Ecology of the breeding bald eagle and osprey in the Grand Teton-Yellowstone National Parks complex
by Kurt Langdon Alt

A thesis submitted in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in Fish and Wildlife Management
Montana State University

Abstract:
A study on the breeding ecology of the bald eagle (EaHaeetus ZeuoocephaZus) within the Grand Teton-Yellowstone National Parks complex and osprey (Pandion haZiaetus) within Grand Teton National Park was conducted during 1978 and 1979. The bald eagle population was reproducing at an average annual rate of 0.92 young per occupied territory. Also 4 territories have been initiated since 1973 thus indicating that the breeding population may be increasing. However, the number of breeding bald eagles within Yellowstone National Park appears to have remained relatively stable since 1972. . Osprey pro- • ductivity underwent a dramatic increase from 0.39 young per occupied nest in 1978 to 1.13 in 1979. Based primarily on nests located on Jackson Lake, osprey breeding pairs have not changed significantly since 1972 and possibly even since 1968. Bald eagle nest initiation dates ranged from early March to mid-April, hatching dates from mid-April to mid-May and fledging dates from late June to early August, Ospreys initiated nesting as early as May, hatching occurred during June and fledging during the first 2 weeks in August. Nest site parameters were characterized for both species. A minimum of 232 individual bald eagle prey items were identified by combining pellets and remnants. Lake nesting bald eagles utilized a higher proportion of waterfowl while river nesters utilized a higher proportion of fish Mammals constituted approximately 14% of the overall prey items.

Bald eagles nesting oh Yellowstone Lake undergo a marked shift in diet from cutthroat trout during June and early July to waterfowl in August. Ospreys prey primarily on catostomids followed by cyprinids and salmonids. Spring weather and bald eagle reproduction within Yellowstone National Park were correlated, p=.0039 and r^=.77, suggesting that cold wet springs inhibit bald eagle reproduction within this park. Observed osprey reaction to human activities were classified according to reaction category. The differences in possible disturbance caused by private versus commercial float trips are discussed. Three bald eagle population units could be distinguished on the basis of reproduction, chronology, nest site characteristics and food habits. Based on the above data management recommendations are presented.

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by

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A thesis submitted in partial fulfillment
of the requirements for the degree

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ABSTRACT

A study on the breeding ecology of the bald eagle (*Haliaeetus leucocephalus*) within the Grand Teton-Yellowstone National Parks complex and osprey (*Pandion haliaetus*) within Grand Teton National Park was conducted during 1978 and 1979. The bald eagle population was reproducing at an average annual rate of 0.92 young per occupied territory. Also 4 territories have been initiated since 1973 thus indicating that the breeding population may be increasing. However, the number of breeding bald eagles within Yellowstone National Park appears to have remained relatively stable since 1972. Osprey productivity underwent a dramatic increase from 0.39 young per occupied nest in 1978 to 1.13 in 1979. Based primarily on nests located on Jackson Lake, osprey breeding pairs have not changed significantly since 1972 and possibly even since 1968. Bald eagle nest initiation dates ranged from early March to mid-April, hatching dates from mid-April to mid-May and fledging dates from late June to early August. Ospreys initiated nesting as early as May, hatching occurred during June and fledging during the first 2 weeks in August. Nest site parameters were characterized for both species. A minimum of 232 individual bald eagle prey items were identified by combining pellets and remnants. Lake nesting bald eagles utilized a higher proportion of waterfowl while river nesters utilized a higher proportion of fish. Mammals constituted approximately 14% of the overall prey items. Bald eagles nesting on Yellowstone Lake undergo a marked shift in diet from cutthroat trout during June and early July to waterfowl in August. Ospreys prey primarily on catostomids followed by cyprinids and salmonids. Spring weather and bald eagle reproduction within Yellowstone National Park were correlated, $p=.0039$ and $r^2=.77$, suggesting that cold wet springs inhibit bald eagle reproduction within this park. Observed osprey reaction to human activities were classified according to reaction category. The differences in possible disturbance caused by private versus commercial float trips are discussed. Three bald eagle population units could be distinguished on the basis of reproduction, chronology, nest site characteristics and food habits. Based on the above data management recommendations are presented.

