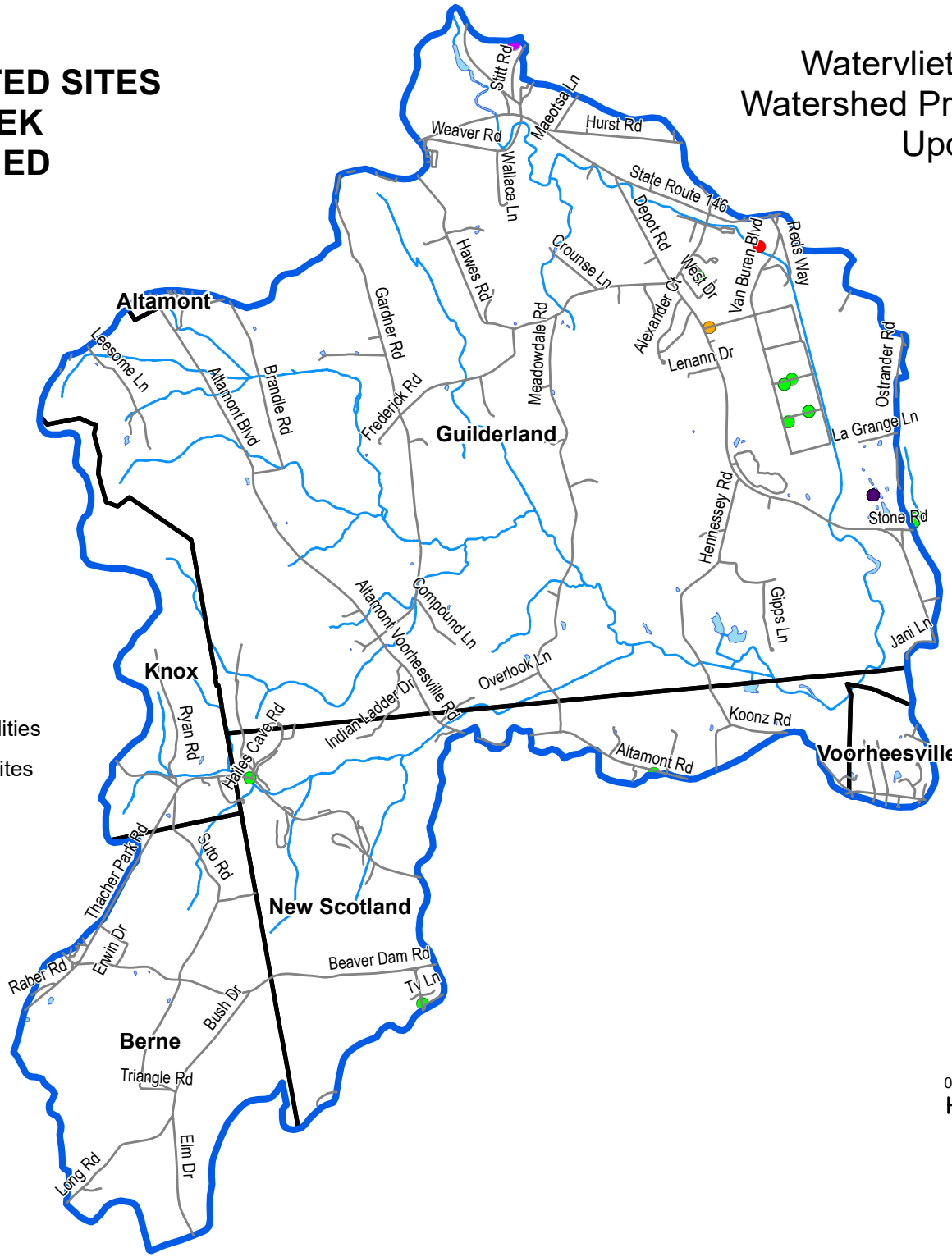
LAND USE
BLACK CREEK SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



NYS DEC REGULATED SITES
BLACK CREEK
SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update



- Bulk Storage Facilities
- Wastewater Treatment Plants
- SPEDES Permits
- Oil Wells
- Mined Land Permits
- Landfils and Solid Waste Facilities
- Environmental Remediation Sites

Source: Open Data NY

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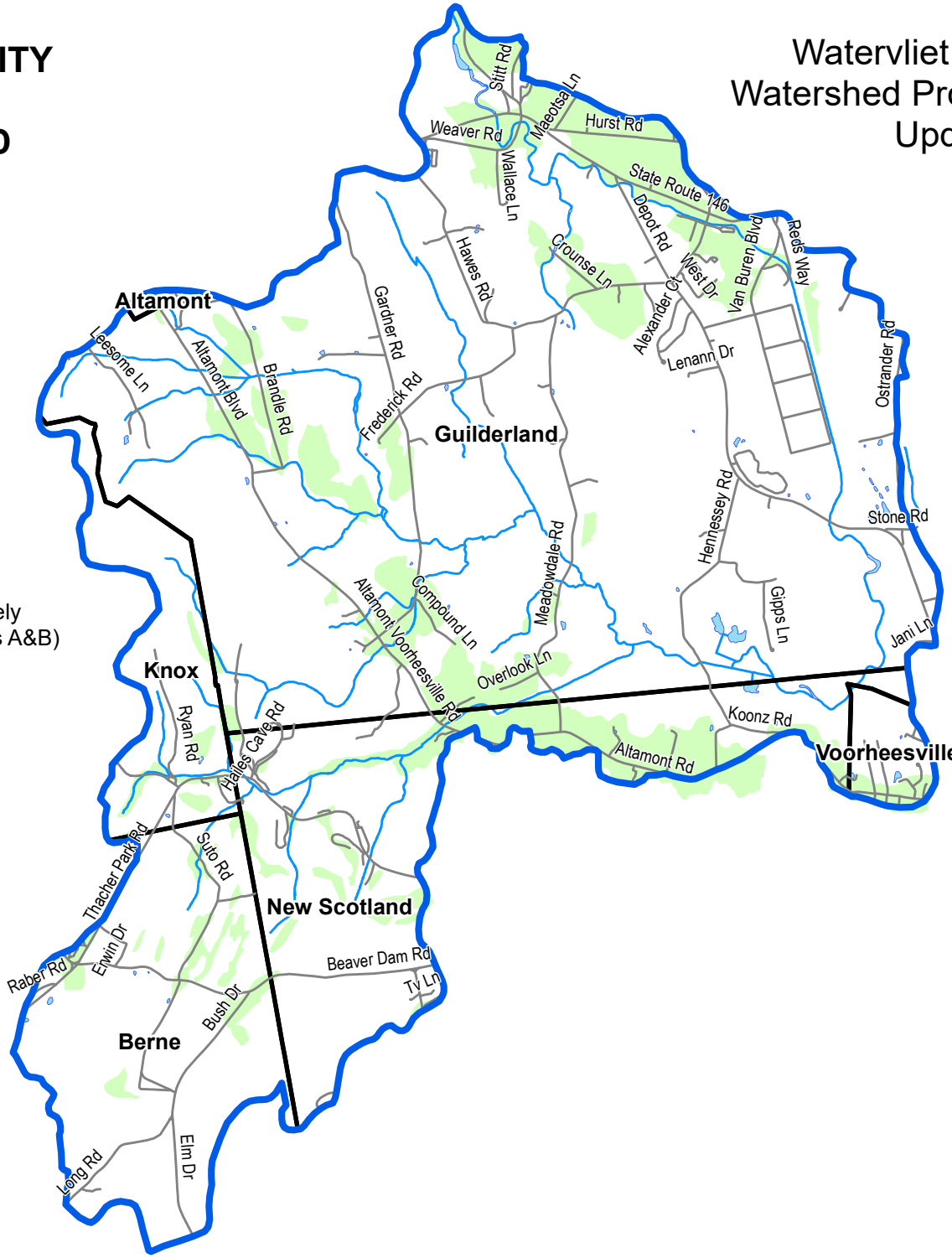
CAPITAL DISTRICT
Regional
Planning
Commission

SOIL PERMEABILITY
BLACK CREEK
SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update



Well Drained and Moderately Well Drained Soils (Groups A&B)

Source: US Dept. of Agriculture
Natural Resource Conservation Service
Soils Surveys

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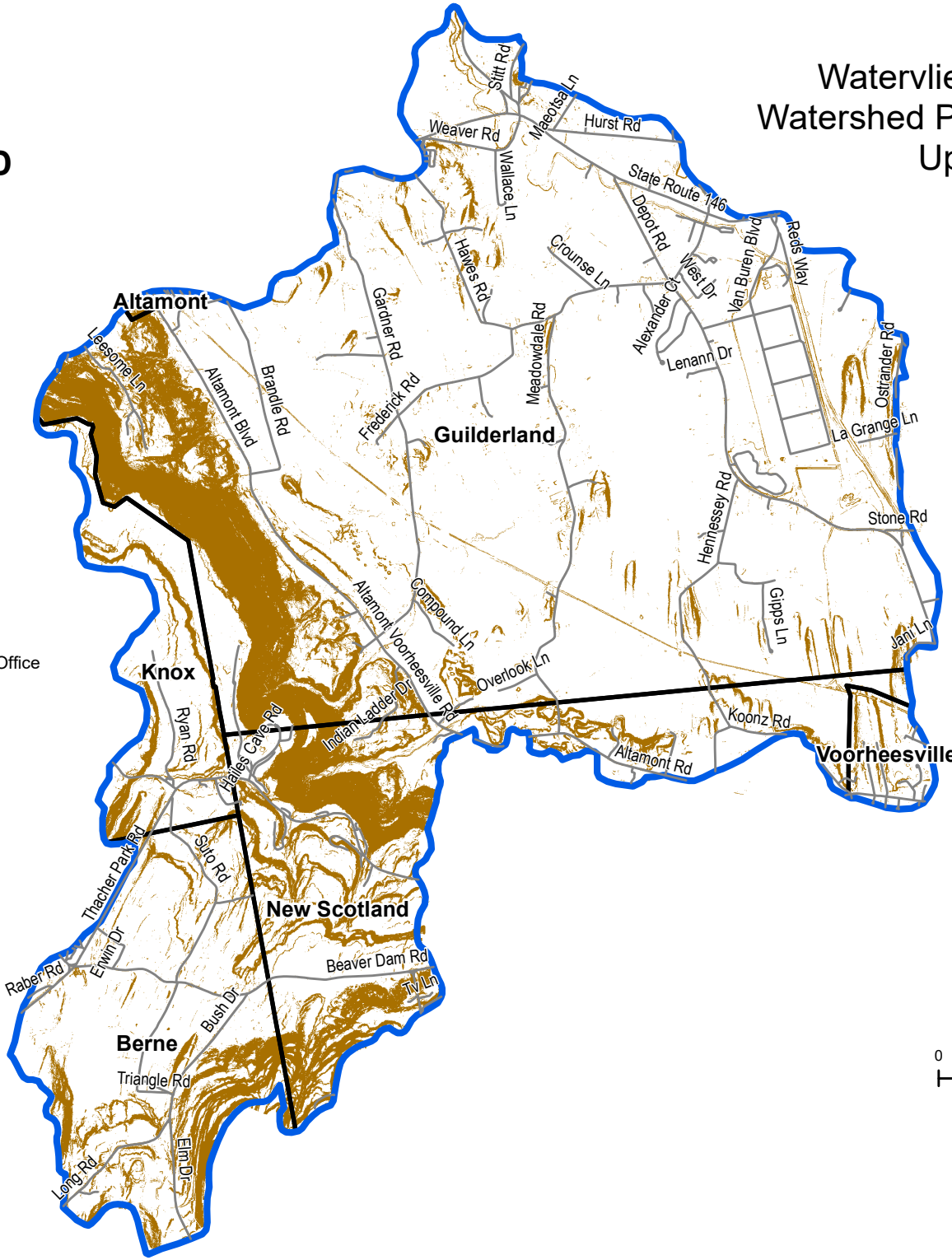
CAPITAL DISTRICT
Regional
Planning
Commission

STEEP SLOPES BLACK CREEK SUBWATERSHED

Watervliet Reservoir Watershed Protection Study Update



Slopes > 15%

Data Source: NYS GIS Program Office

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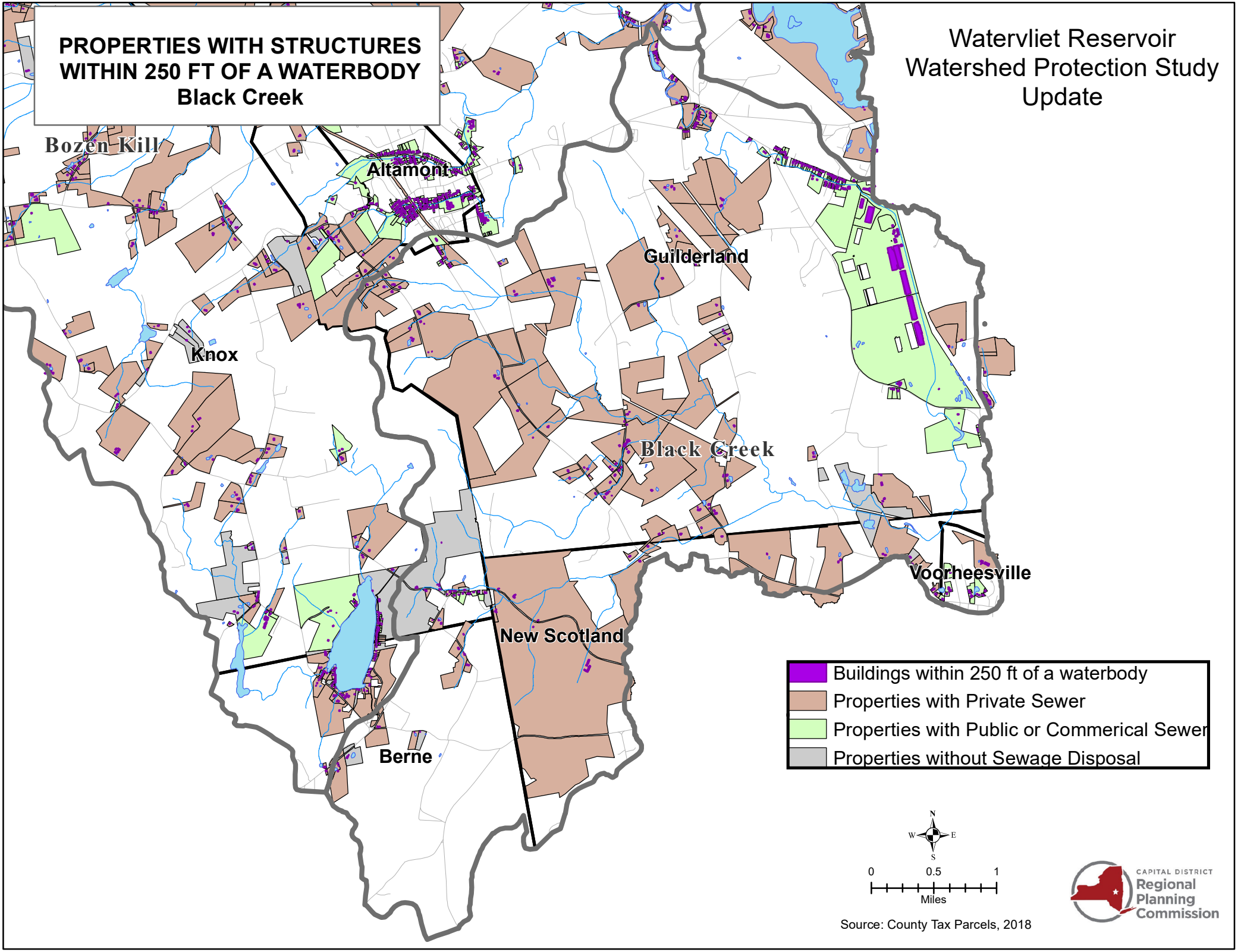
L DISTRICT Regional Planning Commission


PROPERTIES WITH STRUCTURES
WITHIN 250 FT OF A WATERBODY
Black Creek
Watervliet Reservoir
Watershed Protection Study
Update
Bozen Kill
Altamont
Guilderland
Knox
Black Creek
Voorheesville
New Scotland
Berne
Buildings within 250 ft of a waterbody
Properties with Private Sewer
Properties with Public or Commerical Sewer
Properties without Sewage Disposal
N
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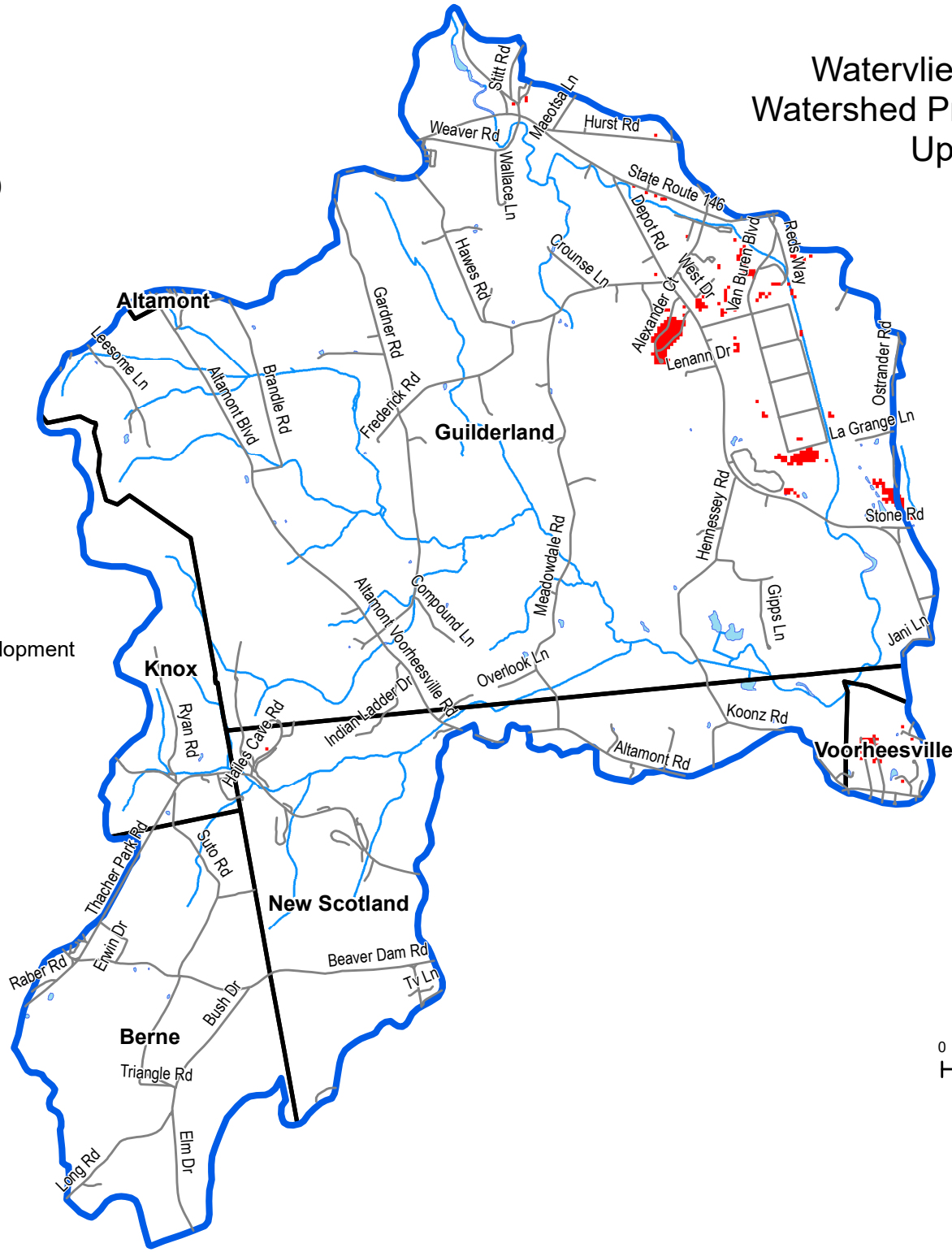
Source: County Tax Parcels, 2018
CAPITAL DISTRICT
Regional
Planning
Commission

URBAN CHANGE
2001 - 2016
BLACK CREEK
SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



New Impervious Urban Development

Data Source: Multi-Resolution
Land Characteristics Consortium
National Land Cover Database

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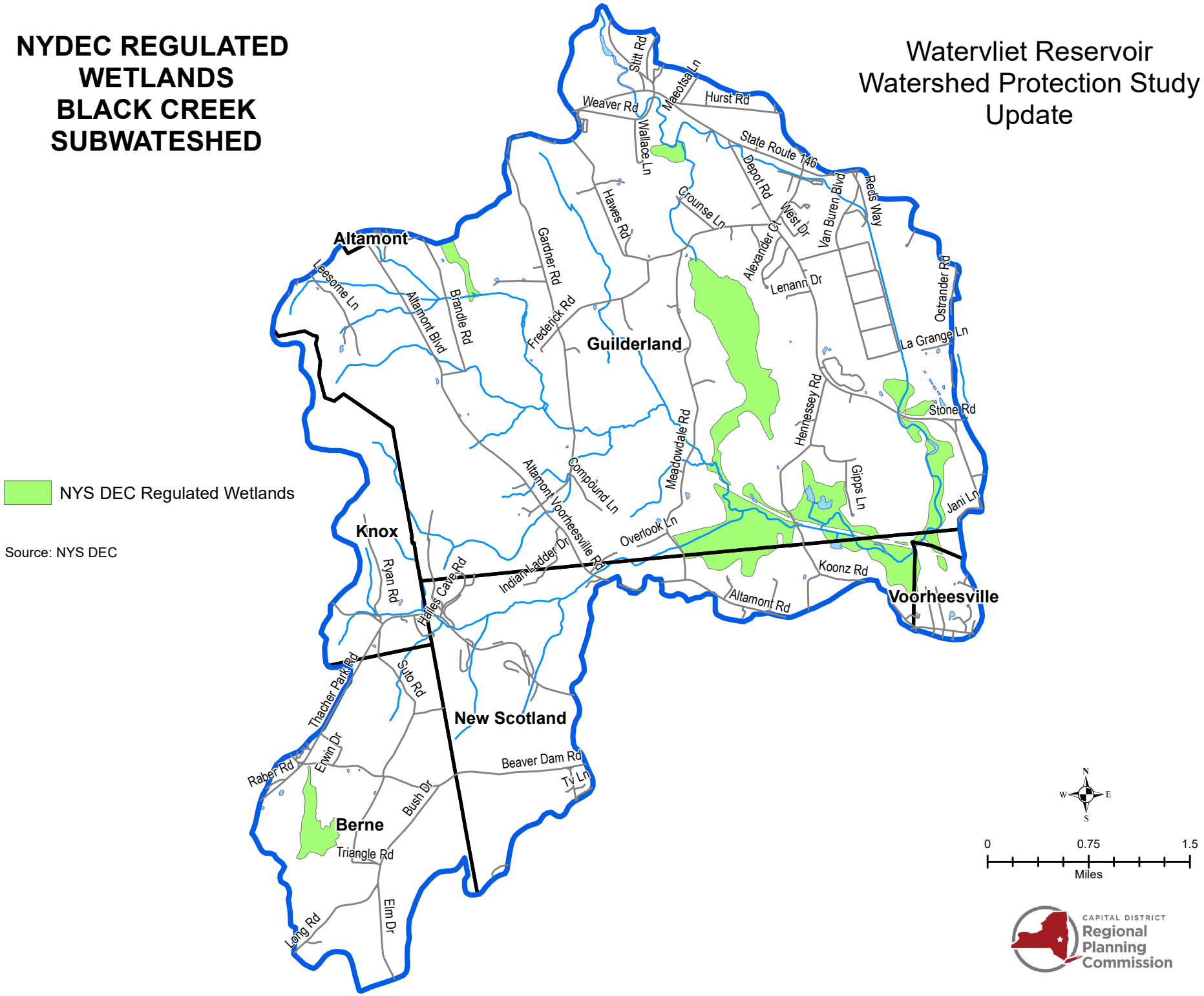
Miles

CAPITAL DISTRICT
Regional
Planning
Commission

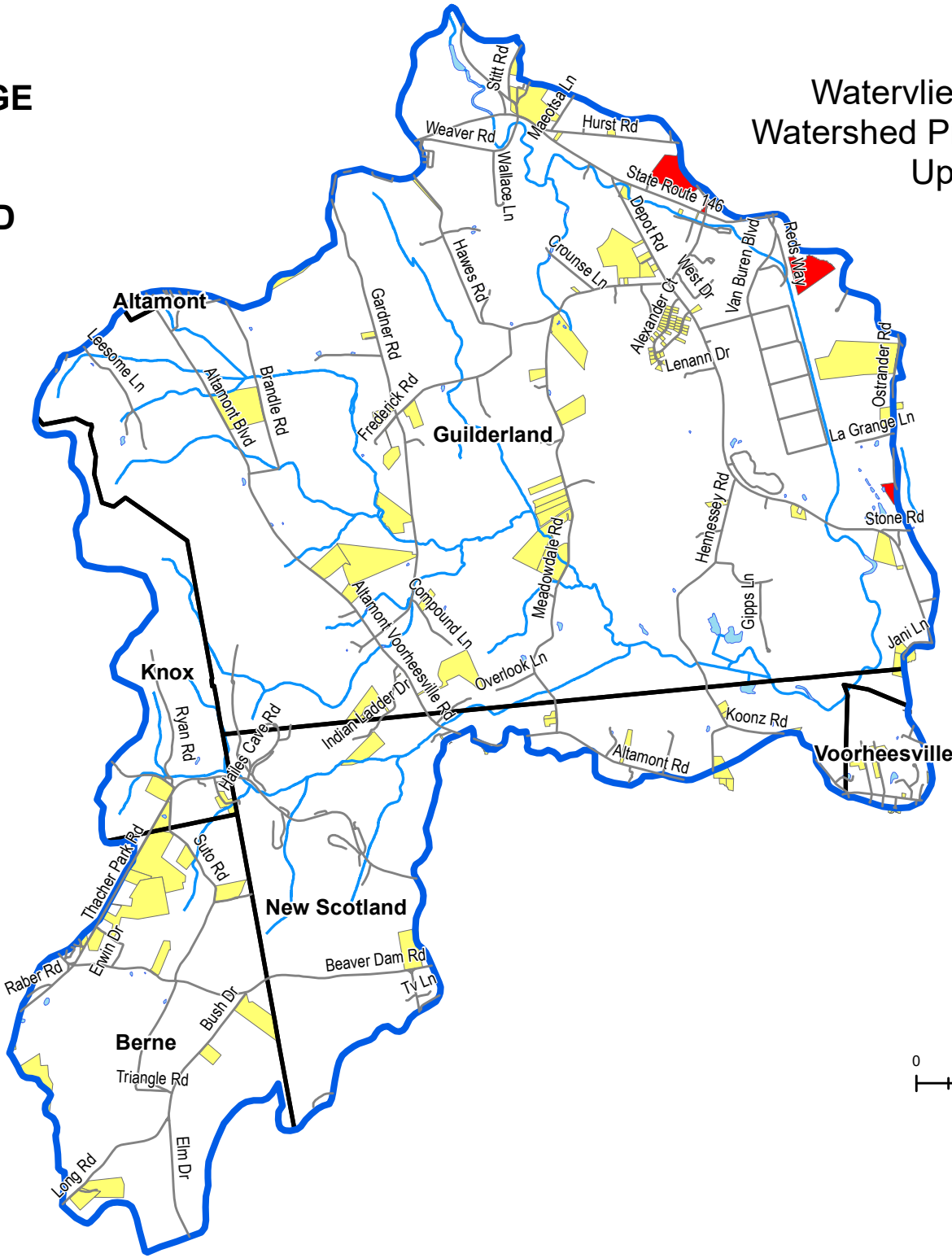
NYDEC REGULATED WETLANDS BLACK CREEK SUBWATESHED

Watervliet Reservoir
Watershed Protection Study
Update



LAND USE CHANGE
2002 - 2018
BLACK CREEK
SUBWATERSHED

Watervliet Reservoir
Watershed Protection Study
Update



Year Built 2002 - 2018

- Agriculture
- Residential
- Commerical/Services

Source: County Tax Parcels, 2018

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CAPITAL DISTRICT
Regional
Planning
Commission

Appendix L: Queensbury Septic Law

§ 137-1. Title.

This article shall be known as "Septic Inspection Upon Property Transfer."

§ 137-2. Statutory authority.

Enactment of Chapter 137 of the Queensbury Town Code is pursuant to Article 16 of the Town Law and Article 3 of the Public Health Law.

§ 137-3. Findings and intent.

The intent of this article is to better protect water bodies from exposure to excess nutrients and pollutants. The Town of Queensbury finds that the occurrence of such nutrients and pollutants is increased by the presence of inadequately functioning septic systems proximate to water bodies. In addition, such septic systems are more likely to be a threat to public health with particularly acute impacts upon the general public through impairing and contaminating precious ecological resources of the Town of Queensbury and rendering drinking water unsafe. In determining the geographic scope of this article, the Town further finds that it is desirable and efficient to rely upon the zoning district boundaries of the Town of Queensbury Waterfront Residential (WR) Zone as properties within this zoning district are proximate to water bodies within the Town. As to water bodies not surrounded or adjacent to such zoning district, such properties are zoned in such a manner that has adequately protected and will continue to protect such water bodies and additional regulation is not currently needed in such areas at this time.

§ 137-4. Compliance required.

A. Applicability. This article shall apply to conveyances of real property located wholly or partially in the Waterfront Residential Zone, as defined in the Town Code, occurring on January 1, 2019, and thereafter.

B. Property transfer inspections.

   (1) Prior to any conveyance of real property in the Town of Queensbury Waterfront Residential (WR) Zone where the property utilizes an on-site wastewater treatment system (OWTS), the OWTS must be inspected by the Town of Queensbury Building and Codes Enforcement Office (herein referred to as the "Building and Codes Enforcement Office"). The inspection shall include a septic tank pump out by a NYSDEC registered septic hauler and all seepage pits and septic drainfield distribution boxes (D-box) accepting effluent from a septic tank must be uncovered and opened by the property owner or their agent prior to inspection. The property transfer inspection and pump out shall be arranged by the property owner as early in the conveyance of real property process as possible in order to obtain an accurate and timely assessment of the OWTS. Upon submission of a complete application to the Building and Codes Enforcement Officer and payment of the applicable fee, the property owner must make arrangements to schedule the inspection with no less than 48 hours' advance notice and shall coordinate with the septic hauler to be on site simultaneously. The cost of the inspection, as set forth in

the Town's Fee Schedule Ordinance, shall be paid to the Town of Queensbury prior to the inspection. Inspections must be undertaken within one year of the application or a renewal application with payment of the associated fee will be required. **[Amended 1-13-2020 by L.L. No. 1-2020]**

(2) No such conveyance shall take place subject to this article until and unless:

(a) The owner/seller has obtained from the Building and Codes Enforcement Office a letter of acknowledgement demonstrating satisfactory compliance with this section;

(b) The owner/seller has obtained a variance/waiver from the Town Board in accordance with this article; or

(c) The conveyance is exempt from the property transfer inspection requirements and the owner/seller complies with all applicable provisions for exemption set forth in this article.

(3) As used herein, the term "conveyance of real property" shall mean the transfer of the title of real estate, in the form of a deed or other legal instrument, whether or not recorded in the Office of the Warren County Clerk. It shall be violation of this article not to have the property inspected prior to the conveyance of real property.

(4) Upon satisfactory inspection in accordance with the protocol set forth in Subsection B(5) below, the Building and Codes Enforcement Office will issue to the property owner a letter of acknowledgment confirming that the OWTS is functioning properly.

(5) The OWTS inspection shall utilize the New York On-site Wastewater Treatment Training Network (OTN) materials, including the OTN System Inspection Request Form, Findings Worksheet and Site Report (Inspection Findings), all of which shall be available in the Building and Codes Enforcement Office. The following minimum standards shall apply to each inspection:

(a) All septic tanks and holding tanks must be within 250 gallons of the minimum volume requirement; minimum volume includes bedrooms, rooms used for sleeping, Jacuzzi tubs and garbage grinders; **[Amended 1-13-2020 by L.L. No. 1-2020]**

(b) All holding tanks shall be equipped with a float switch with a 50% level alarm, a 100% high-level alarm located in a conspicuous place to indicate when pump out is necessary and a water shut off device. A copy of pump out records shall be submitted during the inspection prior to conveyance of real property; **[Amended 1-13-2020 by L.L. No. 1-2020]**

(c) For an aerobic treatment system or enhanced treatment unit (ETU), the new owner must send a signed copy of an updated service contract to the Town within 30 days after the conveyance of real property.

(d) If the on-site wastewater treatment system is determined to be failing or inadequate, a written notice of violation will be issued. An approved compliance agreement to correct the violation must be obtained prior to conveyance of real property.

C. Exemption from property transfer inspection. The following conveyances of real property shall be exempt from the provisions of this article in the following situations and pursuant to the terms identified below: **[Amended 5-20-2019 by L.L. No. 5-2019]**

(1) The property to be sold or transferred will not be inhabited, and the new owner plans to demolish the existing structure and remove the OWTS within six months. In order to qualify for the exemption, a notarized affidavit must be submitted to the Building and Codes Enforcement Office stating that the dwelling will not be inhabited and that it will be demolished and the OWTS fully removed within six months. In addition, a check payable to the Town of Queensbury in the amount of $2,000 must accompany the notarized affidavit. Such funds will be held in a non-interest-bearing escrow account and will be released upon confirmation that demolition and removal have been timely carried out. Failure will result in forfeiture of the deposit pursuant to § 137-4C(6) unless an appeal to the Town Board is timely made pursuant to § 137-5, in which case the Town Board may grant an extension. **[Amended 1-13-2020 by L.L. No. 1-2020]**

(2) An OWTS inspection was not able to be completed prior to the conveyance of real property due to inclement weather. In order to qualify for the exemption, a notarized affidavit from the new property owner to complete the requisite OWTS inspection within six months of the date of the conveyance of real property, or June 1, whichever comes first, must be filed with the Building and Codes Enforcement Office. A check payable to the Town of Queensbury in the amount of $2,000 will be held in a non-interest-bearing escrow account and shall be released upon the completion of a satisfactory OWTS inspection from the Building and Codes Enforcement Office.

(3) The property to be sold or transferred contains an existing OWTS that does not comply with the provisions of this article, and the prospective purchasers and/ or the Seller wish to forgo an inspection in favor of installing an approved OWTS within six months of the transfer of property. In order to qualify for the exemption, a notarized affidavit must be submitted to the Building and Codes Enforcement Office stating that the existing OWTS will be replaced within six months from transfer of property. The affidavit must be accompanied by a site plan, including adequate detail to demonstrate that the replacement OWTS will comply with this article, together with a check payable to the Town of Queensbury in the amount of $2,000. Such funds will be held in a non-interest-bearing escrow account and will be released upon issuance of a certificate of compliance from the Building and Codes Enforcement Office.

(4) During the OWTS inspection, a failure of the septic system was determined.

Due to winter and frozen conditions, the repair to an existing OWTS could not occur or a new OWTS could not be installed before the conveyance of real property. In order to qualify for the exemption, a notarized affidavit from the new property owner to complete the installation or repair of the septic system within six months from the date of the conveyance of real property, or June 1, whichever comes first, must be filed with the Building and Codes Enforcement Office. A check payable to the Town of Queensbury in the amount of $2,000 will be held in a non-interest-bearing escrow account and shall be released upon the completion of the repair or installation of a new septic system and a satisfactory OWTS inspection from the Building and Codes Enforcement Office.

(5) There is record of the property's OWTS having passed Town inspection within the last three years.

(6) Failure to complete the inspection, obtain the permit or complete all repairs/ installations identified in the preceding subsections of this section within the time provided or any subsequent deadline established by the Building and Codes Enforcement Office will result in forfeiture of the moneys held in escrow, and the Town may use such funds toward abating the conditions caused by each such violation of this article.

D. Failure of OWTS. Failure of an existing OWTS occurs when the standards for lawful OWTS as set forth in Chapter 136 and this article are not met. While not exhaustive, some examples of a failing system include the following:

(1) Lack of a pre-treatment vessel (i.e., septic tank, aerobic treatment unit, ETU, etc.) prior to effluent discharge to any subsurface treatment (soil treatment area or absorption field);

(2) There is a discharge of effluent directly or indirectly to the ground's surface, with surface breakouts, ponding or saturated soils over the soil treatment area;

(3) Direct pipe surface discharge of grey water (into a dry well, over an embankment, into a roadside ditch or stream/tributary, etc.);

(4) A dye test results in the presence of dye on the ground surface or adjacent/ downstream water body;

(5) There is a backup of sewage into the home, building, septic tank or facility as a result of a septic tank overload or malfunction, or a clogged soil treatment area;

(6) The septic tank requires pumping more than four times per year and/or sewage is observed flowing back into the septic tank from the secondary treatment area during pump out;

(7) Presence of a metal septic tank that is undersized and/or corroded;

(8) A cesspool, defined as a covered hole or pit used to receive untreated sewage

from a house or building constructed as a primary source of wastewater disposal;

(9) A holding tank that discharges effluent to surrounding subsurface areas;

(10) No septic tank, seepage pit, enhanced treatment unit or soil treatment area (STA) shall be permitted to discharge to any natural outlet or adjoining property.

