

JOB PROGRESS REPORT

State: California

Project Number: W-65-R-1 Subproject Title: Nongame Wildlife
Investigations

Job Number: II-2.0 Job Title: Diurnal Raptor Eyrie Monitoring
Program

Period Covered: July 1, 1983 - June 30, 1984 Job Type: Survey and
Inventory

SUMMARY:

During the report period, information on nesting populations, habitat quality and competitive relationships of Swainson's Hawks (Buteo swainsoni) was gathered and added to the diurnal raptor eyrie files. Also included was information on the breeding activities of Ospreys (Pandion haliaetus). Insufficient data were gathered to yield meaningful information on Swainson's Hawk productivity. A total of 84 Swainson's Hawk territories was visited; 64 were active. The number of known and active territories has increased in 1984; however, this does not represent an increasing population, but instead reflects the degree of survey intensity.

Habitat destruction continues to be the major threat to Swainson's Hawk survival. Certain agricultural practices provide unsuitable hunting habitat and decreased prey populations while nesting habitat is threatened by diminishing riparian areas. Also, competition with other stick-nest-building raptors may be significant enough to reduce Swainson's Hawk populations in the future if trends of habitat destruction continue and result in even more limited nesting and hunting habitat. Thirty-six Osprey territories were monitored in the Lake Almanor area in northern California by the Lassen National Forest. Results indicate the population is now reproducing at a rate that is more than twice as high as it was during the mid-1970's. This is the highest reproductive rate since the Forest Service inventory of Ospreys began in 1969. Most of the eyrie location, activity, and productivity information has been entered into the Nongame Wildlife Section microcomputer. The data base is updated as more information becomes available.

BACKGROUND:

Department of Fish and Game personnel have reported on the location of diurnal raptor eyries since the 1950's. Much of the information was gathered in an informal manner; however, records obtained in the past dozen years have been filed systematically. There has been an effort to maintain a central file containing data on raptor nest locations, breeding success, and other facts on the nesting activities of several

species. New information is added on a continuing basis. Currently, Department eyrie files contain information on the following diurnal raptors: Turkey Vulture (Cathartes aura), California Condor (Gymnogyps californianus), Black-shouldered Kite (Elanus leucurus), Northern Goshawk (Accipiter gentilis), Cooper's Hawk (A. cooperii), Sharp-shinned Hawk (A. striatus), Swainson's Hawk, Golden Eagle (Aquila chrysaetos), Bald Eagle (Haliaeetus leucocephalus), Osprey, Prairie Falcon (Falco mexicanus), Peregrine Falcon (F. peregrinus), and American Kestrel (F. sparverius).

Reports on the locations of Northern Goshawk territories have been received, primarily from various national forests within the species' range in California. More information on the Goshawk is contained in the report dealing with the Montane Forest Accipiter Study (W-65-R-1; II-11.0).

The raptor eyrie files contain data on over 2,000 nest sites and territories that have been active, both historically and recently. The files are most complete and contain the greatest number of records on Prairie Falcons (600+), Ospreys (350+), Golden Eagles (300+), Goshawks (250+) and Swainson's Hawks (250+). Files on species such as Black-shouldered Kite, Sharp-shinned Hawk, and Turkey Vulture are the least complete and no records have been entered into the microcomputer data base on these species.

OBJECTIVE:

The objective is to establish baseline data for use in evaluating raptor population trends. Information on the size and distribution of breeding populations and their breeding success on an annual basis is contained in the diurnal raptor eyrie files and used to monitor populations of selected raptor species and to determine research and management needs. Files must be current and up to date to be useful for a variety of research and management tasks.

PROCEDURES:

Information on territory or nest site location, date of nest check, status of occupancy, number of eggs or young, and other notes are recorded on field forms. Nest and territory records are completed by Department and cooperating field personnel, most frequently U.S. Forest Service biologists, and forwarded to the Nongame Wildlife Section. Land use changes that might adversely affect nests and nesting territories are noted. These data are also entered into the microcomputer file. Location information for endangered species and those species popularly used in falconry is kept confidential to reduce human disturbance and harassment. However, this information is available to Department personnel, biologists from cooperating agencies and bona fide researchers for use in planning and research activities. These same agencies and personnel often are the source

of new raptor eyrie information. The raptor eyrie file often functions as a starting point when a study to determine the status of a particular species is undertaken. Information gained as a result of such studies is added to the system and facilitates periodic monitoring thereafter.

Swainson's Hawk surveys were conducted by Nongame Wildlife staff. Cooperating Department personnel included W. Bailey, R. Schoonover, and D. Gifford. Additional assistance was provided by D. Schlorff. D. Airola of U.S. Forest Service provided information on Osprey populations.