INTRODUCTION

The Grand Teton-Yellowstone National Parks complex is an area of considerable importance to bald eagle (*Haliaeetus leucocephalus*) (Swenson 1975) and osprey (*Pandion haliaetus*) populations in the Montana, Wyoming and Idaho area. However, there have been few intensive studies conducted on these species in this complex. Skinner (1917) published data on numbers, distribution and life history of osprey in Yellowstone National Park. Murphy (1960, 1961 and 1965) provided information concerning bald eagle productivity, population size and nest site selection in Yellowstone. Turner (1968) included both parks in an osprey productivity survey conducted in northwestern Wyoming during 1968. Houston (1969) included data on numbers, distribution, productivity and life history of both birds in his description of the avifauna of Grand Teton National Park.

Because of the fragmented information concerning these two species in Yellowstone and the published declines in various parts of North America (Sprunt 1969, Henny and Ogden 1970, Ames and Mersereau 1964), Yellowstone National Park funded a study, conducted by Jon Swenson from 1972-1974, on the ecology of the bald eagle and osprey in Yellowstone Park. Swenson (1975) found no discernible change in numbers or distribution of occupied bald eagle territories although productivity had dropped to quite low levels when compared with data from the early 1960's (Murphy 1960, 1961). Swenson found 0.23 young per occupied

territory while Murphy recorded 0.69 from the same area. Swenson's productivity data appeared low when compared with results expressed as young per occupied territory from other population studies in North America (1.02, Sprunt et al. 1973; 0.90, Greer 1969; 0.67, Houston 1969). Swenson (1975) also reported a decline in population size and about a 35 percent decline in osprey productivity from pre-1945 levels. When he compared his productivity figures (0.45, Yellowstone Lake, 0.64, Yellowstone Park, 0.95, Yellowstone streams) with those from other areas having stable or increasing populations (1.12, Melquist 1974, 1.01, Schroeder, 1972) it was apparent that Yellowstone osprey productivity with the exception of stream nests was depressed.

The University of Wyoming-National Park Service Research Center funded the present study in light of these results to further identify the bald eagle population in the Grand Teton-Yellowstone complex as a possible single isolated breeding population and to compare the osprey breeding population in Grand Teton National Park with data previously gathered in Yellowstone National Park (Swenson, 1975). The specific objectives were to locate actual and potential nesting areas, to provide quantitative data on numbers and distribution of breeders and non-breeders, to provide baseline data on aspects of life history (nesting success, breeding chronology and food habits), to characterize nest and nest site parameters, to assess response to human

activity and on the basis of the above formulate management recommendations.

DESCRIPTION OF STUDY AREA

The study area was located in southwestern Montana and northwestern Wyoming and encompassed Grand Teton National Park, Yellowstone National Park and a complex of adjacent lakes, rivers, and streams (Figure 1). This complex included that section of the Snake River flowing south from Grand Teton to Cabin Creek Campground, east from Grand Teton up the Gros Ventre River to Lower Slide Lake, up the Yellowstone River to Bridger Lake bordering Yellowstone Park on the southeast, west from Yellowstone Park along the Madison River drainage to Hebgen and Cliff Lakes, and west onto the Red Rocks Refuge in the Beaverhead drainage of southwestern Montana.

