

South Florida Everglades Research Center

Report T-663 Summary of Fires in Everglades National Park and Big Cypress National Preserve, 1980



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and Big Cypress National Preserve, 1980

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INTRODUCTION

Everglades National Park and Big Cypress National Preserve have a high fire incidence where 50% of all acreage burned within the entire National Park Service system occur. Because of the high fire frequency, and because fire records are about the only tool for fire history work (Taylor 1980a), a fire records system has been developed which includes an annual fire summary (Taylor 1981a). This paper is the third annual fire summary.

Fire statistics for Everglades National Park and for Big Cypress National Preserve are presented for the 1980 calendar year (Appendix I and II). The 1980 fire season is the second full year of Service responsibility for Big Cypress Preserve, and the 33rd year for Everglades National Park. Everglades Park fire records from 1948-1979 are included in Taylor (1981b). These records combined with this report and the 1978 and 1979 summaries include all records to date for both parks.

EVERGLADES NATIONAL PARK

The fire year

Precipitation at Royal Palm Ranger Station and water levels at Taylor Slough Bridge are used as relative indicators for fire conditions during the year (Table 1). Precipitation was 14.97 inches above the mean for year, and water levels were higher than the mean for each month data are available. Accordingly, number of fires and acres burned should have been about average or below average. Approximately 96% as many acres burned as compared to the 1948-1980 average, but 123% more fires occurred (Table 2). The higher number of fires was due to increased surveillance for lightning strikes (see lightning-caused fires).

Taylor (1981b) has shown that water levels and precipitation are correlated with number of man-caused fires. By applying 1980 data to his graph which predicts number of man-caused fires, 1980 water-levels predicted 4 fires would occur while precipitation data predicted 9 fires would occur. Six man-caused fires were recorded for 1980.

Lightning strikes

The 1980 fire total was 123% greater in number than the average for the 33 year period of record (Table 2). This increase would indicate excellent burning conditions occurred during the year. As noted above, this was not the case, and the entire increase is attributable to an overall increase of 300% in the number of lightning-caused fires. This increase is possibly a result of recently instituted observation flights for detecting lightning-caused fires, and reporting procedures.

Knowledge of the number of lightning-caused fires and the monthly distribution of strikes is important in efforts to restore natural fire to the ecosystem during the appropriate time of the year. Information available from fire records show that the number of lightning-caused fires recorded each year is directly proportional to the effort spent in finding the fires (Taylor 1981b). Because of this factor, an experimental design was developed for monitoring lightning strikes for a three year period by observation flights (Taylor memorandum N-2219 to Chief Ranger, October 29, 1979). It is postulated that if the number of lightning-caused fires is fairly constant over the three year period, estimates of total lightning fires becomes possible. This 1980 report includes data from the first of the three year concentrated effort to locate and report all lightning strike fires in Everglades Park. The six fires found on these flights are indicated by an asterisk in Appendix I.

Seven lightning-caused fires burned 100 or more acres. Two of these fires (8016 and 8046) each burned 1000 or more acres. Average size of 1980 lightning-caused fire was 127 acres compared to 430 acres for the period of record.

Prescribed fire

More prescribed fires were set and more acres were burned by prescribed fire than occurred on the average (Table 2). Increase in number was due to burning in the Hole-in-the-Donut (4 fires, 31%). Higher acreage than average burned due to three boundary burns (8002, 8006, and 8045) that accounted for 7389 acres (79% of prescribed fire acreage). In previous years, approximately one-half the annual total number of fires consisted of prescribed burns in Management Unit 3 (pinelands shown in Fig. 1). However, during 1980, only 5 of 48 fires (10%) occurred there. The decreased percentage is due to more lightning strikes being reported elsewhere and increased burning in prairies and the Hole-in-the-Donut. The November burn in Pine Block A (No. 8048) was postponed until summer because Schinus fruits were ripening, and prescribed fires may assist in the spread of this exotic. Taylor (1980b) shows the relationship of Schinus fruiting and potential to spread following prescribed fire is probably less during the summer than at other times of the year.

The Everglades prescribed fire program shifted toward a new goal in 1980 when the program was directed towards an increase in wet season (June through September) prescribed burns to match historic fire season, and to reduce potential for Schinus spread. Wet season burns included pine blocks T (8030), Q (8031) (Fig. 12), and E (8045) (Fig. 13), which were started on August 7 and 8 and September 18 respectively. Backing fires were used.

The Block T burn was successful in reducing hardwoods, but the Block Q burn left large areas of dense hardwoods that were not killed, and additional reclamation will be required to remove them.

The Block E burn was probably the first significant example of a wet season pineland prescribed management fire. The fire burned 1,031 acres in six days. Each night the fire would go out in most areas, apparently due to high relative

humidity. Generally, by mid-afternoon, smoke columns would build again as small spots that smoldered during the night re-ignited the fuels. Needle scorch occurred in isolated areas when wind shifts occurred and pine boles were singed in excess of 3 meters, but these conditions occurred infrequently. Variable local weather patterns, accompanied by temporary wind shifts would cause the fire behavior to be unpredictable, but usually for only a few minutes at a time before normal patterns would occur again. Occasional rains, variability of burning conditions, and the slow moving backing fire, resulted in the burn taking six days to complete. Top-kill of hardwood shrubs was considered to be excellent.

Wet season burning will probably result in some changes in mechanics of burning. Less accurate fire behavior predictions due to localized storms may occur and if backing fires are used as the burning method (rather than head fires), longer burning times will be required.

Stagnation index

Everglades National Park has a mutual air quality agreement with Dade County. The agreement is tied to the stagnation index, an indicator of air mixing and movement. The following is the guide to stagnation conditions in relation to allowable burning, used by the Florida Division of Forestry (pers. comm. Stan Withrow, 1982):

- 0-6 - burning allowed
- 7-8 - marginal conditions
- 9-15 - no open burning

Everglades National Park has agreed not to burn when the stagnation index exceeds 9. During the summer wet season of 1980, approximately 4 of 5 days were in the no-burn category. It appears the stagnation index is higher in summer than during winter and some evaluation of the stagnation index parameters will need to be made before the wet season burn program is expanded.

Muhlenbergia research fires

This was the second year for the long-term study of fire effects on Muhlenbergia prairies (Taylor 1980b). Attempts were made to burn a one year rough in the February and July annual burn plots (Fire No. 8004 and 8024). The December plot was not burned until January 8, 1981, consequently it will be discussed in the 1981 Fire Summary.

No fire would carry in the one year rough of either plot, and no significant area could be burned. It was even difficult to see where drip torches had been used to try to burn fuels.

Hole-in-the-Donut

Attempts to burn Hole-in-the-Donut lands began in November 1971 (See Taylor 1981b, p. 107 for a list of previous fires). Many of the previous burns were not

considered successful because fire would not carry well. Strip head-fires were most often used.

During 1980, backing fires were used as the burning technique, and approximately 3600 acres of a total of 5,000 acres were burned (Fig. 2 and 3). Hardwood kill (the object of the burns) was dramatic in areas where fine fuels were present. Para grass (Brachiaria mutica) was the major fuel.

The apparent difference between 1980 burning conditions and previous fires was the burning technique. Strip head fires would go out when they hit hardwoods, but backing fires would slowly burn around in the hardwood understory, consuming fine fuels and top-killing hardwood stems.

Several test plots were set up in the Donut to test effectiveness of burning in relation to fine fuel expansion and hardwood kill. These plots will be monitored annually.

BIG CYPRESS NATIONAL PRESERVE

During the second year of National Park Service operation of the Big Cypress Preserve, fire suppression was a main resource management activity. The Fire Management Plan was awaiting final approval, and until a plan is approved, all fires must be suppressed (NPS Fire Management Guideline, Policy 18, Chapter 2, p. 2, 1978).

Monthly totals for acres burned and for numbers of fires were higher during seven months but lower during five months of 1980 compared to 1979 (Table 3). Thirty-nine percent more fires occurred and 13% more acreage burned during 1980 than occurred the previous year. With the larger number of fires, suppression costs increased over 1979 by 41% (Table 3). Forty-six percent of all fires and 61% of all acreage burned occurred during November and December when "hunting season" fires were set. Fires are set during this season to attract deer to an area, to clear areas for hunting, and to clear fuel from around cabins. Because water levels were near or above normal at Bridge 105, little resource damage was sustained (Table 1).

Even though water levels were relatively high, precipitation at the Tamiami Ranger Station, located on U.S. 41 at the eastern edge of the Preserve, was low for the latter half of 1980 (Table 1). The lack of rainfall undoubtedly influenced the number of fires, but high water levels prevented resource damage.

Fire cause

Man-caused fires accounted for a minimum of 75% of all fires (Table 4). Unknown cause of fire and false alarms (where smoke was reported but no fire could be found) accounted for 12% of all fires but only 2% of acreage burned. Even though pasture burning permit fires accounted for only 5% of all fires, they accounted for 18% of all acreage burned. All pasture burns occurred north of U.S. 84 (Fig. 4, 5, 6, 7). Pasture burns have occurred during January, February, March, October, and December (Table 3).

Lightning-caused fires occurred during June, July and August, and they have previously been recorded during May (1979). Lightning-caused fires accounted for only 2% of all recorded fires, 1% of acres burned, and 3% of all suppression cost (Table 4).

Research burns were begun during 1980. Nine fires were set that burned 705 acres and cost \$10.05 per acre.

Location of fires

Approximate location of all known fires is shown on Figure 4. Most fires are distributed in three locations: along roads, in the interior north of U.S. 41, and north of U.S. 84. Fires are set along roadsides during all months of the year (Figs. 4, 5, 6, 7). Almost all fires set during the summer wet season (June-October) are set along roadsides with almost no fires occurring in the interior (Fig. 5). Fires set during March, April and May are primarily set along roadsides, but some do occur in the interior of the Preserve (Fig. 6). However, almost all fires in the interior during this season were set during the first two weeks of March which coincides with the closing of the turkey hunting season.

Fires set during November, December, January and February, the typical hunting season, are primarily in the interior of the Preserve but a few also occur along roadsides (Fig. 7).

Pasture permit fires are set only in the area north of U.S. 84 (Fig. 5, 6, 7). Most pasture permit fires are set from November through February (Fig. 7) with an occasional permit fire being set from March through May (Fig. 6) or from June through October (Fig. 5). Over the past 2 years only two fires other than pasture permit fires, have occurred north of U.S. 84.

The area south of U.S. 41 has had relatively few fires during the past two years (Fig. 5, 6, 7). Considerable fuel build-up is occurring over most of the area south of and west of the Loop Road, and within the Loop Road.

Fire season

Weather, water levels, and visitor use activities have resulted in a designation of three "fire seasons" within the Preserve.

Wet-season

Wet-season is defined as occurring from June through October. During these months, 71% of the rainfall occurs, water levels are increasing to the highest yearly levels, lightning fires normally occur, and Preserve visitation is usually the lowest for the year. This is the season when fewest fires occur and lowest acreage is burned (Table 7). No fires of over 1000 acres have occurred during this period. Most fires are benign and have little environmental impact.

Hunting season

Hunting season begins in early November and extends into January, with a turkey season in early March. Water levels decline to the soil surface or below during this season. Most people who use the Preserve feel fires should be allowed from September through February when water is left in strands, or as soon as the water level reaches the top of the soil of the area to be burned (Taylor 1980c). A traditional way of life has been to burn for hunting purposes or to burn around cabins during these months.

The largest number of fires occur during this season, but with almost all fires remaining under 1000 acres in size (Table 7). Most fires are relatively benign and have little impact, except possibly on dwarf cypress prairies where considerable impact may be sustained by the dwarf cypress trees.

