

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

A STUDY OF FACTORS AFFECTING NESTING RAPTOR POPULATIONS
IN URBAN AREAS, SACRAMENTO COUNTY, CALIFORNIA - 1974^{1/}

by

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ABSTRACT

A study was undertaken during the 1974 raptor breeding season to determine factors that affect breeding raptor populations in urban areas. The study area covered 9,835 hectares (24,303 acres) along 48.3 kilometers (30 miles) from Folsom Dam to the mouth of the American River, Sacramento County, California. Seventy-one active raptor nests were located, consisting of 10 species. The American kestrel and the burrowing owl were the most numerous of the nesting raptors with 19 nests and 16 burrows respectively. Fledging success, disturbances, and nest failures were documented for 53 (75%) nests. Of the 53 nests, 43 (81%) were successful and 100 young fledged, averaging 2.3 young per successful nest. Of the 10 known nesting failures, 9 were attributed to human activities; 5 nest failures were caused by construction activities, 2 nests were robbed by humans, 1 nest was destroyed by high winds and young later taken, and 1 owl burrow was destroyed by motorcycle vandals. The remaining nest failure was caused by scrub jay predation.

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RECOMMENDATIONS

1. Initiate an education program, aimed especially at the junior high and high school levels, to acquaint the public with the need to protect raptors and the laws which protect this group of animals.
2. When reviewing environmental impact reports regarding the American River area, the Department of Fish and Game shall make every effort to reduce the effects land development and recreational activities have on California's raptor populations.
3. Encourage public assistance in the enforcement of existing laws protecting raptors.

INTRODUCTION

During recent years urban communities have expanded greatly throughout California. With urban expansion, natural areas are gradually being surrounded, choked off, and in many cases eliminated by housing developments, industrial areas, and, in general, the encroachment of civilization. A report by Environmental Assessment Engineering (1974), prepared for Sacramento County, reported that between 1966 and 1972, over 566.6 hectares (1,400 acres) of previously undeveloped land adjacent to the American River and the American River Parkway were developed as urban areas. Gerstung (1971) reports the Sacramento County Planning Department predicted a population increase within the county from 640,000 in 1970 to 1,000,000 in the year 2000. As a result, remaining natural areas in or adjacent to urban communities are being exposed to great increases in recreational activities, subjecting wildlife to greater disturbance. Raptor populations that nest in and use these natural areas are greatly affected by increased human activities.

A study of nesting raptor populations in an urban environment was needed to determine what factors affect raptor survival so measures may be taken to protect and enhance California's raptor resource.

OBJECTIVES

This study was initiated February, 1974 and continued through 1 nesting season, terminating August, 1974. Objectives were: 1) to census nesting raptor populations in an urban area; 2) determine fledging success, 3) determine effects human activity and recreational use of natural areas near urban areas have on raptors; and 4) make recommendations to insure survival and protection of birds of prey.

STUDY AREA

Description

Area selected for study covers 9,835 hectares (24,303 acres) along a 48.3 kilometer (30 mile) stretch of the American River in Sacramento County, California, from Folsom Dam to the confluence of the American and Sacramento Rivers (Figure 1). Folsom Prison property, located at the eastern end of the study area on the south side of the river, was not included in the study area because entry is restricted. Continuing downstream, the river passes by several urban and suburban communities beginning with the town of Folsom and the suburb of Orangevale. The river then goes through the Lake Natoma unit of the Folsom Lake State Recreational Area, also part of the study area.

The American River study area also includes a portion of the communities of Fair Oaks, Rancho Cordova, and Carmichael. The river and study area pass through a portion of Sacramento to terminate at the river's mouth at Discovery Park.

