

Red-cockaded Woodpecker Status on the Blackwater River State Forest

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FINAL REPORT

State: Florida

Project Number: E-1 III-2-5

Project Title: RED-COCKADED-WOODPECKER STATUS ON THE
BLACKWATER RIVER STATE FOREST

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INTRODUCTION

The Blackwater River State Forest (BRSF), the largest state forest in Florida, occupies portions of Santa Rosa and Okaloosa counties in northwest Florida and consists of about 184,000 acres, of which an estimated 150,000 acres are comprised of forests dominated by longleaf pine (*Pinus palustris*). Pine timber on the BRSF has been managed, since the 1960's, under a sixty-year rotation and a ten year cutting cycle using the multiple use concept combining timber management, recreation, wildlife and water management (Florida Division of Forestry 1982). The Division of Forestry is in the process of revising its management program to place greater emphasis on ecosystem processes and to use a combination of uneven-aged management and longer rotation even-aged management in an effort to improve the quality and health of all resources and ecosystems at BRSF.

The red-cockaded woodpecker (*Picoides borealis*, RCW) population at BRSF was estimated to be 50 active colonies (clusters) by Wood and Wenner (1983), the largest on state-owned lands in Florida in their assessment. However, the BRSF has never been systematically surveyed for RCWs; known clusters were opportunistically discovered during the course of timber management, inventory and other activities. An assessment of the status of known RCW clusters and cavity trees was undertaken in 1989, and an annual cluster monitoring program was initiated in 1990. Efforts to identify previously unknown clusters were subsequently increased. Although a few more known clusters were discovered, all evidence strongly suggested that the BRSF RCW population was a small, fragmented population that was either unstable or declining over most of the Forest. The BRSF population is the central portion of a regionally significant population, including those at Conecuh National Forest and Eglin Air Force Base, that may be critical to RCW recovery (U.S. Fish and Wildlife Service 1985).

The lack of a systematic survey for RCW on BRSF hampers management for RCWs, fire, timber, wildlife, and recreation. Such a survey is the necessary first step to managing the BRSF RCW population to prevent its demise. Approximately 17,734 acres were surveyed in 1994 using funding obtained from Florida Gas Transmission Company (FGT) as mitigation for pipeline construction through RCW foraging habitat and abandoned clusters. The objective for this project was to conduct a systematic survey of BRSF to determine the status and distribution of RCW clusters on the BRSF.

METHODS

Habitat Survey

Using two experience RCW technicians and other temporary employees, full-time employees and volunteers, a more comprehensive forest-wide RCW habitat survey was established for the collection of cluster status and distribution data. Habitat surveys were conducted using the parallel line transect method and a daily minimum survey goal of 50 acres per person per day was established. This method involved systematically walking through the forest and looking for trees that could possibly be in use by RCWs. Daily survey progress data such as date, survey crew size, number of acres surveyed, number of hours spent surveying,

number and status of cavity trees found (active cavity, active start, inactive cavity, or inactive start), and location of area surveyed (highlighted on copies of aerial photos) were recorded. The activity status of trees was determined using standard criteria such as those outlined in Hooper et al. (1980). Areas to be surveyed were prioritized according to two criteria: age of timber (older stands were given priority), and locations of known clusters. Prioritizing surveys according to these criteria allowed stands of timber to be surveyed prior to possible timber harvesting activity. All stands surveyed were upland longleaf pine stands that could be classified as sandhill or clayhill (upland pine forest).

Any cavity tree located was marked by scraping the bark around the trunk (at breast height) and painting a white band (about 14 in. wide) in the scraped area. All cavity trees were tagged at the base of the trunk with a stainless steel identification tag. Tag information identified the forest unit name (BRSF is divided into 7 units), cluster number, and cavity tree number. Cavity tree locations were marked on aerial photographs and forest maps for future reference.

