

**REPORT ON
RED-SHOULDERED HAWK INVESTIGATIONS
WITHIN THE
MILAN BOTTOMS/MILL CREEK COMPLEX
DURING 1996**



SUBMITTED TO:

**The Natural Resources Division of the U.S. Army Corps of Engineers
Mississippi River Project**

**Illinois Department of Natural Resources Wildlife Preservation Fund
(project 97-036)**

The U.S. Fish and Wildlife Service, Mark Twain Refuge, Wapello Division



SUBMITTED BY:

**Jon W. Stravers, Kelly J. McKay, and Paul Lopez
Midwest Raptor Research Fund
P.O. Box 32, Pella, Iowa 50219**

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INTRODUCTION

Although there has been much speculation concerning the effect of various types of timber harvest on red-shouldered hawk (Buteo lineatus) nesting, very little data has been collected on specific responses in the vicinity of recent forest cuts, especially in areas of red-shoulder nesting in forest tracts along the Mississippi River.

Red-shouldered hawks generally require fairly large unfragmented tracts (500 acres or more) of mature bottomland forest (Bednarz & Dinsmoore 1981; Stravers & McKay 1994); they are one of the rarest nesting raptors in Iowa and Illinois, and they are considered endangered in both states. Most of the documented nesting sites for this species in Iowa and Illinois are near or along the Mississippi River (Roosa & Stravers 1989). In some districts, such as the Wapello District (Pools 16-19) They are particularly rare; we know of only three areas that support active red-shoulder nests sites within a 150 mile stretch of the Mississippi from Savanna, Illinois, to Fort Madison, Iowa (Stravers 1992; Stravers & McKay 1994).

During the spring and summer of 1993, personnel from the U.S. Army Corps of Engineers Natural resources Division and the Midwest Raptor Research Fund both observed red-shouldered hawk territorial behavior within one of the proposed timber harvests within the Milan Bottoms. Subsequently, the planned timber harvest within the Mill Creek / Milan Bottoms were delayed, and eventually, the U.S.C.O.E. natural Resources Division altered their original harvest plan of three areas fora total 28 acres due to the potential negative effect of red-shouldered hawks nesting. Instead, an eleven acre harvest (proposed cut #3) was completed during the winter of 1994-1995.

In order to understand the potential impact of the accomplished timber harvest, we conducted regular investigations form five observation points within the study area during the months following the cut in 1995. We conducted searches for and initiated inventory techniques for all raptors nesting within the Mill Creek / Milan Bottoms study area.

In 1996 we continued to monitor the cut but not as frequently as in 1995. We continued observations at the known RSH nest sites and searched additional areas for active nests.

This report describes our initial effort to monitor the raptor population within the Milan Bottoms. We intend to continue these investigations over the next several years in order to make a more accurate assessment of red-shoulder response to timber harvest methods within the Milan Bottoms.

RESEARCH OBJECTIVES

1. To determine the presence or absence of nesting or foraging Red-shouldered hawks during the spring and summer of 1996 within the harvested and unharvested forest tracts in the Milan Bottoms, near the confluence of Mill Creek and the Mississippi River, in Rock Island County, Illinois.
2. To compare reproductive success of Red-shouldered hawks, with the reproductive success of red-tailed hawks, great-horned owls, barred owls, and any other raptors nesting within the study area.
3. To compare sightings and use rates for red-shouldered hawks with those of other raptor species within harvested and unharvested forest tracts of the study area.
4. To provide an updated assessment of Red-shouldered hawk response to specific forest management techniques within flood plain forest within the Mississippi River Valley.

METHODS

All potential red-shoulder hawk nesting habitat within the Milan Bottoms/Mill Creek area was systematically searched for raptor nests between November 1995 and March 1996; these searches were repeated between March and May of 1996 (Craighead & Craighead 1956). Nest searches were conducted on 16 days; monitoring of active nests and investigations on red-shouldered hawk foraging were conducted on an additional 18 days. To assist in locating active nesting territories, taped calls of red-shouldered hawks were played in order to elicit a territorial response (Fuller & Mosher 1987). All active raptor nests were plotted on topographic maps or aerial photos and were visited periodically throughout the nesting cycle in order to determine reproductive success.

