

OSPREY MANAGEMENT ON THE LASSEN NATIONAL FOREST

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Abstract. The Lassen National Forest is unique in that it contains within and adjacent to its boundary one of the largest known breeding population of ospreys in the Western States. The Department of Fish and Game is charged with the protection of the osprey and the U.S. Forest Service has the responsibility for protection and management of the osprey habitat on National Forest Lands. An osprey study was initiated in 1969 by the Lassen National Forest. The California Department of Fish and Game and Humboldt State College joined in and enlarged on the study in 1970 and 1971. Some results of the study and efforts by the Lassen National Forest to maintain and improve the osprey habitat are described.

INTRODUCTION

I welcome this opportunity to address The Wildlife Society on the subject of Osprey (Pandion haliaetus) Management on the Lassen National Forest. The U.S. Forest Service objective in wildlife management is to maintain and improve the habitat of both game and non-game species at its highest level consistent with other resource values and uses.

There are a growing number of management programs in National Forests designed to provide special habitat protection to rare, endangered, or unique wildlife species. Among the most notable are the bald eagle (Haliaeetus leucocephalus), Kirtland's warbler (Dendroica kirtlandi) and California condor (Gymnogyps californianus) programs. Of the approximately 150 species of wildlife listed as rare or endangered, one-third live in or near National Forests. The Forest Service has either drawn up plans for, or is giving special habitat management emphasis to 27 of these. The goal is to provide special management programs for all rare, endangered and unique wildlife species in National Forests.

The Bureau of Sports Fisheries and Wildlife in its "Redbook" has directed attention to the threatened existence of the American Osprey by designating it as a "status undetermined species." A status undetermined species is one that has been suggested as possibly endangered, but one about which there is not yet enough information to determine its status. The Lassen National Forest began a study in 1969 to gather information to prepare an osprey habitat management plan. The Special Wildlife Investigation Section of the California

Department of Fish and Game and Humboldt State College joined in and enlarged on this study in 1970 and 1971. The major objectives of this cooperative study were to record life history information, determine breeding population size and reproductive rates, recognize limiting factors and determine habitat needs.

In this brief slide presentation I will attempt to point out interesting and significant aspects of the study, how the study's findings influenced our management direction and to illustrate various management techniques that we are using to maintain and improve the osprey habitat. First of all for a general introduction to the osprey, let's quickly take a look at some life history information.

GENERAL LIFE HISTORY INFORMATION

In late March and early April, osprey return to their breeding grounds on the Lassen National Forest after a winter probably spent from lower California to Argentina in South America. For those of you who may not be aware, the Lassen National Forest is found in northeastern California. Osprey nest primarily around two major bodies of water in this area: Eagle Lake, containing 27,000 surface acres, which is the second largest natural lake entirely in California, and Lake Almanor, a man made lake about the same size as Eagle Lake.

Once on their breeding grounds, pairs form quickly and by late April most birds are paired and nest sites selected. Pair bond and nest site selection appears to carry over from year to year.

Preferred nest sites are in the broken tops of dead trees standing in or adjacent to water, where an abundance of available fish are found. Where preferred nesting sites are not available, and this is getting to be the case, osprey will use flattened or broken top live trees, snags away from water, and artificial structures such as telephone poles and micro-relay towers. The only prerequisites these sites appear to have in common is a broad base on which to place a nest and height sufficient for security and good visibility.

Nests are built of criss-crossed sticks, one or two inches in diameter and one to two feet in length. The nest is usually three to four feet across and a foot or two deep. The inner portion of the nest, in which the eggs are laid, is lined with soft fine material. Both members of the pair work at nest building and spend most of April bringing in material. The female appears to do most of the placing of the sticks on the nest and nest material is added throughout the breeding season.

Near the nest is always at least one pilot tree. The pilot tree is a place the male usually sits when not fishing or attending the nest.

Egg laying begins in late April or early May. The normal clutch size is three eggs laid at one or two day intervals. Incubation is primarily by the female and begins with the first egg. The incubation period appears to be between 5 and 6 weeks.

Young begin hatching about the first of June and most young have hatched by mid-June. Newly hatched young are covered with a short tan colored coat of down. The young hatch at intervals and for a time the eldest is considerably larger than the youngest. The young are covered with a dark colored down at three weeks of age and up to this point in life have done little more than eat, sleep, or preen. At four weeks, buff tipped feathers begin appearing through the down, and at six weeks the young are mostly feathered. At eight weeks, except for the buff tipped feathers and reddish colored eyes, they appear similar to their parents.

Vigorous wing flapping exercises are performed by the young in the nest from about the sixth week and they make their first flight from the nest at about 8 weeks.