FINDINGS:

Swainson's Hawk:

An intensive survey covering four 36 square mile blocks in the Central Valley was conducted during May and June, 1984. As a result of using a more intensive survey method this year, several new territories were discovered (Table 1) which resulted in an increase of known and active territories in most central California counties in 1984 (Table 2). Each survey block differed in the total number of territories and in the type and quality of habitat. Together, they provided a reasonable cross-section of Swainson's Hawk habitat in the Central Valley.

Woodland

The Woodland block is located between the cities of Davis and Woodland in Yolo County. Of the four blocks surveyed, Woodland had the most open habitat, was under the most agricultural use, had the least amount of riparian habitat, the highest density of Swainson's Hawks, and the lowest density of all hawks (Table 3). Of the 14 active territories found, 12 were directly associated with riparian habitat and 1 was a nest site within 1 mile of a riparian zone.

Nesting habitat is scarce in this area, resulting in dense association of nest sites. Willow and Dry Sloughs are the only waterways through the block, providing two thin zones of riparian habitat. Landowners of the area have removed much of the riparian vegetation over the recent decades. A farm-related construction project along Willow Slough resulted in the abandonment of a Swainson's Hawk territory. Virtually all the land in the Woodland block is under agricultural use. The major crops are grains, tomatoes and corn. All Swainson's Hawks hunted in agricultural fields. The flat, open land and thin riparian zones provide suitable habitat and still support one of the highest densities of Swainson's Hawks in the State.

TABLE 1

1984 Swainson's Hawk Survey Results

Active = A
Not Active = NA

Survey Block	Terr. #	A/NA	Past Activity X = Active					#Adults	Color Phase	Nest	Yng.	
			New	83	82	81	80					79
WOODLAND	Yo - 06	A		X	X	X		X	2	2 Med.		
	Yo - 07	A			X			X	1	Lt.		
	Yo - 12	A		X	X	X	X	X	1	Lt.		
	Yo - 13	NA		X		X		X				
	Yo - 16	A			X	X		X	2	1 Lt., 1 Dk.		
	Yo - 18	NA						X				
	Yo - 19	A			X	X			1	Lt.		
	Yo - 45	A		X					1	Dk.	Nest	2
	Yo - 46	A		X					2	1 Lt.	Nest	
	Yo - 47	A		X					2		Nest	
	Yo - 48	A		X					2	1 Lt., 1 Dk.	Nest	
	Yo - 49	A		X					2	1 Lt., 1 Med.		
	Yo - 50	A		X					2	1 Lt., 1 Dk.		
	Yo - 51	A		X					2	1 Lt., 1 Dk.		
	Yo - 52	A		X					2	2 Lt.	Nest	
	Yo - 53	A		X					1		Nest	
	Yo - 54	A		X					4			
WILTON	Sa - 13	A				X			2	1 Lt., 1 Dk.		
	Sa - 24	A			X				1		Nest	
	Sa - 25	NA			X							
	Sa - 36	A		X					2	1 Lt., 1 Dk.		
	Sa - 37	A		X					2	2 Dk.		
	Sa - 38	A		X					2	1 Dk., 1 Med.		
	Sa - 39	A		X					1			

TABLE 1 (continued)
1984 Swainson's Hawk Survey Results

Active = A
Not Active = NA

Survey Block	Terr. #	A/NA	Past Activity X = Active					# Adults	Color Phase	Nest	Yng.
			New	83	82	81	80				
GALT-THORNTON	Sa - 07	NA						X			
	Sa - 08	A			X			X	1	Lt.	
	Sa - 40	A	X						1	Lt.	
	Sa - 41	A	X						2		Nest
	Sa - 42	A	X						1		
	Sa - 43	A	X						1		
	SJ - 02	A						X	1	Lt.	
	SJ - 22	A	X						1	Lt.	
	SJ - 23	A	X						1		
	SJ - 24	A	X						5		
VERNALIS	SJ - 10	A					X		2	1 Lt., 1 Med.	
	SJ - 11	A		X		X			1	Lt.	
	SJ - 12	A		X	X	X			1		Nest
	SJ - 13	NA				X					
	SJ - 14	NA				X					
	SJ - 17	A			X				3	2 Dk., 1 Lt.	
	SJ - 25	A	X						2	1 Lt., 1 Med.	Nest
	SJ - 26	A	X						2	1 Lt., 1 Dk.	Nest
	SJ - 27	A	X						2	1 Lt., 1 Dk.	Nest
	St - 02	NA						X			
	St - 03	NA						X			
	St - 04	A						X	2	1 Lt., 1 Dk.	
	St - 05	A	X						1	Dk.	
St - 06	A	X						2			