After completing the final habitat survey, all daily survey progress data were compiled in order to identify total survey progress. Survey progress results included:

- Total number of days spent surveying.
- Total number of acres surveyed.
- Total number of field hours spent surveying.
- Average daily survey crew size.
- Average number of field hours spent surveying per person, per day.
- Average number of acres surveyed per person, per day.
- Total number and status of cavity trees found.

Cluster Status Checks

Cavity tree and cluster status data were collected from September 5-26, 1995, including: cavity tree tag number, cavity tree species, cavity type (start or complete), and cavity activity status (active or inactive). Cluster location and status (active or inactive) were indicated on aerial photograph copies and forest maps. These data were compared with cluster checks from previous years beginning in 1990. Annual cluster checks have been conducted during the fall to maintain consistency with the time of year the first surveys were conducted. The 1993 cluster checks were not completed for the entire forest, thus were not included in this comparison.

Cluster Status Trend

Cluster status data from 1995 were compared to cluster status data for the sample of 56 clusters that were originally monitored in 1990. This analysis allowed evaluation of a 5 year cluster status trend. Comparisons were made for:

- Total number of clusters still present per year.
- Total number of active clusters per year.
- Total number of single active trees per year (see below).
- Total number of inactive clusters per year.

Terminology

A definitive determination of clusters, based on locating all nests and making daily observations of cavity use by birds, was beyond the scope of this project. However, it is important to use some estimate of the number of clusters in order to monitor the status of the RCW population at BRSF over time. The method used for estimating numbers of clusters, described by Harlow *et al.* (1983), requires that progressively overlaid scaled circles on a scaled cavity tree map (1) do not overlap but can touch other circles, (2) encompass as many cavity trees as possible, and (3) must contain at least two cavity trees with one being active. The method of Harlow *et al.* (1983) was used to obtain an estimate of clusters at BRSF. In this report, such clusters are referred to as "active clusters."

A modification of this method was used to develop an estimate for "inactive clusters" by ignoring the third criterion of the Harlow method. This provides important and useful information for management by including sites that may have once contained active clusters. Inactive clusters, which may contain one or more inactive cavity trees, have been reactivated by RCWs at BRSF during the period they have been closely monitored. Thus, inactive clusters are managed and maintained as though they contained RCWs. Inactive clusters may also be useful for restrictor plates and for relocating birds, should such projects ever be implemented at BRSF.

The first two criteria of the Harlow method were also used to map RCW sites that contained only one active cavity tree. These sites are identified as "single active trees." This again provides a convenient method for mapping and delineating areas that are being used by RCWs. Single active trees are managed and maintained as though they were active clusters. For this report, active clusters are those determined strictly by the Harlow method, and inactive clusters and single active trees are as defined above.

RESULTS

Habitat Survey

The forest-wide RCW habitat survey was conducted from March 23, 1995 to June 13, 1996. The following are final survey progress results (see Appendix for daily progress results):

-Total number of days spent surveying	= 152.0
-Total number of acres surveyed	= 24,500.0
-Total number of field hours spent surveying	= 2,674
-Average daily survey crew size	= 2.3
-Average number of field hours spent surveying per person per day	= 7.6
-Average number of acres surveyed per person per day	= 70.1
-Number and status of cavity trees found	= 2 inactive starts 2 active starts 1 inactive complete cavity 4 active complete cavities

Gaps in the survey record of Appendix 1 were times when cluster checks were conducted or were bad weather days when crews processed field information indoors. During the previous FGT survey, three active and six inactive cavity trees were discovered all near known clusters. The total number of acres surveyed at BRSF from 1994-96 was 42,234 acres (17,734 from the FGT survey + 24,500 from the current project).

Cluster Status Checks

Results from the September 1995 status check (Table 1) showed 78 total clusters; 44% active clusters plus single active trees and 56% inactive clusters. The activity status of a total 177 cavity trees was checked; 67 active and 110 inactive. Ten previously known RCW trees (four active cavity trees and six inactive cavity trees) were dead, primarily from lightning.