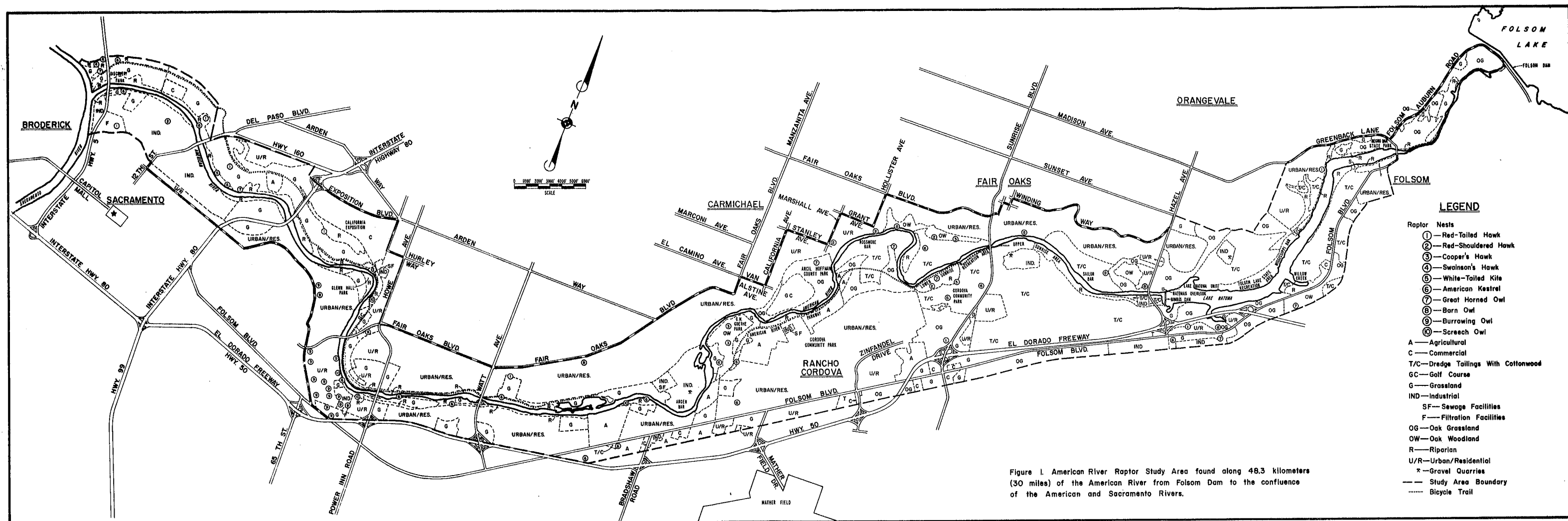


Figure 1. American River Raptor Study Area found along 48.3 kilometers (30 miles) of the American River from Folsom Dam to the confluence of the American and Sacramento Rivers.

General habitat of the eastern half of the study area consists mainly of oak woodland and oak grassland habitats, trees of the area are mainly blue oak (Quercus douglasi) and interior live oak (Quercus wislizeni). Scattered digger pines (Pinus sabiniana) and valley oak (Quercus lobata) are also found in this portion of the study area. Much of the woodland of this area was destroyed during the earlier gold dredging operations. Some 1,398 hectares (3,454 acres) of dredger tailings are found here, consisting of mounds and fields of rocks that cover the landscape. Vegetation is slowly coming back and the dominant tree in the dredger tailings is the Fremont cottonwood (Populus fremontii) which manages to grow in the sparse soil.

The western half of the study area is more populated and is composed mainly of residential areas which were at one time agricultural lands. Some commercial and industrial areas are also found in the western half. River levees were built along the river in this portion of the study area to protect urban areas and cities against flooding. Many residential housing tracts are adjacent to the river levees, leaving only riparian habitat between the river and levee. In some spots the vegetation between the river and the levee has been removed completely for flood control purposes. Where riparian vegetation occurs, it consists of mainly Fremont cottonwood and willow (Salix spp.) thickets which line the river banks (Table 1).

Land Use

Residential

The study area contains 3,456 hectares (8,541 acres) of land which consists of residential urban areas. Most of these residences are single family and multi-family dwellings which border the American River. In the eastern sector of the study area, where there are no levees, some of the residential property extends to the river's bank. In the western half where levees exist, residential property usually extends to the base of the river levees. In the eastern half of the area, especially on the north side of the river where the river passes through the communities of Fair Oaks and Carmichael, many residential areas have preserved the oak woodland habitat providing excellent raptor habitat.

Recreational

The river and adjacent lands are centers of recreational activity in the Sacramento area. At the eastern end of the study area the Lake Natoma unit of the Folsom Lake State Recreational Area covers a total of 526.1 land hectares (1,300 acres) (Table 2). Within this recreational area Negro Bar State Park and Lake Natoma offer water sports as well as picnicking and camping (Table 3). The river is bordered by the American River Parkway from Nimbus Dam to the mouth of the American River. The parkway under the management of the Sacramento County Parks and Recreation District, extends 37 kilometers (23 miles) and covers a total of 1,379.1 hectares (3,407.7 acres) along the river. Within the parkway are several major parks and recreational areas.

Table 1

American River Raptor Study Area, Habitat Types, 1974

<u>Habitat Types</u>	<u>Hectares</u>
Oak Woodland	161 (398)
Oak Grassland	940 (2,323)
Grassland	1,150 (2,842)
Riparian	602 (1,488)
Dredge Tailings w/cottonwoods	1,398 (3,454)
Agricultural	525 (1,297)
Commercial	219 (541)
Industrial	594 (1,467)
Urban/Residential	3,456 (8,541)
Golf Courses	53 (132)
Major Highways	149 (367)
Water	588 (1,453)
TOTAL	9,835 (24,303)
() acres	

Table 2

Major Parks and Recreational Areas,
American River Study Area, Sacramento County, California
1974

<u>Recreational Area</u>	<u>Hectares</u>
Folsom Lake State Recreational Area (Lake Natoma Unit)	526.1 (1,300)
American River Parkway	928.2 (2,293.6)
Sailor Bar	120.3 (297.2)
Upper Sunrise	32.7 (80.7)
Lower Sunrise Park	68.8 (170.0)
Cordova	63.4 (156.7)
Rossmore Bar	239.1 (590.9)
Ancil Hoffman Park	158.0 (390.5)
C. M. Goethe Park	110.1 (272.0)
Glenn Hall Park	25.2 (62.3)
Discovery Park	110.6 (273.3)
TOTAL	1,454.3 (3,593.6)
() acres	

Lake Natoma Unit 1,300 land acres and 500 water acres.