We were able to search all of the habitat we considered high potential. However, the low topography within the study area and, high water levels during the spring months reduced the efficiency of nest searches within some sections. Our coverage of some of the fringe and low potential habitat was not as complete, especially in some areas where the water was deep and the trees were young creating a "crowded" situation that made searches ineffective.

DESCRIPTION OF THE STUDY SITE

The Milan Bottoms / Mill Creek complex study area includes over 1000 acres in Rock Island County, Illinois near the confluence of Mill Creek and the Mississippi River. The study area is bounded on the east by Interstate Highway 280, on the north by the Mississippi river, on the south by highway 92, and by a line approximately 3/8 mile west of the cut #3 on the west. The study area is dissected by an Iowa / Illinois powerline. Most of the study area is owned by U.S. Army Corps of Engineers and managed as part of the Mark Twin National Wildlife Refuge; however, some sections of the study are privately owned.

Several small streams flow into each other and into the Mississippi River within the study area. These include Mill Creek, Kickapoo Slough, Turkey Hollow Creek and several smaller unnamed temporary streams. There are several ridges within the study area that are elevated enough to remain exposed during most flooding; however, the elevation of the study area is low enough so that much of the study area is under water during typical spring water levels. Depth of flood waters may be anywhere between two inches and twelve feet and the duration of the flooding during some years may be as brief as a few days or as long as several months. The study area has had extended periods of high water each of the last four years and was quite likely inundated by record water levels during the summer of 1993.

Although there has been some selective timber harvest within the study area at various times in the past, there has been no large scale timber production from this area. Tree age diversity as well as tree species diversity within the study area is perhaps one of the highest of any of the flood-plain forests along the Mississippi River.

RESULTS AND DISCUSSION

RED-SHOULDERED HAWK NESTING SITES AND PRODUCTIVITY

During the 1996 field study, we documented two red-shouldered hawk (RSH) nesting attempts and we suspected at least one other nesting attempt within the Milan Bottoms/ Mill Creek study area. Both active nests were in nest structures used during the previous year. One RSH nest was situated along Mill Creek near the outflow from Mallard Pond, about 100 yards south of the confluence of Mill Creek and Kickapoo Slough (Map 1, Figure 1). This nest was within 100 yards of proposed cut #1. Two young RSH reached the age of ten or twelve days, but non survived beyond the fourth week and none fledged from this nest.

The second RSH nest was located near the intersection of Cormorant Pond and a drainage ditch about 75 yards from the powerline on private property (owned by Charles Brandt). This nest was approximately 500 yards east of the accomplished cut #3. The results from this year were the same as last year when eggs were laid and incubated but none hatched.

We suspect a third pair RSH may have nested either just east of the lower portion of Mill Creek, or along a slightly elevated ridge about half way between Long Pond and Mill Creek, about 400 yards from the Mississippi River, and about 150 yards west of proposed cut #2. RSH have nested in this location in previous years and there are several nest structures in the immediate area.

We observed adult RSH exhibiting territorial behavior in this area on several occasions during the early portions of the breeding season, but not after mid-May. Consequently, we suspect that if there was a nesting attempt in this location, it was also unsuccessful.

DISCUSSION OF RED-SHOULDERED HAWK NESTING SITE LOCATIONS

Despite the lack of topographic relief within the study area, it appears that RSH are selecting nesting locations within the driest portions of the study area where they find adequate-sized nesting trees. This is similar to our findings in other areas along the Mississippi River. However, in some respects, placement of RSH nests within the study area is somewhat unusual according to our previous findings (Stravers 1992; Stravers & McKay 1994), where we typically found RSH nests near the edge of the valley slope. However, the forests within the Milan Bottoms are not contiguous with the valley slope, since the valley slope is situated one mile south, separated by open fields, highway 92, and several human dwellings. Also, there is only slight topographic relief within the study area which makes this area different from most other RSH nesting sites within the Mississippi river Valley that we know of.

We have found that RSH are capable of adapting to typical flooding cycles along the Mississippi River; however young fledglings have a poor chance of survival when the nest tree is situated in a low-lying area when the surrounding areas are inundated during the fledging period in early June. Because of the lack of topographic relief and the limited availability of suitable nesting sites within the Milan Bottoms, some RSH might be forced to select sites that are less favorable due the potential for flooding and more frequent for human disturbance.