Physiography

Love and Reed (1968) and Keefer (1971), respectively, have described the geology of Grand Teton and Yellowstone National Parks. The present physiography of the Grand Teton-Yellowstone National Parks complex is very diverse, much of it sculptured by the most recent, Pinedale, glaciation. Grand Teton consists of a relatively high mountain valley (2,042 m), bordered on the west by the Teton Range and the east by numerous foothills and extensive mountains. The valley (Jackson Hole) is essentially a flat glacial outwash plane with pothole topography in the north-central portion, glacial moraines and lakes along the western edge, and several isolated buttes in the northern and southern extremes. The Tetons are a faulted mountain

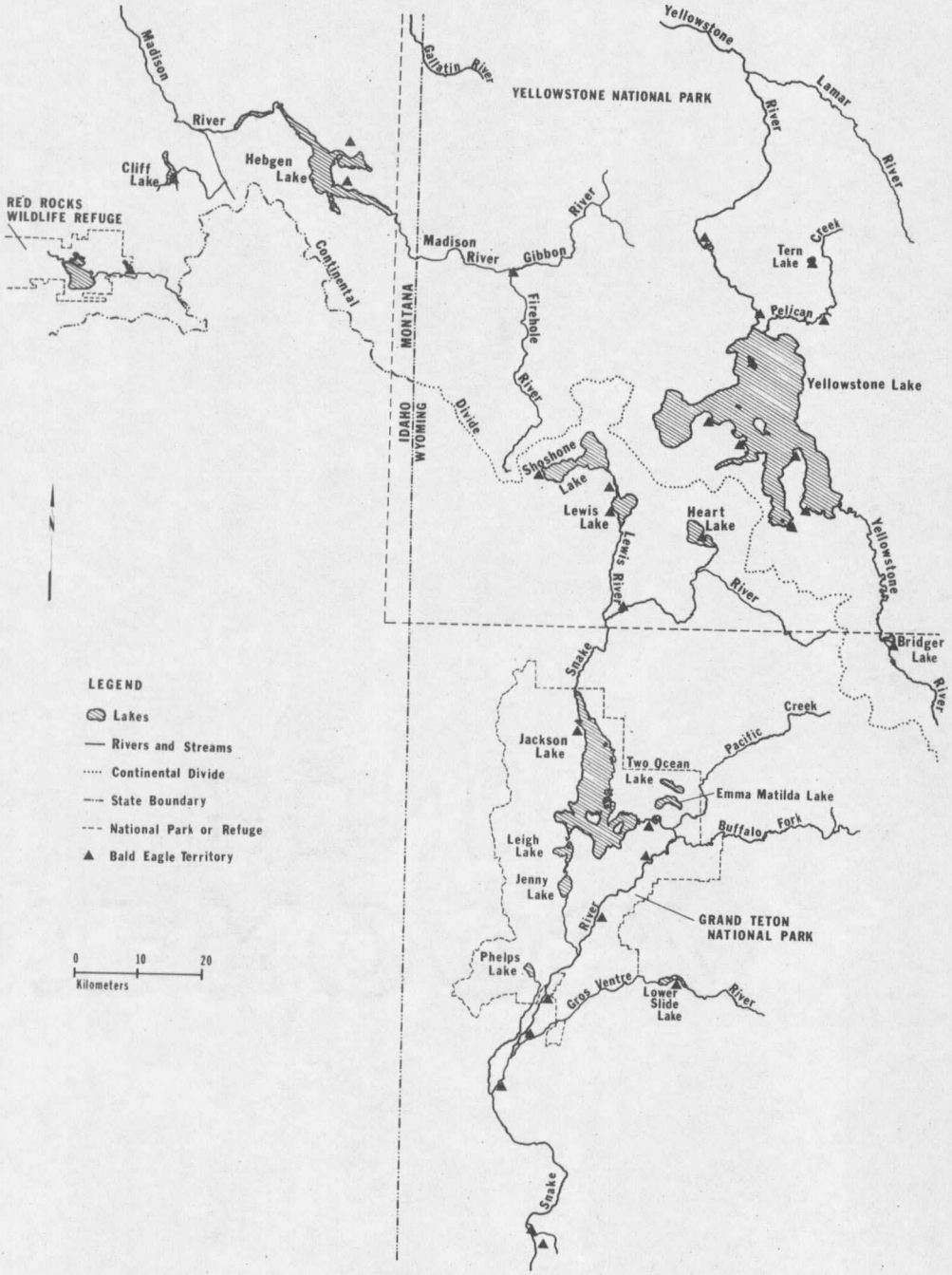

Figure 1. Map of the Grand Teton-Yellowstone National Parks study area showing bald eagle territories.

