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ALBANY PINE BUSH FIRE MANAGEMENT PLAN
Report to the Albany Pine Bush Commission

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Introduction

This report was written to provide background information and initial plans for the development of a fire management program in the Albany Pine Bush. In 1989 the New York State legislature created the Albany Pine Bush Commission to coordinate management of the Albany Pine Bush Preserve, which is in diverse ownership (The City of Albany, NYS-Office of Parks, Recreation, and Historic Preservation, NYS-Department of Environmental Conservation, and The Nature Conservancy) in three municipalities (Albany, Colonie, and Guilderland). In 1986 the landowners and municipalities involved in the Pine Bush realized that fire management would play an important role in the long-term maintenance of the pine barrens. The N. Y. Field Office of the Conservancy was contracted to prepare a report reviewing fire history for the site, fire effects on the pine barrens communities and individual species, and prepare representative, initial research plans for prescribed burns.

The City of Albany, as a part of a generic environmental impact statement associated with the expansion of the Rapp Road landfill, commissioned three scientists to determine the minimum preserve size for maintenance of the pitch pine-scrub oak barrens natural community and the Karner blue butterfly. Their report (Givnish et al., 1988) concluded that 2000 acres (ca. 800 hectares) under effective management are required to preserve the biological integrity of the community and butterfly. It is the assumption of this report that this means that 2000 acres will require some level of fire management over the long term.

The currently protected 1500 acres (ca. 600 hectares) in the Albany Pine Bush are dissected by several major highways and bordered by numerous types of development, which must be taken into consideration in a fire management program.

This report focuses on the biological need for fire management and steps that should be taken to balance the ecological effectiveness of fire in maintaining a pine barrens with concerns of neighbors for health and safety and the presence of numerous fire and smoke hazards near the preserve (Sections 1-6).

This report includes the background information needed to develop a fire management program and reviews the components involved in prescribed burn planning in relation to the conditions in the Pine Bush (Section 7). Six small research burn plans are included (Appendices E-J).

The current condition of the Albany Pine Bush is reviewed in relation to fire management (Appendix D). Fuel type maps are presented with rare species locations and fire hazards.

An outline of a wildfire contingency plan is presented (Section 8) to coordinate response to unplanned wildfires, which will continue to occur in the Pine Bush. Steps needed to educate the public and participants in a comprehensive Pine Bush management program are also outlined (Section 9).

The intention of this plan is that during the first year of fire management there will be a series (probably three or four) of small research prescribed burns which will evaluate the behavior and effect of fire in a range of fuel (community) types. These research burn compartments are designed as a part of a cluster of compartments of similar fuel types. It may be possible during one day to burn several of the compartments in a unit after the research compartment burn has been successfully completed. Confidence in fire behavior predictions and crew effectiveness must be developed before larger burns can be undertaken.

Sections 1-6 were researched by David Hunt, who also wrote the first draft. Bob Zaremba revised Sections 1-6 and wrote Sections 7 and 8 and Appendices D-J. Amy Lester wrote Section 9. The entire document was reviewed by Greg Capobianco (TNC-NYFO), Steve Buttrick (TNC-ERO), Stephanie Gebauer (TNC-ENY), and Ron Myers (TNC Fire Management Program).

ALBANY PINE BUSH
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1.0 Site characterization

1.1 Origin of the Albany Pine Bush

The Albany Pine Bush occurs on sand deposits associated with Glacial Lake Albany which, for about 5000 years following the last period of glaciation, stretched from Glens Falls south to a large blockage in the Hudson River drainage near Newburgh, New York (La Fleur, 1976). Numerous meltwater rivers carrying sand and silt flowed into the lake from the melting icesheet. Approximately 5,000 years ago, the blockage in the Hudson Valley broke, releasing the great volume of water in the lake and exposing the accumulated sand to wind movement. Large dunes developed along the old shore of the lake and in the location of old river deltas. The Albany Pine Bush is located where the Mohawk River deposited its load of glacial sediment into Lake Albany. Dunes as high as 80 feet (25 meters) were created by wind movement of the unvegetated sand deposits. At one time, following the creation of these dunefields, the Albany Pine Bush may have covered as much as 40,000 acres (16,000 hectares) (Rittner, 1976c). The current boundaries of the remnant community were drawn by Carol Reschke, community ecologist for the New York Natural Heritage Program (NYNHP), from 1977 and 1984 aerial photographs with extensive ground-truthing (see Williams, 1985b).

1.2 Plant communities of the Albany Pine Bush

The Albany Pine Bush supports two communities that are fire-maintained and regarded as rare in New York by the NYNHP: pitch pine-scrub oak barrens (G2S1)-(for an explanation of the NYNHP rarity ranks see Appendix A) and pine barrens vernal ponds (sandplain intermittent ponds-G3G4S2) (Reschke, 1984a and b, 1990).

1.2.1 Pitch pine-scrub oak barrens

The pitch pine-scrub oak barrens community occurs at scattered sites from Pennsylvania to Maine on sand deposits associated with the last period of glaciation (Schweitzer and Rawinski, 1987). It is dominated by an often dense thicket of scrub oaks (*Quercus ilicifolia*-all scientific names for plants follow Mitchell, 1986) with scattered pitch pines (*Pinus rigida*)

that have survived fires. Typically, pines will average 8-10 trees per acre (20-25 per hectare) (Schweitzer and Rawinski, 1987), although there can be a broad range of tree densities related to fire frequency. Grassy openings occur at irregular intervals at sites of high intensity fires, recent physical disturbances, and in low-lying areas where cold air drainage limits the growth of woody species. Other common species in the pitch pine-scrub oak barrens natural community include:

early lowbush blueberry	Vaccinium angustifolium
late lowbush blueberry	Vaccinium vacillans
black huckleberry	Gaylussacia baccata
dwarf chestnut oak	Quercus prinoides
sweetfern	Comptonia peregrina
false indigo	Baptisia tinctoria
goats rue	Tephrosia virginiana
asters	Aster spp.
bushclovers	Lespedeza spp
milkweeds	Asclepias spp.
little bluestem	Schizachyrium scoparium
Indian grass	Sorghastrum nutans

The flora and fauna of the Albany Pine Bush occurrence of the pitch pine-scrub oak barrens community are among the most diverse known, supporting species characteristic of the Atlantic coastal plain, Midwestern prairies, boreal regions, and Appalachian uplands. Eleven rare insect species and three rare plant species have been documented within the Albany Pine Bush by the New York Natural Heritage Program (Table 1). The locations of all rare species and natural communities documented in the Albany Pine Bush by the NYNHP are mapped in Appendix D, Figures A2-H2. The rarest of these species globally is the Karner blue butterfly (Lycaeides melissa samuelis) which was first described from a site near the village of Karner in the Pine Bush. The largest remaining population of Karner blue butterflies east of Michigan occurring in natural habitat is found in the Albany Pine Bush (see Section 4.2.1). The inland barrens buckmoth (Hemileuca maia sp. 1) population in the Albany Pine Bush is the largest known globally (see Section 4.2.2).

One of the unusual features of the Albany Pine Bush pitch pine-scrub oak barrens community is large, open grassy areas with large stands of wild blue lupine (Lupinus perennis) associated with disturbances on sand dunes. It is unknown how frequent these features were in the past. It is, however, reported that both blue lupine and Karner blue butterflies were once much more abundant within the Pine Bush than they are today (Givnish et al., 1988).

There are limited sections of the Albany Pine Bush that support good to excellent examples of pitch pine-scrub oak barrens. The largest example is located at the Albany City

Table 1. Rare species and communities within the Albany Pine Bush.

Map Code*	Scientific name Common name	Heritage ** rarity rank	Heritage *** occurrence #	Region(s)
RARE NATURAL COMMUNITIES:				
1	Pitch pine-scrub oak barrens	G2 S1	.001	A,B,C,D,E, F,G,H.
2	Pine barrens vernal pond	G3G4 S2	.001	A
RARE ANIMALS:				
3	Atrytonopsis hianna dusted skipper	G4 S3	.002 .003	C/D D
4	Cerma cora bird dropping moth	G3G4 S1S3	.001	A,B,C,D,E, F,G,H.
5	Chaetaglaea cerata insect no common name	G3G4 S1S2	.002 .003	B F
6	Chytonix sensilis a noctuid moth	G4 S1	.001	A,B,C,D,E, F,G,H.
7	Hemileuca maia ssp.3 inland barrens buckmoth	G4T1T2 S1	.003	A,B,C,D,E, F,G,H.
8	Incisalia henrici Henry's elfin	G5 S2S3	.001	F
9	Incisalia irus frosted elfin	G4 S1S3	.004 .001 .002	D D F
10	Itame sp. 1 a geometrid moth	G3 S1S2	.001	B
11	Lycaeides melissa samuelis Karner blue butterfly	G5T2 S1	.053 .006 .013 .010 .011 .012 .001 .003 .008 .009	B B C C C/D D F G G G

12	Satyrium edwardsii Edward's hairstreak	G4	S3S4	.001	A,B,C,D,E, F,G,H.
13	Zanclognatha martha a noctuid moth	G4	S1	.001	A,B,C,D,E, F,G,H.
RARE PLANTS:					
14	Cyperus schweinitzii Schweinitz's flatsedge	G3	S2	???	G

* used in Appendix E. Figures A2-H2.

** see Appendix A for explanation of NYNHP rarity ranks.

*** reference to NYNHP documentation.

Preserve north of the New York State Thruway and east of Route 155 extending westward across Route 155 (Figure 1-Region F). Much of this stand burned in a 1981 fire, which originated at the Albany City landfill and burned west crossing Route 155, burning out in the NYS Office of Parks, Recreation, and Historic Preservation (NYS OPRHP) tract (Region B) south of Madison Avenue. This section of the Pine Bush is structurally characteristic of the pitch pine-scrub oak community with scattered surviving pitch pines in a dense thicket of scrub oaks with occasional grassy openings. Two other good examples of this community occur north of Kings Road on tracts burned in 1987 and owned by NYS OPRHP and the Watervliet Gun and Rod Club (Figure 1-Region B) and on the south slope of "Blueberry Hill", which burned in about 1975 on the NYS Department of Environmental Conservation (NYS DEC) tract south and east of the southern end of Pitch Pine Drive West (Figure 1-Region H).

For more information about the flora and fauna of the pitch pine-scrub oak barrens community in the Albany Pine Bush and throughout the range of the community consult the NYNHP or Schweitzer and Rawinski, 1987 (Appendix B).

1.2.2 Pine barrens vernal ponds

Pine barrens vernal ponds are intermittent ponds found within the pitch pine-scrub oak barrens community at low elevation sites where topography intersects groundwater and in locations with clay deposits that impede drainage. The characteristic species in these wetlands include: tussock sedge (Carex stricta), steeplebush (Spiraea latifolia), bulrush (Scirpus sp.), and leatherleaf (Chamaedaphne calyculata). During dry periods, fires from adjacent pine and oak-dominated woodlands burned into these wetlands, limiting tree and shrub growth. In recent years, the groundwater level within the Albany Pine Bush has fallen, resulting in the conversion of many of these wetlands to dry uplands. The remaining pine barrens vernal ponds in the Pine Bush are located in the north along the Amtrak line on land owned by the Conservancy (Figure 1-Region A), in the north-central region of the Albany City Preserve (Region F), and along the margins of Rensselaer Lake (Region H). Historical records of many other plant and animal species rare to New York exist from this community (Reschke, 1984b). Fire suppression and a drop in the water table may have led to the local extirpation of some of these species. The re-introduction of fire may result in the reestablishment of some of these species.

1.3 History of plant communities in the Albany Pine Bush

Historically, Pine Bush dunes may have supported a white pine-tree oak community, which was destroyed by clear-cutting

ıre 1. Locations of the fire management regions within the Albany Pine Bush.

during the 1600's (New York State Department of Environmental Conservation, 1986). Extensive clear-cutting may have destroyed the original humus, acidified the soil, and permitted establishment of pitch pine-scrub oak barrens.

Schweitzer and Rawinski (1987) disagree with the notion that the Pine Bush is of recent anthropogenic origin. They argue that the extensive assemblage of specialized lepidoptera indicate that this community has existed at least within the region for millennia, although not necessarily in the exact same spot. The Albany Pine Bush may have first developed during a warmer period several thousand years ago, when pine barrens-type vegetation connected many of the disjunct occurrences known today stretching from central New York to coastal Maine.

Rittner (1976a) states that the Pine Bush has existed for at least 7000 years. Pollen analysis indicates pines have been dominant in the Pine Bush for at least 8000 years and pitch pine has been dominant for at least the last few thousand years (Lewis, 1976).

2.0 Historical presence of fire in the Albany Pine Bush

Formation and maintenance of Northeastern pine barrens, including the Pine Bush, have been attributed to both natural fires (ignited by lightning) and fires resulting from human activity (Lutz, 1934; Day, 1953; Widoff, 1987). Fire probably first occurred in the Pine Bush area from lightning strikes in dry vegetation either in white pine-tree oak woodlands or pitch pine-scrub oak barrens (Benton, 1976). In general, pitch pine-dominated communities have probably burned regularly over the past 1000 years (Dwight, 1821; Day, 1953). Specifically, the Pine Bush may have burned intermittently over 20,000 years (Lewis, 1976). Charcoal deposits and oscillations in pollen abundance in sediments indicate repeated fires over the last 4000 years. These deposits include most of the genera present in the current plant communities found in the Pine Bush (Lewis, 1976).

Human activity in the Pine Bush dates back about 14,000-10,000 years (e.g., Paleo-Indians) (Ritchie, 1976). Fires are believed to have been set by Indians in the Pine Bush, as in many other forests of the Northeast, starting about 10,000 years ago (Day, 1953), continuing for thousands of years. Reasons cited for fires set by Indians include:

1) managing game, such as wild turkey and heath hen, by improving habitat, driving animals during hunts, and increasing visibility for hunting (Van der Donck, 1656; Day, 1953);
2) increasing supplies of nuts and berries and removing dead grass and brush to stimulate spring growth (Bergdahl,

1987);
3) driving away insects and reptiles (Day, 1953; Rather, 1984; Bergdahl, 1987);
4) waging war or defending villages from hostile tribes (Day, 1953); and
5) preparing land for cultivation (Day, 1953).

Fire management in the Pine Bush was first reported by Van der Donck (1656), with widespread annual fires set by Indians in woods, plains, and meadows (Rittner, 1976b; Milne, 1985) in the Colony of Rensselaerwyck near Fort Orange. These fires may have burned hundreds of acres at a time (Cryan, 1985). Russell (1983), however, argues that burning by Indians in the Northeast was probably more accidental than systematic and was not widespread or frequent, since such fires would have destroyed tribal food sources (e.g. acorns), firewood, and saplings and bark for construction of canoes, baskets and tools.

The Dutch, the first European settlers in the Pine Bush area, caused fires accidentally while burning trash (Benton, 1976) and intentionally set fires imitating Indian bush-burning (Van der Donck, 1656; People for the Pine Bush, 1975). Fires set by settlers in the Northeast were probably less frequent than those set by Indians (Olsvig, 1980) or those occurring naturally before human occupation (Forman and Boerner, 1981). Pine Bush accounts from the 1700's describe a pitch pine-scrub oak barrens community and indicate that fires were regular occurrences (Pownall, 1776). Areas with the best examples of the pitch pine-scrub oak barrens natural community in the Pine Bush have burned frequently during at least the past 90 years, and possibly for the past 300 years (Milne, 1985).

Causes of recent fires in the Pine Bush have been difficult to document. Natural fires may still occur occasionally in the Pine Bush (Wacker, 1979). However, in contrast to historical wildfires caused by lightning, most recent fires have been caused by man (Wacker, 1979), started carelessly by matches, trash burning or cigarettes (Arnold, 1968; Benton, 1976; Richey, 1978); intentionally by arsonists (O'Connor, 1982; Cantiello, 1987); accidentally by sparks from locomotives on tracks bordering the Pine Bush (Wacker, 1979; Forman and Boerner, 1981; Paul, 1986); inadvertently by motorcyclists riding through the Pine Bush (Richey, 1978; Dzinanko et al., 1981); and randomly by sunlight shining through discarded glass bottles (Schenectady Gazette, 1987). Fires in the Albany landfill, which was created in 1972 (Toczylowski, 1987), have been numerous (e.g., Albany Times Union, 1984b, 1986b, 1987a, 1987b; Thurman, 1987; Toczylowski, 1987, see also Table 2), with several spreading underground to the adjacent Pine Bush (Handrahan, 1982). Many of these fires burned for as long as ten days and penetrated underground as deep as 30 feet (Thurman, 1987). "Live" ashes in trash transported from the Albany City incinerator may have caused these fires

(Toczylowski, 1987).

Around 1900, it became policy to suppress all fires within the Albany Pine Bush (Williams, 1986). Motorized fire-fighting equipment developed in the 1940's resulted in faster response to fires (Little, 1979a). A decrease in railroad use and laws against open burning further reduced fire frequency in Northeastern pine barrens (Little, 1979a; Forman and Boerner, 1981). The establishment of the Pine Bush police-fire station complex in 1977 near the heart of the Pine Bush (Crupi, 1977) and the misconception that fire was harmful to native plant and animal communities resulted in attempts to suppress all Pine Bush fires (Handrahan, 1982; Connell, 1985b; Cryan, 1985; New York State Supreme Court, 1985; Albany Times Union, 1986a). Housing and office developments and roads throughout the Pine Bush have increased access and reduced response time to fires (LaMountain, pers. comm.).

In the last 10 years, the public has, however, become more aware of the role of fire in the ecology of the Pine Bush (Hughes, 1985 and many others). Fire departments have occasionally been more flexible in responding to wildfires, allowing fires to burn themselves out (Williams, 1985a).

3.0 Characteristics of Pine Bush fires

Information concerning the nature, time and place of past Pine Bush fires was obtained from fire records kept by local fire departments and the New York State Fire Prevention and Control Division of the Department of State, old newspaper articles, Milne's (1985) study of charcoal deposits in the Pine Bush, various local historical documents, and conversations with people knowledgeable about the Albany Pine Bush. An historical log of Pine Bush fires, compiled from these sources, is presented in Tables 2, 3, 4, 5 and 6; three large areas that burned are mapped in Figures 2 (1968), 3 (1981), and 4 (1987); the location of other fires is shown in Appendix C, which is included in only a single copy of this report which is on file at the Conservancy Field Office in Albany.

3.1 Fire intensity, duration and size

Fires in pine barrens are usually of high to moderate intensity with extremely rapid rates of spread (Cryan and Turner, 1981) due to high levels of dead woody material (Cryan and Turner, 1981) and the flammability of waxes, oils, resins and terpenes in pine leaves and stems and ericaceous shrubs (Little, 1979a; Cryan, 1980). Because recent response to such fires is immediate suppression, Pine Bush fires are commonly of short duration (Benton, 1976). Research on past fires, however,

Table 2. Fire History Log
Rapp Road Landfill
between 1981 & 1986

date	reference	notes
1976	Dzinanko et al., 1981	dump fire
1981 Apr 8-13	AFD, 1981	dump fires, large brush fires, large grass fires
1981 Apr 15-18	AFD, 1981	brush/grass/rubbish/dump fires
1981 Dec 7	AFD, 1981	rubbish fire
1982 Feb 17	AFD, 1982	rubbish fire
1982 Apr 19	AFD, 1982	accidental
1982 May	AFD, 1982	explosion in hopper
1982 Jun 11	AFD, 1982	rubbish fire
1982 Jun 21	AFD, 1982	dump fire
1983 Jan 27	AFD, 1983	rubbish fire
1983 Apr 29	AFD, 1983	dump fire; unknown cause
1984 Mar 29	AFD, 1984	brushfire; 4:48-5:06pm
1984 Nov 24-27	AFD, 1984	unknown cause; 10:42pm-8:09pm
1986 Jul 7	AFD, 1986	rubbish fire
1986 Jul 10-11	AFD, 1986	rubbish fire
1986 Sep 11	AFD, 1986	brush fire

AFD = Albany Fire Department

		10:27pm
1932 May 19	AFD, 1932	Pinehurst Ave/Austain Ave, grass fire, 12:54-1:45pm
1932 May 25	AFD, 1932	Tremont Ave S of Pinehurst Ave, grass fire, 1:59-3:07pm
1932 Nov 25	AFD, 1932	Oxford Rd, grass fire, 1:34-1:58pm
1932 Dec 2	AFD, 1932	Magazine St off Western Ave, grass fire, 8:22-8:48pm
1932 Dec 8	AFD, 1932	Fuller Rd N of Western Ave, grass fire, 1:30-2:04pm
1933 Jan 12	AFD, 1933	rear of 15 Austain Ave, grass fire, 1:18-1:31pm
1933 Mar 9	AFD, 1933	Colvin Ave N of Washington Ave, grass fire, 2:38-2:53pm
1933 Apr 22	AFD, 1933	Washington Ave W of Brevator St, grass fire, 3:12-4:46pm
1933 Apr 22	AFD, 1933	60 to 96 Colvin Ave, grass fire, 1:11-2:09pm
1933 May 16	AFD, 1933	rear of 27 Austain Ave, grass fire, 10:28-10:56am
1933 Oct 28	AFD, 1933	end of Magazine St, grass fire, 12:35-12:51pm
1933 Oct 28	AFD, 1933	W of Colvin Ave, grass fire, 1:11-1:54pm
1933 Oct 29	AFD, 1933	Central Ave S of Austain Ave, grass fire, 10:47-11:16am
1933 Dec 2	AFD, 1933	Colvin Ave S of Central Ave, grass fire, 8:32-8:58pm
1934 Mar 21	AFD, 1934	Western Ave W of Magazine St, grass fire, 6:21-6:42pm
1934 Mar 22	AFD, 1934	17 to 21 Austain Ave, grass fire, 1:10-1:33pm
1934 Mar 31	AFD, 1934	end of Melrose Ave, grass fire, 1:03-1:43pm
1934 Apr 3	AFD, 1934	end of Rosemont St, grass fire, 11:37-11:57pm
1934 Apr 3	AFD, 1934	Colvin St S of Central Ave, grass fire, 6:58-7:29pm
1934 Apr 9	AFD, 1934	Washington Ave W of Tremont Ave, grass fire, 9:55-10:37am
1934 Apr 10	AFD, 1934	Melrose Ave/Brevator St, grass fire, 7:54-8:24pm
1935 Mar 30	AFD, 1935	Magazine St, grass fire, 2:55-3:20pm
1935 Apr 7	AFD, 1935	Colvin Ave and Austain Ave S of Central Ave, grass fire, 11:57am-1:30pm
1935 Apr 7	AFD, 1935	Washington Ave between Tremont St and Austain Ave, grass fire, 2:30-3:35pm
1935 Apr 26	AFD, 1935	Magazine St, grass fire, 2:58-3:35pm
1935 Apr 28	AFD, 1935	Magazine St, grass fire, 12:45-1:35pm
1935 Oct 20	AFD, 1935	Yardboro Ave, grass fire, 2:10-2:58pm
1936 Mar 30	AFD, 1936	Washington Ave/Brevator St, grass fire, 12:50-1:02pm
1936 Mar 30	AFD, 1936	N of Washington Ave, W of Colvin Ave, grass fire, 4:48-5:46pm
1936 Dec 27	AFD, 1936	Western Ave/Brevator St, grass fire,

		12:22-12:34pm
1936 Dec 28	AFD, 1936	12 Belvidere Ave, grass fire, 12:27-12:45pm
1942 Mar 13	AFD, 1942	rear of 11 to 19 Lowell St, grass fire, 2:15pm.
1942 Mar 13	AFD, 1942	fields W of Tudor Rd N of Western Ave, brush fire, 12:15-12:35pm
1942 Mar 21	AFD, 1942	lots at SE corner of Clermont St/ Melrose Ave, grass/brush fire, 1:23-2:48pm
1942 Oct 31	AFD, 1942	lots at NW corner of Clermont St/ Belvidere Ave, grass/brush fire, 6:53-7:17pm
1943 Mar 28	AFD, 1943	field at NE corner of Belvidere Ave/ Clermont St, brush fire, 4:46-5:06pm
1943 Jul 3	AFD, 1943	fields on Washington Ave E of Tudor Rd, grass fire, cause: set, 11:35am.
1944 Nov 13	AFD, 1944	Tudor Rd W of Western Ave, grass fire, 7:58-8:35pm
1944 Nov 19	AFD, 1944	Oxford Rd between Western Ave and Washington Ave, grass fire, 5:15-5:48pm
1944 Dec 10	AFD, 1944	field at rear of tuberculosis sanitarium on Tudor Rd, grass fire, 3:50-4:35pm
1945 Apr 1	AFD, 1945	Tudor Rd N of Western Ave, grass fire, 3:37-4:47pm
1945 Apr 3	AFD, 1945	Washington Ave W of Tudor Rd, grass fire, 5:02-5:50pm
1945 Apr 3	AFD, 1945	near tuberculosis camp on Tudor Rd, grass fire, 1:16-1:55pm
1945 Oct 22	AFD, 1945	rear of 16 Yardboro Ave near railroad yards, grass fire, 5:59-6:25pm
1945 Oct 28	AFD, 1945	1226 Washington Ave, grass fire, 12:41-1:12pm
1946 Mar 24	GFD, 1946	Rt 146/Rt 20, grass fire, 1:45-4:45pm
1950 Apr 16	AFD, 1950	Washington Ave/Jermain Ave, grass fire, 4:30pm.
1950 Apr 18	AFD, 1950	Washington Ave/Tudor Rd, grass fire, 1:45pm.
1950 Apr 19	AFD, 1950	Washington Ave/Tremont St, grass fires, 12:02pm, 12:58pm.
1950 Apr 25	AFD, 1950	Washington Ave/Fuller Rd, grass fire, 10:18am.
1950 May 17	AFD, 1950	Washington Ave/Tremont St, grass fire, 1:37pm.
1950 May 21	AFD, 1950	Washington Ave/Fuller Rd, grass fire, 10:05pm.
1950 Jun 4	AFD, 1950	Six Mile Waterworks, grass fire, 5:59pm.
1950 Oct 20	AFD, 1950	Washington Ave/Yardboro Ave, grass fire, 4:12pm.
1950 Oct 22	AFD, 1950	Washington Ave/Tremont St, grass fire, 12:55pm.
1950 Nov 7	AFD, 1950	Lincoln Ave/Tremont St, grass fire, 8:17pm.
1950 Nov 16	AFD, 1950	rear of 7 Yardboro Ave, grass fire, 1:24am.