OTHER RAPTOR ACTIVITY OBSERVED WITHIN THE STUDY AREA

BARRED OWL

In addition to documenting the RSH nesting activity, we documented nesting, foraging, and migrating activity for eleven other raptor species within the Milan Bottoms study area during 1996. Barred owls were the most common nesting nocturnal raptor; we located two cavities that were used as nest sites and we suspect Barred Owl nesting at two other locations. Barred owls appeared to have a much higher success rate since we observed juveniles (first year) on three occasions during June and July, indicating that this species did have reproductive success within the study area.

GREAT-HORNED OWL

Great-horned owls nested along Kickapoo Slough again this year as they did in 1995; this nest site produce three young owls in 1995, but the nesting attempt was a failure in 1996. The failure may have been due to the poor weather, although we are not certain.

RED-TAILED HAWK

Although no active red-tailed hawk nests were located within the study area, red-tails were one of the most consistently sighted raptors during this study. Most observed during 1995 were immatures (non-breeding birds in their second year). In 1996, we observed adult red-tails on a more consistent basis. We suspect that they had an active nest about one mile south of the study area along the edge of a pasture and wooded ravine, and another pair may have nested just east of the study site and east of Highway 92. These birds most likely used portions of the Milan Bottoms as a regular foraging area.

TURKEY VULTURES

Between 20 and 80 turkey vultures consistently used the powerline structures and adjacent large trees as a nightly communal roosting site between late March and mid-October, especially between June and September. We suspect that there may be active nest sites for turkey Vultures in some of the large dead trees within the study area, however, did not locate any active turkey vulture nests.

OTHERS

During March and April we observed Cooper's Hawk's, Sharp-shinned Hawks, Broad-winged Hawks, Peregrine Falcon's, and Ospreys. We considered all of these individuals to be migrants that do not nest within the study area.

BALD EAGLE

In addition to the nesting and resident raptors, we observed a variety of wintering and migrating raptors. The most significant were Bald Eagles. They consistently used several areas within the Milan Bottoms as night roosting and day loafing areas from October through March. Number of Bald Eagles night roosting within the study area was consistently above thirty individuals, and we suspect that at times as many as one hundred eagles may night roost within the study area.

Although there have been regular observations of Bald Eagle numbers in this portion of the river, very little has been done to identify and document important night roosting sites for wintering Bald Eagles.

The Milan Bottoms study area appears to be an important night roosting area for Bald Eagles and we feel that this should also be considered in the Milan Bottoms forest management plan.

DISCUSSION OF RED-SHOULDERED HAWK RESPONSE TO THE TIMBER HARVEST

Recent research has suggested that fragmentation of large forest tracts that are suitable for RSH nesting and may favor red-tailed hawks (RTH) due to the increase in edge habitat. Timber cuts within the core RSH nest site habitat may disrupt established territorial boundaries and could eventually discourage RSH nesting (Bednarz & Dinsmore 1981; Hands et al 1989; Jacobs and Jacobs 19093; Stravers & McKay 1993). At the same time, studies in some locations have suggested that RSH may benefit from small cuts of less than 20 areas, and that such cuts may help to insure suitable nest site habitat 50-70 years from now (Anderson, in press. Jacobs & Jacobs 1993).

From our observations, it appears that RSH spend more time perched, and/or foraging, rather than soaring above the mature forest. On the other hand, RTH were usually observed in flight, but usually only passing over the mature forested areas. RSH were heard more often than seen, while RTH were seen more often than heard. This indicates that RSH were much more defensive and territorial within the Milan Bottoms, while RTH were less territorial while in the immediate area which they probably use primarily as a foraging area.

The 11 acre timber harvest appeared to be a frequent foraging area for several raptor species including red-tailed hawks, barred owls, and great-horned owls. Bald eagles and turkey vultures were also frequently observed, but most often they were flying over the area rather than perched or actively foraging.