E. Access to parcel for inspection. On properties for which an OWTS inspection has been requested by the owner or owner's agent pursuant to this article, the Building and Codes Enforcement Office shall be permitted by the property owner to make a physical inspection of the lands and premises in order to determine compliance with this article.

§ 137-5. Review.

Appeals from determinations of the Building and Codes Enforcement Office and/or requests for variance/waivers from the provisions of this article must be sought from the Town of Queensbury Town Board as the local Board of Health within 60 days.

A. Forms for such Appeals and/or requests for variance and waivers will be made available to the public in the Building and Codes Enforcement Office. Such forms must be properly filled out and must be submitted to the Building and Codes Enforcement Office with payment of the applicable fee as established by the Town Board.

B. In evaluating appeals from determinations of the Building and Codes Enforcement Office, the Town Board may consider whatever information it deems relevant, including any evidence or information submitted by the applicant and any information obtained from the Building and Codes Enforcement Office and/or Town Engineer. In the event additional information is needed, the Town Board may direct a subsequent inspection of the OWTS at issue, in which case the applicant will not be required to make any additional inspection payments.

C. In regard to any request for variance or waivers, such applications will be governed by the procedure set forth in Town Code Section § 136-44.1C(1) through (3). The Town Board should take into consideration all matters it deems relevant, including the age of the OWTS, whether it appears to be functioning, its proximity to any water body, its age, the circumstances concerning the request for variance or waiver and the hardship to the property owner in the event no variance or waiver is granted.

D. The above remedies shall be exhausted prior to any judicial review.

§ 137-6. Notice of violation; penalties for offenses.

If a property owner fails to complete an inspection required by this article, or to allow access to the property for the required inspection, or if the property owner fails to comply with any other provision of this article, a notice of violation may be issued by the Building and Codes Enforcement Office mandating the compliance with the inspection

requirements.

A. In the event the property owner in its capacity as grantor was issued a notice of violation and such violation continues for a period of six months, the current property owner (or grantee) too shall be deemed to be in violation of this article and may be subject to enforcement proceedings.

B. An offense against any provision of this article shall constitute a violation, punishable by a fine not exceeding $950, or imprisonment for a term not exceeding 15 days, or both. Each week such violation continues after notification to the person in violation shall constitute a separate violation.

Legend

- NYS FOREST LANDS
- 75 Ft. Waterfront Setback Overlay
- I-87 500 Ft. Residential Buffer
- Office Zone Residential Development Setback*
- Travel Corridor Overlay District
- Mobile Home Overlay District
- Design Guideline Areas
- Underground Utility Overlay Zone

Zoning Districts

- Land Conservation 42 Acre (LC-42A)
- Land Conservation 10 Acre (LC-10A)
- Parkland Recreation 42 Acre (PR-42A)
- Parkland Recreation 10 Acre (PR-10A)
- Rural Residential 5 Acre (RR-5A)
- Rural Residential 3 Acre (RR-3A)
- Waterfront Residential (WR)
- Moderate Density Residential (MDR)
- Neighborhood Residential (NR)
- Planned Unit Development (PUD)
- Main Street (MS)
- Office(O)
- Recreation Commercial (RC)
- Neighborhood Commercial (NC)
- Commercial Moderate (CM)
- Commercial Intensive (CI)
- Commercial Intensive Exit 18 (CI-18)
- Enclosed Shopping Center (ESC)
- Commercial Light Industrial (CLI)
- Heavy Industry (HI)

** Office Zone Residential Development Setback distance is 600 ft. along Bay Rd. and 300 ft. along West Mtn. Rd.*

LAKE GEORGE

FORT ANN

KINGSBURY

LAKE LUZERNE

GLENS FALLS

MOREAU

Lake George

Lake George Village

ADIRONDACK PARK

Hudson Falls

South Glens Falls

Fort Edward

HUDSON RIVER

WASHINGTON COUNTY

WARREN COUNTY

SARATOGA COUNTY

This map was produced by the Town of Queensbury Community Development Department and is for GENERAL REFERENCE PURPOSES ONLY. Data contained on this map was acquired by the Town of Queensbury from various sources to be used for DISPLAY PURPOSES ONLY. This map and the information displayed is provided "AS IS" and the Town of Queensbury makes no claim of the positional accuracy of the data represented on this map. The Town of Queensbury does not accept liability for any damages or misrepresentation as a result of reliance on the data displayed in this map.

This map contains Zoning for the properties shown. Specific questions regarding Zoning of a property shown on this map should be directed to the Town of Queensbury's Zoning Administrator.

N W E S

2,000 1,000 0 2,000 4,000 6,000 Feet

500 250 0 500 1,000 1,500 Meters

Map Produced by Town of Queensbury GIS: February, 2021

Town of Queensbury, New York

ZONING MAP

Community Development Department
742 Bay Road
Queensbury, New York
12804
www.queensbury.net

Appendix M: Queensbury Septic Forms

Property Transfer Sewage Disposal Information Form

Town of Queensbury
742 Bay Road, Queensbury, NY 12804
P: 518-761-8256 www.queensbury.net

Date: _____

_____
(Name of Owner/Applicant)

Re: Onsite Wastewater Treatment System Inspection Information Request for:

_____
(Site Address for Inspection)

Thank you for requesting an inspection for the onsite wastewater treatment system (OWTS) located on the property referenced above. We look forward to completing a thorough inspection for you. You can help us do the best job possible by providing some advanced information about the site. Prior to our inspection, we request this **completed application**, a **site map indicating the location of the septic components** and confirmation the pre-inspection preparation (see the last page of this packet) will be completed *prior to our arrival.*

Enclosed is a **Septic System Inspection Information** form, which must be completed, signed and returned to this office, with the appropriate fee(s) and documentation, prior to scheduling an inspection.

Please note the Town of Queensbury's fee for this service is $275. Be advised that all fees must be paid prior to scheduling the inspection. **We require 48 hours notification prior to scheduling the inspection.**

If the purchaser is requesting an **exemption**, please submit this application along with a **notarized letter** stating the septic system will be **inspected or repaired/replaced within 6 months** from the date of the Property Conveyance or **June 1st of the current, or following year** (whichever comes first), a map locating the septic system and **payment totaling $2275** ($2000 refundable deposit plus $275 permit fee). The deposit is forfeited if the owner fails to complete the repairs or installation as stated above.

If you have any questions, please call.

Phone: (518) 761-8256 Email: kated@queensbury.net

Thank you.

Sincerely,

David Hatin, Director
Building and Code Enforcement
Town of Queensbury

Town of Queensbury
742 Bay Road, Queensbury, NY 12804
P: 518-761-8206 or 518-761-8205
www.queensbury.net

Office Use Only

Permit #: _____

Fee: _$_____

Invoice #: _____

S□□ A□□ □S□□SAL S□ST□□ □NS□□CT□□N □NF□R□ AT□□N
□ndividual Residential □ astewater Treatment System

CONTACT INFORMATION (please print legibly or type and include an email address)

Property and Owner Information: *(Please attach property survey or tax parcel map)*

Property address for inspection: _____

Tax map number: _____

Property owner: _____

Mailing Address (c/s/z): _____

Cell #: _____ Land Line #: _____

Email: _____

Applicant (**if different than above):** _____

Mailing Address (c/s/z): _____

Cell #: _____ Land Line #: _____

Email: _____

☐ Proposed Owner ☐ Realtor ☐ Attorney ☐ Other (explain:_____)

Septic Contractor: _____

Mailing Address (c/s/z): _____

Cell #: _____ Land Line #: _____

Email: _____

Reason for Inspection Request:

☐ On the market ☐ Future listing ☐ Sale Pending ☐ Deed Transfer ☐ Other: _____

HOUSEHOLD INFORMATION

****PLEASE SEE SEPARATE PAGE FOR EXEMPTIONS****

Bedrooms _____ # Bathrooms _____ # Kitchens ____ Jacuzzi tub(s) ____ Garbage grinder ____

Onsite Wastewater Treatment System:

How many systems are on the property? _____

Year system(s) installed: Tank _____ Size of Septic Tank _____

Type of Absorption System: _____

Are all system components wholly within the property boundaries? ☐ Yes ☐ No

Are system plans available? ☐ Yes ☐ No

Does the system(s) serve multiple properties? ☐ Yes ☐ No

If yes, describe _____

Maintenance:

Service agreement? ☐ Yes ☐ No; If yes, business' name _____

Date of last inspection _____ N/A ☐ Date tank last pumped _____ N/A ☐

Frequency of pumping _____ N/A ☐

List known repairs/replacements, with dates:

Date	Type of Repair/Replacement
_____	_____
_____	_____
_____	_____

Operation:

System problems?	☐ **Yes**	☐ **No**
♦ Sewage odors?	☐ Yes	☐ No
♦ Direct surface discharge(s)?	☐ Yes	☐ No
♦ Back-up of toilets?	☐ Yes	☐ No
♦ Back-up of any other fixtures? (e.g. slow drains)	☐ Yes	☐ No
♦ Seasonal ponding or breakout of leach field?	☐ Yes	☐ No

Statement of Acceptance of Conditions:

I agree to:

- Ensure that the septic tank(s), distribution box (es), and/or seepage pit(s), if any, will be uncovered prior to the requested inspection time;
- Have a septage hauler on site (to pump the tank ***after**** the inspector verifies flow from fixtures);
  - *Tank must be pumped in presence of inspector*
- Have an authorized representative present at the site;
- Allow the inspector to verify information provided above, and to conduct an inspection of the indicated onsite wastewater treatment system(s), including all system components and interior plumbing in crawl spaces and basements.

To the best of my knowledge, the information provided above is accurate and I acknowledge the following:
After 1 year from date of submission and there is no activity on this permit, the permit will expire and will be subject to submission of a renewal application and payment of the renewal fee based on the current fee schedule. All fees must be paid PRIOR TO SCHEDULING any inspections. In addition, if the permit is withdrawn 20% of the fee is retained by the Town of Queensbury.

Signature of property owner or authorized agent:

Affiliation: ☐ owner ☐ agent ☐ other: _____

Please print name: _____

Signature: _____ Date: _____

<u>Prior to scheduling with the Town of Queensbury, you MUST:</u>

1. Schedule a sewage hauler to be on site to pump tank while inspector is on site. Hauler should arrive 30-45 minutes after scheduled time with the Town of Queensbury's Code Enforcement Officer.

2. Expose inlet and outlet of septic tank, and/or pump station, expose d-box, expose any seepage pit covers.

3. Excavate test hole in leach field if there is no d-box.

□□ □□ □T□□N C□N□ □T□□N □ □T□□NS

□ue to one of the conditions listed below□□am requesting an e□emption from the Septic □nspection □pon □roperty Transfer by the Town of □ueensbury□

□L□AS□ C□ □ □S□ □NL□ □N□ C□N□□T□□N □□L□ □F □□□ AR□ R□□□□ST□N□ A □ A□□□R

☐ The property to be sold or transferred will **not be inhabited**, and the new owner plans to **demolish the e□isting structure**. In order to qualify for the exemption, a notarized affidavit must be submitted to the Building and Codes Enforcement Office stating that the dwelling will not be inhabited and that it will be demolished with **no immediate plans to rebuild** or the dwelling will not be inhabited, it will be demolished and rebuilt, in which case the affidavit shall be accompanied by a site plan, including adequate detail to demonstrate a lawful OWTS, together with a check payable to the Town of Queensbury in the amount of $2,000. Such funds will be held in a non-interest-bearing escrow account and will be released, in the former case, upon issuance of a demolition permit and, in the latter case, upon issuance of a certificate of compliance from the Building and Codes Enforcement Office. **□f the □roperty Transfer inspection is not completed within that 6 □si□□month timeframe□ the □2000 will be forfeited.**

☐ An OWTS inspection was not able to be completed prior to the conveyance of real property due to **inclement weather**. In order to qualify for the exemption, a notarized affidavit from the new property owner to complete the requisite OWTS inspection within six months of the date of the conveyance of real property, or June 1, whichever comes first, must be filed with the Building and Codes Enforcement Office. A check payable to the Town of Queensbury in the amount of $2,000 will be held in a non-interest-bearing escrow account and shall be released upon the completion of a satisfactory OWTS inspection from the Building and Codes Enforcement Office. **□f the □roperty Transfer inspection is not completed within that 6 □si□□month or □une 1st timeframe□the □2000 will be forfeited.**

☐ The property to be sold or transferred contains an existing OWTS that does not comply with the provisions of this article, and the prospective purchasers and/or the Seller wish to **forgo an inspection in favor of installing an approved □□ TS** within six months of the transfer of property. In order to qualify for the exemption, a notarized affidavit must be submitted to the Building and Codes Enforcement Office stating that the existing OWTS will be replaced within six months from transfer of property. The affidavit must be accompanied by a site plan, including adequate detail to demonstrate that the replacement OWTS will comply with this article, together with a check payable to the Town of Queensbury in the amount of $2,000. Such funds will be held in a non-interest-bearing escrow account and will be released upon issuance of a certificate of compliance from the Building and Codes Enforcement Office. **□f the □roperty Transfer inspection is not completed within that 6 □si□□month timeframe□the □2000 will be forfeited.**

☐ During the OWTS inspection, a **failure of the septic system was determined**. Due to **winter and fro□en conditions, the repair to an e□isting □□ TS could not occur or a new □□ TS could not be installed before the conveyance of real property**. In order to qualify for the exemption, a notarized affidavit from the new property owner to complete the installation or repair of the septic system within six months from the date of the conveyance of real property, or June 1, whichever comes first, must be filed with the Building and Codes Enforcement Office. A check payable to the Town of Queensbury in the amount of $2,000 will be held in a non-interest-bearing escrow account and shall be released upon the completion of the repair or installation of a new septic system and a satisfactory OWTS inspection from the Building and Codes Enforcement Office. **□f the □roperty Transfer inspection is not completed within that 6 □si□) month or □une 1st timeframe, the $2000 will be forfeited.**

☐ There is a record of a septic system inspection upon property transfer permit and inspection completed and passed within the last three years. Please provide a copy of this record.

□L□AS□ R□A□ N□T□C□ THO **R**OUGH **L**Y:

Failure to complete the inspection, obtain the permit or complete all repairs□installations identified in the preceding subsections of this section within the time provided or any subsequent deadline established by the □uilding and Codes □nforcement □ffice will result in forfeiture of the moneys held in escrow, and the Town may use such funds toward abating the conditions caused by each such violation of this article.

□nspections must ta□e place within one □1) year of submission of a completed application. □nspections scheduled to ta□e place after the one year period will be sub□ect to submission of a renewal application and payment of the renewal fee based on the current fee schedule.

*****□NL□ S□□N T□ □S** PA**G**E **□F** YOU **AR□ □□T□N□ F□R A** W **A**IVE **R R□□□□ST**!!***

I have read and understand the above notice regarding the expectations and possible forfeiture of moneys submitted to the Town of Queensbury for an exemption request.

Seller:
Print Name: _____

Sign Name: _____ Date: ____

Buyer:
Print Name: _____

Sign Name: _____ Date: ____

Building & Code Enforcement
742 Bay Road, Queensbury, NY 12804-5902
P: 518-761-8256 www.queensbury.net

Property Owner Checklist for Property Transfer Law Inspection

The following items must be completed prior to the inspection date or the inspection will be cancelled and rescheduled when all items have been accomplished:

____1. All paper work submitted and fees paid

____2. Water is on in the structure

____3. All water fixtures tied to the plumbing system are accessible for flow testing

____4. The inlet and outlet cover of the septic tank or holding tanks are exposed and removed

____5. The distribution box is exposed and cover is open for inspection

____6. Any seepage pits are exposed and the cover(s) are open for inspection

____7. Any pump stations are open and covers expose for inspection

____8. Any grinder pumps are exposed and accessible for inspection

____9. Septic hauler is scheduled to pump septic tanks or holding tanks after water flow test is complete

____10. A plot plan of septic tank, distribution box, leech field or seepage pits is completed with measurements off structure prior to end of inspection

____11. Provide maintenance Contract if you have an Enhanced Treatment Unit (ETU) septic tank

____12. All Floats for pump stations and holding tanks must be accessible for testing

____13. Alarm panels need to be accessible for testing and free of trouble alarms

____14. Any access covers or pump stations access covers below 12” will require extensions to be installed at time of inspection

Please assure that all applicable items above are completed prior to the inspection date or the inspection will be cancelled and rescheduled to a later date

RESOLUTION NO 1 JANUARY 9, 2017

ADOPT FINDINGS STATEMENT TO TOWN-WIDE GENERIC ENVIRONMENTAL IMPACT STATEMENT (TWGEIS)

Motion by: Councilman Dunn **Seconded:** Councilwoman Ruisi
Vote Adopted: Ayes-5 nays-0

WHEREAS the Town Board of the Town of Malta has prepared an update to the Town-Wide Generic Environmental Impact Statement (2006 TWGEIS) evaluating the cumulative impacts of growth on the Town's natural and built environment; and

WHEREAS the Town Board of the Town of Malta prepared a Draft Supplemental Environmental Impact Statement (DSEIS), subsequently determined the DSEIS to be complete for purposes of commencing public review on June, 15, 2015, and issued the required notices and intent to conduct a public hearing on the DSEIS; and

WHEREAS the Town Board of the Town of Malta held a public hearing on the DSEIS July 6, 2015, and accepted public comment on the DSEIS until July 24, 2015; and

WHEREAS the Town Board of the Town of Malta accepted a Final Supplemental Environmental Impact Statement at its June 20, 2016 meeting; and

WHEREAS subsequent to concerns raised an amended Final Supplemental Environmental Impact Statement has been drafted to address these concerns, and

WHEREAS the Town Board of the Town of Malta reviewed comments from the public and involved and interested agencies, and prepared a Final Supplemental Environmental Impact Statement ("FSEIS") addressing the substantive comments; and

WHEREAS the Town Board of the Town of Malta (1) adopted the Notice of Completion of FSEIS on November 14, 2016, (2) caused a copy of the Notice of Completion and the FSEIS in the Environmental Notice Bulletin (625 Broadway, Rm. 538, Albany, NY 12233-1750) for publication therein, (3) posted copies of the Notice of Completion and the FSEIS on the official website of Town of Malta; and (4) distributed copies of the Notice of Completion and the FSEIS to the Involved and the Interested Agencies as identified on the notice and as required by SEQRA; and

WHEREAS the Town Board of the Town of Malta has prepared a *Statement of Findings, Supplemental Environmental Impact Statement to the Malta Townwide Generic Environmental Impact Statement*; now, therefore, it is

RESOLVED that Town Board of the Town of Malta adopts the *Statement of Findings, Supplemental Environmental Impact Statement to the Malta Townwide Generic Environmental Impact Statement* in the form annexed hereto; and it is further

RESOLVED that a copy of the *Statement of Findings* shall be provided to the Environmental Notice Bulletin (625 Broadway, Rm. 538, Albany, NY 12233-1750) for publication therein, and that copies of the same shall be posted on the official website of Town of Malta distributed to the Involved and the Interested Agencies as identified on the notice and as required by SEQRA.

RESOLUTION NO 209 November 14, 2016

RESOLUTION ACCEPTING FINAL SEIS AS COMPLETE

Motion by: Councilman Hartzell **Seconded:** Councilman Warner
Vote: Ayes-5 Nays-0

WHEREAS the Town Board of the Town of Malta has prepared an update to the Town-Wide Generic Environmental Impact Statement (2006 TWGEIS) evaluating the cumulative impacts of growth on the Town's natural and built environment; and

WHEREAS the Town Board of the Town of Malta prepared a Draft Supplemental Environmental Impact Statement (DSEIS), subsequently determined the DSEIS to be complete for purposes of commencing public review on June, 15, 2015, and issued the required notices and intent to conduct a public hearing on the DSEIS; and

WHEREAS the Town Board of the Town of Malta held a public hearing on the DSEIS July 6, 2015, and accepted public comment on the DSEIS until July 24, 2015; and

WHEREAS the Town Board of the Town of Malta accepted a Final Supplemental Environmental Impact Statement at its June 20, 2016 meeting; and

WHEREAS subsequent to concerns raised an amended Final Supplemental Environmental Impact Statement has been drafted to address these concerns, and

WHEREAS the Town Board of the Town of Malta reviewed comments from the public and involved and interested agencies, and prepared a Final Supplemental Environmental Impact Statement ("FSEIS") addressing the substantive comments;

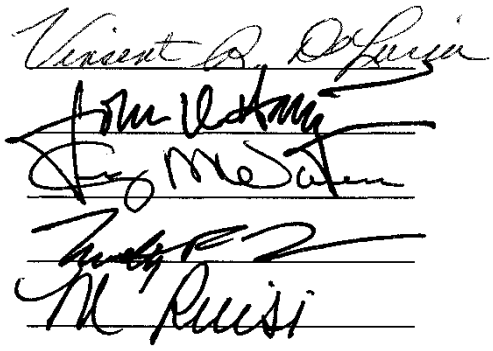
NOW, THEREFORE, IT IS RESOLVED that the Town Board of the Town of Malta determines that the November 14, 2016 version of the amended FSEIS adequately address the comments received from the

public; and

IT IS FURTHER RESOLVED that the Town Board of the Town of Malta adopts the Notice of Completion of FSEIS, and that a copy of the Notice of Completion and the FSEIS shall be provided to the Environmental Notice Bulletin (625 Broadway, Rm. 538, Albany, NY 12233-1750) for publication therein; and

IT IS FURTHER RESOLVED that copies of the Notice of Completion and the FSEIS shall be posted on the official website of Town of Malta; and

IT IS **FURTHER RESOLVED** that a copy of Notice of Completion and the FSEIS shall be distributed to the Involved and the Interested Agencies as identified on the notice and as required by SEQRA.



Appendix N: NYS DEC Fertilizer Fact Sheet

Buying Fertilizer?

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

LOOK FOR THE ZERO

Protect Your Waters

PHOSPHORUS-FREE MEANS...

Zero pollution –

Phosphorus is one of the leading causes of water pollution. Even if you live far from a water body, excess phosphorus from your lawn can wash off and pollute lakes and streams, harming fish and ruining boating and swimming. More than 100 water bodies in the state cannot be used for drinking, fishing or swimming because they contain too much phosphorus.

Zero waste –

Why pay for a chemical your lawn doesn't need? Generally, only newly established lawns or those with poor soil need phosphorus. Phosphorus applied to a lawn that doesn't need it won't be used and can cause water pollution. Do a soil test if you are unsure.

Zero hassle –

It's against the law to use phosphorus on lawns that don't need it. (New York State Environmental Conservation Law, article 17, title 21 and Agriculture and Markets Law § 146-g) Check local laws, too–some municipalities have stricter laws about selling and using lawn fertilizers.

PHOSPHORUS CAN CAUSE SERIOUS PROBLEMS

Excess phosphorus in freshwater lakes and ponds can cause algae overgrowth, with serious impacts to the environment and public health:

- Heavy mats of algae deplete the water of oxygen that fish need to survive.
- Algae overgrowth makes water recreation unpleasant and potentially harmful.
- Algae growth may cause carcinogens to form in drinking water during chlorination.
- Phosphorus feeds blooms of toxic algae, creating health risks to people and animals.

Does the law apply to...?

- *Pesticide/fertilizer combination products ("weed and feed")* **– YES, when these products contain over 0.67% phosphorus**
- *Organic phosphorus fertilizer (such as bone meal)* **– YES**
- *Agricultural fertilizer* **– no**
- *Fertilizer for trees, shrubs or gardens* **– no**
- *Compost* **– no**

Fertilizing Your Lawn...

DO NOT:

- Use lawn fertilizer that contains phosphorus unless you are establishing a new lawn, or a soil test shows that your lawn does not have enough phosphorus.
- Apply any lawn fertilizer December 1 - April 1.
- Apply fertilizer on sidewalks, driveways or other impervious surfaces. If fertilizer spills onto these surfaces, you MUST sweep it up to prevent it from washing into drains or waterways. Do not hose it off.
- Apply lawn fertilizer within 20 feet of any water body unless...
  - there is at least a 10-foot buffer of shrubs, trees, or other plants between the area you are fertilizing and the water,

  OR
  - fertilizer can be applied no closer than 3 feet from the water using a device with a spreader guard, deflector shield or drop spreader.

...the Right Way

Look for the zero!

Before buying, check the fertilizer bag for a set of three numbers showing the percentage of nitrogen, phosphorus and potassium. Buy a bag with a "0" in the middle.

What should I see at the store?

Retailers who sell fertilizer must display phosphorus-containing fertilizer separately from phosphorus-free fertilizers and post a sign near the display.

Test your soil

If you think your lawn might need extra phosphorus, test your soil. Tests cost $10-$20.
There are several options:

- Have testing done through your local Cornell Cooperative Extension office.
- Find a commercial laboratory that tests soil.
- Use a home test kit. These tests tend to be less accurate and do not come with fertilizer recommendations.

For more information:

General information on the nutrient runoff law:
http://www.dec.ny.gov/chemical/67239.html

Frequently asked questions about lawn fertilizer:
http://www.dec.ny.gov/chemical/74885.html

Green lawns and gardens:
http://www.dec.ny.gov/public/44290.html

Blue-green harmful algal blooms:
http://www.dec.ny.gov/chemical/77118.html

Local Cornell Cooperative Extension offices:
http://cce.cornell.edu/learnabout/pages/local_offices.aspx

Contact Information:

New York State Department
of Environmental Conservation
Division of Water
625 Broadway, Albany, NY 12233-3508
518-402-8086
DOWinformation@dec.ny.gov

CONNECT WITH NYSDEC

Appendix O: Model Inspection Form

Model Contact Form

On Municipal letterhead

Property owner address

Dear Property Owner,

Clean drinking water is the most important natural resource known to humankind. Our survival depends on it.

The Watervliet Reservoir, owned by the City of Watervliet and is the city's sole source of drinking water. It also is the main source of drinking water for the Guilderland Water District. The Town of Guilderland has an agreement with the City of Watervliet to withdraw as much as 5 million gallons a day from the reservoir. The watershed of the reservoir is a 113-square mile basin drained by the Norman's Kill, Bozen Kill and Black Creek. Chances are, if you are on Guilderland municipal water, the source of your drinking water is the Watervliet Reservoir.

The Watervliet Reservoir was constructed in 1915 by a dam built on the Norman's Kill. After the construction of the water supply, New York State Department of Health (NYSDOH) imposed Watershed Rules and Regulations in 1917, established to protect public health by regulating certain activities that may take place within the reservoir's watershed. A copy of the Watershed Rules and Regulations may be accessed at the NYSDOH website, https://regs.health.ny.gov/content/section-1002-city-watervliet

The Watershed Rules and Regulations contain setback and draining requirements for specific potentially harmful activities. The town of Guilderland and City of Watervliet depend on and trust landowners within the watershed to be good stewards of the land, to help keep drinking water for thousands of people that rely on it every day.

Per the watershed regulations, the board of water commissioners of the city of Watervliet has the authority, and is required, to make regular and thorough inspections of the reservoir, streams and lands with the reservoir's drainage area. Thus, in order to protect public health and increase the public confidence in the health of the drinking water, periodic inspections of certain operations within the watershed are a necessity.

In the coming weeks, a representative of the Town of Guilderland or City of Watervliet will contact you to discuss a visit. Our goal is to work in partnership with you to ensure that activities on your land are not impacting water quality. We may also bring along a representative of the Albany County Soil and Water Conservation District, United States Department of Agriculture who can share some best practices and information on funding opportunities to improve or correct a potential area of concern. Their presence is helpful should the inspection identify an area of concern or violation – as staff from these agencies can aid, and in some cases assist property owners to obtain grants to abate violations or potential hazards.

We are contacting you to schedule an onsite inspection to ensure the continued protection of drinking water within the Watervliet Reservoir. We have identified your property as being within the watershed

DRAFT

for the reservoir and subject to Watershed Rules and Regulations governing certain uses and activities such as

- septic systems,
- cesspools,
- chemical or petroleum bulk storage,
- stables,
- barnyards,
- poultry houses or yards,
- manure piles,
- compost heaps,
- Landfills,
- quarries,
- junk yards or recycling operations, and
- hazardous materials storage

Thank you for joining us to help protect our resident's drinking water. We look forward to partnering with you to ensure the town has the safest, highest quality municipal water supply in New York. Please contact me at your earliest convenience to schedule a site visit.

Thank you,

Town Code Enforcement

DRAFT

Appendix P: Great Flats Intermunicipal Agreement

AN AGREEMENT

FOR

INTERMUNICIPAL COOPERATION FOR AN AQUIFER PROTECTION PROGRAM

THIS AGREEMENT, dated the _____ day of _____, 1991, among the Towns of Glenville, Niskayuna, Rotterdam, the City of Schenectady, and the Village of Scotia, all municipal corporations of the County of Schenectady, New York.

W I T N E S S E T H:

WHEREAS, the drinking water for the residents of the City of Schenectady, the Village of Scotia, and the Towns of Rotterdam, Glenville and Niskayuna, is drawn solely from the wellfields of the "Great Flats" Aquifer, also known as the Schenectady Aquifer; and

WHEREAS, on the 27th day of February, 1985, the Administrator of the United States Environmental Protection Agency designated the Schenectady Aquifer as the sole drinking water source pursuant to Section 1424[e] of the Safe Drinking Water Act, PL 93-523, thereby acknowledging the vital role of the Schenectady Aquifer to the residents of Schenectady County; and

WHEREAS, several studies have been undertaken, the most recent such study dated February, 1989 and entitled "Schenectady Aquifer Protection Zones, Final Report" to define the hydrogeologic characteristics of the Schenectady Aquifer and which identify the Schenectady Aquifer's high susceptibility to risks of contamination from the release of toxic or

hazardous substances; and

WHEREAS, the Mayors of the City of Schenectady and the Village of Scotia, and the Supervisors of the Towns of Rotterdam, Glenville and Niskayuna, have agreed to jointly pursue the creation of the uniform rules and regulations to protect the Schenectady Aquifer from uses and activities which threaten the quality and/or quantity of the water drawn from the Schenectady Aquifer; and

WHEREAS, the Mayors of the City of Schenectady and the Village of Scotia, and the Supervisors of the Towns of Rotterdam, Glenville and Niskayuna, have proposed the "Schenectady Intermunicipal Watershed Rules and Regulations for Protection from Contamination of the Public Water Supplies Drawing from the Schenectady Aquifer"; and

WHEREAS, the Mayors of the City of Schenectady and the Village of Scotia, and the Supervisors of the Towns of Rotterdam, Niskayuna, and Glenville recognize that a long-term and ongoing commitment of resources which would enable, but not be limited to, aquifer studies, data collection and monitoring, and obtaining necessary technical assistance, acquiring properties, providing public education, and assisting in local administration of the Intermunicipal Watershed Rules and Regulations, are elements of an Aquifer Protection Program; and

WHEREAS, the parties acknowledge that it is only through a cooperative multi-jurisdictional program and the creation of an Intermunicipal Watershed Rules and Regulations Board, that an effective Aquifer Protection Program can be assured.

NOW, THEREFORE, in consideration of the mutual covenants and agreements contained herein, and in the spirit of cooperation, it is hereby

agreed by and between the parties as follows:

SECTION I. INTERMUNICIPAL WATERSHED RULES BOARD

An Intermunicipal Watershed Rules and Regulations Board [hereinafter "the Board"] is hereby created for the purposes and duties as hereinafter enumerated. Said Board shall be a joint cooperative venture in conformance with Article 5G of the General Municipal Law, with a membership consisting of the Supervisors of the Towns of Glenville, Niskayuna and Rotterdam, and the Mayors of the City of Schenectady and the Village of Scotia, or a representative designated by the respective Town, City or Village to act in the place of the Supervisor or Mayor.

The Board shall elect one of its members to serve as the chairperson thereof. A quorum of the Board shall consist of at least three [3] members for the transaction of business. The Board may delegate to one or more of its members such powers and duties as it sees fit. The Board may appoint such agents or consultants as it shall deem necessary, each of whom shall perform such duties and shall receive such compensation, if any, as the Board shall determine. The Board members shall serve without pay or any other compensation.

Meetings may be called by any member of the Board upon written notice of at least seven [7] days to the other members. The Board shall meet at least once annually to review and approve the annual operating budget and the annual report to the Commissioner of Health. The concurring vote of a majority of the members of the Board shall be necessary to approve any action of the Board, with the exception of the acquisition of real property which shall require a unanimous vote of approval by the Board as described in Section V.

All actions of the Board shall be subject to the adoption of a resolution setting forth the decision of the Board and the vote thereon. All meetings shall be at a mutually convenient time and place. The Board shall keep a record of all of its proceedings. The Board will operate under Roberts Rules of Orders [last revised] or such other rules and regulations of procedures as the Board may adopt.

The Commissioner of the Schenectady County Department of Planning, or the Commissioner's designated representative, shall serve in a technical advisory capacity to the Board.

SECTION II. DURATION

The term of this Agreement shall be for a period of five [5] years from the date of this Agreement, to be renewable by the parties upon such terms and conditions as they may agree upon. The terms and conditions of this Agreement may be amended at any time subject to approval of all members of the Board.

The terms and conditions of this Agreement with all the amendments then in effect, shall automatically be renewed for a five [5] year period unless, at least one [1] year prior to the end of its term, one of the parties notifies the other parties in writing of its intention to terminate at the end of the term.

In the event that one or more of the parties elects to terminate participation in the Aquifer Protection Program, and the remaining members of the Board elect to continue the program, any assets previously acquired by the Board shall continue to be held for the purposes of the Board and shall not be disposed of until such time as all Board members mutually agree.

In the event that the election to terminate participation in the Aquifer Program is exercised by a sufficient number of Board members to result in the dissolution of the Program, any acquired assets which the Board members agree no longer serve the purposes for which the Board was created, may be disposed of only by unanimous agreement of all past and present Board members.

The proceeds derived from the disposition of such assets shall be returned to the parties in the following order:

1. In accordance with the relative contribution each municipality made to the purchase of a particular asset, if such determination is possible; and

2. In the event that the municipality's actual contribution cannot be determined, in accordance with the funding formula set forth in Section IV. of this Agreement.

However, no municipality will receive a pro-rata distribution of the proceeds of the disposition of any assets if that municipality elected to terminate its participation in the Aquifer Protection Program prior to the acquisition of that asset by the Board.

Additionally, the liabilities, if any, of the Aquifer Protection Program as limited by Section IV. of the Agreement, and including those which continue or cannot be satisfied within the term of this Agreement or any renewals thereto, are the joint obligations of the parties herein. These obligations shall be paid by the parties according to the formula set forth in Section IV. of this Agreement. However, any parties which have elected to terminate their participation in the Aquifer Protection Program shall not be responsible for any liabilities incurred by the Program after their election to terminate that are not proximately related to the Board's activities while the municipality was a Board member.

SECTION III. INDEPENDENCE

It is the intention of this Agreement to allow the Board to make decisions and raise funds to accomplish the goals set forth in the preamble of this Agreement. This Agreement shall be considered the enabling and contractual basis to allow the Board to provide financing to plan for and implement an Aquifer Protection Program for said municipalities, except as so limited by the financing review procedures set forth in Section IV.

SECTION IV. FINANCING

A. Formula For Municipal Contributions:

The formula for equitably providing for and allocating revenues, discharging liabilities and equitably allocating and financing any and all capital and operating costs necessary to accomplish the goals set forth in the preamble to this Agreement shall be based upon the average annual water usage of each municipality as a percentage of the total amount of water drawn from the aquifer annually. The parties agree to use this formula as set forth in Attachment "A" hereto, in determining the amount of revenues each municipality shall contribute to the annual operating budget of the Board.

B. Annual Budget:

The Board shall prepare an annual budget which shall be based upon and designed to achieve the goals and objectives set forth in the preamble to this Agreement, and shall identify any expenditures anticipated during the subsequent twelve [12] month operating period. Such annual budget, and any amendments that may be deemed necessary throughout the operating period, shall be approved by a resolution of the Board. Prior to adoption, each member of the Board shall submit the annual budget, and any amendments, to their respective municipal

Boards for review and approval as set forth below. Expenditures by the Board and fiscal management practices the Board exercises shall be in compliance with the requirements of the New York State Department of Audit and Control and general accounting procedures.

C. Financing Review Procedure:

The proposed annual budget adopted by the Board shall be submitted to each municipality, so that the municipality may vote on the amount of revenues to be contributed to the annual operating budget of the Board. The proposed contribution figure to be submitted to the Municipal Board shall be determined by the formula set forth herein.