TABLE 2

Swainson's Hawk Territories, Central and Owens Valley
Survey 1979-84

<u>County</u>	<u>Year</u>	<u>No. of Known Territories</u>	<u>No. of Territories Checked</u>	<u>No. of Active Territories</u>
Butte	1979	1	1	1
	1980	2	1	1
	1981	2	0	0
	1982	4	2	2
	1983	4	0	0
	1984	4	0	0
Colusa	1979	3	3	3
	1980	4	4	2
	1981	9	6	6
	1982	11	11	3
	1983	12	11	5
	1984	14	3	1
Glenn	1979	2	2	2
	1980	2	0	0
	1981	2	1	1
	1982	2	0	0
	1983	2	0	0
	1984	2	0	0
Inyo	1979	0	0	0
	1980	0	0	0
	1981	1	1	1
	1982	2	1	1
	1983	2	1	1
	1984	2	0	0
Merced	1979	7	7	7
	1980	7	0	0
	1981	7	0	0
	1982	7	0	0
	1983	9	7	3
	1984	9	0	0
San Joaquin	1979	9	9	9
	1980	10	5	1
	1981	16	8	8
	1982	19	17	5-6
	1983	22	13	10
	1984	30	16	14

TABLE 2 (continued)

Swainson's Hawk Territories, Central and Owens Valley
Survey 1979-84

<u>County</u>	<u>Year</u>	<u>No. of Known Territories</u>	<u>No. of Territories Checked</u>	<u>No. of Active Territories</u>
Sacramento	1979	11	11	11
	1980	12	12	4
	1981	22	14	12
	1982	27	20	13
	1983	34	19	14
	1984	43	29	24
Solano	1979	0	0	0
	1980	0	0	0
	1981	0	0	0
	1982	2	2	2
	1983	4	3	3
	1984	4	0	0
Stanislaus	1979	4	4	4
	1980	4	0	0
	1981	4	0	0
	1982	4	1	0
	1983	4	3	0
	1984	6	5	3
Sutter	1979	7	7	7
	1980	9	3	1
	1981	10	3	3
	1982	14	11	7
	1983	17	8	7
	1984	20	10	8
Yolo	1979	16	16	16
	1980	18	17	8
	1981	29	19	15
	1982	38	25	15-19
	1983	42	17	14
	1984	57	34	27
Total	1979	60	60	60
	1980	68	42	17
	1981	102	52	46
	1982	130	90	51
	1983	150	78	42
	1984	191	97	77

TABLE 3

Results of 1984 Swainson's Hawk Intensive Survey

	Woodland	Wilton	Galt-Thornton	Vernalis
Swainson's Hawks (#) (#/mi. ²)	(27) (0.75)	(10) (0.278)	(14) (0.389)	(18) (0.5)
Swainson's Hawk Terr. (#) (#/mi. ²)	(14) (0.389)	(6) (0.167)	(9) (0.25)	(10) (0.278)
Red-tailed Hawk (#) (#/mi. ²)	(6) (0.167)	(25) (0.694)	(27) (0.75)	(48) (1.33)
Red-tailed Hawk Terr. (#) (#/mi. ²)	(3) (0.083)	(18) (0.5)	(17) (0.472)	(26) (0.722)
Other Raptors (#) (#/mi. ²)	(0) (0)	(7) (0.194)	(6) (0.167)	(2) (0.056)
Other Raptor terr. (#) (#/mi. ²)	(0) (0)	(6) (0.167)	(5) (0.139)	(1) (0.028)
All Raptors (#) (#/mi. ²)	(33) (0.917)	(42) (1.17)	(47) (1.31)	(66) (1.83)
All Raptor terr. (#) (#/mi. ²)	(17) (0.472)	(30) (0.833)	(31) (0.861)	(36) (1.0)
SH:RTH	4.5:1	0.4:1	0.519:1	0.375:1
SH terr.: RTH terr.	4.67:1	0.33:1	0.529:1	0.385:1
SH: Other Raptors (inc. RTH)	4.5:1	0.313:1	0.424:1	0.36:1
SH terr: Other Raptor terr. (inc. RTH)	4.67:1	0.25:1	0.409:1	0.370:1

Wilton

The Wilton block is located near the town of Wilton in southeastern Sacramento County. This block had the greatest diversity of land use, including development, cropland, pasture (including hilly terrain), residential, marsh and riparian habitat. Also, the lowest density of Swainson's Hawks and a high density of other hawks, particularly Red-tailed Hawk (Buteo jamaicensis), was observed here (Table 3). Suitable nesting habitat exists along Deer Creek and the Cosumnes River; however, little hunting habitat remained to support a large population of Swainson's Hawks. Human disturbance and the diversity of land-use patterns provided habitat more suitable to Red-tailed Hawks, which were common here. Five of the six Swainson's Hawk territories found here were associated with riparian habitat. Five of six utilized agricultural areas to hunt, the other was found in pasture.