The field of vision and effectiveness of our observations differed from location to location within the study area because of vegetation, topography, and water levels. Because the timber harvest provided a suitable clearing for observations, RSH were actually more easily observed at the cut than at locations within the forest where vision was limited by vegetation. However, these differences in visibility from site to site were somewhat minimized by the fact that often times we heard rather than saw RSH.

These observations in the Milan Bottoms confirm that RSH forage throughout the entire study area during the nesting season. RSH do indeed incorporate foraging in edge habitat, and we did observe them near the timber harvest on several occasions. However, our findings in the Milan Bottoms are similar to our previous findings that RSH spend most of their time foraging along wooded sloughs, small back water pools, and various waterways or wetland habitats, especially where these wetland habitats occur within mature and canopied forest. RSH probably find less competition from the more common raptors within these mature forest habitats, while they probably face increased competition from various other raptor species at edge habitats or open habitats.

RECOMMENDATIONS

Our conclusions concerning red-shouldered hawk response to specific forest harvests are based on observations from two nesting seasons following the eleven-acre timber harvest, and also from observations collected at numerous other RSH nesting sites each year between 1983 and 1996. We feel there are both benefits and drawbacks associated with any type of timber harvest within the Milan Bottoms: and there are also benefits and drawbacks with allowing large portions of any specific forest tract to become over-mature.

Because RSH often select stable trees within the driest and oldest portions of large forest tracts, they are often in direct conflict with the most valuable timber within the study area. Cuts within or near prime nesting sites may cause RSH to abandon specific areas as nesting habitat, or may force them to select another site somewhere within the study area which may be less favorable. This is typified by the fact that the RSH nest which was situated in low quality habitat (near a clearing, a powerline, and an agriculture field), was unsuccessful during both of the last two nesting attempts. This may support our theory that some sites are naturally less favorable for RSH than others. Or, the lack of production may be due to the relatively young age of the two adults involved in the nesting attempt.

Timber harvest may, however, be necessary in some areas in order to stimulate new growth since regeneration of canopy tree species is often poor in areas of mature flood plain forests. Canopy species such as cottonwood and silver maple are typically shade intolerant and most seedlings don't survive beyond four or five years underneath a well-developed canopy. Consequently, some kind of concessions may be needed to provide suitable nest-site habitat for RSH in 40-60 years.

Although some research has suggested that RSH will abandon territories near timber harvests, recent observations in Wisconsin, Minnesota, and other areas along the Upper Mississippi River suggest that RSH continue to nest in some sites where the timber harvest have been conducted on a small scale (Jacobs & Jacobs 1993; Dr. David Anderson, University of Minnesota, in press; Stravers 1996, pers. obs.).

According to these observations, it appears that the USCOE's methods of timber management, which incorporates a series of small clear cuts (> 20 acres) within a given areas, may cause a minimum of disturbance to nesting RSH and may also provide for needed regeneration. We agree with this approach to timber management as long as the overall plans provide for a protected core area, and as long as nest sites that have a history of good reproductive success are protected.

We feel the proposed cuts at sites #1 and #2 should not be completed as yet since these cuts might cause RSH to abandon nearby nesting sites. While we feel it is important to provide protection for RSH nesting sites, we also feel that the overall health of the forest within the study site may be more important than the protection of a few nesting sites within the study area. Because the species diversity within the Milan Bottoms is particularly rich in comparison with many other areas along the Mississippi River, we feel that the promotion of forest diversity should be an important factor in any forest harvests conducted in the study area. We also feel that any estimate of RSH response to timber harvest within the study should be based on long term data rather than on any findings from a single season.

While our observations are limited to only a few aspects of RSH behavior and nesting success, we nevertheless feel that these observations provide an important record of occupation and reproductive success from a specific site. We feel these observations should continue in some kind of capacity during the next few years.