The status check in late 1995 immediately following Hurricane Opal revealed the all trees in three clusters (one active cluster and two inactive clusters) were destroyed by the hurricane. . One tree (an inactive start) was lost to Hurricane Erin and 14 trees (six active) were lost to Hurricane Opal. These numbers do not coordinate with Table 1 for the following reasons: status changes unrelated to the hurricanes, the discovery of new cavity trees, and the start trees are not reported in the table. The age of cavity trees lost to Opal ranged from 56 to 185 years with a mean of 90 years. The fate of birds that inhabited these trees is unknown.

Cluster Status Trend

A five year cluster status trend was established by comparing cluster activity in 56 clusters (Table 2) originally surveyed in 1990. Between 1990 and 1995, the combined number of active, single tree and inactive clusters in that sample decreased by three due to the loss of one single active tree and two inactive clusters to fire and lightning. An additional inactive cluster was lost to Hurricane Opal.

The number of active clusters decreased from 23 in 1990 to 21 in 1995. During the period, five active clusters became inactive for unknown reasons and one active cluster was destroyed by fire. One active cluster became a single active tree. The number of single active trees was the same in 1990 and 1995, but fluctuated in the intervening years. One single active tree was destroyed by prescribed fire. Two single active trees became active clusters due to the discovery of trees that are believed to have been present previously. One inactive tree became a single active tree. Three inactive clusters became active clusters. Thus, the overall number of active clusters plus single active trees decreased from 27 to 25 during the period.

Inactive clusters decreased from 29 to 28 during the 5 year period. The number of inactive clusters exceeded the number of active clusters every year.

Table 3 shows the trend sample of 56 clusters by unit of BRSF. Only inactive clusters were in the sample from two units, Bone Creek and Horse Creek, which make up the easternmost units of the BRSF. There was no change in status in these two units. There was also no change in status in the Sweetwater unit, which had two out of five clusters active.

Although the number of active clusters in West Boundary unit fluctuated slightly, there

was no change between the first and last year of the survey. In the intervening years, one active cluster became inactive, while one inactive cluster became active. One active cluster became a single active tree while another single active tree was killed by prescribed fire. The number of inactive clusters decreased in this unit due to the loss of an inactive cluster to lightning in 1993.

Both the Floridale unit and the Rock Creek unit had increased numbers of active clusters and decreased numbers of inactive clusters. In the Floridale unit, two inactive clusters became active clusters, while one active cluster was destroyed by prescribed fire. In the Rock Creek unit, one active cluster became inactive, while two inactive clusters became active.

In the Coldwater unit, four active clusters became inactive clusters. Two separate single active trees in the 1990 survey were scored as active clusters when additional nearby active trees were discovered in 1991. One inactive cluster was lost to the hurricane.

DISCUSSION

Habitat Survey

Habitat survey progress fluctuated daily due to weather, habitat condition (vegetation density), daily crew size, and the extent of crew member survey experience. The average of 70 acres surveyed per person per day is a result of the openness of the habitat and the lack of cavity trees found.

Only one previously unknown active cluster was found, which contained only 2 trees, both active. All other new cavity trees found (2 active cavity trees, 1 inactive cavity tree, 2 active starts, and 2 inactive starts) were in previously known clusters.

The discovery of only one additional active cluster is discouraging. All timber stands within BRSF aged 60 years or older were surveyed, and it was thought stands of this age class would contain clusters, but in fact most stands contained very little old growth longleaf. Nearly all of the stands 60 years old or older contained a large percentage of trees much smaller in dbh (diameter at breast height) than expected. It is possible that stand card information, on which stand selection for the survey was based, is not accurate enough for RCW management because its primary purpose is timber management. Furthermore, under the strategy of even-aged rotation on a 60 year harvest rotation cycle, very little longleaf pine reaches the age normally associated with suitable RCW nesting habitat.