Galt-Thornton

The Sacramento-San Joaquin county line divides the Galt-Thornton block. Here, a variety of habitat types limit the density of Swainson's Hawks by limiting the amount of open range. Also, residential areas, ranchettes, and crops, such as grapes, provided little habitat for Swainson's Hawks. Nine territories were located, all of which were in riparian habitat (Table 3). Approximately 10 percent of the block was pasture, which supported 2 territories, while the other 7 pairs utilized certain agricultural areas to hunt. Seventeen Red-tailed Hawk territories were found here, utilizing most habitat types for nesting and hunting.

Vernalis

The San Joaquin-Stanislaus county line divides the Vernalis block. This area was characterized by extensive riparian habitat, large open pasture and farmland, the second highest density of Swainson's Hawks of the 4 blocks surveyed, and the highest density of all hawks (Table 3). Both the Stanislaus and the Tuolumne Rivers run through the block, as well as a number of small sloughs, which provided adequate nesting habitat for a relatively large population of Swainson's Hawks. Ten pairs were found here, all but one utilizing riparian habitat to nest. Approximately one-half of the block was pasture, the other half was crop lands. The birds in 4 territories utilized pasture to hunt, 6 utilized other agricultural lands.

Much of the Vernalis block was excellent Swainson's Hawk habitat, providing adequate riparian nesting habitat and sufficient hunting habitat. The Vernalis block also supported 48 Red-tailed Hawk individuals in 26 territories, which were observed utilizing typical Swainson's Hawk nesting and hunting habitat, as well as other habitat types.

A survey of the Sacramento River also was conducted this year. The survey area included 141 river miles from Colusa to the Sacramento-San Joaquin Delta (Table 4). There was little difference in the total number of Swainson's Hawks observed between 1983 and 1984 (Tables 4 and 5). However, there was a marked difference in the location of many sightings. Several 1984 territories were new, while several 1983 territories were inactive this year. Little change in habitat quality occurred between 1983 and 1984. Only 41 of the 282 miles of stream bank were considered suitable habitat. The remaining 85% surveyed was either denuded of all vegetation or had trees that were not suitable for nesting Swainson's Hawks.

Osprey:

Results of the U.S. Forest Service's 1984 survey at Lake Almanor (Table 6) and the trend in reproductive success (based on number of young per occupied nest) indicate that not only has the population recovered from its low levels in the early 1970's (Fig. 1), but has reached its highest level since the Forest Service inventory of Ospreys began in 1969. Both the number of young per occupied nest (1.81) and the number of young per successful nest (2.32) were up from 1983 (1.40 and 1.81, respectively) (Table 7).

Even though pesticide use within Osprey range does not appear to be significant enough to cause reproductive failure, the Department is still concerned that disturbance caused by logging activities and the potential for loss of snags and live nest trees continues to threaten the population on both public and private lands.

ANALYSIS:

Each year the amount of information contained in the eyrie files increases. The data files contain sufficient information to determine population trends of certain species. Ironically, more is known about the population status of the less common species, such as the Swainson's Hawk, than raptors such as the Red-tailed Hawk, Turkey Vulture, and American Kestrel. Since it has always been assumed the latter species were abundant and not threatened in any way, no effort has been made to study their populations. It will be important to establish a baseline population level for such species should they show signs of decline in the future.

Swainson's Hawk:

In 1983, the Swainson's Hawk was listed as a Rare species by the California Fish and Game Commission. This was in response to recommendations from the Department based on results of surveys taken