1951 Apr 7	AFD, 1951	Washington Ave/Fuller Rd, grass fire, 9:45pm.
1951 Apr 22	AFD, 1951	Six Mile Waterworks, grass fire, 5:24pm.
1951 Apr 30	AFD, 1951	Washington Ave/Tudor Rd, grass fire, 10:42pm.
1951 May 10	AFD, 1951	Washington Ave/Tudor Rd, grass/rubbish fire, 11:19pm.
1951 Oct 26	AFD, 1951	Washington Ave/Jermain Ave, grass fire, 2:09pm.
1951 Oct 30	AFD, 1951	Washington Ave/Tremont St, grass fire, 1:00pm.
1951 Nov 11	AFD, 1951	Washington Ave/Tremont St, grass fire, 1:51pm.
1952 Feb 15	AFD, 1952	Tremont St, grass fire, 1:30pm.
1952 Mar 26	AFD, 1952	Washington Ave/Tudor Rd, grass fire, 9:12pm.
1952 Apr 10	AFD, 1952	27 Yardboro Ave, grass fire, 11:16am.
1952 Apr 10	AFD, 1952	12 Yardboro Ave, grass fire, 4:15pm.
1952 Apr 10	AFD, 1952	Washington Ave/Tremont St, grass fire, 5:40pm.
1952 Apr 16	AFD, 1952	Tremont St, grass fire, 12:45pm.
1952 May 3	AFD, 1952	Yardboro Ave, grass fire, 7:16pm.
1952 Oct 27	AFD, 1952	Yardboro Ave/Lowell St, grass fire, 2:25pm.
1952 Dec 1	AFD, 1952	Washington Ave/Tremont St, grass fire, 12:58pm.
1952 Dec 28	AFD, 1952	Yardboro Ave/Lowell St, grass fire, 12:30pm.
1953 Jan 31	AFD, 1953	Pinehurst St/Austain Ave, grass fire, 10:45am.
1953 Mar 20	AFD, 1953	Washington Ave/Tremont St, grass fire, 10:08pm.
1953 Mar 23	AFD, 1953	Washington Ave/Tremont St, grass fires, 1:35-1:45pm.
1953 Apr 3	AFD, 1953	Yardboro Ave, grass fire, 3:37pm.
1953 Apr 9	AFD, 1953	Lowell St, grass fire, 12:17pm.
1953 Oct 1	AFD, 1953	Washington Ave/Tudor Rd, grass fire, 5:40pm.
1953 Oct 16	AFD, 1953	Tremont St/Lincoln Ave, grass fire, 11:28am.
1953 Oct 17	AFD, 1953	Lowell St, grass fire, 3:47pm.
1953 Oct 18	AFD, 1953	Washington Ave/Tudor Rd, grass fire, 6:48pm.
1953 Dec 31	AFD, 1953	Washington Ave/Tremont St, grass fire, 2:59pm.
1954 Feb 24	AFD, 1954	Tremont St, grass fire, 12:47pm.
1954 Mar 6	AFD, 1954	Washington Ave/Tudor Rd, grass fire, 6:32pm.
1954 Mar 8	AFD, 1954	Lincoln Ave/Tremont St, grass fire, 11:19am.
1954 Mar 19	AFD, 1954	Washington Ave/Tudor Rd, grass fire, 1:58pm.
1954 Mar 22	AFD, 1954	Tremont St/Pinehurst St, grass fire, 4:32-6:00pm

1954 Mar 29	AFD, 1954	Washington Ave/Tudor Rd, grass fire, 9:15pm.
1954 Apr 4	AFD, 1954	Tremont St, grass fire, 2:55pm.
1954 Apr 9	AFD, 1954	Tremont St/Pinehurst St, grass fire, 9:09pm.
1954 Apr 9	AFD, 1954	Washington Ave/Tudor Rd, grass fire, 11:18pm.
1954 Apr 13	AFD, 1954	Tremont St, grass fire, 8:59pm.
1954 Oct 24	AFD, 1954	Six Mile Waterworks, grass fire, 5:32pm.
1954 Nov 11	AFD, 1954	Washington Ave/Tudor Rd, grass fire, 4:10pm.
1954 Dec 17	AFD, 1954	Tremont St, grass fire, 8:16pm.
1954 Dec 27	AFD, 1954	Washington Ave/Tremont St, grass fire, 12:58pm.
1955 Jan 20	AFD, 1955	Pinehurst St/Tremont St, grass fire, 4:29pm.
1955 Apr 2	AFD, 1955	Lyric Ave/Zoar Ave, grass fire, 12:30pm.
1955 Apr 5	AFD, 1955	Tremont St/Washington Ave, grass fire, 6:43pm.
1955 Apr 6	AFD, 1955	Tremont St/Washington Ave, grass fire, 8:10am.
1955 Apr 6	AFD, 1955	Tremont St/Washington Ave, grass fire, 2:58pm.
1955 Apr 12	AFD, 1955	Tremont St/Pinehurst St, grass fire, 12:36pm.
1955 Apr 30	AFD, 1955	Washington Ave/Tremont St, grass fire, 2:05pm.
1955 May 2	AFD, 1955	Washington Ave/Jermain Ave, grass fire, 11:10am.
1955 May 4	AFD, 1955	Washington Ave/NY Thruway, grass fire, 5:40pm.
1955 May 5	AFD, 1955	Tremont St, grass fire, 6:21pm.
1955 May 19	AFD, 1955	Tremont St/Pinehurst St, grass fire, 7:34pm.
1955 May 20	AFD, 1955	Tremont St/Pinehurst St, grass fire, 10:20pm.
1955 May 21	AFD, 1955	Tremont St, grass fire, 4:43pm.
1957 Apr 19	AFD, 1959	Tremont Ave N of Lincoln Ave, grass fire, 10:25pm.
1958 Apr 19	AFD, 1958	Pinehurst St off Tremont St, grass fire, 3:11pm.
1959 Apr 15	GFD, 1959	Lydius St, grass fire, 1:15-2:44pm
1959 Apr 15	GFD, 1959	Siver Rd, grass fire, 2:45-3:05pm
1959 Apr 17	GFD, 1959	Siver Rd, grass fire, 3:50-4:17pm
1959 Apr 18	GFD, 1959	Dr. Lee's backyard, grass fire, 12:35-12:55pm
1959 Sep 19	AFD, 1959	N of Washington Ave, W of Tremont St, grass fire, 3:00pm.
1962 Apr 25	GFD, 1962	Old State Rd/Swan Rd, grass fire, 10:00-11:00
1963 Oct 9	GFD, 1963	7 Hite Ct, grass fire in woods, 1:50-2:24pm
1965 Apr 24	GFD, 1965	Okara Dr, grass fire, 11:35am-12:08pm
1965 Nov 6	GFD, 1965	113 Mohawk Dr, grass fire, 9:35-9:50

1966 Apr 9	GFD, 1966	vacant lot on Western Ave between Gay Ln & Highland Dr, grass fire, caused by unknown persons, 2:37pm.
1966 Apr 16	GFD, 1966	Rt 20/Rt 87 by NY Thruway, grass fire, 12:45am.
1966 Jul 15	GFD, 1966	Old State Rd @ Lober's Turkey Farm, grass fire, unknown cause, 9:25-9:50pm
1968 Apr 12	GFD, 1968	Old State Rd/Acre Dr, grass fire, 11:53am-out on arrival
1968 Apr 12	GFD, 1968	Gay Ln, grass fire, 12:32pm.
1968 Apr 12	GFD, 1968	315 Acre Dr, grass fire, 1:00pm.
1968 Apr 14	GFD, 1968	Okara Dr/Highland Dr, grass fire, 11:50am.
1968 Apr 14	GFD, 1968	7 Hite Ct, trash/grass fire, 3:20pm.
1968 Apr 16	GFD, 1968	Acre Dr, grass fire, unknown cause, 2:20pm; 4:05pm.
1968 Apr 19	GFD, 1968	Acre Dr, grass fire, 2:30pm.
1968 Apr 20	GFD, 1968	Old State Rd @ Carmen Drive-in Theatre, grass fire, 7:17pm.
1969 May 5	GFD, 1969	Curry Rd Ext, grass fire, 4:34pm.
1970 Apr 16	GFD, 1970	Old State Rd @ Bigsbee Farm, grass fire, unknown cause, 3:10pm-out on arrival
1970 May 13	GFD, 1970	Maywood Ave/Old State Rd, grass fire, cause: set, 3:45pm-out on arrival
1971 Nov 8	GFD, 1971	rear of Highland Dr, grass fire, 12:55pm-out on arrival
1972 Apr 29	GFD, 1972	Lone Pine Rd, grass fire, 12:45pm.
1973 May 6	GFD, 1973	Maywood Ave/Old State Rd, grass fire, unknown cause, 2:21-2:57pm
1973 Jul 25	GFD, 1973	Siver Rd @ Pinehaven Golf Course 17th hole, grass fire, cause: probably cigarette or cigar, 6:40-6:56pm
1975 Apr 23	GFD, 1975	woods behind 129 to 133 Okara Dr, brush fire, unknown cause, 4:39-5:15pm
1975 Jul 2	GFD, 1975	Old State Rd behind Carmen Drive-in Theatre, tree fire, unknown cause, 8:47-9:41pm
1975 Aug 21	GFD, 1975	corner of Hillview Rd/Parkway South, grass fire, unknown cause, 12:07-12:43pm
1976 Jul 25	GFD, 1976	rear of 603 Maywood Dr, grass fire, 3:21-3:43pm
1977 Apr 22	GFD, 1977	Prospect Hill Cemetary, grass fire, unknown cause, 3:15-3:47pm
1979 May 3	AFD, 1979	Six Mile Waterworks/watershed, grass fire, 6:43-6:57pm
1980 Oct 10	AFD, 1980	E of Yardboro Ave, grass fire, 4:36-5:11pm
1982 Apr 25	AFD, 1982	Old State Rd/Shaver Rd at rear of Carmen Drive-in Theatre, grass/brush/woods fire, 3:31-4:31pm
1982 Nov 23	AFD, 1982	1400 Washington Ave, SUNYA, Dutch Quad, grass fire, 7:16-7:40pm
1983 Apr 9	GFD, 1983	2332 Western Ave, grass fire, 2:37-3:15pm

AFD = Albany Fire Department
GFD = Guilderland Center Fire Department

* potential in the sense that these fires probably occurred at non-pine barren locations peripheral to the entire Pine Bush and probably were extinguished before they could spread into the Pine Bush.

Table 3. Fire History Log
Albany Pine Bush
large pine barren fires*

date	reference	notes
1600's	Cryan, 1985	repeated fires
1656	Rittner, 1976b	sensu Van der Donck, annual Indian burns, Fort Orange & Rensselaerwyck
1854 Aug 22	Munsell, 1855; AA, 1854	after severe drought, fire several days long, extensive, many places between Schenectady and Albany
1935 May 27	AFD, 1935	Karners, brush fire, 4:08-6:58pm
1935 Aug 25	AFD, 1935	Washington Ave E of Fuller Rd, brush fire, 8:36-10:25pm
1943 Jul 18	AFD, 1943	Madison Ave/Tudor Rd, brush/woods fire, 6:29-8:15pm
1943 Aug 15	AFD, 1943	Washington Ave W of Fuller Rd, brush/woods fire, 3:48-4:48pm
1943 Oct 12	AFD, 1943	Washington Ave W of Tudor Rd, tree stump/woods/brush fire, 1:05-2:58pm; 3:46-4:10pm
1943 Apr 24	AFD, 1943	woods on upper Madison Ave, brush fire, 3:08-6:18pm
1943 Apr 26	GFD, 1943	Pine Bush, forest/brush fire, 2:30-7:30pm
1944 Apr 6	GFD, 1944	Pine Bush in Albany, brush fire, 6:30-10:00pm
1944 Apr 30	AFD, 1944	Tudor Rd N of Washington Ave extending into Pine Bush, brush fire, 6:13-7:26pm
1944 Apr 30	AFD, 1944	Fuller Rd/Washington Ave, brush fire, 5:20-8:17pm
1944 May 6	AFD, 1944	Washington Ave/Fuller Rd, brush/grass/woods fire, 7:33-10:00pm
1944 May 19	AFD, 1944	Rapp Rd off Madison Ave Ext, brush fire, 3:53-6:23pm
1945 Mar 30-31	GFD, 1945	Pine Bush to cemetery, brush/grass fire, 11:30pm-1:30am
1947 Apr 8	GFD, 1947	Pine Bush, brush/grass fire, 3:10-4:10pm
1947 Apr 11	GFD, 1947	Pine Bush, brush/grass fire, 3:00-4:30pm
1947 May 10	GFD, 1947	Pine Bush, brush/grass fire, 2:00-3:00pm; 4:30-5:30pm
1947 May 11	GFD, 1947	Pine Bush, brush/grass fire, 3:30-7:00pm
1947 Oct 21	GFD, 1947	Pine Bush, brush/grass fire, 1:00-9:30pm
1949 Jun 12-15	GFD, 1949	Pine Bush, brush fire, continuous
1950's	Larson, 1987	many large fires
1950 Apr 7	GFD, 1950	Pine Bush in Guilderland, brush fire, 1:00-2:00pm
1951 May 25	AFD, 1951	Madison Ave Ext, brush fires,

		9:50am; 1:40pm.
1952 Apr 10	GFD, 1952	Pine Bush, grass/brush fire, 8:00-9:30pm
1952 Apr 11	GFD, 1952	Pine Bush, grass/brush fire, 2:30-6:30pm
1953 Jun 23	AFD, 1953	Washington Ave/Fuller Rd, brush fires, 3:21pm; 6:55pm; 11:15pm
1957 Apr 19	AFD, 1957	Albany section of Pine Bush at end of Lincoln Ave off Schenectady Rd, brush fire, 1:25pm.
1957 May 9	AFD, 1957	Washington Ave/Fuller Rd, brush/grass fires, unknown cause, 12;26pm; 1:45pm; 2:09pm; 3:17pm, 10:16pm; 10:29pm
1959 Jun 3	AFD, 1959	Pine Ln/Rapp Rd, brush fire, 3:56-5:33pm
1960's	LaMountain, 1987	some for weeks, inner part, extinguish at Karner Rd
1960 May 4	GFD, 1960	Willow St/NY Thruway, grass/brush fire, 1:00-3:18am
1964 Oct 4	GFD, 1964	Pine Bush @ Stewarts, grass/woods fire, 1:30-8:21pm
1964 Oct 5	GFD, 1964	Siver Rd 0.5 mi N of Willow St, grass/brush fire, unknown cause, 5:35-6:00pm
1964 Nov 1-2	GFD, 1964	Willow St opposite Delsoto house, grass/brush fire, cause: set by unknown persons, 11/1 12:25-2:11am; 11/1 4:15-5:58pm; 11/2 9:20am-5:45pm
1964 Nov 2-3	ATU, 1964	W of Karner Rd on NY Central Railroad, 2 acres, 11/2 3:00pm - 11/3 early morning
1964 Nov 3	GFD, 1964	upper Willow St opposite Delsoto house, grass fire, unknown cause, 2:20-8:33pm
1964 Nov 4-5	GFD, 1964	upper Willow St @ Galusha house, grass fire, unknown cause, 11:50pm-1:12am
1968 Apr 18-19	Arnold, 1968; GFD, 1968; KN, 1968	Pine Bush area behind Guilderland elementary school and Sandy Hollow Stables, US 20 to Willow St to NY Thruway to Karner Rd, 400 acres, brush/grass fires, 4/18 9:50am-4:00pm; 4/19 morning, (mapped)
1960's late	Daigle, 1987	several fires, some Fri to Sun, between Albany and Schenectady
1970's early	Larson, 1987	many large forest fires
1972 May 28-29	GFD, 1972	N end of Willow St, brush/rubbish fire, unknown cause, 5/28 4:45pm; 5/29 started smoldering in afternoon
1973	Lester, 1983	sensu Rittner, city preserve
1973 Apr 23 S	KN-US, 1973	start in several areas by children,

		several acres, 3:30-9:00pm, E of rt 155 S of Washington Ave
1975	Rittner, 1976c (TU,KN 4/23,24)	2 mile section
1976 Apr 29-30	McKinney, 1976; Rittner 1976d; Connell, 1985b; Milne, 1985	pt. map 30 acre control, SUNYA
1976	Lester, 1983	sensu Rittner, developed area E of rt 155 S of NY Thruway
1977 May 14	GFD, 1977	end of Willow St in Albany, grass/brush fire, cause: probably children cooking picnic lunch, 2:00-3:00pm
1978 Apr 23	GFD, 1978	Pine Bush at end of Willow St, grass/brush fire, unknown cause, AFD let part in Albany burn, 10:00-11:00am
1978 Apr 25	AFD, 1978	Pine Bush area on rt 155, brush fire, 8:22am-5:22pm
1978 Apr 26	AFD, 1978 Kermani, 1978; Richey, 1978; GFD, 1978 Hughes, 1985 Cryan, 1986	Pine Bush from Washington Ave Ext @ Daughters of Sarah nursing home W of Rapp Rd to Pine Ln to rt 155 N of Washington Ave to Pine Bush on Willow St, Albany S of Guilderland line, Karner Meadows, many brush fires, scores of acres, for days, 10:13am-5:24pm, (mapped)
1978 Apr 29	AFD, 1978	Pine Ln, brush fire, 4:40-6:22pm
1979 May 2	AFD, 1979; Lester, 1983	Pine Bush area @ city preserve, brush fire, 4:21-6:14pm
1979 May 8	AFD, 1979	Washington Ave/Fuller Rd, brush fire, unknown cause, 3:12-4:34pm
1979 May 9	AFD, 1979	Washington Ave Ext/Fuller Rd, large brush fire, 3:47-6:21pm
1979	Lester, 1983 Cryan, 1986	sensu Rittner, developed area E of rt 155 S of NY Thruway, Karner Meadows
1980 Feb 12-13	AFD, 1980; Haggerty, 1980	W side of rt 155 N of NY Thruway to Old State Rd, grass/brush/tree/tree stump fire, 4 sq mi area, 2/12 1:47-10:30pm; 2/13 8:00-8:40am; 2/13 3:19-4:20pm, (mapped)
1980 Feb 14	AFD, 1980	Washington Ave/Fuller Rd, brush fire, 11:01am-12:44pm
1980 May 3-5	AFD, 1980; Friedman, 1980; Milne, 1985	Pine Bush from Washington Ave Ext @ Teresian House to Velina Dr to Pine Ln, large brush fire, 5/3 11:18pm-5/4 1:12am; 5/4 8:30am-5:30pm; 5/4 7:57pm-5/5 12:13am (mapped)
1981 Apr 8-9	AFD, 1981; ATU, 1981; Danzo, 1981b; Dzinanko et al.,	two fires: Rapp Rd landfill to rt 155 to railroad to Old Karner Rd & Gipp Rd to Washington Ave Ext to rt 155, large brush fires, 300-400

	1981; Fram et al., 1981; Gazin, 1981; GFD, 1981; Jones and Perlmutter, 1981; Nelson, 1981; Hughes, 1985; Milne, 1985; Daigle, 1987	acres, 4/8 10:00am- 4/9 3:40pm, (mapped)
1981 Apr 8-9	AFD, 1981	Fuller Rd/Madison Ave Ext, brush fire, 11:21pm-12:23am
1981 Apr 16	AFD, 1981; LaPoint, 1981	Pine Bush at rt 155/Old State Rd, large brush fire, cause: deliberately set, 3:07-8:10pm; 8:55-9:55pm, (mapped)
1981 Aug 18	AFD, 1981	rt 155 N of NY Thruway, brush fire, 10:53am-12:25pm
1983 Jun 23	AFD, 1983; Cryan, 1986	Pine Bush Plaza; Karner Meadows, brush fire, 5:22-5:42pm
1984 Apr 12-13	AFD, 1984; ATU, 1984b; Schultz, 1984; LaMountain, 1987	Rapp Rd to Velina Dr to Teresian House on Washington Ave Ext to Pine Ln, large brush fire, 4/12 7:05pm- 4/13 6:21pm, (mapped)
1985 Mar 26	AFD, 1985 Williams, 1985a	Washington Ave to Karner Rd to NY Thruway, brush fire, 10 acres, 2:02-4:27pm (mapped)
1985 May 4	GFD, 1985	Kings Rd to Dennis Ter, brush/grass fire, unknown cause, 3:39-5:27pm
1985 May 21	AFD, 1985	Fuller Rd/Int 90, brush fire, 1:00-2:06pm
1985 Jul 24	AFD, 1985	Rapp Rd to Pine Ln to southern Albany city line, brush fire, 3:52-4:00pm; 4:15-5:07pm (mapped)
1986 Apr 29	AFD, 1986	Rt 155/Washington Ave Ext, brush fire, 9:19-11:04am; 12:01-4:20pm
1986 Sep 11	AFD, 1986	Rapp Rd landfill, brush fire, 5:20-6:39pm
1987 Apr 26	Carey, 1987; Daigle, 1987; KN, 1987; SG, 1987	Kings Rd to Old State Rd to rt 155 to Rifle Range Rd, brush fire, 100 acres, 12:45-6:30pm, (mapped)

AA = Albany Argus
AFD = Albany Fire Department
ATU = Albany Times Union
GFD = Guilderland Center Fire House
KN = Knickerbocker News
SG = Schenectady Gazette
ca. = circa

* large pine barrens fires were classified based on those occurring within the limits of probable pristine Pine Bush and encompassing large areas if acreage known or occurring over long duration if only time known.