Figure 1 shows the distribution of active clusters, single active trees and inactive clusters at BRSF in November, 1995. The highly fragmented nature of the state forest (note darkened private land inholdings) and the fragmented nature of the RCW population are both evident from this map. Three major groups of active clusters can be noted: one in the western portion (West Boundary and Coldwater units), a second in the southern Floridale Unit, and a third in the Rock Creek Unit. Most striking is the lack of active clusters in the center of the forest.

Cluster Status Checks

The ratio of active clusters and single active trees to inactive clusters is not necessarily alarming. However, 34 active clusters and single active trees is an uncomfortably small number

for 184,000 acres of contiguous, high quality pineland. So few active clusters may be an indication of a severe lack of suitable roosting, nesting, and foraging habitat. Unsuitable habitat may discourage immigration by RCWs from populations outside of BRSF, and may in fact encourage emigration by RCWs from BRSF.

Cluster Status Trend

The fluctuations in numbers of active clusters and numbers of single active trees is greater when these are considered separately than when the two are summed. There may be a biological explanation, or these fluctuations may just indicate that we are better at determining whether a cluster has some level of activity or no activity than we are at assessing the level of activity, i.e., one active tree or more than one active tree. Nevertheless, the cluster status trend data indicates a decrease in active and inactive cluster numbers between 1990 and 1995. Since the loss of the two clusters in 1991 to prescribed fires, the implementation of a rigorous policy toward the treatment of RCW clusters in stands where prescribed burning is to occur has decreased the loss of trees to this essential activity.

The number of inactive clusters slightly exceeded the number of active clusters in the cluster sample monitored between 1990 and 1995. Some inactive clusters may be located in areas where habitat becomes unsuitable for foraging or cavity tree excavation. Inactive clusters containing cavity trees in good condition and numbers, and located in habitat presently adequate for foraging and cavity tree excavation, may be good candidates for reactivation.

INFORMATION NEEDS

Certain information needs are evident that, if met, would help in the development and implementation of management plans that could increase the probability that this population will persist. A few of these needs can be met with existing staff, but most needs will require additional funding or cooperation with other agencies, e.g., Eglin Air Force Base, that already have the equipment and experience in gathering and evaluating these types of information.

These needs are:

1. Continue annual cluster checks of all known clusters.
2. Complete the forest-wide survey, especially in areas proximal to known clusters. An estimated 50,000 acres should be surveyed. This would result in complete surveys of the habitat most likely to contain RCWs. Further survey would probably not be useful, as the remaining habitat would consist of the youngest stands least likely to support RCWs.
3. Conduct a habitat assessment that evaluates the potential of all stands to provide foraging and nesting habitat. This would require gathering accurate data on the structure of trees (i.e., density, basal area, age, number of old trees). The current stand data may not be a suitable source of such information and is obsolete due to the effects of the 1995 hurricanes.
4. Conduct nest checks during the summer. These would provide useful information on cluster distribution and relative reproductive effort.
5. Implement a bird banding program. Information that could be obtained would include:

- a. An accurate count of existing functional clusters. This information could help determine whether single trees are independent or satellite trees of nearby clusters. Clan size could be established through dawn or dusk activity monitoring.
 - b. True foraging zones could be established and analyzed to determine the actual foraging parameters for BRSF RCWs.
 - c. An accurate census could be obtained and a determination of reproductive success could be made through nest checks and by banding nestlings.
 - d. Breeding clusters could be more carefully monitored on an annual basis.
6. Using population data from the banding program, determine if and where restrictor plates are needed, if intraspecific competition for cavities is an important factor at BRSF, and if artificial cavities and/or translocation of birds is needed.
 7. Develop a GIS data base that can be used for tracking cavity tree and cluster location and status over time.

MANAGEMENT RECOMMENDATIONS

The management recommendations below include both short- and long-term activities that may be essential to maintaining this population.