In any event no municipality shall be liable for any of the Board's expenditures until the contribution figure for the annual budget has been approved by that municipality.

The total amounts contributed by all municipalities shall represent the final operating budget figure for the year. The Board shall not in any event incur debt or expend money in excess of the annual budget amount as finally approved.

In the event the Board finds it necessary to expend money in excess of the approved annual budget amount, the Board must submit the proposed additional expenditures for approval to each municipality. This proposal shall be considered to be an amendment to the annual budget, and as such shall go through the same financing review procedure set forth herein.

D. Finance Officer:

The Board shall appoint the treasurer of one of the municipalities to be the Financial Officer to the Board. The Financial Officer shall serve for one [1] term of the Agreement and thereafter this responsibility shall be rotated

to each of the participating municipalities in turn for as long as the Agreement is in affect. The Financial Officer shall have custody of all funds and shall be responsible to maintain the financial account[s] of the Board and, subject to resolution of the Board, shall disburse funds. All of the Board's operating funds shall be deposited in a separate interest bearing account.

E. Annual Audit:

Prior to adoption of the annual budget, the Board shall conduct an audit of all fiscal management records and expenditures of its prior twelve [12] month operating period. Such audit shall be performed in accordance with applicable State financial management procedures.

SECTION V. TITLE TO PROPERTY

Acquisition of real property shall occur only after a unanimous vote of the Board and adoption of a resolution which describes how such acquisition conforms with and furthers the goals and objectives set forth in the preamble to this Agreement and the Intermunicipal Watershed Rules and Regulations. Prior to the adoption of such resolution, each member of the Board shall submit the proposal for property acquisition to their respective municipal boards for review and approval.

Title to any and all real or personal property and equipment acquired to accomplish the goals as set forth in the preamble of this Agreement shall vest in the parties hereto in the same proportions as their contribution to the property in question or in accordance with the formula set forth in Section IV. Resale and reuse of any property acquired in conjunction with this Agreement shall be subject to the express condition that such property shall only be used for activities specifically permitted by the Intermunicipal Watershed Rules and Regulations. Any funds obtained from the sale or resale of any property acquired

in conjunction with this Agreement shall return to the Board for uses consistent with the goals and objectives of this Agreement and the Intermunicipal Aquifer Protection Program.

All conveyances made in accordance with this Section shall contain restrictive covenants deemed necessary and appropriate by the Board to insure conformance with the Watershed Rules and Regulations.

SECTION VI. RESPONSIBILITIES AND ROLE OF THE BOARD

The parties hereto agree to take whatever actions they may deem necessary to accomplish the goals set forth in the preamble to this Agreement as long as such actions are in conformance with the Laws of New York State and the United States. Such actions may include, but shall not be limited to:

A. Annual Reporting Responsibilities - The Board is responsible to prepare an annual report which describes all inspections of the Protection Zones, identified violations, notices served, violations corrected, the general condition of the resource, Protection Zone boundary adjustment decisions, relevant information related to the administration of the Watershed Rules including zoning district changes and subdivision activity relative to property within the Aquifer Protection Zones. This report is to be submitted to the Commissioner of the New York State Department of Health on or before the 30th day of January each year.

B. Recommendation and Review - The Board shall also provide recommendations to the Commissioner of the New York State Department of Health with respect to use variance requests under consideration by the Commissioner.

C. Boundary Adjustments - The Board is responsible to review all Protection Zone boundary disputes, determine if adjustments are necessary, and make recommendations relative to its determination to the municipal

legislatures.

D. Referral by the Municipal Water Purveyor - Each of the five [5] municipalities served by the Schenectady Aquifer shall refer any proposals for zoning regulations amendments, site plans, subdivisions, special permits, variances and issues of enforcement and/or administration of the Watershed Rules to the Board, prior to taking final action on such matters for any parcel of land within any of the Protection Zones defined by the Intermunicipal Watershed Rules and Regulations, as set forth in Attachment "B" hereto. Within thirty [30] days of receipt of a full statement describing the referral, the Board shall review and report its recommendations regarding the proposal to the referring municipality.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their duly authorized officers and sealed with their corporate seals the day and the year first above mentioned.

Approved By

Town Attorney

Town of Glenville

John F. Ryan, Jr.
Supervisor

Approved By

Town of Niskayuna

_____
Town Attorney

_____
Edwin D. Reilly, Jr.
Supervisor

Approved By

Town of Rotterdam

_____
Town Attorney

_____
James A. Constantino
Supervisor

Approved By

City of Schenectady

_____
City Attorney

_____
Karen B. Johnson
Mayor

Approved By

Village of Scotia

_____
Village Attorney

_____
Mayor

AN AGREEMENT
FOR
INTERMUNICIPAL COOPERATION FOR AN
AQUIFER PROTECTION PROGRAM

Attachment "A"

Municipal Contributions Formula

The Towns of Rotterdam, Glenville, Niskayuna, the Village of Scotia and the City of Schenectady, whose chief elected officials shall comprise the Intermunicipal Watershed Rules and Regulations Board [hereinafter called the "Board"] are parties to this Intermunicipal Cooperation Agreement. The formula for municipal contributions to the operating budget of the Board shall be based upon the total number of gallons of water pumped from the Aquifer by each of the participating municipalities annually.

The pumpage figures for the first year the Agreement is in effect shall be based upon an average of the total gallons of water each of the municipalities pumped from the Aquifer between 1980 and 1989. For each year thereafter, the municipal contribution amounts shall be adjusted annually to reflect the actual total number of gallons each municipality draws from the Aquifer during that year. The formula accounts for the fact that the Towns of Niskayuna and Rotterdam purchase water from the City of Schenectady.

Contributions Formula

$$\frac{\text{Municipality's Total Annual Pumpage}}{\text{Aquifer-Wide Total Annual Pumpage}} = \text{Municipality's Annual Contribution}$$

Contributions for 1991:

Municipality	Municipal Total Annual Pumpage [in millions of gallons]	Aquifer-Wide Total Annual Pumpage [in millions of gallons]	Municipal Annual Contributions
Glenville	706	8,224	8.6%
Scotia	497	8,224	6.0%
Rotterdam	1,060	8,224	12.9%
Schenectady*	5,961	8,224	72.5%
Total	8,224		100%

*Schenectady Total = 479 million gallons to Niskayuna
104 million gallons to Rotterdam
5,378 million gallons to City
5,961

Appendix Q: Great Flats Watershed Rules and Regulations

AN AGREEMENT FOR INTERMUNICIPAL COOPERATION FOR AN AQUIFER PROTECTION PROGRAM

Schenectady Intermunicipal
Aquifer Protection Program

ATTACHMENT "B"
INTERMUNICIPAL WATERSHED RULES AND REGULATIONS

INTERMUNICIPAL WATERSHED RULES AND REGULATIONS

SCHENECTADY COUNTY, NEW YORK

Pursuant to the authority vested in me as State Commissioner of Health by Section 1100 of the Public Health Law, I hereby repeal Sections 142.2, 142.3, 142.4, and 142.5 of Part 142 of Title 10 [Health] of the Official Compilation of Codes, Rules and Regulations of the State of New York to be effective upon filing with the Secretary of State to read as follows:

Section 142.2, Schenectady Aquifer, Schenectady County, New York

04/23/91

A. APPLICABILITY

These Rules and Regulations herein set forth, duly made and enacted in accordance with the provisions of Sections 1100-1107 of the New York State Public Health Law, shall apply to the wells which comprise the sources of public water supply for the following municipal jurisdictions in Schenectady County:

City of Schenectady
Town of Glenville
Town of Niskayuna
Town of Rotterdam
Village of Scotia

These Rules and Regulations shall apply to any lands, premises and uses within the respective protection zones created herein and shown on the Intermunicipal Watershed Rules and Regulations "Schenectady Aquifer Protection Zones Map", Plate #1, dated February, 1990, and the "Intermunicipal Watershed Rules and Regulations Municipal Property Inventory Maps", dated February, 1990. Said map, or series of maps, all notations or other information shown thereon are part of these Rules and Regulations and is located in the Office of the Clerk of each municipality and the County. These Rules and Regulations are intended to be superimposed upon the existing land use laws of each municipality served by the Schenectady Aquifer to augment and enhance those protective measures already in place. These Rules and Regulations shall in no way affect the limitations or requirements applicable in the underlying municipal land use and zoning districts.

B. DEFINITIONS

1] **Aboveground Storage Facility** - Any tank, pipe or other vessel, used singularly or in combination, at least ninety percent (90%) of which is above the surface of the ground and is used for the purpose of material holding, storage or containment.

2] **Board** - The Intermunicipal Watershed Rules and Regulations Board comprised of the chief elected official of each of the municipal jurisdictions in Schenectady County served by the Schenectady Aquifer and established to enforce and administer these Rules and Regulations and to conduct the central review function of actions taking place within the designated protection zones. The Board was established by adoption of "An Agreement for Intermunicipal Cooperation for an Aquifer Protection Program", and was previously known as the Watershed Committee.

3] **Bulk Storage** - The holding or containment of dry, semi-dry or liquid materials in large quantities, either packaged or loose, usually dispensed in smaller quantities for sale, use or consumption.

4] **Chloride Salt** - The solid compounds or solutions of potassium chloride (commonly used as fertilizer), calcium chloride (commonly used for winter road maintenance) or sodium chloride (commonly used for winter road maintenance and water softener regeneration).

5] **Fertilizer** - Any commercially produced mixture generally containing phosphorus, nitrogen and/or potassium which is applied to the ground to provide nutrients to plants.

6] **Fungicide** - Any substance used to destroy or inhibit fungus growth.

7] **General Aquifer Recharge Zone** - The land outside of the primary recharge zone through which runoff and precipitation flow directly and rapidly into the ground, also to be known as Zone III. [See Schenectady Aquifer Protection Zones Map, Plate #1, dated February, 1990].

8] **Groundwater** - The slowly moving subsurface water resources present in the Aquifer.

9] **Hazardous Material** - Any substance listed in regulations promulgated under authority of either the Federal Resource, Conservation and Recovery Act [RCRA] or Comprehensive Environmental Response Compensation and Liability Act, or the New York State Environmental Conservation Law Articles 40, 27 or 37, and amendments thereto, alone or in combination including, but not limited to petroleum products, organic chemical solvents, heavy metal sludges, acids with a pH less than or equal to 2, alkalies with a pH greater than or equal to 12.5, radioactive substances, pathogenic or infectious wastes or any material exhibiting the characteristics of ignitability, corrosivity, reactivity, or Toxicity Characteristic Leaching Procedure [TCLP] toxicity.

10] Herbicide - Any man-made substance used to destroy or inhibit plant growth.

11] Human Excreta - Human feces and urine.

12] Linear Distance - The shortest horizontal distance from the nearest point of a structure or object to the boundary of any protection zone, or to the edge, margin or steep bank forming the ordinary high water line of a waterbody.

13] Municipal Water Purveyor - The local official responsible for the operation, maintenance, and provision of the public water supply in each of the communities served by the Schenectady Aquifer also to be known as the Director of the Department of Water and Wastewater in the City of Schenectady, the Superintendent of Public Works in the Village of Scotia, the Superintendent of Water in the Town of Glenville, the Commissioner of Public Works in the Town of Niskayuna and the Commissioner of Public Works in the Town of Rotterdam.

14] Nonconforming Use - A building, structure or permitted use of land lawfully existing at the time of the effective date of these Rules and Regulations or any amendments thereto and which does not conform to the standards and prohibitions of the protection zone in which it is situated.

15] Onsite Disposal System - Any system used for the disposal of sewage, "industrial waste" or "other waste", as defined in Section 17-0105 of Article 17 of the New York State Environmental Conservation Law, and including sewer systems and sewage treatment works, on a site or parcel of land.

16] Open Storage - The holding of a material in such a way which permits exposure to the elements of nature.

17] Pesticide - Any man-made substance used to destroy or inhibit pests such as rodents and insects.

18] Primary Recharge Zone - Those land areas of general aquifer recharge, also to be known as Zone II [see Schenectady Aquifer Protection Zones Map, Plate #1, dated February, 1990, and the Intermunicipal Watershed Rules and Regulations Municipal Property Inventory Maps, dated February, 1990] that contribute groundwater to the public wells, including and encompassing the wellhead protection zone.

19] Protection Zones - Specific areas, also known as Zones I-IV, that define a hierarchy of aquifer sensitive land as designated and described herein and delineated on the Schenectady Aquifer Protection Zones Map, Plate #1, dated February, 1990, and the Intermunicipal Watershed Rules and Regulations Municipal Property Inventory Maps, dated February, 1990.

20] Radiation - Ionizing radiation, that is, any alpha-particle, beta particle, gamma ray, x-ray, neutron, high speed proton, and any other atomic particle producing ionization, but shall not mean any sound or radio wave, or visible, infrared, or ultra violet light.

21] Radioactive Material - Any material in any form regulated as a spontaneous emission of radiation within regulations promulgated under authority of Section 225 of the New York State Public Health Law, or Articles 17, 19, or 27 of the New York State Environmental Conservation Law, and amendments thereto.

22] Salvage Yards - An area where two or more unregistered, old or second hand motor vehicles are being accumulated for purposes of disposal, resale of used parts or reclaiming certain materials such as metal, gas, fabric and/or the like.

23] Schenectady Aquifer - The saturated and overlying unsaturated geologic formations generally existing in the Mohawk Valley lowland areas within the municipal boundaries of the City of Schenectady, Village of Scotia, and the Towns of Rotterdam, Glenville, Niskayuna and Princetown.

24] Septage - Residue removed from wastewater disposal systems.

25] Sewage - Any liquid, semi-liquid or solid human or animal waste matter from domestic, commercial, private or industrial establishments or other places together with such groundwater infiltration and surface water as may be present including mixtures of sewage with "industrial wastes" or "other wastes" as defined in Section 17-0105 of Article 17 of the New York State Environmental Conservation Law.

26] Sludge - The solid residue resulting from a municipal or industrial process of wastewater or water treatment.

27] Solid Waste - All putrescible and nonputrescible materials or substances discarded or rejected including but not limited to garbage, refuse, industrial and commercial waste, sludges, ashes, contained gaseous materials, incinerator residue, demolition and construction debris, discarded automobiles and offal, but not including sewage and other highly diluted waterborne materials.

28] Solid Waste Management Facility - Any facility employed beyond the initial solid waste collection process and managing solid waste including, but not limited to: storage areas or facilities; transfer stations; rail-haul or barge-haul facilities; landfills; disposal facilities; solid waste incinerators; landspreading facilities; composting facilities; surface impoundments; and waste oil storage, reprocessing, refining facilities, recyclables handling and recovery facilities, and waste tire storage facilities.

29] **Spill** - Any intentional or unintentional action or omission resulting in an unpermitted releasing, spilling, discharging, leaking, pumping, pouring, emitting, emptying or dumping of a petroleum product, toxic substance or any other potentially hazardous material so that such substances, products or materials may enter the environment.

30] **Toxic Substance** - Any compound or material which is, or may be, harmful to human health as defined by Section 4801 - Subdivision 2 of the New York State Public Health Law.

31] **Tributary Watershed Zone** - Land outside the aquifer area that contributes runoff overland and/or through surface streams for groundwater recharge, also known as Zone IV. [See Schenectady Aquifer Protection Zones Map, Plate #1, dated February, 1990 and the Intermunicipal Watershed Rules and Regulations Municipal Property Inventory Maps, dated February, 1990].

32] **Underground Injection** - The emplacement of fluids into the subsurface of the earth including but not limited to radioactive hazardous and non-hazardous waste, the use of this procedure for the production of oil or gas productions, the excavation of minerals or the emplacement of fluids into the subsurface of the earth, <u>with the exception of sanitary waste water discharges</u>.

33] **Underground Storage Facility** - Any tank, pipe or other vessel at least ten percent of which is beneath the surface of the ground and is used for the purpose of material holding, storage or containment, except those used for public water and sewer.

34] **Waste Treatment Facility** - Any facility used for the purpose of treating, neutralizing, stabilizing or disposing of sewage, but excluding small scale septic systems and leachfields serving fewer than five residential units.

35] **Waterbody** - Any river, stream, spring, pond, lake, reservoir or channel of water or any man-made culvert which flows directly into one of the aforementioned.

36] **Wellhead Protection Zone** - The surface extent of the cone of depression, immediately adjacent to the public wells, where groundwater is diverted to the public wells, also known as Zone I. [See Schenectady Aquifer Protection Zone Maps, Plate #1, dated February, 1990 and the Intermunicipal Watershed Rules and Regulations Municipal Property Inventory Maps, dated February, 1990].

C. GENERAL PROVISIONS

1] Agency Actions:

i. No state, county or local government agency having jurisdiction shall perform any act nor grant any permit or approval for any use or activity within any of the herein defined protection zones which may result in the contravention of water quality standards as set forth in regulations promulgated under authority of the New York State Public Health Law, Section 1100 regarding Sources of Water Supply, and the New York State Environmental Conservation Law, Article 17, Water Pollution Control, and amendments thereto.

ii. Where groundwater deterioration is likely to be caused by land development, municipal officials shall insure that appropriate zoning or other controls are implemented to prevent groundwater contamination.

2] Accidental Spills - Within any of the herein defined Protection Zones, any person who is the owner of, or in actual or constructive possession or control of a hazardous substance, or any agent or employee thereof, or any person in a contractual relationship therewith, who is responsible for, or has knowledge of any spill, as defined in Section B., above, of any petroleum, hazardous material, toxic substance or radioactive material to the ground surface or any waterbody, which is likely to have an adverse affect on water quality or quantity, shall notify the appropriate Municipal Water Purveyor, the New York state Departments of Environmental Conservation and Health, as described in the following sub-paragraphs i. and ii., of this Section. The Municipal water Purveyor shall notify all other appropriate agencies and the Board of any spill.

i. All spills shall be reported to the appropriate Municipal Water Purveyor and the New York State Department of Environmental Conservation within two [2] hours of such spill, or as soon as knowledge of such spill is obtained, and shall be addressed in accordance with the provisions of Article 12 of the Navigation Law, Sections 170 through 197, and Article 17 of the New York State Environmental Conservation Law. Clean-up of spills is the responsibility of the owners; in case of material in transit, clean-up is the responsibility of the carrier.

ii. The State Department of Health shall be advised of any spills within twelve [12] hours.

3] SPDES Permits - Within any of the herein defined Protection Zones, all applicants for a permit under the New York State Pollutant Discharge Elimination System [SPDES] shall simultaneously submit a copy of the application to the New York State Department of Environmental Conservation and the appropriate Municipal Water Purveyor. The Municipal Water Purveyor shall transmit a copy of this application to the Board for its information.

4] **Exceptions** - Exception to the Rules and Regulations may be granted by the Commissioner of the New York State Department of Health after appropriate study and review, based on prior usage and unique local conditions if, in his judgment, the health and safety of the consuming public will be protected because of treatment provided or other remedial action taken. Such exceptions shall be given to the applicant for such exception, the Municipal Water Purveyor and the Board in writing, and only after a hearing on the question has been held.

5] **Protection Zone Boundary Adjustments** - When the location of a protection zone boundary, as shown on the adopted Protection Zones Map, is in dispute by any owner or abutter affected by said boundary, the owner or abutter at his own expense may engage a licensed engineer or professional hydrogeologist to conduct such investigations as are necessary to determine if a discrepancy exists in the mapped boundary.

The owner or abutter shall submit all pertinent findings to the appropriate Municipal Water Purveyor. The Municipal Water Purveyor shall transmit the submission to the Board. The Board shall investigate and hear evidence regarding the proposed adjustment and make a recommendation to the appropriate municipality. The appropriate municipality shall in turn, hear evidence regarding the proposed boundary zone adjustment and make a recommendation to the Commissioner. The Commissioner shall act to grant, grant with conditions, or deny a boundary adjustment request.

All amendments and adjustments to a Protection Zone Boundary or designation shall be officially recorded on the Intermunicipal Watershed Rules and Regulations Protection Zones Map. The Board shall transmit to the Commissioner of the New York State Department of Health, a copy of any such recorded amendments or adjustments.

6] **Non-Conforming Buildings, Structures and/or Uses** - No non-conforming building, structure or use of land shall be enlarged, altered or extended in any manner without a site plan review and specific prior approval by the Local Water Purveyor. No non-conforming building, structure or use of land, may be modified in any way which is deemed, by the Local Water Purveyor, to increase its threat to the groundwater or otherwise contravene the purpose and intent of these watershed Rules and Regulations; however, in no event shall a non-conforming building, structure or use be permitted to expand, enlarge or extend the capacity to store or handle any materials or substances deemed to be a threat to the Schenectady Aquifer, including, but not limited to, pesticides, herbicides, fungicides, fertilizers, chloride salt, septage, sewage, sludge, solid waste, hazardous materials, toxic materials, or radio active materials.

In the event that any non-conforming use is discontinued for a period of six [6] months, or more, it shall permanently desist. Any new building, structure or use of land shall conform to the purpose intent and literal

provisions of these Rules and Regulations, and any amendment thereto. A non-conforming use of land may only be changed to a conforming use of land.

Non-conforming buildings, structures and/or uses of land may be continued subject to the owner of such building, structure or use of land demonstrating compliance with conditions set forth in sub-paragraphs a. through c. of this Section.

a. Provide a written annual report with the following information submitted to and approved by the appropriate Municipal Water Purveyor:

   1. Changes in operation;

   2. intended sale[s] of property;

   3. results of state agencies programs - test results and audits from such programs as Petroleum or Chemical Bulk Storage, Resources Conservation and Recovery Act [RCRA], etc.; and

   4. accidental spills [see Paragraph C.2.].

b. Develop and implement a plan to protect the Aquifer from potential contaminations associated with land use activities. This plan must include:

   1. Restrictions or management of activities on the property;

   2. dam/berm [revised drainage control] planned;

   3. identification and development of operating procedures for potential pollution activities [ie., changing oil of a car]; and

   4. disposal procedure for toxic substance or hazardous material.

   The plan must be approved by the appropriate water purveyor.

c. Should procedures described in Paragraphs a. and b. of this Section not prevent contamination of the Schenectady Aquifer or any portion thereof, the owner shall immediately cease the offending activity and shall be responsible to immediately remove the contamination from the Aquifer.

D. SPECIFIC REGULATIONS: ZONE IV. TRIBUTARY WATERSHED ZONE

i. The discharge or disposal of any hazardous material, toxic substance or radioactive material is prohibited, except as allowed by a valid permit per regulations promulgated under authority of the New York State Environmental Conservation Law Articles 1, 3, 8, 15, 17, 19, 23, 27, 52, and 70, and New York State Public Health Law, Section 225, and amendments thereto.

ii. The discharge, land application, burial or disposal of any septage, sewage, sludge, animal wastes, animal remains or human excreta within one hundred [100] feet of any waterbody is prohibited, except as allowed by a valid Permit in accordance with regulations promulgated under authority of the New York State Environmental Conservation Law Articles 1, 3, 8, 15, 17, 19, 23, 27, 52 and 70, and the New York State Public Health Law, Section 225, and amendments thereto.

iii. The dumping or disposing of snow or ice collected offsite from roadways or parking areas is prohibited within one hundred [100] feet of any waterbody.

iv. The open storage of agricultural chemicals, pesticides, herbicides, fungicides and fertilizers within one hundred [100] feet linear distance of any waterbody is prohibited.

v. The open storage of coal or chloride salts within one hundred [100] feet linear distance of any waterbody is prohibited.

E. SPECIFIC REGULATION: ZONE III. GENERAL AQUIFER RECHARGE ZONE

Except to the extent that broader prohibitions or more stringent limitations and requirements are set forth in this Section, all regulations and provisions applicable to Zone IV shall also apply to Zone III.

i. The construction, installation, maintenance or use of any aboveground storage facility that discharges any petroleum product, hazardous material or toxic substance into the groundwater or into any waterbody, except as allowed by a valid SPDES Permit, is prohibited.

ii. The establishment of any raw waste landfill, ash landfill, construction/demolition landfill, junkyard, salvage yard or dump is prohibited.

iii. Any form of underground injection for any purpose is prohibited with the sole exception of underground injection activities specifically and directly related to development or maintenance

of water supplies wells. With the exception of single family residences, proposals to undertake water supply well development or maintenance related underground injection require prior review and approval from the appropriate Municipal Water Purveyor.

iv. The above-ground discharge, land application or disposal of any septage, sewage, sludge, animal wastes, animal remains or human excreta is prohibited.

v. The dumping or disposing of snow or ice collected offsite from roadways or parking areas into or within one hundred [100] feet of any waterbody is prohibited.

vi. The storage of pesticides, herbicides, fungicides and fertilizers for wholesale, retail or commercial agricultural purposes is prohibited unless authorization has been obtained from the New York State Department of Environmental Conservation as provided by Article 33 of the New York State Environmental Conservation Law. The open storage of such material is prohibited.

vii. The bulk storage of coal or chloride salts is prohibited except in a watertight ventilated structure constructed on an impervious surface that prevents all seepage and runoff. To protect the structure's contents from exposure to the weather, all entrances without permanent doors shall be covered with a properly secured waterproof material. Any outside areas used for loading, handling or mixing shall be constructed of impervious material, sealed and diked in such a manner so as to prevent all seepage and runoff from entering the groundwater or any waterbody.

viii. The owner of any aboveground or underground storage facility existing on the effective date of these Rules and Regulations shall notify the appropriate Municipal Water Purveyor and all other appropriate agencies of any leak or spill promptly upon its discovery. The owner shall immediately undertake any such actions as may be necessary to prevent contamination of the groundwater. The Municipal Water Purveyor shall transmit this information to the Board and all other involved or interested agencies.

ix. The drilling, construction, installation, discontinuance and abandonment of all individual or private water supply wells shall comply with the requirements and standards of the New York State Department of Health.

x. Any underground storage facility that is out of service for more than one year shall be removed. Any liquid residue shall be removed from the facility, and all connecting lines shall be securely capped or plugged.

xi. Sanitary sewer lines, pipes and mains shall meet the tightness specifications set by the Water Pollution Control Federation. Remedial measures shall be taken by the owner if there is evidence of excessive exfiltration.

F. SPECIFIC REGULATIONS: ZONE II. PRIMARY RECHARGE ZONE

Except to the extent that broader prohibitions or more stringent limitations and requirements are set forth in this Section, all regulations and provisions applicable to Zones IV and III shall also apply to Zone II.

i. Uses that pose a risk to groundwater quality due to associated storage, use or handling of hazardous materials or toxic substances as defined by regulations promulgated under authority of the New York State Environmental Conservation Law Articles 3, 17, 37, or 40, and amendments thereto, are prohibited. These uses include, but are not limited to, motor vehicle service or body shops; salvage yards; trucking or bus terminals; coin or commercial laundries; on-site processing relating to dry cleaning and dyeing establishments, furniture stripping and refinishing operations, printing and photographic establishments; the storage for sale of gasoline, diesel fuel, heating oil, lubricants, anti-freeze, solvents or agricultural or industrial chemicals.

ii. The commercial excavation or extraction of soils, sands and gravels, with the exception of those existing mining operations authorized by the New York State Department of Environmental Conservation under Article 23 - Title 27 of the New York State Environmental Conservation Law, is prohibited.

iii. The introduction into an existing onsite disposal system of any material that is potentially hazardous to groundwater quality, including but not limited to petroleum products, solvents or brine, is prohibited.

iv. The establishment of any solid waste management or waste treatment facility is prohibited.

v. The installation of any underground storage facility is prohibited.

vi. The interment of human or animal remains is prohibited.

vii. The dumping or disposing of snow or ice collected offsite from roadways or parking areas is prohibited.

viii. Approval is required from the appropriate municipal authority having jurisdiction prior to the installation of any new onsite septic disposal system or the replacement or expansion of any existing onsite septic disposal system. Conditions for approval shall include an engineering

plan deemed acceptable by the municipal building inspector and/or engineer, a site specific soils analysis, verification of the site's percolation rate and inspection of the site before backfilling. A copy of the approval will be forwarded to the Municipal Water Purveyor.

ix. Approval is required from the appropriate Municipal Water Purveyor prior to the spreading, application or use of any pesticide, herbicide or fungicide for commercial agricultural purposes. Applications for approval shall include a description of the area to be covered, identification of the type and volume of the material to be used plus a full environmental assessment of the activity's potential to contaminate the groundwater. A referral is required from the County's Soil and Water Conservation District Representative and the County's Cooperative Extension Office Representative prior to the spreading, application or use of any pesticides, fungicides, herbicides by any licensed applicator.

G. SPECIFIC REGULATION: ZONE I. WELLHEAD PROTECTION ZONE

Except to the extent that broader prohibitions or more stringent limitations and requirements are set forth in this Section, all regulations and provisions applicable to Zones IV, III and II shall also apply to Zone I.

i. All land uses and development activities other than those directly connected with the pumping and treatment of public water supplies is prohibited, with the exception of existing single family residences to which the relevant restrictions of these regulations shall apply.

ii. The storage or handling of any septage, sewage, sludge, animal wastes, human excreta, hazardous material, toxic substances or radioactive materials, with the exception of existing single family residences to which the relevant restrictions of these Regulations shall apply and except for fuels and chemicals necessary for pumping and treatment of water supplies wells, is prohibited.

iii. The bulk storage of coal or chloride salts is prohibited.

iv. The use of pesticides, herbicides, fungicides and fertilizers for commercial/agricultural purposes is prohibited.

v. No filling, excavation or dredging, other than those activities specifically referred to in Section F., ii, above, is permitted in any manner without prior site plan review and specific approval by the appropriate Municipal Water Purveyor. Conditions for approval shall include certification and concurrence from the Local Water Purveyor that the activity shall not contravene water quality standards as set forth in regulations promulgated under authority of the New York State

Public Health Law, Section 1100 and the New York State Environmental Conservation Law, Article 17, and amendments thereto, based upon an environmental assessment specifically addressing the need for the the activity and its potential impact.

vi. All other use of pesticides, herbicides, fungicides and fertilizers shall be in conformance with the application rates recommended by the Cooperative Extension Association of Schenectady.

H. INSPECTIONS

Each municipality which has Protection Zones, or portions of Protection Zones, within its municipal jurisdiction, shall make periodic inspections of all properties within the boundaries of such Zones, consistent with all Constitutional limitations, to ascertain conformance with these Rules and Regulations. These inspections shall be conducted by the Municipal Water Purveyor, or designated municipal official, having jurisdiction, at least one time annually. Prior to January 1st of each year the Municipal Water Purveyor shall make a report to the Board describing the results of these inspections together with any other information relevant to the enforcement and administration of these Rules and Regulations.

Information necessary to demonstrate compliance shall be submitted at the request of the Municipal Water Purveyor. The aforesaid shall cause copies of any provisions violated to be served upon the violator together with notices of such violations. If said violator does not immediately comply, the Municipal Water Purveyor shall take any and all appropriate remedial action and shall promptly notify the Board and the State Commissioner of Health of such violations.

The Board shall make annual reports to the Commissioner of the New York State Department of Health, prior to the 30th day of January, including such information as to number of inspections, violations found, notices served, violations abated, the general condition of the resource and any other information relevant to the enforcement and administration of these Rules and Regulations.

I. VARIANCES

1. Standards - An owner who experiences unnecessary hardship as a consequence of the literal interpretation of the provisions of these Rules and Regulations may request a hearing by the Commissioner of the New York State Department of Health. The Commissioner may grant a variance of the requirements of the Rules and Regulations if the Commissioner finds that the health, welfare and safety of the consuming public will be protected. In making this determination, the Commissioner shall consider the following factors and make findings with respect to each:

i. Whether the use or activity to be authorized by the variance is in harmony with the purpose and intent of these Rules and Regulations.

ii. Whether a substantial change will be produced in the general condition of the resource or a substantial risk to groundwater quality or quantity will be created as a result of the variance.

iii. Whether the hardship can be alleviated by some other method that is feasible for the applicant to pursue.

iv. After considering all permitted uses, whether the property in question cannot yield a reasonable return if used for any purpose allowed in that Protection Zone.

v. Whether the variance requested is the minimum variance necessary to afford relief. To this end, the Health Department may grant a lesser variance than that applied for.

vi. Whether the hardship has not been created by the applicant.

2. Decision of the Commissioner - The Commissioner of the New York State Department of Health may request the Municipal Water Purveyor and the Board to review any application for a variance prior to reaching a determination with respect to the request. The Commissioner may impose such conditions as it may deem necessary to serve the purpose and intent of these Rules and Regulations.

The Commissioner of the New York State Department of Health shall act on all requests within sixty [60] days of a complete variance application. Failure to act within this sixty [60] day period shall be deemed a denial of the application.

Every decision of the Commissioner of the New York State Department of Health to grant, grant with conditions or deny a variance request shall be made in writing and served to the Board, appropriate Municipal Water Purveyor, and the applicant, and shall include all findings made with respect to the aforementioned factors. All conditions shall be expressly set forth and the reasons for such conditions specified. Violations of the conditions of a variance shall be deemed a violation of these Rules and Regulations.

The issuance of a variance shall not authorize the establishment or extension of any use nor the construction of any structure but shall merely authorize the filing of an application for any permit or approval that may be required by the municipality in which such action is proposed.

3. Variance Application Procedure - Applications for a variance shall be submitted to the appropriate Municipal Water Purveyor in the form of a registered letter and shall contain at least the following information:

   i. The applicant's name, address and interest in the subject property; or the owner's name and address, if different from the applicant, and the owner's signed consent to file the application.

   ii. The protection zone location, along with the street address and legal description of the subject property.

   iii. A narrative description of the proposed use or action together with any other pertinent information that may be necessary to adequately review the application.

   iv. A site plan illustrating all proposed site alterations, all structures existing on site, the existing uses and zoning of adjacent parcels, site contours and drainage patterns.

   v. A statement articulating the hardship imposed by the enforcement and administration of these Rules and Regulations with specific reference to the factors listed in Section I.1. of these Rules and Regulations.

   vi. A statement assessing the potential impact on groundwater quality of the use or activity to be authorized by the waiver or variance.

   vii. A plan and annual report as described in Section C.6a. and b.

J. PENALTIES FOR VIOLATIONS

Any person, firm or corporation who violates any provisions of these Intermunicipal Watershed Rules and Regulations or a permit of other approval granted hereunder, shall be subject to those penalties specified in Section 1103 of the New York State Public Health Law. Any such violation may be enjoined subject to Sections 1104 and 1105 Of the New York State Public Health Law.

K. AMENDMENTS

The Board, from time to time, on its own motion or on a recommendation from any community in Schenectady County served by the Schenectady Aquifer, may propose to amend, supplement or change the provisions of these Rules and Regulations. In proposing any amendment, supplement or change, the Board shall, in writing, state the reasons for such action.

No amendment, supplement or change proposed by the Board shall become a valid part of these Rules and Regulations until it is duly adopted by resolution of the governing bodies of each of the communities in Schenectady County served by the Schenectady Aquifer, approved by the Commissioner of the New York State Department of Health and filed in the Office of the Secretary of State.

L. SEPARABILITY

In the event that any section, paragraph or part of these Rules and Regulations is for any reason declared invalid or held unconstitutional by the courts, every other section, paragraph and part shall continue in full force and effect.

M. ADMINISTRATIVE PROCEDURES

Procedures for the administration of these Rules and Regulations are contained within "The Schenectady Aquifer, Schenectady Intermunicipal Watershed Rules and Regulations Administrative Procedures Manual". Such Administrative Procedures may be revised by the Board as it deems necessary.

Appendix R: Agricultural Best Management Practices

Agricultural Best Management Practice Systems Catalogue

NYS Soil and Water Conservation Committee

Approved April 2021

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Introduction – Purpose – Use of Catalogue

Agricultural Best Management Practice Systems Catalogue

The Agricultural Best Management Practices Catalogue was developed and approved by the NYS Soil and Water Conservation Committee in 2014 to replace The Agricultural Catalog for Nonpoint Source Pollution Prevention and Water Quality Protection in NYS. This revised and maintained catalogue shall provide guidance during the watershed planning process to select appropriate agricultural best management practice systems for the control and treatment of pollutants from agricultural nonpoint sources. Utilizing a complete Agricultural BMP System ensures a consistent and effective approach to addressing resource concerns, provides levels of protection and benefits to the environment that partial systems may not deliver, results in an effective use of public resources, and supports the reporting and planning efforts throughout many watersheds both entirely within NYS and those extending beyond (e.g., Clean Water Act 303(d) Programs, Clean Water Plans, and TMDLs for Chesapeake Bay, Lake Champlain, Long Island Sound, Finger Lakes, etc).

For more information on Clean Water Planning: https://www.dec.ny.gov/chemical/23835.html

What are Agricultural Best Management Practice (BMP) Systems?

Complete Agricultural BMP Systems may include one, two, or even a series of National Resources Conservation Service (NRCS) Conservation Practice Standards (CPS).