SCIENTIFIC NAMES FOR BIRDS USED IN THIS REPORT

Red-shouldered Hawk - *Buteo lineatus*
Red-tailed Hawk - *Buteo jamaicensis*
Broad-winged Hawk - *Buteo platypterus*
Cooper's Hawk - *Accipiter cooperii*
Sharp-shinned Hawk - *Accipiter striatus*
Peregrine Falcons - *Falco peregrinus*
American Kestrel - *Falco sparverius*
Osprey - *Pandion haliaetus*
Bald Eagle - *Haliaeetus leucocephalus*
Great-horned Owls - *Bubo virginianus*
Barred owls - *Strix varia*
Turkey Vulture - *Cartheria aura*

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TABLE I

SUMMARY OF SEARCHES FOR RED-SHOULDERED HAWK NESTING SITES IN
THE MILAN BOTTOMS - WINTER AND SPRING OF 1996

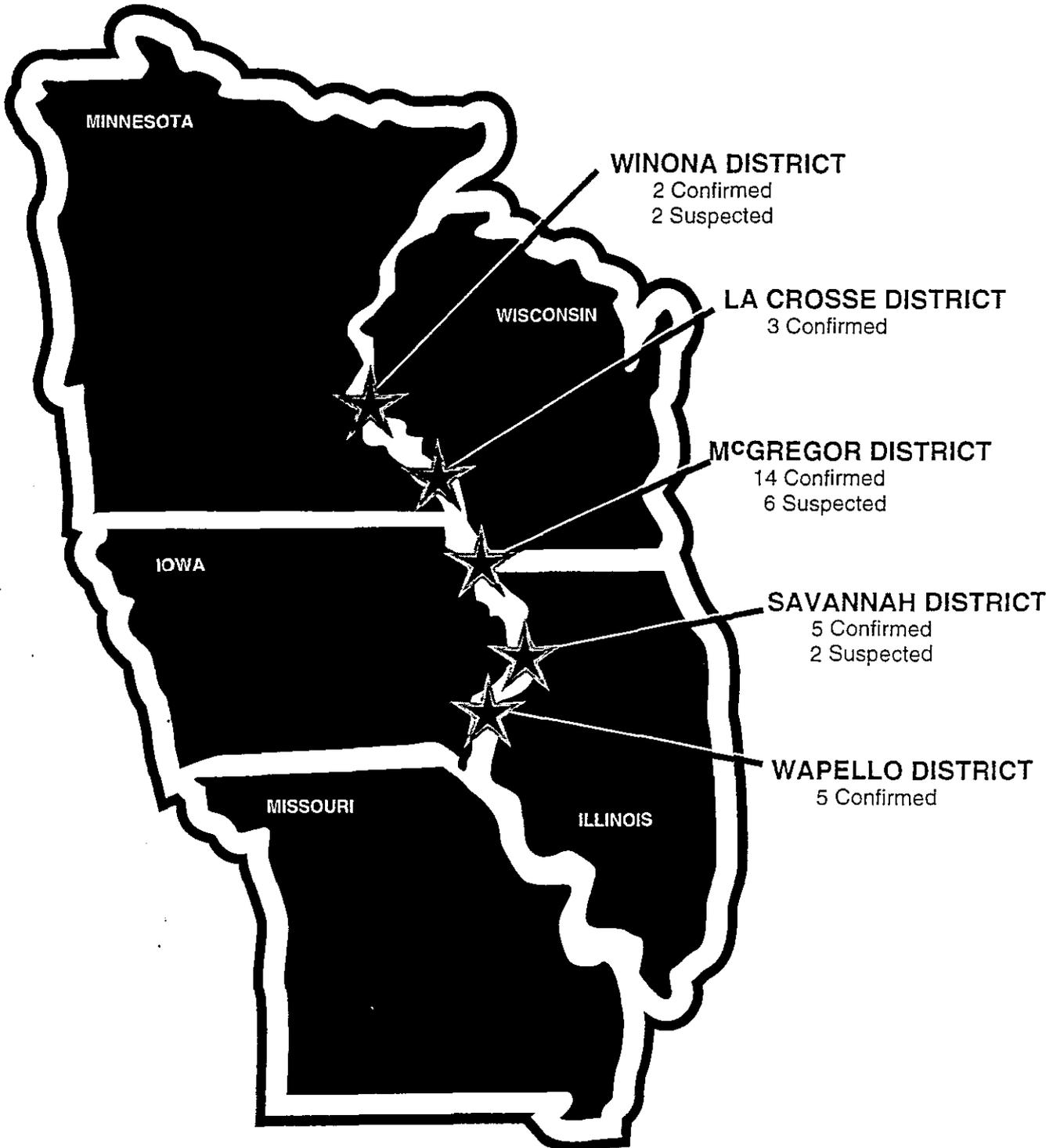
<u>Date</u>	<u># Hours</u>	<u>Area Searched</u>	<u>Results</u>
02/24	3.3	Mill Creek/Gun -Pond	RSH calling - CH, TRH, AK, BE
	2.0	Long Pond - east	BO
	2.0	edges of Heron Rokkery	no
	2.0	Powerline - west	RSH calling
03/04	2.0	Mill Creek - supper	RSH calling - potential structure
	2.0	Mill Creek - middle	RSH calling
	2.0	Mill Creek - lower	RSH calling
03/05	2.0	Kickapoo Slough	RSH & RTH sighted
	4.5	cut #3	RSH activity south of cut
03/17	2.0	Kickapoo Slough	GHO, RTH
03/23	2.5	Powerline & Cut #3	BO (numerous), BE
03/24	3.5	Kickapoo Slough	RSH foraging - RTH, BE, BO, GHO
03/25	4.5	Powerline	RSH calling, carrying sticks, BO, BE
04/10	2.0	Long Pond	
	2.0	Mill Creek Core #2	
	2.0	Mill Creek - middle	
04/20	2.0	Powerline & edges	RSH incubating
04/21	3.5	Mill Creek	RSH incubating
	3.5	Powerline Pond & Cut 3	RSH incubating and foraging
04/26	3.5	Powerline & edges Cut #3 and nearby	
04/27	2.0	Cut #3 and nearby	RSH calling & foraging
	0.5	Mill Creek - upper	RSH calling & incubating
	1.5	Kickapoo Slough	RTH, GHO
	2.0	Mill Creek - lower	RSH calling
05/04	6.5	Powerline	RSH incubating, soaring
		Mill Creek	RSH incubating, calling, foraging
		Cut #3	RSH, RTH, BO (numerous)