Dry season

Dry season fires begin as early as March (and in some exceptional years may begin during February) and continue until the summer wet season begins, usually in mid to late May (or in exceptional years in June). The "dry season" is when the second highest number of fires occur, and when large fires are most common (Table 7). Water levels are below the soil surface, little rainfall traditionally occurs, and severe environmental impact due to soil fires is common.

Fuel type burned

Previous work has identified pinelands, cypress prairies, and prairies as where nearly 100% of all 1979 fires occurred (Taylor 1980b). This condition persisted into 1980 as shown by less than 4% of "other" vegetation types having been burned (Table 5). Prairies were most frequently burned (44%) followed by pinelands (30%) and cypress prairies (22%) (Table 5). As occurred during 1977, most acreage of all types burned during March and December. One major change was the large acreage of prairies that burned during June 1980 (Table 5).

Research fires

Because of high fire frequency in Big Cypress, and the fact most fires occur outside the "wet season" when historic fires must have occurred, a prescribed research fire program has been started. The program is to set basic fire management parameters. The first prescribed research fires were set during 1980.

Our previous research identified cypress prairies, prairies and pinelands as vegetation types where fires burn frequently, often on an annual basis. Prescribed research fires are to be set in these three vegetation types. Other plant communities are potentially destroyed by fire, or else fire plays a non-significant role (Table 6).

Research study sites

Study sites have been selected as follows:

prairies. Copeland Prairie near Deep Lake Strand, T51 S, 30 E, Sections 25-28.

pinelands. North of the Dade County Jetport Training Facility at the end of the existing Eleven Mile road T51 S, R 34 E, Sections 3 and 4.

cypress prairie. North of U.S. 41 and west of the Eleven Mile road, T53 S, R 34 E, Section 6,7,18, and T53S, R 33 E, Sections 1 and 12.

Location of the study sites is shown on Fig. 8.

Twenty-three study plots, each 400 x 500 m in size, were established (Fig. 9, 10 and 11). Prairie study plots P1 and P2 were burned by arson fire, consequently sites P1 and P2 were relocated. Study plots are to be burned at one and three year intervals to measure the impact of fire frequency upon species and fuel levels. Longer intervals between fires are impractical at this time because it will be nearly impossible to protect the study plots from arson fire.

Season for research fires

Fires will be set at three different hydrologic seasons of the year:

Wet season. July, August, and September is when water levels are usually highest (Table 1). Convective thunderstorms, which occur on an almost daily basis, are accompanied by lightning which could set fires. Historically, fires may have been most frequent during this time period.

Declining water season. October, November, and December are months when water levels usually drop and conditions are normally drier than during the summer "wet season" (Table 1). The fall hunting season starts during this time period.

Early dry season. January, February and early March are months when water levels drop and approach the lowest levels of the year. Only April and May have potential for having lower water levels. Drought conditions can be extreme during these months.

A fourth season, the late dry season, exists when extremely severe fires could occur resulting in extreme fire effects. Prescribed fires will be difficult to control during these months and should be avoided until considerable experience is gained with prescribed burning.

Conditions for research fires

Conditions are to be extremely general, covering season of the year, and water levels at Bridge 105. The following guide will be used:

Season	Months	Bridge 105 (ft msl)
Wet Season	July-September	8.0
Declining Water	October-December	7.5 - 7.0
Early Dry Season	January-March	7.2 - 6.8

At the beginning of 1980, water levels at Bridge 105 were above normal (Table 1), resulting in a delay of prescribed burns in the early dry season. By the wet season, water levels were approaching more normal circumstances and the following burns were completed.

Date	Fire Report Number	Water Level		Plot	Acres Burned
		Desired	Actual		
July 24	80060	8.0	7.8*	Prairie P3, P4	100
August 14	80065	8.0	8.0*	Pineland T3	40
August 14	80066	8.0	8.0*	Pineland T4	100
August 15	80067	8.0	8.0*	Cypress Prairie C3, C4	100
November 4	80076	7.5-7.0	8.0 ¹	Prairie P5	50
November 4	80077	7.5-7.0	8.0 ¹	Prairie P6	50
December 10	800131	7.5-7.0	7.9 ²	Pineland T5	70
December 10	800132	7.5-7.0	7.9 ²	Pineland T6	135
December 11	800133	7.5-7.0	7.9 ²	Cypress Prairie C5, C6	60

*USDI - Geological Survey Provisional Data, Bridge 105

¹8.0 Reading on December 2

²December 11, 1981 Manual reading

Fuel consumption was complete in all prairies and pineland burns. Rates of spread in November prairie burns ranged from .08 to .11 m/sec. Burns in cypress prairie were difficult to complete, and fuel consumption was usually low, especially in areas with standing water. Rain fell at 1400 hours during fire 80065 (cypress prairie), but by 1500 hours the fire was re-started and in areas where fuel was

present, flames were 7 feet high and a satisfactory burn resulted. Prairies and pinelands will burn during any time of the year. Rain shower effect on fine fuel and burning conditions is short-lived even in the summer wet season.

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Table 1. Rainfall and water levels indicative of conditions in Big Cypress National Preserve and Everglades National Park

Location		<u>Mean Rainfall</u>												
		<u>Month</u>												
		J	F	M	A	M	J	J	A	S	O	N	D	Total
Tamiami	Mean	1.52	1.48	1.80	2.33	5.96	9.25	8.20	7.50	8.91	5.54	1.50	1.17	55.16
	1980	2.89	0.79	1.38	9.19	5.22	4.14	2.46	5.42	2.21	0.55	3.93	0.49	38.87
	Departure	+1.37	-0.69	-0.22	+6.86	-0.74	-5.11	-5.74	-2.08	-6.7	-4.99	+2.43	-0.68	-16.29
Royal Palm Ranger Station	Mean	1.61	1.86	1.52	2.54	6.63	10.24	7.02	7.78	8.91	6.38	2.16	1.39	58.04
	1980	2.86	1.35	1.29	4.33	5.04	14.70	12.36	9.25	8.81	4.34	7.34	1.34	73.01
	Departure	+1.25	-0.51	-0.23	+1.79	-1.59	+4.46	+5.34	+1.47	-0.1	-2.04	+5.18	-0.05	+14.97
		<u>Mean Water Level</u>												
Bridge 105	Mean	7.37	7.11	6.69	5.95	6.00	7.52	8.18	8.19	8.32	8.27	7.90	7.57	
	1980	7.86	7.84	7.75	7.98	7.78	7.77	7.83	7.97	8.46	*	*	7.9	
	Departure	+0.49	+0.73	+1.06	+2.03	+1.78	+0.25	-0.35	-0.22	+0.14	-	-	+0.33	
Taylor Slough Bridge	Mean	2.05	1.83	1.33	0.75	1.11	2.89	3.37	3.18	3.70	3.65	3.08	2.37	
	1980	2.49	2.62	2.37	2.26	1.97	3.38	3.55	3.51	4.05	*	*	*	
	Departure	+0.44	+0.79	+1.04	+1.51	+0.86	+0.49	+0.18	+0.33	+0.35	-	-	-	

* Data not available

Table 2. 1980 Fire Statistics for Everglades National Park compared to 33 year average.

	CAUSE														
	<u>Man</u>			<u>Lightning</u>			<u>Prescribed</u>			<u>Research</u>			<u>Total</u>		
	No.	Acres	Cost	No.	Acres	Cost	No.	Acres	Cost	No.	Acres	Cost	No.	Acres	Cost
JAN	-	-	\$ -	-	-	\$ -	1	143	\$ 917	-	-	\$ -	1	143	\$ 917
FEB	-	-	-	-	-	-	2	3,423	2,966	-	-	-	2	3,423	2,966
MAR	3	508	17,500	-	-	-	2	3,002	730	1	1	25	6	3,511	18,255
APR	-	-	-	1	135	475	1	310	1,156	-	-	-	2	445	1,631
MAY	-	-	-	-	-	-	3	831	3,287	-	-	-	3	831	3,287
JUN	-	-	-	3	1,515	628	-	-	-	-	-	-	3	1,515	628
JUL	-	-	-	6	205	194	-	-	-	1	1	15	7	206	209
AUG	2	7	72	14	275	1,527	2	42	474	1	3	752	19	327	2,825
SEP	-	-	-	2	1,196	637	1	1,031	2,930	-	-	-	3	2,227	3,567
OCT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NOV	1	268	358	-	-	-	1	606	7,368	-	-	-	2	874	7,726
DEC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTALS:	6	783	\$17,930	26	3,326	\$3,461	13	9,388	\$19,828	3	5	\$792	48	13,502	\$42,011
1980 AVERAGE		130.5	\$2,988		127	\$ 133		722	\$ 1,515		1.6	\$264		281	\$ 875
1948-1980 Average ^a	7.6	8,527	-	6.5	2,564	-	7.8	4,285 ^b	-	0.3	55	-	21.5	14,078	-
1980 COST/ACRE			\$22.89			\$ 1.04			\$ 2.11			\$158.40			\$ 3.11

^aTaylor 1981

^bPrescribed fires have occurred since 1958

Table 3. Number of fires and acres burned each month. Big Cypress National Preserve - 1979 and 1980.

<u>Month</u>	<u>Year</u>	<u>1979 - 1980 Compared</u>									
		<u>Number Fires</u>	<u>Acres Burned</u>	<u>Average Size</u>	<u>Pasture No.</u>	<u>Burns Acres</u>	<u>No.</u>	<u>Research Acres</u>	<u>Cost</u>	<u>\$ Cost</u>	<u>% on Sunday</u>
January	1979	15	4,227	282	6	2,642	-	-	-	0*	80
	1980	4	257	64	0	0	0	-	-	1,154	0
* Cost was not assessed during January, 1979.											
February	1979	8	736	92	0	0	-	-	-	1,228	20
	1980	3	546	182	1	320	0	-	-	62	0
March	1979	20	9,236	462	0	0	-	-	-	16,194	25
	1980	30	8,967	300	1	2,500	0	-	-	6,599	20
April	1979	6	5,801	967	0	0	-	-	-	4,575	17
	1980	2	445	223	0	0	0	-	-	1,210	0
May	1979	6	183	31	0	0	-	-	-	339	0
	1980	3	340	113	0	0	0	-	-	412	0
June	1979	1	4	4	0	0	-	-	-	29	0
	1980	6	3,905	651	0	0	0	-	-	8,256	0
July	1979	2	130	65	0	0	-	-	-	232	100
	1980	6	1,265	211	0	0	1	100	992	5,361	0

<u>Month</u>	<u>Year</u>	<u>Number Fires</u>	<u>Acres Burned</u>	<u>Average Size</u>	<u>Pasture No.</u>	<u>Burns Acres</u>	<u>No.</u>	<u>Research Acres</u>	<u>Cost</u>	<u>\$ Cost</u>	<u>% on Sunday</u>	
August	1979		-----no fires recorded-----									
	1980	5	405	81	0	0	3	240	4,360	5,404	50	
September	1979		-----no fires recorded-----									
	1980		-----no fires recorded-----									
October	1979	3	28	9	-	-	-	-	-	0	0	
	1980	5	781	156	1	500	0	-	-	1,535	0	
November	1979	9	1,067	119	0	0	-	-	-	2,268	44	
	1980	34	1,127	33	0	0	2	100	1,070	4,953	23	
December	1979	14	2,728	195	0	0	-	-	-	3,511	57	
	1980	40	9,868	245	5	1,920	3	265	661	13,367	17	
Totals	1979	84	24,140	287	6	2,642	0	0	0	28,376	41	
	1980	138	27,906	202	8	5,240	9	705	7,083	48,273	14	
Average/year		111	26,023		8	4,421	-	-	-	38,325	23	

Table 4. Percentage for kinds of fires, acres burned, and cost for suppression of fires in Big Cypress National Preserve.