The osprey is also called the fish hawk and apparently for good reason. In our area the osprey appears to be entirely dependent on fish for its food. When fishing, the osprey flies 50 to 100 feet above the water. On sighting a fish near the water's surface, it may

hover briefly before diving or may plunge directly into the water with a tremendous splash. Upon capturing a fish, the osprey explodes from the water carrying the fish head foremost, with both feet gripping it, one behind the other.

The male does all the fishing for the family during the egg laying and incubation period and for the eight-week period the young are confined to the nest. About two-thirds of the fish delivered to the nest are rough fish and are usually between 8 to 16 inches in length. When hungry, the male will eat the head and part of the viscera of the fish he has caught, giving the remainder to the female on the nest. She in turn feeds the young the choice center portions and eats the remainder of the fish herself. The female feeds the young in the nest for about seven weeks, after which they are capable of feeding themselves.

By late September most ospreys have departed from their breeding grounds and are winging their way to a warmer southern climate.

This briefly covers some of the life history of the osprey. Now for a look at some of the findings of the study.

METHODS AND FINDINGS

Our studies have shown that a minimum of three nest checks are required each breeding season to determine breeding population size, clutch size, and number of young produced.

Field checks by car, boat and on foot from May 1 to May 20 to locate breeding pairs was judged to be the optimum time in this area. The period for the early checks coincide with the normal egg laying or incubation activity. Nest checks in the early spring are essential because the omission of a number of unproductive pairs in a census would seriously prejudice data on reproduction. Pairs which fail to produce young for one reason or another usually leave their breeding territory and are often missed during summer surveys.

Thirty-eight breeding pairs were found in 1969, 51 in 1970 and 47 in 1971. The variation in numbers of breeding pairs does not reflect yearly changes in population levels, but is thought to be merely a reflection of the number of census hours expended each year. Based on the last three years study, I would estimate there are about 60 to 70 breeding pairs of ospreys in the study area.

Most osprey egg laying is complete by the end of May and this period appears to be when nests contain maximum clutch size. For this reason, clutch counts were taken by helicopter on May 20, 1970, and May 22, 1971. In a total of 89 active nests inspected, 49 in 1970 and 40 in 1971, clutch size ranged from 0 to 4 eggs and averaged 2.6 eggs per active nest.

Reproductive Success

Nests were visited from late July to early August to determine the number of young produced. During this period young are large enough to be seen in the nest with the use of binoculars and spotting scopes but it is before they have flown for the first time. We found the optimum time for this check is between July 25 and August 5. A total of 138 young were known fledged from 136 active nests during the three year study for an average of 1.01 fledging per active nest.

From what information is available throughout the United States, it is felt that the reproductive success of the osprey is very near what is needed to maintain a stable population.

However, even though it appears the osprey population may be producing young at a rate sufficient to maintain itself, high losses to eggs and young are occurring during the nesting season.

Egg and Young Losses

Failure of eggs to hatch was an important factor. For example, of 15 active nests closely studied in 1970 and 1971 at Eagle Lake it was found that of 47 eggs laid, 11 failed to hatch. Of the 11 eggs, two were found crushed in the nest, four were cracked and five were

addled. These samples were collected along with eggs lost to other causes, dead nestlings, and fish taken from nests and sent to the California Department of Fish and Game Laboratory for a pesticide analysis. This analysis showed a high of 17.9 total DDT residue present in egg tissue.

High winds during the three nesting seasons caused substantial losses to eggs and young in nests under intensive study. Four nests of 15 were found blown down in 1969 at Eagle Lake. In the same area in 1970 three nests of nine blew down and in 1971, 3 nests of 15 were destroyed by wind.

Human disturbance caused moderate losses to eggs and young in nests under study at Eagle Lake. Basically, losses occurred from two sources, disturbance of incubating birds and forcing fledglings from nests before they obtain full flight stage.

For example, in May of 1971 at Eagle Lake, one group of uninformed individuals camped for two days very near an active nest containing 4 eggs. The incubating female was kept off the nest and the eggs were lost.

Two log landings were constructed near two active nests during logging operations on private land at Eagle Lake in 1971. A great deal of logging activity took place at these landings during the incubation period and both females were kept from their nests for considerable periods of time. Neither nest produced young and I suspect this was because the eggs chilled.

Normally in other logging operations this problem would not have presented itself because the snags containing these nests would have been felled during the actual tree cutting operation. The State Forestry Practice Act requires that all snags over 20 feet in height and 16 inches d.b.h. (diameter breast height--at 4.5 feet above ground) be felled in a timber operation on private land. Only through a great deal of local coordination and cooperation between Fruit Growers Supply Company, California Division of Forestry and the Lassen National Forest were these two active nest sites, along with three other nest sites, spared.