1. Establish larger foraging zones until actual foraging needs and habits are determined and the actual status of the foraging substrate (forest conditions) is determined.
2. Reevaluate prescribed fire procedures and precautions in cluster zones to determine if these in need of improvements.
3. Reevaluate timber marking rules and develop a monitoring procedure to ensure these are being followed. These rules should assure that old potential nesting trees are left, including poorly formed trees that may have a higher probability of developing red heart disease.
4. Develop a plan that creates corridors of potential RCW habitat between major groups of clusters and isolated active clusters. This plan should consider developing corridors of habitat that link with Conecuh National Forest and potentially with Eglin Air Force Base. Evaluate timber conditions in these corridors and elsewhere to assure that timber management practices will promote a continuous supply of potential nesting habitat, i.e., older trees.
5. Develop and implement a plan for installing restrictor plates that evaluates the inactive cavities for their suitability for plates and for their location in the context of providing corridors of suitable habitat.
6. Develop and implement a plan for installing artificial cavities based on the location of suitable habitat and corridors connecting major groups. Evaluate the feasibility of translocating birds into BRSF.

CONCLUSIONS

The existing data on RCWs at BRSF show that this is a small, fragmented population in a large area of potentially highly suitable habitat. The population appears to be slowly declining, as evidenced by the decreases in the total of active clusters and single active trees found in the 5-year cluster trend analysis. Changes suggesting a decline (e.g., changes from active cluster to

single active tree or to inactive or dead trees) outnumber changes that suggest an increase (e.g., changes from inactive cluster to single active tree or active cluster, and from single active tree to active cluster) by a ratio of 3 to 2. The causes of these changes are primarily unknown, although losses of entire clusters (both active and inactive) have resulted from hurricanes, lightning and prescribed fire. Efforts to reduce the loss from prescribed fire have been largely successful, although individual tree loss still occurs.

The population may be too small to recover from such changes. The lack of active clusters in the center of the forest is a characteristic noted for other declining populations (Fran James, personal communication) and further suggests that this is a declining population. The population may reach a threshold beyond which it does not have the capacity to recover from events such as hurricanes or the slow attrition in numbers.

The limiting factors for this population are not precisely known but most likely include the lack of suitable nesting habitat and the sparseness of available foraging habitat. These factors are being addressed through changes in timber management that emphasize uneven-aged management. Midstory encroachment problems have been largely corrected over the past 5 years.

Without additional funding to obtain additional information and implement many of the management recommendations listed above, the BRSF RCW population may have a high probability of continuing its steady decline toward possible extirpation before habitat conditions can be improved. It is essential that other agencies, including the Florida Game and Fresh Water Fish Commission, the U.S. Fish and Wildlife Service and Eglin Air Force Base, become involved as active partners if this RCW population is to be maintained and, hopefully, increased.

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Table 1. Blackwater River State Forest red-cockaded woodpecker cluster survey summary for 1990-1995. The 1993 data were incomplete and are not included.

Month Year	Nov. 1990	Oct. 1991	Aug. 1992	Sep.-Oct. 1994	Sept. 1995	Nov. 1995*
Total Clusters	56	60	68	77	78	75
Active Clusters	21	25	25	28	29	28
Single ** Active Tree	6	3	2	4	5	5
Inactive Clusters**	29	32	41	45	44	42
Active Cavity Trees	58	56	46	58	67	62
Inactive Cavity Trees	68	88	108	131	110	104

* survey conducted after Hurricane Opal.

** See text for definition of Single Active Tree and Inactive Clusters.

Note: Between 1994 and 1995 cluster checks, 10 trees died due primarily to lightning. During 1995, 1 tree was lost to Hurricane Erin and 14 to Hurricane Opal.

Table 2. Blackwater River State Forest red-cockaded woodpecker cluster status checks for 56 clusters monitored since 1990.

Month Year	Nov. 1990	Oct. 1991	Aug. 1992	Sep.-Oct. 1994	Sept. 1995	Nov. 1995*
Total Clusters	56	54 ^a	54	53 ^b	53	52 ^c
Active Clusters	23	23	23	22	21	21
Single** Active tree	4	2	1	3	4	4
Active plus Single Tree	27	25	24	25	25	25
Inactive Clusters**	29	29	30	28	28	27

* survey conducted after Hurricane Opal.