Table 3

Use Figures for the Fiscal Year 1973-74,
Folsom Lake Recreational Area, Sacramento County, California

<u>Area</u>	<u>Visitors per Year</u>
Natomas Overlook	24,020
Nimbus Dam	44,107
Negro Bar State Park ^{1/}	68,842
Willow Creek	26,639
Mississippi Bar	<u>6,306</u>
TOTAL	169,914

^{1/} Negro Bar State Park is the only facility that offers overnight camping.

Recreational activities along the river include rafting, fishing, swimming, boating, SCUBA diving, horseback riding, bicycling, nature study, picnicking, and hiking. Gerstung reports the recreational activities and sightseeing in 1965 accounted for at least 200,000 to 300,000 visitor-days per year along the river. Anglers contributed 70,000 to 100,000 days of this figure. Golfers at the golf course at Ancil Hoffman Park and visitors to the fish hatcheries were not included in the visitor use figure. The hatcheries alone averaged 71,620 visitor-days per year between 1956 and 1970. Gerstung also states that in a study conducted in 1967, 923,000 people used the river area for recreational activities.

Fishing is very popular on the American River because it offers at least 12 species of game fish; included are several warmwater fish species, trout, salmon, shad, and striped bass. In 1966 it was estimated by Gerstung that 76,000 angler-days were spent fishing on the American River. This use increased to 100,000 angler-days in 1969.

Bicycling has become very popular and the bicycle trails in the parkway receive heavy use. There are two sections of bicycle trail that run along the river. The older section, started in 1967 and completed in 1971, runs from Discovery Park east upstream to Rio Americano High School, a distance of 19.6 kilometers (12.2 miles) on the north side of the river. Further east on the south side of the river the newer section of the bicycle trail, built in 1973, begins at Goethe Park and ends at the old Fair Oaks Bridge, a distance of 8.8 kilometers (5.5 miles). Eventually the two bicycle trail sections will be connected and extended to Nimbus Dam, to cover the entire 37 kilometers (23 miles) of the American River Parkway.

Hiking and horseback riding are also popular. Unlike bicycle trails and hiking trails, horse trails are only found in certain sections of the parkway and in the larger parks. C. M. Goethe Park and Ancil Hoffman Park have the most horse trails. In 1973, 22,000 hikers and 2,200 equestrians used the park trails (Environmental Assessment Engineering 1974).

Industrial and Commercial Use

Industrial land use within the study area is limited. Three gravel quarries are located within the study area (Figure 1). Two State fish hatcheries are located on the river, just downstream from Nimbus Dam. They are involved in the production of salmon and trout, and cover an area of 3.7 hectares (9.2 acres). Also within the study area are 4 sewage disposal plants and 2 water filtration plants located at various points along the river (Figure 1). At the westernmost end of the study area an industrial park encompasses 354 hectares (875 acres) of land.

Commercial land use includes a private marina being built on the north side of the river, 2 kilometers (1.25 miles) upstream from the river's mouth. Commercial developments along the river have also been limited. However, there are shopping centers and gas stations at various places near the river, and in residential developments within the study area. Plans are underway to build a restaurant east of Discovery Park near the industrial park area. Also, the construction of a 9.7 hectare (24 acre) tennis recreational complex in the Lower Sunrise Park area is expected. Other commercial recreation facilities include a golf course at Ancil Hoffman Park and a golf course just north of Fair Oaks Boulevard.

METHODS

Nest Surveys

The study was initiated in mid-February, a time when raptor courtship activity and selection of nesting territories was beginning for many species. A study area was divided into 23 sections, ranging in size from 214.8 hectares (530.8 acres) to 978.1 hectares (2,416.8 acres), depending on the area and habitat to be surveyed.

Volunteer help was enlisted from members of the Sacramento Chapter of the National Audubon Society, California Hawking Club, and college and high school students from the American River area. Volunteers were selected on the basis of their experience and desire to help. A meeting was arranged whereby all the volunteers could get together to discuss the study. During the meeting the study and its objectives were explained to the volunteers. They were taken through a study section and shown various species of raptors and their nests to acquaint the observers to what they were looking for, and where and how to locate nests. The observers were then assigned to study sections and were given survey forms along with maps and aerial photographs of their sections. They were given the responsibility of locating, plotting on maps the raptor nests found in their areas, documenting known disturbances

to the nests or birds, and reporting the information for compilation and evaluation. Throughout the study period, the author continued a search for overlooked nests.

Seidensticker, et al. (1971) and Fitch, et al. (1946) reported that climbing into raptor nests may cause nest failure. Since one of the study's objectives was to determine disturbance factors other than disturbances caused by study activities, nest trees were not climbed or ground burrows dug up. Therefore, no information was obtained pertaining to the number of eggs laid, number of eggs hatched, and young survival. No birds on the study area were banded or handled in any way. Data on the number of young fledged was obtained by observations from a vantage point on the ground.