Table 4. Fire History Log
Albany Pine Bush
small pine barren fires*

date	reference	notes
1935 May 16	AFD, 1935	end of Washington Ave, brush fire, 8:40-9:37pm
1943 Oct 13	AFD, 1943	Washington Ave to Melrose Ave to Tudor Rd to Homestead Ave to Central Ave to Western Ave, brush fire, 4:54-6:20pm
1943 Oct 14	AFD, 1943	Washington Ave/Tudor Rd, woods fire, 4:17-4:47pm
1944 Apr 20	AFD, 1944	end of Washington Rd, brush fire, 4:32pm.
1944 Apr 28	AFD, 1944	upper Madison Ave/Oxford Rd, brush/grass fire, 9:15-9:50pm
1945 Oct 28	AFD, 1945	Washington Ave W of Fuller Rd, brush fire, 4:19-4:55pm
1946 Mar 31	GFD, 1946	Old State Rd/Lydius St @ rifle range (=Woodlawn Sportsman Club), 5:45-6:30pm; 9:45-10:30pm
1946 May 2	GFD, 1946	Pine Bush, grass fire, 9:10-9:40pm
1949 Mar 29	GFD, 1949	Pine Bush, grass fire, 7:30-8:30pm
1950 Apr 9	GFD, 1950	Pine Bush in Guilderland, grass fire, 1 hr
1950 Apr 30	GFD, 1950	Pine Bush, grass fire, 9:00-10:00pm
1950 Oct 21	GFD, 1950	Pine Bush on Lydius St, 3:30-4:00pm
1950 Oct 30	GFD, 1950	Pine Bush, grass fire, 0.5 hr
1951 Apr 10	GFD, 1951	Pine Bush on Spawn Rd, 11:30-12:00
1952 May 24	AFD, 1952	Washington Ave/Fuller Rd, brush fire, 5:04pm.
1953 Nov 3	AFD, 1953	Pine Bush on Karner Rd, brush fire, 3:10-3:34pm
1954 Apr 10	AFD, 1954	Fuller Rd, brush fire, 1:42pm.
1954 Apr 20	AFD, 1954	Washington Ave/Fuller Rd, brush fire, 11:00pm
1954 Jul 10	AFD, 1954	Laughlin St off Fuller Rd, brush fire, 3:07pm.
1954 Aug 22	AFD, 1954	Madison Ave Ext, brush fire, 3:33pm
1954 Aug 24	AFD, 1954	Washington Ave/Fuller Rd, brush fire, 1:30pm.
1955 Apr 17	AFD, 1955	Rapp Rd, brush fire, 4:51pm.
1955 May 22	AFD, 1955	Fuller Rd, brush fire, 2:28pm.
1957 Apr 23	AFD, 1957	vacant land at Lincoln Ave/Tremont St; Lyric Ave between Tremont St and Zoar Ave; Lincoln Ave/Jermain Ave, several grass/brush fires, unknown cause, 10:47-11:05pm.
1957 Apr 23	AFD, 1957	Washington Ave W of Thruway Motel, brush fire, 11:13-11:25pm
1957 May 6	AFD, 1957	Tremont Ave/Washington Ave, large area, brush fire, unknown cause, 2:34-2:43pm
1957 Jul 26	AFD, 1957	Washington Ave/Fuller Rd @ Six Mile Waterworks, brush fire, 2:13pm.
1958 Apr 5	AFD, 1958	Washington Ave @ Thruway Motel (1375)

		brush fire, 6:33pm.
1958 Apr 19	AFD, 1958	Washington Ave W of Thruway Motel, brush fire, 6:02pm.
1959 Apr 18	AFD, 1959	Pine Ln off Rapp Rd, brush fire, 12:13pm.
1959 Apr 18	GFD, 1959	Siver Rd/Old State Rd, grass fire, 10:22am-3:30pm
1960's	LaMountain, 1987	many spot brush fires
1960 ca.	Milne, 1985	S of Rensselaer Lake N of Int 90 (point map)
1962 Apr 25	GFD, 1962	Pine Bush @ Old State Rd/Lydius St, grass fire, 8:14-9:14pm
1962 May 5	GFD, 1962	Pine Ridge Dr, small brush/grass fire, 9:30-10:09
1962 Sep 9	GFD, 1962	Old State Rd/Lydius St, grass fire, suspicious cause, 2:25-3:30pm; 4:05-7:58pm
1963 Apr 12	GFD, 1963	Pine Bush, grass fire, 6:15-6:45pm
1963 Apr 13	GFD, 1963	Pine Bush @ Willow St, grass fire, 3:15-7:00.
1963 Jul 5	GFD, 1963	Old State Rd to Lydius St, grass fire, unknown cause, 12:35-6:12pm
1963 Jul 5	GFD, 1963	Pine Bush, grass fire, 10:35-11:08
1964 Oct 17	GFD, 1964	Siver Rd opposite Pinehaven Golf Course, grass/brush fire, unknown cause, 11:30am-12:01pm; rekindle rubbish fire, 6:40-7:01pm
1964 Sep 24	GFD, 1964	Old State Rd/Kings Rd, grass/brush fire, unknown cause, 5:20-6:05pm
1964 Sep 26	GFD, 1964	Old State Rd/Kings Rd, grass/brush fire, 5:20-6:17pm
1965 Mar 28	GFD, 1965	192 Pineridge Dr @ Tisdale house, grass/brush fire, 12:55-1:10pm
1965 May 9	GFD, 1965	Karner Rd near NY Thruway in Albany, grass fire, 4:10pm.
1965 May 13	GFD, 1965	Old State Rd/Kings Rd in Colonie, grass fire, unknown cause, 11:35am-12:15pm
1965 Jul 2	GFD, 1965	Siver Rd/Old State Rd, grass fire, 5:40-6:55pm
1965 Nov 4	GFD, 1965	Old State Rd/Kings Rd, grass fire, 3:15-4:15pm
1965 ca.	Milne, 1985	Old Karner Rd just S of railroad tracks (point map)
1966 Apr 14	GFD, 1966	Pine Bush on Siver Rd, grass/brush fire, unknown cause, 1:38pm.
1966 Jun 3	GFD, 1966	Pine Bush N of Old State Rd E of Siver Rd, grass/brush fire.
1966 Oct 30	GFD, 1966	Pine Bush area at Old State Rd/Siver Rd, grass/brush fire, unknown cause, 9:25am.
1967 Nov 1	GFD, 1967	Siver Rd N of Old State Rd, brush/grass fire, cause: unknown persons, 2:05.
1967 ca.	Milne, 1985	NY Thruway SE of Rapp Rd landfill, (point map)
1968 Mar 26	GFD, 1968	Willow St Ext, brush fire.

1968 Apr 20	GFD, 1968	Pine Bush area, upper Willow St, grass/brush fire, cause: unknown persons, 11:05am.
1968 Apr 21	GFD, 1968	Old State Rd/Lydius St @ Pinehaven Golf Course, grass fire, 8:45am
1968 May 8	GFD, 1968	Old State Rd, grass/brush fire, unknown cause, 5:23pm.
1970	Benton, 1976	Pine Bush
1970 ca.	Milne, 1985	Karner Meadows at Pitch Pine Rd/Red Pine Dr, (point map, site 22)
1970 ca.	Milne, 1985	N of NY Thruway W of Rapp Rd landfill in Pine Bush preserve, (point map, site 14)
1971 ca.	Lewis, 1976	Poplar St. bog, Colonie
1972 ca.	Milne, 1985	The Dunes W of West Meadow Dr, (point map)
1973 ca.	Jones & Perlmutter, 1981	sensu Salisbury, Pine Ln
1975 Apr 12	GFD, 1975	upper end of Willow St in Albany, brush/grass fire, cause: possibly children, 5:59-6:38pm
1975 May 19	GFD, 1975	Old State Rd between Siver Rd and Lydius St, grass/brush fire, 12:54-12:58pm
1975 ca.	Jones & Perlmutter, 1981	sensu Salisbury, Pine Ln
1975 ca.	Milne, 1985	S of Washington Ave Ext, W of Teresian House (point map)
1976 ca.	Milne, 1985	SW corner of Rensselaer Lake, (point map)
1977 Sep 3	GFD, 1977	Pineview Dr, brush fire, unknown cause, 2:45-3:22pm
1977 Oct 25	GFD, 1977	186 Pineridge Rd, grass/brush/leaves fire, cause: suspicious origin, 4:18-4:44pm
1977 Oct 30	GFD, 1977	Willow St Ext, grass/brush fire, unknown cause, 4:45-5:29pm
1978 Apr 18	AFD, 1978	Washington Ave Ext behind Teresian House, brush fire, unknown cause, 7:06-7:36pm
1978 Apr 28	AFD, 1978	Rapp Rd, brush/tree/stump fire, 7:16-9:16pm
1978 Apr 28-29	AFD, 1978	Lincoln Ave Ext, brush fire, 11:24pm-12:49am
1978 Apr 29	AFD, 1978	Lincoln Ave Ext, brush fire, 3:26-6:10pm
1978 Jul 12	AFD, 1978	Point of Woods, brush fire, 11:09-11:26am
1978 Jul 30	AFD, 1978	Six Mile Waterworks, brush fire, unknown cause, 12:05-12:40am; 1:21-2:22pm
1978 Oct 12	GFD, 1978	dirt road end of Willow St, grass/brush fire, cause: set, 4:46-5:28pm
1978 Nov 6-7	AFD, 1978	Old State Rd/rt 155, brush fire, 11:42pm-12:37am
1978 Nov 12	AFD, 1978	Old State Rd/rt 155, brush fire, 7:04-7:24pm
1978	Hughes, 1985; Cryan, 1986	Karner Meadows, Albany S of Guilderland line
1979 Mar 21	AFD, 1979	54 Rapp Rd, brush fire, 3:10-3:29pm
1979 Mar 27	AFD, 1979	E of Pine Ln, two brush fires, 12:11-12:59am

1979 Apr 8	AFD, 1979	Old State Rd, brush fire, 5:31-6:13pm
1979 Apr 8	AFD, 1979	Washington Ave Ext, brush fire, 7:39-7:57pm
1979 Apr 13	AFD, 1979	Old State Rd/rt 155, brush fire, 7:05-7:36pm
1979 May 12	AFD, 1979	Rapp Rd, brush fire, 12:10-12:32pm
1979 Jun 27	AFD, 1979	Washington Ave Ext @ Daughters of Sarah nursing home, brush fire, 3:55-4:19pm
1979 Jul 4	GFD, 1979	194 Pineridge Dr, small brush fire - 1 ft diameter, 9:41-9:44pm
1979 Oct 21	Daigle, 1987	rt 115/Rifle Range Rd, brush fire, 5:24-5:41pm
1980 Jan 5	AFD, 1980	rear of 20 Warren St, brush fire, 5:27-5:38pm
1980 Feb 2	AFD, 1980	E of Pinehurst Estates, brush fire, 4:30-5:08pm
1980 Feb 11	AFD, 1980	Washington Ave Ext, brush fire, unknown cause, 4:19-4:31pm
1980 Apr 7	AFD, 1980	Fuller Rd/Int 90, brush fire, unknown cause, 1:57-2:16pm
1980 Apr 13	GFD, 1980	Siver Rd @ 4th house from Willow St, grass/brush/underbrush fire, cause: controlled burn that got away, 1:00-1:49pm
1980 Apr 21	GFD, 1980	end of 200 Pineridge Dr, brush fire, unknown cause, 3:03-3:31pm
1980 Apr 22	GFD, 1980	Siver Rd, brush/tree stump fire, cause: owner burning farm, 12:41-12:55pm
1980 Apr 30	AFD, 1980	Rapp Rd, W side of Six Mile Waterworks, brush fire, 6:42-8:26pm
1980 May 27	AFD, 1980	Washington Ave, Rapp Rd in Guilderland, brush fire, 10:10-10:28pm
1980 Jun 1	AFD, 1980	Int 90/NY Thruway, brush fire, 2:19-2:57pm
1980 Jun 24	AFD, 1980	wooded lane off Rapp Rd 0.5 mi N of Washington Ave, brush fire, 7:08-8:03pm
1980 Aug 5	AFD, 1980	Fuller Rd/Int 90, brush fire, 4:42-5:10pm
1981 Mar 23	AFD, 1981	Point of Woods, grass fire, 4:16-4:46pm
1981 Apr 13	AFD, 1981	Rapp Rd @ landfill, brush fire
1981 May 25	AFD, 1981	Washington Ave Ext @ Daughters of Sarah nursing home, brush fire, 8:45-9:15pm
1981 Jul 30	AFD, 1981	Rapp Rd, brush fire, 7:38-8:05pm
1982 Jul 22	AFD, 1982	Washington Ave W of Fuller Rd, brush fire, 8:07-8:20pm
1982 Jul 30	AFD, 1982	Karner Rd, brush fire, 1:44-1:58pm
1983 Jul 7	AFD, 1983	Rapp Rd, small brush fire, 4:17-4:26pm
1983 Aug 21	GFD, 1983	end of Tower St behind water tower, brush/grass fire, cause: believed kids with fireworks, 2:14-2:17pm
1983 Sep 12	AFD, 1983	Washington Ave Ext behind Daughters of Sarah nursing home, brush fire, unknown cause, 8:50-9:28pm
1983 Sep 15	AFD, 1983	Washington Ave Ext @ Teresian House, brush fire, 7:58-8:28pm
1984 Mar 29	AFD, 1984	Rapp Rd landfill, brush fire, 4:48-5:06

1984 Apr 2	AFD, 1984	Rt 155 S of Washington Ave, brush fire, 9:44-9:56pm
1984 May 26	AFD, 1984	Washington Ave Ext/Rapp Rd, brush fire, 3:02-3:08pm
1984 Jun 28	GFD, 1984	end of Willow St in Albany, brush/grass fire, 4:20-5:36pm
1985 Feb 25	AFD, 1985	Washington Ave Ext @ Polish Club, brush fire, unknown cause, 2:55-2:58pm
1985 Mar 19	AFD, 1985	67 Aspen Ct, brush fire, 5:51-6:00pm
1985 Mar 20	AFD, 1985	Washington Ave Ext, brush fire, 9:31-9:36am
1985 Mar 24	GFD, 1985	Old State Rd 300 yds E of Siver Rd, brush/grass fire, unknown cause, 12:28-12:50am
1985 Mar 26	AFD, 1985	Washington Ave Ext, tree fire, 5:55-6:03pm
1985 Mar 27	GFD, 1985	Crossgates Mall, brush fire, unknown cause, 3:38-4:27pm
1985 Jul 23	AFD, 1985	Rapp Rd/Pine Ln, brush fire, 9:57-10:06pm
1985	Hughes, 1985	sensu Rittner, planned control, 10-30 acres W Pine Hurst & Point of Woods (completed?)
1986 Mar 18	AFD, 1986	Washington Ave/Springsteen Rd, brush fire, 9:17-9:25am
1986 Mar 25	AFD, 1986	rear of Teresian House, unfounded brush fire, 8:20-8:27pm
1986 Apr 20	AFD, 1986	Rt 155/Washington Ave Ext, brush fire, 12:08-12:26pm
1986 Sep 11	AFD, 1986	Rapp Road landfill, brush fire, 5:20-6:39pm

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AFD = Albany Fire Department
GFD = Guilderland Center Fire Department

* small pine barrens fires were classified based on those occurring within the limits of probable pristine Pine Bush and encompassing small areas if acreage known or occurring over short duration if only time known.

Table 5. Fire History Log
Albany Pine Bush
possible pine barren fires*

date	reference	notes
1929 Sep 1	AFD, 1929	Washington Ave W of Magazine St, grass fire, 6:59-8:01pm
1931 Apr 20	AFD, 1931	Oxford Rd, woods/forest fire, 3:28-6:03pm; 7:13-9:15pm
1935 Oct 12	AFD, 1935	Western Ave/Magazine St, brush fire, 1:48-2:38pm
1942 Mar 20	AFD, 1942	fields on Washington Ave W of Brevator St, grass/brush fire, 5:11-7:20pm
1942 Oct 31	AFD, 1942	field on Tremont Ave N of Washington Ave, grass/brush fire, 2:20-3:34pm
1943 Mar 28	AFD, 1943	field at NE corner of Tremont St/ Washington Ave, brush fire, 12:51-1:35pm
1943 Mar 28	AFD, 1943	field on Upper Madison Ave W of Brevator St, brush fire, 8:53-10:00pm
1943 Mar 28	AFD, 1943	field and woods at rear of 35 Oxford Rd, brush fire, 10:42-11:42pm
1943 May 2	AFD, 1943	vacant fields at Washington Ave/Brevator St, grass/brush fire, 8:43-9:06pm
1943 Oct 12	AFD, 1943	Pinehurst Ave/Austain Ave, brush fire, 5:53pm.
1944 Apr 2	AFD, 1944	W of 261 Lincoln Ave, grass/brush fire, 7:43-8:09pm
1944 Apr 14	AFD, 1944	Washington Ave/Tudor Rd, grass/brush fire, 5:00-5:34pm
1944 Apr 19	AFD, 1944	Western Ave/Tudor Rd, grass/brush fire, 10:51-11:18am
1944 Apr 19	AFD, 1944	fields on Western Ave W of Tudor Rd, grass/brush fire, 2:43-4:27pm
1944 Apr 19	AFD, 1944	Fuller Rd, grass fire, 4:29-6:49pm
1944 Apr 19	AFD, 1944	woods E of Oxford Rd, brush fire, 9:26-10:30pm
1944 Oct 28	AFD, 1944	Washington Ave W of Brevator St, brush/ rubbish fire, 4:38-5:30pm
1944 Oct 31	AFD, 1944	Austain Ave/Pinehurst Ave, brush fire, 6:53-7:24pm
1944 May 29	AFD, 1944	end of Lincoln Ave, grass/brush/rubbish fire, 2:17-3:40pm
1945 Apr 7	AFD, 1945	S of Pausey and Frost Pl, brush fire, 2:14-2:52pm
1945 Oct 21	AFD, 1945	S of Frost Pl, brush fire, 1:31pm.
1946 Mar 22	GFD, 1946	Pine Bush @ Dr. Lee's house, grass fire, 2:10-3:10pm
1947 Oct 21-22	GFD, 1947	Lydius St @ rifle range (=Woodlawn Sportsman Club), 10:00pm-1:00am
1947 Nov 3	GFD, 1947	Old State Rd, grass fire, 1:00-1:30pm
1948 Apr 24	GFD, 1948	Lydius St, grass fire, 1 hr
1949 Apr 2	GFD, 1949	Old State Rd, grass fire, 4:30-5:30pm
1950 Apr 18	AFD, 1950	12 Yardboro Ave, brush fire, 12:40pm.

1950 Nov 19	AFD, 1950	end of Oxford Rd, grass/brush fire, 3:26pm.
1951 May 2	AFD, 1951	Washington Ave/Tudor Rd, brush fire, 7:32pm.
1951 May 3	AFD, 1951	Madison Ave Ext, grass/brush fire, 12:10pm.
1952 Mar 30	GFD, 1952	Gipp Rd, grass fire, 11:30-11:59pm
1952 May 4	AFD, 1952	Washington Ave/Fuller Rd, grass fire, 8:35pm, 11:19pm.
1953 Apr 3	AFD, 1953	Laughlin St/Fuller Rd, grass fire, 9:54am.
1953 Apr 5	AFD, 1953	Fuller Rd, grass fire, 1:20pm.
1953 Apr 29	AFD, 1953	Rapp Rd, grass fire, 12:20pm.
1953 May 10	AFD, 1953	Fuller Rd, grass fire, 4:08pm.
1953 Jun 24	AFD, 1953	Six Mile Waterworks, brush fire, 9:55am.
1954 Mar 12	AFD, 1954	Rapp Rd, grass fire, 2:57pm.
1954 Mar 22	AFD, 1954	Washington Ave/Fuller Rd, grass fire, 7:17pm.
1954 Apr 4	AFD, 1954	Madison Ave Ext, grass fire, 1:35pm.
1954 Apr 15	AFD, 1954	Rapp Rd, grass fire, 5:19pm.
1954 Apr 15	AFD, 1954	Rapp Rd, grass fire, 9:33pm.
1954 Apr 19	AFD, 1954	Madison Ave Ext, grass fire, 2:10pm.
1954 Jul 8	AFD, 1954	Washington Ave/Tudor Rd, brush fire, 6:55pm.
1954 Oct 24	AFD, 1954	Rapp Rd, grass fire, 1:00pm.
1954 Dec 23	AFD, 1954	Fuller Rd, grass fire, 1:15pm.
1955 Apr 2	AFD, 1955	Tremont St/Pinehurst St, brush fire, 7:17pm.
1955 Apr 8	AFD, 1955	Rapp Rd, grass fire, 8:18pm.
1955 Apr 12	AFD, 1955	Washington Ave/Fuller Rd, grass fire, 9:53am; 1:01pm.
1955 Apr 30	AFD, 1955	Western Ave/Rapp Rd, grass fire, 6:38pm.
1955 May 4	AFD, 1955	12 Yardboro Ave, brush fire, 12:40-1:40pm
1955 Jul 10	AFD, 1955	Lincoln Ave/Tremont St, tree fire, 6:31pm.
1955 Sep 23	AFD, 1955	Tudor Rd off Washington Ave, brush fire, 4:59pm.
1957 Apr 1	AFD, 1957	Fuller Rd @ Six Mile Waterworks, brush/ rubbish fire, unknown cause, 4:49-4:58pm
1957 May 25	AFD, 1957	Six Mile Waterworks, grass/brush fire, 6:41pm.
1959 Jan 1	AFD, 1959	Tremont St W of Lyric Ave, brush fire, 4:08pm.
1959 Mar 21	AFD, 1959	fields on Lincoln Ave W of Tremont St, brush fire, 4:15pm
1959 Mar 26	AFD, 1959	fields on Lyric Ave between Tremont St and Zoar Ave, grass/brush fire, 3:00pm.
1959 Apr 5	AFD, 1959	Madison Ave Ext W of Fuller Rd, grass fire, 5:28-5:37pm
1959 Apr 14	GFD, 1959	North Gate Dr, grass fire, 2:30-2:45pm
1959 May 4	AFD, 1959	Washington Ave/Tremont St, brush fire, 2:31pm.
1959 May 7	GFD, 1959	Pinewood St off Willow St, grass fire, 1/4 acre burned, 4:30-5:10pm

1959 May 8	AFD, 1959	Washington Ave off Tudor Rd, brush fire, 7:37pm.
1959 Jun 9	AFD, 1959	rear of Civil Defense Bldgs off Tudor Rd, brush fire, cause: children, 1:04pm.
1959 Jun 10	AFD, 1959	rear of Civil Defense Bldgs off Tudor Rd, brush fire, 3:49-5:09pm
1959 Jul 10	AFD, 1959	Washington Ave W of Tremont, brush/grass/ dump fire, 12:17pm.
1960 Oct 29	GFD, 1960	Willow St near Thruway, grass fire, 7:45-9:30pm
1960 Oct 31	GFD, 1960	Willow St near Thruway, grass fire, unknown cause, 5:52-7:26pm
1961 Mar 30	GFD, 1961	Siver Rd, grass fire
1961 Apr 9	GFD, 1961	53 Willow St, grass/brush fire, 1:35-1:54pm
1962 Apr 9	GFD, 1962	Pinewood Rd, grass fire, 6:15-6:30pm
1962 Apr 24	GFD, 1962	Rapp Rd, grass fire, 3:45-5:35pm
1962 May 15	GFD, 1962	Old State Rd/Lydius St, grass fire, unknown cause, 2:01-2:43pm
1962 May 26	GFD, 1962	Old State Rd/Lydius St, grass fire, 2:30-3:02pm
1962 May 28	GFD, 1962	Old State Rd/Lydius St, grass fire, 3:41-4:45pm
1962 Jun 10	GFD, 1962	Old State Rd/Lydius St, grass fire, 12:20-12:57pm
1962 Jun 17	GFD, 1962	Old State Rd/Lydius St, grass fire, unknown cause, 3:30-5:57pm
1963 Apr 14	GFD, 1963	Willow St, grass fire, 11:05-11:35am; 3:14-4:24pm
1963 Apr 14	GFD, 1963	Karner Rd, grass fire, 2:35-2:47pm
1963 Apr 14	GFD, 1963	Prospect Hill Cemetery, grass fire, 4:43-7:16pm
1963 Apr 16	GFD, 1963	Siver Rd, grass fire, 4:50-5:04pm
1963 May 16	GFD, 1963	Leda Ln, grass fire, 3:55-4:16pm
1963 Jul 4	GFD, 1963	Pinehaven Golf Course, 16th hole, grass fire, 6:55-8:10pm
1963 Jul 6	GFD, 1963	Old State Rd/Siver Rd, grass fire, unknown cause, 1:25-1:57pm
1963 Jul 25	GFD, 1963	Pinewood Rd/Cherry Ln, grass fire, 2:15-3:51pm
1963 Jul 31	GFD, 1963	Hillview Terrace, grass fire, 1:40pm-out on arrival
1963 Oct 12	GFD, 1963	Siver Rd, grass fire, 5:40pm.- 735pm
1963 Oct 19	GFD, 1963	Leda Ln @ Wessendorf house, grass fire, 12:20-12:35
1964 May 17	GFD, 1964	0.5 mi E of Karner Rd (out of district), grass fire, 9:05pm.
1964 Jun 23	GFD, 1964	Gipp Rd, grass fire, 3:00pm-out on arrival
1964 Jul 10	GFD, 1964	Old State Rd between Siver Rd and Lydius St, grass fire, 4:40-5:30pm
1964 Jul 11	GFD, 1964	Old State Rd/Lydius St, grass fire, 11:35am-12:40pm
1964 Jul 11	GFD, 1964	Lydius St/Siver Rd, grass fire, 3:42-