TABLE 4

SURVEY OF RIPARIAN ZONE OF
SACRAMENTO RIVER FOR NESTING SWAINSON'S HAWKS
AND OTHER STICK NESTING RAPTORS, 1984

Swainson's Hawk & Other Raptor
Sighting & Territory Frequencies

Section of Sacramento River

	Colusa- Fraziers Landing	Steiner-Bend Knights Landing	Knights Landing- Discovery Park	Discovery- Park- Hood	Hood- Grand Island
Swainson's Hawks per river mi.	6/28; 0.21	4/27; 0.15	14/30; 0.47	9/21; 0.43	3/35; 0.09
River mi. per hawk	28/6; 4.67	27/4; 6.75	30/14; 2.14	21/9; 2.33	35/3; 11.67
Swainson's territories per river mi.	5/28; 0.18	2/27; 0.07	9/30; 0.30	6/21; 0.29	2/35; 0.06
River mi. per terr.	28/5; 5.60	27/2; 13.5	30/9; 3.33	21/6; 3.50	35/2; 17.5
Swainson's per suitable hab. mi.	6/10; 0.60	4/6; 0.67	14/20; 0.70	9/3; 3.0	3/2; 1.50
Suitable hab. mi. per hawk	10/6; 1.67	6/4; 1.5	20/14; 1.43	3/9; 0.33	2/3; 0.67
Swainson's terr. per suitable mi.	5/10; 0.50	2/6; 0.33	9/20; 0.45	6/3; 2.0	2/2; 1.0
Suitable mi. per Swainson's terr.	10/5; 2.0	6/2; 3.0	20/9; 2.22	3/6; 0.5	2/2; 1.0
Other raptors per river mi.	14/28; 0.50	19/27; 0.70	11/30; 0.37	2/21; 0.10	0/35; 0.0
River mi. per other raptor	28/14; 2.0	27/19; 1.42	30/11; 2.73	21/2; 10.5	35/0; 0.0
Other raptor terr. per river mi.	12/28; 0.43	14/27; 0.52	7/30; 0.23	2/21; 0.10	0/35; 0.0
River mi. per other raptor terr.	28/12; 2.33	27/14; 1.93	30/7; 4.29	21/2; 10.5	35/0; 0.0
Other raptor per suitable hab. mi.	14/10; 1.40	19/6; 3.17	11/20; 0.55	2/3; 0.67	0.2; 0.0
Suitable hab. mi. per other raptor	10/14; 0.71	6/19; 0.32	20/11; 1.82	3/2; 1.50	2/0; 0.0
Other raptor terr. per suitable mi.	12/10; 1.20	14/6; 2.33	7/20; 0.35	2/3; 0.67	0/2; 0.0
Suitable mi. per other raptor	10/12; 0.83	6/14; 0.43	20/7; 2.86	3/2; 1.50	2/0; 0.0

TABLE 5

SURVEY OF RIPARIAN ZONE OF
SACRAMENTO RIVER FOR NESTING SWAINSON'S HAWKS
AND OTHER STICK NESTING RAPTORS, 1983

Swainson's Hawk and Other Raptor Sighting and Territory Frequencies	Section of Sacramento River				
	Colusa- Fraziers Landing	Steiner Bend- Knights Landing	Knights Landing- Discovery Park	Discovery Park- Hood	Hood- Grand Island
Swainson's Hawks per river mi.	4/28; 0.14	5/27; 0.19	18/30; 0.60	3/21; 0.14	4/35; 0.11
River mi. per hawk	28/4; 7.0	27/5; 5.4	30/18; 1.7	21/3; 7.0	35/4; 8.8
Swainson's territories per river mi.	3/28; 0.11	4/27; 0.15	14/30; 0.47	2/21; 0.10	3/35; 0.09
River mi. per terr.	28/3; 9.3	27/4; 6.8	30/14; 2.1	21/2; 10.5	35/3; 11.7
Swainson's per suitable hab. mi.	4/10; 0.40	5/6; 0.83	18/20; 0.90	3/3; 1.0	4/2; 2.0
Suitable hab. mi. per hawk	10/4; 2.5	6/5; 1.2	20/18; 1.1	3/3; 1.0	2/4; 0.50
Swainson's terr. per suitable mi.	2/10; 0.30	4/6; 0.67	12/20; 0.60	2/3; 0.67	3/2; 1.5
Suitable mi. per Swainson's terr.	10/3; 3.3	6/4; 1.5	20/12; 1.7	3/2; 1.5	2/3; 0.67
Other raptors per river mi.	10/28; 0.36	23/27; 0.85	22/30; 0.73	3/21; 0.14	1/35; 0.03
River mi. per other raptor	28/10; 2.8	27/23; 1.2	30/22; 1.4	21/3; 7.0	35/1; 35.0
Other raptor terr. per river mi.	10/28; 0.36	14/27; 0.52	15/30; 0.50	3/21; 0.14	1/35; 0.03
River mi. per other raptor terr.	28/10; 2.8	24/14; 1.9	30/15; 2.0	21/3; 7.0	35/1; 35.0
Other raptors per suitable hab. mi.	10/10; 1.0	23/6; 3.8	22/20; 1.1	3/3; 1.0	1/2; 0.50
Suitable hab. mi. per other raptor	10/10; 1.0	6/23; 0.26	20/22; 0.91	3/3; 1.0	2/1; 2.0
Other raptor terr. per suitable mi.	10/10; 1.0	14/6; 2.3	15/20; 0.75	3/3; 1.0	1/2; 0.50
Suitable mi. per other raptor	10/10; 1.0	6/14; 0.43	20/15; 1.3	3/3; 1.0	2/1; 2.0

TABLE 6

1983 and 1984 Lake Almanor Osprey Survey Results

	<u>1983</u>	<u>1984</u>
#Occupied Nests	29 (+6) ^{a/}	31 (+1)
#Successful Nests	20 (+3)	24 (+1)
#Young Produced	43 (+6)	57 (+1)
%Nests Successful	20/29 = 69% (23/35 = 66%)	24/31 = 77% (25/32 = 78%)
%Young/Occupied Nest	43/29 = 1.48 (49/35 = 1.40)	57/31 = 1.84 (58/32 = 1.81)
#Young/Successful Nest	43/20 = 2.15 (49/23 = 2.13)	57/24 = 2.38 (58/25 = 2.32)

^{a/} Numbers in parentheses are values for nests found late in the season.