** See text for definition of Single Active Tree and Inactive Clusters.

^a two active clusters destroyed by fire

^b one inactive cluster destroyed by lightning

^c one inactive cluster destroyed by hurricane.

Table 3. Blackwater River State Forest red-cockaded woodpecker cluster status checks for 56 clusters monitored since 1990 by unit.

Year	1990	1991	1992	1994	1995	1995*
BONE CREEK						
Active Clusters	0	0	0	0	0	0
Inactive Clusters**	2	2	2	2	2	2
COLDWATER						
Active Clusters	5	6	5	3	3	3
Single Active Tree**	2	0	0	0	0	0
Inactive Clusters	6	7	8	10	10	9
Dead Trees	0	0	0	0	0	1 ^c
FLORIDALE						
Active Clusters	5	5	5	6	6	6
Inactive Clusters	5	4	4	3	3	3
Dead Trees	0	1 ^a	1	1	1	1
HORSE CREEK						
Inactive Clusters	6	6	6	6	6	6
ROCK CREEK						
Active Clusters	3	3	3	4	4	4
Single Active Tree	1	1	1	1	1	1
Inactive Clusters	4	4	4	3	3	3

Table 3. (Cont.)

SWEETWATER						
Active Clusters	2	2	2	2	2	2
Inactive Clusters	3	3	3	3	3	3
WEST BOUND.						
Active Clusters	6	6	6	7	6	6
Single Active Tree	3	2	1	2	3	3
Inactive Clusters	3	3	4	1	1	1
Dead Trees	0	1 ^a	1	2 ^b	2	2

* survey conducted after Hurricane Opal.

** See text for definition of Single Active Tree and Inactive Clusters.

^a two active clusters destroyed by fire

^b one inactive cluster destroyed by lightning

^c one inactive cluster destroyed by hurricane.

APPENDIX

DAILY SURVEY PROGRESS DATA

Survey Date	Survey Crew Size	Acres Surveyed	Field Person Hours
03-22-95	02	123	15.5
03-23-95	02	58	16.0
03-24-95	02	178	16.0
03-27-95	02	206	16.0
03-30-95	02	80	16.0
04-03-95	02	150	16.0
04-04-95	02	180	16.0
04-05-95	03	109	24.0
04-06-95	03	100	24.0
04-07-95	04	145	31.5
04-10-95	04	150	28.5
04-12-95	04	50	30.5
04-13-95	04	100	30.0
04-14-95	04	183	32.0
04-17-95	04	194	32.0
04-18-95	03	161	24.0
04-19-95	04	202	32.0
04-20-95	04	142	27.0
04-24-95	03	729	24.0
04-25-95	04	210	31.5
04-26-95	04	156	28.0
04-27-95	04	232	28.5
04-28-95	04	130	32.0
05-01-95	03	125	24.0
05-02-95	03	183	24.0

05-03-95	03	188	24.0
05-04-95	03	170	24.0
05-05-95	03	145	24.0
05-08-95	02	106	16.0
05-19-95	03	199	24.0
05-22-95	03	204	23.0
05-23-95	03	216	24.0
05-24-95	03	318	24.0
05-25-95	03	278	23.0
05-26-95	03	191	24.0
05-30-95	03	76	24.0
05-31-95	03	219	24.0
06-02-95	03	194	23.0
06-05-95	02	145	16.0
06-06-95	03	172	24.0
06-07-95	03	245	24.0
06-08-95	03	266	24.0
06-09-95	03	305	24.0
06-12-95	03	351	24.0
06-13-95	04	218	32.0
06-14-95	04	216	32.0
06-15-95	04	240	32.0
06-16-95	04	212	27.5
06-19-95	04	251	32.0
06-20-95	04	220	32.0
06-21-95	04	280	32.0