Eleven young ospreys were frightened by the observers during fledging counts in 1970 and flew from their nests apparently for the first time. These birds had sufficient strength to fly only short distances from their nests and then had to land. Two birds were retrieved from Eagle Lake, one was found entangled in a low shrub and one crash landed into the back of our pickup. The other birds either disappeared from sight, gradually sinking down through the trees, or barely returned to their nests. From this activity we found that forced early flights prompted by close human activity, leads to increased mortality.

Nesting Site Losses

Two other major problems were also noted during the study. One serious habitat problem was the continuous loss of suitable osprey nesting sites within a couple of miles of fishing waters. These nesting sites are being lost primarily during logging operations in which most snags and large overstory trees are felled. Consequently, after an area has been logged, for all practical purposes, most present and future osprey nesting sites have been eliminated for a hundred years or more.

Increasing Human Use

The other major problem was that the osprey colony on the west shore of Eagle Lake was endangered. Twenty-six pairs of ospreys are known to nest at Eagle Lake and thirteen of these are found in a loose colony situation along the west shore. The birds in this colony nest primarily in the snags created from the flooding of the shoreline timberland in the early 1900's. This entire site is located on the Lassen National Forest.

Osprey are attracted to this area for three reasons: (1) an abundance of available fish are nearby in the lake, (2) a few suitable nest snags are present, wherein other shoreline areas nesting sites are lacking, and (3) the area receives low use by the public.

Of these three factors, only the fish food source appears likely to remain constant in the immediate future. All nesting snags are in a deteriorated condition and most will topple within the next decade. In addition, Eagle Lake has been recently discovered by Californians and public recreation use along the shoreline has increased tremendously in the last few years. The osprey colony area is attracting more people each year who are seeking secluded out of the way places.

MANAGEMENT

Based on the findings of the study the Lassen National Forest has taken a positive management direction to insure that the osprey habitat on the Forest will be maintained and improved.

The first step was to prepare a Forest Osprey Habitat Management Plan. This plan was approved by the Forest Supervisor of the Lassen National Forest and the Regional Forester in January 1971.

The primary purposes of the plan were fourfold: (1) To identify suitable osprey habitat on the Lassen National Forest, (2) to provide guidelines for implementing a continuous habitat protection and improvement program, (3) to determine where major habitat problems occur, and (4) to establish a management area to protect the osprey and its habitat.

With the approval of this habitat plan an osprey management area was created on the west shore of Eagle Lake that included the osprey colony breeding grounds. This management unit contains about 1,200 acres and extends along the shoreline for about 3 miles and proceeds inland for distances from about 1/4 to 1/2 mile. The purpose of the management unit is to preserve this unique colony nesting grounds and to provide a place where osprey may prosper.

Restricting Development

Four major steps took place with the establishment of the Osprey Management Area. The first was to place the unit off limits to any activity that would not be compatible with osprey management. For instance, no timber cutting will be allowed, recreational facilities developed, nor new roads placed through the unit. Our primary objective is to maintain this area in its natural state, except of course, for osprey habitat developments.

Restricting Human Activity

The next step was to place restrictions on human activity within the boundaries of the unit. This was done because osprey nests are so concentrated that any disturbance or vandalism could lower production substantially. It is possible to stand in one place and with the aid of binoculars see nine active nests. Thirteen active nests are in a 1 1/4 mile radius. To restrict use near these nests, two roads leading through the heart of the colony breeding grounds were closed to vehicles from April 1 to September 15. In addition, portions of the boundary were signed, placing the following five restrictions on the use of the area:

1. Human activity is not permitted within 1/8 mile, or as posted, of an active nest from April 1 to September 15.
2. Discharge of firearms is not permitted in the area from April 1 to September 15.
3. Motorized vehicles are not permitted except on designated roads.
4. Tree and snag cutting is prohibited.
5. No overnight camping is permitted from April 1 to September 15.

Improving Nesting Habitat

The third major step was to improve the nesting habitat in the unit. One management technique used was to cut the tops out of fifteen of the largest live trees found along the shoreline. This was done primarily to encourage first time breeding birds, and other pairs that have lost previously used nesting sites, to use the area. These trees ranged

in height from about 75 to 125 feet, and were from 4 to 6 feet d.b.h. After each tree was topped, large 12 inch spikes were driven around the outer edge of the cut to help anchor future nests. Trees were topped at a height that would provide good visibility, above a whorl of limbs that would give support to a nest, and in an area of the main trunk that was over 24 inches in diameter.