Nest Checks

Raptor nests which were reported by volunteers were periodically checked from a vantage point to determine status of nesting activity and to look for any evidence of disturbance. At no time during the study were the nest trees climbed except when the nest was known to be destroyed or the nest had been abandoned. This was done to determine the cause of failure. Young birds were counted as successfully fledged when they were able to leave the nest and were seen perching on adjacent branches or trees. Binoculars or spotting scopes were used as aids in checking sites. Young burrowing owls were counted as successfully fledged when they could fly towards or away from the burrow, when intruders approached or when the parent birds came with food.

Public Education

A public education program was initiated in or near the American River study area. Slide talks were given at local high schools and colleges. The purpose of these talks was to inform the students about raptors, their values in the balance of nature, and laws for their protection. Television coverage was arranged with local stations during initial stages of the study. The project and its objectives were explained. The Department of Fish and Game put out a press release on the objectives and purpose of study, which was distributed to all major California newspapers.

RESULTS

Eyries

Seventy-one active raptor eyries of 10 species were located in the study area and plotted on study maps (Figure 1). Of the 71 nests, 5 nests were not actually located but were counted because young birds were seen on branches in the study area begging for food from adults, and it was obvious they had just fledged from a nest in the immediate vicinity. These included 3 great horned owl and 2 American kestrel nests.

An effort was made to locate all raptor nests in the study area. It is estimated that 90 percent of the active eyries were located. However, this was a difficult task because of the varied types of habitat and it was impractical to search every private estate thoroughly for nesting raptors. Thusly, figures for the number of eyries and fledging success are conservative for the total nesting raptor population for the study area.

Of the 10 raptor species found to nest within the study area, volunteers and study personnel found the following: 19 American kestrel (Falco sparverius) nests (Figure 2); 3 Cooper's hawk (Accipiter cooperii) nests; 8 red-tailed hawk (Buteo jamaicensis) nests; 5 red-shouldered hawk (Buteo lineatus) nests; 1 Swainson's hawk (Buteo swainsoni) nest; 2 white-tailed kite (Elanus leucurus) nests; 6 barn owl (Tyto alba) nests; 16 burrowing owl (Speotyto cunicularia) burrows (Figure 3); 7 great horned owl (Bubo virginianus) nests; and 4 screech owl (Otus asio) nests (Table 4).

Species that were seen within the study area but did not nest include merlin (Falco columbarius), sharp-shinned hawk (Accipiter striatus), golden eagle (Aquila chrysaetos), bald eagle (Haliaeetus leucocephalus), osprey (Pandion haliaetus), and turkey vulture (Cathartes aura). These raptors, with the exception of the sharp-shinned hawk which winters in the area, were uncommon visitors to the area. The turkey vulture is a common visitor although it does not nest within the study area.

The first raptor found to nest in the study area was the great horned owl. First nest was found on March 12 with the female sitting on the nest incubating eggs. The young fledged around May 15. The last nest to be located on June 19, was that of a Swainson's hawk which contained a young eyas about 3 to 4 weeks old. According to Bent (1937) the Swainson's hawk does not appear in California until mid-March. Therefore they did not nest until mid- or late April. The young Swainson's hawk fledged around July 14. The last young to fledge were 2 young Cooper's hawks on August 1.

Fledging Success

Of the 71 active nests, 43 successfully fledged one or more young, 10 nests were abandoned and data was not obtained on the success or failure of 18 nests. From 104 young birds observed on 43 nests, 100 fledged averaging 2.3 young per successful eyrie (Table 4). Of the 4 young which did not fledge, 1 one-month old red-shouldered hawk was found dead on the nest from causes unknown. Because two other young from the same brood appeared healthy and fledged, it was assumed that this bird died of natural causes. Of the other three birds, 1 young American kestrel, 1 red-shouldered hawk, and 1 Cooper's hawk, each disappeared from their nests from unknown causes before fledging.

Since owls are nocturnal, fledging success data is difficult to obtain, especially the barn and burrowing owls. Consequently, data is lacking in the cavity and burrow nesting owls.

Since 100 young fledged from 53 nests for which data was complete, averaging 1.9 young per nesting pair, the number of young fledged from 71 nests was estimated to be 135.



FIGURE 2. American kestrel using abandoned woodpecker nest cavity, American River Raptor Study.