		6:30pm
1964 Sep 8	GFD, 1964	E of Karner Rd, S of railroad tracks, grass fire, 4:20-5:10pm
1964 Oct 6	GFD, 1964	Lydius St/Old State Rd, grass fire, 3:00-4:00pm
1964 Oct 9	GFD, 1964	210 Pinewood Rd, grass fire, cause: burning papers, 3:30-4:18pm
1964 Oct 12	GFD, 1964	Old State Rd, grass fire, 12:45-1:33pm
1964 Oct 16	GFD, 1964	Karner Rd to Old State Rd, grass fire, unknown cause, 4:00-5:14pm
1964 Oct 17	GFD, 1964	Highland Dr, brush/grass fire, unknown cause, 11:51am-1:00pm
1964 Dec 22	GFD, 1964	between Dr. Lee's and school, brush pile fire, 8:20-8:30am
1965 Apr 5	GFD, 1965	Leda Ln/Denny Rd, grass fire, 3:00-3:16pm
1965 Jul 14	GFD, 1965	Willow St - woods behind Goldsmith house, grass fire, 2:04-2:34pm
1966 Apr 23	GFD, 1966	Pineview Dr @ Sawyer & Sternberg houses, grass fire, 9:00am.
1966 May 18	GFD, 1966	Mohawk Dr/Highland Dr, brush fire, cause: burning papers, 1:55pm.
1966 Oct 20	GFD, 1966	Victoria Dr, dead tree fire.
1967 May 29	GFD, 1967	Acre Dr, brush fire, unknown cause, 12:33pm.
1968 Feb 13	GFD, 1968	513 Acre Dr, grass/tree fire, unknown cause - matches?, 3:10.
1968 Mar 30	GFD, 1968	8 Pineridge Dr, grass fire, 2:15pm-out on arrival
1968 May 6	GFD, 1968	Old State Rd/Lydius St, grass/dump/junk fire, unknown cause, 3:27pm.
1968 May 27	GFD, 1968	woods behind 351 Highland Dr, brush fire, unknown cause, 4:10pm.
1969 Oct 13	GFD, 1969	Mohawk Dr, grass/brush fire, 4:00pm.
1969 Oct 16	GFD, 1969	woods behind 20 Pinewood Dr, grass fire, cause: incinerator, 6:45pm.
1970 Apr 12	GFD, 1970	Willow St @ Arnold house, grass fire, unknown cause, 1:00pm.
1970 Apr 15	GFD, 1970	Willow St @ Wager house, grass fire, 3:45pm-out on arrival
1970 May 1	GFD, 1970	Old State Rd E of Siver Rd, grass fire, unknown cause, 5:20pm.
1970 May 23	GFD, 1970	Kings Rd/Old State Rd, grass fire, 12:05am.
1971 Apr 17	GFD, 1971	Old State Rd, grass fire, cause: kids with matches?, 9:30pm.
1971 May 26	GFD, 1971	Rapp Rd in Albany, fire, 12:00pm.
1971 Jun 4	GFD, 1971	14 Leda Ln, leaf pile fire, 11:00pm.
1974 Mar 2	GFD, 1974	Willow St near Tower St, (no wild fire, person burning brush in woods), 6:05-6:24pm
1974 Mar 10	GFD, 1974	Rt 155 behind park clubhouse, (no wild fire, person burning brush), 12:53pm.
1974 Apr 21	GFD, 1974	woods at Ridgehill Rd/Acre Dr, grass/brush fire, cause: probably

		children, 2:22-2:51pm
1974 Apr 28	GFD, 1974	Siver Rd @ Pinehaven Golf Course, grass/brush/leaves fire, cause: probably discarded cigarette, 7:25-7:55pm
1974 Apr 28	GFD, 1974	rear of 111 Willow St, grass/brush/leaves fire, cause: probably children, 8:45-9:05pm
1974 Jun 13	GFD, 1974	Siver Rd @ Pinehaven Golf Course, grass/brush/dump fire, unknown cause, 8:30-9:22pm
1974 Jun 14	GFD, 1974	Siver Rd @ Pinehaven Golf Course (different from Jun 13 fire), grass/brush/dump fire, cause: probably mischief, 1:00-2:14am
1975 May 29	GFD, 1975	Old State Rd/Betty Ln, grass/brush fire, 5:32-5:52pm
1976 Apr 13	GFD, 1976	509 Acre Dr, grass/brush fire, cause: boys with campfire, 4:19-6:06pm
1976 Apr 14	GFD, 1976	Siver Rd @ Pinehaven Golf Course, grass/brush fire, unknown cause, 1:50-2:12pm
1976 May 10	GFD, 1976	rear of 365 Highland Dr, grass/pine needles fire, unknown cause, 5:48-6:33pm
1977 Apr 19	GFD, 1977	Ridgehill Rd to Highland Dr & Mohawk Dr, grass/brush fire, 12:01-1:22pm
1977 May 27	GFD, 1977	99 Willow St, grass/brush fire, unknown cause, 1:30-2:13pm
1977 Jul 17	GFD, 1977	gully on Siver Rd, brush fire, unknown cause, 2:09-2:22pm
1977 Sep 2	GFD, 1977	dead end of Pineridge Rd, grass fire, unknown cause, 3:10-3:30pm
1977 Oct 31	GFD, 1977	3885 Old State Rd, brush fire, 9:24-9:43pm
1978 Apr 23	AFD, 1978	Six Mile Waterworks, brush fire, unknown cause, 2:43-3:09pm
1978 Apr 29	AFD, 1978	Six Mile Waterworks, brush fire, unknown cause, 7:30-8:02pm
1978 Nov 6-7	GFD, 1978	Acre Dr to Ridgehill Rd to Lisa Ln to Highland Dr, several brush/leaves fire, cause: unknown/kids?, 11:40pm-12:20am
1979 Apr 25	AFD, 1979	NY Thruway mile 146 (near US 20?), brush fire, 6:52-7:17am
1979 May 2	GFD, 1979	end of Pineridge Dr @ Pinehaven Golf Course 18th hole, grass/brush/underbrush/tree fire, cause: unknown/lighter?, 3:05-4:01pm
1979 May 12	AFD, 1979	Six Mile Waterworks, brush fire, 7:48-8:06pm
1979 Jun 8	AFD, 1979	NY Thruway exit 24, brush fire, 11:19-11:57am
1979 Aug 5	GFD, 1979	293 Highland Dr, grass/brush fire, cause: paper lit in middle of grassy area, 9:46-10:16pm
1979 Oct 20	GFD, 1979	fields at Old State Rd/Hite Ct in rear of

		Carmen Drive-in Theatre, grass/brush/ paper fire, cause: unknown/probably kids, 8:25-8:57pm
1980 Feb 2	AFD, 1980	SUNYA Lake, brush fire, 2:34-3:09pm
1980 Mar 7	AFD, 1980	Lowell St/Yardboro Ave, brush fire, 11:04-11:12am
1980 Apr 20	GFD, 1980	66 Hite Ct, brush fire, 5:11-5:23pm
1980 May 30	AFD, 1980	Six Mile Waterworks, brush fire, 12:10-12:32pm
1980 Jul 6	AFD, 1980	Yardboro Ave, brush fire, 4:23-4:43pm
1980 Nov 15	AFD, 1980	Yardboro Ave, brush fire, 5:35-5:58pm
1981 Mar 17	AFD, 1981	SUNYA, brush fire, 11:14-11:40pm
1981 Mar 28	AFD, 1981	NY Thruway mile 146.6 (near Crossgates Mall), brush fire, cause: possible arson, 12:36-1:19pm
1981 Mar 31	AFD, 1981	E of Yardboro Ave, brush fire, 5:14-5:41pm
1981 Apr 6-7	GFD, 1981	open fields behind houses on Maywood Ave S of Old State Rd, grass/brush fire, cause: suspicious origin, 11:56-12:47am
1981 Apr 15-18	AFD, 1981	Rapp Rd landfill, brush/grass/rubbish/ dump fires
1981 Apr 27	AFD, 1981	Six Mile Waterworks, brush fire, unknown cause, 5:45-6:28pm
1981 May 4	AFD, 1981	Six Mile Waterworks, brush fire, 7:40-9:26pm
1982 Apr 16	AFD, 1982	Six Mile Waterworks, brush fire, 5:59-6:14am
1982 May 13	AFD, 1982	Washington Ave/Rapp Rd, grass fire, 2:38-2:47pm
1982 May 15	AFD, 1982	1400 Washington Ave, SUNYA, brush fire, unknown cause
1982 Jul 24	AFD, 1982	Fuller Rd, grass fire, 6:43-7:11pm
1982 Oct 18	AFD, 1982	Fuller Rd, rear of Star Textile, grass fire, 4:33-5:08pm
1982 Oct 23	GFD, 1982	Acre Dr/Ridgehill Rd, brush/woods fire, unknown cause, 9:02-9:54pm
1983 Apr 6	AFD, 1983	Six Mile Waterworks, brush fire, 6:24-6:53pm
1983 Apr 9	GFD, 1983	2234 Western Ave, brush/grass fire, unknown cause, 1:04-1:17pm
1983 Apr 28	AFD, 1983	Lincoln Ave Ext, brush fire, 2:33-3:48pm
1983 Jun 29	GFD, 1983	Willow St @ Guilderland Water Dept, grass fire, cause: possibly glass bottles reflecting sunrays, 1:22-1:41pm
1983 Sep 27	AFD, 1983	1400 Washington Ave, SUNYA, brush fire, 8:30-8:33pm
1984 Feb 23	GFD, 1984	Old State Rd opposite Oakleaf Dr, brush/ grass fire, 1:02-1:43pm
1984 May 6	AFD, 1984	rear of 18 Friar Tuck Rd, grass fire, 4:26-4:36pm
1984 May 17	AFD, 1984	Washington Ave/Fuller Rd, grass fire, 6:42-7:01pm
1984 Jun 21	AFD, 1984	Fuller Rd, brush fire, 12:22-12:29pm

1985 Mar 24	AFD, 1985	Six Mile Waterworks, brush fire, 9:08-9:30pm
1986 Apr 24	AFD, 1986	Van Rensselaer Lake @ Six Mile Waterworks, brush fire, 2:24-2:32pm
1986 May 10	AFD, 1986	Park @ Six Mile Waterworks, brush fire, 10:40-10:56am

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AFD = Albany Fire Department
GFD = Guilderland Center Fire Department

* possible in the sense that these fires seem to be pine barren fires but are at locations peripheral to the entire Pine Bush or else they are inside the area of pristine pine barrens but may be in man-made habitats supporting a community other than pine barrens such as grassy roadsides, lawns, altered parks or vacant lots.

Table 6. Fire History Log
Albany Pine Bush
potential pine barren fires*

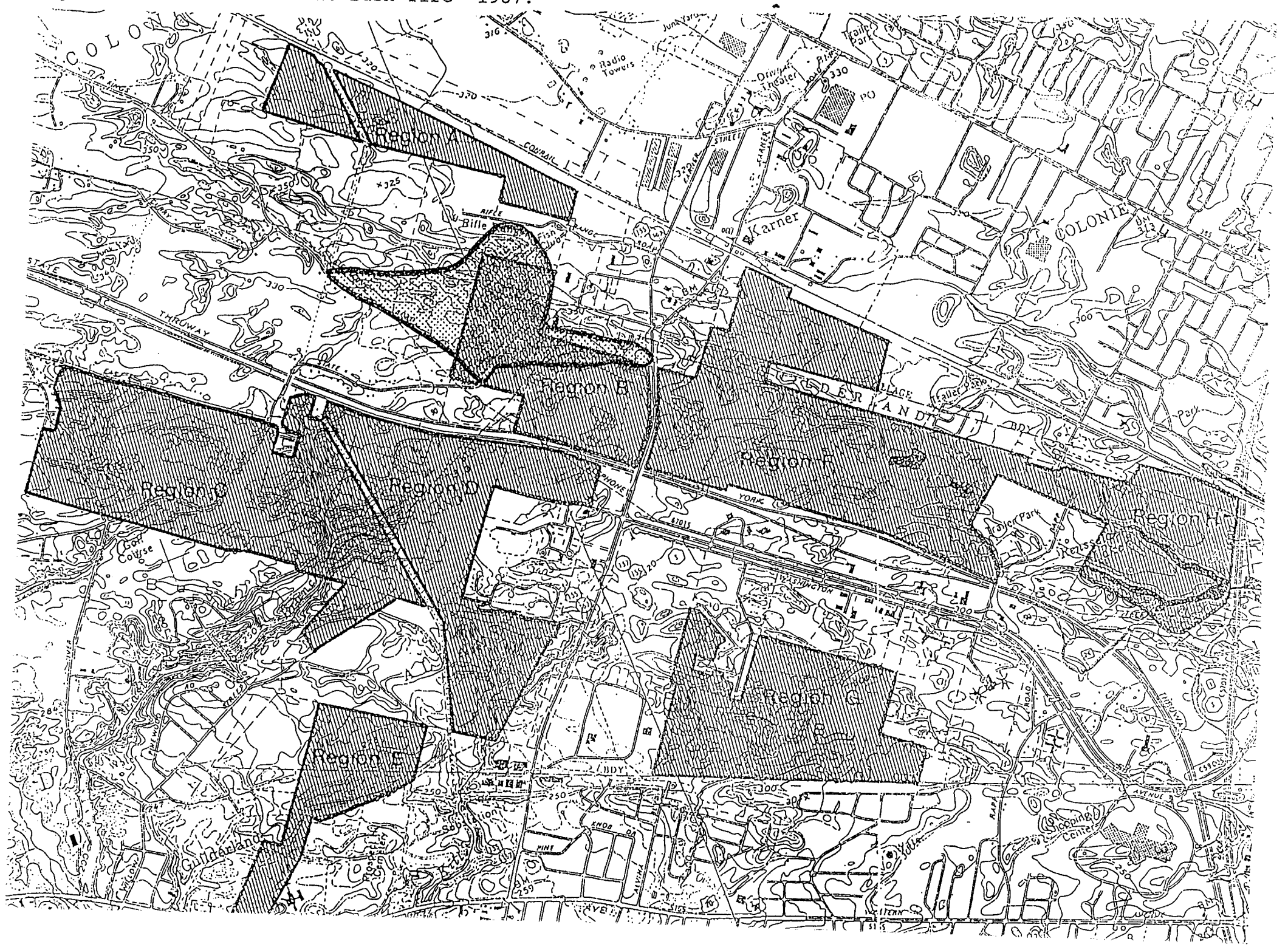
date	reference	notes
1926 Jul 4	AFD, 1926	Central Ave W of Colvin Ave, grass fire, 12:02-12:15pm
1926 Nov 15	AFD, 1926	W end of Lincoln Ave, grass fire, 11:30-11:46am
1926 Nov 15	AFD, 1926	Colvin Ave N of Washington Ave, grass fire, 4:54-5:44pm
1927 Apr 4	AFD, 1927	rear of 81 Oxford Rd, grass fire, 3:31-3:45pm
1927 Apr 13	AFD, 1927	W end of Lincoln Ave, grass fire, 3:05-3:47pm
1927 May 8	AFD, 1927	W of Colvin Ave @ Shaffer's Grove, grass fire, 1:27-1:35pm
1929 Mar 17	AFD, 1929	W of Colvin Ave S of Central Ave, grass fire, 7:55-8:22pm
1929 Mar 29	AFD, 1929	Melrose Ave W of Brevator St, grass fire, 12:15-1:23pm
1929 Apr 3	AFD, 1929	W side of Western Ave near Brevator St, grass fire, 12:59-1:53pm
1929 Apr 9	AFD, 1929	lot N of Austain Ave, grass fire, 6:00-6:20pm
1929 May 31	AFD, 1929	Tremont St S of Central Ave, grass fire, 5:10-5:32pm
1929 Jun 12	AFD, 1929	Wolf Rd N of Stop 25 on Schenectady Rd, grass fire, 5:50-6:35pm
1929 Nov 25	AFD, 1929	rear of 911, 915, 917 Austain Ave, grass fire, 9:44-10:09am
1930 Mar 15	AFD, 1930	rear of 82 Tremont St, grass fire, 10:23-10:32am
1930 Mar 15	AFD, 1930	Colvin Ave S of Central Ave, grass fire, 12:31-12:49pm
1930 Mar 21	AFD, 1930	S of stop 31 on Schenectady Rd, grass fire, 10:48-11:07am
1930 Mar 22	AFD, 1930	stop 25 on Schenectady Rd, grass fire, 1:11-1:40pm
1930 Mar 22	AFD, 1930	stop 28 on Schenectady Rd, grass fire, 2:03-2:30pm
1930 Mar 23	AFD, 1930	rear of 5 to 9 Austain Ave, grass fire, 10:10-10:29am
1930 Mar 29	AFD, 1930	end of Oxford Rd, grass fire, 5:20-6:16pm
1930 Apr 3	AFD, 1930	Magazine St N of Western Ave, grass fire, 1:13-2:15pm
1930 Apr 25	AFD, 1930	Yardboro Ave between Patroon St and Central Ave, grass fire, 8:23-8:46pm
1930 Apr 28	AFD, 1930	Tremont St/Pinehurst Ave, grass fire, 3:39-4:47pm
1930 Apr 29	AFD, 1930	Magazine St between Washington Ave and Western Ave, grass fire, 8:01-8:55pm
1930 May 8	AFD, 1930	N end of Zoar Ave, grass fire, 6:37-

		6:59pm
1930 May 13	AFD, 1930	S of Central Ave W of Colvin Ave, grass fire, 11:30-11:37am
1930 Aug 11	AFD, 1930	rear of 21 to 32 Austain Ave, grass fire, 1:01-1:22pm
1931 Mar 19	AFD, 1931	Colvin Ave N of Central Ave, grass fire, 6:23-6:35pm
1931 Mar 21	AFD, 1931	rear of 15 to 25 Austain Ave, grass fire, 9:47-10:29am
1931 Mar 21	AFD, 1931	Washington Ave opposite Brevator St, grass fire, 3:55-6:55pm
1931 Mar 22	AFD, 1931	Magazine St at stop 6 on Western Ave, grass fire, 4:17-5:20pm
1931 Mar 24	AFD, 1931	Magazine St S of Western Ave, grass fire, 11:55am-12:22pm
1931 Mar 28	AFD, 1931	Magazine St S of Western Ave, grass fire, 3:02-3:22pm
1931 Apr 8	AFD, 1931	Magazine St/Washington Ave, grass fire, 2:45-3:55pm
1931 Apr 9	AFD, 1931	Central Ave/Colvin Ave, grass fire, 11:28-11:49am
1931 Apr 20	AFD, 1931	Washington Ave/Tremont St, grass fire, 2:59-3:47pm
1931 Apr 22	AFD, 1931	Colvin Ave/Central Ave, grass fire, 3:25-3:59pm
1931 Oct 1	AFD, 1931	Colvin Ave/Washington Ave, grass fire, 1:17-1:45pm
1931 Nov 10	AFD, 1931	8 Yardboro Ave, grass fire, 6:26-6:44pm
1931 Nov 26	AFD, 1931	Tremont St N of Washington Ave, grass fire, 5:35-6:06pm
1931 Dec 19	AFD, 1931	rear of 9 Colvin Ave, grass fire, 1:35-2:00pm
1931 Dec 19	AFD, 1931	Magazine St, grass fire, 3:07-3:34pm
1931 Dec 29	AFD, 1931	21 Austain Ave, grass fire, 1:37-1:50pm
1932 Feb 15	AFD, 1932	88 Oxford Rd, grass fire, 2:13-2:28pm
1932 Feb 22	AFD, 1932	Yardboro Ave S of Central Ave, grass fire, 8:43-9:20pm
1932 Feb 25	AFD, 1932	Magazine St/Western Ave, grass fire, 1:05-1:47pm
1932 Mar 3	AFD, 1932	E of Oxford Rd, grass fire, 4:15-4:52pm
1932 Mar 5	AFD, 1932	Washington Ave/Oxford Rd, grass fire, 11:20am-12:31pm
1932 Mar 18	AFD, 1932	S of Central Ave E of Austain Ave, grass fire, 12:13-12:40pm
1932 Apr 19	AFD, 1932	W of Magazine St, grass fire, 6:17-7:04pm
1932 Apr 20	AFD, 1932	rear of 35 to 51 Austain Ave, grass fire, 11:30am-12:15pm
1932 Apr 21	AFD, 1932	Western Ave/Magazine St, grass fire, 4:48-5:35pm
1932 Apr 23	AFD, 1932	Brevator St between Washington Ave and Western Ave, grass fire, 1:05-3:20pm
1932 May 3	AFD, 1932	Washington Ave between Colvin Ave and Brevator St, grass fire, 2:37-4:39pm
1932 May 3	AFD, 1932	Lincoln Ave/Frost Pl, grass fire, 10:04-

Figure 2. Location of Pine Bush fire- 1968.

Figure 3. cations of Pine Bush fires- 1981.

Figure 4. 1 ation of Pine Bush fire- 1987.



suggests that when they are allowed to burn, many Pine Bush brush fires burn for long periods of time. Several fires in the Pine Bush have lasted from two days to two weeks (LaMountain, pers. comm.).

Fire intensities vary during a specific burn event and depend on the frequency of past fires and burning conditions (Little, 1979a). Rates of spread in the Pine Bush have been cited as 300 feet per minute (90 meters per minute) under conditions with winds gusting to 33 mph (ca. 50 km/hr) (Fram et al., 1981). Most fires are carried along the surface in fine, grassy fuels or in understory shrubs, resulting in low mortality of pines (Zelker, 1976; Haggerty, 1980; Olsvig, 1980). However, crown fires have been reported with extremely long flame lengths in fire-suppressed pine barrens (Van der Donck, 1656; Russell, 1983). The 1981 Pine Bush fire had reported flame lengths in excess of 16 feet (five meters) (Fram et al., 1981).

Ravines, which harbor more mesophytic species, are less fire-prone than sandy dunes harboring pitch pines and scrub oaks (Bristol et al., 1978; Milne, 1985). These small, narrow sites, which are now occupied by hardwood stands, must have burned periodically during severe burning conditions.

At least two fires covering more than 300 acres (120 hectares) have burned in the Pine Bush within the past 22 years (1968 and 1981 fires). Pine Bush fires in earlier times were probably much more extensive (LaMountain, pers. comm.; Larson, pers. comm.), such as the 1854 fire, which burned thousands of acres (Albany Argus, 1854; Munsell, 1855). Research also suggests that large Pine Bush fires are often not continuous, but occur as scattered spot fires leaving unburned patches (e.g., Friedman, 1980; LaMountain, pers. comm.; and others).