	<u>Man Caused</u>			<u>Pasture Burns</u>			<u>Research Burns</u>			<u>Lightning Fires</u>			<u>False Alarms Unknown Cause</u>		
	No. (%)	Acres (%)	Cost (%)	No. (%)	Acres (%)	Cost (%)	No. (%)	Acres (%)	Cost (%)	No. (%)	Acres (%)	Cost (%)	No. (%)	Acres (%)	Cost (%)
January	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0
February	0	0	0	33	59	0	0	0	0	0	0	0	66	41	100
March	88	72	98	3	28	0	0	0	0	0	0	0	9	0	2
April	33	94	71	0	0	0	0	0	0	0	0	0	66	6	29
May	33	4	27	0	0	0	0	0	0	0	0	0	66	96	73
June	71	96	94	0	0	0	0	0	0	14	4	5	14	0	1
July	67	90	72	0	0	0	17	8	19	17	2	9	0	0	0
August	20	28	13	0	0	0	60	59	81	20	12	6	0	0	0
September	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	57	36	98	14	64	0	0	0	0	0	0	0	29	0	2
November	86	91	78	0	0	0	5	9	22	0	0	0	8	0	0
December	80	77	95	13	20	0	8	3	5	0	0	0	0	0	0
Averages	75	76	81	5	18	0	6	3	15	2	1	3	12	2	1

Table 5. Acres burned by month and vegetation type, 1980

	Acres	Cypress Prairies	Pinelands	Prairie	Other
Januray	257	180	57	21	0
February	546	3	543	0	0
March	8965	2939	3608	1791	628
April	445	132	19	273	21
May	340	79	44	217	1
June	3905	126	1403	2377	0
July	1266	18	47	1150	50
August	405	100	168	137	0
September	0	0	0	0	0
October	780	255	175	225	125
November	1127	256	383	490	0
December	9928	2082	1905	5664	279
Total	27964	6170	8352	12345	1104
%		22%	30%	44%	4%

Table 6. Vegetation types within the Big Cypress Preserve (McPherson, 1973). The cypress forest has been subdivided into three units and apparent fire requirements/effects on each community have been added by this author.

<u>Vegetation Type</u>	<u>Acres</u>	<u>Fire Requirements/Effects</u>
1. Cypress forest	249,000	
a. cypress strands		destroyed by fire during drought
b. cypress domes		destroyed by fire during drought
c. cypress prairie		burned frequently by man, (almost annually). Affected adversely by fire during dry seasons.
2. Prairies	137,600	burned almost annually
3. Pine forest	102,400	burned almost annually, probably adversely affected by fire during the dry season
4. Mixed swamp forest	37,120	potentially destroyed by fires
5. Inland marsh	23,680	potentially destroyed by fire, especially during drought conditions
6. Hammock forest	9,600	potentially destroyed by fire
7. Coastal forest	7,680	unknown, fires are rare
8. Coastal marsh	5,120	fire occurs naturally, but forest is a more important influence
9. Agricultural/disturbed	3,200	fire may be required to control exotic plants/may carry fire annually.

Table 7. Number of fires (exclusive of pasture permits and research fires) by fire season in 1979 and 1980, Big Cypress National Preserve

Month	Number of Fires by Acreage				Total
	1-10	11-100	101-1,000	1,000	
"Dry Season"					
March	13	17	15	5	
April	1	3	2	2	
May	4	4	1	0	
Totals	18	24	18	7	67
"Wet Season"					
June	1	2	2	0	
July	0	4	4	0	
August	0	1	1	0	
September	0	0	0	0	
October	3	3	1	0	
Totals	4	10	8	0	22
"Hunting Season"					
November	12	27	3	0	
December	4	27	19	2	
January	3	6	4	0	
February	2	2	4	0	
Totals	21	62	30	2	115
Grand Total	43	96	56	9	204

Appendix I. Individual fires for Everglades National Park, 1980.

Fire Number	Location (R-R-S)	Cause	Fire Mgt Unit	Acres	Cost(\$)	Date	Remarks
<u>January</u>							
8001-c	36E,58S,18,19	Res Mgt burn	2	143	\$ 917.12	1-11	Hardwood control
<u>February</u>							
8002-c	34E,56S,4,4,7,8	Res Mgt burn	2	3,370	1,640.00	2-7	Reduce fuel build-up
8003-c	37E,58S,15	Res Mgt burn	2	53	1,325.85	2-27	Reduce fuel build-up
<u>March</u>							
8004-d	37E,58S,3,4	Research	2	0	25.29	3-7	Prairie study
8005-c	36E,58S,16	Res Mgt burn	2	14	338.07	3-12	Hardwood control
8006-c	37E,59S,10	Res Mgt burn	2	2,988	391.96	3-15	Southeast boundary
8007-a	37E,59S,31	Man	2b	11	722.18	3-29	Incendiary
8008-a	37E,58S,12	Man	2b	516	16,766.32	3-29	Incendiary
8009-a	36E,57S,9	Man	2	1	12.00	3-29	Incendiary
<u>April</u>							
8010-b	37E,59S,19	Lightning	2	135	475.00	4-10	Madeira Slough
8011-c	36E,58s,36	Res Mgt burn	2	310	1,156.00	4-25	Donut-9
<u>May</u>							
8012-c	37E,58S,17	Res Mgt burn	2	38	478.00	5-6	Donut-6
8013-c	37E,58S,18	Res Mgt burn	2	551	1,102.61	5-12	Donut-4
8014-c	37E,58S,19	Res Mgt burn	2b	242	1,707.17	5-19	Donut-7,8

Fire Number	Location (R-R-S)	Cause	Fire Mgt Unit	Acres	Cost(\$)	Date	Remarks
<u>June</u>							
8015-c	31E,56S,24	Lightning	1	8	55.00	6-19	Lostman's River
8016-b	37E,57S,35	Lightning	2b	1,270	518.22	6-23	Pumpside
8017-b	33E,56S,29	Lightning	1	237	55.00	6-28	Rogers Creek
<u>July</u>							
8018-b	35E,57S,29	Lightning	2	138	48.26	7-3	Rookery Branch
8019-b	35E,58S,25	Lightning	3	10	62.50	7-7	Sisal Pond
8020-b	35E,58S,3	Lightning	2	4	40.32	7-9	South Reef
8021-b	37E,59S,8	Lightning	2	43	31.34	7-8	Madeira Ditch
8022-b	36E,59S,20	Lightning	2	5	5.53	7-21	Ingtwin I
8023-b	36E,59S,20	Lightning	2	5	5.53	7-21	Ingtwin II
8024-c	37E,57S,31,32	Research	2b	1	15.00	7-31	Prairie study
<u>August</u>							
8025-b	37E,57S,22	Lightning	2b	68	387.90	8-1	East 5 mile
8026-b	35E,56S,21	Lightning	2b	4	200.00	8-2	Shark Slough
8027-b	35E,56S,29	Lightning	2	3	200.00	8-2	Cane Mill
8028-b	35E,56S,29	Lightning	2	3	200.00	8-2	East Shark Slough
8029-b	36E,58S,23	Lightning	3	7	46.11	8-2	Double E
8030-c	37E,58S,13,14	Res Mgt burn	3	22	166.66	8-7	Block T
8031-c	37E,58S,13,14	Res Mgt burn	3	20	292.27	8-7	Block Q
*8032-b	36E,60S,16	Lightning	1	4	50.00	8-7	Coastal Marsh, 7-Mile Lake
8033-d	37E,58S,9	Research	3	3	752.00	8-8	Effects on soil nutrients
*8035-b	32E,56S,7	Lightning	1	152	50.00	8-14	Old Onion
*8036-b	35E,55S,17	Lightning	2	3	50.00	8-14	E Slough #1
*8037-b	35E,55S,17	Lightning	2	1	50.00	8-14	E Slough #2

Fire Number	Location (R-R-S)	Cause	Fire Mgt Unit	Acres	Cost(\$)	Date	Remarks
*8038-b	35E,55S,15	Lightning	2	1	50.00	8-14	Eagle Eye
8039-e	37E,58S,31	Miscellaneous	2b	1	15.00	8-22	Unknown
8040-b	36E,58S,19	Lightning	3	19	50.00	8-23	Sisal Pond#2
8041-b	36E,58S,13	Lightning	3	6	72.00	8-25	Ingraham
8042-e	31E,60S,11	Miscellaneous	1	6	72.00	8-25	NW Cape, Coastal Marsh
8043-b	36E,58S,34	Lightning	3	2	72.00	8-25	Atoll Hammock
<u>September</u>							
8044-b	31E,55S,36	Lightning	1	106	110.00	9-10	Onion Creek
8045-c	36E,58S,23,25	Res Mgt burn	3	1,031	2,930.00	9-18	Block E
8046-b	31E,55S,36	Lightning	1	1,090	527.00	9-20	Two Island
<u>October</u>							
No Fires Recorded							
<u>November</u>							
8047-a	31E,60S,11	Miscellaneous	1	268	358.00	11-2	Unknown
8048-c	58E,36S,21-23; 26-28	Res Mgt burn	3	606	7,229.00	11-6	Block A
<u>December</u>							
No Fires Recorded							

* Denotes lightning-caused fires discovered on flights.

Appendix II. Individual fires for Big Cypress Preserve, 1980

<u>Fire Number</u>	<u>Date</u>	<u>Origin</u>	<u>Cause</u>	<u>Acres Burned</u>	<u>\$ Cost</u>	<u>Day of Week</u>
January						
W0001	1-7	52S-30E-22	Man	7	150	Mon
W0002	1-10	53S-33E-14	Man	15	218	Thu
80003A	1-22	53S-32E-1	Man	225	469	Tues
80004A	1-31	52S-31E-6	Man	<u>10</u>	<u>317</u>	Thu
<u>Totals:</u> 4 fires; 257 acres burned, cost = \$1,154						
February						
8005C	2-6	T49S-R30E-S15	Pasture permit	320	0	Wed
8006A	2-14	T52S-34E-S4	unknown	66	0	*
8007A	2-21	T51S-R32E-S19	Unknown	160	0	Thu
8008F.A	2-28	False Alarm			18	-
8009F.A	2-29	False alarm			37	-
8010F.A	2-28	False alarm			7	-
<u>Totals:</u> 6 fire reports; 3 fires; 1 permit burn; 3 false alarms; 546 acres burned cost = \$62.00. No cost was assigned to 5, 6, and 7.						
*Out when discovered.						
March						
80011A	3-03	T55S-R32E-S1	Man	760	1,347	Mon
80012A	3-04	T52S-R30E-S32	Man	1	0	Tue
80013C	3-04	T49S-R31E-S35	Pasture permit	960	0	Tue
80014A	3-05	T53S-R31E-S11	Man	5	38	Wed
80015A	3-09	T50S-R30E-S25	Man	680	700	Sun
80016FA	False Alarm				32	
80017A	3-11	T50S-R30E-S21	Man	440	0	Tue
80018A	3-11	T50S-R30E-S16	Man	108	0	Tue
80019A	4-11	T51S-R32E-S4	Man	3	0	Tue
80020A	3-11	T51S-R32E-S1	Man	90	0	Tue
80021A	4-11	T51S-R33E-S18	Man	55	0	Tue
80022A	3-12	T52S-R33E-S1	Man	100	70	Wed
80023A	3-13	T52S-R31E-S12	Man	600	1,105	Thu
80024A	3-13	T53S-R33E-S17	Man	1	11	Thu
80025C	3-11	T49S-R31E-S7	Pasture permit	2,500	0	Tue
80026A	3-15	T54S-R33E-S18	Man	820	75	Sat
80027A	3-15	T53S-R32E-S7	Man	70	11	Sat