range lacking foothills on the east side. They rise nearly 2133 m above the valley floor to a maximum elevation of 4197 m. The northern extension of this range is covered by extensive lava flows which came out of Yellowstone. Yellowstone Park is characterized by rolling plateaus (primarily rhyolotic lava flows) in the central portion bounded on all but the west side by extensive mountain ranges. Elevations in this park range from 1849 to 3373 m.

This park complex is bisected by the Continental Divide. In the Pacific drainage, the Snake River and its tributaries drain the southwestern and south-central portion of Yellowstone Park and the entire Grand Teton area. In the Atlantic drainage, the Yellowstone, Madison and Gallatin Rivers and their tributaries drain the remaining portion of Yellowstone National Park while the Beaverhead River drains the Red Rocks Refuge.

Jackson Lake is situated in the extreme northern portion of Grand Teton Park and is the largest lake in the above-described Pacific drainage. A dam built at the outlet in 1912 has raised the level of the lake 11.9 m (Hayden 1969). It has a maximum depth of 129.5 m and surface area of 104 km^2 (Pete Hayden, pers. comm. 1980). Yellowstone Lake is located in the Atlantic drainage and is the largest lake in the complex. It has a maximum depth of 94.2 m and a surface area of 355 km^2. The remaining major bodies of water in this complex are Emma

Matilda, Jenny, Leigh, Two Ocean, Phelps, Lewis, Shoshone, Heart and Lower Slide Lakes located in the Pacific drainage and Bridger, Hebgen, Cliff, and Red Rocks Lakes in the Atlantic drainage.

Climate

Long cold winters with heavy snowfall typify the study area. Freezing temperatures can occur any month of the year. Snowfall is also possible during any month, but is heaviest from November through March.

Weather data have been recorded at Moran, Wyoming (Jackson Lake Dam) by the Bureau of Reclamation since 1912. The average annual precipitation is 56.8 cm, over half of which falls as snow. The average annual temperature is 1.6°C. January is the wettest (7.1 cm) and coldest (-11.4°C) month and July the driest (2.2 cm) and warmest (14.5°C).

Yellowstone National Park has kept records at Mammoth on precipitation and temperature for nearly 90 years. The average annual precipitation and temperature at Mammoth is 42.1 cm and 4.3°C, respectively. In contrast to the Moran station June was the wettest month (6.3 cm) and February the driest (2.3 cm). The coldest and warmest months are again January and July, respectively.

Ice-out on Jackson Lake, mid-May, is approximately two weeks earlier than on Yellowstone Lake. Jackson Lake usually freezes over around mid-December (Hayden 1969).

Vegetation

The vegetation of Grand Teton National Park has been described by Reed (1952) and Shaw (1958, 1976) who both provided community characteristics and plant species lists. Beetle (1961), Martinka (1965) and Oswald (1966) identified communities and described each extensively.

The major river and stream bottoms are characterized by narrowleaf cottonwood (*Populus angustifolia*), blue spruce (*Picea pungens*) and occasionally balsam poplar (*Populus balsamifera*). Buffaloberry (*Shepherdia canadensis*) and various species of *Salix* are frequent shrubs in this area. Big sagebrush (*Artemisia tridentata*) is the predominant shrub typifying outwash planes, terraces and low lying hills. Other important species in this portion of the valley floor include low and alkali sagebrush (*Artemisia arbuscula* and *A. longiloba*), bitterbrush (*Purshia tridentata*), rabbitbrush (*Chrysothamnus nauseosus* and *C. viscidiflorus*), arrowleaf balsamroot (*Balsamorhiza sagittata*), thickspike and bluebunch wheatgrasses (*Agropyron dasystachyum* and *A. spicatum*) and Idaho fescue (*Festuca idahoensis*) (Beetle 1961 and Shaw 1958, 1976).