3.2 Season of fires

Historically, lightning fires started occasionally under dry conditions from late spring through summer (People for the Pine Bush, 1975; Benton, 1976). This contrasts with the New Jersey pine barrens where climatic conditions are most favorable for fire in the early spring (Forman, 1979). Indians are believed to have burned the Albany Pine Bush in fall (Van der Donck, 1656; Ritchie, 1976; Russell, 1983) and the New Jersey pine barrens in winter (Little, 1979a). Cryan (1985) states that "natural" wildfires in pine barrens are most common from February to May during dry periods. Modern-day Pine Bush fires, which are generally related to human activity, are most frequent in the spring and fall (Perlmutter, 1981; and many others). In the past 70 years, Pine Bush fires have invariably occurred in greatest numbers every year in mid to late April after vegetation killed by the previous winter has cured and from October to November

after leaf fall.

3.3 Fire frequency

Fires have been reported in the Pine Bush at least once yearly for generations (Perlmutter, 1981 and many others). Conversations with knowledgeable people (e.g. LaMountain, pers. comm.) suggest 2-15 burns occur in the Pine Bush per year. Fire records indicate that on average one major fire (of ten to several hundred acres) and six smaller fires have occurred in the Pine Bush per year for the past 70 years. The "natural" point frequency of fire in the Pine Bush has been reported to be 5-10 years (Doremus and Kerlinger, 1979), 5-15 years (Public Information Committee, 1985), and 10-15 years (Cryan, 1986). Establishing a fire-return interval for the Albany Pine Bush is difficult because there are many scattered spot fires, inadequate records on boundaries of past burns, and variability of this frequency from spot to spot. Based on current vegetation conditions and fire history, the mean fire-return interval is approximately 10 years. Some sections of the Pine Bush, however, may have a naturally higher fire-return interval (e.g., the end of Willow Street in 1977 and 1978-Figure 1, between Regions C and D; Washington Avenue Extension/Fuller Road intersection in April and May 1944 and in 1979 and 1980-not within the remaining Pine Bush boundaries).

4.0 Adaptations of pine barrens biota to fire

The pitch pine-scrub oak barrens community is maintained by recurring fires (Schweitzer and Rawinski, 1987; and numerous others). Without fire, faster- and taller-growing tree species such as white (Quercus alba), northern red (Q. rubra) and black oaks (Q. velutina), white pine (Pinus strobus) and black locust (Robinia pseudo-acacia) would displace shade-intolerant pitch pines and scrub oaks (Little et al., 1948; Forman and Boerner, 1981). Fires limit tree and shrub growth and modify species composition. The specialized plants and animals indigenous to pitch pine-scrub oak barrens have adaptations to fire and are dependent on fire for either reproduction or for maintaining a competitive advantage over fire-intolerant species (Bristol et al., 1978). Pine barrens vernal ponds, similarly, are probably dependent on recurrent fires during droughty periods for their maintenance (Little, 1978; Reschke, 1983b).

4.1 Adaptations of pine barrens flora to fire

Most of the plants in the Pine Bush have adaptations to survive periodic fires (Zelker, 1976; Olsvig, 1980; Bergdahl, 1987). Many, such as pitch pine and blue lupine, have deep root

systems with high starch reserves and are well-insulated by soil from intense heat of fires (Forman, 1979; Little, 1979a). Many plants, such as grasses and many pine barrens perennial herbaceous species, have below-ground buds that are protected from surface fires (Little, 1979a). Pitch pine, scrub oak, dwarf chestnut oak, and blueberries have the ability to resprout from a root crown (Little, 1979a). Other plants have adapted to fire by rapid initial productivity following a fire (Forman, 1979), prolific production of seeds (Forman, 1979), seed production at an early age, as occurs in pines and oaks (Zelker, 1976), and heat-tolerant seeds, as in some grasses (Wright and Bailey, 1982). Lupine, New Jersey tea (Ceanothus americanus), and many other species have hard seedcoats (Reschke, 1986) and/or large seedbanks (Schweitzer and Rawinski, 1987). Some plants, such as pitch pine and bushclover, depend on fire to scarify and dry out seeds prior to germination (Benton, 1976; Doremus and Kerlinger, 1979). Mature plants of some pine barrens species produce thick bark that protects the sensitive meristematic tissue from all but high intensity fires (Forman, 1979). For more information on plant adaptations to fire see Forman, 1979.

4.1.1 Response of pitch pines to fire

Pitch pines can resprout after fire from large underground swellings called "root crowns" until they are about 80 years old (Little, 1979a). Symbiotic bacteria and mycorrhizae on their roots respond favorably to fire (Nadareski, 1985).

Dense tufts of long needles protect bud meristems of pitch pines from intense heat (Nadareski, 1985). Epicormic buds beneath bark and dormant buds at bases of trees are also protected from fire and have the ability to resprout foliage (Ledig and Little, 1979), which usually occurs within six weeks following a fire (Nadareski, 1985).

Pitch pines produce mature cones rapidly, within 3-4 years from basal sprouts following a fire and within ten years from trees grown from seed (Zelker, 1976; Olsvig, 1980). Serotinous cones store seeds which are released when heat from fires melts resinous cone scale (Little, 1979a). Low levels of soil organics, which are maintained by fires, are needed for pitch pine germination (Little, 1979a).

Pitch pines become resistant to fire at about three years old when they reach a basal diameter of three cm and a height of 60 cm (Little and Somes, 1959). At this stage, a thick, fire-invulnerable corky periderm develops in the bark (Zelker, 1976), and a basal crook forms with dormant buds below the soil surface (Little, 1979a). Trunks of mature trees may become charred, but the vascular cambium remains protected (Cryan, 1980). Lower branches of older trees are shaded out, die, and fall off, making

crowns inaccessible to surface and underbrush fires typical of the Pine Bush (Doremus and Kerlinger, 1979; Nadareski, 1985). Pines with green crowns and charred, blackened trunks are characteristic of the Pine Bush (Nadareski, 1985).

For additional information on pitch pine adaptations to fire see Forman, 1979.

4.1.2 Adaptations of scrub oak to fire

Scrub oaks have large root crowns that resprout prolifically following a fire (Little, 1979a). Acorn production is greatly increased after wildfire (Cryan and Turner, 1981). Although old clones lose the capacity to produce numerous acorns, fire stimulates mast production in younger plants (Zelker, 1976). Scrub oaks produce viable seeds in as little as three years after a fire (Little, 1979a; Olsvig, 1980). Acorns germinate best in soil with low organic content, such as those created by recurrent fires (Nadareski, 1985).

4.2 Adaptations of pine barrens fauna to fire

Many Pine Bush animals have adaptations to periodic fires. Some, such as hog-nosed snake (Heterodon platyrhinos), worm snake (Carphopis amoenus), Fowler's toad (Bufo woodhousei fowleri), and spadefoot toad (Scaphiopus holbrooki), escape the heat of fires by burrowing underground (Benton, 1976; Cryan, 1980). Others, such as butterflies, birds, and large mammals, move to adjacent areas of similar vegetation that are unaffected by fire (Bristol et al., 1978; Cryan, 1980). Insects and small vertebrates are usually killed by fires, but quickly recolonize from adjacent unburned sites (Cryan, 1980; Schweitzer, 1985). Fires often improve habitat for these species, resulting in increases in population size despite some mortality during the fire. Many animals characteristic of the Pine Bush, such as Karner blue butterflies and inland barrens buckmoths, are dependent on the specialized pitch pine-scrub oak barrens vegetation, and are consequently indirectly dependent on fire (Bristol et al., 1978; Forman and Boerner, 1981; Schweitzer, 1985).

4.2.1 Fire effects on Karner blue butterflies

Karner blue butterflies require large stands of blue lupine on which larvae feed during both the first and second broods. Egg-laying is stimulated by the presence of lupine, and eggs are laid on or near bases of lupine plants. It is believed that Karner blues require at least 500 stems of lupine to be sustained at a site for many years (Zaremba, pers. obs.).

Karner blue butterflies have no known adaptations that allow individuals to survive a fire (Schweitzer, 1989). Adult butterflies may be able to avoid a fire by flying away to an unburned site, but eggs, larvae and pupae are in exposed areas and would die during a fire.

Fire, however, plays a major role in the long-term maintenance of Karner blue meta-populations by maintaining large lupine populations and associated grassland habitats essential for the survival of the butterfly. Blue lupine exists through time in sites like the Albany Pine Bush using a patch dynamic strategy. Lupine can become established rapidly at sites where the forest canopy is opened and has been documented to expand dramatically after burning (Huffman, pers. comm.). Within a few years, populations can expand to thousands of stems. A lupine population will decline as the forest canopy closes. Historically, in the Albany Pine Bush, lupine was found in recently-burned sites and along heavily-used deer paths. More recently, human disturbances, such as sand pits, abandoned fields, powerline right-of-ways, and off-road vehicle trails, have created open sandy sites favored by lupine. Fire suppression within the pitch pine-scrub oak barrens has eliminated blue lupine from more natural sites.

Karner blues colonize blue lupine stands, thrive for a period while the lupine thrives, and decline as the lupine is shaded out by competing vegetation. Some butterflies will emigrate from a site with a declining lupine population, if there are other appropriate lupine sites within the 0.6-1.0 mile (1.0-1.5 km) flight range of the species (Schweitzer, 1989). Without adequate levels of lupine, the local population of Karner blues will be extirpated.

During the past ten years, numbers and sizes of lupine populations have declined dramatically in the Albany Pine Bush (Givnish et al., 1988). It is believed that lupine populations, and consequently Karner blues, are approximately one-tenth of what they were only ten years ago. Several disjunct sections of the Pine Bush that formerly supported Karner blues now support only small populations of lupine with no associated butterflies. It may also not be possible for butterflies from the remaining Karner blue sites to cross major highways and other migration barriers to colonize these sites (Schweitzer, 1989). Some lupine populations have been lost to commercial and residential development; some have declined as a result of fire-suppression and a reduction in human land use such as farming that would result in fallow natural areas capable of supporting lupine.

For more information on Karner blue butterflies and fire see Section 7.9.1. An Element Stewardship Abstract is being prepared for Karner blue butterflies and should be available in early 1991.

4.2.2 Fire effects on inland barrens buckmoths

The inland barrens buckmoth requires large stands of young or resprouted scrub oaks to sustain a long-term population (Cryan and Dirig, 1977). Females use twigs as outposts to attract males. They deposit their eggs in a spiral pattern on scrub oak twigs that are about 5 mm in diameter (Cryan, 1985); larvae eat only young scrub oak leaves (Bristol et al., 1978).

Unlike Karner blue butterflies, buckmoths have developed some adaptations to survive fire. Caterpillars emerge in May after the late winter/early spring fire season and feed on scrub oak leaves (Cryan, 1985). After about eight weeks, they burrow into loose sand, digging small chambers about five cm below the soil surface where they pupate and are protected from fires between July and September (Cryan, 1980, 1985). Adults emerge from pupae in the fall after the fire-prone season has passed (Cryan, 1985). During drought years, when fires are often frequent, some pupae are known to remain dormant for up to two years, until adequate fall rains occur (Cryan, 1985; Schweitzer and Rawinski, 1987). Eggs and feeding larvae are, however, killed during fires; pupae and most adults can survive light fires (see Section 7.9.2).

5.0 Effects of fire in pitch pine-scrub oak barrens

Fire is the primary ecological force that has shaped the structure and composition of pine barrens in the Northeast and is essential for their long-term maintenance (Little, 1974a; Givnish, 1981; Schweitzer and Rawinski, 1987). Fires in pine barrens regions prevent development of hardwood forests. Without fire, most pine barrens would eventually succeed into more mesic oak-maple-beech community types typically found in the Northeast.

5.1 Effects of fire on pine barrens soils

The accumulation of pine needles and scrub oak leaves in pine barrens increases soil acidity and limits populations of many organisms responsible for organic breakdown such as bacteria and earthworms (Little, 1979a). Reduced activity of decomposers results in slow breakdown of litter resulting in low nutrient levels (Cryan, 1980). An accumulation of litter increases the likelihood of fires caused by lightning or human activity (Milne, 1985). Fires reduce organic litter levels and prevent the buildup of humus. Nutrients are recycled rapidly by fires which convert leaf litter into nutrient-rich mineral ash (Lotti, 1962; Buffington, 1967). Ash accumulates after a fire, raising the pH of topsoil; charcoal increases the moisture-holding capacity of

sandy soils (Ahlgren and Ahlgren, 1960).

Although burning of organic humus releases nutrients rapidly, it does reduce long-term nutrient availability. At high temperatures, much of the organic nitrogen volatilizes and is not available for plants. Other nutrients, like calcium, magnesium, and potassium, become more soluble after fire and may be leached from the soil.

5.2 Effects of fire on plant composition

Within the Pine Bush, species composition is determined by the ability of species to survive frequent, hot fires and the ability of seeds to germinate on nutrient-deficient soils. Fire-resistant plants are adapted to low-nutrient soil conditions and precede establishment of more mesophytic, invading species dependent on nutrient-rich soils (Cryan and Dirig, 1977). Fire provides a suitable seedbed for specialized pine barrens plants by:

1) maintaining nutrient-poor soil conditions, limiting competition from species requiring higher nutrient levels (Donahue, 1976);
2) exposing sandy mineral soil and allowing sunlight to reach the soil surface by removing leaf litter and overhead canopies (Little, 1979a);
3) eliminating fungi that are pathogenic to pitch pine seeds and seedlings (Nadareski, 1985); and
4) increasing soil temperature (Cumming, 1969; Henderson, 1982).

Effects of fire on vegetation vary, depending on the size and species of plants, intensity and frequency of fires, length of time since the last burn, site, season, and direction of fire relative to wind direction (Forman, 1979; Little, 1979a). Fires kill small plants of invading species such as locust and poplar that are intolerant of brief, intense heat (Benton, 1976). Recurrent fires will eventually eliminate species that do not produce seed at an early age (Buell and Cantlon, 1950). For example, tree oaks can resprout following a fire, but cannot recover from repeated fires. They do not produce seeds until they are at least 20 years, and even then do not produce abundant seeds until they reach 40 years (Little, 1979a). Repeated fires kill adult plants and reduce the seedbank, eventually eliminating these species.

Heat from typical pine barrens fires probably does not penetrate more than 1 cm into mineral soil (Little, 1979a; Schweitzer and Rawinski, 1987). Most roots of most upland plants occur below a depth of 1 cm. Fires, however, in poorly drained

lowland sites can damage buds and roots that grow in combustible organic soils (Little, 1979a).

5.3 Ecosystem recovery following fire

After a fire, most pine barrens rapidly recover. Most shrubs resprout from buried rootstocks and become reestablished in the first year (Boerner, 1980). One hundred percent cover was reestablished in 1.5 years following a burn in the New Jersey pine barrens (Boerner, 1980, 1981); within five years, a new shrub layer was fully restored (Doremus and Kerlinger, 1979; Cryan and Turner, 1981).

5.4 Effects of fire on human populations

Although carbon monoxide and hydrocarbons, which can be harmful in high concentrations, are present in smoke, they are produced in only minute amounts and are quickly dispersed by wind (Zelker, 1976). Fires also add particulate matter to the air and can decrease air quality, increasing health hazards. Smoke from fires can mix with moisture in the air forming fog, creating traffic hazards.

Benefits of frequent fires include:

1) reducing potential for uncontrolled fires by maintaining low fuel loads (Little, 1979a; Heitlinger et al., 1983);
2) increasing wildlife habitat patchiness by creating a wider variety of food and cover conditions (Cumming, 1969; Little, 1979a);
3) improving yield and quality of grasses, herbs, legumes, and browse (Cumming, 1969; Heitlinger et al., 1983);
4) controlling spread of plant diseases, such as tar spot and brown spot fungus which affects early growth of pitch pines (Cumming, 1969);
5) promoting flowering and fruiting of fire-adapted species (Cumming, 1969; Heitlinger et al., 1983; and
6) providing easier access to control wildfires by preventing undergrowth from becoming too dense (Mobley et al., 1978).

6.0 Effects of fire suppression on pitch pine-scrub oak barrens

Successful fire suppression in the Pine Bush over the past 25 years has prevented large-scale wildfires (Rittner, 1976d). Although the number of fires per year in the Pine Bush has remained fairly constant over time, total area burned per fire per year has declined substantially over the last 60 years. In the early 1900's, the fire-return interval in pine barrens in the

Northeast was approximately 25 years, in contrast to a current return interval of approximately 60 years (Forman and Boerner, 1981). Many sections of the Pine Bush have not burned in the last 20-40 years (Milne, 1985). The woods west of Pinehurst and Point of Woods have not burned in the past 50 years (Figure 1, Section D; Hughes, 1985). Other Northeastern pine barrens, such as the Rhode Island pine barrens, New York's Saratoga sand belt, New Hampshire's Merrimack Valley sand plain, and pine barrens in Springfield (Massachusetts) and Glens Falls and Rome (New York), have portions that have not burned in over 50 years. These pine barrens show effects of long-term fire suppression: decreased size or loss of the natural community entirely and extirpation of pine barrens species (Kerlinger and Doremus, 1981; Cryan, 1985; Schweitzer, 1985; Schweitzer and Rawinski, 1987). In a recent study of the Pine Bush (Milne, 1985), 60% of 20 randomly-sampled plots had not burned in the past 30 years and had succeeded to hardwood forest or "declining pine barrens." With continued fire suppression, the acreage of pitch pine-scrub oak barrens in the Pine Bush will continue to decline (Milne, 1985).

Most pine barrens plant species can persist for many years without fire as other non-fire-adapted species invade the community (Schweitzer and Rawinski, 1987). After several decades of fire suppression, however, most pine barrens sites no longer have the characteristic structure and species composition of pine barrens and cannot recover to pine barrens after a single fire (Johnsen, 1986). Of the 40,000 acres (16,000 hectares) of original Pine Bush, only 2,200 acres (900 hectares) exist today, and only 850-1700 acres (350-700 hectares) are in "good" condition (Kerlinger and Doremus, 1981; Reschke, 1984a; Cryan, 1985). This area hovers at the minimum critical size for preservation of the community (Givnish et al., 1988).

6.1 Effects of fire suppression on pine barrens plants

In areas where fires have not occurred for many years, deep litter layers create seedbeds unsuitable for germination of pine seed but adequate for germination of oak seed (Buell and Cantlon, 1953). A deep litter layer also provides suitable habitat for invading species, including rapidly growing species that are difficult to eradicate, such as trembling aspen (*Populus tremuloides*), sumacs (*Rhus* spp.), black locust, and brambles (*Rubus* spp.), as well as gray birch (*Betula populifolia*), pin and black cherries (*Prunus pensylvanica* and *P. serotina*), common chokecherry (*P. virginiana*), and oak species (Dirig and Cryan, 1975; Reschke, 1984a). Many of these species are abundant in the ravines of the Pine Bush (Rittner, 1976a; Milne, 1985). With fire suppression, these species invade dry upland sites and outcompete and displace native pine barrens species such as pitch pines, scrub oaks, lupine, sweet-fern, and New Jersey tea (Little, 1974b; Schweitzer and Rawinski, 1987). Pines are

particularly shade-intolerant; seeds cannot germinate in shade (Little, 1979a). Invading species, such as trembling aspen, black locust, and tree species of oaks, resprout readily from root crowns after fire, making them particularly difficult to eradicate after they have become established (Zelker, 1976).

6.2 Effect of fire suppression on pine barrens animals

A major regional decline in populations of Karner blue butterflies (as well as a local decline in the Albany Pine Bush) has been attributed to fire suppression (Schweitzer, 1985; Givnish et al., 1988).

Changes in vegetative composition cause changes in groups of animals such as foliage insects, birds, and small mammals (Forman, 1979). Fire suppression and soil disturbance lead to increases in non-native plant species and create habitat for non-native animal species. Fire suppression is blamed for local extirpation of eastern bluebirds (Sialia sialis) and pine warblers (Dendroica pinus) and a decline in local breeding populations of prairie warblers (Dendroica discolor), ovenbirds (Seiurus aurocapillus), and brown thrashers (Toxostoma rufum) (Kerlinger and Doremus, 1981).

6.3 Increased probability of wildfires with fire suppression

In fire-suppressed areas, the accumulation of dead woody material increases potential for a major wildfire that poses serious threats to lives and property (Niering et al., 1970). The probability of dangerously explosive crown fires increases under these conditions (Olsvig, 1980). The large 1981 Pine Bush fire had flame lengths up to 15 feet (5 meters), causing major roads to be closed due to poor visibility; utility poles were burned, causing a transformer to explode, resulting in a loss of power and failure of traffic lights for several hours (Fram et al., 1981). Those species adapted to frequent, low intensity, ground fires are often killed by crown fires (Chapman, 1952; Olsvig, 1980), which generate more intense heat and have a longer duration than ground fires (Benton, 1976).

6.4 Decreased mosiac of habitat types with fire suppression

Fire suppression replaces a landscape mosaic containing large patches of variable habitats with a more uniform landscape, leading to lower species diversity and a greater risk of extirpation of rarer species (Forman and Boerner, 1981). Some species, especially native pine barrens birds, require large tracts as minimum habitat for successful breeding and would not be favored in areas where fires are suppressed (Forman et al., 1976; Kerlinger and Doremus, 1981).

7.0 Background information for prescribed burns in the Albany Pine Bush

Fire management in the Albany Pine Bush will require understanding fire behavior and the ecological effects of fire in several different types of fuels and in plant communities that range from hardwoods with no characteristic pine barrens features to good quality pitch pine-scrub oak barrens. For convenience in mapping and discussion, the Albany Pine Bush has been divided into eight regions, generally comprising contiguous tracts of protected land. A map of these regions appears in Figure 1. Maps of the locations of different fuel and community types within the Albany Pine Bush appear in Appendix D, Figures A1-H1.

One of the most difficult aspects of fire management planning in the Albany Pine Bush is the diversity of fire and smoke hazards associated with all regions of the preserve. The preserve is situated in a highly suburbanized area between downtown Albany (10 km to the east) and Schenectady (11 km to the northwest). Bordering the preserve are one single-story and two multi-storied nursing homes. Interstate 90-the New York State Thruway bisects the Preserve; Interstate 87-The Adirondack Northway runs along the eastern border; the high-speed Amtrak line runs along the northern border. A map of major fire and smoke hazards in the immediate vicinity of the Albany Pine Bush appears in Figure 5. A discussion of fire and smoke hazards and fire management modifications in relation to these hazards appears in Section 7.10.