<u>Fire Number</u>	<u>Date</u>	<u>Origin</u>	<u>Cause</u>	<u>Acres Burned</u>	<u>\$ Cost</u>	<u>Day of Week</u>
80028A	3-15	T53S-R31E-S7	Man	1,160	1,215	Sat
80029A	3-16	T54S-R34E-S15	Man	1	0	Sun
80030A	3-16	T54S-R33E-S21	Man	180	0	Sun
80031FA	False Alarm				33	
80032A	3-17	T54S-R31E-S24	Man	25	251	Mon
80033A	3-20	T53S-R32E-S9	Man	220	222	Thu
80034A	3-22	T51S-R32E-S4	Man	4	64	Sat
80035A	3-22	T51S-R32E-S7	Man	20	64	Sat
80036A	3-23	T52S-R30E-S9	Man	5	182	Sun
80037FA	False Alarm				73	
80038A	3-23	T52S-R32E-S5	Man	30	77	Sun
80039A	3-23	T51S-R34E-S26	Man	75	73	Sun
80040A	3-23	T51S-R33E-S6	Man	10	73	Sat
80041A	3-23	T51S-R32E-S20	Man	150	0	Fri
80042A	3-29	T53S-R32E-S14	Man	1	346	Sat
80043A	3-29	T52S-R32E-S22	Man	3	497	Sat

Totals: 33 fire reports; 30 fires; 1 permit fire; 3 false alarms;
cost = \$6,559; 8,967 acres

April

8044A	4-11	52S-31E-S7	Unknown	25	346	Fri
8045F.A.	4-19	51S-31E-S11	False Alarm			
8046A	4-25	54S-34E-S2	Man (plane crash)	420	864	Fri

Totals: 3 fire reports; 2 fires; 1 false alarm; 445 acres; cost = \$1,210

May

80047A	5-8	53S-31E-3	Unknown	290	212	thu
80048A	5-10	52S-34E-23	Man	15	110	Sat
80049A	5-15	53S-31E-10	Unknown	35	90	Thu

Totals: 3 fire reports; 3 fires; 340 acres; cost = \$412

June

80050A	6-6	51S-30E-26S	Man	1950	1,400	Fri
80051A	6-16	52S-30E-13S	Man	30	160	Mon
80052A	6-17	52S-30E-12S	Man	25	564	Tue
80053FA	False Alarm				100	
80054A	6-23	51S-32E-29S	Man	350	413	Mon
80055A	6-23	49S-30E-21S	Lightning	150	372	Mon
80056A	6-26	50S-30E-4S	Man	1400	5,247	Thu

<u>Fire Number</u>	<u>Date</u>	<u>Origin</u>	<u>Cause</u>	<u>Acres Burned</u>	<u>\$ Cost</u>	<u>Day of Week</u>
July						
80057A	7-7	53S-30E-6S	Lightning	25	505	Mon
80058A	7-24	53S-32E-12S	Man	300	1,290	Thu
80059A	7-25	53S-32E-12S	Man	150	286	Fri
80060D	7-24	51S-30E-26S	research	100	992	Thu
80061A	7-28	51S-30E-34S	Man	540	1,894	Mon
80062A	7-31	50S-30E-36S	Man	150	394	Thu

Totals: 6 fire reports, 6 fires; 1 research burn; 1,265 acres; cost = \$5,361

August

80063A	8-3	52S-30E-14S	Lightning	50	331	Sun
80064A	8-11	52S-30E-16S	Man	115	713	Mon
80065D	8-14	51S-34E-34S	Research- pineland	40	1,098	
80066D	8-14	51S-34E-33S 52S-34E-3S	Research- pineland	100	1,098	
80067D	8-15	53S-34E-7S	Research- Cypress prairie	100	2,164	

Totals: 5 fire reports, 5 fires; 3 research burns; 405 acres, 240 acres for research; cost = \$5,404; \$4,360 for research fires

September

No fires recorded

October

80068A	10-4	50S-31E-21	Man	100	150	Sat
80069FA	10-10	False Alarm			15	Fri
80070FA	10-16	False Alarm			15	Thurs
80071A	10-19	54S-35E-16	Man	1	64	Sun
80072A	10-23	53S-31E-6	Man	50	772	Thurs
80073A	10-28	53S-32E-7	Man	130	519	Tue
80074C	10-23	49S-31E-3	Pasture Permit	500	0	Thurs

Totals: 7 fire reports; 5 fires; 1 permit fire; 2 false alarms; 781 acres; cost = \$1,535

November

80075A	11-1	52S-35E-20	Man	40	120	Sat
80076D	11-4	51S-30E-21	Research	50	435	Tue
80077D	11-4	51S-30E-22	Research	50	635	Tue

<u>Fire Number</u>	<u>Date</u>	<u>Origin</u>	<u>Cause</u>	<u>Acres Burned</u>	<u>\$ Cost</u>	<u>Day of Week</u>
80078A	11-6	51S-32E-15	Man (Plane crash)	60	616	Thurs
80079A	11-7	50S-32E-24	Man	30	48	Fri
80080FA	False Alarm					
80081A	11-7	51S-32E-3	Man	100	48	Fri
80082A	11-7	54S-34E-29	Man	50	60	Fri
80083A	11-7	52S-32E-26	Man	60	132	Sat
80087A	11-8	51S-33E-22	Man	90	132	Sat
80088A	11-8	50S-33E-26	Man	25	0	Sat
80089A	11-8	51S-33E-6	Man	35	132	Sat
80090A	11-8	51S-34E-23	Man	30	0	Sat
80091A	11-9	50S-33E-30	Man	10	60	Sun
80092A	11-9	50S-33E-30	Man	15	60	Sun
80093A	11-11	52S-34E-23	Man	15	120	Tue
80094FA	False Alarm					
80095A	11-12	51S-30E-36	Man	24	248	Wed
80096A	11/13	53S-34E-18	Man	1	24	Thurs
80097A	11-16	52S-35E-30	Man	3	0	Sun
80098A	11-18	50S-30E-12	Man (Plane crash)	1	0	Tue
80099A	11-22	53S-31E-3	Man	120	716	Wed
80100A	11-22	51S-34F-26	Man	25	59	Wed
80101A	11-22	51S-34E-25	Man	70	73	Wed
80102A	11-25	50S-33E-31	Man	30	213	Tue
80103A	11-26	53S-32E-8	Man	2	117	Wed
80104A	11-19	51S-34E-25	Man	2	106	Sat
80105A	11-29	52S-34E-6	Man	5	120	Sat
80106A	11-29	51S-35E-30	Man	2	0	Sat
80107A	11-19	54S-33E-10	Man	3	132	Sat
80108A	11-30	50S-33E-22	Man	15	0	Sun
80109A	11-30	50S-33E-27	Man	22	223	Sun
80110A	11-30	52S-35E-6	Man	32	145	Sun
80111A	11-30	52S-35E-6	Man	25	119	Sun

Totals: 37 reports; 3 false alarms; 34 fires; 2 research burns; 1,127 acres
100 acres for research; Cost = \$4,953; \$1,070 for research.

December

80112A	12-3	53S-31E-19	Man	210	363	Wed
80113A	12-3	52S-30E-13	Man	250	1,463	Wed
			Cattle			
80114C	12-4	49S-30E-15	Lease Permit	190	0	Thurs
80115A	12-4	51S-31E-13	Man	65	260	Thurs
80116A	12-4	55S-32E-1	Man	270	258	Thurs
80117A	12-5	52S-30E-12	Man	2,245	4,550	Fri
80118A	12-5	50S-32E-25			65	Fri

(Not located due to large number of fires in the area)

<u>Fire Number</u>	<u>Date</u>	<u>Origin</u>	<u>Cause</u>	<u>Acres Burned</u>	<u>\$ Cost</u>	<u>Day of Week</u>
80119A	12-5	50S-31E-22			65	
		(Not located due to large number of fires in the area)				
80120A	12-5	50S-30E-20	Man	1,540	430	Fri
80121A	12-6	51S-30E-15	Man	830	1,045	Sat
80122A	12-6	54S-33E-12	Man	12	212	Sat
80123A	12-7	53S-33E-19	Man	430	303	Sun
80124A	12-7	55S-34E-31	Man	85	303	Sun
80125A	12-7	51S-32E-8	Man	45	108	Sun
80126A	12-7	52S-30E-5	Man	10	108	Sun
80127A	12-8	50S-32E-30	Man	43	130	Mon
80128A	12-8	53S-32E-8	Man	100	121	Mon
80129A	12-9	50S-31E-6	Man	45	130	Tue
			Cattle			
80130C	12-10	49S-30E-1	Lease Permit	780	0	Wed
80131D	12-10	52S-34F-28	Research	70	240	
80132D	12-10	52S-34E-33	Research	135	321	
80133D	12-11	53S-33E-7	Research	60	100	
80134A	12-15	52S-31E-18	Man	75	165	Mon.
80135A	12-23	51S-30E-36	Man	4	85	Tue
80136A	12-27	53S-31E-5	Man	120	150	Sat
80137A	12-28	51S-30F-35	Man	300	665	Sun
80138A	12-29	52S-30E-36	Man	2	50	Mon
			Cattle			
80139C	12-31	49S-31E-35	Lease Permit	270	0	Wed
			Cattle			
80140C	12-22	49S-30E-14	Lease Permit	680	0	Mon
80141C	12-26	52S-34E-1	Hazard Reduction	110	0	Fri
80142A	12-29	52S-34E-25	Man	50	197	Mon
80143A	12-29	52S-34E-12	Man	100	172	Mon
80144A	12-29	51S-34E-27	Man	10	172	Mon
80145A	12-29	52S-32E-10	Man	22	147	Mon
80146A	12-29	51S-32E-33	Man	30	147	Mon
80147A	12-29	51S-32E-33	Man	35	147	Mon
80148A	12-29	50S-32E-33	Man	30	111	Mon
80149A	12-31	51S-32E-13	Man	40	50	Wed
80150A	12-31	52S-30E-18	Man	560	532	Wed
80151A	12-30	49S-30E-3	Permit	75	0	Tue

Totals: 40 fire reports, 5 permit fires (C); 3 research burns (D);
9,928 acres; 265 acres fo research
Cost; \$13,367; \$661 for research