Figure 1

OSPREY REPRODUCTION - LAKE ALMANOR
(N = 13-32/YR)

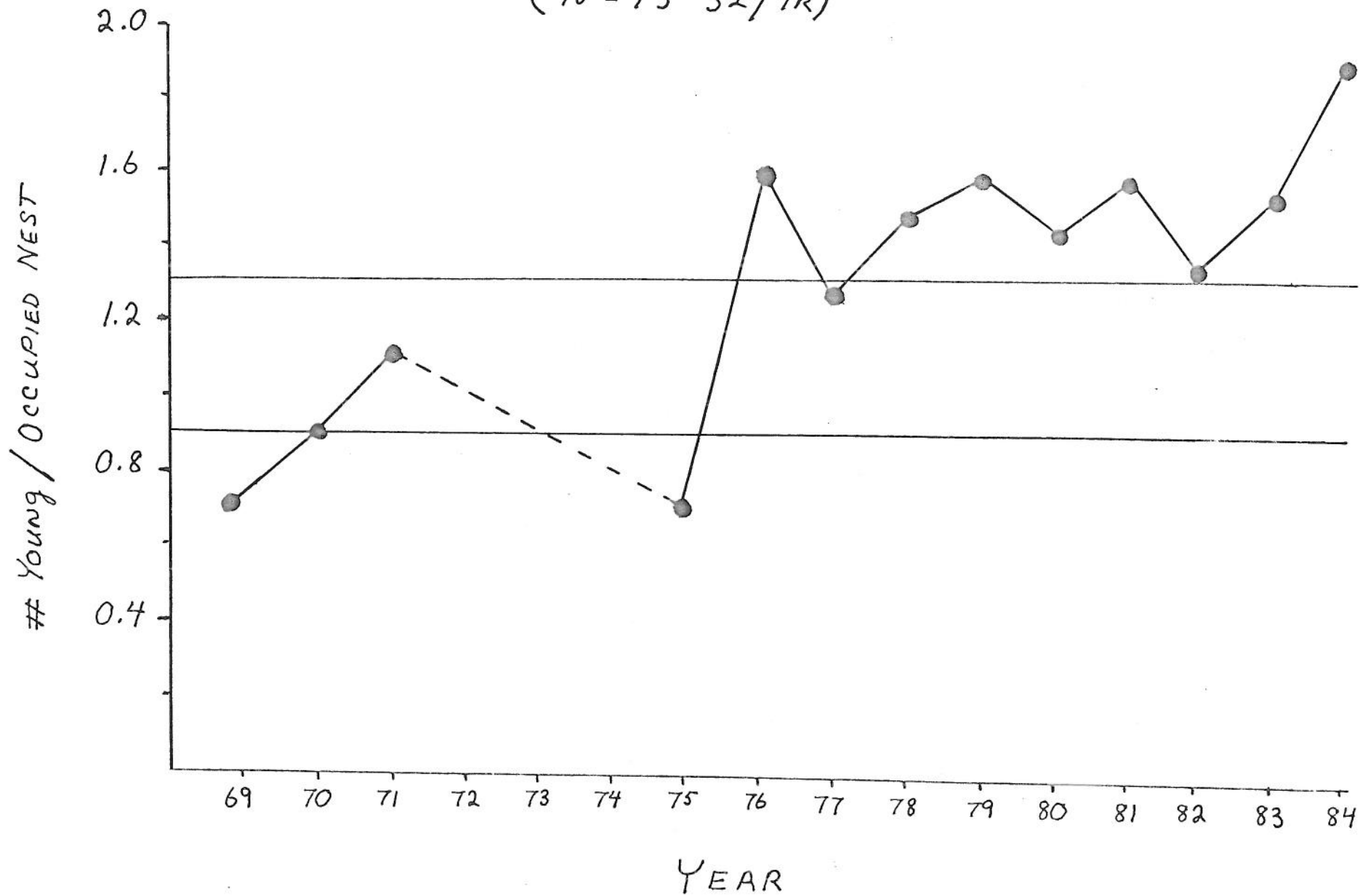


TABLE 7

Osprey Nesting Success - Lake Almanor Area, 1984

	<u>Almanor Area Checked Early</u>	<u>Almanor Area Found Late</u>	<u>Almanor Total</u>	<u>Mt. Meadows</u>	<u>Butt Valley</u>	<u>Total</u>
#Nests Occupied	31	1	32	2	2	36
#Nests Successful	24	1	25	1	1	27
#Young Produced	57	1	58	3	2	63
%Nests Successful	77		78	50	50	75
#Young/ Occupied Nest	1.84		1.81	1.50	1.00	1.75
#Young/ Successful Nest	2.38		2.32	3.00	2.00	2.33