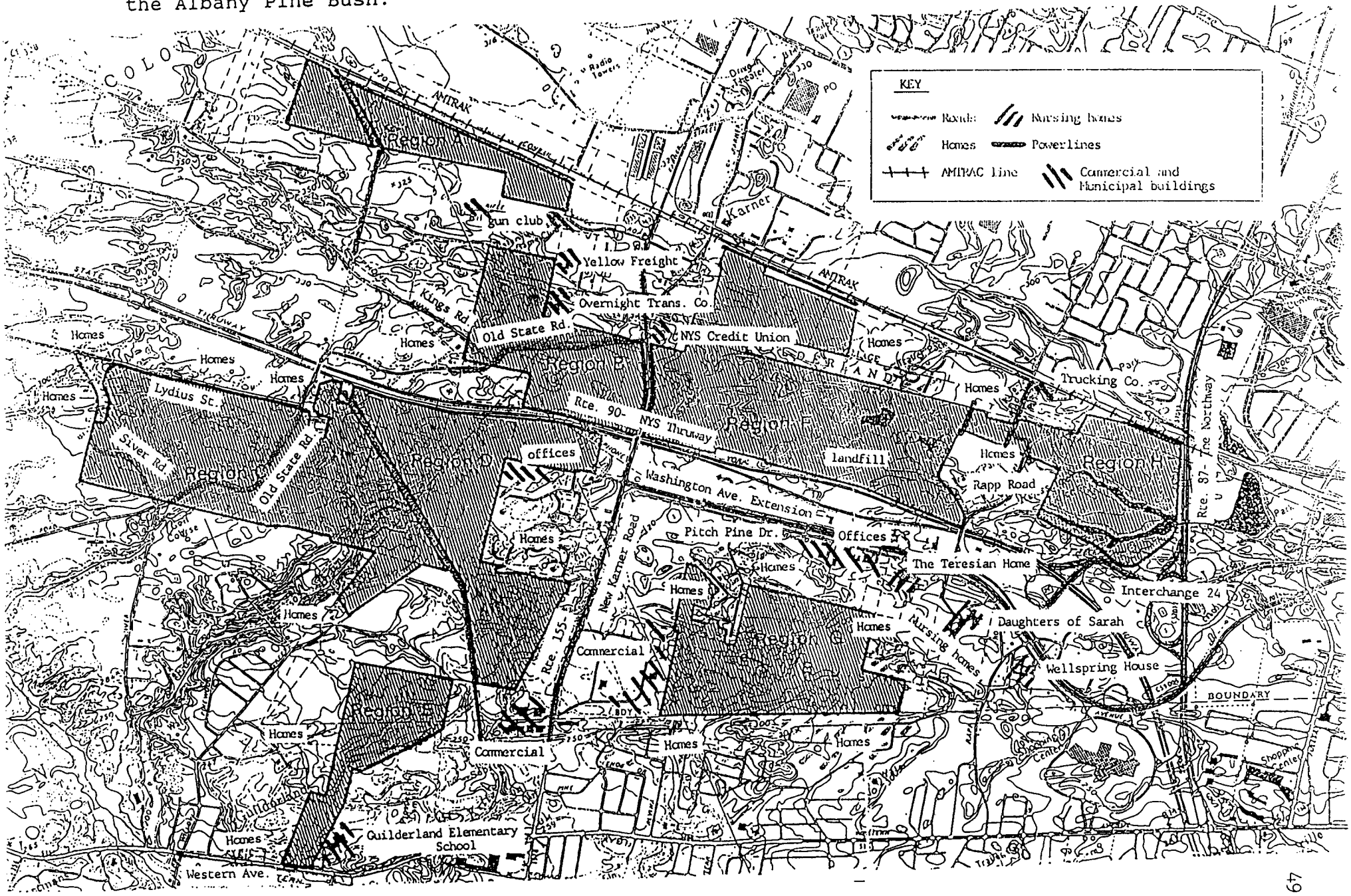
Six research burns in the range of current fuel and community types are described in detail in Appendices E to J. These experiments are designed to accomplish several important preliminary steps in the development of a full-scale fire management program:

1- Fire behavior in pitch pine-scrub oak barrens community fuel types is known only from a few small burns in the Northeast. Experience with small prescribed fires will be necessary initially to understand prescription limits in relation to fire intensity and smoke management;

2- It will be necessary to train many crew members and local support personnel in prescribed burning field techniques. These small burns will expose these people to the range of prescribed burn practices;

3- The public will be appropriately skeptical of prescribed burning initially in relation to fire and smoke safety. Small burns will develop a public awareness that fire can be managed safely with minimal inconvenience to neighbors;

Figure 5. Locations of major fire and smoke hazards in the vicinity of the Albany Pine Bush.



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3- The public will be appropriately skeptical of prescribed burning initially in relation to fire and smoke safety. Small burns will develop a public awareness that fire can be managed safely with minimal inconvenience to neighbors;

4- Ecological effects of fire in the pitch pine-scrub oak barrens natural community are poorly known. An understanding of responses of plants and animals to prescribed burns will be necessary before long-range fire management can be planned. Particular attention should be paid to effects of fires in fire-suppressed hardwood stands and the practicality of restoring these areas to pine barrens.

A series of research, program, and ecological objectives are listed for each research burn with a short description of possible monitoring techniques to assess progress toward the prescribed burn objective. These monitoring techniques are designed to be guidelines. Monitoring of prescribed burn effects should be incorporated into the overall research design planned for the entire Pine Bush. Where research questions posed in these experimental burns are not addressed in the Givnish (1989) research plan (e.g. fuel assessment), separate monitoring activities must be used. Monitoring methods used in the overall Pine Bush research program should be used in the prescribed burn program and modified as necessary wherever possible to avoid duplicated or overlapping efforts.

It was necessary to establish an overall sense of fire management needs within currently protected parts of the Albany Pine Bush. Descriptions of the eight regions in the Pine Bush appear in Appendix D. These descriptions include maps of the current, general fuel-community types throughout the Pine Bush and locations of rare species that need to be considered in fire management planning, fire and smoke hazards, weedy species concentrations, and possible firebreaks. No attempt was made to divide these regions into burn units and compartments with firebreaks. Plans for prescribed burns will need to be developed for each region using information from first-phase research burns. General firebreak establishment at perimeters of these regions and obvious firebreak points (such as powerlines and major trails) can take place in advance of formal prescribed burn plans.

The current status of pitch pine-scrub oak barrens in the Albany Pine Bush ranges from excellent quality, characteristic pine barrens stands that have been subject to periodic burns during the past 100 years and have burned within the past 10 years (e.g. The City Preserve east of the NYS Credit Union- see Appendix D, Figure F1) to fire-suppressed, post-agricultural sites currently dominated by oaks, white pines, poplar and locust with few characteristic pine barrens species (e.g. NYS OPRHP tract in the SW section of the Pine Bush- see Appendix D, Figure C1). The former areas will require only maintenance prescribed fires and will need only minor management to eliminate undesirable species (see Appendices E and F). The latter will require major time and money investments in community restoration before they can be burned under a maintenance regime. These

sites vary depending on past land use, but can be summarized into the following types:

1) fire-suppressed pine barrens with high fuel loads that still support some characteristic pine barrens species (see Appendix G);
2) fire-suppressed pine barrens with high fuel loads that do not support significant levels of native pine barrens (see Appendix H); and
3) fire-suppressed sites with low fuel loads that do not support significant levels of native characteristic pine barrens species (see Appendix I).

The total area for fuel-community types within the Albany Pine Bush was calculated from vegetation maps (Appendix D, Figures A1-H1) using a calibrated dot grid and is presented in Table 7.

Any site within the Albany Pine Bush may support pest plant species that will require special management. These include black locust, which is not native to this part of the U. S. and is fire-adapted, and clonal. Black locust can form stands of many acres displacing desirable pine barrens species (see Section 7.6). Trembling aspen (but also Populus grandidentata, big-toothed aspen) is native to this region and was probably always present in low concentrations in the Pine Bush. In some parts of the Pine Bush where soil has been disturbed, trembling aspen now forms stands of many acres, outcompeting all other pine barrens species. Trembling aspen is also fire-adapted and clonal, but can be controlled somewhat by fires during some seasons (see Section 7.7). There are other weedy species, usually associated with mechanically-disturbed soil, that should also be considered in an overall fire management program (see Section 7.8).

7.1 Maintenance burns

Those sections of the Albany Pine Bush dominated by scrub oaks with scattered pitch pines will require maintenance burns on a return-interval frequency of 5-10 years. Maps of these areas appear in Appendix D, Figures A1-H1. Approximately 350 acres (140 hectares, 24%) of the currently-protected Albany Pine Bush are in good condition and can be managed with maintenance burns. One characteristic stand requiring maintenance burning only is located in the City Preserve east of the New York State Credit Union on Route 155 and west of the Albany City landfill (see Appendix D, Figure F1). Another typical example of this type of site is on the south slope of Blueberry Hill in the DEC tract southeast of the south end of Pitch Pine Drive West (Appendix D, Figure G1).

Fires in this fuel type are carried by grasses and shrub leaf litter. Wildfires can be very hot with flame lengths to

Table 7. Review of total area of fuel types in the protected sections of the Albany Pine Bush.

Fuel type-Community	Estimated area hectares	acres	Percentage of total protected Pine Bush
Good quality pitch pine-scrub oak barrens	140	350	24
Fire-suppressed pitch pine-scrub oak barrens	180	450	30
Fire-suppressed hardwood forest	220	550	36
open canopy wetlands	24	60	4
open or grassy areas	36	90	6
	600	1500	100

%age of Pine Bush Preserve not requiring fuel reduction = 34%

%age of Pine Bush Preserve requiring fuel reduction = 66%

1 acre = approx. 0.4 hectares

20 feet (six meters) and rates of spread in excess of 200 feet per minute (60 meters per minute) (Andrews, 1986). This community type has been included in prescribed burning programs in Massachusetts at the Miles Standish State Forest (Patterson, pers. comm.) and in the dwarf pine plains in New Jersey (Windisch, pers. comm.). There is currently no fuel model predicting fire behavior specifically designed from experience in this community/fuel type. The closest existing fuel model used to predict fire behavior in good quality pitch pine-scrub oak barrens may be fuel model 6 for dense shrub thickets (Anderson, 1982). Fuel model 4, based on information collected from prescribed burns in West Coast chaparral communities dominated by shrubs that have leaves with highly flammable oils and resins, may be similar to fuels in the pitch pine-scrub oak barrens natural community. A review of available fuel models appears in Appendix K.

Data are being collected to develop a pitch pine-scrub oak model from work in Massachusetts. Until an adequate fire behavior model has been developed for this fuel type, each Albany Pine Bush prescribed burn should include fuel load, fire weather, and fire behavior measurements to add to the range of data available to enhance this model. In grassier sections of good quality pitch pine-scrub oak barrens, fuel model 2, designed from grasslands with 33-66% low shrub cover, should be combined with model 4 to predict fire behavior. The 1986 version of BEHAVE, a computer program designed to predict fire behavior (Andrews, 1986), permits a combination of fuel models.

Fire compartment size and configuration can vary to meet hazard abatement requirements and biological management needs. Management of these sites will be fairly straightforward from a biological perspective except for management concerns regarding occurrences of rare species (see Section 7.9) and fire and smoke hazards (see Section 7.10).

Only a small percentage of the Albany Pine Bush is currently suitable for a maintenance regime. Eventually, the predominant type of prescribed burn in the Pine Bush will be in characteristic pitch pine-scrub oak barrens, which will require only maintenance burning. As familiarity with fuels, local weather conditions, and smoke behavior increases, larger units can be burned.

Eventually, vegetation differences once evident in the larger pine barrens community associated with topography, soil variation, and fire frequency should reemerge. The overall long-term goal of fire management in the Pine Bush will be to maintain high diversity in the natural community. It will become necessary to regulate fire frequencies and intensities locally to achieve and maintain these variations. Some areas may be naturally more inclined to support grassy, forb-dominated

variants of the community. Fire frequency may need to be increased in these areas to favor habitat for rare species. There may conversely be some sections of the dissected Pine Bush that do not support desirable habitat for rare species (e.g. lupine and nectar species for Karner blue butterflies). In these areas, it may be necessary (if it is desired to increase rare species habitat) to clear areas mechanically to promote development of grassy openings. It may even be necessary to plant or sow seeds of desirable species, as well as regulate fire frequency. Monitoring of rare species and the overall pitch pine-scrub oak barrens community will be necessary to determine needed changes in local and regional fire management practices.

Two prescriptions and logistics plans have been prepared for prescribed burns in examples of pitch pine-scrub oak barrens. One (Appendix E) is for a grassy variant, while the other (Appendix F) is for a more typical, dense scrub oak thicket with scattered pitch pines.

7.2 Restoration burns in fire-suppressed pine barrens with high fuel loads and remnants of characteristic pine barrens species

Not all fire-suppressed sections of the Albany Pine Bush are alike. Some sites remain dominated by pitch pines and scrub oaks, but have not burned for more than 15 years. Approximately 450 acres (180 hectares or 30% of the currently-protected Albany Pine Bush) are fire-suppressed and structurally unlike the pitch pine-scrub oak barrens community, but will not require the introduction of native pine barrens species. This community variant is found in a range of conditions throughout the Pine Bush. Good examples of this fire-suppressed type occur in the southeast corner of the Old State Road Region (see Appendix D, Figure B1) and on the east side of the s-curve on Rapp Road north of the Thruway on land owned by the City of Albany (see Appendix D, Figure H1). This pine barrens variant needs minimal restoration and should be in a condition for maintenance burns after only one or two prescribed fires.

Fires in this fuel type are carried by leaf litter, scattered grasses and sedges, and low levels of downed dead woody material. Fuel models 9 and 10 may approximate fire behavior in these woods. Model 8 may also be appropriate.

Some fire-suppressed sections of the Pine Bush continue to support those highly flammable species found in the pitch pine-scrub oak barrens understory. In these areas it will be necessary to combine these woodland models with either model 6 or 4 to refine fire behavior predictions.

The objectives of a prescribed burn in this pine barrens

variant are to 1) reestablish the overall structure of the pitch pine-scrub oak community by reducing canopy cover of pines; 2) increase cover of scrub oak by opening the canopy and increasing resprouting; 3) increase the frequency and cover of characteristic grassy openings; and 4) prepare the site for inclusion in a maintenance burning program. Monitoring of fire effects should focus on these changes.

An example of a burn prescription and logistics plan for a fire-suppressed pine barrens dominated by characteristic pitch pine-scrub oak barrens species appears in Appendix G.

Most fire-suppressed variants of the pitch pine-scrub oak barrens community will require some pre-burn site preparation, including establishment of brush-hogged firebreaks with a 3-5 feet (1.0-1.5 meters) wide mineral scratch line. Since there is a wide range of this pine barrens variant, each burn unit and compartment will need to be evaluated separately. Some crown fires will be desirable to reduce overall pine cover. In many cases, however, it will be necessary to limit flame lengths and rate of spread because of smoke and fire hazards bordering the compartment.

7.3 Restoration burns in fire-suppressed pine barrens without significant levels of characteristic pine barrens species

The most challenging prescribed burns within the Albany Pine Bush will be those in sections of the preserve that have been fire-suppressed for many years and are currently dominated by species not characteristic of the pitch pine-scrub oak barrens community. In some cases these sites have high levels of downed dead fuels and deep layers of leaf litter. Each site will be slightly different and require modifications in pre-burn site preparation.

Approximately 550 acres (220 hectares or 37% of the currently- protected Albany Pine Bush) is fire-suppressed and dominated by hardwoods not characteristic of the pitch pine-scrub oak barrens natural community. Good examples of the hardwood community occur in the ravines in Regions C, D, and E (see Appendix D, Figure C1, D1, and E1) and between the branches of Rensselaer Lake (see Appendix D, Figure H1). Some of these sites are dominated by poplar and/or black locust; some support a community very similar to the typical regional mixed hardwood-conifer forest.

Currently the ravine woods are very different from surrounding woods. Higher soil moisture has encouraged the development of a more mesic forest type than adjacent sites on flat sandy soil. Small fires, which are characteristic of recent years, burned out as they reached the less volatile fuels of

these hardwood stands. Historically, fires in the Pine Bush were often large and fast-moving, burning into adjacent communities. While small fires probably burned out at the edges of these ravines, large fires must have burned into some ravines, establishing cycles of pine barrens vegetation alternating with more mesic vegetation associated with periods without high intensity fires. Efforts should be made in the prescribed burning program to reestablish these conditions in the ravines.

Fuel models 8 and 9 for open woodlands with low fuel loads should adequately predict fire behavior in these woods.

Objectives of a prescribed burn in these fire-suppressed sections are to: 1) reduce overall fuel levels to allow larger and more characteristic pine barrens fires in the future; 2) reduce organic litter and soil organics to provide appropriate conditions for reestablishment of pine barrens-adapted species; 3) eliminate species not adapted to periodic fires; 4) encourage germination of native pine barrens species present in the seedbank; 5) create a favorable seedbed for pine barrens species present at adjacent areas; and 6) prepare these sites for inclusion in a maintenance burn program.

At representative fire-suppressed sites, it is important to monitor the effects of prescribed burns. Where remnant pine barrens are nearby, it should be possible to stimulate growth of native species in low concentrations and provide favorable habitat for colonization by native pine barrens species. However, in sections of the preserve isolated from stands of native pine barrens species, it may be necessary to reintroduce native species by planting pitch pines and scrub oaks and sowing seeds of other dominant pine barrens trees, shrubs, grasses and forbs. Only local material should be used. It may be necessary to find a sympathetic local nurseryman or develop the capability to raise large numbers of pitch pines and scrub oaks for a reintroduction program. It may be possible to work with the NYS tree farm at Saratoga State Park.

A prescription and logistics plan for a research-restoration burn in a representative fire-suppressed example of the Albany Pine Bush without characteristic pine barrens species is presented in Appendix H.

7.4 Restoration-burns in fire-suppressed, disturbed sites with low fuels and without significant levels of characteristic pine barrens species

There are several areas in the Pine Bush where recent agriculture, sand mining, or other mechanical disturbance of soils has resulted in grassy or shrubby vegetation with low fuel loads and few or no species characteristic of the Albany Pine

Bush pitch pine-scrub oak barrens community. Although some generalizations can be made about management of these sites, each will differ and require individual review and management planning. Approximately 90 acres (36 hectares or 6% of the total area of the protected Albany Pine Bush) are in this condition.

If enough fuel exists for a burn, prescribed burns at these sites will be easier than in wooded sections of the Pine Bush, because low fuel loads result in fewer fire and smoke management problems. Generally, fuel model 1 for grassy fuels or model 2 for grasses mixed with up to 67% cover of shrubs without highly flammable leaves should adequately predict fire behavior. Most sites of this type have low soil organics and leaf litter and will require few fire-related changes in soil characteristics.

The nature of the native seedbank at these sites is uncertain and undoubtedly variable. Fires may release dormancy in some seeds of characteristic pine barrens species still present in the seedbank. At some sites seeds may blow in from neighboring remnants of the pine barrens. Management of these sites will remain experimental for many years. Fire effects on weedy species and reestablishment of native pine barrens species should be documented to direct future efforts.

Some disturbed sites will be ideal for establishment of open, grassy habitats required by blue lupine and other herbaceous species required to support populations of Karner blue butterflies. Establishment and maintenance of these desirable species should take precedence locally over eradication of weedy, non-native species such as spotted knapweed (Centaurea maculosa) or bouncing bet (Saponaria officinalis), both used by Karner blues for nectar.

One extreme example of this type of low-fuel, disturbed site is the large northern section of one DEC tract (see Appendix D, Figure G1.), where woods were eliminated by a chain dragged between two bulldozers. Most woody material was removed from the site, eliminating high fuel loads. The resulting vegetation on highly disturbed soil is composed of weedy, farm grasses and vines with an occasional resprouting shrub and a few large clonal patches of brambles (Rubus spp.). A prescription and logistics plan for a research burn at this site appears in Appendix J.

Another example of these low-fuel, weedy sites is the bulldozed southern extension of Pitch Pine Drive West, which also extends to the west (see Appendix D, Figure G1). This site was open sand 6-8 years ago and now has a light cover of spotted knapweed with scattered individuals of bouncing bet, daisy fleabane (Erigeron sp.), and Queen Anne's lace (Daucus carota) and occasional native species found in grassy pine barrens openings. At this site it may be difficult to carry a fire in the low fuels until additional organic material builds up.

A third example of this fuel type is the sand pit west of the bulldozed extension off the south end of Pitch Pine Drive West (see Appendix D, Figure G1). This shallow pit is similar to several others within the Pine Bush: the northwest end of the City of Albany landfill (see Appendix D, Figure F1); off Velina Drive (see Appendix D, Figure G1); east of the Overnight Transportation facility (see Appendix D, Figure B1); and along the south side of Old State Road east of its junction with Kings Road (see Appendix D, Figure B1). While each of these sites has been abandoned for a different length of time, they are all partially vegetated with weedy species. The sand pit in Region G has a thin layer of chipped woody material with a light cover of blackberries and scattered grasses and forbs. Light ground fires at this site may limit growth of weedy species, increase dominance of the few native pine barrens species present, and stimulate germination of seeds of pine barrens species remaining in the seedbank.

Most disturbed sites can be burned as a part of neighboring compartments.

7.5 Restoration burns in pine barrens wetlands

At one time there were wetlands scattered throughout the Albany Pine Bush. Development and a drop in the regional water table have reduced the remaining wetlands to three general areas: the north-central region along the railroad tracks (see Appendix D, Figure A1); the City Preserve northwest of the City landfill (see Appendix D, Figure F1); and the borders of Rensselaer Lake (see Appendix D, Figure H1). These wetlands total about 60 acres (24 hectares or approximately 4% of the total area of the protected Albany Pine Bush).

All wetlands were subject to effects of fires that originated in neighboring dry pine barrens. During drought years when the natural water levels were low, fires burned into these shrubby and peaty wetlands, top-killing shrubs and trees and consuming organic matter, exposing wet sand and creating some of the most unusual wet habitat for pine barrens plants and animals. Some rare plant and animal species no longer seen in the Pine Bush were probably associated with this ephemeral habitat, including chaffseed (Schwalbea americana), collected only once in New York at a site referred to as "Karner".

In the past 40 years, there have been no fires at the wetlands near the railroad or Rensselaer Lake. Parts of the wetland northwest of the City landfill may have burned during the large April 1981 fire that covered much of the Pine Bush north of the Thruway and east of Route 155.

Effects of fire in the Pine Bush vernal wetland community

are unknown. Undoubtedly, wetlands, like dry pine barrens, burned periodically under a range of conditions, resulting in a mosaic of habitat variants over time. To achieve similar results with prescribed burns, it will be necessary to vary the management strategy at each of the wetland sites, being sure to burn only parts of each at any one time to avoid eliminating all available local habitat for a species. It is particularly important to monitor biological effects of fire in these wetlands and adjust fire regimes appropriately to meet ecological goals.

Fires in these wetlands are carried by grasses and sedges. Fuel models 2 and 3 can be used to predict fire behavior in open sections of these sites. In most cases, sections of a wetland will be burned with adjacent uplands. Fire behavior in both fuel types will need to be considered in writing prescriptions.

One objective of prescribed burns in Pine Bush wetlands is to maintain open, sedge-dominated areas, which are being invaded by shrubs and trees. Parts of the railroad wetlands (see Appendix D, Figure A1) and those on the City Preserve (see Appendix D, Figure F1) are in this condition. Another objective is to create wet, open sandy areas at the edges of peaty wetlands. This habitat has become increasingly scarce during the prolonged years of fire suppression. The best site for reestablishment of this wetland variant is along the railroad tracks.

A prescription and logistics plan for part of the larger wetland in the City Preserve appears in Appendix J.

7.6 Prescribed burning at sites with black locust

Black locust is a member of the pea family and native to dry sites in the Southeastern U. S., reaching its natural northern limit in Maryland. It is a nitrogen-fixer and forms large clonal stands. It has been planted in the Northeast, where it has naturalized and grows well on dry, well-drained sites with limited competition from hardwoods. In the Albany region, black locust is an aggressive colonizer of open sandy, disturbed sites, where it can form clones of many hectares that can persist until outcompeted by taller growing hardwoods.

Black locust is considered a pest species in many parts of the Northeast and Midwest. It has often been the target of programs to eradicate weedy non-native species from natural communities. An Element Stewardship Abstract (ESA) for black locust, which reviews the ecology and biology of the species and results of efforts to eliminate it from natural communities, is included in Appendix L.

Management programs focused on black locust have generally

been unsuccessful. There has, however, been no documented effort to control it in the Northeast. Black locust resprouts aggressively after both cutting and burning. Spot herbicide application onto cut stumps has been most successful in reducing resprout numbers, but has not entirely killed the plant.

Responses of black locust to cutting and a range of fire intensities and frequencies should be investigated, since it appears that the response of black locust to stress (fire, cutting, and herbicide application) varies within the current range of the species. Stem densities should be sampled before and after cutting and fires to assess effects of management on resprouting. It may become necessary to modify fire intensity or pre-burn procedures such as firebreak construction or girdling of trees to limit black locust growth. Effects of multiple fires or combined fire/herbicide/girdling treatments on locust clones are currently unknown. Success of black locust control must be assessed and treatments modified appropriately. At the very least, while it may be difficult or impossible to eliminate black locust from the Pine Bush, it should be possible to prevent its expansion to new sites.