TABLE I
(CONTINUED)

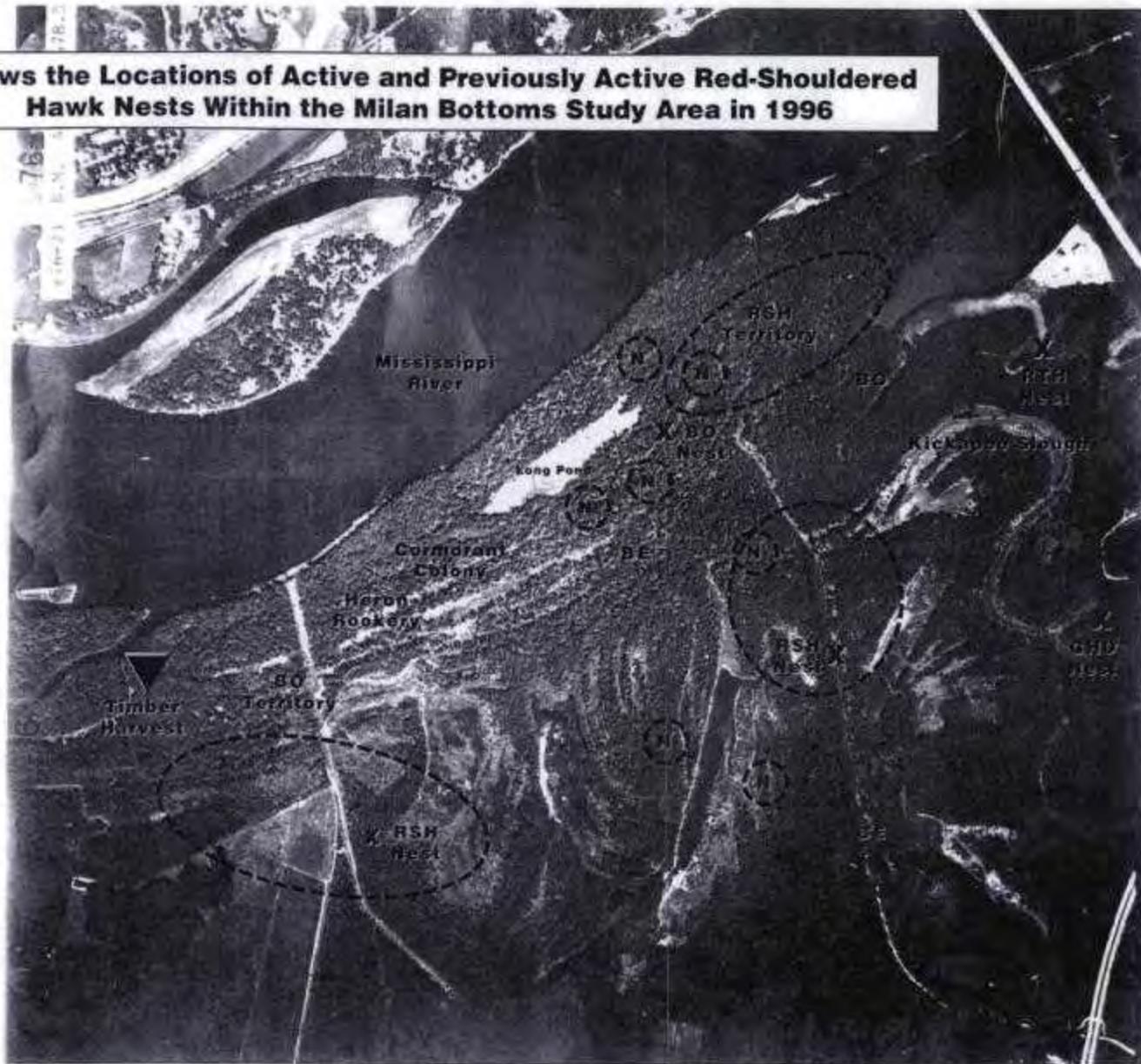
SUMMARY OF SEARCHES FOR RED-SHOULDERED HAWK NESTING SITES IN
THE MILAN BOTTOMS - WINTER AND SPRING OF 1996