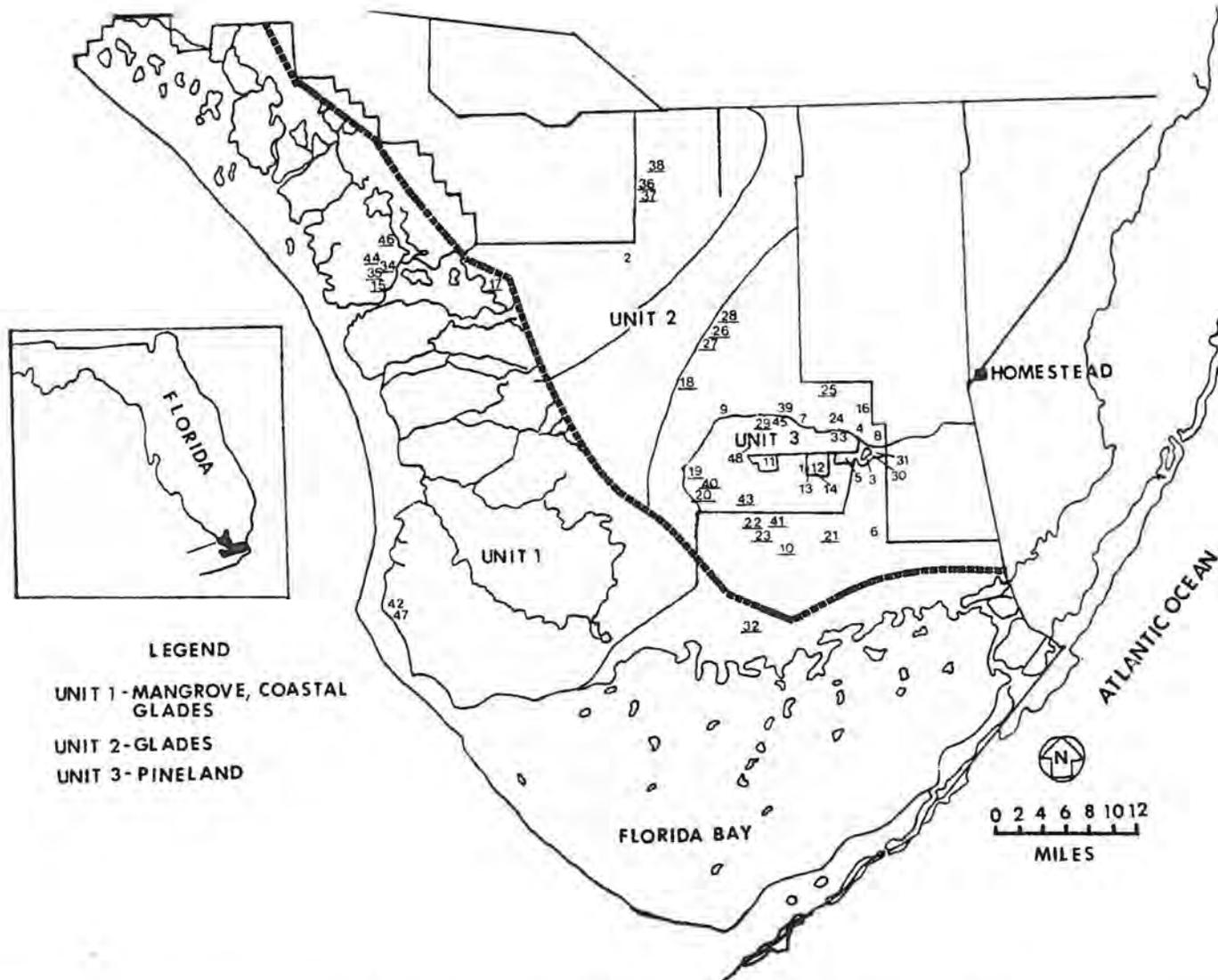


Figure 1. Approximate location of fires during 1980 within Everglades National Park. Fire numbers shown correspond to Appendix I with lightning fires underlined.

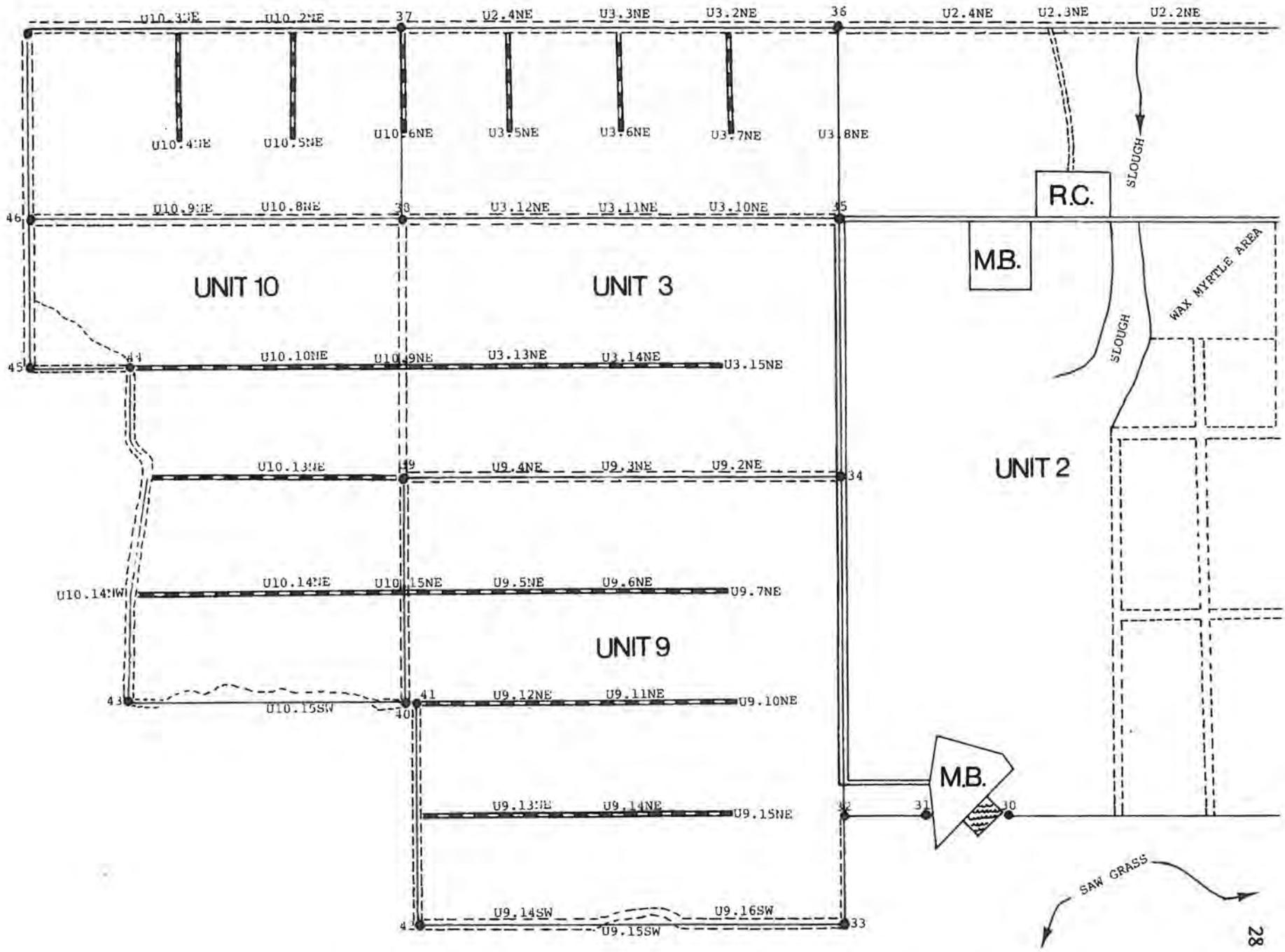


Figure 2. Approximate location of burning within the western half of the Hole-in-the-Donut

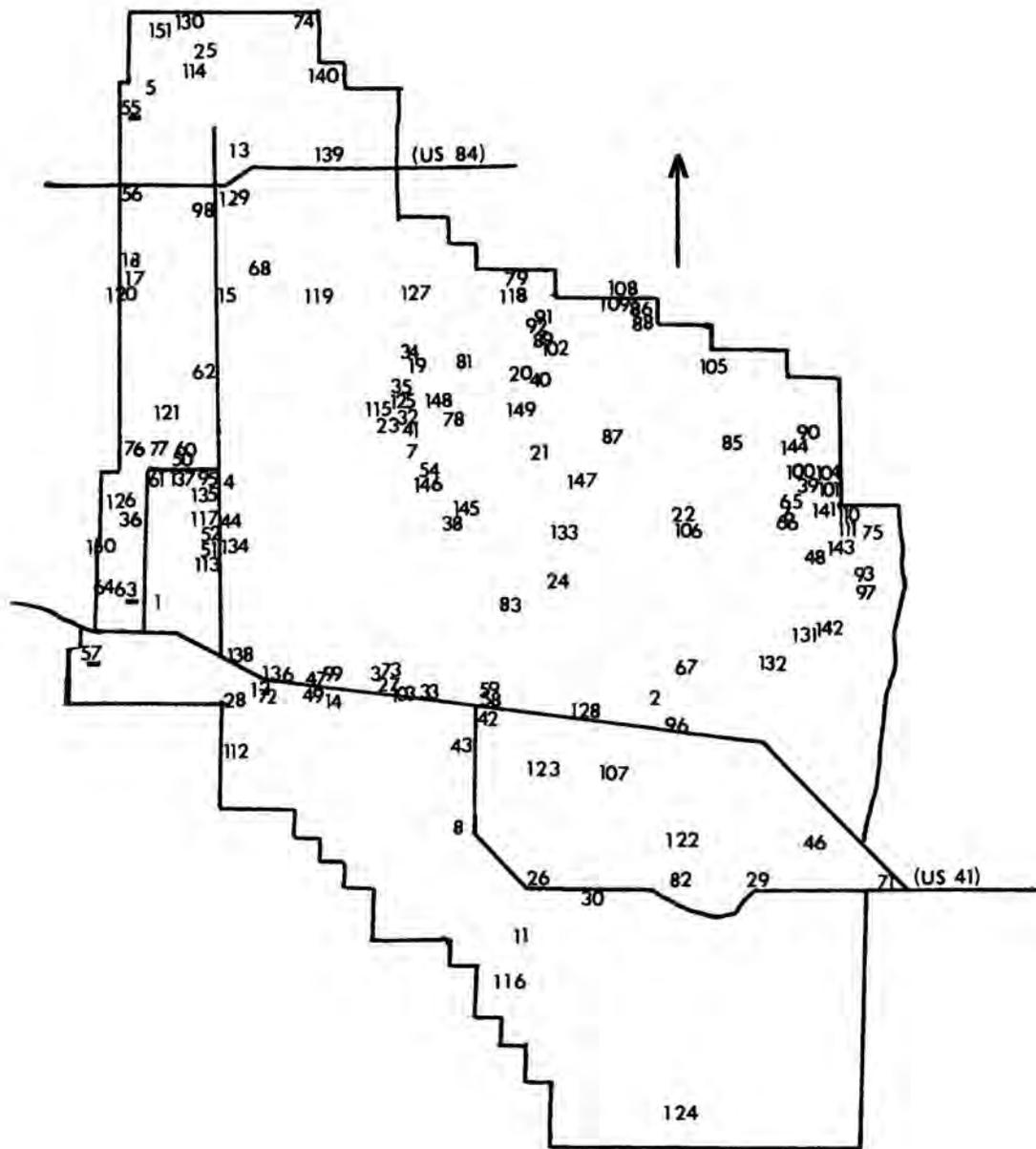


Figure 4. Approximate location of fires during 1980 within Big Cypress National Preserve. Fire numbers shown correspond to Appendix II with lightning fires underlined.