Agricultural BMP Systems prevent or reduce the source or transport of substances originating from agricultural activities which may adversely affect surface and ground waters. While a management practice system can have standards associated with its installation, operation or maintenance, it does not impose effluent limits for specific pollutants. Rather, it provides an effective means of reducing or preventing the impact of nonpoint pollutants from a specific resource concern. Agricultural Environmental Management (AEM) is a framework created to assist Soil and Water Conservation Districts and their partners in developing and delivering a science-based agricultural conservation program based on local priorities and goals. A 5-Tiered AEM planning approach identifies resource concerns and BMP system alternatives to address those concerns.

See the following for more information about the AEM 5-Tiered Approach to conservation: https://agriculture.ny.gov/soil-and-water/agricultural-environmental-management

Agricultural BMP Systems can be categorized as operational, vegetative, or structural, depending upon purpose, function, and design.

- **Operational Systems**: are systems that involve changes in farm management, usually resulting in a change in day-to-day decision making. Feed Management System and Integrated Pest Management System are examples of operational management practices.

- **Vegetative Systems**: increase the amount of herbaceous and/or woody vegetation on a field or critically eroding area. Riparian Buffer System and Soil Health System are examples of vegetative management practice systems.

Agricultural Conservation Management System Summary Sheet

- **Structural Systems**: are usually practices that require engineering design, and often control surface runoff, the primary transporter of most agricultural pollutants. Erosion Control System Structural and Livestock Heavy Use Area Runoff Management Systems are examples of structural management practice systems.

Resource Concerns and Agricultural Best Management Practice (BMP) Systems

The AEM Planning Process requires each individual management area or resource concern area to be clearly identified, assessed / evaluated, and planned as its own entity; this approach allows each of these areas to be planned as a complete system on their own. For example: a farm with two different barnyards, each evaluated as a possible resource concern, may be planned and further treated by two separate Livestock Heavy Use Are Runoff Management Systems, each System unique to its own management area, considerations, and Component BMPs.

Agricultural BMP Systems and Component BMPs are expressed in unique measurable quantities and units (e.g., number, linear feet, square feet, acres); correct measurable units may be found in this Catalogue as well as the NRCS Field Office Technical Guide. Further unit descriptors in addition to required NRCS reportable units are acceptable and often beneficial (e.g., (Waste Transfer (CPS 634) - 1 NO, 100 ft), (Waste Storage Facility (CPS 313) – 1 NO, 2 Million Gallons)).

In some cases, multiple Agricultural BMP Systems may work within or adjacent one another to properly control and treat a resource concern; scenarios utilizing two or more BMP Systems should have each System listed. For example: An Access Control System with an adjacent and supporting Riparian Buffer System, both Systems used in conjunction to address one or more resource concerns.

The Agricultural BMP Catalogue is not a design manual and should not be used to replace NRCS Conservation Practice Standards and Specifications.

Interacting with the Agricultural BMP Systems Catalogue

Updates to the Agricultural BMP Systems Catalogue will be conducted on an annual basis or as NRCS Conservation Practice Standards change and/or new information is available for incorporation. Please direct questions about content and application of this directory to the following NYS SWCC Staff:

Greg Albrecht, AEM Program Manager, CNMP Specialist: Greg.Albrecht@agriculture.ny.gov
Ron Bush, CNMP Specialist: Ronald.Bush@agriculture.ny.gov
Brendan Jordan, CNMP Specialist: Brendan.Jordan@agriculture.ny.gov

Agricultural Conservation Management System Summary Sheet

Table I – Management Practice Systems with Potential Components

Access Control System

Access Control	472
Fence	382
Trails and Walkways	575
Access Road	560
Watering Facility	614
Heavy Use Area Protection	561
Livestock Pipeline	516
Pond	378
Pumping Plant	533
Spring Development	574
Structure for Water Control	587
Stream Crossing	578
Water Well	642
Field Border	386

Agrichemical Handling and Storage System

Agrichemical Handling Facility	309
Waste Recycling	633
Access Road	560
Heavy Use Area Protection	561
Diversion	362
Pumping Plant	533
Underground Outlet	620
Grassed Waterway	412

Composting System – Animal

Animal Mortality Facility	316
Composting Facility	317
Access Road	560
Diversion	362
Heavy Use Area Protection	561
Roofs and Covers	367
Vegetated Treatment Area	635
Waste Storage Facility	313
Waste Transfer	634

Erosion Control Systems – Structural

Water and Sediment Control Basin (WASCOB)	638
Sediment Basin	350
Grade Stabilization Structure	410
Grassed Waterway	412

Erosion Control Systems – Structural (continued)

Diversion	362
Filter Strip	393
Critical Area Planting	342
Lined Waterway or Outlet	468
Conservation Cover	327
Terrace	600
Subsurface Drain	606
Underground Outlet	620
Obstruction Removal	500
Fence	382
Access Road	560
Roof Runoff Structure	558
Trails and Walkways	575

Feed Management System

Feed Management	592

Integrated Pest Management System

Pest Management Conservation System	595
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Irrigation Water Management System

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Livestock Heavy Use Area Runoff Management System

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Fence	382
Access Road	560
Roof Runoff Structure	558
Roofs and Covers	367
Conservation Cover	327
Critical Area Planting	342
Vegetated Treatment Area	635
Diversion	362
Grassed Waterway	412
Lined Waterway or Outlet	468
Pumping Plant	533
Sediment Basin	350
Subsurface Drain	606
Underground Outlet	620
Waste Separation Facility	632
Waste Storage Facility	313
Waste Transfer	634
Water and Sediment Control Basin (WASCOB)	638
Watering Facility	614

Manure and Agricultural Waste Treatment Systems

Waste Separation Facility	632
Waste Storage Facility	313
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Waste Treatment	629
Anaerobic Digester	366
Composting Facility	317
Pumping Plant	533
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Heavy Use Area Protection	561

Nutrient Management System – Cultural

Nutrient Management	590

Pathogen Management System

Animal Mortality Facility	316
Composting Facility	317
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Pathogen Management System (continued)

Anaerobic Digester	366
Fence	382
Heavy Use Area Protection	561
Waste Separation Facility	632
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Petroleum and Oil Products Storage System

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Prescribed Rotational Grazing System

Prescribed Grazing	528
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Watering Facility	614
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Herbaceous Weed Treatment	315
Heavy Use Area Protection	561
Stream Crossing	578
Subsurface Drain	606
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Process Wash Water Management System

Vegetated Treatment Area	635
Waste Separation Facility	632
Waste Transfer	634
Pumping Plant	533
Waste Storage Facility	313
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Riparian Buffer System

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Conservation Cover	327
Critical Area Planting	342
Stream Crossing	578
Access Control	472
Access Road	560
Trails and Walkways	575
Brush Management	314
Fence	382
Filter Strip	393
Pasture and Hay Planting	512
Grassed Waterway	412
Herbaceous Weed Treatment	315
Pest Management Conservation System	595
Lined Waterway or Outlet	468
Structure for Water Control	587
Water and Sediment Control Basin (WASCOB)	638

Silage Leachate Control and Treatment System

Vegetated Treatment Area	635
Waste Separation Facility	632
Waste Transfer	634
Pumping Plant	533
Dike	356
Diversion	362
Subsurface Drain	606
Structure for Water Control	587
Heavy Use Area Protection	561
Waste Storage Facility	313
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Silage Leachate Control and Treatment System (Continued)

Sediment Basin	350
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Conservation Crop Rotation	328

Soil Health System

Conservation Crop Rotation	328
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Stream Corridor and Shoreline Management System

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Streambank and Shoreline Protection	580
Clearing and Snagging	326
Critical Area Planting	342
Obstruction Removal	500
Open Channel	582
Stream Crossing	578
Riparian Forest Buffer	391
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Tree/Shrub Establishment	612
Tree/Shrub Site Preparation	490
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Waste Storage and Transfer System

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Waste Transfer	634
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Agricultural Conservation Management System Summary Sheet

Table II. Agricultural Management Systems by Category and Lifespan

- The following listed lifespans are for BMP Systems implemented under the New York State Non-Point Source Pollution Abatement and Control Grant Program.
- Management System Lifespan indicates the minimum term that Operation and Maintenance **MUST** be performed on the management system. Implementation of an Operation and Maintenance (O&M) plan is required to assure efficient operation of the system and may extend the system lifespan beyond the minimum term.
- Management System Design Criteria is variable depending on the component practices that are used.

Management System	Management System Categories			Management System Lifespan
	Operational	Vegetative	Structural	
Access Control System	•	•	•	10 years
Agrichemical Handling and Storage System	•		•	10 years
Composting System – Animal	•	•	•	10 years
Erosion Control System – Structural	•	•	•	10 years
Feed Management System	•			1 year
Integrated Pest Management Conservation System	•	•		1 year
Irrigation Water Management System	•		•	1 years
Livestock Heavy Use Area Runoff Management System	•	•	•	10 years
Manure and Agricultural Waste Treatment System	•		•	10 years
Nutrient Management System – Cultural	•	•		1 year
Pathogen Management System	•	•	•	10 years
Petroleum and Oil Products Storage System	•		•	10 years
Prescribed Rotational Grazing System	•	•	•	10 years
Process Wash Water Management System	•	•	•	10 years
Riparian Buffer System	•	•		10 years

Agricultural Conservation Management System Summary Sheet

Management System	Management System Categories			Management System Lifespan
	Operational	Vegetative	Structural	
Silage Leachate Control and Treatment System	•	•	•	10 years
Soil Health System	•	•		1- 5 years
Stream Corridor and Shoreline Management System	•	•	•	10 years
Waste Storage and Transfer System	•	•	•	10 years

Agricultural Conservation Management System Summary Sheet

Access Control System

DEFINITION
An Access Control System provides for the permanent exclusion of livestock from a waterbody or hydrologically active area to protect water quality.

WATER QUALITY PURPOSE
To prevent the direct deposition of manure and urine into waterbodies and hydrologically active areas, and to protect the stability of the banks of a waterbody from livestock traffic.

POLLUTANT CONTROLLED
Nutrients, pathogens, bio-chemical oxygen demand, sediment and thermal modification

WHERE USED
On farmsteads, pastures, and fields where livestock have access to surface waterbodies and hydrologically active areas, and a resource concern has been identified.

SYSTEM DESCRIPTION
An Access Control System involves the use of appropriate fence and associated components to exclude livestock from having significant direct access to surface waters and hydrologically active areas to protect water quality. Other conservation practices that provide an alternative source of water, and/or allow for the controlled access to, or crossing of streams may be included in the system.

In some cases, multiple Agricultural BMP Systems may work within or adjacent one another to properly control and treat a resource concern; scenarios utilizing two or more BMP Systems should have each System listed. For example: An Access Control System with an adjacent and supporting Riparian Buffer System, both Systems used in conjunction to address one or more resource concerns.

SYSTEM EFFECTIVENESS
Eliminating access of livestock to waterbodies and hydrologically active areas prevents direct nutrient, pathogen, and organic matter contributions by livestock as well as protecting bank stability and vegetation which leads to less erosion and improved wildlife habitat.

IMPACTS ON SURFACE WATER
Beneficial – reduces the risk of contamination from nutrients, pathogens, bio-chemical oxygen demand, sediment, and thermal modification.

IMPACTS ON GROUND WATER
Neutral - It may be beneficial in areas where groundwater is recharged directly from surface waterbodies or there is a direct surface connection to groundwater.

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IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial by excluding livestock from the banks of waterbodies helping to maintain bank stability and vegetation reducing soil erosion and sedimentation.
Air: Neutral.
Plants: Beneficial by excluding livestock from the banks of waterbodies helping to maintain bank vegetation.
Animals: Beneficial as it can help protect riparian vegetation that in turn provides habitat, wildlife corridors and water quality benefits.
Humans: Beneficial by improving overall water quality and recreational opportunities.
Energy: Neutral, but may be negative if alternative water requires pumping.

ADVANTAGES TO FARM

- Easy to implement.
- Relative low cost.
- Could improve neighbor relations due to livestock control and increased aesthetics in the stream corridor.

DISADVANTAGES TO FARM

- Requires fence maintenance and potential replacement after flood events.
- Often requires the installation of an alternative water supply system.

SYSTEM LIFESPAN

Ten (10) years.

COST

Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Some factors impacting cost include the type of livestock involved, the length and type of fence needed, the need for alternative water, and stream crossings.

OPERATION AND MAINTENANCE

Each Agricultural Management System is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system:

- Pastures within the Access Control System shall be managed and maintained to remain vegetated, and the development of future resource concerns shall be avoided (e.g., heavily disturbed areas, runoff to nearby Highly Sensitive Areas).
- Basic maintenance to fence, crossings, and watering stations is needed.
- Periodic access of livestock to protected areas may be allowed, if in line with NRCS CPS Access Control, Riparian Herbaceous Buffer, or other relevant Standard operation and maintenance guidelines.
- Significant flooding may result in the need for repair or replacement.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific conservation practice standard being utilized for additional information on operation and maintenance needs.

Agricultural Conservation Management System Summary Sheet

MISCELLANEOUS COMMENTS

Components that result in a complete system that eliminates a resource concern may be eligible for cost-sharing. Compliance with local and state laws should be adhered to including the need for Erosion and Sediment Control plans for disturbances over 1 acre, contacting Underground Utilities Protection before excavation, contacting SHPO and others as applicable. Stream crossings and other activities that disturb streambanks may require permits.

NRCS STANDARDS TO UTILIZE*

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Access Control	472	Acre	April 2019	10
Fence	382	Feet	Oct 2014	10
Trails and Walkways	575	Feet	Oct 2015	10
Access Road	560	Feet	March 2021	10
Watering Facility	614	Number	March 2021	10
Heavy Use Area Protection	561	Sq. Feet	Oct 2015	10
Livestock Pipeline	516	Feet	March 2021	10
Pond	378	Number	May 2018	10
Pumping Plant	533	Number	Dec 2011	10
Spring Development	574	Number	August 2014	10
Structure for Water Control	587	Number	March 2019	10
Stream Crossing	578	Number	May 2012	10
Water Well	642	Number	March 2021	10
Field Border	386	Acre	Oct 2017	10

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NY NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

Agricultural Conservation Management System Summary Sheet

REFERENCES

- USDA NRCS eFOTG: https://efotg.sc.egov.usda.gov/#/details
- Pasture Management AEM Tier 2 Worksheet and Information Sheet
- Stream and Floodplain Management AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Agrichemical Handling and Storage System

DEFINITION
A permanent structure, with associated operation and maintenance procedures, that includes an impervious surface to provide an environmentally safe on-farm area for agri-chemical storage, handling, mixing, loading, recovery, and rinsing.

WATER QUALITY PURPOSE
To reduce the potential for soil, groundwater, and surface water contamination during agrichemical storage, mixing, loading, unloading, rinsing, and recycling operations.

POLLUTANT CONTROLLED
Agrichemicals – (i.e. pesticides, fertilizers, etc.)

WHERE USED
On farms where current methods of storing, mixing, loading, and unloading of agri-chemicals; and the rinsing of equipment and/or agrichemical containers are polluting, or have the potential to pollute ground and/or surface waters ; and a resource concern has been identified.

SYSTEM DESCRIPTION
An agrichemical mixing facility consists of a watertight containment structure comprised of a concrete pad and all necessary equipment for pumping, transferring, and storing water used in agrichemical mixing, loading, unloading, and rinsing operations. The size of the pad and storage capacity is related to the volume and size of the largest spray tank on the pad. Containment storage vessels incorporated into the facility design allow for the recovery of agrichemical, rinsate storage, plus handling/mixing/recovery/disposal. Surface runoff from a 25-year, 24-hour duration storm event is diverted away from the facility. A roof and sidewalls may be used to shelter the facility from rain, snow and ice, preventing precipitation from accumulating on the pad and contaminating runoff.

SYSTEM EFFECTIVENESS
Little or no information exists on the documented effectiveness of agrichemical handling facilities on water quality improvement. Much is known about water quality impacts when these facilities are not available for agrichemical handling and rinsing operations. A recent study of commercial pesticide mixing and loading sites in Wisconsin, without pesticide handling facilities, found that two-thirds of the sites had significant groundwater contamination.

Pesticides were detected in groundwater at more than half of these sites, with concentrations exceeding groundwater standards at one-third of the sites surveyed. Officials and the pesticide industry in Wisconsin recognized that use of agrichemical mixing facilities minimize the potential for surface and groundwater contamination.

Agricultural Conservation Management System Summary Sheet

IMPACTS ON SURFACE WATER
Beneficial.

IMPACTS ON GROUND WATER
Beneficial.

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial as it greatly reduces the risk of soil contamination due to leaks and spills.
Air: Beneficial as it greatly reduces the risk of air contamination resulting from leaks and spills.
Plants: Neutral.
Animals: Neutral.
Human: Beneficial as it improves environmental safety.
Energy: Neutral.

ADVANTAGES TO FARM

- Improves environmental safety by preventing contamination of ground and surface water from routine use and accidental spills.
- Allows compliance with federal and state regulations.
- Enhances owner / operator management.
- Promotes recycling of rinse water as tank make up water.
- Reduces liability risk.

DISADVANTAGES TO FARM

- Can be very expensive.
- Must perform maintenance frequently and diligently to ensure proper facility operation and water source protection.
- Expansive cropland acreage makes it difficult to pick one central location to protect and utilize exclusively.

SYSTEM LIFESPAN
Ten (10) years.

COST
Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost.

OPERATION AND MAINTENANCE
Each Agricultural Management System is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system:

- An Emergency Action Plan should be a part of the written O&M plan, in case of an accidental agrichemical spill, exposure, fire or other incident that could adversely affect environmental health. The plan should include a record-keeping component to accurately log spills, exposure, fire or other incidents.
- Safe agrichemical handling procedures and frequent maintenance are critical to the performance of any agrichemical mixing facility.

Agricultural Conservation Management System Summary Sheet

- The proper disposal/utilization of rinsate, exterior wash water, accumulated sediment and spilled wastewater must be accomplished in accordance with the pesticide labeling requirements and federal, state and local laws and codes.
- Operator must perform periodic checks of any backflow prevention devices, inspect the pad and sump for cracks and leaks, clean the sump and pad between different chemical mixing operations and remove sediment accumulation from the sump.
- Personal protective equipment must be used during O&M procedures.
- Accurate records indicating maintenance, cleaning and inspection of equipment are necessary.
- Pesticide containers are to be triple rinsed and properly recycled.

See the documents in Section 4 of the NRCS field Office Technical Guide (eFOTG) under the specific conservation practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS

Components that result in a complete system that eliminates a resource concern may be eligible for cost-sharing. Compliance with Federal, State, and local laws should be adhered to including the need for Erosion and Sediment Control Plans for disturbances over one acre, contacting Underground Utilities Protection before excavation, contacting SHPO and others as applicable.

NYSDEC recommends that all pesticide rinsates, including wash waters from cleaning of spray equipment, should be collected and stored above ground. Stored rinsates should be recycled for future mixing with the same concentrates.

An agrichemical storage facility should have good air ventilation and an impervious floor and sides to contain spills and leaks. The building should be locked at all times and be located adjacent to the pad.

NRCS STANDARDS TO UTILIZE

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Agrichemical Handling Facility	309	Number	June 2018	10
Waste Recycling	633	Tons	Oct 2015	1
Access Road	560	Feet	March 2021	10
Access Control	472	Acre	April 2019	10

Agricultural Conservation Management System Summary Sheet

Heavy Use Area Protection	561	Sq. Feet	Oct 2015	10
Diversion	362	Feet	May 2017	10
Pumping Plant	533	Number	Dec 2011	10
Underground Outlet	620	Feet	Oct 2014	10
Grassed Waterway	412	Acre	Oct 2015	10

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- USDA NRCS eFOTG: https://efotg.sc.egov.usda.gov/#/details
- Pesticide Storage, Mixing and Loading AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Composting System – Animal

DEFINITION
An on-farm system to safely facilitate the treatment or disposal through controlled aerobic decomposition of livestock and poultry carcasses, by micro-organisms into a biologically stable, soil-enriching material useful for soil amendment. This system is especially useful when rendering services are not available or too costly.

WATER QUALITY PURPOSE
To have a system for the safe decomposition and ultimate utilization of nutrients from animal composting in a safe environmental manner.

POLLUTANT CONTROLLED
Pathogens, Nutrients

WHERE USED
On farms where safe disposal of livestock carcasses is needed.

SYSTEM DESCRIPTION
A facility to safely compost animal carcasses. To protect surface and groundwater and allow for proper composting of animal carcasses, the facility may be located on lower permeability soils, an improved pad, or be a building with a roof and concrete floor, depending on the operation and need. Clean surface water will be diverted from the site and all contaminated run-off will be contained and treated.

Composting on the farm is accomplished by mixing an energy source (carbonaceous material: wood chips, sawdust, straw, corn cobs, or well-bedded horse manure) with a nutrient source (nitrogenous material: animal carcasses,) in a prescribed manner under aerobic conditions. Microorganisms (primarily bacteria and fungi) break down the raw organic waste under controlled conditions. Air, water, nutrients, surface area, temperature and pH are all important factors in the composting process.

Two types of carcass composting operations are common for on-farm use and either can be managed outside or in a controlled environment or building:

- The most common - Static Piles – carcasses are placed on bulky, high carbon organic material (such as wood chips) and then covered with more organic material and not turned during the composting process. Correct moisture content and bulk density facilitate air movement throughout the pile.
- Aerated Windrows - organic materials are formed into long narrow piles, called windrows, and turned periodically with power equipment to aerate the piles and promote the composting process. This method is the most suitable for smaller carcasses, such as poultry and but has been done on larger scales in the Midwest.

Agricultural Conservation Management System Summary Sheet

SYSTEM EFFECTIVENESS

Unsafe disposal of animal carcasses can be a large source of pathogens and nutrients. Proper composting, including the collection and treatment of any leachate from the process, greatly reduces the issues with pathogens and when the final product is land applied in accordance with a Nutrient Management Plan, the loss of nutrients is negligible.

IMPACTS ON SURFACE WATER

Beneficial - Improper disposal of carcasses can cause surface water contamination and a proper composting facility can eliminate the potential.

IMPACTS ON GROUND WATER

Beneficial - Improper burial or improper composting on well drained soils, shallow to fractured rock or near high groundwater tables can have negative effects on ground water quality. Proper composting facility will be installed in proper soils or lined and will not affect ground water quality.

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial. Nutrients and organic matter will be incorporated in the soil and approve the soil health and nutrient values.

Air: Beneficial. Improper disposal or improperly operated composting facilities can cause major air quality issues on a farm. Properly operated and maintained composting facilities will create little to no odor.

Plants: Beneficial. Plants will benefit from increased nutrients in the soil.

Animals: Beneficial. Properly operated composting facilities will not be an attractant to wild animals or vectors.

Human: Beneficial. Protection of ground and surface water, odor control and vector control will all benefit humans.

Energy**:** Negative. Increased energy will be needed to properly run a composting system which requires increased equipment time over some forms of disposal (dragging carcass into woodlot) but energy use can be less than needed for proper burial.

ADVANTAGES TO FARM

- Can be done simply, at low cost and may not require engineering assistance (for non-structural composting facilities).
- Can utilize on-farm waste products for cover material, such as refusals, spoiled feed, etc.
- Compost can be used as a soil amendment increasing soil tilth and water-holding capacity.

DISADVANTAGES TO FARM

- Requires input (and possible purchase) of materials for composting, such as wood chips.
- Increased cost of initial investment (can be expensive, especially if a building or roofed structure).
- Higher degree of management by farm.
- Requires monitoring for run-off, temperature, proper covering with suitable materials.
- Some practices may require a SPDES permit for site disturbance.

SYSTEM LIFESPAN

Ten (10) years.

Agricultural Conservation Management System Summary Sheet

COST

Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Costs can range from little to no out of pocket cost when there is a readily available supply of high carbon material for a base or can be very expensive for a building where large volumes of material are composted – range $0 to $150,000.

OPERATION AND MAINTENANCE

Each Agricultural Management System is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system:

- Maintain correct operating temperatures, proper aeration, carbon to nitrogen (C: N) ratio, and perform periodic testing of compost.
- Check for run-off, kill zones or other signs of nutrient loss after storm events.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS

Testing of compost for nutrients or heavy metals can be arranged through the local Cornell Cooperative Extension or through the Cornell Nutrient Analysis Laboratory. This practice may be eligible for cost-sharing. Compliance with local and state laws should be adhered to including the need for Erosion and Sediment Control plans for disturbances over 1 acre, contacting Underground Utilities Protection before excavation, contacting SHPO and others as applicable.

NRCS STANDARDS TO UTILIZE *

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Animal Mortality Facility	316	Number	April 2016	10
Composting Facility	317	Number	March 2018	10
Access Road	560	Feet	March 2021	10
Diversion	362	Feet	May 2017	10
Heavy Use Area Protection	561	Sq. Feet	Oct 2015	10
Roof and Covers	367	Number	Oct 2016	10
Vegetative Treatment Area	635	Acre	Oct 2016	10

Agricultural Conservation Management System Summary Sheet

Waste Storage Facility	313	Number	March 2018	10
Waste Transfer	634	Number	Oct 2015	10

* This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

-National Engineering Handbook Part 637, Chapter 2 – Composting (NEH 637.0213, Dead Animal Composting),
-National Engineering Handbook Part 651,
-Agricultural Waste Management Field Handbook, Chapter 10 Mortality Management (NEH 651.1007), NRCS or comparable extension publication.
-Bonhotal, J., L Telega, J. Petzen. Natural Rendering: Composting Livestock Mortality and Butcher Waste. 2002. Cornell Waste Management Institute: http://compost.css.cornell.edu/naturalrenderingFS.pdf
-Northeast Regional Agricultural Engineering Service publication No. 54, On Farm Composting Handbook, Cornell Cooperative Extension, Ithaca, NY.
- Waste Disposal AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Erosion Control System - Structural

DEFINITION
The construction of an erosion control system to control the loss of soil from sheet, ephemeral, rill or gully erosion on agricultural lands, farmsteads, and production areas. This includes systems utilizing terraces, diversions, water and sediment control basins (WASCoBs), waterways (both grassed and lined), roof runoff practices, access roads, and associated earthmoving practices in a system.

WATER QUALITY PURPOSE
To reduce all forms of erosion and thereby reducing sediment delivery to waterbodies. This includes shortening slope lengths, cutting off sheet and concentrated flows from adjacent landuses, stabilizing gullies and providing safe outlets for flowing waters.

POLLUTANT CONTROLLED
Sediment, nutrients, and pathogens

WHERE USED
On erodible land, in both crop fields and pastures, where soil erosion and runoff must be controlled and the use of rotation, minimum tillage or seeding does not or cannot limit the erosion to acceptable levels.

Within and adjacent farmsteads where excessive volumes of clean water concentrate and result in soil erosion and un-controlled runoff. This system would not be appropriate as a treatment method of concentrated nutrient-laden runoff (e.g., livestock heavy use area runoff, feed storage area runoff, waste storage and transfer sites); other practice systems within this Catalogue may apply to forementioned resource concern areas.

SYSTEM DESCRIPTION
This system may be one practice or several; terraces, diversion and WASCoB's are generally constructed across the slope, usually on the contour to intercept and conduct surface runoff at a non-erosive velocity to stable outlets, reducing ephemeral and gully erosion. These practices control erosion by shortening slope length and regulating surface runoff. They can outlet into established grassed waterways, flat vegetated areas or other stabilized outlets. They also can be total storage structures that release the flow through underground outlets within 24 to 48 hours, depending on crops grown. These systems also act as sediment traps and help to reduce sediment-bound pollutants in surface run-off.

This system will also be used for the construction of waterways; grassed, lined or stone-centered, which are used to convey concentrated flows down slope to protected outlets to prevent gully erosion or to act as outlets for other erosion control practices. On slopes of less than 1% where out-of-bank flow will not cause erosion or property damage, the confinement of flow is not a design requirement.

Structures can be cropped, seeded to grasses and legumes to stabilize the slopes or lined with another material, such as rock, when velocities require.

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Soil and water resources are often further conserved when structural erosion control practices are paired with cultural soil health practices (e.g., crop rotation, strip cropping, cover crop, conservation tillage) and nutrient management practices to further reduce pollutant transport and loss.

Within and adjacent farmsteads, BMPs may be compiled to collect, store, convey, and safely outlet clean water sources, thus protecting nearby management areas and infrastructure from possible damage and/or potential runoff.

When this system is funded by the NYS Agricultural Nonpoint Source Abatement and Control Program (ANSACP), a complete system of BMPs meeting NRCS Standards must result.

SYSTEM EFFECTIVENESS
Structural erosion control practices are effective at reducing soil loss significantly as well as limiting nutrient losses and runoff.

IMPACTS ON SURFACE WATER
Beneficial - Terraces, diversions, waterways and WASCoB's reduce erosion by controlling surface runoff and gully erosion which lessen loads delivered to the receiving waterbody. Terraces, diversion and WASCoB can also reduce nutrient loading through settling in areas of water retention.

IMPACTS ON GROUND WATER
Slight to Moderate - Can be beneficial in areas where the groundwater is recharged from surface waterbodies. In the absence of a nutrient management plan, terraces and diversions may increase nutrient leaching to groundwater. Impacts on groundwater may be reduced by increasing terrace or diversion release rates, thereby decreasing runoff storage time and potential soil saturation. Diversions decrease the amount of surface runoff infiltrating into the soil, reducing the risk of transporting nutrients and pesticides to groundwater. Waterways generally have little to no impact on ground water.

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial to soil resources as soil loss will be diminished.
Air: Slightly beneficial and can have beneficial effects as erosion rates are reduced and the possibility that fines in the air will also be reduced.
Plants: Neutral.
Animals: Slightly beneficial improvement to wildlife as cross field practices could provide pathways for wildlife movement. Slight to moderate for fisheries as erosion rates will be lessened and delivery of sediment to waterbodies controlled.
Human: Slight to no effect on humans unless sediment reduction in waterbodies for public use are impacted.
Energy: Energy use may be slightly higher due to increased tractor use to go around conservation practices instead of normal plowing.

Agricultural Conservation Management System Summary Sheet

ADVANTAGES TO FARM

- Are relatively easy to design and install.
- Can be cheap to install for simple practices.
- May allow timelier planting and potential yield increases by removing surface runoff.
- Controls surface runoff and gully and ephemeral erosion.
- Can provides flood protection for crop fields.
- Stores runoff up to 48 hours, allowing sediment and sediment-bound pollutants to settle out.
- Protects management areas and farmstead infrastructure.
- Collects surface flows during storm events and provides safe clean water outlets.

DISADVANTAGES TO FARM

- Can take land out of crop production.
- Systems may need to be in conjunction with other conservation practices such as conservation tillage, crop rotations, and contour or strip cropping to bring soil loss to acceptable levels.
- Some systems can be very expensive and usually are not considered cost-effective management practices in relation to cultural control measures.
- Require increased maintenance as trapped sediment accumulates in the structure and removal of sediment or reconstruction is required to maintain capacity.
- Grassed waterways may be unsuitable for areas where a base flow exists (sustained wetness prevents adequate vegetative cover) unless a stone-center lining and a subsurface drain and surface inlet are installed.
- Use may be precluded or have an increased cost if a stable outlet is lacking.

SYSTEM LIFESPAN

Ten (10) years.

COST

Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Costs can range from $1.00 per foot for a cross slope ditch to $10 a foot for storage structures with outlets.

OPERATION AND MAINTENANCE

Each Agricultural Management System is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system that need to be performed annually and after large storm events:

- Maintain capacity, storage, ridge height and outlets.
- Clean out inlets for underground outlets.
- Remove sediment build-up and redistribute.
- Inspect channel cross-section for stable side slopes, points of scour, rodent holes, and breaches.
- Check channel bottom for erosion or excessive scour, deposition of sediment or other obstructions.
- Outlets should be checked to ensure that they remain adequate, show no sign of erosion or loss of structural integrity.
- Vegetated structures will need to be periodically mowed.
- Periodic inspection and repair of roof runoff structures, outlets, access roads, etc.

Agricultural Conservation Management System Summary Sheet

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS

Component BMPs that result in a complete system meeting appropriate NRCS Standards, and reduce a resource concern may be eligible for cost-sharing. Compliance with local and state laws should be adhered to including the need for Erosion and Sediment Control plans for disturbances over 1 acre, contacting Underground Utilities Protection before excavation, contacting SHPO and others as applicable.

NRCS STANDARDS TO UTILIZE*

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find at the minimum the practice standard. You may also find: a Statement of Work; Practice Guideline, Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation of operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Water and Sediment Control Basin	638	Number	March 2019	10
Sediment Basin	350	Number	May 2017	10
Diversion	362	Feet	May 2017	10
Grassed Waterway	412	Acre	Oct 2015	10
Filter Strips	393	Acre	Oct 2017	10
Grade Stabilization Structure	410	Number	March 2021	10
Critical Area Planting	342	Acre	Oct 2017	10
Lined Waterway or Outlet	468	Feet	March 2018	10
Conservation Cover	327	Acre	July 2019	1
Terrace	600	Feet	Oct 2015	10
Subsurface Drain	606	Feet	May 2020	10
Underground Outlet	620	Feet	Oct 2014	10
Obstruction Removal	500	Acre	Sept 2010	1

Agricultural Conservation Management System Summary Sheet

Fence	382	Feet	Oct 2014	10
Access Road	560	Feet	March 2021	10
Roof Runoff Structure	558	Number	Oct 2015	10
Trails and Walkways	575	Feet	Oct 2015	10

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for NY: https://efotg.sc.egov.usda.gov/#/details
- Soil Management AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Feed Management System

DEFINITION
The continual process of providing adequate, not excess, nutrients to dairy animals through the integration of feeding and crop management to reduce nutrient excretion in manure and nutrient accumulation in soil, lower potential pollution risks to water and air resources, and improve farm profitability.

WATER QUALITY PURPOSE
Reduces the accumulation and potential loss of nitrogen and phosphorus in manure from dairy farms.

POLLUTANT CONTROLLED
Nutrients, pathogens, biochemical oxygen demand, and ammonia

WHERE USED
Dairy farms

SYSTEM DESCRIPTION
Feed management is a continuous improvement process involving benchmarking, planning, implementation, and monitoring. It is facilitated by a feed management specialist and adopted and directed by farm management to meet goals in three areas:

1. improved nutrient use efficiency, homegrown feed utilization, and income-over-feed cost;
2. crop production and purchased feeds are optimized for the feeding system; and
3. reduced nutrient overfeeding, excretion, and accumulation.

Dairy farms using the feed management process pursue those goals often by improving the digestible nutrient content of homegrown feeds produced and fed; accurately estimating feed nutrient intakes by animals and tracking feed inventories; employing scientific standards to determine nutrient requirements and ration levels; and increasing the level of homegrown feeds (forages and/or grains) in the diet.

Feed management recommendations should be based on the best available research information. The USDA-NRCS Feed Management Standard (NY-592) provides specific technical details and references about planning, implementation, and operation and maintenance. The Cornell Precision Feed Management guidelines and Precision Feed Management Benchmarking tools provide further information for effective feed management with dairy cows. Management of feed rations and forages should be consistent with Cornell recommendations, where available; otherwise National Research Council recommendations should be utilized.

Agricultural Conservation Management System Summary Sheet

SYSTEM EFFECTIVENESS

Improving a farm's nutrient mass balance (the amount of nutrients imported compared to the amount of nutrients exported) will reduce the amount of nutrients that have the potential to be lost to the environment. Changes in the feeding program can have a significant influence on farm nutrient management and its mass nutrient balance. While it varies widely by farm size and management, a substantial portion of the nutrients imported to dairy farms in the form of purchased (imported) feeds, and to a lesser degree fertilizers, often remains on the farm where they may accumulate in farm soils and may be lost to air and water resources. Farms that intensively manage their feeding program reduce nutrient excretion in the manure, increase feed nutrient utilization, and subsequently improve the farm's mass nutrient balance.

A 60% reduction in nitrogen and phosphorus mass nutrient balances has been documented by Cornell University and Cornell Cooperative Extension research on over 40 dairy farms that adopted feed management practices between 2004 and 2008. Those dairy farms also realized lower operating costs ($1.33/CWT) and 11% higher milk production that similar sized farms not participating in the feed management process in the region.

IMPACTS ON SURFACE WATER

Beneficial, including nutrients and pathogens.

IMPACTS ON GROUND WATER

Beneficial, including nutrients and pathogens.

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial, the soil health/conservation often must improve in order to optimize homegrown crop production for herd forage and/or grain needs.

Air: Beneficial, as it has the potential to reduce particulate matter from ammonia volatilization and nitrous oxide emissions.

Plants: Beneficial, as it can reduce nutrient losses and subsequent impacts on neighboring plant communities.

Animals: Beneficial, as it can reduce nutrient losses and subsequent impacts on terrestrial and aquatic habitat.

Human: Beneficial, as it can further safeguard drinking water sources, improve land and water resources for recreation, and provide economic growth.