<u>Date</u>	<u># Hours</u>	<u>Area Searched</u>	<u>Results</u>
05/05	6.0	Long Pond Cut #3 Lower Mill Creek	- RTH, BO, RSH, RSH calling
05/17	2.0	Powerline (p.m.)	B.O.
05/18	6.0	Powerline Kickapoo Slough Lower Mill Creek	RSH nest looks deserted RTH, GHO, B.O. RSH calling
05/19	5.5	Mill Creek Lower Mill Creek Long Pond	two RSH nestlings - -
05/25	2.5	Powerline Cut #3	RSH nest looks deserted - no rsh no raptors observed (rain)
05/26	3.0	Mill Creek Lower Mill Creek Long Pond	RSH nest looks deserted - -
06/02	3.5	Mill Creek & Lower Mill Creek - Kickapoo Slough	
06/04	5.5	Mill Creek & Powerline Cut #3	-
06/11	2.5	Powerline (p.m.)	B.O.
06/12	6.5	Ponds east of Powerline	- no RSH
06/16	3.5	Ponds east of Powerline	B.O. - (no RSH)
06/29	2.0	Mill Creek & Powerline (p.m.)	- B.O.
06/30	5.0	Mill Creek & Long Pond Cut #3	
07/16	4.0	Mill Creek & Lower Mill Creek - Powerline & Cut #3	
08/02	4.0	Ponds east of Powerline Long Pond	

DISTRIBUTION OF THE KNOWN RED-SHOULDERED HAWK TERRITORIES BY DISTRICTS ON THE UPPER MISSISSIPPI RIVER



Shows the Locations of Active and Previously Active Red-Shouldered Hawk Nests Within the Milan Bottoms Study Area in 1996



KEY

- RSH = Red-Shouldered Hawk
- RTH = Red-Tailed Hawk
- GHO = Great-Horned Owl
- BO = Barred Owl
- BE = Bald Eagle Winter Roosting Sites
- N = Inactive RSH Nest Used in Previous Years

**Shows the Locations of Red-Shouldered Hawk
Activity Observed with the Milan Bottoms Study Area in 1996**

KEY

- X = Red-Shouldered Hawk Sighting
- N = Inactive RSH Nest Used in Previous Years
- A = Alternate Nest