The remainder of Grand Teton National Park (except above timberline) is covered primarily by coniferous forests interspersed with deciduous species. At high elevations, between 2103 and 3048 m, Englemann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*) and whitebark pine (*Pinus albicaulis*) are the principal tree species (Shaw 1958). At lower elevations (Beetle 1961) and on the low lying moraines (Martinka 1965, Oswald 1966) lodgepole pine (*Pinus contorta*) predominates with Douglas fir (*Pseudotsuga menziesii*), subalpine fir and limber pine (*Pinus flexilis*) as principal associates. It is believed that those areas where lodgepole pine now exist were burned over 90 years ago (Reed 1952, Shaw 1958). The lodgepole pine forest is also interspersed on moraines with aspen (*Populus tremuloides*). In general, aspen was found to occur on a variety of mesic sites (Beetle 1961).

Despain (1973) divided the vegetation of Yellowstone Park into five zones. Swenson (1975) identified the spruce-fir and lodgepole pine zones as the areas in which the majority of bald eagle and osprey activity occurred. The spruce-fir zone is located above 2560 m with Englemann spruce and subalpine fir the dominant tree species. Whitebark pine and Douglas fir were primary associates near timberline. The lodgepole pine zone is situated in the central, west-central and most of the southern half (Beetle 1961) of Yellowstone National Park.

These areas of extensive lodgepole pine forests are characteristically found on the rhyolitic lava flows (Beetle 1961).

Primary and Secondary Study Areas

The most intensive research was conducted in Grand Teton National Park, where most human-eagle-osprey interactions were observed. Data on the bald eagle were gathered from all known eagle territories in this complex. Osprey data were collected primarily from Grand Teton, although some information was also gathered from Yellowstone National Park and Hebgen Lake.

Potential prey items in this complex include a variety of waterfowl, fish and mammals. Common waterfowl observed were trumpeter swan (*Cygnus buccinator*), Canada goose (*Branta canadensis*), American wigeon (*Anas americana*), gadwall (*A. strepera*), green-winged teal (*A. crecca*), mallard (*A. platyrhynchos*), blue-winged teal (*A. discors*), lesser scaup (*Aythya affinis*), bufflehead (*Bucephala albeola*), Barrow's goldeneye (*B. islandica*) and common merganser (*Mergus merganser*). Other water birds frequently seen include the eared grebe (*Podiceps caspicus*), white pelican (*Pelecanus erythrorhynchos*), and American coot (*Fulica americana*).

Utah chubs (*Gila atraria*) are one of the largest cyprinids in the area. Catostomids in this complex are Utah sucker (*Catostomus ardens*), longnose sucker (*Catostomus catostomus*), mountain sucker

(*Catostomus platyrhynchus*) and bluehead sucker (*Catostomus discobolus*) (Baxter and Simon 1970). Salmonids include the mountain whitefish (*Prosopium williamsoni*), arctic grayling (*Thymallus arcticus*), and cutthroat (*Salmo clarki*), rainbow (*Salmo gairdneri*), brown (*Salmo trutta*), lake (*Salvelinus namaycush*), and brook (*Salvelinus fontinalis*) trout (Baxter and Simon 1970).

The Uinta ground squirrel (*Spermophilus armatus*), beaver (*Castor canadensis*) and muskrat (*Ondatra zibethicus*) are potential mammalian prey species. In addition, large ungulates in the form of carrion are also available to bald eagles.