Energy: Beneficial, as it can reduce use of transportation fuels for imported feed and fertilizer and improve livestock output per energy input.

ADVANTAGES TO FARM

- Potential to reduce nutrient losses and improve animal and crop production.
- Potential to improve herd/flock health.
- Often a positive impact on farm profitability.

DISADVANTAGES TO FARM

- Higher level of farm management is required may result in increased labor and equipment costs.
- Requires additional time and training to adjust to new management strategies.
- Cost to change management may be prohibitive for some farms.

Agricultural Conservation Management System Summary Sheet

SYSTEM LIFESPAN
One (1) year.

COST
Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Costs for feed management depend on several factors, including the size and type of farm, existing level of farm management, feeding and feed storage facilities, history of herd, feed, and other farm records, available equipment, and familiarity with custom operators. Consultation fees for developing and maintaining a feed management plan should be considered in addition to the costs for feed and forage analyses.

OPERATION AND MAINTENANCE
Each Agricultural Management System is unique and must be customized for every situation. Feed management is a continuous improvement process, involving regular monitoring through benchmarking, planning to address opportunities, implementing those plans, and evaluating the plans via benchmarking.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific conservation practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS
See Cornell Feed Management guidelines and Precision Feed Management Benchmarking tools as well as the USDA-NRCS Feed Management Standard (NY-592) for specific technical details about planning, implementation, and operation and maintenance.

NRCS STANDARDS TO UTILIZE*
For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Feed Management	592	Animals Units Affected	Oct 2012	1

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES
- NRCS eFOTG for NY: https://efotg.sc.egov.usda.gov/#/details
- Cornell Precision Feed Management: https://cnydfc.cce.cornell.edu/topic.php?id=19
- Management of Dairy Feed Nutrients AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Integrated Pest Management System

DEFINITION
An ecologically based, site-specific integrated pest control strategy utilizing a combination of pest prevention, pest avoidance, pest monitoring, and pest suppression strategies coupled with precision application techniques and Best Management Practices when pesticide application is warranted.

WATER QUALITY PURPOSE
To reduce pesticide use, availability, and losses to the environment in crop and livestock production.

POLLUTANT CONTROLLED
Pesticides

WHERE USED
On all agricultural lands where pests will be managed, and a resource concern has been identified.

SYSTEM DESCRIPTION
Integrated Pest Management (IPM) strategies that keep pest populations below economically damaging levels and minimize pest resistance are used to reduce pest management risks to water quality and the environment. Specific IPM techniques include:

Prevention – activities such as cleaning equipment when leaving an infested area, using pest free seeds and transplants, and irrigation scheduling to limit situations that are conducive to disease development,

Avoidance – activities such as using pest resistant varieties, crop rotation, refuge management, and maintaining healthy and diverse plant communities,

Monitoring – activities such as crop scouting, establishing trap crops, degree-day modeling and weather forecasting to help target suppression strategies and avoid routine preventative treatments,

Suppression – activities such as the judicious use of cultural, mechanical, biological, and chemical control methods that reduce or eliminate a pest population or its impacts while minimizing risks to non-target organisms. As part of a suppression system, precision application techniques in an IPM system can further minimize pesticide risks to natural resources and humans. Examples of such techniques include: appropriate equipment calibration to include the correct rate, boom height, appropriate nozzle type, nozzle spacing, operating speed and pressure; computer controlled application technologies; and advanced technology equipment.

Agricultural Conservation Management System Summary Sheet

SYSTEM EFFECTIVENESS

Overall, IPM is effective, profitable, and relatively safe. Few if any studies have established a solid link between IPM usage and reduction of pesticide levels in receiving waters. However, IPM has been credited with the reduction in chemical usage. IPM is an effective management practice for consideration in vegetables, fruit, ornamentals, or field crops especially where large amounts of pesticides are applied, waterbodies are adjacent to crop fields, and soils are highly permeable. Numerous studies have shown pesticide use can be reduced up to 45% in fields employing IPM strategies verses conventional fields. Pesticide use for the control of house flies in dairy barns can be reduced 50 to 80% if manure is removed on a timely basis and fly biological control agent populations are enhanced.

When a pesticide is used its effectiveness depends upon the proper application and placement of the chemical. It is estimated that 60% of sprayers have a calibration error rate greater than plus or minus 10%. Frequent calibration checks and/or computerized precision application greatly reduce this problem.

Associated conservation practices that provide for adequate plant nutrients and soil moisture, including a favorable pH and soil quality, can reduce plant stress, improve plant vigor and increase the plant's overall ability to tolerate pests thereby reducing the need for pesticide use.

IMPACTS ON SURFACE WATER

Beneficial – In most management options the availability of pesticides as a nonpoint source pollutant is reduced.

IMPACTS ON GROUND WATER

Beneficial – In most management options the availability of pesticides as a nonpoint source pollutant is reduced.

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial as the use of pesticides generally declines reducing risk of carry over and accumulation in the soil.

Air**:** Beneficial as IPM strategies generally result in less pesticide drift.

Plants: Beneficial as overall less use of pesticide and more precise application is a benefit to non-target plants.

Animals: Beneficial as IPM strategies and precision application techniques reduce the impact of pesticides on non-target organisms such as pollinators.

Human: Beneficial as it is an economically and environmentally defensible practice which realizes a higher net return per acre due to improved commodity quality.

Energy: Neutral.

ADVANTAGES TO FARM

- Use of pesticides usually declines with the use of IPM strategies.
- Usually requires fewer pesticides on a per acre basis.
- IPM generally results in higher average per acre crop yield.

Agricultural Conservation Management System Summary Sheet

DISADVANTAGES TO FARM

- May result in more pesticide applications per growing season as scouting may find pest populations over threshold.
- Higher level of grower management is required which may result in increased labor and equipment costs.
- Requires additional time and training to adjust to new management strategies.
- May have control costs higher than conventional control techniques.
- Cost of some advanced technology equipment may not be economical for small pesticide applicators.

SYSTEM LIFESPAN

One (1) year for IPM plan and may vary up to 10 years for various application equipment.

COST

Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. The cost of this system will be highly variable depending on the control strategies employed.

OPERATION AND MAINTENANCE

Each Agricultural Management System is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system:

- Scouting and monitoring is an on-going activity.
- O&M is specific for each prevention, avoidance, monitoring, and suppression technique used. Record keeping is an essential component of all these practices.
- Follow label directions when pesticides are used.
- Follow equipment manufacturer's directions.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific conservation practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS

Components that result in a complete system that eliminates a resource concern may be eligible for cost-sharing. Compliance with local, state, and federal laws should be adhered to.

Agricultural Conservation Management System Summary Sheet

NRCS STANDARDS TO UTILIZE

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Pest Management Conservation System	595	Acre	April 2021	1
Conservation Cover	327	Acre	July 2019	5
Herbaceous Weed Treatment	315	Acre	April 2021	1
Conservation Crop Rotation	328	Acre	Oct 2015	1
Field Border	386	Acre	Oct 2017	10
Filter Strip	393	Acre	Oct 2017	10
Forage Harvest Management	511	Acre	Dec 2010	1
Irrigation Water Management	449	Acre	Oct 2015	1
Waste Recycling	633	Tons	Oct 2015	1

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for New York: https://efotg.sc.egov.usda.gov/#/details
- Pesticide Use AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Irrigation Water Management System

DEFINITION
A planned system that determines and controls the rate, amount, placement, and timing of irrigation water.

WATER QUALITY PURPOSE
To reduce surface water runoff, including any associated erosion, and/or leaching of nutrients and pesticides by applying irrigation water based upon the capacity of the soil to hold water and the needs of the crop.

POLLUTANT CONTROLLED
Sediment, nutrients, and pesticides

WHERE USED
On agricultural fields requiring irrigation where the potential for surface water runoff and/of groundwater contamination exists, and a resource concern has been identified.

SYSTEM DESCRIPTION
Irrigation water management is utilized on cropland to supplement rainfall, and to apply fertilizer and pesticides to target crops. Several irrigation methods exist. Selection of the irrigation system to be used is based on the needs of the crop to be grown, soil type, topography, climate, distance to streams or other water bodies, and the source of water to be used for irrigation. To decrease non-point source pollution of surface and groundwater resources, water application must be at rates that minimize the transport of sediments, nutrients and chemicals to surface waters and that minimize the transport of nutrients and chemicals to groundwater.

The development of an “Irrigation Water Management Plan” that addresses the irrigation scheduling, in both timing and amount, control of runoff, minimizing deep percolation and the uniform application of water is an essential component of this practice.

SYSTEM EFFECTIVENESS
This system can help prevent over irrigation and the resulting loss of sediment, nutrients, and pesticides by surface runoff and leaching.

IMPACTS ON SURFACE WATER
Beneficial.

IMPACTS ON GROUND WATER
Beneficial- Leaching losses of nutrients and pesticides are minimized when scheduling is a part of an irrigation water management system. However, other associated practices that promote infiltration may have adverse impacts on groundwater.

Agricultural Conservation Management System Summary Sheet

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial by minimizing irrigation induced soil erosion and sedimentation.
Water: Beneficial by reducing water waste – applies what the crop needs.
Air: Beneficial by managing soil moisture to reduce particulate matter movement.
Plants: Neutral.
Animals: Neutral.
Human: Beneficial due to positive impacts on soil, water, air and energy.
Energy: Beneficial as it can reduce energy use.

ADVANTAGES TO FARM

- Manages air, soil, or plant micro-climate.
- Provides the medium and guidance for proper and safe chemigation and fertigation.
- Avoids crop stress due to under-irrigation, and may increase crop yields.
- May reduce operating and labor costs.
- May reduce energy costs.

DISADVANTAGES TO FARM

- May require additional training, or an increase in irrigation management skills.
- Requires additional time and equipment to collect data.
- Changes in irrigation methods may require changes in equipment which can be costly.

SYSTEM LIFESPAN

One (1) year.

COST

Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Some factors impacting cost include additional labor and equipment expenses to collect data and automated irrigation scheduling software may need to be purchased.

OPERATION AND MAINTENANCE

Each Agricultural Management System is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system:

- Accurate and timely records of rate, amount, timing and maintenance of equipment is a necessary component of this practice.
- A record keeping system and O&M plan must be prepared for the system.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific conservation practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS

Components that result in a complete system that eliminates a resource concern may be eligible for cost-sharing. Compliance with local and state laws should be adhered to.

Agricultural Conservation Management System Summary Sheet

NRCS STANDARDS TO UTILIZE

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Irrigation Water Management	449	Acre	Oct 2015	1
Irrigation Pipeline	430	Feet	Dec 2011	10
Irrigation Reservoir	436	Acre/Feet	Dec 2011	10
Irrigation System, Microirrigation	441	Acre	Oct 2016	10
Sprinkler System	442	Acre	Oct 2016	10
Irrigation System, Surface and Subsurface	443	Acre	Oct 2017	10
Pumping Plant	533	Number	Dec 2011	10
Water Well	642	Number	March 2021	10
Nutrient Management	590	Acre	Sept 2020	1
Pest Management Conservation System	595	Acre	April 2021	1

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for NY: https://efotg.sc.egov.usda.gov/#/details
- Irrigation Water Management AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Livestock Heavy Use Area Runoff Management System

DEFINITION
A system for the interception, collection and safe treatment of runoff water from a barnyard or concentrated livestock area.

WATER QUALITY PURPOSE
To exclude clean water from the concentrated livestock areas and to reduce the transport of pollutants from barnyards and concentrated livestock areas into surface or groundwaters.

POLLUTANT CONTROLLED
Nutrients, sediments, pathogens, and Bio-chemical Oxygen Demand

WHERE USED
Barns, barnyards, loafing areas, paddocks, feedlots, calf hutch areas or any area where livestock concentrate, and a resource concern has been identified.

SYSTEM DESCRIPTION
The system is composed of one or more component practices. Structural practices may be employed to exclude clean water from areas of livestock concentrations (for example, diversions that intercept and transport upslope surface water away from barnyards and roof runoff systems that collect rainwater from barn roofs). Heavy Use Areas are used to facilitate clean up and direct polluted runoff where a variety of structural, vegetative and operational practices are used to treat polluted runoff and seepage from barnyards, loafing areas and other areas with concentrated waste. Examples include settling tanks, collection or vegetative treatment areas.

Alternatives also include elimination, utilizing gates and laneways to move livestock to barns and / or managed pastures or as a last resort, installation of roofs to isolate the barnyard from precipitation.

When this system is funded by the NYS Agricultural Nonpoint Source Abatement and Control Program (ANSACP), a complete system meeting all NRCS Standards must result.

SYSTEM EFFECTIVENESS
Because livestock heavy use area management systems are site-specific and are composed of one or more management practices, system effectiveness varies. Key factors for effectiveness include success of cutting off clean water before it reaches pollutants, reducing the size of the affected area and treating and or collecting polluted run-off.

IMPACTS ON SURFACE WATER
Beneficial.

IMPACTS ON GROUND WATER
Beneficial - Can be negative if the abandoned heavy use areas are not remediated and nutrient laden soil and manure is not removed allowing nutrient losses to the groundwater.

Agricultural Conservation Management System Summary Sheet

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Neutral.
Air: Beneficial in that clean barnyards, where manure and organics are collected more frequently, tend to have less odor issues.
Plants: Neutral.
Animals: Beneficial. Clean run-off leads to cleaner streams.
Human: Beneficial. Barnyard areas that are kept clean are more aesthetically pleasing and produce less odors, flies or vectors.
Energy: Negative – increased fuel use.

ADVANTAGES TO FARM

- Dries up barnyard and loafing area.
- Improves ease of daily operating procedures.
- Less clean-up time during milking.
- Decreases the chance of milk production reduction during wet periods.
- Increased milk value due to lower somatic cell counts.
- Can include herd health benefits (less risk of mastitis and hoof rot in cattle).
- Depends on the system. Improved barnyard require more energy to clean up on a regular basis (more each day instead of a massive amount every few years) but are more efficient and can save energy required for cow-clean up, milking center clean-up (from less sediment and manure to treat).
- More manure collected to utilize for crop fertility.

DISADVANTAGES TO FARM

- Requires a higher level of producer management skill to achieve positive pollution control.
- May be expensive initial investment and operating costs.
- Increased fuel consumption.

SYSTEM LIFESPAN

Ten (10) years.

COST

Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Range: $3,000 to $150,000 or more, depending upon system design, complexity, and number of animals treated and total area to be treated.

Agricultural Conservation Management System Summary Sheet

OPERATION AND MAINTENANCE

Each Agricultural Management System is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system:

- Daily to weekly scraping of concrete pads.
- Maintain fences and gates.
- Re-grade barnyards as needed to control water.
- Maintain vegetation.
- Check roof gutters after heavy storm events and remove debris and ice.
- Maintain gravel/stone heavy use areas, if applicable.
- Ensure dosing on VTA to not overload system. Harvest and remove filter area vegetation.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS

Components that result in a complete system of BMPs meeting NRCS Standards that eliminate a resource concern may be eligible for cost-sharing. Livestock operations that have been designated as a CAFO are required to comply with CAFO regulations. Compliance with local and state laws should be adhered to including the need for Erosion and Sediment Control plans for disturbances over 1 acre, contacting Underground Utilities Protection before excavation, contacting SHPO and others as applicable. For an ANSACP grant application, it is required to utilize the Roof Screening Tool if a covered facility is included in the grant.

NRCS STANDARDS TO UTILIZE*

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice."

NRCS Name	Standard #	Reportable Item	Date	Life Span
Heavy Use Area Protection	561	Sq. Feet	Oct 2015	10
Access Control	472	Acres	April 2019	10
Trails and Walkways	575	Feet	Oct 2015	10
Fence	382	Feet	Oct 2014	10
Access Road	560	Feet	March 2021	10
Roof Runoff Structure	558	Number	Oct 2015	10
Roof and Covers	367	Number	Oct 2016	10

Agricultural Conservation Management System Summary Sheet

Conservation Cover	327	Acre	July 2019	1
Critical Area Planting	342	Acre	Oct 2017	10
Vegetated Treatment Area	635	Acre	Feb 2017	10
Diversion	362	Feet	May 2017	10
Grassed Waterway	412	Acre	Oct 2015	10
Lined Waterway or Outlet	468	Feet	May 2011	10
Pumping Plant	533	Number	Dec 2011	10
Sediment Basin	350	Number	May 2017	10
Subsurface Drain	606	Feet	May 2020	10
Underground Outlet	620	Feet	Oct 2014	10
Waste Separation Facility	632	Number	Oct 2013	10
Waste Storage Facility	313	Number	March 2018	10
Waste Transfer	634	Number	Oct 2015	10
Water and Sediment Control Basin	638	Number	March 2019	10
Watering Facility	614	Number	March 2021	10

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for NY: https://efotg.sc.egov.usda.gov/#/details
- Livestock Heavy Use Area AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Manure and Agricultural Waste Treatment System

DEFINITION
A system for the mechanical, chemical or biological treatment of agricultural wastes.

WATER QUALITY PURPOSE
Treating manure and other agricultural wastes in order to improve nutrient and pathogen management and reduce losses to surface water and groundwater.

POLLUTANT CONTROLLED
Nutrients, pathogens, biochemical oxygen demand, and ammonia

WHERE USED
Any farm with agricultural wastes, such as manure, process wastewaters, crop residues, or other organic residues, where nutrient, pathogen, and/or odor management could be improved through treatment of the wastes.

SYSTEM DESCRIPTION
Manure and agricultural waste treatment systems encompass a broad set of technologies used to process wastes for the purposes of:

- improving ground and surface water quality by reducing the nutrient content, biochemical oxygen demand, and/or pathogen levels of agricultural waste;
- improving air quality by reducing odors and gaseous emissions;
- producing value added byproducts; and/or
- facilitating desirable waste handling, storage, or land application alternatives.

This system applies where the form and characteristics of agricultural waste make it difficult to manage, where changing the form or composition provides additional utilization alternatives, and where conventional waste management alternatives are deemed not as effective.

Systems may be comprised of one or more of the following established treatment practices:

- anaerobic digestion;
- liquid solid separation;
- biological and/or chemical amendments;
- manure or agricultural waste composting facility (other than animal carcass)
- waste facility cover (and flare, where applicable); and/or

Manure and agricultural waste treatment systems are often also combined with other conservation practices, such as manure storage and transfer, composting, vegetated treatment areas, nutrient management, etc. for more comprehensive management of resources and/or compliance with State and/or federal regulations.

Agricultural Conservation Management System Summary Sheet

SYSTEM EFFECTIVENESS

Manure and agricultural waste treatment systems must be planned, designed, implemented, and maintained to address the unique set of resource concerns for each farm, so systems will be comprised of different components and achieve varying levels of effectiveness. In general, any system that utilizes high temperatures (such as anaerobic digestion) for prolonged periods will achieve significant pathogen control and odor control, allowing for improved nutrient management, water quality protection and neighbor relations. If such a system is anaerobic, it will also result in enhanced methane production/capture which, if flared or used for heat or electricity production, could have positive greenhouse gas and renewable energy benefits. Systems that cover manure and other wastes reduce total volume by eliminating additions from precipitation and reduce ammonia, methane, and odor compound emissions. Systems that separate the waste into liquid and solid pools allow for more precise and efficient nutrient management (pumping, drag line application, incorporation, etc.) as well as the potential for value added products (solids re-used as bedding, compost for sale off farm, lower-risk solid manure for nutrient applications in sensitive areas, etc.). Most of these systems to not make nutrients disappear, but they concentrate, separate, etc. nutrients into forms that facilitate more efficient re-use by crops and/or sale or export from the farm.

IMPACTS ON SURFACE WATER

Beneficial - including reduced losses of nutrients, biochemical oxygen demand, ammonia, and pathogens.

IMPACTS ON GROUND WATER

Beneficial - including nutrients and pathogens.

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial if system allows more precise application of nutrients with less soil compaction. Could be neutral or negative if the system results in significant manure/waste organic matter to be sold/exported from farm and not returned to cropland.

Air: Beneficial, as it has the potential to reduce emissions of ammonia, greenhouse gas, and odor compounds. May be negative if the treatment system is not operated correctly.

Plants: Beneficial, as it can reduce nutrient losses and subsequent impacts on neighboring plant communities.

Animals: Beneficial, as it can reduce pathogen losses as well as nutrient losses and subsequent impacts on terrestrial and aquatic habitat.

Human: Beneficial, as it can further safeguard drinking water sources, improve land and water resources for recreation, reduce odor, and provide economic growth.

Energy: Beneficial, as such systems often improve the use of on-farm nutrients, thereby reducing energy for fertilizer production and transport. Some treatment systems also allow for on-farm energy production.

ADVANTAGES TO FARM

- Reduced nutrient losses.
- Improved productivity of crops and livestock as well as greater management flexibility.
- Can have a positive impact on farm profitability and diversify income streams.
- Improved neighbor relations.

Agricultural Conservation Management System Summary Sheet

DISADVANTAGES TO FARM

- High capital costs, early stage of technology, sometimes inadequate infrastructure to deliver energy to market, competition with much larger energy entities, etc. may present significant barriers to entry.
- Soil organic matter may decline if systems involve significant exports/sales of manure solids.
- Higher level of farm management required may result in increased labor and equipment costs.
- Requires significant additional time and training to adjust to new management strategies.

SYSTEM LIFESPAN

Variable depending on component practices of the system but generally 10 years.

COST

Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. The cost is variable depending on the type of manure and agricultural waste treatment system. More complex systems, such as anaerobic digestion, coupled with liquid solid separation, electricity generation, solids composting, effluent storage, and drag hose land application, can be very expensive to design, build, and operate, but allow farms to realize other economic, community, and environmental goals.

OPERATION AND MAINTENANCE

Each Agricultural Management System is unique and must be customized for every situation. Very regular monitoring and maintenance are required with these systems, according to the O&M associated with the various system components.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific conservation practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS

Components that result in a complete system that eliminates a resource concern may be eligible for cost-sharing. Livestock operations that have been designated as a CAFO are required to comply with CAFO regulations. Compliance with local and state laws should be adhered to including the need for Erosion and Sediment Control plans for disturbances over 1 acre, contacting Underground Utilities Protection before excavation, contacting SHPO and others as applicable.

Agricultural Conservation Management System Summary Sheet

NRCS STANDARDS TO UTILIZE*

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice."

NRCS Name	Standard #	Reportable Item	Date	Life Span
Waste Separation Facility	632	Number	Oct 2013	10
Waste Storage Facility	313	Number	March 2018	10
Waste Transfer	634	Number	Oct 2015	10
Waste Treatment	629	Number	Oct 2013	10
Anaerobic Digester	366	Number	March 2019	10
Composting Facility	317	Number	March 2018	10
Pumping Plant	533	Number	Dec 2011	10
Roofs and Covers	367	Number	Oct 2016	10
Heavy Use Area Protection	561	Sq. Feet	Oct 2015	10

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for NY - https://efotg.sc.egov.usda.gov/#/details
- Cornell University Dairy Environmental Systems: https://cals.cornell.edu/pro-dairy/our-expertise/environmental-systems

Agricultural Conservation Management System Summary Sheet

Nutrient Management System - Cultural

DEFINITION
Managing the amount (rate), source, placement (method of application), and timing of plant nutrient and soil amendment applications for efficient use by crops and reduced losses to the environment. If applicable, this can include addressing the issues from farmstead areas as it relates to non-point sources of pollutants.

WATER QUALITY PURPOSE
To reduce or prevent nutrient losses from runoff, erosion, and leaching to surface and groundwater resources.

POLLUTANT CONTROLLED
Sediment, nutrients, pathogens, biochemical oxygen demand, and ammonia

WHERE USED
Cropland, hayland, pasture, vegetable and fruit production, orchards, vineyards, turf, biomass production, and ornamental production, including greenhouses.

SYSTEM DESCRIPTION
Nutrients are managed for the economic production of crops, forages, pasture, ornamentals, and biomass, and the protection of natural resources. Cultural nutrient management consists of applying nutrients and soil amendments to crops in the right amount, right source, right method, and right timing ("the 4Rs") according to several, integrated factors:

- farm management and goals including realistic crop yields;
- an accurate estimate of crop nutrient needs;
- nutrients credits in soil and manure;
- nutrient credits from crop residues;
- risk assessments for runoff, leaching, and erosion;
- setbacks from hydrologically active areas;
- weather and soil conditions; and
- adaptive management over time.

A well integrated nutrient management plan provides recommendations for manure, fertilizer, process wastewaters, composts, and/or lime applications according to the factors, above. It promotes nutrient use efficiency and controls nutrient loss by focusing on the use of on-farm nutrient sources, emphasizing the 4Rs, and, in many cases, reducing nutrient imports onto farms. Nutrient management recommendations should be based on the best available research information for the soils and climate in New York State. Nutrient applications and their management should be consistent with Cornell Nutrient Guidelines.

Agricultural Conservation Management System Summary Sheet

SYSTEM EFFECTIVENESS

Proper nutrient management prevents excessive applications, can decrease nutrient imports on farms, and reduces the potential for nutrient loss. Long-term experimentation demonstrates that recommendations based on field research, conducted in New York, provide the best estimate of economic response and improved nutrient cycling for our conditions. Several studies from Cornell University demonstrate reductions in whole farm nutrient balances and nutrient purchases as well as nutrient losses via runoff and leaching through improved nutrient management.

Specifically, there are many management opportunities that advance conservation and crop productivity through nutrient applications made with the 4Rs, including:

- counting nitrogen credits from soil organic matter, past manure applications, and crop residues can significantly reduce the need for supplemental nitrogen fertilizer without sacrificing crop yield;
- regular soil and manure testing helps make the most of on-farm nutrient sources and better target purchased fertilizers, saving money and excess nutrient applications without sacrificing crop yield;
- on-farm tracking of soil tests, manure tests, and field records over time improves confidence in the nutrient management program and allows continual improvement through adaptive management;
- incorporating/injecting manure soon after application to a growing crop or just before planting in the spring can increase the nitrogen supply from the manure, reduce the need for supplemental nitrogen fertilizer, reduce the risk of over applying phosphorus relative to crop uptake, and reduce risk of surface runoff losses;
- considering hydrologically active areas, weather, field risk assessments, and timing of crop nutrient use to prioritize nutrient applications improves crop uptake and lowers risk of runoff or leaching;
- using cover crops scavenges nutrients remaining after the main crop, reducing losses from runoff, erosion, and leaching, as well as conserving nutrients and organic matter for the following crop;
- applying fertilizer with a method and timing to allow optimal plant uptake reduces losses and improves efficiency;
- etc.

IMPACTS ON SURFACE WATER

Beneficial - including nutrients, sediment, and pathogens.

IMPACTS ON GROUND WATER

Beneficial - including nitrogen and pathogens.

Agricultural Conservation Management System Summary Sheet

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial, as it generally improves soil health and reduces erosion.

Air: Beneficial, as it has the potential to reduce particulate matter from ammonia volatilization and odors.

Plants: Beneficial, as it can reduce nutrient losses and subsequent impacts on neighboring plant communities.

Animals: Beneficial, as it can reduce pathogen losses as well as nutrient losses and subsequent impacts on terrestrial and aquatic habitat.

Human: Beneficial, as it can further safeguard drinking water sources, improve land and water resources for recreation, reduce odor, and provide economic growth.

Energy: Beneficial, as it can reduce use of farm fuels, energy for fertilizer manufacturing and transportation fuels for imported fertilizer and feed.

ADVANTAGES TO FARM

- Reduced nutrient losses and improved nutrient use efficiency.
- Improved crop yield and quality, often across the range of optimal and extreme weather conditions (improved soil health).
- Beneficial or neutral impact on farm profitability.
- Improved neighbor relations.

DISADVANTAGES TO FARM

- Higher level of farm management required may result in increased labor, equipment costs, and capital investment (e.g., manure storage).
- Requires additional time and training to adjust to new management strategies.
- Cost to change management may be prohibitive for some farms.

SYSTEM LIFESPAN

One (1) year.

COST

Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Costs depend on several factors, including the size and type of farm, existing level of farm management, history of nutrient analyses and farm records, available equipment, familiarity with custom operators, and, on livestock farms, existing manure storage and transfer capacity. Consultation fees for developing and maintaining a nutrient management plan should be considered in addition to the costs for soil testing and manure nutrient analyses.

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OPERATION AND MAINTENANCE

Each Agricultural Management System is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system:

- annual updating of the nutrient management plan.
- soil testing every three years and manure analyses once per calendar year.
- records showing manure tests, date and conditions when applied, amount applied, application method, manure source, and location.
- crop management records are maintained.
- calibration of manure and fertilizer application equipment

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific conservation practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS

See Cornell Nutrient Guidelines and the USDA-NRCS Nutrient Management Practice Standard (NY-590) for specific technical details about planning, implementation, and operation and maintenance.

Nutrient management plans are limited to the management of nutrients and soil health/conservation practices on fields, pastures, and in greenhouses. Comprehensive Nutrient Management Plans (CNMPs) address resource concerns across fields, pastures, and farmstead concentrated sources on livestock farms and should be given priority consideration where:

- excess nutrients are produced or imported;
- other farm related environmental concerns exist (i.e., silage leachate runoff, barnyard runoff, milkhouse wastewater, petroleum product storage, pesticide storage, mixing and loading, pesticide use and waste disposal);
- the farm has been determined to be a Concentrated Animal Feeding Operation (CAFO) by NYS Department of Environmental Conservation;
- etc.

Note: a Nutrient Management Plan (NRCS Standard 590), alone, does not meet the NYS requirements for CAFOs. A Comprehensive Nutrient Management Plan (NRCS Standard 312) must be developed for these farms.

Nutrient management plans, Comprehensive Nutrient Management Plans, and certain components may be eligible for cost-sharing. Check with the local NRCS and/or SWCD office to determine practice eligibility and the availability of funds.

Agricultural Conservation Management System Summary Sheet

NRCS STANDARDS TO UTILIZE*

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Nutrient Management	590	Acre	Sept 2020	1

REFERENCES

- NRCS eFOTG for NY - https://efotg.sc.egov.usda.gov/#/details
- Cornell Nutrient Guidelines for Field Crops: http://nmsp.cals.cornell.edu/guidelines/nutrientguide.html
- Cornell Nutrient Guidelines for Vegetable Crops: www.vegetables.cornell.edu/crops/index.htm
- Cornell Nutrient Guidelines for Grapes: https://cals.cornell.edu/cornell-agritech/products-we-research/grapes
- Cornell Nutrient Guidelines for Berries: https://cals.cornell.edu/cornell-agritech/products-we-research/berries
- Cornell Nutrient Guidelines for Tree Fruits: https://cals.cornell.edu/cornell-agritech/products-we-research/tree-fruits
- Cornell Guidelines for Greenhouses: www.greenhouse.cornell.edu
- Cornell Guidelines for Turf: https://turf.cals.cornell.edu/
- Nutrient Management: Manure and Fertilizer AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Pathogen Management System

DEFINITION
Use of preventative measures, livestock management and conservation practices to provide multiple barriers to the introduction, replication and survival of pathogens in domestic livestock and reducing the risk of pathogen contamination of surface and groundwater resources by treatment and/or controlling the movement of pathogens to water.

WATER QUALITY PURPOSE
To reduce the threat to surface and ground water from contamination by pathogenic organisms (e.g. Giardia and Cryptosporidium) found in farm animals.

POLLUTANT CONTROLLED
Pathogens, nutrients

WHERE USED
Primarily on agricultural land (livestock and poultry operations) where a resource concern has been identified citing runoff from young stock housing and/or exercise lots or land receiving manure application containing feces from infected animals which could enter nearby watercourse.

SYSTEM DESCRIPTION
A pathogen management system plan which incorporates a 4-barrier approach, as described below, shall be developed. The pathogen management plan will address each of the four barriers. A veterinarian, or other qualified professional, utilizing the protocol from the New York State Cattle Health Assurance Program (NYSCHAP), or other similar protocols for appropriate species, shall develop the first two barriers.

The **FIRST** barrier is reducing the potential for pathogens to enter the farm. This shall be accomplished by carrying out actions such as the following:

- The testing of non-chlorinated water supplies that serve the herd or flock for fecal coliform bacteria
- Establishing appropriate biosecurity measures, including those controlling people, pets, pests and other animals, equipment or materials that may transport pathogens from other sources.
- Maintaining good hygiene and minimizing herd or flock contact with manure from other animal groups.
- Maintaining an accurate animal identification system and record of all health events

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The **SECOND** barrier minimizes cross-contamination among animals and amplification of infection within a herd or flock. This shall be accomplished by actions such as:

- Keeping animal raising areas clean and dry,
- Proper worker hygiene when moving between facilities or animal groups,
- Ensuring that all feeds are stored and handled properly, and feeding utensils are clean, specifically avoiding manure contamination of feed.
- Implementing rodent and pest control programs,
- Separating pre-weaned animals to prevent direct contact with another young animal and with adult manure,
- Isolating infected animals until they are no longer infectious,
- Identifying the order in which animals should be fed, i.e. youngest to oldest, etc. depending upon the pathogen of concern.

The **THIRD** barrier provides for collection, handling, and treatment of manure and wastes appropriately to minimize the spread of the pathogens. This shall be accomplished by practices such as:

- Vegetated Treatment Areas (635) conservation practice standard to reducing runoff
- Composting (317) conservation practice standard for the composting of manures
- Animal Mortality (316) conservation practice standard for proper disposal of animal mortalities
- Waste Storage Structure (313) conservation practice standard to extension of waste storage time and/or isolation of waste storages to take advantage of pathogen die-off using:
    - Anaerobic Digester (366) conservation practice standard
    - Water Well Testing (355) conservation practice standard

The **FORTH** barrier restricts movement of contaminated feces into watercourses and/or groundwater. This shall be accomplished by practices such as:

- Diversion (362) conservation practice standard to divert clean water away from livestock facilities
- Nutrient Management (590) conservation practice standard to spreading manure.
- Access Control (472) conservation practice standard for the exclusion of animals from waterbodies, such as streams, creeks, rivers and lakes
- Fence (382) conservation practice standard for isolating septic systems, leach fields and filter areas, and other septage disposal areas from grazing animals
- Protecting aquifer recharge areas and wellheads from manure runoff from fields
- Filter Strips (393), Riparian Forested Buffer (391) Riparian Herbaceous Cover (390) conservation practice standards

SYSTEM EFFECTIVENESS

Pollution prevention effectiveness increases if a multi-barrier approach is implemented that controls pathogens at the source (e.g., improved calf management) while also controlling pathogen transport on the farm (e.g., composting of infected manure) and controlling pollutants at the water course (e.g., vegetative filter strip).

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IMPACTS ON SURFACE WATER
Potential for significant reduction in the risk of waterborne disease outbreaks from agricultural activities.

IMPACTS ON GROUND WATER
Actual risk of pathogens from agricultural activities polluting groundwater sources still needs to be determined. Avoiding spreading of infected manure on karst topography and within recharge areas of wells would reduce risk of well contamination.

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Neutral.
Air: Neutral.
Plants: Beneficial, as it often also results in reduced nutrient losses which can lead to less fertilization of off-site plant communities.
Animals: Beneficial, as it can reduce pathogen losses, transmission of pathogens to wildlife, and nutrient losses all of which can impact wildlife and their habitat.
Human: Beneficial, as it can further safeguard drinking water sources and improve land and water resources for recreation.
Energy: Neutral.

ADVANTAGES TO FARM

- Practices to improve health and survivability of young stock can increase overall farm production, profitability, and, in some cases, labor efficiency.
- Further reduces risk of pathogen contamination of farm wells used for drinking water.

DISADVANTAGES TO FARM

- Some solutions may involve high costs of providing separate housing facilities for raising calves on farms.

SYSTEM LIFESPAN
Ten (10) years.

COST
Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost, from no cost to $1000 to 1500 per calf if separate housing and waste storage is needed.

OPERATION AND MAINTENANCE
Each Agricultural Management System is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system:

- periodic plan review to determine if adjustments or modifications to the plan are needed.
- inspection and maintenance of animal exclusion.
- on-going monitoring of animal health is needed to determine practice effectiveness.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific conservation practice standard being utilized for additional information on operation and maintenance needs.

Agricultural Conservation Management System Summary Sheet

MISCELLANEOUS COMMENTS

For this system to be cost-shared, several criteria must be met. At a minimum, a Pathogen Management Plan (PMP) or a PMP included in a CNMP must be completed. All four tiers must be implemented for any one practice to be cost-shared. For example, to qualify for alternative calf housing (Tier 2), the farm must have implemented Tier I and agrees to implement Tier 3 and 4 during the life-span of the practice. This practice may be eligible for cost-sharing. Check with the local NRCS and/or SWCD office to determine practice eligibility and the availability of funds.