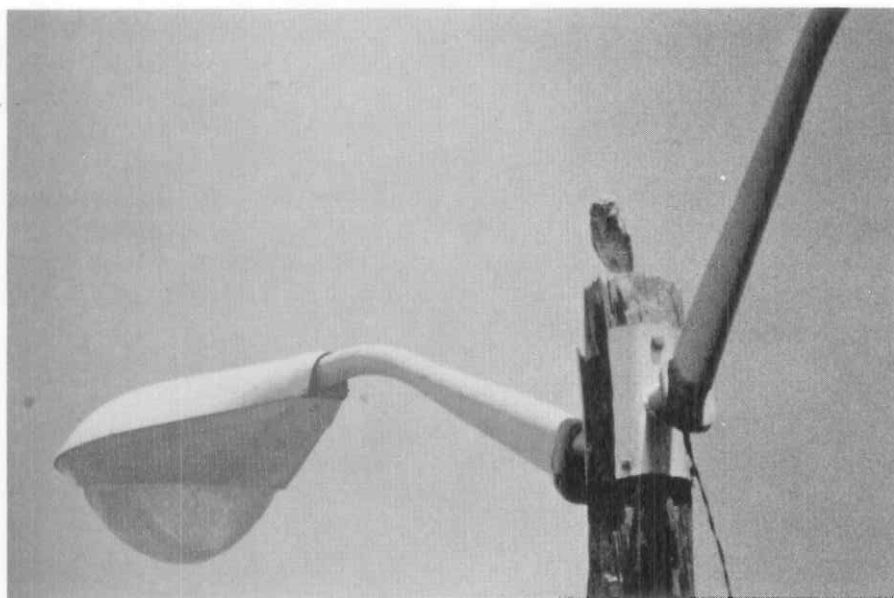


FIGURE 3. Burrowing owl using a light pole as a lookout post near its burrow, American River Raptor Study.

Table 4

Raptor Nesting and Fledging Success, American River Raptor
Study Area, Sacramento County, California - 1974

<u>Species</u>	<u>Total No.</u>	<u>NESTS</u>				<u>No Data</u>		<u>SUCCESSFUL NESTS</u>	
		<u>Successful No.</u>	<u>%</u>	<u>Abandoned No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>Number Fledged</u>	<u>Average per Successful Nest</u>
American Kestrel	19	17	89.4	1	5.3	1	5.3	38	2.2
Cooper's Hawk	3	2	66.7	1	33.3			5	2.5
Red-tailed Hawk	8	2	25.0	3	37.5	3	37.5	4	2.0
Red-shouldered Hawk	5	4	80.0	1	20.0			7	1.8
Swainson's Hawk	1	1	100.0					1	1.0
White-tailed Kite	2	1	50.0			1	50.0	2	2.0
Barn Owl	6	1	16.7			5	83.3	2	2.0
Burrowing Owl	16	7	43.7	4	25.0	5	31.3	22	3.1
Great Horned Owl	7	6	85.7			1	14.3	11	1.8
Screech Owl	4	2	50.0			2	50.0	8	4.0
	—	—	—	—	—	—	—	—	—
TOTAL	71	43	60.6	10	14.1	18	25.3	100	2.3

Nesting Habitat

Raptors used varied habitat for nesting within the study area. Table 5 shows that riparian habitat was used by more raptors than any other habitat and the nesting success was greatest. Urban habitat was second in raptor use; however, there were more failures which were attributed to construction activities.

Lack of suitable habitat for nesting sites is a factor affecting the number of raptors which may use an area. Many portions of the study were open with few trees or suitable nesting cover. American kestrels use open areas which still have a few trees or dead snags, and burrowing owls used other open area such as levees and the university campus. Larger raptors require both tree cover for nesting and open space necessary for foraging. Additional intensive field work is needed to determine the amount of habitat necessary for a nesting territory and foraging area needed to sustain the various species of raptors.

Usually raptors nesting in intensively used areas are subject to greater nest failures than raptors nesting in quiet secluded areas. This was not entirely true in this study. Two pairs of great horned owls successfully nested in an intensively used area where they were clearly visible to anyone that happened to look up. One nest was over a picnic area, and the other was over a frequently used horse trail. In another example, a Cooper's hawk successfully raised her brood 25 feet from the edge of a picnic ground and cars were usually parked no further than 15 feet from the nest tree. Perhaps because the birds are nesting in the midst of so much traffic, it doesn't occur to people that raptors might be there. The nearness of so much activity might also discourage people from disturbing the nest for fear of attracting attention to themselves.

Baumgartner (1939) reported that great horned owls need suitable wood lots for nesting sites, and were limited by human disturbance and environmental changes which would decrease the food supply. This is supported by the fact that five of the seven great horned owls that were located in the study area nested in wood lots and up in inaccessible places which were not disturbed.

Disturbance Factors

Of the 10 raptor nests which were abandoned, 9 were caused by human activities. Construction activities caused the failure of five nests (Table 6). Two burrowing owl burrows with the adult females in the burrows were covered in the construction of a parking lot. One of the burrows was dug up immediately and the female was saved. The other owl, however, was not so lucky. A third burrowing owl burrow was abandoned because of construction activities near the burrow. A red-tailed hawk nest and a red-shouldered hawk nest failed because heavy equipment was used in construction work near the nest sites.