7.7 Prescribed burning at sites with poplar

Poplar or trembling aspen is native to the Albany area, where it naturally occurs as an early successional species at disturbed sites. It was probably a minor component of the overall pine barrens community within the Albany Pine Bush, but certainly not a dominant species. Like black locust, poplar is clonal and resprouts aggressively after cutting or fires. Unlike black locust, however, there have been successful efforts to control poplar through a combination of spring girdling to reduce root reserve availability and repeated prescribed burns to kill resprouts and further reduce root reserves. Theoretically, enhanced vigor of scrub oak will eventually outcompete resprouts of weakened poplar clones.

Poplar control has been a major concern in efforts to restore natural communities in the Midwest. An ESA, reviewing the ecology and biology of this species and research/management efforts to control it, is found in Appendix M.

7.8 Prescribed burns at sites with other weedy species

The major weedy species concerns within the Albany Pine Bush are black locust and trembling aspen. There are, however, other non-native species that are locally dominant and may become a focus of management after a prescribed burn program and efforts to control locust and popular are underway. Most of these

species are associated with disturbances and include:

*Centaurea maculosa	spotted knapweed
Saponaria officinalis	bouncing bet
*Melilotus alba	sweet white clover
*Lonicera japonica	honeysuckle
Linaria vulgaris	butter and eggs
*Daucus carota	Queen Anne's lace
Setaria spp.	foxtail grass
*Festuca spp.	fescues
*Phragmites australis	common reed
*Lythrum salicaria	purple loosestrife

Fire management and expansion of fire-adapted pine barrens species should reduce the dominance of these species locally. It will not be possible to eliminate these species entirely from the Pine Bush, because they are associated with disturbed edges of the very dissected preserve. ESA's are available for those species preceded by an asterisk (*).

Spotted knapweed is currently a major source of nectar for the second brood of Karner blue butterflies. While it is the intention of Karner blue management to establish significant populations of native nectar species for the second brood, it may be necessary to rely on spotted knapweed until adequate native nectar species are established.

There are numerous native species that are not fire-adapted and not characteristic of the Albany Pine Bush. These include white pine; red, white, and chestnut oaks; red maple; and other native components of the hardwood-dominated community found in fire-suppressed sections of the Pine Bush. These species should not require any specific management because they are not adapted to survive periodic fires and will be reduced in abundance when a fire program is underway. Surrounding properties, however, unmanaged by prescribed burning, will continue to support these species typical of the Northeastern hardwood forest.

7.9 Prescribed burns at sites with rare species

Rare species occurrences are scattered throughout the Pine Bush. Fire management in the protected Pine Bush will have an impact on all of these species. A list of the known rare plant and animal species appears in Table 1. Locations of these species in the Albany Pine Bush are mapped in Appendix D, Figures A2-H2.

7.9.1 Karner blue butterflies

One major focus of Pine Bush management has been the Karner

blue butterfly, which is believed to be in danger of local extirpation if pitch pine-scrub oak barrens vegetation is not restored in the near future (Givnish et al., 1988). Effects of fire on Karner blue butterflies are reviewed in Section 4.2.1. Because Karner blue butterflies do not have adaptations to survive fires at any point in their life cycle (Schweitzer, 1989), it is important in each area subject to prescribed burning to maintain a remnant population that can recolonize burned sites. In the summer of 1989, with the assistance of local volunteers, staff of the Conservancy mapped locations of blue lupine throughout the Pine Bush and in neighboring areas. Maps showing locations of blue lupine stands in the Pine Bush appear in Appendix D, Figures A2-H2. Although blue lupine was found in all regions of the Pine Bush except Region E, some areas will require supplemental planting, if they are expected to support butterflies in the near future. Some lupine populations are very small (fewer than 50 flowering stems) and could be enhanced by cutting shading shrubs and trees, expanding sandy areas, and seeding nearby sites with local seeds.

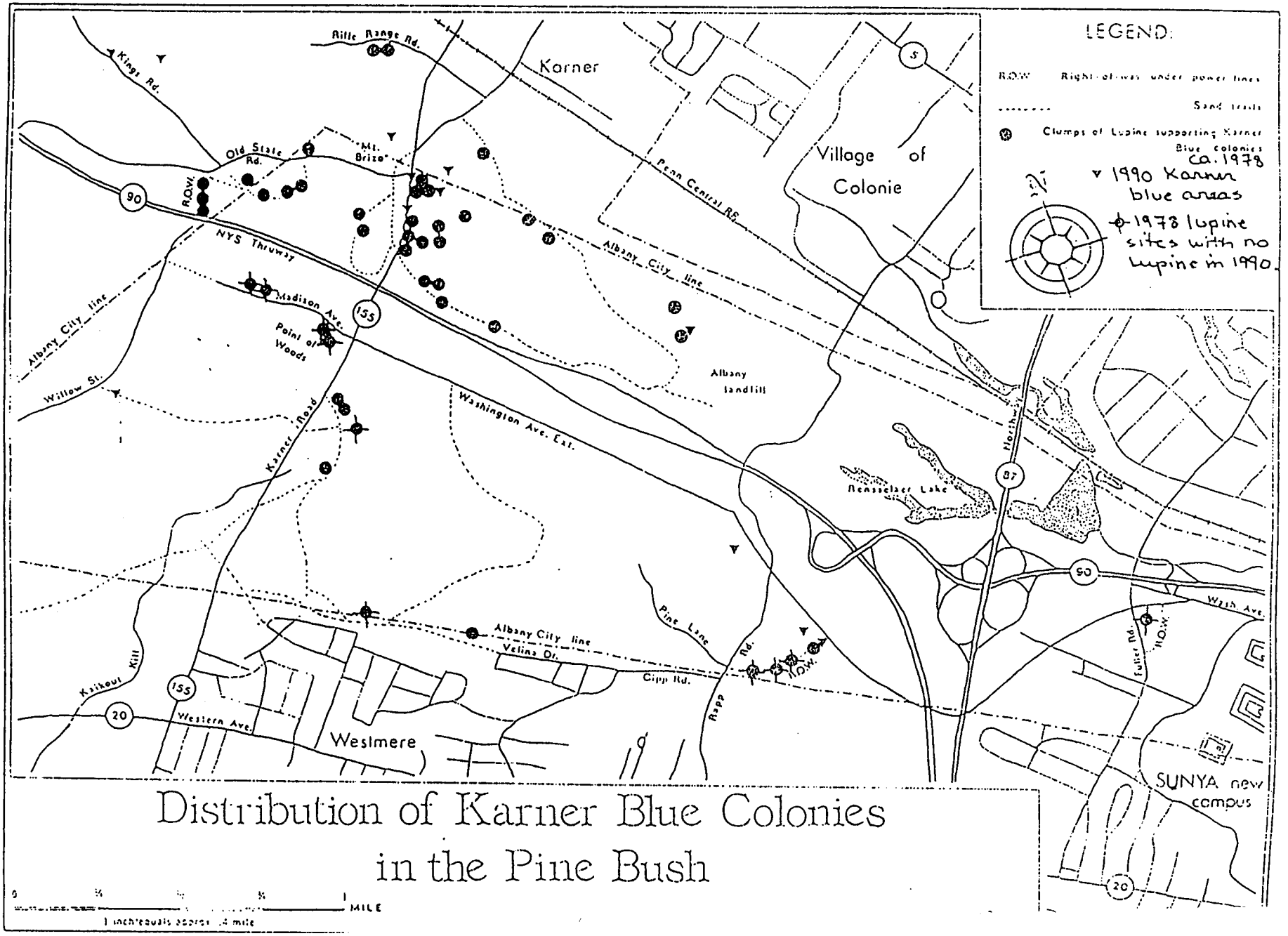
Lupine sites were visited by the Conservancy or NYNHP staff during the second brood of Karner blue butterflies in July 1989, the best time to assess butterfly use of a site. Karner blues were found in four general sites within the Pine Bush and at four additional sites near the Pine Bush Preserve but not on land dedicated to the Preserve (Figure 6). Three general sections of the Pine Bush, The Big Dune (Region E), Blueberry Hill (Region G) and the City Preserve around Rensselaer Lake (Region H), were not known to support Karner blue butterflies in 1989.

A monitoring program should be established to assess the status of Karner blues and blue lupine throughout the Pine Bush. In those sections of the Pine Bush where Karner blue numbers are very low (which in 1989 appears to be true for all the Pine Bush), lupine patches that support Karner blue butterflies should be excluded from burn units and managed by mechanical means until they are large enough to permit burning of part of each patch within a burn compartment. An arbitrary threshold of 1000 flowering stems scattered over at least 0.25 hectare should be established before fire management begins. Effects of fire on blue lupine should be evaluated as part of the overall Karner blue butterfly monitoring program.

7.9.2 Inland barrens buckmoth

The inland barrens buckmoth will also be impacted by a fire management program in the Albany Pine Bush. Currently, buckmoths are believed to occur at very low concentrations throughout the Pine Bush at sites with recently burned scrub oak. Before large areas of the Pine Bush are under fire management, the status of the buckmoth should be assessed using either a breeding female to

Figure 6. Locations of Karner blue butterfly sites within the Albany Pine Bush 1978 and 1990.



determine presence/absence in burn units or a mark-release-recapture (MRR) program. Although it is believed that at least some of the buckmoth population will survive fire (Schweitzer and Rawinski, 1987), local populations should be divided between adjacent burn compartments to permit recolonization of recently burned sites (until it is proven from field experience that the inland barrens buckmoth is secure within the Pine Bush).

7.9.3 Other rare insect species

The needs of several other rare lepidopteran species in the Pine Bush are less well known than those of the Karner blue or the inland barrens buckmoth. Blue lupine is also the only food plant for dusky skipper and Perseus underwing. The status of these species should be assessed throughout the Pine Bush in a presence/absence survey during their flight period. If their population levels are either very low or restricted to only small areas, a more detailed MRR study should be undertaken to assess impacts of prescribed burning on these species.

It is important to monitor the status of these species and modify details of the fire management program affecting these species. Life histories, information on food plant needs, phenology, and any fire-adapted life stages of these insects should be investigated. Future survey work may result in the discovery of additional rare insect species in the Albany Pine Bush. It may be necessary to make further changes in fire prescriptions to benefit these species.

7.9.4 Rare plant species

Currently there are three rare plant species known from within the Albany Pine Bush; only Schweinitz's flatsedge (*Cyperus schweinitzii*), however, is located on a protected section of the Pine Bush. All three species are members of the genus *Cyperus* and are found at open sandy sites. It is unknown how these species respond to fire. While it is likely that open sandy habitat will persist and provide favorable habitat for these species within the Pine Bush even while it is under a comprehensive fire management plan, it will be necessary to monitor the status of these species and assess effects of the overall program. Local adjustments in burn units may be needed to maintain these species within the Pine Bush.

Fire management within the Albany Pine Bush will result in an increase in natural habitat diversity over time. Plants currently found only in the seedbank may become reestablished within the community following management. Although unlikely, other native species may immigrate from nearby sites. Surveys for rare plants and animals should be conducted periodically

throughout the Pine Bush to assess the success of the program measured by species diversity and determine whether additional factors need to be considered in fire frequency, intensity or the season of burning.

7.10 Prescription modifications for smoke and fire hazards

Prescribed burns add particulate matter to the air. Particulates are assessed as a part of air quality evaluation. All prescriptions should consider the annual flux in air quality in the Albany area to minimize adverse impacts on general air quality. It may be necessary to block out certain periods during the year when air quality levels are lowest.

7.10.1 Residential and commercial areas

The Albany Pine Bush is dissected into several disjunct units separated by highways and development. Most outer boundaries of the dedicated preserve are defined by flammable structures or smoke hazards which need to be the focus of fire management planning. A map of the residential, municipal, and commercial structures adjacent to the Albany Pine Bush appears in Figure 5.

All fire units should initially be bordered by wide firebreaks with cleared areas of at least 20 feet (6 meters) and a mineral soil band of at least 5 feet (1.5 meters) to prevent fire damage to surrounding areas. With experience, it may not be necessary to maintain such wide firebreaks for some fuel types. Firebreaks initially should be cleared mechanically. In most cases, brush can be burned within a compartment with low fuel loads. After firebreaks have been established by cutting, brush-hogging and mowing, it may be possible to burn these low-fuel-load firebreaks under ideal conditions with winds blowing away from smoke and fire hazards. Some firebreaks can only be maintained by mowing because of the proximity of flammable structures. Efforts should be made at mowed firebreaks to maintain an assemblage of native species to limit the movement of seed of exotic species into the Pine Bush. It will be necessary to evaluate effects of mowing on native grass-dominated vegetation during different seasons. Cutting, brush-hogging, and mowing can simulate only part of the ecological effects of fire. It will be relatively easy to maintain the structure of the pitch pine-scrub oak barrens community by cutting shrubs, mowing grasses and leaving scattered pitch pines. Some firebreaks may be appropriate sites for creation of blue lupine stands for establishment of Karner blue populations.

Burn prescriptions must take into account neighboring development to minimize smoke and fire effects. Prescriptions

should be written so that winds blow smoke and embers away from flammable structures or landscaping. For all burn compartments, staff should be assigned to watch for spotting outside burn compartments with a particular focus on neighboring structures.

Three nursing homes are located along Washington Avenue Extension northeast of Region G (Figure 5). Two of these, The Teresian Home and Daughters of Sara Nursing Home, are multi-storied and will be a major concern for smoke management. Prescriptions for burn compartments within a 0.5 miles (0.75 km) of these structures must call for winds that direct smoke away from these structures. Higher transport winds and mixing heights should also be included in these prescriptions. General smoke limiting prescriptions should be developed. During fires in the vicinity of these structures, particular attention should be paid to smoke movement. If a smoke management problem develops, fires should be extinguished immediately.

Smaller burn compartments produce less smoke than larger compartments. Fires are also easier to extinguish in smaller units, if weather conditions change and cause danger from spotting or smoke drift. Lower spotting frequency and lower amounts of smoke can also be achieved by a short line of fire, which generates less smoke than a broad fire front and is easier to extinguish if necessary.

Fires during the growing season create high levels of smoke, as water in leaves and other living tissue is converted to steam. In some areas, it will be necessary to burn only at times of the year when smoke levels can be minimized. Highest water levels in aboveground parts of plants generally occur at the end of "green up" in late May, and remain high throughout the growing season until late September when they begin to decrease. Hot fires produce less smoke than cooler fires. Backfires are slower moving, hotter, produce fewer spots, and are easier to control than headfires, and may be more appropriate in regions of the Pine Bush with severe smoke limitations.

Ecological objectives of fire management will have to be balanced against fire and smoke hazards to achieve reasonable, desired results. In some parts of the Pine Bush, it will be necessary to readjust fire prescriptions and other management strategies to meet these ecological and hazard limitation goals.

It is important that people who live and own property adjacent to sections of the Pine Bush under fire management understand the precautions taken in developing a fire management plan. Prior to each prescribed burn, neighbors who may be affected in any way should be notified. For details on a public awareness campaign on the role of fire in the Albany Pine Bush and the procedures used in developing a fire management plan see Section 9.2.

7.10.2 Highways and railroad lines

The Albany Pine Bush is bisected by Interstate 90 (NYS Thruway) and Route 155 (Karner Road) with good quality examples of the pitch pine-scrub oak barrens natural community extending up to the mowed margins of the road in some areas. Washington Avenue Extension, Interstate 87 (Northway), the Amtrak line between Albany and points west, and numerous smaller roads are all either bordering or very close to the Pine Bush. Maps showing highways and the Amtrak line in the vicinity of the Pine Bush are shown in Figure 5.

In the past, wildfires have burned across roads at several points. The large 1981 fires moved northward across Washington Avenue Extension and the NYS Thruway and then later moving westward across Route 155. These fires were fast-moving headfires with extremely long flame lengths driven by winds up to 45 km/hr. No prescribed fires within the Albany Pine Bush would be of this intensity.

The major hazard during a prescribed burn associated with roads and the railroad is, however, reduced visibility from smoke. Amounts of smoke are related to season, length of fire line, fire intensity, and wind characteristics (see Section 7.10 for discussion). Smoke can also mix with existing fog or moisture-laden air to create dense fogs. It will be necessary to limit prescriptions to periods when fog is not expected and when mixing heights and transport winds are high. It will be necessary to limit smoke production in burn units near highways. In a few cases, it may be possible to close local roads, rerouting traffic. In units that have very narrow prescriptions that can seldom be met, it may only be possible to maintain a variant of the Pine Bush vegetation mechanically.

It will also be necessary to inform the state, county, and town highway departments, as well as all levels of police about the overall fire management plan and about specific prescribed burns. A working relationship should be developed with traffic control personnel to alert motorists if danger from smoke or fire develops. Interagency response to any danger from a prescribed fire will be detailed in individual fire unit plans. For compartments near roads, one member of the burn crew should be in charge of traffic control issues. This crew member must be familiar with smoke management and aware of contingency plans if a smoke problem should develop. At all times the crew must be ready to shut down a fire, if a fire or smoke danger develops associated with a road that cannot be closed during a prescribed fire.

7.10.3 Utility lines

Major electrical transmission lines cross the Albany Pine Bush in two areas, between Regions C and D and from Kings Road to the Amtrak line, crossing several Pine Bush tracts in different ownership. Minor powerlines occur along Route 155, along the Amtrak line, and along Kings Road. The locations of these power and telephone transmission or service lines are shown in Appendix D, Figures A5-H5.

Fire can melt electric and telephone cables and damage transformers, resulting in line failure. High fuel loads under or adjacent to these lines may lead to flame lengths and high temperatures that will affect cables. Vegetation bordering electric and telephone lines will need to be cut to reduce the possibility of adversely affecting these lines.

In New Hampshire, there is a prescribed burning program jointly coordinated by New England Power and the University of New Hampshire to manage for low vegetation under powerlines. The low heat generated by grass and shrub fires does not affect transmission lines. These fires, however, are limited to the maintained powerlines and do not extend into neighboring woods where higher flame lengths and temperatures would be generated.

Woods bordering powerlines should be cut back to a distance of 100 feet (30 meters) from the lines to prevent cables from melting. Fire damage to wooden poles will be very minor, if fuels bordering poles are removed by cutting or raking.

Karner blue butterflies currently occur along four sections of electric line right-of-ways (ROW) within the Albany Pine Bush. The associated populations of blue lupine undoubtedly have been maintained by the ROW maintenance practices of the power company. These sites are, at least in the foreseeable future, vital to the continuance of Karner blues in the Pine Bush and should be maintained using current practices of periodic hand-cutting to remove shrubs and trees.

7.10.4 Other fire hazard issues

The current City of Albany landfill (Region F) is scheduled to be closed within the next five years. The refuse will be graded, covered with a layer of clay, topped with sand and soil, and planted with a mixture of lupine and other species associated with Karner blue butterflies. Flammable methane generated by decomposing organic material in the closed landfill will be vented through a network of pipes. The vegetation overlying the old landfill will be maintained by mowing and firebreaks will be constructed on the western border of the site to prevent fires from the City Preserve to the west from extending into the area

with gas vents.

The Overnight Transportation Company, located north of Kings Road and east of an extension of the OPRHP tract west of Route 155 (Region B), has a small group of propane tanks bordering the Pine Bush. A 30-foot-wide (10 meter) cleared area should be maintained around these tanks, which should be inspected prior to any prescribed burns to check for leaks. Burn prescriptions for compartments near these tanks must call for winds blowing away from the tanks to prevent spotting near flammable fluids. No other fuel tank hazards are currently known in or near borders of the Pine Bush. Any new hazards or existing hazards not identified here should be noted on the base map during fire management planning for specific units; burn prescriptions in the vicinity of these hazards should be adjusted.

Throughout the Pine Bush there are areas that have been subject to illegal dumping. Maps of some of these sites appear in Appendix D, Figures A3-H3. A more complete inventory of these dumps should be made in burn units prior to any prescribed burning. Some of the inorganic dumped material, if burned, may produce toxic gases, which will reduce local air quality and may threaten the health of fire crew members. Man-made debris, such as tires and plastics, should be removed from the burn compartment before ignition. Piles of organic debris from illegal dumping or natural causes should also be removed from burn compartments or dispersed on site to prevent smoldering. Dense organic debris piles may either produce unwanted smoke for days following a burn or re-ignite after mop up.

Similarly, peat deposits in wetlands may burn for days following a prescribed burn. It will, however, be necessary to plan for the extended period of smoke generation and for the possibility of re-ignition of fuels near smoldering peat.

Burning poison ivy generates smoke with the same toxic oils found on leaf surfaces. Burn compartments with poison ivy should be identified before a prescription is written. Crew members hypersensitive to poison ivy should be deployed in positions out of smoke.

7.11 Prescriptions for research burns at representative sites within the Albany Pine Bush

Six prescribed burn plans are presented in Appenices F-K. for the five generalized fuel types-communities in the Albany Pine Bush. Each burn plan consists of two basic parts: 1) a narrative describing the site, prescribed burn objectives and activities and 2) a formal prescription and logistics plan. The narrative includes a description of the location and condition of the site. Objectives of the prescribed burn are listed with

monitoring methods to evaluate progress toward these objectives. Fire and smoke constraints are noted with maps showing a design of firebreaks and other important regional features. Unusual features of the site are also described, principally focusing on rare species. Possible detrimental effects of the prescribed burn are also discussed. Burn crew members and their field duties are described.

The prescription and logistics plan involves a series of standardized forms developed by the Conservancy for burn planning. This is the working document of the burn plan and is used in the field. The first section includes site features such as ownership, location, and fuel type. Emergency assistance services are identified and their phone numbers are listed. A fire prescription is developed from fuel models for a range of dates and environmental conditions, which include wind speed and direction, temperature, and humidity. This range of conditions represents the limits within which a proposed burn can be ignited to meet strict fire and smoke safety requirements and ecological goals. Under these conditions, fuel models predict fire behavior. Equipment needs and crew size, which are determined by fire behavior, are also listed. Site preparations are described, including firebreak placement and construction and any need to remove or adjust fuels. An ignition plan is presented describing how the fire is initiated. Details of mop-up are also described and forms to document actual activities during the burn are included.

The six research burns constitute the preliminary phase of a fire management program in the Pine Bush. The general questions regarding fire behavior and ecological effects of fire will not be completely answered by these few small fires alone. After these experimental fires have taken place, modifications will be made in prescriptions and general plans. With experience, larger compartments can be burned, which will be both more cost-effective and better simulate natural fire conditions. Each prescribed burns will need to be planned separately using specific details of the burn compartment and its surroundings as well as accumulated knowledge from past prescribed burn experience.

Some aspects of the Albany Pine Bush fire management program will require ongoing research for many years. Each burn will add information for development of an accurate model to predict fire behavior in the pitch pine-scrub oak barrens natural community. Some effects of fire, such as changes in species dominance, will be evident within weeks and certainly during the growing season after a prescribed burn. Other fire effects, such as changes in soil character and invasion of fire-adapted species to newly burned areas, will require many years and many burns at individual sites before trends are clearly understood. Environmental subtleties related to topography, soil moisture,

and varying fire frequency, which were inherent in Pine Bush vegetation years ago when fires were larger and more frequent, will begin to emerge only after the fire management program is well-established.

8.0 Wildfire contingency plan

8.1 Need for a wildfire contingency plan

The plant communities in the Albany Pine Bush are fire-adapted and have been created and maintained by wildfires. Furthermore, successful fire suppression for the past 40 years and the dissection of the remaining natural community into smaller, more manageable units have resulted in the accumulation of high fuel loads and an increase in the probability of high intensity wildfires. Wildfires will occur in the Albany Pine Bush, even after a comprehensive fire management program is well underway. Prescribed burning will reduce fuel loads in long-unburned sections of the Pine Bush. The naturally flammable fuels of pine barrens will, however, continue to be subject to fires. Any fire that is not planned and within prescription is considered a wildfire. These include both accidental, natural, and arson fires, as well as prescribed burn escapes.