since 1979 showing drastic population reduction of this species. The Swainson's Hawk and its habitat has now been afforded some measure of increased protection. Greater effort is to be expended toward the species' recovery in California. The 1984 survey was the most extensive since Pete Bloom's original survey was completed in 1979. There are 191 known territories in the Sacramento Valley, up from 150 in 1983 and 60 in 1979. The number of active territories equals 77 this year, up from 42 in 1983. This increase does not necessarily represent an increasing population, but instead reflects the degree of survey intensity. Each year known territories are checked and new territories are added as they are discovered.

Prior to 1984, the survey covered most of the suitable habitat in the Central Valley. The general method was to recheck previously known territories. Any new sightings found along the way were recorded accordingly. For the 1984 survey, a new method was developed. Four township-sized blocks (36 sq. mi.) were chosen in four different areas in the Valley. Together they make up a reasonable cross section of most of the Swainson's Hawk range in California. An intensive survey was completed on each block, which covered every accessible area within the boundary.

By performing the survey in this manner a more accurate population index can be derived. By intensively surveying a smaller defined area, which includes most habitat types utilized by the Swainson's Hawk in California, it is possible to determine preferred and critical nesting and hunting habitat as well as the influence of various agricultural practices.

Habitat quality appears to be a primary factor influencing the Swainson's Hawk populations in the study area. The results of the 1984 survey help to define habitat requirements by associating Swainson's Hawks with specific nesting and hunting habitat types. Unlike its conspecifics in other parts of the country, the Central Valley population of Swainson's Hawks require riparian habitat for nesting that is close to flat, open country for hunting. The importance of this relationship is demonstrated by the number of nesting territories that were found in riparian zones. Nine of 10 nests located within the survey blocks were in riparian habitat. Also, 87% of all known nest sites in the Central Valley were found within riparian zones (Table 8). This diminishing habitat type is critical to the preservation of a healthy population of Swainson's Hawks in this region of the state.

Recently, the land in and around the Woodland intensive survey block has been among the most productive Swainson's Hawk habitat in California. The interspersed riparian vegetation for nesting and flat, open land for hunting provide suitable habitat here.

TABLE 8 (continued)

Nesting and Hunting Habitat Types of Known
Swainson's Hawk Nest Sites in the Central Valley

<u>County</u>	<u>Territory #</u>	<u>Nesting Habitats</u>	<u>Hunting Habitat</u>
San Joaquin	SJ - 01	R	A
	SJ - 08	R	A
	SJ - 09	R	A
	SJ - 10	R	P
	SJ - 11	R	A
	SJ - 12*	R	P
	SJ - 17	R	A
	SJ - 20	R	A
	SJ - 21	R	A
	SJ - 25*	NR	P
	SJ - 26*	R	A
	SJ - 27*	R	A/P
	Solano	Sl - 01	R
Sutter	Su - 01	R	A
	Su - 05	R	A
	Su - 06	R	A
	Su - 13	R	A
	Su - 15	R	A
	Su - 16	R	A
	Su - 17	R	A
	Su - 19	R	A
Yolo	Yo - 01	R	A
	Yo - 02	NR	A
	Yo - 03	NR	A
	Yo - 04	NR	A
	Yo - 05	NR	A
	Yo - 06	R	A
	Yo - 07	R	A
	Yo - 08	NR	A
	Yo - 11	R	A
	Yo - 12	R	A
	Yo - 13	R	A
	Yo - 16	R	A
	Yo - 23	R	A
	Yo - 24	R	A
	Yo - 25	R	A
	Yo - 29	R	A
	Yo - 38	R	A
Yo - 41	R	A	

TABLE 8 (continued)

Nesting and Hunting Habitat Types of Known
Swainson's Hawk Nest Sites in the Central Valley

<u>County</u>	<u>Territory #</u>	<u>Nesting Habitat</u>	<u>Hunting Habitat</u>
Yolo	Yo - 42	R	A
	Yo - 43	R	A
	Yo - 45*	NR	A
	Yo - 46*	R	A
	Yo - 47*	R	A
	Yo - 53*	R	A
	Yo - 55	R	A
	Yo - 56	R	A

Agricultural development is also intensive here, involving virtually all the land within the Woodland block. Much of the riparian habitat in the Woodland block has been removed through various agricultural practices over time. The continued removal of riparian vegetation has resulted in reduced habitat quality and dense association of nesting territories within remaining suitable areas. For example, there were 5 active territories within a 1.0 mile stretch of Willow Slough.