Another factor that affected fledging success was intentional human disturbance. During the study, an American kestrel's nest and a red-tailed hawk's nest were disturbed early in the nesting season. The trees were climbed by someone so early in the season that the American kestrel and the red-tailed hawk nests probably contained only eggs. Nevertheless, the adults abandoned

Table 5

Raptor Nesting Habitat, American River Study Area
1974

Habitat	Hectares	American Kestrel	Cooper's Hawk	Red-tailed Hawk	Red-shouldered Hawk	Swainson's Hawk	White-tailed Kite	Barn Owl	Burrowing Owl	Great Horned Owl	Screech Owl	T.
Oak woodland	161	1S	2S, 1A		1S					1S		6
Oak grassland	940			1A				2N		1S		4
Grassland	1,150	1S, 1A, 1N		1S					3N	1S, 1N		9
Riparian	602	8S		1A 1N	1S	1S	1S			3S	1S 2N	19
Dredger tailings w/cottonwoods	1,398	3S					1N	1N				5
Agriculture	525	1S										1
Commercial	219											0
Industrial	594	1S		1S					2S			5
Urban/Residential	3,456	2S		1A 2N	2S			1S 2N	4S 4A 3N		1N	22
Golf courses	54											0
Highways & Water	737											0
TOTAL	9,835	19	3	8	5	1	2	6	16	7	4	71

S = Successful nests

A = Abandoned nests

N = Unknown nesting success

Table 6

Factors Affecting Raptor Nesting Failures in American
River Study Area - 1974

<u>Species</u>	<u>Reason for Failure</u>
Burrowing Owl	Construction over burrow
Burrowing Owl	Construction over burrow
Burrowing Owl	Construction near burrow
Red-tailed Hawk	Construction near nest tree
Red-shouldered Hawk	Construction near nest tree
American Kestrel	Nest disturbed or eggs taken
Red-tailed Hawk	Nest disturbed or eggs taken
Burrowing Owl	Motorcycles destroyed burrow
Red-tailed Hawk	Nest blown out and young taken from below the nest
Cooper's Hawk	Scrub jay predation on eggs

the nests and no renesting was attempted. A burrowing owl burrow was obliterated by motorcyclists when they deliberately spun their wheels over the burrow. A second red-tailed hawk nest failed when high winds blew down the nest a few days before the single young bird fledged. The adult birds cared for the young one on the ground until some well meaning boys caught it and took it to a zoo, preventing it from fledging.

In one instance, predation by scrub jays (Aphelocoma coerulescens) caused the failure of a Cooper's hawk nest. The male hawk had not been seen for two weeks and the female had to hunt for herself. It is believed that during one of her absences her nest was raided. A punctured egg was found below the nest and the nest was empty. Fitch reported jay predation, in a similar situation, of a red-tailed hawk's nest. During the same period of time, a female Cooper's hawk was found dead near the nesting area. Causes of death could not be determined and it is not known if it was the female from this nest or one not discovered.

In addition to the Cooper's hawk mortality mentioned above one barn owl was killed by a car on the highway. An injured adult red-shouldered hawk found shot by one of the volunteers prior to the nesting season was not included in nesting failure data.

Harvest of raptors for falconry or for pets was not found to be a problem in the study area as encountered in 1973 by Wiley (unpublished manuscript) in Orange County, California. Wiley reported that out of 20 red-tailed hawk nests that were within one-quarter mile of a public road, 12 (60%) of the nests failed. Of these 12 nests, 91.7 percent were caused primarily as a result of legal or illegal harvest. In the American River study, 10 (18.9%) of the 53 nests with complete data failed. Of the 10 failures, 2 (20%) failures were caused by legal or illegal harvest (Table 5). Three young may have been taken from 3 nests which were successful in fledging the remaining eyas. However, since 80 percent of these failures were caused by man's activities, raptors' eyries should be closely watched and disturbance prevented wherever possible.

Recreational Use

Portions of the study area are heavily used by man as recreational areas. The American River Parkway concept was adopted by Sacramento County in 1962. With river rafting becoming popular and new bicycle trails, parkway use has increased greatly. Environmental Assessment Engineering reports the parkway use has more than doubled between 1968 and 1973. The parkway alone currently supports an estimated annual total use of 283,000 people for recreation and sightseeing purposes. Raft rental dealers along the American River report the heaviest days of use for rafts is on weekends, with Sunday being the busiest day (Table 7).

Rafting begins to pick up with the start of hot weather, toward the end of May. The Memorial Day weekend, May 25-27, was the first big weekend for rafting on the American River. As summer vacation begins and temperatures increase, river traffic also increases.