NRCS STANDARDS TO UTILIZE*

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Animal Mortality Facility	316	Number	April 2016	
Composting Facility	317	Number	March 2018	10
Ground Water Testing	355	Number	March 2021	1
Access Control	472	Acres	April 2019	10
Anaerobic Digester	366	Number	March 2019	10
Fence	382	Feet	Oct 2014	10
Heavy Use Area Protection	561	Sq. Feet	Oct 2015	10
Waste Separation Facility	632	Number	Oct 2013	10
Waste Storage Facility	313	Number	March 2018	10
Waste Transfer	634	Number	Oct 2015	10
Waste Treatment	629	Number	Oct 2013	10
Vegetated Treatment Area	635	Acre	Feb 2017	10
Nutrient Management	590	Acre	Sept 2020	1
Roofs and Covers	367	Number	Oct 2016	10
Diversion	362	Feet	May 2017	10

Agricultural Conservation Management System Summary Sheet

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for NY: https://efotg.sc.egov.usda.gov/#/details
- NYS Cattle Health Assurance Program: http://nyschap.vet.cornell.edu
- Water Borne Pathogens AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Petroleum and Oil Products Storage System

DEFINITION
An oil and petroleum product storage tank is a stationary facility which may include one or more above ground tanks, underground tanks, or a combination of both, for the storage, transfer, and usage of liquid oil or oil products such as diesel fuel, gasoline, kerosene, fuel oil, lubrication oil, hydraulic oil, crop oil, vegetable oil, waste oils, or animal fat. An oil storage system involves planning, implementation of standard operating procedures, proper tank siting, design and installation, spill and overfill prevention, leak monitoring and inspection, secondary containment, operation and maintenance, and emergency action planning.

WATER QUALITY PURPOSE
To prevent contamination of surface and groundwater from oil product storage facility leaks and spills.

POLLUTANT CONTROLLED
Petroleum/oil products and bio-chemical oxygen demand (for organic oil products)

WHERE USED
On agricultural operations where liquid oil products are stored and/or utilized and a resource concern has been identified.

SYSTEM DESCRIPTION
This practice consists of a combination of one or more of the following depending on the water quality risk posed by the storage facility as well as the regulatory requirements defined by NYS DEC and USEPA:

1. Proper storage tank siting – includes consideration of soil characteristics (corrosivity, permeability, bearing capacity, etc.), depth to groundwater, distance from a surface waterbody or drinking water well, location of floodplains, vehicular traffic patterns around the tank site, and distance from existing and planned farm buildings.

2. Proper tank design and installation – includes the use of corrosion resistant tanks and pipes (e.g., tank contains label that it conforms with 6 NYCRR Part 614), double wall tanks with wall thickness of at least 7/16th inch to protect against ballistics, steel posts to protect against vehicular traffic, anchoring or diking to avoid floatation in areas subject to flooding, a roof over tank to exclude rain water, etc., and utilizing an experienced tank installer who is familiar with state petroleum tank installation requirements.

3. Spill and overfill prevention equipment – includes color coding of fill ports, operating and shutoff valves, gauges and high level alarms, automated shutoff devices, tank labels (showing design and working capacity), spill catchment basin for fill ports of underground storage tanks.

4. Leak monitoring and tank inspection – includes checking of aboveground tank for corrosion and leaks, installing underground piping access ports for leak testing, installing a concrete pad under above-ground tanks to detect levels and installation of a monitoring well (e.g., 4" slotted plastic pipe) between underground storage tank and secondary containment barrier.

5. Secondary containment barrier – includes aboveground engineered dikes, curbs, liners, or diversion system designed to contain spills from above-ground tank rupture, overfills, vandals and equipment failure. Also included are drainage provisions for storm water that accumulates within the dike, curb or liner and installing double-wall tanks.

6. Spill emergency response plan – includes a written emergency plan at the storage facility location that shows action to be taken in case of a spill, leak, fire or explosion. Cleanup equipment should also be available at the site.

SYSTEM EFFECTIVENESS
When properly designed, installed, maintained, and managed this system can significantly reduce the risk of a contamination event occurring from the spill or leak of an oil product.

IMPACTS ON SURFACE WATER
Beneficial as a complete system should greatly reduce the risk of contaminants from reaching a surface water body.

IMPACTS ON GROUND WATER
Beneficial as a complete system should greatly reduce the risk of contaminants from reaching groundwater.

IMPACTS ON OTHER RESOURCES (OFF-SITE)
Soil**:** Beneficial by reducing the risk of leaks and spills that could contaminate soil.
Air**:** Neutral.
Plants**:** Beneficial as movement of product offsite following a major spill or leak could destroy vegetation.
Animals**:** Beneficial as movement of product offsite could have a detrimental effect on animal health and habitat.
Human**:** Beneficial by reducing the risk of health impacts through contamination of water and air resources.
Energy**:** Neutral.

ADVANTAGES TO FARM
- May provide direct protection to farmstead water supply if water source is a well.
- Can save product.
- May reduce farmer liability.

DISADVANTAGES TO FARM
- Requires continuous monitoring for potential leakage.

SYSTEM LIFESPAN
Ten (10) years.

COST
Each agricultural management System is unique and must be customized for every situation in which it is employed resulting in a wide and variable range in cost. Factors impacting cost may include site

characteristics, and the number of upgrades or add-ons to the system are required to reduce risk or comply with regulations.

OPERATION AND MAINTENANCE

Each agricultural management system is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system:

- Daily inspection for leaks either visually or check of leak monitoring system.
- All applicable State and Federal regulations and manufacturers recommendations regarding operation and maintenance and record keeping will be followed.
- An emergency action plan should be developed and may be required for certain threshold volumes.

See documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific conservation practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS

Components that result in a complete system that eliminates a resource concern may be eligible for cost-sharing. Compliance with local and state laws should be adhered to including the need for Erosion and Sediment Control plans for disturbances over 1 acre, contacting Underground Utilities Protection before excavation, contacting SHPO and others as applicable.

Leaks from underground petroleum storage are difficult to detect especially since most of the tanks installed on farms lack a leak monitoring system. Also, most landowners are unaware of the significant groundwater contamination risk to their own water supply posed by these storage tanks.

Farms with certain types and capacities of petroleum or oil product storages are required to comply with the NYS Department of Environmental Conservation (DEC) Petroleum Bulk Storage (PBS) regulation and/or the US EPA's Spill Prevention, Control, and Countermeasure (SPCC) regulation. To absolutely determine whether a farm is regulated under PBS and/or SPCC and the regulatory requirements for each, please visit these web sites: www.dec.ny.gov/chemical/287.html
www.epa.gov/ceppo/web/content/spcc/

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NRCS STANDARDS TO UTILIZE

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NRCS Name	Standard #	Reportable Item	Date	Life Span
On-Farm Secondary Containment Facility	319	Number	March 2016	10
Access Road	560	Feet	March 2021	10
Access Control	472	Acre	April 2019	10
Heavy Use Area Protection	561	Sq. Feet	Oct 2015	10
Conservation Cover	327	Acre	July 2019	5

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for NY: https://efotg.sc.egov.usda.gov/#/details
- NYS Department of Environmental Conservation (DEC) Petroleum Bulk Storage (PBS) regulation: www.dec.ny.gov/chemical/287.html
- US EPA's Spill Prevention, Control, and Countermeasure (SPCC) regulation: www.epa.gov/ceppo/web/content/spcc/
- Petroleum and Oil Products Storage AEM Tier 2 Worksheet and information Sheet

Agricultural Conservation Management System Summary Sheet

Prescribed Rotational Grazing System

DEFINITION
A prescribed grazing management system using 5 or more paddocks for a grazing season, alternating paddocks to allow for forage vigor and re-growth. Livestock graze for no more than 7 days before they are rotated to another paddock.

WATER QUALITY PURPOSE
To prevent soil erosion; reduce water runoff that may transport nutrients, sediments, and pathogens; and allow for the management of animal manure and nutrients.

POLLUTANT CONTROLLED
Sediment, nutrients, pathogens, bio-chemical oxygen demand, and ammonia

WHERE USED
On continuously grazed pastures, and fields including cropland that can be converted to pasture where a resource concern has been identified.

SYSTEM DESCRIPTION
Prescribed rotational grazing involves subdividing pastures and hayfields into grazing units called paddocks. The size and number of paddocks depend on the level of pasture productivity, stocking rate of livestock, and the residency period in the paddock. Individual paddocks are grazed for a period long enough to harvest available forage, and then rotated to allow optimal re-growth of the forage before livestock are returned to the paddock. Livestock may be moved as often as twice per day but at least once per week. The frequent rotation of livestock allows forage to recover from grazing, permitting plant re-growth and resulting in increased plant productivity.

SYSTEM EFFECTIVENESS
Most of the pollution associated with livestock on pasture is the result of overgrazing and allowing livestock direct access to surface water sources. When comparing prescribed rotational grazing systems to continuous grazing, forage quality is improved and ground cover is increased reducing erosion and runoff potential. Prescribed rotational grazing systems reduce the time livestock spend grazing on any single paddock, and improve the uniformity of manure and urine deposition over the pasture allowing for improved plant utilization and reduced runoff of nutrients. Controlled grazing pressure increases the quality and quantity of forage, thereby reducing the fiber content in manure and increasing the speed of manure decomposition. Livestock manure from a prescribed rotational grazing system is less likely to cause surface water pollution compared to a continuous grazing system. Because prescribed rotational grazing improves overall pasture yields, farmers can fence out riparian areas, wetlands, and other areas adjacent to waterbodies and still meet or exceed their pasture requirements.

IMPACTS ON SURFACE WATER
Beneficial as the practices reduces erosion and water runoff that may transport nutrients, sediment, and pathogens to waterbodies.

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IMPACTS ON GROUND WATER

Beneficial as the practice can improve the distribution of nutrients across a farm, address areas of livestock concentration, and result in a conversion of row crop acres to perennial pasture seedings.

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial by reducing erosion, sedimentation, and improving or maintaining soil quality.
Air: Beneficial as it has the potential to reduce motorized equipment use and sequester carbon.
Plants: Neutral.
Animals: Beneficial as it may provide or improve wildlife habitat.
Human: Beneficial as farmers have reported positive comments from their nonfarm neighbors who like seeing livestock out on lush green pasture.
Energy: Beneficial by allowing livestock to harvest their own feed and spread their own manure saving fossil fuels in the process.

ADVANTAGES TO FARM

- It allows for the recovery of the economic investment in 1 to 5 years.
- Promotes harvest efficiency thus maximizing animal production per acre.
- Has the potential to lower annual feed costs and reduce dependence on purchased feeds.
- Proper implementation can improve forage quality, species composition, and yield.
- Can reduce energy, labor and equipment requirements.
- Practice has the potential to improve livestock health.

DISADVANTAGES TO FARM

- Requires a high degree of management skills.
- May be necessary to install stabilized stream crossing and alternative water supplies to provide livestock access to all grazed forage resources while protecting riparian areas and waterbodies.
- Requires a fencing system to subdivide existing pastures.

SYSTEM LIFESPAN

Ten (10) years.

COST

Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Some factors which will influence cost include:

- the number and type of livestock;
- system design, including the number and size of paddocks;
- the need for and design of watering facilities;
- pasture improvement needs such as seeding, lime, fertilizer, and pest management; laneway and stream crossing needs; and
- the amount and condition of existing fence.

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OPERATION AND MAINTENANCE

Each agricultural management system is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system:

- Soil analysis on at least a 3-year rotation to determine pH and fertility needs.
- Periodic forage analyses from actual pasture samples should be done about 3 times throughout the growing season.
- Excess forage growth (spring flush) must be captured either by mechanically harvesting or allowing another livestock group to graze it.
- Paddocks must be rotated according to forage growth stage.
- Basic maintenance as needed to fences, laneways, crossings, and watering stations.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific conservation practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS

Components that result in a complete system that eliminates a resource concern may be eligible for cost-sharing. Compliance with local and state laws should be adhered to including the need for Erosion and Sediment Control plans for disturbances over 1 acre, contacting Underground Utilities Protection before excavation, contacting SHPO and others as applicable. Stream crossing or disturbance of stream banks may require a permit.

NRCS STANDARDS TO UTILIZE

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Prescribed Grazing	528	Acre	May 2011	10
Pasture and Hay Planting	512	Acre	Sept 2010	5
Forage Harvest Management	511	Acre	Dec 2010	1
Fence	382	Feet	Oct 2014	10
Field Border	386	Acre	Oct 2017	10
Trails and Walkways	575	Feet	Oct 2015	10
Watering Facility	614	Number	March 2021	10

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Livestock Pipeline	516	Feet	March 2021	10
Pumping Plant	533	Number	Dec 2011	10
Structure for Water Control	587	Number	March 2019	10
Water Well	642	Number	March 2021	10
Spring Development	574	Number	August 2014	10
Pond	378	Number	May 2018	10
Access Road	560	Feet	March 2021	10
Access Control	472	Acre	April 2019	10
Grazing Land Mechanical Treatment	548	Acre	May 2011	1
Brush Management	314	Acre	March 2018	1
Herbaceous Weed Treatment	315	Acre	April 2021	1
Heavy Use Area Protection	561	Sq. Feet	Oct 2015	10
Stream Crossing	578	Number	May 2012	10
Subsurface Drain	606	Feet	May 2020	10
Underground Outlet	620	Feet	Oct 2014	10

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for NY: https://efotg.sc.egov.usda.gov/#/details
- Pasture Management AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Process Wash Water Management System

DEFINITION
A system designed for the collection, storage, treatment and disposal of effluents from processes on farms that including milking centers, horse washing, egg washing, vegetable and fruit washing. They may contain milk solids, nutrients, liniments, organic matter and soil along with detergents, acid rinses and sanitizer, all mixed with a quantity of water. This practice is not applicable for wash water containing manure and other animal waste or for wash water from commercial processing like cheese production or vegetable or fruit processing (like vineyard waste).

WATER QUALITY PURPOSE
To reduce the organic and nutrient component of the liquid waste from regular processes on a farm, into receiving waters.

POLLUTANT CONTROLLED
Primarily biodegradable organics and soluble phosphorous. Secondary pollutants include ammonia, nitrates and pathogens.

WHERE USED
On operations where water is used to assist in the on-farm processing or clean-up of organic materials in areas such as milking centers, horse barns, egg farms or produce washing facilities that are not part of a value-added operations (such as cheese or wine making, commercial processing, etc.) or that require a NYS SPEDES Permit or are deemed to be a point source of pollution.

SYSTEM DESCRIPTION
The system is composed of an area where water is used to either clean up the barn or facility or is used to clean the animals or products. The wastewater is collected and then treated by a combination of tanks for settling of materials, transfer to proper waste storage structures, daily or periodic spreading or treatment by the use of vegetative measures or a combination there of.

When this system is funded by the NYS Agricultural Nonpoint Source Abatement and Control Program (ANSACP) a complete system of BMPs meeting NRCS Standards must result.

SYSTEM EFFECTIVENESS
These systems can be very effective in the removal of organic material including milk solids, soil, nutrients and some chemicals when properly installed and maintained on a regular basis or incorporated into a waste management system and land applied in accordance with a Nutrient Management Plan.

IMPACTS ON SURFACE WATER
Beneficial - Reduces phosphorous, fecal coliform and organics loading.

IMPACTS ON GROUND WATER
Beneficial if sited properly and care is given to avoid areas of shallow bedrock or groundwater.

Agricultural Conservation Management System Summary Sheet

IMPACTS ON OTHER RESOURCES

Soil: Beneficial by adding nutrients when applied in accordance with a Nutrient Management Plan.
Air: Negative if system is not operated or managed properly.
Plants: Beneficial.
Animals: Neutral.
Human: Beneficial as system protect water quality.
Energy: Negative to Beneficial depending on the system designed and its additional energy use or energy saving.

ADVANTAGES TO FARM

- Can be treated separately and does not need to add additional water to manure system.
- Can be made to perform with gravity and be relatively management free.
- Can be relatively inexpensive.

DISADVANTAGES TO FARM

- Some systems need high level of management to perform correctly.
- May require additional pumps and tanks that require clean-out and maintenance on a regular basis.
- Can be expensive if major modification to the existing infrastructure is required.

SYSTEM LIFESPAN

Ten (10) years.

COST

Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Cost can run from $3,000 to $45,000 depending on the complexity of the system and the material to be treated.

OPERATION AND MAINTENANCE

Each Agricultural Management System is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system:

- Tanks installed in the system for settling of solids, collection of milk fats, etc. need to be emptied on a regular basis.
- Pumps need to be monitored, maintained and or replaced.
- Vegetated treatments need to be mowed and material removed.
- Flocculation systems need to be emptied and maintained.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific practice standard being utilized for additional information on operation and maintenance needs.

Agricultural Conservation Management System Summary Sheet

MISCELLANEOUS COMMENTS

Components that result in a complete system of BMPs meeting NRCS Standards that eliminate a resource concern may be eligible for cost-sharing. Livestock operations that have been designated as a CAFO are required to comply with CAFO regulations. Compliance with local and state laws should be adhered to including the need for Erosion and Sediment Control plans for disturbances over 1 acre, contacting Underground Utilities Protection before excavation, contacting SHPO and others as applicable. In some cases, discharge of process wastewater to the surface untreated is a violation of NYS Environmental Conservation Law (ECL).

NRCS STANDARDS TO UTILIZE*

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Vegetated Treatment Area	635	Acres	Feb 2017	10
Waste Separation Facility	632	Number	Oct 2013	10
Waste Transfer	634	Number	Oct 2015	10
Pumping Plant	533	Number	Dec 2011	10
Waste Storage Facility	313	Number	March 2018	10
Structure for Water Control	587	Number	March 2019	10
Subsurface Drain	606	Feet	May 2020	10
Heavy Use Area Protection	561	Sq. Feet	Oct 2015	10

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for NY: https://efotg.sc.egov.usda.gov/#/details
- Process Wash Water AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Riparian Buffer System

DEFINITION
An area of grasses, sedges, rushes, ferns, legumes, forbs, shrubs, and/or trees tolerant of intermittent flooding or saturated soils located adjacent to and up-gradient from waterbodies.

WATER QUALITY PURPOSE
To intercept surface runoff, subsurface flow and shallow groundwater flow from agricultural sources in order to reduce excess amounts of pollutants. Systems can be used to create shade to lower or maintain surface water temperature, and to reduce pesticide drift from entering a waterbody.

POLLUTANT CONTROLLED
Sediment, nutrients, pesticides, bio-chemical oxygen demand, thermal modification

WHERE USED
These systems can be applied to agricultural lands adjacent to permanent or intermittent waterbodies where a resource concern has been identified. They are not applied to stabilize stream banks or shorelines.

SYSTEM DESCRIPTION
A riparian buffer system consists of an area containing a variety of vegetation situated between agricultural lands and waterbodies that are designed to filter surface runoff and shallow groundwater by encouraging sheet flow and infiltration and impede concentrated flow. The type and extent of vegetation is suited to the soil and hydrology of the site and for the water quality purpose. Up to three distinct zones may be employed to achieve desired results. In all cases livestock must be excluded or controlled. Appropriate site preparation is essential to establishing desired vegetation, and practices that promote the vigor and reproduction of desired plant species, including pest management, may be employed. In addition, excessive sheet-rill and concentrated flow erosion may need to be controlled in the areas immediately adjacent and up-gradient of the buffer area.

SYSTEM EFFECTIVENESS
A riparian buffer will be most effective when used as a component of a conservation system including nutrient management, pest management, and runoff, sediment and erosion control practices. The filtering effects of riparian buffers are most effective when used in conjunction with erosion reducing management practices. Riparian buffers can be very effective for sediment and sediment-bound pollutant removal with trapping efficiencies exceeding 50%. Riparian buffers are less effective at removing soluble phosphorous or nitrates.

IMPACTS ON SURFACE WATER
Beneficial – this system does not generally address pollutants at the source (thermal modification is an exception), but “polishes” surface runoff by removing additional amounts of pollutants such as sediment, soil attached nutrients, and organic matter.

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IMPACTS ON GROUND WATER

Neutral – It may be beneficial in areas where groundwater is recharged directly from surface waterbodies or there is a direct surface connection to groundwater.

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Neutral.

Air: Beneficial by increasing carbon storage in plant biomass and soils.

Plants: Neutral.

Animals: Beneficial by improving riparian habitat and potentially providing a source of detritus and large woody debris. Provides food and cover for fish, wildlife, and livestock. Establish and maintain habitat corridors. Enhance pollen, nectar, and nesting habitat for pollinators. Improves overall surface water quality.

Human: Increase water storage on flood plains potentially reducing flood impacts.

Energy: Neutral.

ADVANTAGES TO FARM

- Provides a low cost, cost-effective approach to treat agricultural runoff.
- Restore, improve or maintain riparian plant communities.
- May provide a buffer for cropland and farm infrastructure from flood damage.

DISADVANTAGES TO FARM

- May take cropland and pasture out of production.
- Requires a large land area.

SYSTEM LIFESPAN

Ten (10) years.

COST

Each Agricultural management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Factors impacting costs may include buffer length, width, types of vegetation, and the need for associated practices to exclude livestock or maintain sheet flow.

OPERATION AND MAINTENANCE

Each Agricultural management System is unique and must be customized to the situation. The following are generally key components to the operation and maintenance of the system:

- Inspections conducted annually and immediately following severe storms for evidence of sediment deposit, erosion, or concentrated flow channels.
- Avoid use of fertilizers, pesticides, other chemicals, vehicular traffic or disturbance of vegetation and litter inconsistent with erosion control and buffering objectives.
- Portions of the buffer may need to be periodically mowed and the clippings removed to promote dense vegetative growth and removal of nutrients.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific conservation practice standard being utilized for additional information on operation and maintenance needs.

Agricultural Conservation Management System Summary Sheet

MISCELLANEOUS COMMENTS

Components that result in a complete system that eliminates a resource concern may be eligible for cost-sharing. Livestock operations that have been designated as a CAFO are required to comply with CAFO regulations. Compliance with local and state laws should be adhered to including the need for Erosion and Sediment Control plans for disturbances over 1 acre, contacting Underground Utilities Protection before excavation, contacting SHPO and others as applicable. Some activities may require stream disturbance or wetlands permits.

NRCS STANDARDS TO UTILIZE

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Riparian Forest Buffer	391	Acre	May 2011	10
Riparian Herbaceous Cover	390	Acre	May 2011	5
Tree/Shrub Establishment	612	Acre	April 2017	10
Tree/Shrub Site Preparation	490	Acre	March 2007	10
Conservation Cover	327	Acre	July 2019	5
Critical Area Planting	342	Acre	Oct 2017	10
Stream Crossing	578	Number	May 2012	10
Access Control	472	Acre	April 2019	10
Access Road	560	Feet	March 2021	10
Trails & Walkways	575	Feet	Oct 2015	10
Brush Management	314	Acre	March 2018	1
Fence	382	Feet	Oct 2014	10
Filter Strip	393	Acre	Oct 2017	10
Pasture and Hay Planting	512	Acre	Sept 2010	10
Grassed Waterway	412	Acre	Oct 2015	10
Herbaceous Weed	315	Acre	April 2021	1

Agricultural Conservation Management System Summary Sheet

Treatment				
Pest Management Conservation System	595	Acre	April 2021	1
Structure for Water Control	587	Number	March 2019	10
Lined Waterway or Outlet	468	Feet	March 2018	10
Water & Sediment control Basin	638	Number	April 2009	10

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for NY: https://efotg.sc.egov.usda.gov/#/details
- Stream and Floodplain Management AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Silage Leachate Control and Treatment System

DEFINITION
A system designed to reduce the generation of silage leachate and for the collection, storage, treatment and disposal of effluents and runoff from the storage of silage crops from upright and bunk silos, as well as silage storage bags.

WATER QUALITY PURPOSE
To manage silage leachate to reduce surface and ground water biochemical oxygen demand (BOD) loading as well as nutrient loading.

POLLUTANT CONTROLLED
Nutrients, Sediment, Organic loading and Biochemical Oxygen Demand (BOD)

WHERE USED
In situations where the storage of silage and haylage can yield effluent and runoff which can enter either a surface water body or ground water and a resource concern has been identified. This practice can be used in barnyards, farmsteads, fields, or other areas where upright silos, bunk silos and silage bagging systems are located.

SYSTEM DESCRIPTION
Silage effluent and runoff control would be composed of a combination of structural and non-structural management practices to control the source of the material or manage the collection and treatment or disposal of it. Source reduction can lessen the amount of low-flow high concentrate leachate produced and can be accomplished with several management techniques including growing the proper variety of corn for the area, harvesting when corn or haylage are at the proper maturity and at the correct moisture content along with proper operation and maintenance of the structure. When source reduction does not eliminate leachate, a system to collect, store or treat the silo effluent and runoff can be installed. If a suitable waste storage is available, the silage leachate can be transferred there. Otherwise, a system to separate low and high flows, collection of low flows and a treatment system such as a Vegetated Treatment Area is required. Relocation of silage storage to an area that is not a resource concern is another option. The system should also include an area for the storage of waste or spoiled feed for later application to crop fields in accordance with a nutrient management program. Use of covered storage and exclusion of surface water runoff from the storage area will also reduce the overall amount of liquid requiring treatment.

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SYSTEM EFFECTIVENESS

Silage leachate exerts a high organic loading on the receiving water and produces a high Biochemical Oxygen Demand (BOD) which will deplete available dissolved oxygen resulting in fish kills, tastes and odors, and a general unaesthetic appearance. The proper management of leachate from silos and other types of storage facilities can significantly reduce these problems. In addition, Silage Leachate Control and Treatment Systems may provide Component BMPs which may greatly reduce or eliminate the degradation of clean water entering the site, stabilize the management area to reduce disturbed ground and/or access roads (reducing erosion, runoff, and sedimentation), allow better collection and management of waste or spoiled feed, and greatly influence the overall source of potential contaminates by incorporating proper feed harvesting and feed storage practices, as well as end use feed management practices.

IMPACTS ON SURFACE WATER

Beneficial - Reduces organic loading and resultant depletion of dissolved oxygen.

IMPACTS ON GROUND WATER

Beneficial - The oxygen depletion in ground water resulting from organic loading can cause bad odors and tastes which may be sustained for extended periods of time due to very low re-aeration rates.

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial when leachate is applied in accordance with a Nutrient Management Plan.
Air: Negative is system is not operated or managed properly.
Plants: Beneficial by eliminating kill zones and correct application rates.
Animals: Beneficial – protects fish from high BOD.
Human: Beneficial as system protects water quality but can be negative if not operated or maintained effectively.
Energy: Negative to Beneficial depending on the system design and its additional energy use or energy saving.

ADVANTAGES TO FARM

- May be corrected by growing a different variety of corn and changing timing of harvest.
- Can be built as a gravity system.
- Can be plumbed into existing waste management system.
- The system design includes an area for waste feed storage for utilization as a nutrient source.

DISADVANTAGES TO FARM

- Can be expensive if separate collection and storage are required.
- Due to amino acid content of silage leachate, collection facilities should be made of corrosion resistant material and land application should be carefully managed to prevent kill-off.
- Require heightened level of management as run-off is precipitation driven and solid separation can require frequent maintenance.

SYSTEM LIFESPAN

Ten (10) years.

Agricultural Conservation Management System Summary Sheet

COST

Each Silage Leachate Collection and Treatment System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Cost can run from $3,000 to $70,000 or more depending on the complexity of the system.

OPERATION AND MAINTENANCE

Each Agricultural Management System is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system:

- Low flow/high flow separation must be adjusted frequently to ensure capture of adequate low flow.
- Checking solid separation after each rainfall to remove debris.
- Keeping records of where silage leachate is applied to reduce potential over application.
- Periodic inspection and repair of storage facility to assure no leakage through floors and walls.
- Periodic inspection and repair of pipes and other connections to eliminate leakage opportunities.
- Tanks installed must be checked for need for emptying.
- Periodic inspection and repair of roads, heavy use areas, and waste feed management areas.
- Maintain clean water practices associated with the management areas.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS

Components that result in a complete system that eliminates a resource concern may be eligible for cost-sharing. Livestock operations that have been designated as a CAFO are required to comply with CAFO regulations which requires all farms that store feedstock to collect low flow, if evidence that it is produced. Compliance with local and state laws should be adhered to including the need for Erosion and Sediment Control plans for disturbances over 1 acre, contacting Underground Utilities Protection before excavation, contacting SHPO and others as applicable.

NRCS STANDARDS TO UTILIZE*

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Vegetated Treatment Area	635	Acre	Feb 2017	10
Waste Separation Facility	632	Number	Oct 2013	10
Waste Transfer	634	Number	Oct 2015	10

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Pumping Plant	533	Number	Dec 2011	10
Dike	356	Feet	Dec 2012	10
Diversion	362	Feet	May 2017	10
Subsurface Drain	606	Feet	May 2020	10
Sediment Basin	350	Number	May 2017	10
Structure for Water Control	587	Number	March 2019	10
Heavy Use Area Protection	561	Sq. Feet	Oct 2015	10
Waste Storage Facility	313	Number	March 2018	10
Sprinkler System	442	Acre	Oct 2016	10
Irrigation Water Management	449	Acre	Oct 2015	10
Fence	382	Feet	Oct 2014	10
Conservation Crop Rotation	328	Acre	Oct 2015	1

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for NY: https://efotg.sc.egov.usda.gov/#/details
- Silage Storage AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Soil Health System

DEFINITION
Soil health systems employ cultural (i.e., non-structural, management-based) measures such as crop rotation, tillage, mulching, cover cropping, and/or other practices according to a soil conservation plan to control soil erosion, reduce run-off and enhance soil health.

WATER QUALITY PURPOSE
To reduce the detachment, transport, and loss of sediment and solid-phase nutrients as well as runoff volumes.

POLLUTANT CONTROLLED
Sediment, nutrients, pathogens, pesticides, and biochemical oxygen demand

WHERE USED
Cropland, pasture, vegetable and fruit production, orchards, vineyards, and/or biomass production areas where a resource concern has been identified.

SYSTEM DESCRIPTION
Soil health systems consist of non-structural, management-based practices working in concert to control soil erosion, reduce runoff volumes, enhance soil health, and improve productivity of the land. Such systems advance soil health, water quality, and productivity through a few general approaches, including:

- reducing the intensity of tillage and oxidization of soil organic matter;
- maintaining greater soil cover throughout the year, by living crops and/or crop residues;
- preventing or slowing sheet and rill flows;
- increasing the diversity of crops grown throughout the rotation; and
- increasing organic matter additions to the soil, by crop residues and/or amendments.

Individual practices often utilized in soil health systems include:

- residue and tillage management, such as no-till, zone-till, mulch-till, etc.;
- cover crops;
- strip cropping
- contour planting;
- long term perennial forage or biomass planting on cropland acres;
- mulching;
- etc.

The soil health system is based on a well integrated, cropland soil conservation plan (or a soil conservation plan within a broader nutrient management or comprehensive nutrient management plan). The plan is utilized to assess risk of water and wind erosion and other soil health resource concerns and make specific recommendations for how various practices will work together to address those concerns. These recommendations may extend beyond the cultural practices addressed with this system to dovetail with other conservation systems on the farm, including structural soil conservation systems, nutrient management systems, etc.

Agricultural Conservation Management System Summary Sheet

SYSTEM EFFECTIVENESS

A systems approach to soil health provides multiple barriers against soil erosion and water quality degradation while improving soil function. Crop rotation, conservation tillage, cover cropping, strip cropping, organic matter amendments (manure, compost, green manures, mulch, etc.) and other cultural conservation practices help protect soil from erosion by wind and water and help maintain or increase soil organic matter. Soil organic matter improves soil tilth, reduces susceptibility to compaction, increases nutrient and water holding capacity, slows the movement of pesticides through the soil, reduces runoff losses, and protects against erosion. Several tons of soil loss per acre can be avoided annually with these practices, as well as significant improvements in nutrient use efficiency and crop production. Soil and water resources are often further conserved when cultural soil health practices are paired with structural soil conservation systems and nutrient management, per the multiple barrier approach.

IMPACTS ON SURFACE WATER

Beneficial - including reduced losses of sediment, nutrients, pathogens, pesticides, and biochemical oxygen demand.

IMPACTS ON GROUND WATER

Beneficial in most cases, but may be negative in some soil types with annual crops in long-term no-till because significant macropores may establish and aid the loss of nutrients and pathogens to groundwater and/or tile drainage systems.

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial, as it generally improves soil health and reduces erosion.
Air: Beneficial, as it can reduce dust and fossil fuel combustion used in crop production.
Plants: Beneficial, as it can reduce sediment and nutrient losses and subsequent impacts on neighboring plant communities.
Animals: Beneficial, as it can reduce off-site impacts from sediment, nutrients, pathogens, pesticides, and biochemical oxygen demand on terrestrial and aquatic habitats.
Human: Beneficial, as it can further safeguard drinking water sources, improve land and water resources for recreation, reduce maintenance costs on public infrastructure (e.g., road ditches, culverts, reservoirs, etc.), and provide economic growth.
Energy: Beneficial, as it can reduce use of farm fuels, energy for fertilizer manufacturing, and transportation fuels for imported fertilizer and feed.

ADVANTAGES TO FARM

- Potential to reduce soil loss, reduce negative effects of extreme weather years on crop production, and improve crop yield and quality.
- Improved labor efficiency and timing for crop management.
- Often a neutral or positive impact on farm profitability.
- Improved neighbor relations.

DISADVANTAGES TO FARM

- Higher level of farm management required may result in increased labor and equipment costs.
- Requires additional time and training to adjust to new management strategies.

Agricultural Conservation Management System Summary Sheet

SYSTEM LIFESPAN
1 to 5 years depending on components in the soil health system.

COST
Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Costs depend on several factors, including the size and type of farm, existing level of farm management, availability of equipment, familiarity/availability of custom operators, etc.

OPERATION AND MAINTENANCE
Each Agricultural Management System is unique and must be customized for every situation. Often annual evaluation and fine tuning of cultural conservation system is required, because many component practices are annual practices and can be refined based on prior years' experiences and the current year's conditions.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific conservation practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS
See the USDA-NRCS Field Office Technical Guide for specific technical details about planning, implementation, and operation and maintenance. Guidance for the AEM Base Program provides details on developing Tier 3A cropland conservation plans. Also, the Cornell Soil Health Program offers technical resources for advancing soil health and productivity.

NOTE: a soil conservation plan, alone, does not meet the NYS requirements for CAFOs. A Comprehensive Nutrient Management Plan must be developed for these farms. Compliance with USDA Food Security Act program requirements should be considered.

NRCS STANDARDS TO UTILIZE*
For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Conservation Crop Rotation	328	Acre	Oct 2015	1
Conservation Cover	327	Acre	July 2019	5
Contour Farming	330	Acre	Oct 2014	1

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Cover Crop	340	Acre	Oct 2015	1
Pasture and Hay Planting	512	Acre	Sept 2010	5
Mulching	484	Acre	Oct 2014	1
Residue and Tillage Management (Mulch Till; No-Till/Strip-Till/Direct Seed; Ridge Till)	345, 329, 346	Acre	Oct 2014	1
Strip Cropping	585	Acre	Oct 2014	5

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for NY: https://efotg.sc.egov.usda.gov/#/details
- Cornell Soil Health Program: http://soilhealth.cals.cornell.edu/
- Soil Management AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Stream Corridor and Shoreline Management System

DEFINITION
A planned system of vegetation, structures, bio-technology, and/or management techniques to stabilize or protect stream channels, streambanks and shorelines while also enhancing natural hydrologic processes and improving fish and wildlife habitat.

WATER QUALITY PURPOSE
To reduce sediment and nutrients entering waterbodies from eroding channels, streambanks and shorelines. Systems can be used to maintain, improve, or restore the physical, chemical and biological functions of a stream, constructed channel, or shoreline while also protecting the designated use classification of the waterbody.

POLLUTANT CONTROLLED
Sediment, nutrients and thermal modification

WHERE USED
Streambanks, constructed channels, lake shores, estuaries and coastal shorelines on agricultural land.

SYSTEM DESCRIPTION
The system may be composed of a variety of operational, structural, and vegetative practices that may be aimed at one specific goal, such as controlling streambank erosion, or at a combination of goals. Component practices may be implemented within several areas of the stream corridor and shoreline area, i.e. within the channel, along the banks, or in the immediate riparian zones. Listed below are some of the components that may be utilized in a stream corridor or shoreline system:

- Implement management techniques such as removing impeding vegetation along the banks (clearing) or selectively removing woody snags, sediment depositions/drifts, or other obstructions (snagging) that have negative impacts on stream flow and increase either bank or channel erosion.
- Establish vegetation to prevent or reduce erosion along the streambank toe, within adjacent riparian zones, and associated floodplains. Examples include shrubs, trees, grasses, rushes and sedges among other site-specific species; see Critical Area Planting practice as well.
- Install structural improvements such as slope stabilization, filter fabric, riprap, deflectors, sediment fencing, bulkheads, or groin systems.
- Employ biotechnical alternatives such as willow wattles, coir logs or direct seeding.
- Utilize fluvial geomorphology techniques.