The distances between topped trees was from 1/4 to 1/2 mile. A tree surgeon contracted the job for \$375.00. The work took 5 days, averaging 3 trees per day and cost \$25.00 per tree. The first tree topped was in mid-August. An osprey nest was found in this tree by the end of August.

To replace deteriorated nesting snags used by most members of the osprey colony, 20 large cedar poles were trucked into the unit from a nearby timber sale. Poles averaged 36 feet in length and 3 to 5 feet d.b.h. Once at the site, poles were cut to 25 feet for ease of handling. Total cost for trucking the poles was \$200.00.

Sites for setting the poles were selected with two criteria in mind. One was to be reasonably close to a deteriorated nesting snag and the other was to provide ospreys with good visibility.

Poles were dragged from the main unloading area to selected sites with a Case 750 tractor containing a front end loader and a backhoe. This procedure took considerable time as some sites were close to a mile away.

To set the poles, holes were dug 5 to 6 feet deep with a backhoe. The poles were then pushed into the holes by the front end loader on the tractor and very gradually put into an upright position. At the upright position the tractor held the poles in place and soil and rock were shovelled into the holes by hand until the poles were firmly anchored. The tractor would then push in extra material and pack around the poles with its tracks. It took six days to set the 20 poles and cost \$800.00 for two men and the tractor. Total cost for trucking and setting 20 poles was \$1,000, averaging 50 dollars per pole.

Nest boxes were constructed on top of each cedar pole once they were set. Each structure consisted of 4 lengths of 8 foot, 2x4 redwood lumber and 12 spikes, 12 inches in length. The 8 foot sections were nailed together to form a rectangular box with extended sides. Spaces between the pole and nest box were ringed with spikes to help keep nest material from falling through the cracks.

Nest boxes were built to provide a broad base on which osprey could place a nest, which hopefully will result in less losses to nests from high winds. Cost for the material for each nest box was \$6.50. Total cost for each cedar pole set, plus nest box was \$56.50.

Protecting Nest Sites

Finally, protection was provided for nesting habitat. To protect these potential nest sites and other nest trees from cutting by uninformed individuals and to protect nesting ospreys, metal signs are being placed on nest trees throughout the Forest containing this message, "Osprey Nest Tree. The osprey, or fish hawk, is a threatened species in the United States. This tree supports an active nest and must not be cut or used for other purposes. Human activity is not permitted within one-eighth mile of the nest from April 1 to August 31. The osprey is protected by law--do not shoot"!

Earlier I mentioned that a serious problem was the continued loss of osprey nesting sites around major bodies of waters and that this loss was primarily from logging operations. To resolve this problem on lands administered by the Lassen National Forest, special coordination measures were established between the timber and wildlife functions. Guidelines for protecting the osprey habitat were spelled out in the Osprey Habitat Management Plan and the following five measures were recommended:

A. Timber

1. No timber or snags to be cut, except individual campground danger trees and clearing for road rights-of-way within 200 feet of known osprey breeding waters.
2. Beyond the 200 foot no-cut strip near the shoreline, an additional one-fourth mile strip should be set aside where a minimum of two dominant live trees and two desirable snags per acre will be reserved for osprey nesting.
3. Beyond the one-fourth mile strip, all suitable broken top nest snags and live trees should be left for a distance of two miles.
4. Within a 10 chain area surrounding all osprey nests, save three to five trees as roosting and potential nest trees. These can be over-mature trees, large thrifty trees, or snags.
5. Modify timber harvest and timber stand improvement projects within 10 chains of known active nests to minimize or prevent human disturbances to nesting osprey during the period from April 1 to August 15.

These measures have been accepted and to date excellent results achieved. Recently a proposed timber sale unit near the southwest portion of Lake Almanor was modified drastically to conform with these coordination measures.

CONCLUSION

The progress we have made to date is just a short step in the right direction in obtaining proper osprey management on the Lassen National Forest. A good many programs are still to be realized. For example, in the near future we plan to cut the tops out of more live trees near Eagle Lake and Lake Almanor. If needed, we will install additional nest poles and pilot trees in the Eagle Lake Osprey Management Area. Also, we will develop a slide program and pamphlet to make the public aware of the osprey and what they can do to help maintain osprey numbers in the area.

Hopefully, through our efforts and the efforts of other interested agencies and private parties, we will maintain a breeding population of ospreys in northeastern California for the future.

LITERATURE CITED

- Garber, D.P. 1972. Osprey study, Lassen and Plumas Counties. Calif. Dept. Fish & Game.
- Kahl, J.R. 1971. Osprey habitat management plan. Lassen National Forest, Susanville, Calif.