METHODS

Aerial Surveys and Nest Observations

Since both the bald eagle and osprey nest in close association to water, nest searches were directed toward lakes, rivers and streams. Ten aerial surveys were conducted during this study: May 27, June 29 and July 30, 1978; February 26, April 6, June 2 and 16, July 16 and 31, and August 18, 1979. These surveys were flown in a 150-hp Super Cub piloted by James Stradley, who has had a minimum of 8 years of experience conducting such nesting surveys in this area. These aerial observations were essential in providing information on territory occupancy, nest initiation, hatching and fledging dates, productivity, and differences in nesting chronology. To minimize observer disturbance, each nest was normally flown over once during a flight. However, when any uncertainty existed as to the number of eggs or young, a second pass was made. Ground observations by myself and river rangers from Grand Teton National Park supplemented the above information.

Age and Sex Classification

Subadult in the context of this thesis refers to young from their first year of life to attainment of full adult plumage. A subadult in its first year will be referred to as an immature.

Southern (1967) identified 7 different subadult bald eagle plumage classes which may or may not relate to age. To minimize the

potential of counting the same bird twice, each subadult bald eagle observed was recorded according to its plumage class and the time and approximate location of the observation.

Immature osprey were distinguished from adult osprey by heavy mottling on their backs (Bent 1937). The relatively solid white breast of male ospreys separated them from females which have a heavily streaked breast (Macnamara 1977).

Reproductive Terminology

To provide more consistency between different studies, Postupalsky (1974) presented a framework of terminology describing raptor nest status and reproductive success upon which researchers could build their own variations. The slight modifications of this terminology suggested by Swenson (1975) were applied to this study. The definitions are as follows:

Breeding territory: an area containing one or more nests within the range of a mated pair of birds.

Occupied nest: any nest at which at least one of the following activity patterns was observed during a given breeding season

a. young were raised;

b. eggs were laid;

c. one adult sitting low in the nest, presumably incubating;

d. two adults present on or near the nest, provided there is no reason to suspect that this pair had already been counted elsewhere;

e. a recently repaired nest with fresh sticks (clean breaks), or fresh (green) boughs on top even if only one adult or no adults were seen;

Active nest: a nest in which eggs have been laid, activity patterns (a), (b) and (c) above being diagnostic.

Productive or successful nest: an occupied nest from which at least one young fledged, or if actual fledging was not observed, was raised to an advanced stage of development.

Alternate nest: one of several unoccupied nests within the breeding territory of one pair of birds.

Frustration nest: an alternate nest built, repaired or frequented by a pair of birds subsequent to a nest failure at another nest during the same breeding season.

Nest success: the proportion of occupied or active breeding territories (with known outcome) which produce at least one young to an advanced stage of development.

Brood size: the number of young (raised to an advanced stage of development) per successful nest.

Productivity: number of young raised to an advanced stage of development per occupied or active nest.

Nest Site and Nest Measurements

At each nest site the following parameters were measured and characterized: tree density, relative species frequency and species dominance, and plant composition at nest sites; species condition, dbh, height, and distance to water of the nest tree; relationship of nest tree to other trees; and height of nest above ground. In addition, all bald eagle nests in nest trees which were climbed were characterized as to size and material composition.

Nest site measurements were obtained using a modification of the point-centered quarter method (Cottam and Curtis 1956). Thirty-meter line transects were established in each of the four cardinal directions using the nest tree as the center. Sampling points were fixed at 15 meter intervals from the nest tree along each transect. Each point was divided into quarters and the species, distance to, and dbh of the nearest tree >10 cm dbh in each quadrant was recorded.

Actual nest measurements obtained were thickness (top to bottom of nest), width (from tree trunk to outermost edge of nest) and length (measurement perpendicular to the width). A Stratex Stratolevel was used to measure heights of nests and trees although in those trees climbed a plumb line was also used as a check on the above measurement.