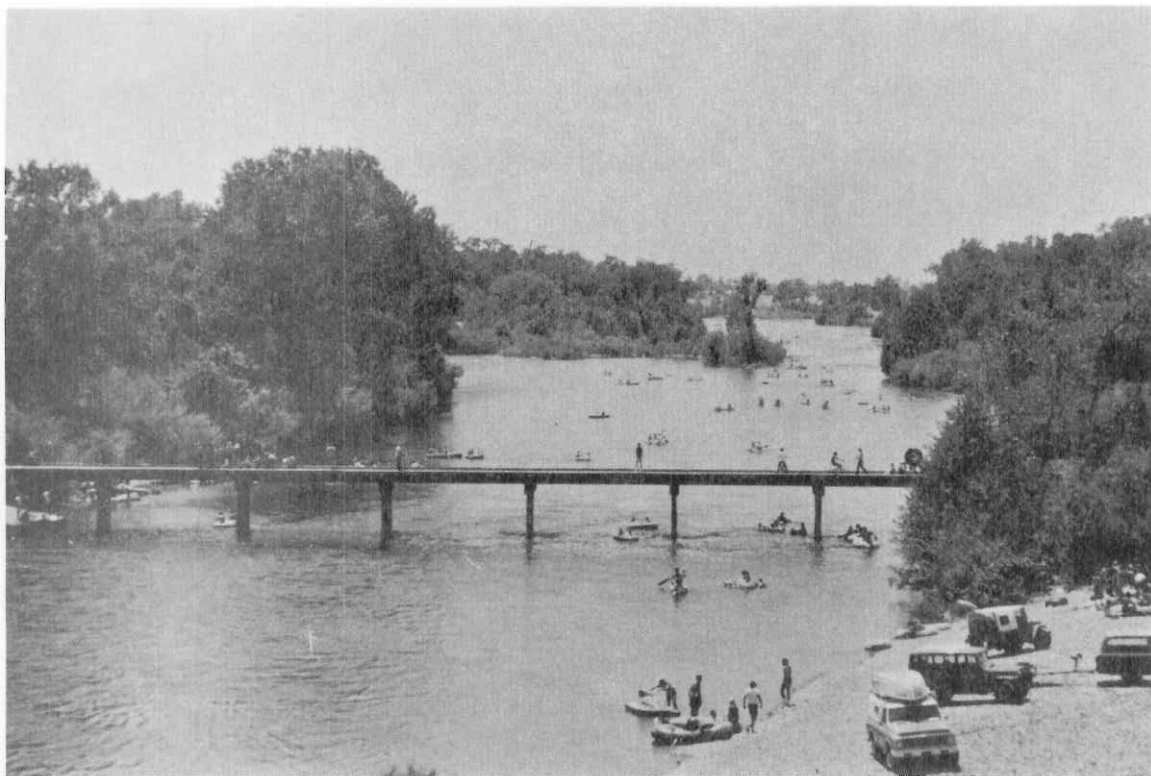


FIGURE 3. Recreational use on the American River below Sunrise Bridge, June, 1974.



FIGURE 4. Bicycling along the bicycle trail, American River Parkway, June, 1974.

Table 7

Report on Rafts Rented by Dealers along
the American River - 1974

<u>Location</u>	<u>Rafts Rented Saturday and Sunday^{1/}</u>	<u>Rafts Rented Monday - Friday</u>
Rancho Cordova	150	40
Rancho Cordova	115	25
Fair Oaks	90	25
Fair Oaks	125	20
	—	—
TOTAL	480	110

^{1/}All dealers reported that Sunday was the highest day for rentals.

Bicycling begins to increase at the same time raptor nesting gets into full swing. When the winter rains taper off in late March and the weather starts to warm up, the bicyclers use on the bike trail increases. The greatest use occurs in April, May and early June, while the weather is still mild. As the temperatures increase, bicycling decreases.

Two use counts were made in early June, of people using the parkway. One count was made on Sunday, June 9, 1974, at Lower Sunrise Park (Figure 3). This is one of the most popular rafting stretches on the river and 3,153 rafters were counted (Table 8). Popularity along this stretch of the river is attributed to two areas of white water, through which people like to take their rafts and canoes. Bicycle trail also runs along the river at this point and 619 cyclists were counted (Figure 4). Count on Sunday, June 15, 1975, was made at a point where Watt Avenue crosses the American River, well below the white water areas. Counts of 85 rafters and 496 bicycles were reported.

Another use of the parkway includes day camp sessions put on by the Girl Scouts, Boy Scouts, and Campfire Girls. Camp uses last about a week with about 200 to 300 children per session, at each day camp. A new group or session comes in each week throughout the summer. Goethe Park has three day camps and the parkway just downstream from the fish hatcheries has another day camp. Two car counts made at 10:00 a.m. in Goethe Park during the week showed a total of 82 cars at the day camps on one day, and 135 cars on the second day.

Peak period for recreational use of the study area coincided with the raptor nesting season.

Table 8

Parkway Use Counts on American River, Bicycle
Trail and Horseback Trail - 1974

<u>Parkway Use</u>	<u>June 9^{1/}</u>	<u>June 15^{2/}</u>
Bicyclers	619	496
Rafters	3,153 ^{3/}	85 ^{5/}
Canoes and kayakers	226 ^{4/}	30 ^{6/}
Horseback riders	21	4
Hikers	11	10
Joggers	11	20
Skin divers	16	3
	<hr/>	<hr/>
TOTAL	4,057	648

1/ Count made from 0800 to 1630 in Lower Sunrise Park.

2/ Count made from 0830 to 1530 at Watt Avenue.

3/ 1331 rafts were used.

4/ 120 canoes and kayaks were used.

5/ 39 rafts were used.

6/ 11 canoes and kayaks were used.