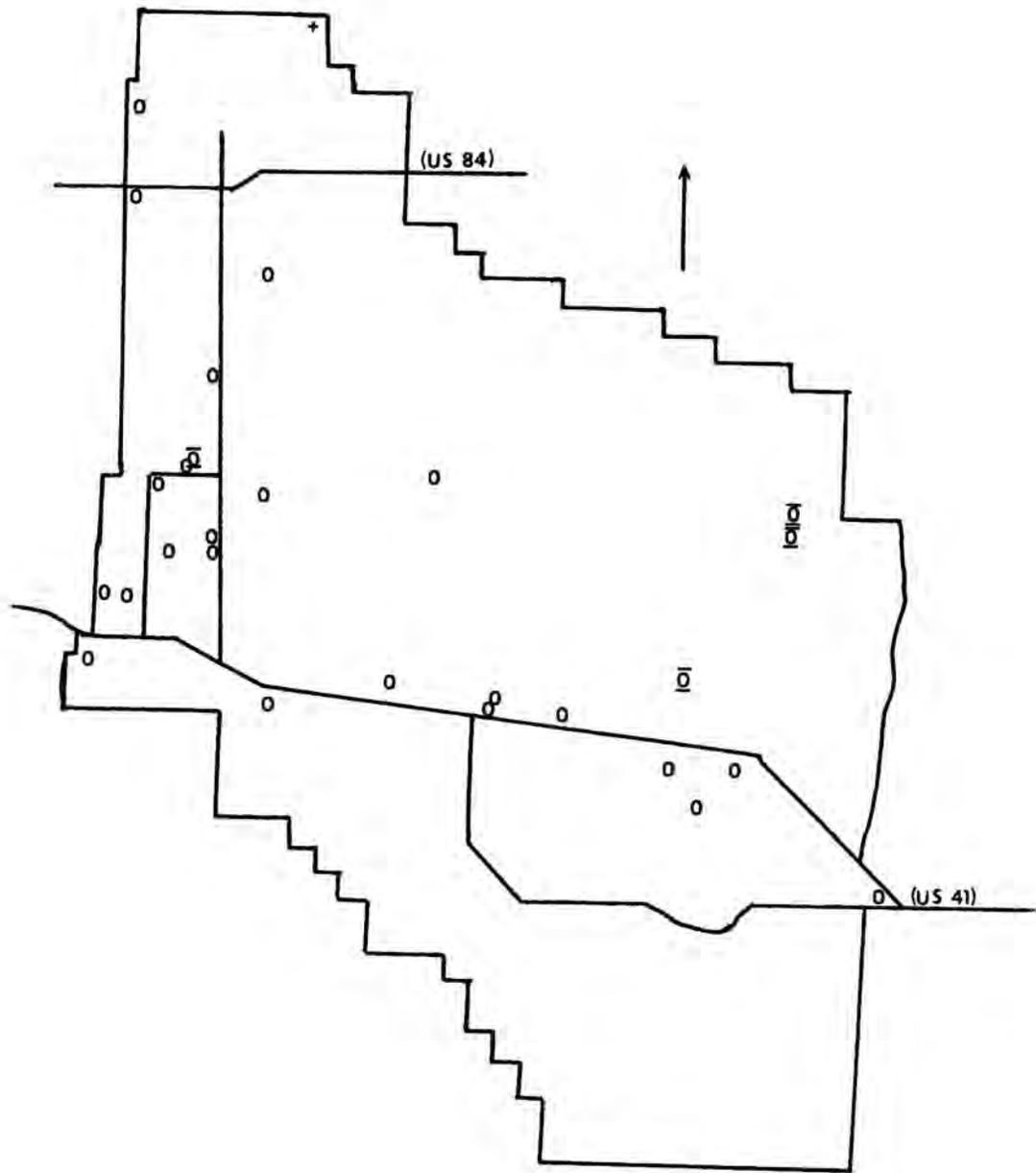


Figure 5. Composite map of all 1979 and 1980 burns that occurred during the wet season (June-October). Bars indicate research burns; a + indicates a pasture permit burn.

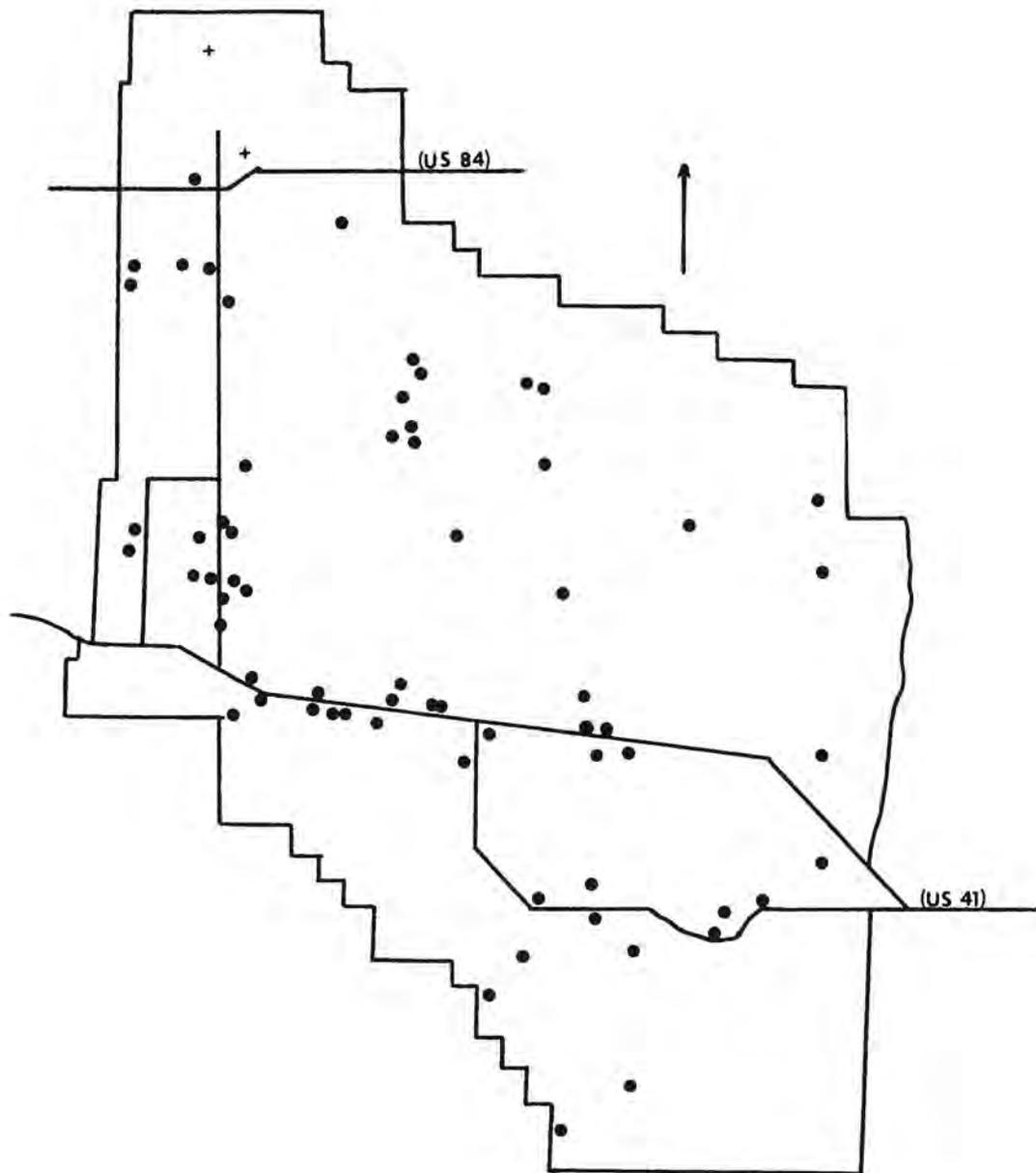


Figure 6. Composite map of all 1979 and 1980 burns that occurred during the dry season (March, April, and May). (+ indicates pasture permit burn).

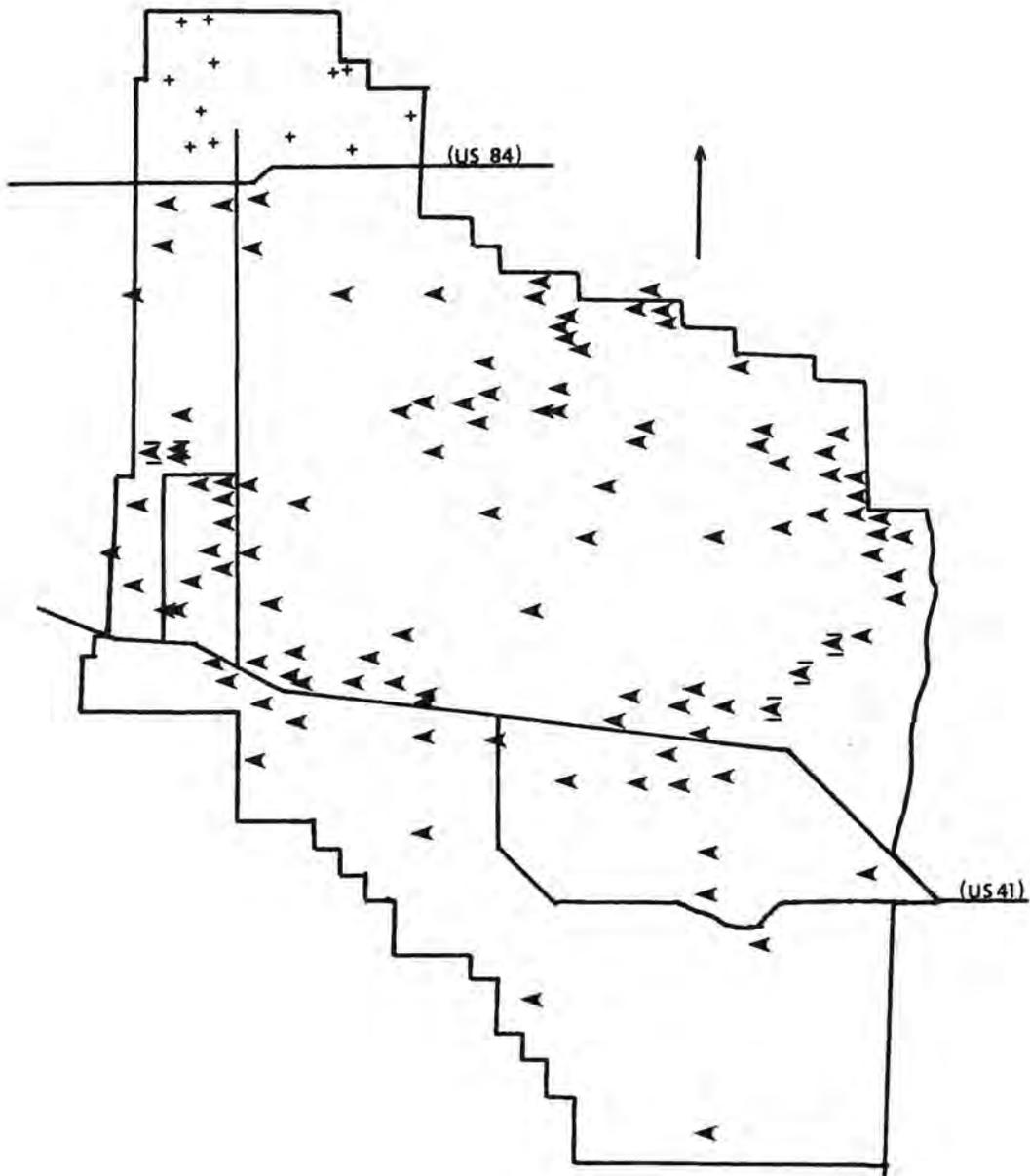
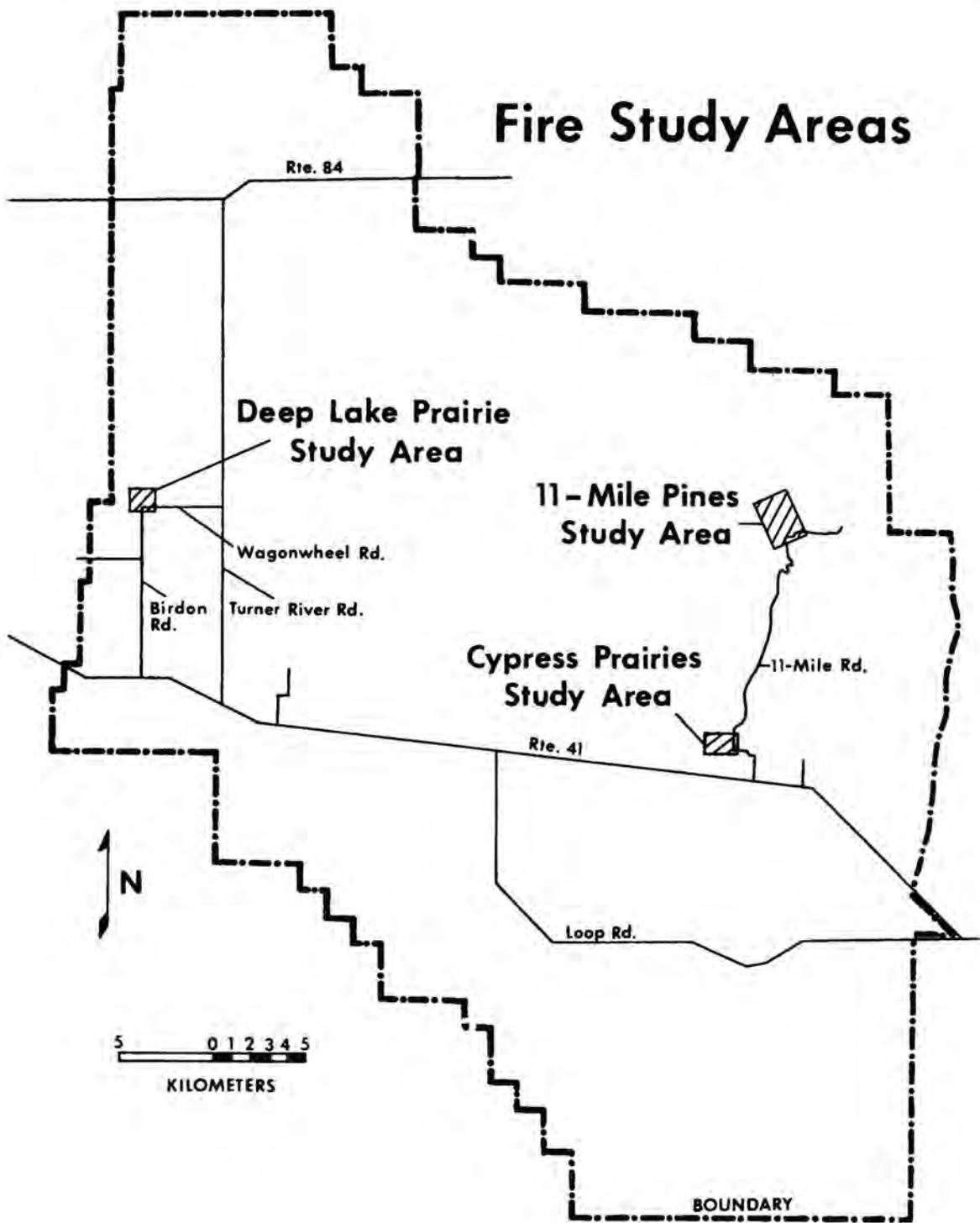