Nesting occurs most commonly along small waterways with thin riparian zones or among the outside trees of a larger riparian zone. In the Woodland block all nests were along small waterways, while in the other 3 blocks nests were along both large and small waterways. These thin zones should not be overlooked when assessing the importance of riparian vegetation as wildlife habitat.

Optimal Swainson's Hawk hunting habitat was found in flat, wide-open, unbroken land that was close to suitable nesting habitat. Undisturbed areas satisfying these requirements appear rare due to intensive agricultural and residential development. Disturbed areas, such as the ranchette development in the Wilton block, may still provide adequate prey populations; however, Swainson's Hawks were not observed hunting there. The more adaptable Red-tailed Hawk was common in these areas.

The presence of agricultural development appeared to have both positive and negative influences. Swainson's Hawks have shown a decrease in productivity when utilizing agricultural land compared to grasslands, but many agricultural lands also maintain the essential requirement of flat, wide-open terrain. Vineyards and orchards are of little to no value to hunting Swainson's Hawks. San Joaquin County, in particular, was found to have extensive areas under grape production. Crops compatible to the needs of Swainson's Hawks are those that support adequate prey populations that are available to the birds. No Swainson's Hawks were observed hunting in vegetation above 1 foot in height. There is an apparent link between type of land use and prey densities, as well as a relationship between type of vegetation and the ability of Swainson's Hawks to effectively hunt there.

In all survey blocks except Woodland, Red-tailed Hawks were much more numerous than Swainson's Hawks. In the Vernalis block, 48 Red-tailed Hawks were observed. The other three blocks had much more diversity in land-use than the Woodland block, and the Red-tailed Hawk, being more of a generalist species than the Swainson's Hawk, was able to utilize those areas. Red-tailed Hawks were observed nesting and hunting in typical Swainson's Hawk habitat, as well as most other habitat types found within the survey area. If habitat destruction continues, there is a potential for population decline of the Swainson's Hawk in response to competition with the Red-tailed Hawk and other stick-nest building raptors.

The results of the Sacramento River survey were similar to those for 1983 except that several new territories were discovered while several known territories were inactive. Since Swainson's Hawks are highly territorial and may often return to the same nest site year after year, the pattern of activity evident in the study area may indicate an unstable population with a high adult turnover rate (Pete Bloom, pers. comm.). The river survey also indicates the importance of habitat quality. Although there was adequate nesting habitat in several portions of the area covered, 85% of the 141 miles of river was unsuitable as nesting habitat for Swainson's Hawks. The results can be partially attributed to large reductions of suitable habitat in the adjacent foraging areas, caused by replacing annual crops with orchards, as well as the loss of nest trees.

The results of the 1984 Swainson's Hawk survey clearly show the significance of three important population limiting factors -- the availability of riparian habitat for nesting, suitable open land for hunting, and the influence of competition with other species, particularly the Red-tailed Hawk. Consideration of these factors is crucial to understanding and the effective management of this Rare California raptor.

Osprey:

Results of Osprey surveys conducted by the U.S. Forest Service and the Department indicate that the declines in the 50's and 60's, attributed to pesticide contamination of the Osprey's food and the resultant reproductive failure, has largely disappeared. However, the threat of habitat disturbance and loss continues, especially on private timber lands. Thus, even though the problems associated with pesticide contamination appear to have abated, there is still reason to closely monitor the population trends of Ospreys in California.

RECOMMENDATIONS:

1. Continue to gather baseline population and productivity information on species of diurnal raptors nesting in California.
2. Monitor habitat disturbance and destruction caused by activities, such as logging, agricultural development, recreation, etc.
3. Place information in a computer data storage and retrieval system and develop the means whereby data can be utilized by a greater number of researchers within and outside the Department.
4. Maintain confidentiality of certain file information to protect sensitive and endangered raptors from disturbance and illegal take.

5. Determine, through monitoring, if annual productivity is sufficient to maintain populations of these species.

Prepared by: James A. Estep Approved by: J. Gustafson
James A. Estep for Kent A. Smith
Student Assistant Nongame Wildlife Coordinator

Approved by: Eldridge G. Hunt Date: 10/19/84
Eldridge G. Hunt, Chief
Wildlife Management Branch
California Department of
Fish and Game