Agricultural Conservation Management System Summary Sheet

SYSTEM EFFECTIVENESS

The effectiveness of streambank and shoreline protection should be evaluated based on the component practices installed. In general, the practice can attenuate the peak flow and bed load of the stream, reduce soil erosion, and decrease sediment and nutrient delivery to waterbodies. The system should not degrade the stream channel beyond tolerable limits, increase or promote new erosion concerns, increase sedimentation, induce gully formations, or disrupt stream habitat, the natural flow regime, and the interaction between the stream and the floodplain.

IMPACTS ON SURFACE WATER

Beneficial - Can control erosion rates and sediment delivery to receiving water bodies. Improving vegetation along a waterbody may decrease thermal modification, thus enhancing the freshwater biome and water quality.

IMPACTS ON GROUND WATER

Neutral - Vegetative cover and some structural practices may increase infiltration.

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial by minimizing soil erosion.
Air: Neutral.
Plants: Beneficial by establishing streambank vegetation.
Animal: Beneficial for wildlife corridor establishment and fish habitat.
Human: Beneficial. Increased recreational opportunities, stable fish habitat. Reduction of flood impacts on agricultural lands and civil infrastructure.
Energy: Neutral.

ADVANTAGES TO FARM

- Stops loss of agricultural land.
- Improves fish and wildlife habitat.
- Restores water flow, capacity and direction.
- Improve landscape aesthetics.
- Protects best use of water bodies.
- Improved neighbor relations.

DISADVANTAGES TO FARM

- Cost of structural practices may be substantial.
- Can move problem areas downstream.
- Investment of practices may be lost by severe storm damage.
- Operation and Maintenance program has significant costs of time and money.

SYSTEM LIFESPAN

Ten (10) years.

COST

Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Costs can vary greatly. For example, bio-technical components can cost as little as $5 per linear foot while structural components could cost in excess of $200 per foot.

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OPERATION AND MAINTENANCE

Each Agricultural Management System is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system

- Debris should be removed from the stabilized streambank or shoreline.
- Structural practices should be inspected and repaired after storm events.
- Vegetation destroyed by bank failure must be replaced to maintain cover integrity.
- Subsequent planting or establishment of failed vegetation to practice integrity.

MISCELLANEOUS COMMENTS

Compliance with local and state laws should be adhered to including the need for Erosion and Sediment Control plans for disturbances over 1 acre, contacting Underground Utilities Protection before excavation, contacting SHPO and others as applicable. Streambank and shoreline disturbance generally require a DEC and or Army Corp of Engineer permit. Other permits from various agencies may also be required.

NRCS STANDARDS TO UTILIZE

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice."

NRCS Name	Standard #	Reportable Item	Date	Life Span
Stream Habitat Improvement and Management	395	Acre	Sept 2020	5
Streambank and Shoreline Protection	580	Feet	May 2011	10
Clearing and Snagging	326	Feet	May 2011	1
Critical Area Planting	342	Acre	Oct 2017	1
Obstruction Removal	500	Acre	Sept 2010	10
Open Channel	582	Feet	Oct 2016	10
Stream Crossing	578	Number	May 2012	10
Riparian Forest Buffer	391	Acre	May 2011	10
Riparian Herbaceous Cover	390	Acre	May 2011	5

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Tree/Shrub Establishment	612	Acre	April 2017	10
Tree/Shrub Site Preparation	490	Acre	Mar 2007	1
Access Control	472	Acre	April 2019	10

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NY NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for NY: https://efotg.sc.egov.usda.gov/#/details
- Stream and Floodplain Management AEM Tier 2 Worksheet and Information Sheet

Agricultural Conservation Management System Summary Sheet

Waste Storage and Transfer System

DEFINITION
A system design for the collection, transfer, and/or storage of agricultural livestock and recognizable process waste.

WATER QUALITY PURPOSE
To reduce surface and subsurface loss of nutrients.

POLLUTANT CONTROLLED
Nutrients, pathogens and organics

WHERE USED
In situations where the collection, transfer, and/or storage of manure and/or other organic waste is recommended to address water quality concerns and improve a farm's ability to apply nutrients with the right timing, placement, method, and rate for recycling by crops. This includes scenarios where storage addresses seasonal limitations for manure application due to lack of suitable crop and hayland to safely apply during adverse weather or field conditions. It may also include systems to better collect manure and other organic wastes for application to fields, without significant (if any) storage component. This system can be used whenever waste is transferred or stored and includes manure, milking center waste, process wastewater, silage leachate, barnyard run-off, etc. This includes the use of bedded pack or composting bedded pack barns.

SYSTEM DESCRIPTION
The system is composed of multiple component practices that collect agricultural waste and transport it to a structural storage facility. System design is dependent upon agricultural operation, site location and management considerations. A waste storage system controls the loss of nutrients and pathogens by safely storing waste during critical runoff and leaching periods. It can include the use of storage covers to trap greenhouse gases or to limit rainfall contribution to spreading volumes.

(NOTE: Prior to adoption of a manure storage system, a Comprehensive Nutrient Management Plan needs to be developed.)

SYSTEM EFFECTIVENESS
Waste storage is effective in reducing losses of nitrogen and phosphorus when surface runoff and erosion potential is high. Storages can reduce pathogen loads through die-off during storage and when applied to soil and incorporated. Significant nutrient loss and water quality degradation may result if the storage is emptied when surface runoff, leaching or erosion potential is high or waste is applied at non-agronomically recommended rates. A Comprehensive Nutrient Management Plan is an important component of this practice.

IMPACTS ON SURFACE WATER
Beneficial when waste is applied in accordance with a nutrient management plan and transfers are designed and operated according to the plan.

Agricultural Conservation Management System Summary Sheet

IMPACTS ON GROUND WATER

Beneficial as applications of waste can be timed to coincide with plant uptake and not during times of nutrient loss to groundwater. However, care must be taken in site selection and construction of storage facilities.

IMPACTS ON OTHER RESOURCES (OFF-SITE)

Soil: Beneficial as organic waste can replenish organic matter in the soil and improve soil health.
Air: Negative or beneficial. When waste is stored and applied a certain times of the year, odor issues increase for that time period unless incorporation of waste is utilized. But conversely, by storing waste, odors are not created when daily spread. Covers trap greenhouse gases and collect them for flaring or use.
Plants: Beneficial as nutrients can be applied during times of plant uptake.
Animals: Beneficial as improved nutrient management on cropland can improve habitat (especially aquatic).
Human: Beneficial as system protect water quality.
Energy: Beneficial depending on the system designed and its additional energy use or energy saving.

ADVANTAGES TO FARM

- Allows for spreading at certain times of the year and eliminated the need for daily spreading.
- Allows for semi-solid or liquid manure which lends itself to gravity systems.
- Can allow for irrigation of waste.
- Allows livestock manure and other waste to be treated as a resource rather than a waste.
- Reduces cost for purchased, commercial fertilizer.
- Can improve aesthetics and relations with neighbors if managed properly.
- Helps to reduce nutrient loss when runoff and erosion potential is high.

DISADVANTAGES TO FARM

- Can be expensive if soils are not suitable and liners or other materials need to be utilized.
- Require increased level of management and manpower especially during times of application.
- Requires increased management and energy when sand is used for bedding.
- Requires frequent maintenance.
- May result in significant nutrient loss if emptied when surface runoff and erosion potential is high.
- May cause serious damage to streams and fish if storage structure leaks or fail.

SYSTEM LIFESPAN

Ten (10) years.

COST

Each Agricultural Management System is unique and must be customized to the situation in which it is employed resulting in a wide and variable range in cost. Cost can run from $30,000 to $400,000 or more depending on the complexity of the system.

Agricultural Conservation Management System Summary Sheet

OPERATION AND MAINTENANCE

Each Agricultural Management System is unique and must be customized for every situation. The following are generally key components to the operation and maintenance of the system:

- A written plan should be prepared for each system designed.
- Accurate records of timing of manure application and location need to be kept.
- Storages must be fenced, and warning signs maintained.
- Earthen storages require mowing several times a year to keep the growth of woody vegetation down and to be able to scout for rodent damage of the dike.
- Settled solids need to be removed on a regular basis increasing frequency with use of inorganics like sand bedding.
- Pumps need to be regularly checked and maintained.
- Safety measures need to be kept up to date.
- Other items need to be addressed based on specific system requirements.

See the documents in Section 4 of the NRCS Field Office Technical Guide (eFOTG) under the specific practice standard being utilized for additional information on operation and maintenance needs.

MISCELLANEOUS COMMENTS

Components that result in a complete system that eliminates a resource concern may be eligible for cost-sharing. Livestock operations that have been designated as a CAFO are required to comply with CAFO regulations. Compliance with local and state laws should be adhered to including the need for Erosion and Sediment Control plans for disturbances over 1 acre, contacting Underground Utilities Protection before excavation, contacting SHPO and others as applicable.

NRCS STANDARDS TO UTILIZE*

For the most current information on each NRCS Standard, please go to the eFOTG at https://efotg.sc.egov.usda.gov/#/details, use the drop box in the left side to reach Section IV – Practice Standards and Specifications, click on the folder for Conservation Practices and locate the appropriate practice. Under each practice, you will find, at the minimum, the practice standard. You may also find: a Statement of Work; Practice Guideline; Operation and Maintenance Plan; Specification Sheet; Standard Drawing; and other document that will assist in the planning, installation or operation of the practice.

NRCS Name	Standard #	Reportable Item	Date	Life Span
Waste Storage Facility	313	Number	March 2018	10 years
Waste Transfer	634	Number	Oct 2015	10 Years
Waste Separation Facility	632	Number	Oct 2013	10 Years
Waste Treatment	629	Number	Oct 2013	1 year to 10 years
Waste Facility Closure	360	Number	May 2020	1 Year
Nutrient Management	590	Acre	Sept 2020	1 year

Agricultural Conservation Management System Summary Sheet

Pumping Plant	533	Number	Dec 2011	10 Years
Roofs and Covers	367	Number	Oct 2016	10 Years
Subsurface Drain	606	Feet	May 2020	10 Years
Access Control	472	Acre	April 2019	10 Years
Access Road	560	Feet	March 2021	10 Years
Composting Facility	317	Number	March 2018	10 Years
Diversion	362	Feet	May 2017	10 Years
Fence	382	Feet	Oct 2014	10 Years
Heavy Use Area Protection	561	Sq. Feet	Oct 2015	10 Years
Hedgerow Planting	422	Feet	May 2011	10 Years
Pond Sealing or Lining – Geomembrane or Geosynthetic Clay Liner	521	Sq. Feet	March 2019	10 Years
Pond Sealing or Lining – Compacted Soil Treatment	520	Sq. Feet	May 2017	10 Years
Pond Sealing or Lining – Concrete	522	Sq. Feet	May 2017	10 Years

*This is a listing of the primary BMPs to utilize but is not all inclusive and other NRCS Standards could be utilized. Please check with your local SWCC representative for approval.

REFERENCES

- NRCS eFOTG for NY: https://efotg.sc.egov.usda.gov/#/details
- Manure and Fertilizer Storage AEM Tier 2 Worksheet and Information Sheet
- Nutrient Management: Manure and Fertilizer AEM Tier 2 Worksheet and Information Sheet

Appendix S: Potential Contaminant Summaries

Potential Contaminant Source Inventory - Reservoir

Contaminant of Concern	Potential Source	Protection Area Relevant Information
Oxygen Saturation	Oxygen Saturation Levels have held declined steadily since 1987 from just above 80% to just above 60%. Generally, the primary cause of oxygen depletion in a water body is from excessive algae and phytoplankton growth driven by high levels of phosphorus and nitrogen. This can also be caused by an overgrowth of algae that consume the oxygen in the impoundment. The density of the Water Chestnut mats has severely limited light penetration into the water likely reduced the growth of native aquatic plants beneath the canopy. The reduced plant growth combined with the decomposition of the water chestnut plants which die back each year are likely contributing to reduced levels of dissolved oxygen in the water.	Aerators have been installed - harvesting the invasizes is needed - as well as addressing contributing factors that lead to their proliferation (turbidity, nitrogen and phosphate levels)
Total Phosphate	Total Phosphate has risen slightly from roughly .04 ppm to roughly .05 ppm. Levels above 0.1 ppm usually indicate human-influenced pollution sources. This includes runoff into waterways from: wastes produced by poultry, dairy and other animal farming operations that are not properly managed, concentrations of droppings from nuisance animals (e.g. Canada geese) and even household pets, seeping of sewage wastes from improperly-sited or poorly-maintained home septic systems, and inadequate sewage treatment plants.	Review of Ag and septic within proximity of streams needed
Petroleum	Fueling stations, bulk storage	Mapping these facilities
Turbidity	Turbidity has steadily increased from 1987, from roughly 5 NTU to more than 20 NTU. Construction or mining activities, Natural erosion may be contributing causes.	analysis of slopes and development within the watershed
Chlorides	Road salting applications	Chlorides have risen sharply from 100ppm levels in 1987 to a roughly 125ppm average in 2019. Chloride concentrations of between 1 and 100 ppm (parts per million) are normal in freshwater. This could be an indication that road salt application is impacting the stream
Fertilizer and Lawn Chemicals	Residential Development and potential growth at former French's Hollow golf course	Cluster Dev't, conservation subdivision, land protection strategies
Pesticides	Orchards and Ag operations	

Potential Contaminant Source Inventory - Black Creek

Potential Source Category	Potential Source	Contaminant Category of Concern	Protection Area(s) Impacted	Relevant Information
Bulk Storage	Chemical Bulk Storage Facilities	Chemicals	Source Water Area	See prioritization table
	Major Oil Storage Facilities	Chemicals	None as of April 2022	
	Petroleum Bulk Storage Facilities	Petroleum	Source Water Area	
Waste Management and Disposal	Active Landfills	Biological and Chemical Contaminants		
	Inactive Landfills (Title 12)	Biological and Chemical Contaminants	Critical Area and Source Water Area	Former Guilderland Landfill, unlined
	Hazardous Waste Management Facilities	Hazardous Chemicals		
	Land Application Sites	Biological and Chemical Contaminants		
	Vehicle Dismantling Facilities	Chemicals	None as of April 2022	
Contamination Sites or Incidents	Remediation Sites	Chemicals	Source Water Area	Former military supply depot, remediated in early 2000s
	Spill Incidents	Chemicals	Source Water Area	
Mineral Extraction Sites	Oil and Gas Wells	Chemicals		
	Orphan Oil and Gas Wells	Chemicals		
	Mines	Chemical & Physical Contaminants	Source Water Area	Four former gravel mines, one active gravel mine
	Historical Abandoned Mines	Chemical & Physical Contaminants	None as of April 2022	
Discharge to Water	State Pollutant Discharge Elimination System Permitted (SPDES) Facilities	Biological and Chemical Contaminants	Critical Area	Average, non geomean levels had increased sharply between 1987 and 2002, rising from 150 colonies /100mL to more than 300 colonies /100mL. This could be the result or runoff into waterways from: wastes produced by poultry, dairy and other animal farming operations that are not properly managed, concentrations of droppings from nuisance animals (e.g. Canada geese). It may also mean seeping of sewage wastes from improperly-sited or poorly-maintained home septic systems are to blame.
	Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs)	Biological and Chemical Contaminants	None as of April 2022	
Transportation	Airports	Chemicals	None as of April 2022	
	Transportation Corridors	Chemical & Physical Contaminants		
	Road and Maintenance Facilities	Chemicals		Guilderland, New Scotland, Altamont, Voorheesville and Rotterdam have MS4 permit coverage. Knox, Westerlo, Berne, Duanesburg and Delanson do not.
	Salt and Deicers Storage	Chemicals		Guilderland, New Scotland, Altamont, Voorheesville and Rotterdam have MS4 permit coverage. Knox, Westerly, Berne, Duanesburg and Delanson do not.
Agriculture	Agricultural Activities	Biological, Physical and Chemical Contaminants	Critical Area and Source Water Area	pH in the Black Creek has risen slightly from 7.5 to 8 on average. The normal, healthy range of pH for supporting aquatic life is between 5 and 7. An increase in pH could be due to contribution of lime, a neutralizer of acid soils in agriculture. Areas with a lot of limestone may also have more alkaline waters naturally. Total Phosphate has remained stable, and high, at .5 ppm. For protection of ecological health phosphate levels should be <.05 ppm. Potential runoff into waterways from: wastes produced by poultry, dairy and other animal farming operations that are not properly managed, concentrations of droppings from nuisance animals (e.g. Canada geese) and even household pets, seeping of sewage wastes from improperly-sited or poorly-maintained home septic systems, and inadequate sewage treatment plants. The NYSDEC designated the Black Creek as Impaired for dissolved oxygen.
Residential Sources	On-site Septic Systems	Biological and Chemical Contaminants	Critical Area and Source Water Area	Total Phosphate has remained stable, and high, at .5 ppm. For protection of ecological health phosphate levels should be <.05 ppm. Average, non geomean levels had increased sharply between 1987 and 2002, rising from 150 colonies /100mL to more than 300 colonies /100mL. This could be the result or runoff into waterways from: wastes produced by poultry, dairy and other animal farming operations that are not properly managed, concentrations of droppings from nuisance animals (e.g. Canada geese). It may also mean seeping of sewage wastes from improperly-sited or poorly-maintained home septic systems are to blame.
	Lawn and Garden chemicals	Chemicals	Critical Area and Source Water Area	Increased development with watershed. Education program needed.
	Waterfront Property Management	Biological, Physical and Chemical Contaminants	Critical Area and Source Water Area	
Conveyances and Pipelines	Oil and Gas Pipelines	Chemicals	Source Water Area	A natural gas pipeline runs through three watersheds of the Reservoir
Other	Golf Courses	Chemicals		
	Marinas and Boat Launches	Biological and Chemical Contaminants	None as of April 2022	
	Stormwater	Chemicals	Source Water Area	
	Stormwater	Temperature	Source Water Area	Temperatures in the waterbody have steadily increased since 1987 - an indication that increased impervious development, which discharges warmer water, could be impacting the stream
	Toxic Release Inventory (TRI) Facilities	Chemicals		
	Fire Training and Dedicated Fire Training Facilities	Chemicals	Source Water Area	Guilderland Fire Training Center, Van Buren Blvd, Guilderland
	Nutrient Loading (Lakes Only)	Chemicals	Duane Lake	
	Saltwater Intrusion	Chemicals	None as of June 2022	
	Road Salt Application	Chemicals	Source Water Area	Chloride levels not concerning, but rising.
	Streambank Erosion	Sediment, Silt, Turbidity	Source Water Area	Turbidity has increased sharply from 1987, from roughly 1 to slightly above 5 NTU.Streambank erosion has been found to be one the highest concerns in the farming and non-farming community in Albany County. Farmers have expressed concerns about a loss of pasture and cropland. While natural stream processes are understood there still seems to be an abnormal increase in frequency and severity of damage to streambanks. This issue can not only be corrected thru work on an individual farm location but must be looked upon in a broad spectrum of issues throughout the community.

Potential Contaminant Source Inventory - Bozen Kill

Potential Source Category	Potential Source	Contaminant Category of Concern	Protection Area(s) Impacted	Relevant Information
Bulk Storage	Chemical Bulk Storage Facilities	Chemicals	Source Water Area	See prioritization table
	Major Oil Storage Facilities	Chemicals	None as of April 2022	
	Petroleum Bulk Storage Facilities	Petroleum	Source Water Area	
Waste Management and Disposal	Active Landfills	Biological and Chemical Contaminants		
	Inactive Landfills (Title 12)	Biological and Chemical Contaminants	Critical Area and Source Water Area	Former Guilderland Landfill, unlined
	Hazardous Waste Management Facilities	Hazardous Chemicals		
	Land Application Sites	Biological and Chemical Contaminants		
	Vehicle Dismantling Facilities	Chemicals	None as of April 2022	
Contamination Sites or Incidents	Remediation Sites	Chemicals	Source Water Area	Former military supply depot, remediated in early 2000s
	Spill Incidents	Chemicals	Source Water Area	
Mineral Extraction Sites	Oil and Gas Wells	Chemicals		
	Orphan Oil and Gas Wells	Chemicals		
	Mines	Chemical & Physical Contaminants	Source Water Area	Four former gravel mines, one active gravel mine
	Historical Abandoned Mines	Chemical & Physical Contaminants	None as of April 2022	
Discharge to Water	State Pollutant Discharge Elimination System Permitted (SPDES) Facilities	Biological and Chemical Contaminants	Critical Area	Altamont WWTP: A biological (macroinvertebrate) assessment of Bozen Kill in Altamont (at Route 158) was conducted in 1997. Sampling results indicated slightly impacted water quality conditions. This impacts were identified as likely the result of municipal discharges from the Village of Altamont WWTP. Previous operational problems and ammonia violations led to plant upgrading in 1990. Subsequent biological macroinvertebrate) sampling in 1993 revealed an enriched stream, but one that was assessed as only slightly impacted. This assessment represented a significant improvement in water quality since the plant upgrade. The NYSDEC designated the Bozen Kill as stressed (data or information indicate a potential impact to the Best Use). Water Quality Assessment yielded the presence of nutrients, specifically phosphorus, as a known pollutant. Dissolved Oxygen levels and Ammonia were identified as potential pollutants. The assessment identified the Village of Altamont Wastewater Treatment Plant as a potential source. Fecal coliform average, non-geomean, levels had increased sharply between 1987 and 2002, rising from 100 colonies /100mL to more than 200 colonies /100mL at current.
	Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs)	Biological and Chemical Contaminants	None as of April 2022	
Transportation	Airports	Chemicals	None as of April 2022	
	Transportation Corridors	Chemical & Physical Contaminants		
	Road and Maintenance Facilities	Chemicals		Guilderland, New Scotland, Altamont, Voorheesville and Rotterdam have MS4 permit coverage. Knox, Westerlo, Berne, Duanesburg and Delanson do not.
	Salt and Deicers Storage	Chemicals		Guilderland, New Scotland, Altamont, Voorheesville and Rotterdam have MS4 permit coverage. Knox, Westerly, Berne, Duanesburg and Delanson do not.
Agriculture	Agricultural Activities	Biological, Physical and Chemical Contaminants	Critical Area and Source Water Area	pH in the Black Creek has risen slightly from 7.5 to 8 on average. The normal, healthy range of pH for supporting aquatic life is between 5 and 7. An increase in pH could be due to contribution of lime, a neutralizer of acid soils in agriculture. Areas with a lot of limestone may also have more alkaline waters naturally. Total Phosphate has remained stable, and high, at .5 ppm. For protection of ecological health phosphate levels should be <.05 ppm. Potential runoff into waterways from: wastes produced by poultry, dairy and other animal farming operations that are not properly managed, concentrations of droppings from nuisance animals (e.g. Canada geese) and even household pets, seeping of sewage wastes from improperly-sited or poorly-maintained home septic systems, and inadequate sewage treatment plants. The NYSDEC designated the Black Creek as Impaired for dissolved oxygen.
Residential Sources	On-site Septic Systems	Biological and Chemical Contaminants	Critical Area and Source Water Area	Total Phosphate has remained stable, and high, at .5 ppm. For protection of ecological health phosphate levels should be <.05 ppm. Average, non geomean levels had increased sharply between 1987 and 2002, rising from 150 colonies /100mL to more than 300 colonies /100mL. This could be the result or runoff into waterways from: wastes produced by poultry, dairy and other animal farming operations that are not properly managed, concentrations of droppings from nuisance animals (e.g. Canada geese). It may also mean seeping of sewage wastes from improperly-sited or poorly-maintained home septic systems are to blame.
	Lawn and Garden chemicals	Chemicals	Critical Area and Source Water Area	Increased development with watershed. Education program needed.
	Waterfront Property Management	Biological, Physical and Chemical Contaminants	Critical Area and Source Water Area	
Conveyances and Pipelines	Oil and Gas Pipelines	Chemicals	Source Water Area	A natural gas pipeline runs through three watersheds of the Reservoir
Other	Golf Courses	Chemicals		
	Marinas and Boat Launches	Biological and Chemical Contaminants	None as of April 2022	
	Stormwater	Chemicals	Source Water Area	
	Stormwater	Temperature	Source Water Area	Temperatures in the waterbody have steadily increased since 1987 - an indication that increased impervious development, which discharges warmer water, could be impacting the stream
	Toxic Release Inventory (TRI) Facilities	Chemicals		
	Fire Training and Dedicated Fire Training Facilities	Chemicals	None as of June 2022	
	Saltwater Intrusion	Chemicals	None as of June 2022	
	Road Salt Application	Chemicals	Source Water Area	Chloride levels not concerning, but rising.
	Streambank Erosion	Sediment, Silt, Turbidity	Source Water Area	Streambank erosion has been found to be one the highest concerns in the farming and non-farming community in Albany County. Farmers have expressed concerns about a loss of pasture and cropland. While natural stream processes are understood there still seems to be an abnormal increase in frequency and severity of damage to streambanks. This issue can not only be corrected thru work on an individual farm location but must be looked upon in a broad spectrum of issues throughout the community.

Potential Contaminant Source Inventory - Normans Kill / Bonny Brook

Potential Source Category	Potential Source	Contaminant Category of Concern	Protection Area(s) Impacted	Relevant Information
Bulk Storage	Chemical Bulk Storage Facilities	Chemicals	Source Water Area	See prioritization table
	Major Oil Storage Facilities	Chemicals	None as of April 2022	
	Petroleum Bulk Storage Facilities	Petroleum	Source Water Area	
Waste Management and Disposal	Active Landfills	Biological and Chemical Contaminants		
	Inactive Landfills (Title 12)	Biological and Chemical Contaminants		
	Hazardous Waste Management Facilities	Hazardous Chemicals		
	Land Application Sites	Biological and Chemical Contaminants		
	Vehicle Dismantling Facilities	Chemicals	Source Water Area	
Contamination Sites or Incidents	Remediation Sites	Chemicals	Source Water Area	
	Spill Incidents	Chemicals	Source Water Area	
Mineral Extraction Sites	Oil and Gas Wells	Chemicals		
	Orphan Oil and Gas Wells	Chemicals		
	Mines	Chemical & Physical Contaminants	Source Water Area	One active mine in Rotterdam
	Historical Abandoned Mines	Chemical & Physical Contaminants	None as of April 2022	
Discharge to Water	State Pollutant Discharge Elimination System Permitted (SPDES) Facilities	Biological and Chemical Contaminants	Source Water Area	WWTPs more than 10 miles upstream of Reservoirs
	Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs)	Biological and Chemical Contaminants	None as of April 2022	
Transportation	Airports	Chemicals	None as of April 2022	
	Transportation Corridors	Chemical & Physical Contaminants		State and County roads as well as I-88
	Road and Maintenance Facilities	Chemicals	Source Water Area	Only Rotterdam a regulated MS4 (not Princetown, Duanesburg or Delanson)
	Salt and Deicers Storage	Chemicals	Source Water Area	Only Rotterdam a regulated MS4 (not Princetown, Duanesburg or Delanson)
Agriculture	Agricultural Activities	Biological, Physical and Chemical Contaminants	Source Water Area	
Residential Sources	On-site Septic Systems	Biological and Chemical Contaminants	Source Water Area	
	Lawn and Garden chemicals	Chemicals	Source Water Area	
	Waterfront Property Management	Biological, Physical and Chemical Contaminants	Source Water Area	
Conveyances and Pipelines	Oil and Gas Pipelines	Chemicals	Source Water Area	A natural gas pipeline runs through three watersheds of the Reservoir
Other	Golf Courses	Chemicals		
	Marinas and Boat Launches	Biological and Chemical Contaminants	None as of April 2022	
	Stormwater	Chemicals	Source Water Area	
	Stormwater	Temperature	Source Water Area	Only Rotterdam a regulated MS4 (not Princetown, Duanesburg or Delanson)
	Toxic Release Inventory (TRI) Facilities	Chemicals		
	Fire Training and Dedicated Fire Training Facilities	Chemicals	None as of June 2022	
	Nutrient Loading (Lakes Only)	Chemicals	Duane Lake	
	Saltwater Intrusion	Chemicals	None as of June 2022	
	Road Salt Application	Chemicals	Source Water Area	Unassessed
	Streambank Erosion	Sediment, Silt, Turbidity	Source Water Area	Streambank erosion has been found to be one the highest concerns in the farming and non-farming community in Albany County. Farmers have expressed concerns about a loss of pasture and cropland. While natural stream processes are understood there still seems to be an abnormal increase in frequency and severity of damage to streambanks. This issue can not only be corrected thru work on an individual farm location but must be looked upon in a broad spectrum of issues throughout the community.

Potential Contaminant Source Inventory - Normans Kill / Indian House

Potential Source Category	Potential Source	Contaminant Category of Concern	Protection Area(s) Impacted	Relevant Information
Bulk Storage	Chemical Bulk Storage Facilities	Chemicals	Source Water Area	See prioritization table
	Major Oil Storage Facilities	Chemicals	None as of April 2022	
	Petroleum Bulk Storage Facilities	Petroleum	Critical area and Source Water Area	
Waste Management and Disposal	Active Landfills	Biological and Chemical Contaminants		
	Inactive Landfills (Title 12)	Biological and Chemical Contaminants		
	Hazardous Waste Management Facilities	Hazardous Chemicals		
	Land Application Sites	Biological and Chemical Contaminants		
	Vehicle Dismantling Facilities	Chemicals	Source Water Area	
Contamination Sites or Incidents	Remediation Sites	Chemicals	Source Water Area	
	Spill Incidents	Chemicals	Source Water Area	
Mineral Extraction Sites	Oil and Gas Wells	Chemicals		
	Orphan Oil and Gas Wells	Chemicals		
	Mines	Chemical & Physical Contaminants	Source Water Area	Active gravel mine
	Historical Abandoned Mines	Chemical & Physical Contaminants	None as of April 2022	
Discharge to Water	State Pollutant Discharge Elimination System Permitted (SPDES) Facilities	Biological and Chemical Contaminants	Critical area and Source Water Area	
	Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs)	Biological and Chemical Contaminants	None as of April 2022	
Transportation	Airports	Chemicals	None as of April 2022	
	Transportation Corridors	Chemical & Physical Contaminants	Critical area and Source Water Area	
	Road and Maintenance Facilities	Chemicals	Critical area and Source Water Area	Guilderland, New Scotland, Altamont, Voorheesville and Rotterdam have MS4 permit coverage. Knox, Westerlo, Berne, Duanesburg and Delanson do not.
	Salt and Deicers Storage	Chemicals	Critical area and Source Water Area	Guilderland, New Scotland, Altamont, Voorheesville and Rotterdam have MS4 permit coverage. Knox, Westerlo, Berne, Duanesburg and Delanson do not.
Agriculture	Agricultural Activities	Biological, Physical and Chemical Contaminants	Critical area and Source Water Area	
Residential Sources	On-site Septic Systems	Biological and Chemical Contaminants	Critical area and Source Water Area	
	Lawn and Garden chemicals	Chemicals	Critical area and Source Water Area	Increased development with watershed. Education program needed.
	Waterfront Property Management	Biological, Physical and Chemical Contaminants	Critical area and Source Water Area	
Conveyances and Pipelines	Oil and Gas Pipelines	Chemicals	Source Water Area	A natural gas pipeline runs through three watersheds of the Reservoir
Other	Golf Courses	Chemicals	Critical area and Source Water Area	Former gold Course on French's Mills Rd.
	Marinas and Boat Launches	Biological and Chemical Contaminants	None as of April 2022	
	Stormwater	Chemicals	Critical area and Source Water Area	
	Stormwater	Temperature	Critical area and Source Water Area	
	Toxic Release Inventory (TRI) Facilities	Chemicals		
	Fire Training and Dedicated Fire Training Facilities	Chemicals	None as of June 2022	
	Nutrient Loading (Lakes Only)	Chemicals	Duane Lake	
	Saltwater Intrusion	Chemicals	None as of June 2022	
	Road Salt Application	Chemicals	Source Water Area	Chlorides have risen sharply from 100ppm levels in 1987 to a roughly 125ppm average in 2019. Local, county and State roads (incl rt. 20, I-90, I-88)
	Streambank Erosion	Sediment, Silt, Turbidity	Source Water Area	Streambank erosion has been found to be one the highest concerns in the farming and non-farming community in Albany County. Farmers have expressed concerns about a loss of pasture and cropland. While natural stream processes are understood there still seems to be an abnormal increase in frequency and severity of damage to streambanks. This issue can not only be corrected thru work on an individual farm location but must be looked upon in a broad spectrum of issues throughout the community.

Appendix T
Grants List

Funding Strategies

The following section includes a number of state and national funding sources. The list below provides several funding sources. This list does not include every potential source of funding.

Click the links below to learn more about each funding source.

New York State Funding Sources:

1. NYS DEC Water Quality Improvement Project (WQIP) Program - Land Acquisition for Source Water Protection
2. NYS DEC WQIP Program - Other Projects
3. NYS DEC Non-Agricultural Nonpoint Source Planning Grant Program
4. NYS DEC Trees for Tribs
5. NYS DEC Climate Smart Communities Grant Program
6. NYS Department of Agriculture and Markets (DAM) NYS Soil and Water Conservation Committee Agricultural Nonpoint Source Abatement & Control Grant Program
7. NYS DAM/NYS Soil and Water Conservation Committee Source Water Buffer Program
8. NYS DAM/NYS Soil and Water Conservation Committee Climate Resilient Farming Program
9. NYS DOS Local Waterfront Revitalization Program
10. Clean Water State Revolving Fund
11. Drinking Water State Revolving Fund
12. NYS Environmental Facilities Corporation (EFC) Green Innovation Grant Program
13. NYS EFC Integrated Solutions Construction Grant Program
14. NYS DEC/EFC Engineering Planning Grant Program
15. NYS EFC Water Infrastructure Improvement Act
16. NYS EFC Intermunicipal Water Infrastructure Grants
17. NYS EFC Septic System Replacement Program

National Funding Sources:

18. US Environmental Protection Agency (EPA) Urban Waters Small Grants Program
19. USDA National Resources Conservation Service (NRCS) Environmental Quality Incentives Program
20. USDA NRCS Conservation Stewardship Program
21. USDA NRCS Agricultural Conservation Easement Program
22. USDA NRCS Health Forests Reserve Program
23. USDA Solid Waste Management Grants
24. National Fish and Wildlife Foundation/Wildlife Habitat Council Five Star and Urban Waters Restoration Grant Program

1. NYS DEC Water Quality Improvement Project (WQIP) Program - Land Acquisition for Source Water Protection	
The WQIP Program - Land Acquisition for Source Water Protection funds projects or programs aimed at protecting sources of public drinking water through land acquisition. Land Acquisition for Source Water Protection applicants must either identify parcels of land to acquire or commit to acquiring parcels of land for water quality improvement purposes.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	Municipalities, Not-for-Profit Corporations and Soil and Water Conservation Districts
Resource / Link for More Information	www.dec.ny.gov/pubs/4774.html (NYS DEC, Division of Water, Search On: "Water Quality Improvement Project (WQIP) Program").

2. NYS DEC WQIP Program - Other Projects	
The WQIP Program has project categories related to nonagricultural nonpoint source abatement and control, salt storage, aquatic habitat restoration, municipal separate storm sewer systems (MS4) and municipal wastewater treatment. Municipalities can apply for WQIP Program funding for any combination of project types, up to five projects.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	Municipalities, Municipal Corporations, Regulated Traditional MS4s, Soil and Water Conservation Districts and Not-for-Profit Corporations (only for land acquisition for source water protection or aquatic habitat restoration projects)
Resource / Link for More Information	www.dec.ny.gov/pubs/4774.html (NYS DEC, Division of Water, Search On: "Water Quality Improvement Project (WQIP) Program").

3. NYS DEC Non-Agricultural Nonpoint Source Planning Grant Program	
The Non-Agricultural Nonpoint Source Planning Grant Program provides funding to municipalities and Soil and Water Conservation Districts for initial planning of non-agricultural nonpoint source water quality improvement projects. Applicants will provide reports that outline an improvement project to address a nonpoint source of pollution.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	Municipalities and Soil and Water Conservation Districts
Resource / Link for More Information	www.dec.ny.gov/pubs/116725.html (NYS DEC, Division of Water, Search On: "Non-Agricultural Nonpoint Source Planning Grant").

4. NYS DEC Trees for Tribs	
The Trees for Tribs Grant Program helps to fund communities in planting young trees and shrubs along stream corridors, also known as riparian areas, to prevent erosion, increase flood water retention, improve wildlife and stream habitat, as well as protect water quality. Applicants should demonstrate appropriate planting techniques and include an education and volunteer engagement component.	
Cost Share (Yes/No)?	No
Eligible Applicants	Municipalities, Academic Institutions and 501(c)(3) not-for-profit corporations. Other groups such as unincorporated river associations must apply through a municipality, not-for-profit, or academic institution as the designated lead.
Resource / Link for More Information	www.dec.ny.gov/animals/113412.html (NYS DEC, Search On: "Trees for Tribs Grant Program").