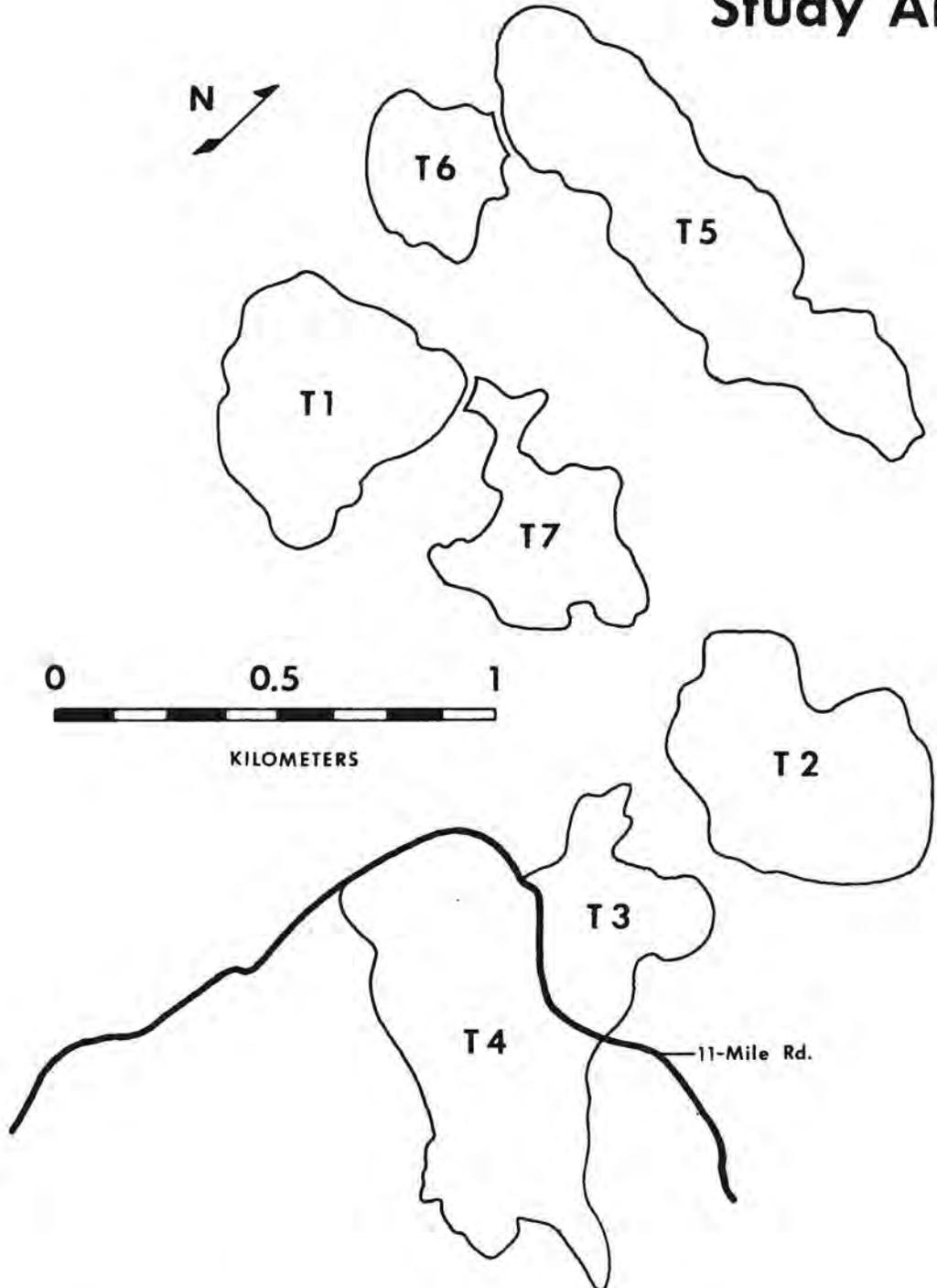
Figure 7. Composite map of all 1979 and 1980 burns that occurred during the hunting season (November through January). Bars indicate research burns; a + indicates a pasture permit burn.



Big Cypress National Preserve

Figure 8. Location of prescribed fire research study sites within Big Cypress National Preserve.

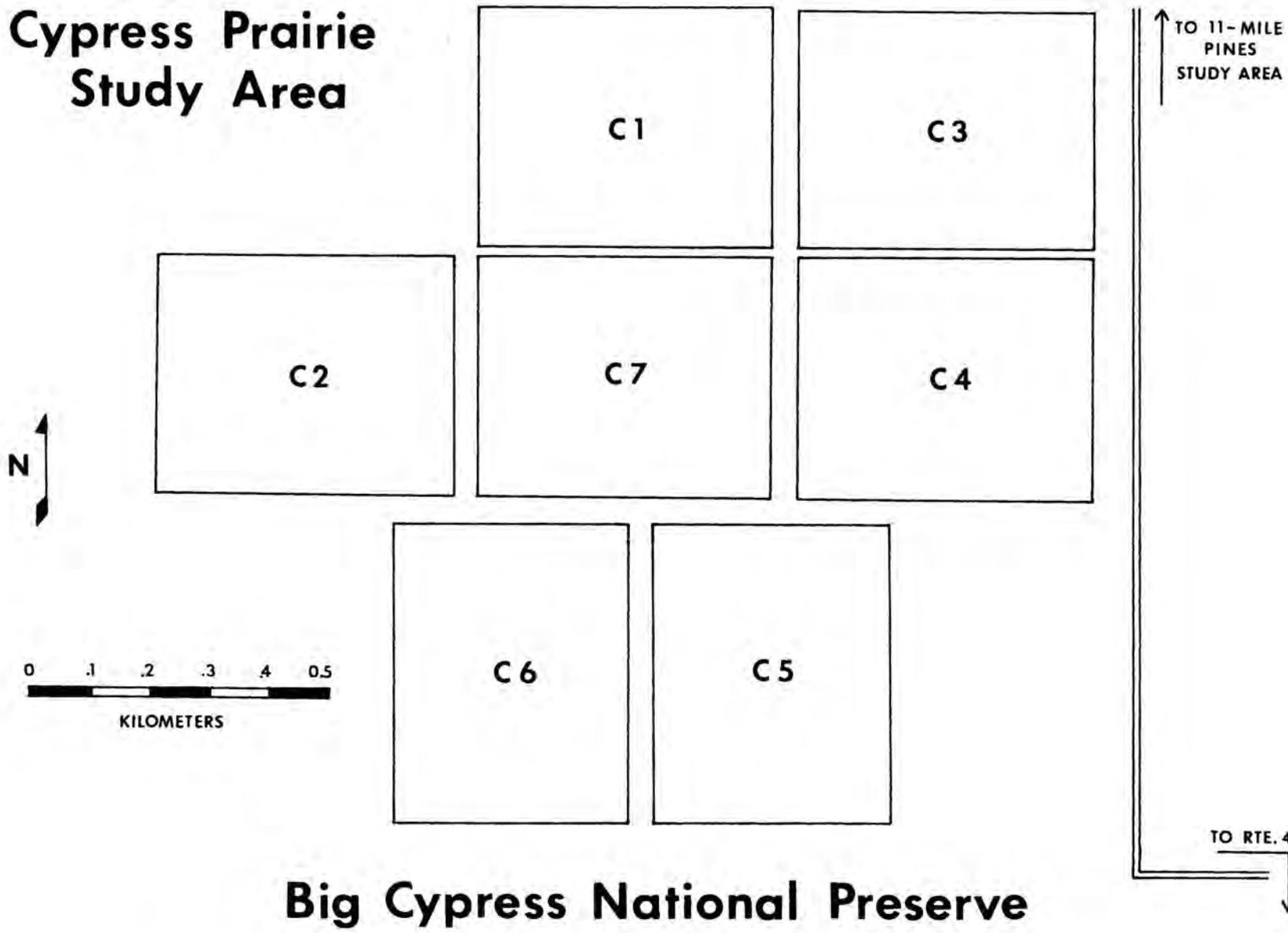
11-Mile Pines Study Area



Big Cypress National Preserve

Figure 9. Location of pineland prescribed fire study sites within big Cypress National Preserve.