CONCLUSION

Raptors can exist in urban situations, providing adequate habitat is present. This includes nesting habitat as well as habitat able to support an adequate supply of prey species. An informed public which knows the value of raptors and present protective laws and is willing to support the proper enforcement of such laws is also necessary. Intensive recreational activity is detrimental only when it is disruptive to the raptors' nesting habits and habitat. Land development and construction work is the greatest disruptive force within the study area. Therefore, immediate as well as long range planning of land development is necessary to insure the survival and welfare of raptors in urban areas.

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APPENDIX A
Status of Raptor Nests Located in the American River Study Area,
Sacramento County, California - 1974

<u>Nest Number</u>	<u>Species</u>	<u>Nest Location</u>	<u>Successful</u>	<u>Number Young</u>	<u>Number Fledged</u>
1	Great horned owl	Unknown	Yes	2	2
2	Swainson's hawk	Cottonwood	Yes	1	1
3	American kestrel	Unknown	Yes	2	2
4	" "	Dead cottonwood	Yes	2	1
5	" "	Snag	Yes	2	2
6	Red-tailed hawk	Cottonwood	No	1	0
7	Red-tailed hawk	"	Yes	2	2
8	American kestrel	"	Yes	2	2
9	Red-shouldered hawk	"	No	0	0
10	White-tailed kite	"	Yes	2	2
11	American kestrel	"	Yes	2	2
12	Red-tailed hawk	"	Yes	2	2
13	Great horned owl	"	Yes	2	2
14	Red-tailed hawk	"	No data		
15	Screech owl	Cottonwood snag	Yes	4	4
16	Burrowing owl	Ground Burrow	Yes	3	3
17	Burrowing owl	" "	No data		
18	Burrowing owl	" "	Yes	5	5
19	Burrowing owl	" "	No	0	0
20	Screech owl	Cottonwood	No data		
21	American kestrel	"	Yes	3	3
22	Screech owl	"	Yes	4	4
23	Burrowing owl	Ground Burrow	Yes	2	2

APPENDIX A (Continued)

<u>Nest Number</u>	<u>Species</u>	<u>Nest Location</u>	<u>Successful</u>	<u>Number Young</u>	<u>Number Fledged</u>
24	Burrowing owl	Ground Burrow	Yes	1	1
25	Burrowing owl	" "	No data		
26	Burrowing owl	" "	Yes	3	3
27	Burrowing owl	" "	No data		
28	Burrowing owl	" "	No data		
29	Burrowing owl	" "	No	0	0
30	Burrowing owl	" "	No	0	0
31	Burrowing owl	" "	No	0	0
32	Burrowing owl	" "	No data		
33	Burrowing owl	" "	Yes	6	6
34	Burrowing owl	" "	Yes	2	2
35	American kestrel	Cottonwood	Yes	3	3
36	American kestrel	"	Yes	2	2
37	American kestrel	"	Yes	2	2
38	Red-tailed hawk	"	No	0	0
39	Barn owl	Valley Oak	No data		
40	Screech owl	Cottonwood	No data		
41	American kestrel	Snag	Yes	2	2
42	American kestrel	Sycamore	Yes	3	3
43	American kestrel	Valley Oak	Yes	2	2
44	American kestrel	Cottonwood snag	No	0	0
45	Cooper's hawk	Blue Oak	No	0	0
46	Cooper's hawk	Blue Oak	Yes	2	2
47	American kestrel	Valley Oak (magpie nest)	Yes	2	2
48	American kestrel	Barn	Yes	2	2

APPENDIX A (Continued)

<u>Nest Number</u>	<u>Species</u>	<u>Nest Location</u>	<u>Successful</u>	<u>Number Young</u>	<u>Number Fledged</u>
49	Great horned owl	Unknown	Yes	2	2
50	Red-shouldered hawk	Eucalyptus	Yes	2	2
51	Red-shouldered hawk	Cottonwood	Yes	1	1
52	Barn owl	Cliff	No data		
53	Great horned owl	Cottonwood	Yes	2	2
54	American kestrel	Unknown	Yes	2	2
55	Red-shouldered hawk	Cottonwood	Yes	2	2
56	Cooper's hawk	Interior Live Oak	Yes	4	3
57	Red-shouldered hawk	Valley Oak	Yes	3	2
58	Great-horned owl	Valley Oak	Yes	2	2
59	White-tailed kite	Interior Live Oak	No data		
60	American kestrel	Snag	Yes	3	3
61	American kestrel	Snag	Yes	3	3
62	Red-tailed hawk	Cottonwood	No	0	0
63	Barn owl	Cliff	Yes	2	2
64	Barn owl	Cliff	No data		
65	Barn owl	Cottonwood	No data		
66	American kestrel	Dead eucalyptus	No data		
67	Red-tailed hawk	Cottonwood	No data		
68	Great-horned owl	Unknown	Yes	1	1
69	Barn owl	Palm tree	No data		
70	Great-horned owl	Digger pine	No data		
71	Red-tailed hawk	Digger pine	No data		