Plans to cope with unplanned fires are needed to prevent wildfire suppression from conflicting with the ecological management for the Pine Bush. It will remain the role of local fire departments to protect lives, property, and services; in most cases, suppression will continue unaltered by the comprehensive fire management plan. Small, easily controlled fires in sensitive smoke or fire hazard areas and fires which threaten ecological or cultural resources within the Pine Bush Preserve itself (e.g. concentrated Karner blue butterfly sites or an interpretive center) should be suppressed by conventional means. Other fires, in areas that have been prepared for prescribed burns or for wildfire containment, should be controlled at predefined points after an analysis of location within the preserve, fuel loading, weather, and available staff and equipment. Physical alteration of fuels in the Pine Bush and response training for wildfires should make fire containment easier and increase public acceptance of ecological management with fire.

8.2 Coordination of wildfire response

8.2.1 Current methods for combating wildfires in the Pine Bush

Currently there are three fire departments responsible for wildfire suppression in the Pine Bush. The Town of Guilderland has a volunteer fire department with stations located at

Guilderland Center, Westmere, and Fort Hunter. They are responsible for wildfires in the western part of the Pine Bush and have authority over all of Region C and parts of Regions B, D, and E (Figure 1). A narrow strip of Guilderland also crosses Region F.

The Town of Colonie has a volunteer fire department with stations located at Fuller Road and Midway Street near the north margin of the preserve. They are responsible for wildfires in all of Region A and parts of Region F.

The City of Albany maintains a staffed fire station in the Pine Bush east of Rapp Road north of Washington Avenue Extension. They are responsible for wildfire suppression in all of Regions G and H and parts of Regions B, D, E, and F.

The three municipal fire departments work cooperatively to suppress fires within the Pine Bush. Many volunteers and staff have extensive experience in combating wildfires in the Pine Bush. They have experience with black-lining, the use of "natural" firebreaks as containment points, and have, on occasion, allowed fires to burn themselves out. Small fires are extinguished immediately. There is not a policy to use plowlines or bulldozers in fighting wildfires.

Equipment to manage wildfires already exists within the three fire districts that cover the Albany Pine Bush. Additional equipment to manage these fires at prescribed containment points should be procured and made available whenever needed. This equipment includes drip torches, backpack pumps, fire rakes, brooms and flappers, nomex suits, and a 4WD pumper truck.

8.2.2 Wildfire response coordinator

The position of Pine Bush Preserve Wildfire Response Coordinator should be assigned within either the Pine Bush Commission or one of the municipal fire departments. This position is needed to coordinate the response of local fire departments and other trained fire management staff to unplanned fires in the Pine Bush Preserve. The coordinator must be familiar with goals of the fire management program and locations of firebreaks and positions of effective wildfire control within the preserve. This person must also be familiar with fuel loads, fire weather, and BEHAVE, a computer model that predicts fire behavior in known fuel types under known weather conditions. There should also be a backup coordinator to fill in when the coordinator in unavailable.

8.3 Wildfire contingency plan concepts

The most desirable response to a wildfire is a limited action that uses existing natural and man-made firebreaks to confine the fire to the preserve. Wildfire response should be less disruptive to the land than the disturbance caused by the fire itself.

8.3.1 Wildfire response practices to avoid

Any activity that increases soil disturbance should be avoided when fighting a wildfire. Soil disturbance kills native species, dissects habitat, creates sites for the introduction of weedy species, and may cause erosion. Soil disturbance can be caused by the creation of new firebreaks by bulldozers or large plows to establish a mineral soil break in surface fuels that carry fires. As much as possible, the need for firebreaks should be anticipated, and adequate firebreaks should be constructed. During a wildfire, all efforts should be made not to widen these breaks unless absolutely necessary.

Several rare species in the Pine Bush, particularly the Karner blue butterfly, are currently limited to only a few sites, which could be adversely affected by either wildfires or wildfire suppression activity. Locations of these rare species sites are shown on maps A2-H2 in Appendix E. Fire suppression staff should become familiar with these maps and should plan wildfire responses to limit impact to these sites.

8.3.2 Wildfire response constraints

There are numerous sections of the Pine Bush where it will be necessary to extinguish wildfires immediately because of fire and smoke hazards. These include:

* near any structure, including (but not limited to) those along the borders of the Point-of-Woods Development, the Dunes Development, and Velina Drive and homes near Lydius Street, Siver Road, Rapp Road, Karner Road, Western Avenue, Kings Road, Old State Road and Willow Street Extension and businesses off Apollo Drive, Rapp Road, and New Karner Road;

* in regions where adequate firebreaks have not yet been constructed;

* in areas where smoke can drift across major highways;

* in areas where high concentrations of smoke can drift toward the nursing homes along Washington Avenue Extension;

* at significant rare species sites;

* near the Albany landfill and;

* in areas with extremely high fuel loads.

Fire and smoke hazards in the Albany Pine Bush are discussed in Section 7.10 and shown on the regional maps of the Pine Bush in Figures A3-H3 and A4-H4. Generalized maps of the current fuel types in the Pine Bush are shown in Figures A1-H1.

8.3.3 Wildfires that can be converted into prescribed burns

Occasionally wildfires will occur in sections of the Pine Bush where prescribed burn plans have been written and where adequate firebreaks exist. If weather conditions are within prescription limits, a wildfire can be managed in the manner of a prescribed burn. As specific burn plans are written, existing firebreaks are widened, and new firebreaks created, many sections of the Pine Bush will be in this state. No wildfire should be considered "in prescription" unless approved by the "Wildfire Response Coordinator" or another qualified prescribed burn planner who has reviewed weather, fuel, and hazard conditions.

8.4 Wildfire contingency plan preparations

8.4.1 Training

Effective responses to wildfires within the Pine Bush will ensure the safety of cultural resources, while preserving the ecological integrity of the preserve. It is very important that fire department staff and other people associated with wildfire suppression be familiar with the overall management goals within the Pine Bush.

Copies of appropriate sections of the fire management plan should be given to local fire departments with clear summaries of the management goals involving fire. Fire containment points and significant ecological (primarily rare species) and cultural resources should be highlighted.

Training programs should be developed for each of the fire departments to cover the management goals and to acquaint volunteers and staff with ignition procedures (backfires, headfires, spot fires, strip headfires, and flankfires), blacklining, firebreak construction and maintenance, fire behavior modeling, fire weather, fuel models, and the computer program BEHAVE.

Local fire departments should be invited and encouraged to participate in all prescribed burns.

8.4.2 Firebreak construction

Firebreaks need to be constructed throughout the Pine Bush Preserve for both prescribed burn units (in preparation for burns) and wildfire containment. All firebreaks should be created and maintained so they can be driven by a 4WD pumper truck for access to all sections of a burn unit. Firebreak construction will be difficult in only a few areas in the preserve: for example along the powerline crossing Region A where it is extremely steep and across the wetlands again in Region A. Burn units and firebreaks should be designed to work with these land features.

In areas that have either been fire suppressed for many years (e.g. Region C near Siver Road) or in areas with dense pitch pine-scrub oak thickets (e.g. Regions B and F), firebreaks should be approximately 6 meters wide with slash removed from the site. Care should be taken to limit soil disturbance during both construction and regular use to avoid creating sites for weedy species such as locust and poplar. Some firebreaks near the borders of the preserve many be effectively rough mowed every few years. Other firebreaks can be maintained by periodic brush-hogging. Herbicide use in maintaining firebreaks should be avoided.

Narrower firebreaks, 5-to-10 feet wide, can be used between compartments within a fire unit, if fuels are low to moderate. During the early phase of fire management, these firebreaks may need to be wider to contain fires in high fuel loads. As fuel loads are reduced, firebreaks can be narrowed.

Some firebreaks may be appropriate sites for the establishment of large stands of blue lupine, which can be used by Karner blue butterflies. Care should be taken to manage these grassy areas to maintain and enhance both lupine and Karner blue populations.

8.5 Activities during a wildfire

When a wildfire is first identified:

--notify the Albany Pine Bush Wildfire Response Coordinator and the local fire departments.

--notify the police, traffic control officials, neighbors, other fire departments, outside prescribed burn crew members, power company crews (if the fire is near a powerline), and legal

representation and the insurance company for the Pine Bush Commission (and anyone else typically notified during fires in this area).

--consult the fire and smoke hazard maps to locate structures and smoke hazards (nursing homes, highways, homes etc.), and the rare species maps to locate sensitive ecological sites (mainly concentrated Karner blue butterfly sites).

--determine whether a prescribed burn plan has been written for the area involved in the fire.

--identify the fuel types in the area of the fire and in the vicinity of the fire. Consult the current fuel type maps (rough maps included in this report-Appendix E, Figures A1-H1) and topographic maps.

--determine location of firebreaks in vicinity of the fire.

--determine the current and projected fire weather conditions. Check current fire weather stick information, determine temperature, humidity, wind speed, direction and variability, mixing heights and transport wind speeds, available through the fire weather station or Albany County Airport.

--run BEHAVE using available information.

--Wildfire Response Coordinator with responsible local fire chief should decide upon a strategy: to extinguish the fire directly or defend it at the best containment point.

--assemble necessary equipment.

--extinguish the fire or contain it at identified firebreak points.

--remain at the site through mop up.

--The Wildfire Response Coordinator or some designee should write a report describing the location of the fire and control methods. The report should include a map of the burned area, weather conditions, a review of procedures used in planning and in the field, and a discussion of how well each procedure worked. Copies of this report should be sent to the Albany Pine Bush Commission, local fire departments, and the Fire Management Program; Tall Timbers Fire Research Station; Box 678; Tallahassee, Florida.

9.1. Permits.

The permitting system in New York State for open burning is

run by the regional DEC (Department of Environmental Conservation) offices. For the Albany area, the office is located in Schenectady (Region 4- telephone number 518-382-0680). This region defers to the Albany County Health Department for open burning permits within the county. The DEC does not take a role in Albany in issuing permits. The Albany County Health Department is located on So. Pearl Street. The contacts are Steve Lukowski and Joe Kelly. Their telephone number is 447-4620.

The Health Department uses the same permit used by DEC throughout the State. A copy of the permit appears in Figure 7. The permit application and attached plans and justification are reviewed by the Health Department which circulates a copy to appropriate local fire departments. The general fire department number in Albany is 447-7879. The contact is Assistant Chief Paul LaJoy, Head of fire prevention; 27 Western Avenue; Albany 12203.

9.2 Public education

Gaining the understanding, support, and trust of the public is essential for a successful fire management program in the Albany Pine Bush. Different groups will have different interests and concerns, and appropriate educational efforts must be developed for each group. Three general groups have been identified: 1) state and municipal officials and employees; 2) residents, neighbors, employers, and workers; and 3) media representatives. Advance education activities should begin at least 6 months before the first burn is scheduled to occur; notifications should occur about one week before any burn is scheduled to occur.

9.2.1 General program development

9.2.1.1 State and municipal officials and employees

Professional and volunteer fire fighters assigned to the Pine Bush Preserve area should be made aware of their municipalities' participation on the Albany Pine Bush Commission and the intention to use prescribed fire in the Pine Bush. An educational program should include review of the overall fire management plan and specific unit plans as they are prepared; opportunities for suggestions from fire departments; visits to units and firebreaks to ensure accessibility by department vehicles; slide and/or video presentations of other prescribed burns; and demonstration burns (not necessarily in the Pine Bush) under carefully controlled conditions. Fire departments should be major participants in preparation of detailed wildfire contingency plans.

Figure 7. Application for restricted burning permit.

76-19-1 (4/85)

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

APPLICATION FOR RESTRICTED BURNING PERMIT

See form 76-11-3 for filing instructions and
form 70-00-2 for address of office where application may be filed.

R [ ][B] LOCATION [ ][ ][ ][ ][ ][ ] PERMIT NO. [ ][ ][ ][ ]

1. NAME OF APPLICANT

2. ADDRESS (Street)

3. CITY, TOWN, VILLAGE | COUNTY | STATE | ZIP CODE

4. PERSON SIGNING APPLICATION
1. ☐ Employee of Applicant 2. ☐ Applicant

5. DATE OF APPLICATION

6. NAME

7. TITLE

8. NAME OF PERSON SUPERVISING OPEN BURNING | 9. TELEPHONE

10. ADDRESS (Street)

11. CITY, TOWN, VILLAGE | COUNTY | STATE | ZIP CODE

12. TYPE OF RESTRICTED BURNING PROPOSED
1. ☐ Residential on-site 2. ☐ Land clearing
3. ☐ Agricultural (fire town or town in fire district
4. ☐ Designated burning area serving a county, city, town or village
5. ☐ Designated area for burning of toxic, explosive or dangerous materials
6. ☐ Other (Describe)

13. LOCATION OF OPEN FIRE

14. TYPE AND MATERIAL TO BE BURNED

15. METHOD OF STARTING FIRE (See conditions on reverse side)

16. REASONS FOR NECESSITATING BURNING OF MATERIAL

17. AMOUNT OF TIME REQUIRED FOR RESTRICTED OPEN BURNING AND EXPECTED COMPLETION DATE

18. EMERGENCY METHOD FOR EXTINGUISHING FIRE (Describe)

I AGREE TO ABIDE BY ALL CONDITIONS OF THE PERMIT. (See Reverse Side and Below)

DATE | APPLICANT'S SIGNATURE X | TITLE

AGENCY USE ONLY

19. RECOMMENDED ACTION
1. ☐ Approved 2. ☐ Disapproved

20. DATE

21. SIGNATURE X

PERMIT FOR RESTRICTED BURNING

(Issued pursuant to 6 NYCRR 191, 215 and the Environmental Conservation Law)

23. DATE ISSUED | 24. BURNING DATES PERMITTED | 25. SIGNATURE OF APPROVAL X | 26. TITLE

THE FOLLOWING CONDITIONS APPLY IN ADDITION TO THOSE SPECIFIED ON THE REVERSE SIDE:

CONDITIONS

1. Where local ordinances restrict open fires, the permit holder shall also obtain permission from local fire department or other local authority having jurisdiction.
2. Tires, fuel oil or similar materials which cause visible emissions shall not be used to ignite or sustain an open fire.
3. Tree trunks, stumps and roots shall not be burned.
4. A restricted open fire is allowed only when prevailing winds are away from populated areas. Fires shall not be started during heavy winds.
5. The permit holder shall not conduct open burning during any stage of an air pollution episode or when a period of high fire danger is announced by the State Commissioner of Environmental Conservation.
6. The permit holder shall notify the local fire department prior to burning and shall show this permit to any prson who requests to see it.
7. Rubbish piles to be ignited shall be isolated to prevent fire spreading.
8. No fire shall be unattended at any time or be left unattended until entirely extinguished.
9. The permit holder shall be liable for damage to trees or other property resulting from fires ignited by him.
10. Should it be necessary to extinguish any fire, the permit holder shall pay the entire cost of suppression.
11. This permit is non-transferable and may be suspended if the permit holder fails to comply with permit conditions.
12. Restricted burning shall not cause contravention of any applicable ambient air quality standard or cause air pollution.
13. This permit is valid only where the permit holder owns the site of open fire or where he has secured permission from the site owner. This permit authorizes no trespass on private property.

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

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INSTRUCTIONS
APPLICATIONS FOR RESTRICTED BURNING PERMITS

PROHIBITED - No open burning permitted.

Part 215 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR 215) prohibits:

1. Open burning of garbage, rubbish for salvage and refuse at refuse disposal areas. This includes refuse disposal areas serving towns, villages and cities. There are no exemptions.

2. On-site open burning of leaves and rubbish generated by residential activities in cities or villages; or in any town with a population exceeding 20,000. The governing body of a county, city or village; or town with a population greater than 20,000 may petition the Commissioner of Environmental Conservation to allow on-site burning of certain types of residence generated rubbish within their area of jurisdiction. Such burning, if permitted, shall be limited to rubbish consisting of paper, paper products, cartons, tree trimmings, leaves, or lawn and garden debris.

3. On-site open burning of rubbish generated by industrial or commercial activities. This applies to any open burning by any person on any site where such rubbish is generated except a site used exclusively as a residence. There are no exemptions.

RESTRICTED - Open burning by permit only.

A. Part 215 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR 215) restricts the following open burning. A permit is required for:

   1. Open burning of toxic, explosive or dangerous materials for which there is no other safe or economical methods of disposal.

   2. Open burning of rubbish generated by land clearing or demolition for the erection of a structure. If permitted, such open burning will be limited to a single location remote from any populated area.

   3. Open burning of some types of rubbish at a designated burning area serving a county, city, town or village. Rubbish which may be burned is limited to trees, tree trimmings, leaves and brush.

   4. Persons desiring to conduct restricted open burning on a continuing basis at a specified site using a forced air overfire unit may also apply for a permit. In such cases, a permit may be issued for a period not to exceed one year when there is no other practicable alternative method of rubbish disposal. On expiration and reapplication, the permit may be re-issued if past performance at that site has not resulted in air pollution or contravention of any ambient air quality standard.

(over)

B. The Environmental Conservation Law and Part 191 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR 191) restricts open burning of all types of rubbish, including agricultural, in Fire Towns and in certain towns within Fire Districts. See form 70-00-2 (page 1) for listings of such towns.

NO DEPARTMENT OF ENVIRONMENTAL CONSERVATION PERMIT REQUIRED

With the exception of Fire Towns and certain Towns within Fire Districts, no permit from the State Commissioner of Environmental Conservation is needed for on-site burning of rubbish generated by residential activities in towns with a population of 20,000 or less. Local ordinances may, however, prohibit or restrict such open burning.

APPLICATION PROCEDURES

Any person desiring to conduct restricted open burning, is required to have a "Permit for Restricted Burning" issued by the State Commissioner of Environmental Conservation. The applicant for a "Permit for Restricted Burning" is to complete items 1 through 18 of form 76-19-1, and sign and date the application. The applicant then detaches and retains the last copy of the application and submits the remaining copies, along with a plot plan if required (see section C below), as instructed below:

A. In Fire Towns and Certain Towns within Fire Districts. (See form 70-00-2)

A person may apply for a "Permit for Restricted Burning" by submitting application form 76-19-1 and a plot plan, if required, (see section C below) to a Forest Ranger. Applications may be obtained from the Forest Ranger in the area where restricted burning is to take place. See form 70-00-2 (page 1) for locations and phone numbers of Forest Rangers.

B. All Areas of the State Except Fire Towns and Certain Towns within Fire Districts.

A person may apply for a "Permit for Restricted Burning" by submitting application form 76-19-1 and a plot plan, if required, (see section C below), to the New York State field representative for the air pollution control program (open fires). Applications may be obtained from the field representative for the county in which restricted burning is to take place. See form 70-00-2 (page 2) for addresses of field representatives.

C. Applications Requiring Plot Plans.

Except for on-site burning of rubbish generated by residential activities conducted in Fire Towns and certain Towns within Fire Districts, with a population of 20,000 or less, each application shall consist of a form 76-19-1 (with the required copies), and an accompanying plot plan. The plot plan must show the location of the proposed burning site, the location of the nearest receptors, the distance from the burning site to the nearest receptors, and the direction of the prevailing wind.

State (DEC and OPRHP) firefighters who may be called upon to assist with prescribed burns or fight wildfires in the Pine Bush should be invited to participate in a program similar to the one described above for local fire departments.

Municipal law enforcement officers should be consulted about the best ways to handle curious onlookers, who may create problems on the day of a burn by driving to the preserve to watch. Municipal and state "managers" of travel corridors in the Pine Bush area should be contacted to inform them of the general plan to use fire in the Pine Bush and to ask for input on minimizing impacts of smoke on traffic safety and flow. Representatives of the New York State Thruway Authority, state police, local law enforcement and traffic control offices, Amtrak and Conrail, Capital District Transportation Authority, and Albany County Airport should be included. Procedures for warning motorists, particularly those on the Thruway, of the possibility of smoke in the Pine Bush area should be discussed.

State and local public health and air quality officials should be contacted to discuss smoke management concerns. Smoke is of particular concern to nursing home residents, young children, the elderly, and anyone with respiratory problems. Procedures for monitoring air quality before, during, and after a prescribed burn should be discussed.

State and municipal public information officers should receive an information packet describing prescribed burning and why it is being used in the Pine Bush. One or more meetings between public information officers and fire planners should occur to anticipate questions from the public and prepare answers. Public information officers may be able to function as primary contacts for representatives of the media and may have many good suggestions for providing information to reporters. On the day of a burn (especially the first several burns), preparations should be made to allow media representatives to be present. Public information specialists may be the best people to plan and oversee these arrangements.

9.2.1.2 Residents, neighbors, employers, and workers

Residents and neighbors of the preserve must have confidence that their properties will not be threatened nor their day-to-day lives inconvenienced by prescribed burning on the preserve. An educational brochure, defining prescribed burning and describing its use in the Pine Bush, would be a useful handout. This could be mailed, but a door-to-door effort would permit a dialogue, which would help fire planners get a better understanding of issues of concern to residents. A series of public information meetings with slides and/or video presentations of other prescribed burns, demonstrations of equipment used, and opportunities to ask questions of fire planners would be

week before any burn is anticipated to occur. At this time, people should know the general location(s) of the unit(s) to be burned and any possible inconveniences that may occur as a result of the burning (smoke, traffic rerouting or slowdown, etc.). Fire departments should be prepared to fulfill whatever role they have agreed to play in the burn plan. Emergency hotline operators should be notified so they will not respond inappropriately to reports of smoke or fire in the preserve. Road and traffic managers should be prepared to warn drivers of possible smoke and slowdowns in the Pine Bush area.

The media, primarily television and radio, will be asked to play a major role in informing the public of exactly when prescribed fires are occurring, keeping them apprised of any inconveniences associated with the burning, and advising them to avoid the area if possible. A potential problem with this intensive media reporting is that many people may want to come to watch the burning, creating serious traffic congestion and crowd management problems. Plans to handle curious onlookers must be made in advance with local law enforcement officers.

Representatives of the media may want to be present at the burn to get photographs and video coverage. An area for reporters and journalists should be set aside and attended by a public information specialist throughout the burn. The fire planner or crew boss should be available to media representatives between burns and/or at the end of each day.

appropriate. Smoke management should be specifically addressed to assure people that minimizing smoke and directing it away from residences, nursing homes, and roads is a part of the plan. Another point to emphasize is that one of the most effective ways to reduce the chances of property damage and inconvenience from wildfires is to have a properly planned and executed prescribed burning program. Of course, the most effective way to gain people's trust is to invite them to watch a demonstration burn.

Many people work in offices and other commercial and industrial facilities in and around the Pine Bush. Property owners, employers, and workers must be assured that their lands, buildings, vehicles, other facilities, and day-to-day operations will not be threatened by prescribed burning in the preserve. An educational brochure similar to the one described above could be made available to all employers and workers. Personal contact should be made with owners and/or managers of "hazardous" facilities (tank farms, city landfill, etc.) to make them aware of special measures to protect their facilities from fire and/or smoke. A series of before-work, lunchtime, and after-work presentations and "field walks" could be offered.

Restaurants, churches, schools, health clubs, and community centers may have "users" who don't live anywhere near the Pine Bush. Educational brochures should be supplied to these businesses and facilities to be made available to their members and users. Programs similar to those suggested for office workers should be offered.

It would be useful to compile information on how many housing units surround the preserve, how many individuals reside in those units, how they feel about prescribed burning in the Pine Bush, and what specific concerns they have about burning and management of the preserve in general. Similar information about places of employment, including identification of employers, numbers of workers, etc., would also be useful. A certain amount of this information could be compiled from existing records, but door-to-door interviews would probably be the most effective way to get complete information.

9.2.1.3 Media representatives

A list of media contacts and a series of press releases and informative packets should be prepared. Media representatives should be invited to public information meetings and demonstration burns.

9.2.2 Notification before a prescribed burn

All of the above groups should be notified again about one

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ALBANY PINE BUSH FIRE MANAGEMENT PLAN
Report to the Albany Pine Bush Commission

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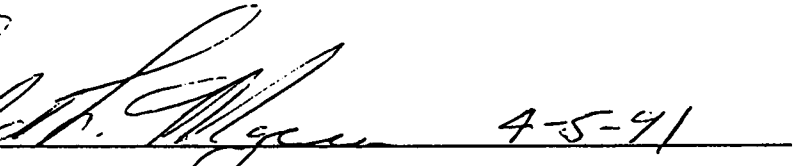
Approved by:  4-5-91

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