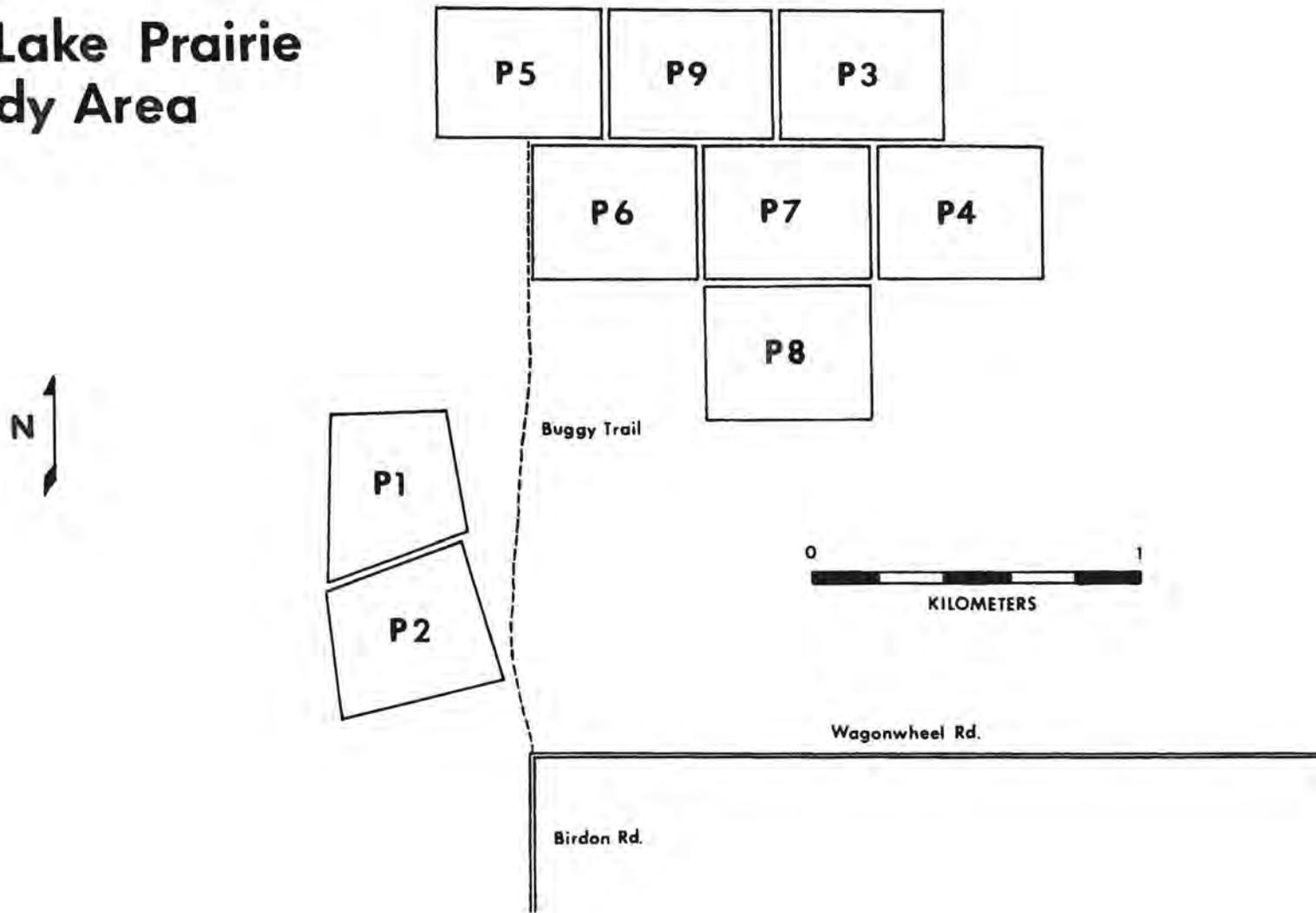
Cypress Prairie Study Area



Big Cypress National Preserve

Figure 10. Location of cypress prairie prescribed fire study sites within Big Cypress National Preserve.

Deep Lake Prairie Study Area



Big Cypress National Preserve

Figure 11. Location of prairie prescribed fire study sites within Big Cypress National Preserve.

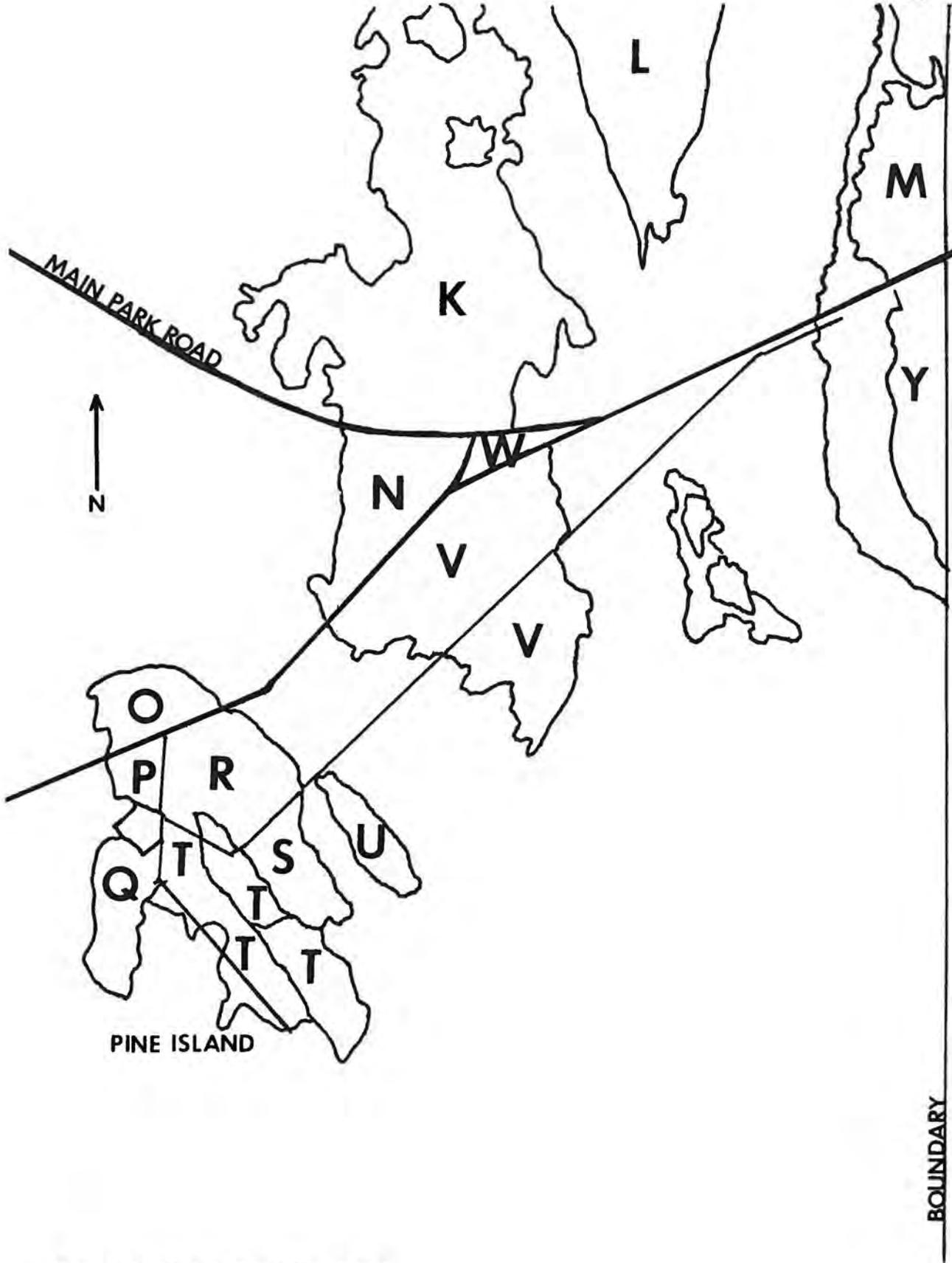


Figure 12. Pine Island Pine Blocks

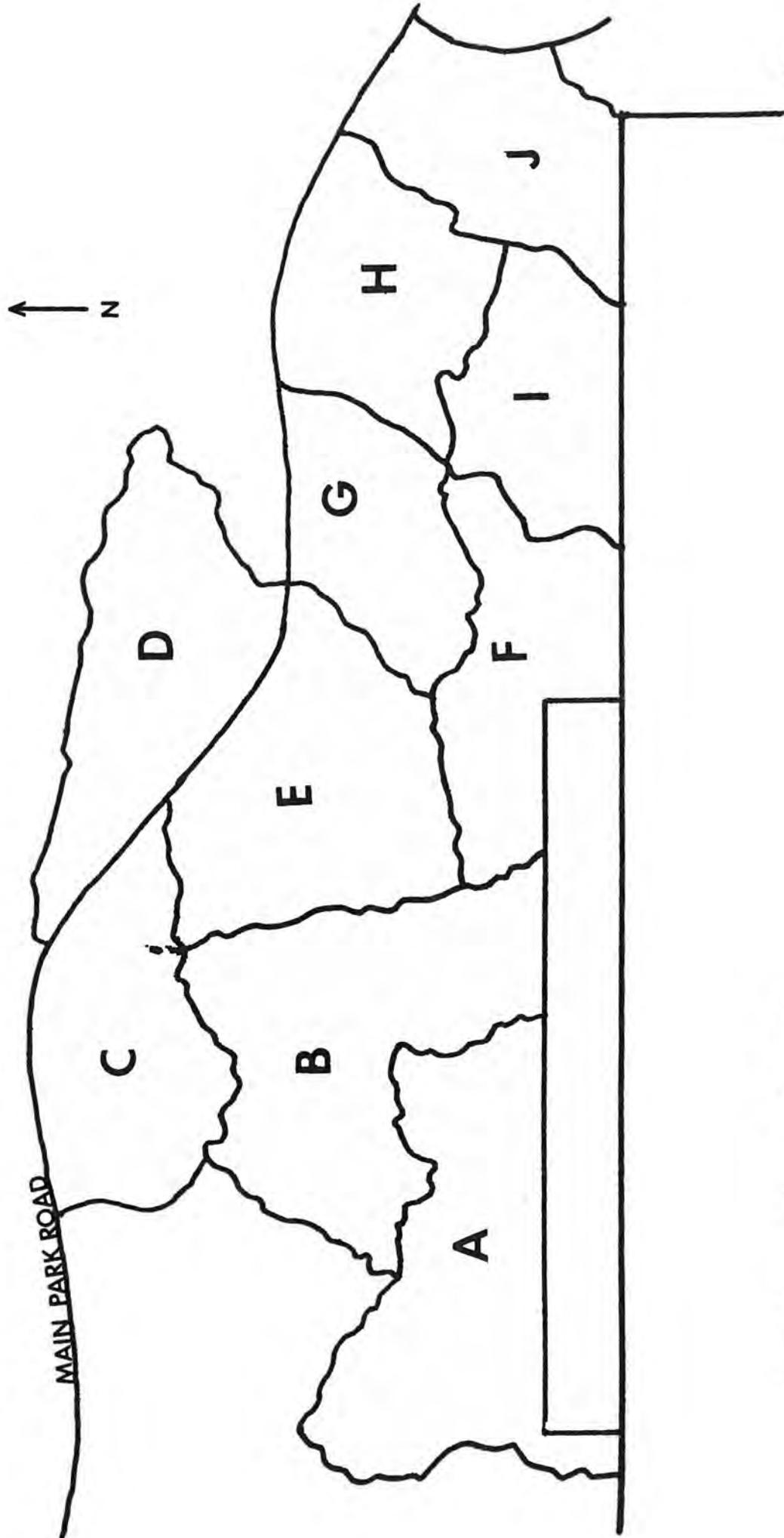


Figure 13. Long Pine Key Pine Blocks