5. NYS DEC Climate Smart Communities Grant Program	
Climate Smart Communities Grant Program offers funding to municipalities to inventory, assess, plan and implement projects that address climate change. Projects can be adaptive or mitigative. Adaptation project types include flood risk reduction, increasing or preserving natural resilience and emergency preparedness.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	New York State cities, towns, villages and counties (or boroughs of New York City)
Resource / Link for More Information	www.dec.ny.gov/energy/109181.html (NYS DEC, Office of Climate Change, Search On: "Climate Smart Communities Grant Program").

6. NYS Soil and Water Conservation Committee Agricultural Nonpoint Source Abatement & Control Grant Program	
The Agricultural Nonpoint Source Abatement & Control Grant Program provides cost share assistance for prevention of water pollution from agricultural activities. Funding is for farm-specific planning or project implementation to improve water quality.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	County Soil and Water Conservation Districts (on behalf of farmers).
Resource / Link for More Information	www.nys-soilandwater.org/aem/nonpoint.html (NYS DAM, Soil & Water Conservation Committee, Search On: "Agricultural Nonpoint Source Abatement & Control Grant Program").

7. NYS DAM/NYS Soil and Water Conservation Committee Source Water Buffer Program	
The Source Water Buffer Program provides assistance to County Soil and Water Conservation districts on behalf of farmers for the purchase of conservation easements on agricultural lands to protect active sources of public drinking water and support, expand or enhance water quality protection, thereby preserving or establishing buffers for public drinking water supplies. To be eligible, the agricultural lands must be: directly adjacent to surface drinking water sources, wetland areas adjacent to surface drinking water sources, within a DOH designated wellhead protection area, or a contributing area to an aquifer sinkhole.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	County Soil and Water Conservation Districts (on behalf of farmers).
Resource / Link for More Information	www.agriculture.ny.gov/RFPS.html (NYS DAM, Search On: "RFA0181 – Source Water Buffer Program").

8. NYS DAM/NYS Soil and Water Conservation Committee Climate Resilient Farming Program	
The Climate Resilient Farming Program provides funding to County Soil and Water Conservation Districts on behalf of farmers for projects that mitigate the impact of agriculture on climate change and enhance the on-farm adaptation and resiliency to projected climate conditions.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	County Soil and Water Conservation Districts (on behalf of farmers).
Resource / Link for More Information	www.nys-soilandwater.org/programs/crf.html (NYS DAM, Soil & Water Conservation Committee, Search On: "Climate Resilient Farming (CRF) Program").

9. NYS DOS Local Waterfront Revitalization Program	
The Local Waterfront Revitalization Program provides funding for eligible municipalities to develop comprehensive Watershed Management Plans with the intent to protect or restore water quality in specific waterbodies and their watersheds by reducing point and nonpoint source pollution.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	Villages, towns and cities - and counties on behalf of one or more villages, towns or cities - located along New York's coasts or designated inland waterways.
Resource / Link for More Information	www.dos.ny.gov/opd/programs/lwrp.html (NYS DOS, Office of Planning and Development, Search On: "Local Waterfront Revitalization Program").

10. Clean Water State Revolving Fund (CWSRF)	
The Clean Water State Revolving Fund provides interest-free or low-interest rate financing for wastewater, water quality improvement, point and non-point source and national estuary projects to municipalities throughout New York State.	
Cost Share (Yes/No)?	N/A
Eligible Applicants	Any county, city, town, village, district corporation, county or town improvement district, Indian reservation wholly within New York State, any public benefit corporation or public authority established pursuant to the laws of New York, or any agency of New York State which is empowered to construct and operate a project, or any two or more of the foregoing which are acting jointly in connection with a project.
Resource / Link for More Information	www.efc.ny.gov/CWSRF (NYS EFC, Loan Programs, Search On: "Clean Water State Revolving Fund").

11. Drinking Water State Revolving Fund	
The Drinking Water State Revolving Fund provides market-rate and below market-rate financing for the construction of certain eligible public water system projects for the protection of public health. Eligible projects include investments to upgrade or replace infrastructure needed to achieve or maintain compliance with federal or state health standards, and projects to provide the public with safe, affordable drinking water.	
Cost Share (Yes/No)?	N/A
Eligible Applicants	Municipalities, including any county, city, town, village, district corporation, county or town improvement district, school district, Indian nation or tribe recognized by the State or the United States with a reservation wholly or partly within the boundaries of New York State, any water authority now existing in a city, or any agency of New York State which is empowered to construct and operate an eligible project.
Resource / Link for More Information	www.efc.ny.gov/drinkingwater (NYS EFC, Loan Programs, Search On: "Drinking Water State Revolving Fund").

12. NYS Environmental Facilities Corporation (EFC) Green Innovation Grant Program	
The Green Innovation Grant Program supports projects across New York State that utilize unique stormwater infrastructure design and create cutting-edge green technologies to improve water quality.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	Municipalities, two or more municipalities with a shared water quality infrastructure project, state agencies, interstate agencies, private entities and Soil & Water Conservation Districts.
Resource / Link for More Information	www.efc.ny.gov/GIGP (NYS EFC, Grant Programs, Search On: "Green Innovation Grant Program").

13. NYS EFC Integrated Solutions Construction Grant Program	
The Integrated Solutions Construction Grant Program funds projects that incorporate green infrastructure into CWSRF projects. Successful applicants will construct projects that remove stormwater from combined, sanitary or storm sewers. The projects should demonstrate the value of integrating green practices into traditional gray infrastructure to provide water quality benefits.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	Municipalities, including any county, city, town, village, district corporation, county or town improvement district, Indian reservation wholly within New York State, any public benefit corporation or public authority established pursuant to the laws of New York or any agency of New York State which is empowered to construct and operate a project, or any two or more of the foregoing which are acting jointly in connection with a project. In accordance with the laws, rules and regulations governing the CWSRF, projects defined in the federal Clean Water Act, Section 212 as treatment works must be publicly-owned. (Income restrictions apply).
Resource / Link for More Information	www.efc.ny.gov/ISC (NYS EFC, Grant Programs, Search On: "Integrated Solutions Construction Grant Program").

14. NYS DEC/EFC Engineering Planning Grant Program	
The Engineering Planning Grant Program advances water quality projects to construction by providing funding to municipalities for initial planning of eligible Clean Water State Revolving Fund water quality projects, as well as WQIP Program projects. Funding can be used by municipalities for the preparation of an engineering report.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	Municipalities with a median household income: a) ≤ $65,000 according to the United States Census 2015 American Community Survey for municipalities located in Regional Economic Development Council regions of the Capital District, Southern Tier, North Country, Mohawk Valley, Central NY, Finger Lakes, or Western NY; or b) ≤ $85,000 according to the United States Census 2015 American Community Survey for municipalities located in Regional Economic Development Council regions of Long Island, New York City and Mid-Hudson. Municipalities may have no more than two active Engineering Planning Grant awards at the same time.
Resource / Link for More Information	www.efc.ny.gov/EPG (NYS EFC, Grant Programs, Search On: "Engineering Planning Grant Program").

15. NYS EFC Water Infrastructure Improvement Act	
The Water Infrastructure Improvement Act invest in clean and drinking water infrastructure projects and water quality protection across New York State. These grants are available for sewage treatment works. Funds are also available for drinking water treatment projects, although drinking water treatment projects do not aim to protect the sources of drinking water.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	Municipalities, including any county, city, town, village, district corporation, county or town improvement district, school district, Indian nation or tribe recognized by the State or the United States with a reservation wholly or partly within the boundaries of New York State, any public benefit corporation or public authority established pursuant to the laws of New York or any agency of the State that is empowered to construct and operate a water quality infrastructure project. School districts are eligible for a Water Infrastructure Improvement Act grant but are ineligible for CWSRF financial assistance.
Resource / Link for More Information	www.efc.ny.gov/WIIA (NYS EFC, Grant Programs, Search On: "Water Infrastructure Improvement Act").

16. NYS EFC Intermunicipal Water Infrastructure Grants Program	
The Intermunicipal Water Infrastructure Grants Program assists municipalities in supporting intermunicipal water quality infrastructure projects by helping to fund both drinking water and sewage treatment works projects that serve multiple municipalities.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	Municipalities, including any county, city, town, village, district corporation, county or town improvement district, school district, Indian nation or tribe recognized by the state or the United States with a reservation wholly or partly within the boundaries of New York State, any public benefit corporation or public authority established pursuant to the laws of New York or any agency of the State that is empowered to construct and operate a water quality infrastructure project. A school district is eligible to apply for an Intermunicipal Water Infrastructure grant and Drinking Water State Revolving Fund financing assistance but is ineligible for CWSRF financial assistance.
Resource / Link for More Information	www.efc.ny.gov/IMG (NYS EFC, Grant Programs, Search On: "Intermunicipal Water Infrastructure Grants Program").

17. NYS EFC Septic System Replacement Program	
The Septic System Replacement Program uses the Septic System Replacement Fund, established in the Clean Water Infrastructure Act, to provide grants to partially reimburse property owners for septic system projects. Septic system projects include the replacement of a cesspool with a septic system, installation of a septic system, replacement or upgrade of a septic system or its components and installation of treatment technologies.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	www.efc.ny.gov/SepticReplacement (NYS EFC, Other Programs, Search On: "Septic System Replacement Program"). New York State Counties that are deemed priority geographic areas based on NYS DEC and NYS DOH based on vulnerability to contamination (e.g. the presence of a sole-source aquifer, or a known water-quality impairment), population density, soils, hydrogeology, climate and reasonable ability for septic system projects to mitigate water quality impacts.
Resource / Link for More Information	

18. US Environmental Protection Agency (EPA) Urban Waters Small Grants Program	
The Urban Waters Small Grants Program provides funding for projects that will help communities engage in activities that improve quality in urban waters. Grants are awarded every two years.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	States, local governments, Indian Tribes, public and private universities and colleges, public or private nonprofit institutions/organizations, intertribal consortia and interstate agencies.
Resource / Link for More Information	www.epa.gov/urbanwaters/urban-waters-small-grants (US EPA, Search On: "Urban Waters Small Grant").

19. USDA National Resources Conservation Service (NRCS) Environmental Quality Incentives Program	
The Environmental Quality Incentives Program provides financial assistance to cover part of the costs of implementing conservation practices outlined in a conservation plan that NRCS develops with the producer.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	Farmers apply directly to County USDA NRCS offices.
Resource / Link for More Information	www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip (USDA/NRCS, Search On: "Environmental Quality Incentives Program").

20. USDA NRCS Conservation Stewardship Program	
The Conservation Stewardship Program helps agricultural producers maintain and improve their existing conservation systems and adopt additional conservation activities to address priority resource concerns. Participants earn Conservation Stewardship Program payments for conservation performance—the higher the performance, the higher the payment.	
Cost Share (Yes/No)?	No
Eligible Applicants	Agricultural produces - Applicant must comply with highly erodible land and wetland conservation requirements and have current farm records with USDA Farm Service Agency. Must have effective control of the land for the term of the proposed contract, be actively engaged in the day-to-day management of the agricultural operation and share in the risks associated with agricultural production. Must also be meeting the stewardship threshold for at least two resource concerns at the time of application.
Resource / Link for More Information	www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp (USDA/NRCS, Search On: "Conservation Stewardship Program").

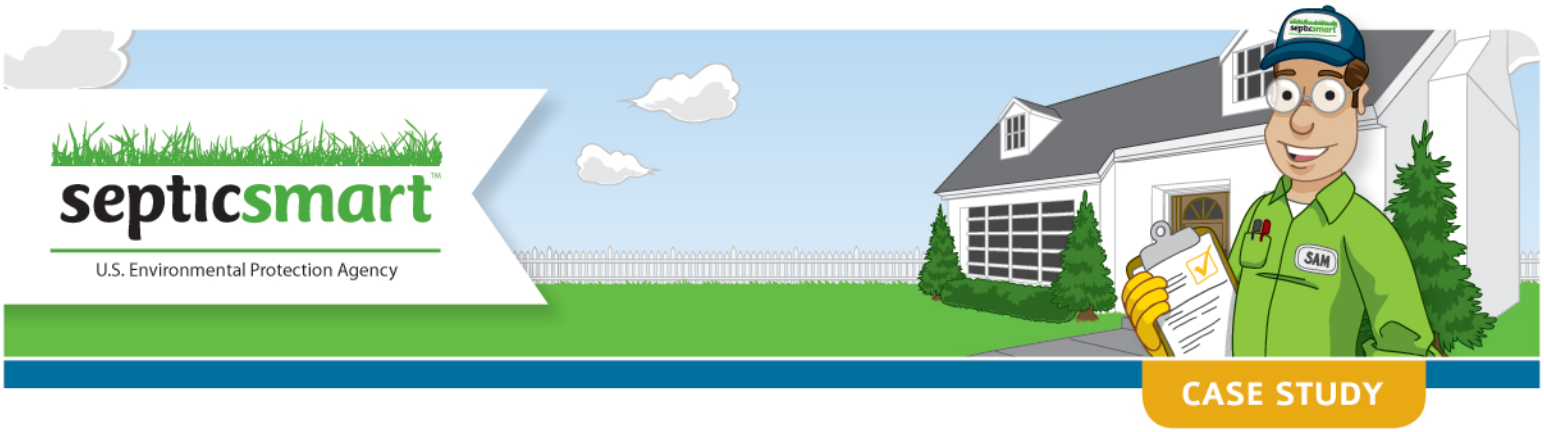
21. USDA NRCS Agricultural Conservation Easement Program	
Through the Agricultural Conservation Easement Program, NRCS provides financial assistance to eligible landowners, land trusts and other entities to protect, restore and enhance wetlands, grasslands and working farms and ranches.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	Eligible landowners, land trusts and other entities. Land eligible for agricultural easements includes cropland, rangeland, grassland, pastureland and nonindustrial private forest land. NRCS will prioritize applications that protect agricultural uses and related conservation values of the land and those that maximize the protection of contiguous acres devoted to agricultural use.
Resource / Link for More Information	www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/acep (USDA/NRCS, Search On: "Agricultural Conservation Easement Program").

22. USDA NRCS Healthy Forests Reserve Program	
The Healthy Forests Reserve Program provides landowners with 10-year cost-share agreements (10YR), 30-year contracts or easements (30YR) or permanent easements to help restore, enhance and protect forestland resources on private and tribal lands.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	Landowners. Healthy Forests Reserve Program applicants must provide proof of ownership, or an operator (tenant) must provide written concurrence from the landowner of tenancy for the period of the Healthy Forests Reserve Program restoration agreement in order to be eligible. Land enrolled in Healthy Forests Reserve Program easements must be privately owned or owned by Indian tribes.
Resource / Link for More Information	www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/forests (USDA/NRCS, Search On: "Healthy Forests Reserve Program").

23. USDA Solid Waste Management Grants	
Solid Waste Management Grants provide funding to organizations of rural areas that provide technical assistance or training with the goal of improving the planning and management of solid waste sites.	
Cost Share (Yes/No)?	No
Eligible Applicants	Applicants must be from rural areas and towns with a population of 10,000 or less. Most state and local governmental entities, nonprofits, federally recognized tribes and academic institutions are eligible to apply. Special considerations may be given to: • Projects serving an area with fewer than 5,500 people. • Regional, multi-state or national areas. • Lower-income populations.
Resource / Link for More Information	www.rd.usda.gov/programs-services/solid-waste-management-grants (USDA, Rural Development, Search On: "Solid Waste Management Grants").

24. National Fish and Wildlife Foundation/Wildlife Habitat Council Five Star and Urban Waters Restoration Grant Program	
The Five Star and Urban Waters Restoration Grant Program provides modest financial assistance to diverse local partnerships focused on improving water quality, watersheds and the species and habitats they support.	
Cost Share (Yes/No)?	Yes. Check the Request for Applicants for percent or dollar amount match required.
Eligible Applicants	Non-profit 501(c) organizations, state government agencies, local governments, municipal governments, Indian tribes and educational institutions.
Resource / Link for More Information	www.nfwf.org/fivestar/Pages/home.aspx (National Fish and Wildlife Foundation, Search On: "Five Star and Urban Waters Restoration Grant Program").

Appendix V Shohomish County Septic Outreach Case Study



Snohomish County Septic System Outreach Pilot Program

As of 2011, over 78,000 septic systems were registered in Snohomish County, Washington, however the number of failing systems was unknown. Studies of streams in multiple Snohomish County, watersheds consistently show the presence of bacteria from human sources. This regular presence indicates that failing septic systems may be a probable source.

The county's Surface Water Management Division launched a septic system outreach pilot program to improve water quality by encouraging septic system owners to adopt a suite of best management practices (BMPs) related to the care and maintenance of septic systems.

PROGRAM ELEMENTS

Through a Centennial Clean Water Fund grant from the Washington State Department of Ecology, the Surface Water Management Division conducted research in order to select target audiences, solidify realistic program goals and objectives, and identify audience barriers to BMP adoption and motivators for behavior change. Research methods included:

For Septic System Owners:

- Interactive polling,
- Telephone survey, and
- Focus groups.

For Service Providers:

- Questionnaire, and
- Rapid Ethnographic Survey.

From this research, the Surface Water Mangement Division developed and tested a multi-modal public involvement and septic system education strategy consisting of:

- Direct mail campaigns,
- Landowner workshops,

GOALS & OBJECTIVES

With the ultimate of goal of cleaner waterways, the pilot program sought to alter everyday behaviors of septic system owners, including regularly checking drain fields, and encouraging increased mindfulness about what should and should not go down drains and toilets. The effort also educated homeowners on the necessity of regular septic system tank inspection and maintenance.

- Onsite septic system care web pages, and
- "House calls" from Snohomish Health District sanitarians to inspect properties and speak one-on-one with homeowners about their septic systems.

A full report on this pilot program and outreach materials are available at the Septic System Outreach Pilot Program website: **www.septicreport.surfacewater.info**.

PROMOTION

The county's outreach initiatives were advertised via:

- A direct mail campaign, which notified homeowners of promotional items available at workshops, including drain snakes, drainers, and more.
- Fact sheets and brochures available online and distributed through technical assistance visits, sanitary surveys, and workshops.
- Mailers and doorknob hangers.
- Posters in public spaces and local businesses.
- Postcards.

- Emailed announcements to key influencers.
- Announcements on the division's website.

OVERCOMING CHALLENGES

The Surface Water Management Division's first challenge regarding its pilot program was identifying key geographic areas to target. This was solved by narrowing down targeted areas to select sub-basins in northern and southern areas of the county, as well as rural and suburban neighborhoods.

Focus group research indicated that homeowners with septic systems had strong negative reactions to scare tactics, such as suggesting homeowners with systems that are 30 years old or older may need to replace their system simply due to its age. To mitigate these negative reactions, the program's messaging utilized a positive tone.

Additional research proved that many homeowners were unsure if they could trust septic system professionals. This was addressed with an ethnographic survey, which increased understanding and explored limitations of the septic industry.

Program managers suggest that some BMPs, such as inspecting septic tanks routinely, may have barriers that are difficult to overcome with education alone.

By integrating an education program with an enforcement program or a service area, such as a septic district, agencies may be able to influence a significant majority of homeowners to adopt these higher-barrier BMPs.

PARTNERSHIPS

The pilot program benefited from a number of different partnerships, including but not limited to:

- A collaboration with the **Snohomish Health District and Department of Ecology** to develop a Snohomish County Septic System Program Public Involvement and Education (PIE) plan.
- An alliance with **Edmonds Community College** to conduct a rapid ethnographic assessment of septic system industry professionals.
- A collaboration with the **Snohomish Health District Septic Issues Committee** to survey operation and maintenance providers.
- A partnership with **Washington Sea Grant**, which provided an engaging workshop speaker.

RESULTS

Overall, participants responded positively to the pilot program, stating that they preferred the effort's "direct, no-nonsense" information versus "scare tactics."

In addition to boosting residential septic system awareness and improved behavioral changes, the program has increased the Surface Water Management Division management's understanding of homeowner attitudes, beliefs, and behaviors regarding septic systems. With this increased understanding, the division has been able to create improved messaging that will better connect with audiences.

The program's success was measured via a direct mail campaign, focus groups, house calls, and post-workshop surveys mailed to participants seven months after the workshops.

Additional information on the results of the pilot program can be found at: **www.septicreport.surfacewater.info.**

FOR MORE INFORMATION ABOUT THE SNOHOMISH COUNTY SEPTIC SYSTEM OUTREACH PILOT PROGRAM

Please contact Stephan Frenzl, Communication Specialist, at 425-388-6466 or **stef.frenzl@snoco.org**

www.septicreport.surfacewater.info

Snohomish County

Appendix W Town of East Greenbush GEIS

New York State Department of State
Division of Corporations, State Records and Uniform Commercial Code
One Commerce Plaza, 99 Washington Avenue
Albany, NY 12231-0001
www.dos.ny.gov

Local Law Filing

(Use this form to file a local law with the Secretary of State.)

Text of law should be given as amended. Do not include matter being eliminated and do not use italics or underlining to indicate new matter.

FILED
STATE RECORDS
DEC 27 2018
DEPARTMENT OF STATE

☐ **County** ☐ **City** ☒ **Town** ☐ **Village**
(Select one:)

of EAST GREENBUSH

Local Law No. 5 **of the year 20**18

A local law A LOCAL LAW REPEALING LOCAL LAW NO. 1 OF THE YEAR 2010, IN RELATION TO
(Insert Title)
MITIGATION FEES IN THE WESTERN EAST GREENBUSH GENERIC
ENVIRONMENTAL IMPACT STATEMENT(GEIS) STUDY AREA, AND REPLACING IT
WITH NEW PROVISIONS

Be it enacted by the Town Board **of the**
(Name of Legislative Body)

☐ **County** ☐ **City** ☒ **Town** ☐ **Village**
(Select one:)

of East Greenbush **as follows:**

Be it enacted by the Town Board of the Town of East Greenbush as follows:

Local number 1 of 2010 is repealed and replaced by the following:

Section 1. Statement of Purpose. The Town Board prepared a Generic Environmental Impact Statement (GEIS), dated July 2009, to evaluate the cumulative impacts of potential future development in the Town in order to plan for and mitigate impacts due to growth. The formulation of this GEIS initiated an evaluation of the cumulative impacts associated with continued growth on the Town's transportation network, water and sewer infrastructure, stormwater management program and recreational resource inventory. The GEIS was limited to the Western East Greenbush Generic Environmental Impact Statement (GEIS) Study Area, the geographic area for which this law is to apply. It is the intent of this law to provide an equitable means of distributing the cost of the improvements identified in the GEIS, requiring developers to contribute their fair share of the development impact without carrying an unnecessary burden often associated with capital improvement costs. It is further the purpose and intent of this law to apply mitigation fees to all development projects within the identified Western East Greenbush GEIS Study Area for which a SEQRA determination has not yet been made, the amount of which shall depend on the time of submittal of a development application.

Section 2. Definitions.

(If additional space is needed, attach pages the same size as this sheet, and number each.)

"Building permit" shall mean a document issued by the Building Inspector in accordance with Section 4.1.4 of the Comprehensive Zoning Law or other rules, regulations, and/or form issued by the Building Inspector in accordance with Section 4.1.1 of the Comprehensive Zoning Law.

"Certificate of Occupancy" shall mean a document issued by the Building Inspector in accordance with Section 4.1.5 of the Comprehensive Zoning Law.

"Commence Construction." shall mean issuance of a building permit.

"Development application" shall mean submission of a request for site plan, subdivision, and/or building permit approval in accordance with Town Code.

"Equivalent Dwelling Unit (EDU)" shall mean an estimate of water consumption and wastewater generation at a rate of 200 gallons per day.

"Certificate of compliance" shall mean a document issued by the Building Inspector in accordance with Section 4.1.1 of the Comprehensive Zoning Law.

"Gross Floor Area" shall mean the floor area within the inside perimeter of the exterior walls of the building under consideration, exclusive of vent shafts and courts, without deduction for corridors, stairways, ramps, closets, the thickness of interior walls, columns or other features. The floor area of a building, or portion thereof, not provided with surrounding exterior walls shall be the usable area under the horizontal projection of the roof or floor above. The gross floor area shall not include shafts with no openings or interior courts, according to the International Building Code.

"Project" shall be defined as any action that requires a development application and for which a complete development application is submitted.

"SEQRA Determination" shall mean that the lead agency has discharged its responsibilities under 6 CRR-NY 617 and determined whether or not the proposed project will have a significant adverse impact on the environment in accordance with 6 CRR-NY 617.7.

"Western East Greenbush Generic Environmental Impact Statement (GEIS) Study Area" shall mean that geographic area as set forth by a map entitled "Map 1: Base Map – Study Area" in the July 2009 Western East Greenbush Final Generic Environmental Impact Statement (GEIS), which map is attached as Figure 1.

Section 3. Amount of Mitigation Fees.

A. The mitigation fees for projects located within the Western East Greenbush Generic Environmental Impact Statement (GEIS) Study Area, dated July 2009, shall be calculated and assessed according to the attached Schedule A.

B. Projects Submitted After the Effective Date of Local Law 1 of 2010. Such projects shall pay 100% of the fees set forth in the section above.

C. Previously Submitted Projects For Which No SEQRA Determination Was Made. For previously submitted projects for which no SEQRA determination has been

made, mitigation fees shall be assessed in a phased implementation based upon the date on which the development application was formally submitted to the Town for processing. The phased implementation of these fees will be applied as follows:

1. Applications submitted before or during 2005 will be assessed a 16% discount from the total calculated GEIS mitigation fees due to the Town;
2. Applications submitted during 2006 will be assessed a 12% discount from the total calculated GEIS mitigation fees due to the Town;
3. Applications submitted during 2007 will be assessed an 8% discount from the total calculated GEIS mitigation fees due to the Town;
4. Applications submitted during 2008 will be assessed a 4% discount from the total calculated GEIS mitigation fees due to the Town;
5. Applications submitted during 2009, and thereafter, will be assessed 100% of the total calculated GEIS mitigation fees due to the Town.

Section 4. Timing of Mitigation Fee Payment. Projects submitted shall be required to make payments according to the provisions included in the attached Schedule A. Projects submitted prior to the effective date of this law, for which a SEQRA Determination has been made, and for which fees are due shall be required to make payments according to the provisions in Schedule A.

Section 5. Notification of Fee Assessment. The Director of Planning and Zoning shall issue a GEIS mitigation Fee Letter for projects that require the assessment of GEIS mitigation fees in accordance with this local law. All Fee Letters shall be issued after a development application has received approval from the Planning Board and/or Town Board. The GEIS mitigation fee schedule and (where practicable) an estimate of GEIS mitigation fees shall be given upon submission of a complete development application.

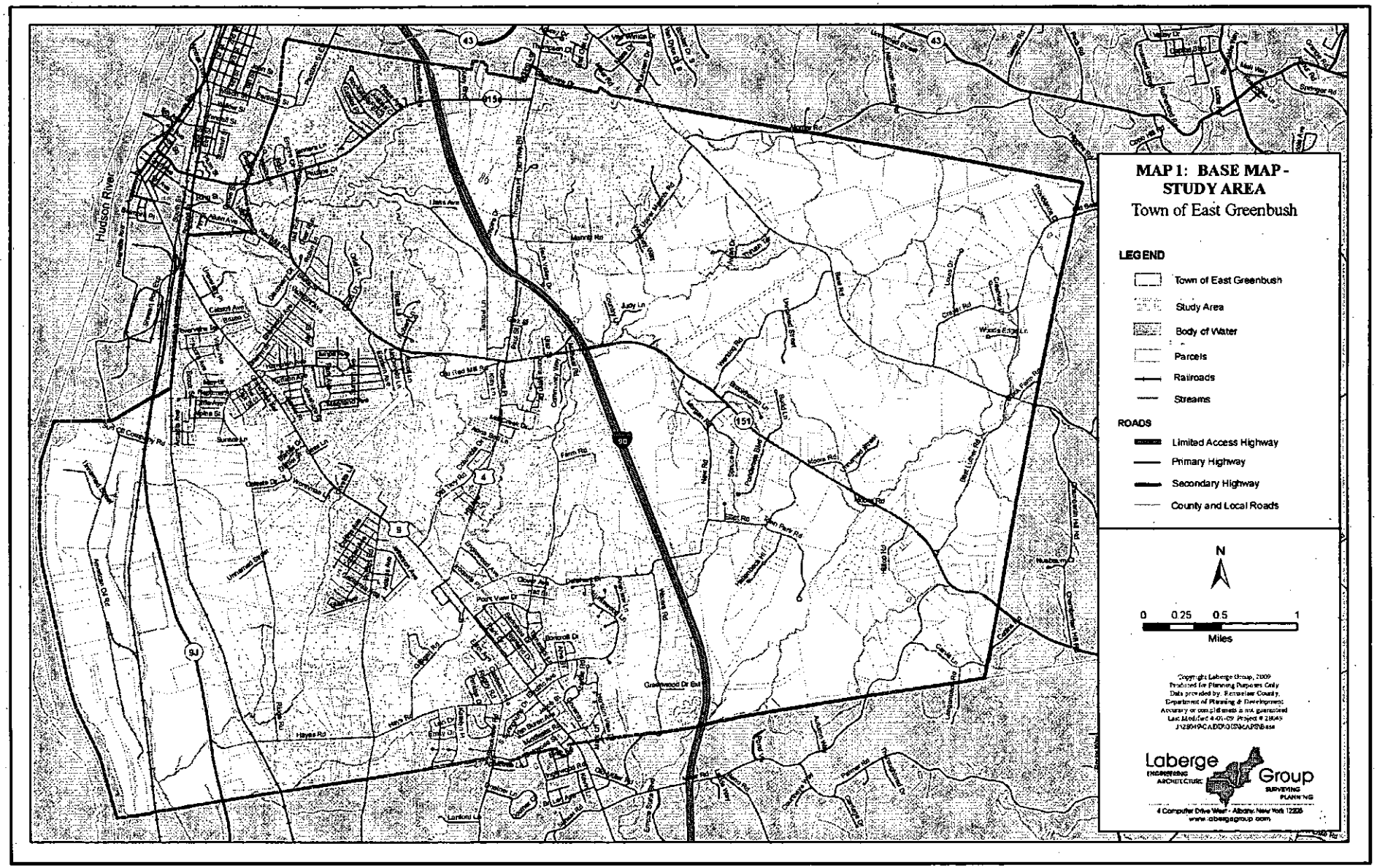
Section 6. GEIS Policy Committee. The Town shall establish a committee to oversee GEIS mitigation fee assessment and accounting of GEIS mitigation fees. The membership of the GEIS Policy Committee shall consist of the following municipal positions: Town Supervisor, Town Services Coordinator, Commissioner of Public Works, Director of Planning and Zoning, and one (1) Town Board member.

Section 7. GEIS Mitigation Fee Accounting. GEIS mitigation fees collected in accordance with this local law shall be kept in subordinate designated accounts not to be intermingled with general municipal funds. Five subordinate designated accounts shall be established as follows: GEIS Administration, Land Use and GIS, Water/Sewer, Recreation, and Traffic.

Section 8. Severability Clause. Should any portion of this law be struck, the remaining portions of the law shall remain in full force and effect.

Section 9. Effective Date. This law shall take effect immediately.

Figure 1. Western East Greenbush Generic Environmental Impact Statement (GEIS) Study Area



Schedule A – Amount of Mitigation Fees and Timing of Payment

Category	Use	Rate	Unit of Measure	Payment Due
GEIS	All	$52.29	Per Peak PM Trip	Prior to approval to commence construction
Land Use & GEIS	All	$5.67	Per Peak PM Trip	Prior to approval to commence construction
Water/ Sewer	Residential	$5,100.00	Per Dwelling Unit or per EDU for Multi-Family	One third (1/3) due prior to approval to commence construction; One third (1/3) due prior to issuance of each building permit; One third (1/3) due prior to issuance of certificate of occupancy for each dwelling unit
	Non-residential	$5,100.00	Per EDU	One half (1/2) due prior to approval to commence construction; One half (1/2) prior to issuance of certificate of occupancy or compliance
Recreation	Residential	$1,000.00	Per Dwelling Unit	One third (1/3) due prior to approval to commence construction; One third (1/3) due prior to issuance of each building permit; One third (1/3) due prior to issuance of certificate of occupancy for each dwelling unit
	Non-residential	$0.98	Per square foot of gross floor area of building	One half (1/2) due prior to approval to commence construction; One half (1/2) prior to issuance of certificate of occupancy or compliance
Traffic	Residential	$1,325.00	Per Dwelling Unit	One third (1/3) due prior to approval to commence construction; One third (1/3) due prior to issuance of each building permit; One third (1/3) due prior to issuance of certificate of occupancy for each dwelling unit
	Retail	$4.91	Per square foot of gross floor area of building	One half (1/2) due prior to approval to commence construction; One half (1/2) prior to issuance of certificate of occupancy or certificate of compliance
	Office	$2.27	Per square foot of gross floor area of building	One half (1/2) due prior to approval to commence construction; One half (1/2) prior to issuance of certificate of occupancy or certificate of compliance

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Schedule A – Amount of Mitigation Fees and Timing of Payment

Category	Use	Rate	Unit of Measure	Payment Due
	Industrial	$1.42	Per square foot of gross floor area of building	One half (1/2) due prior to approval to commence construction; One half (1/2) prior to issuance of certificate of occupancy or certificate of compliance
	Other	$1,310.00	Per Peak PM Trip	One half (1/2) due prior to approval to commence construction; One half (1/2) prior to issuance of certificate of occupancy or certificate of compliance

(Complete the certification in the paragraph that applies to the filing of this local law and strike out that which is not applicable.)

1. (Final adoption by local legislative body only.)

I hereby certify that the local law annexed hereto, designated as local law No. 5 of 2018 of the (County)(City)(Town)(Village) of East Greenbush was duly passed by the Town Board on December 19 2018, in accordance with the applicable provisions of law.

(Name of Legislative Body)

2. (Passage by local legislative body with approval, no disapproval or repassage after disapproval by the Elective Chief Executive Officer*.)

I hereby certify that the local law annexed hereto, designated as local law No. _____ of 20____ of the (County)(City)(Town)(Village) of _____ was duly passed by the _____ on _____ 20____, and was (approved)(not approved)

(Name of Legislative Body)

(repassed after disapproval) by the _____ and was deemed duly adopted

(Elective Chief Executive Officer)*

on _____ 20[ ][ ], in accordance w ith the applicable provisions of law.

3. (Final adoption by referendum.)

I hereby certify that the local law annexed hereto, designated as local law No. _____ of 20____ of the (County)(City)(Town)(Village) of _____ was duly passed by the _____ on _____ 20____, and was (approved)(not approved)

(Name of Legislative Body)

(repassed after disapproval) by the _____ on _____ 20____.

(Elective Chief Executive Officer)*

Such local law was submitted to the people by reason of a (mandatory)(permissive) referendum, and received the affirmative vote of a majority of the qualified electors voting thereon at the (general)(special)(annual) election held on _____ 20____, in accordance with the applicable provisions of law.

4. (Subject to permissive referendum and final adoption because no valid petition was filed requesting referendum.)

I hereby certify that the local law annexed hereto, designated as local law No. _____ of 20____ of the (County)(City)(Town)(Village) of _____ was duly passed by the _____ on _____ 20____, and was (approved)(not approved)

(Name of Legislative Body)

(repassed after disapproval) by the _____ on _____ 20____. Such local law was subject to permissive referendum and no valid petition requesting such referendum was filed as of _____ 20____, in accordance with the applicable provisions of law.

(Elective Chief Executive Officer)*

* Elective Chief Executive Officer means or includes the chief executive officer of a county elected on a county-wide basis or, if there be none, the chairperson of the county legislative body, the mayor of a city or village, or the supervisor of a town where such officer is vested with the power to approve or veto local laws or ordinances.

5. (City local law concerning Charter revision proposed by petition.)
I hereby certify that the local law annexed hereto, designated as local law No. _____ of 20____ of the City of _____ having been submitted to referendum pursuant to the provisions of section (36)(37) of the Municipal Home Rule Law, and having received the affirmative vote of a majority of the qualified electors of such city voting thereon at the (special)(general) election held on _____ 20____, became operative.

6. (County local law concerning adoption of Charter.)
I hereby certify that the local law annexed hereto, designated as local law No. _____ of 20____ of the County of _____State of New York, having been submitted to the electors at the General Election of November _____ 20____, pursuant to subdivisions 5 and 7 of section 33 of the Municipal Home Rule Law, and having received the affirmative vote of a majority of the qualified electors of the cities of said county as a unit and a majority of the qualified electors of the towns of said county considered as a unit voting at said general election, became operative.

(If any other authorized form of final adoption has been followed, please provide an appropriate certification.)
I further certify that I have compared the preceding local law with the original on file in this office and that the same is a correct transcript therefrom and of the whole of such original local law, and was finally adopted in the manner indicated in paragraph _____ above.

Kimberly Carlock
Clerk of the county legislative body, City, Town or Village Clerk or officer designated by local legislative body

(Seal)

Date: 12/28/2018