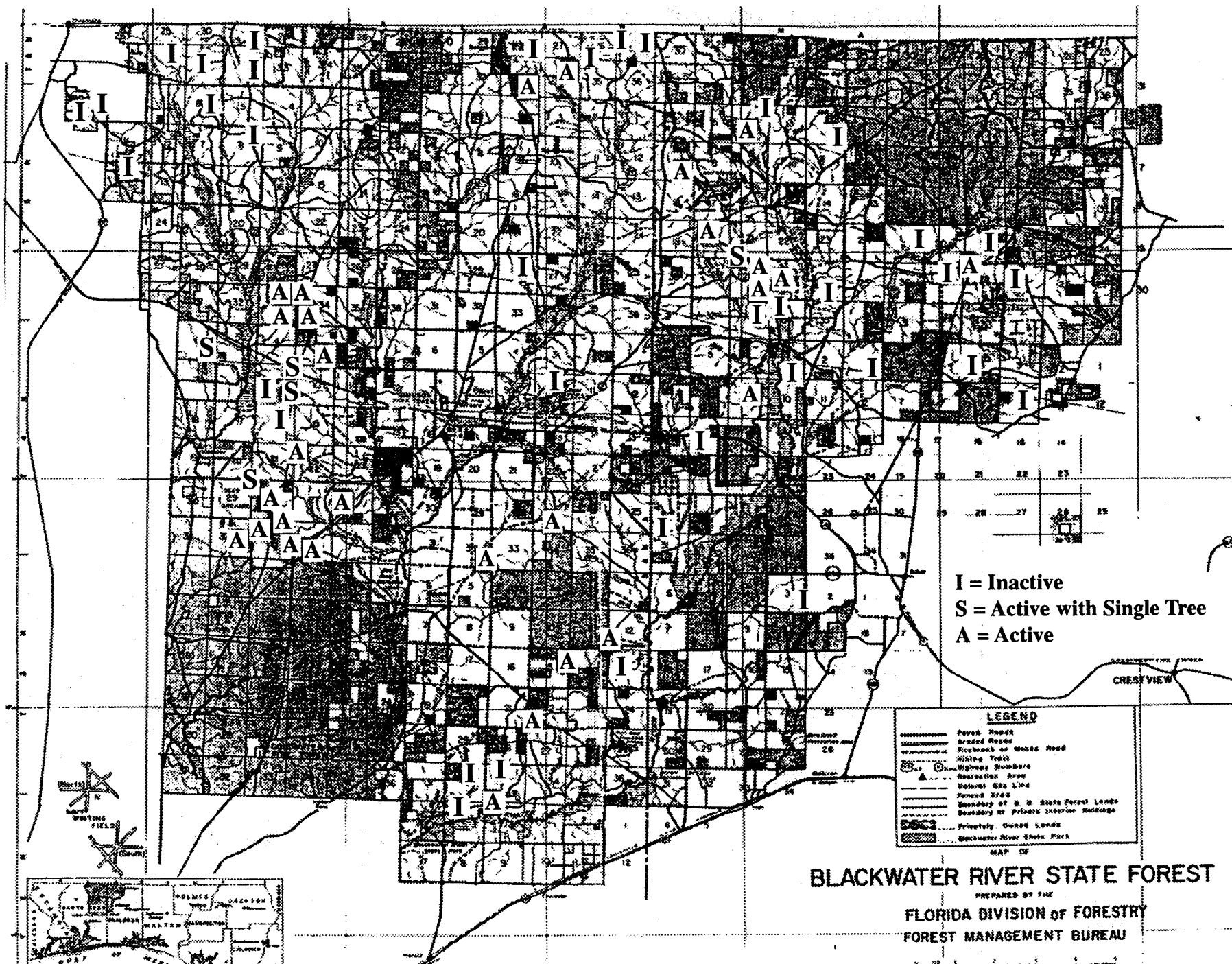
06-22-95	03	150	24.0
06-23-95	03	175	24.0
06-26-95	03	165	24.0
06-27-95	02	114	16.0
06-28-95	03	265	24.0
06-29-95	03	150	24.0
06-30-95	04	557	32.0
07-03-95	03	255	24.0
07-05-95	03	534	24.0
07-06-95	03	450	24.0
07-10-95	03	248	24.0
07-12-95	03	159	24.0
07-13-95	03	100	24.0
07-14-95	03	92	24.0
07-18-95	03	226	24.0
07-19-95	02	121	16.0
07-20-95	02	119	16.0
07-21-95	02	125	16.0
07-24-95	03	226	24.0
07-27-95	02	100	16.0
07-31-95	03	285	24.0
08-01-95	02	94	16.0
08-02-95	02	101	16.0
08-09-95	02	137	16.0
08-10-95	02	200	16.0
08-11-95	02	191	16.0

08-14-95	02	189	16.0
08-15-95	02	80	16.0
08-16-95	02	121	16.0
08-17-95	02	114	16.0
08-18-95	02	117	16.0
08-21-95	02	142	16.0
08-22-95	02	146	16.0
08-23-95	02	195	16.0
08-24-95	02	128	16.0
08-25-95	02	137	16.0
08-28-95	02	109	16.0
08-29-95	02	108	16.0
08-30-95	02	117	16.0
08-31-95	02	103	16.0
09-01-95	02	118	16.0
11-21-95	01	60	8.0
12-12-95	01	58	8.0
12-13-95	01	59	8.0
01-04-96	01	34	4.0
01-10-96	01	78	8.0
01-12-96	01	38	4.0
01-15-96	01	102	8.0
01-16-96	01	95	8.0

01-17-96	01	80	8.0
01-22-96	01	50	8.0
01-23-96	01	88	8.0
01-24-96	01	45	4.0
01-24-96	01	80	8.0
01-30-96	01	97	8.0
01-31-96	01	66	8.0
02-01-96	01	82	8.0
02-05-96	01	37	4.0
02-06-96	01	106	8.0
02-07-96	01	63	5.0
02-08-96	01	57	8.0
02-09-96	01	90	8.0
02-12-96	01	88	8.0
02-13-96	01	159	8.0
02-14-96	01	72	8.0
02-15-96	01	53	8.0
02-16-96	01	192	8.0
02-19-96	01	279	8.0
02-20-96	01	591	8.0
02-21-96	01	344	8.0
02-22-96	01	318	8.0
02-23-96	01	155	8.5
02-26-96	01	123	8.0
02-27-96	01	226	8.0

03-04-96	01	311	8.0
03-05-96	01	99	8.0
03-06-96	01	134	6.0
03-08-96	01	130	8.0
03-12-96	01	100	8.0
03-13-96	01	115	8.0
03-14-96	01	143	8.0
03-18-96	01	122	8.0
03-19-96	01	61	6.0
03-20-96	01	102	8.0
03-21-96	01	119	6.0
03-22-96	02	36	16.0
04-03-96	02	98	16.0
04-10-96	02	133	16.0
04-12-96	02	102	16.0
04-17-96	03	33	9.0
04-22-96	02	123	16.0
04-24-96	02	155	16.0
04-26-96	02	130	16.0
04-30-96	02	105	14.0
06-03-96	02	78	16.0
06-05-96	03	148	15.0
06-07-96	04	81	20.0
06-10-96	03	144	24.0
06-11-96	03	167	24.0

06-12-96	03	179	24.0
06-13-96	03	123	21.0



I = Inactive
 S = Active with Single Tree
 A = Active

LEGEND

- Power, Road
- Graded Road
- Firebreak or Game Road
- Hiking Trail
- Wildlife Refuge
- Recreation Area
- National Game Land
- Forest Area
- Boundary of U. S. State Forest Lands
- Boundary of Private Interior Holdings
- Privately Owned Lands
- Blackwater River State Park

BLACKWATER RIVER STATE FOREST

PREPARED BY THE
 FLORIDA DIVISION OF FORESTRY
 FOREST MANAGEMENT BUREAU