Prey Items and Foraging Behavior

Food habits were determined on the basis of prey item remnants (hair, feathers, bones, scales), reguritated pellets and direct observations. Food remnants and pellets were gathered from within nests and from the ground below nests and obvious perches. Bald eagle food items were collected during the banding operation in June and early July, 1979, and again in late August and early September, 1978 and 1979. Fish remains from osprey nests were collected primarily during September of both years. By waiting until late summer to collect food remains, minimal observer disturbance was rendered at active nest sites. Avian and mammalian prey remains were identified by comparing them with specimens from the Montana State University Zoological Museum. Fish remains were identified by comparing them with known skeletal specimens.

Bald eagle food habits were analyzed by determining the minimum number of recognizable prey individuals. In most instances a regurgitated pellet was considered to represent a minimum of 1 individual. However, when a pellet contained remains of 2 or more species or evidence of more than 1 individual of the same species it is considered to represent the minimum number of recognizable individuals. To insure that the number of prey items truly

represented the minimum number of individuals from a given nest, the following conditions of summation applied:

a. One remnant representing an identified species and 1 pellet representing the same species equalled 1 individual of that species;

b. One remnant representing an unidentified species of a given class (i.e. bird, fish, or mammal) and 1 pellet containing an unidentified species of the same class equalled 1 individual of an unidentified species of that class;

c. One remnant representing an identified species of a given class and 1 pellet containing an unidentified species of the same class equalled 1 individual of that species and class.

In analyzing osprey food remains, the number of bones for each species of fish was determined and their percentage of the total number of bones was calculated. Locations of osprey dives and fishing forays were recorded to determine preferred foraging areas. The lengths of fish caught were estimated by comparing their length with that of the osprey, 56 cm (Robbins et al. 1966).

Human Influence

Several methods were used in an effort to assess response by osprey to human presence or activity. In an attempt to quantify this information, osprey reactions were divided into four distinct

categories: no reaction; alert, bird attentive to human activity; alarm, bird vocalizing in response to human activity (without leaving nest or perch); flight, bird leaves nest as a result of human activity. One or all four reaction categories could occur during one encounter.

Observation points were established along sections of the Snake River and Jackson and Leigh Lakes inhabited or frequented by osprey. From these points any observed human-osprey interactions were described as to nature of human activity (fishing, boating, photography, etc.), date and time of day, distance of human activity to bird or nest, and osprey reaction category.

Experiments were also conducted in cooperation with the National Park lake patrol in an attempt to assess boating disturbance to active osprey nests on Jackson Lake. A 20 foot Bertram boat, 15 foot Boston Whaler boat and an 18 foot Grumman canoe were used to approach the nest in direct and parallel fashions. Observations were recorded and described as to osprey reaction category.

Pete Hayden (Fisheries Biologist, Grand Teton National Park) had placed several cameras at strategic points along the Snake River to determine the number of private and commercially operated (concessioned) float trips each day. Data collected in this manner from the Pacific Creek launching area was used due to its availability and completeness. In addition, all launches from this access would pass 4 of the 6 river osprey nests. Thus, data concerning times of peak

boating pressure were obtained and correlated with sensitive periods in the breeding season of the bald eagle and osprey. These data along with direct observations were used to compare disturbance factors due to private versus concessioned float trips.

Banding Procedure

Banding was done under authorization of Federal Bird Marking and Salvage permit # 20357 and Endangered Species Permit # PRT-2-4164. Permits were also obtained from Grand Teton National Park, Yellowstone National Park, Montana Department of Fish, Wildlife and Parks, and the Wyoming Game and Fish Department. Pop-rivet bands, size 9, were placed on the bird's left leg.

The aerial survey conducted June 16, 1979, helped establish the number of nestling bald eagles in each active nest and their approximate stage of development. Ground observations, comparing the development and relative length of the tail and primaries, were essential in determining the relative age of nestlings. From these data the sequence of nestling banding was formulated in which priority was given to those most advanced in age and development.

A combination of nylon rope, nylon runners, and carabiners were used in climbing most nest trees. Climbing spikes were seldom used. The technique involved one person climbing and the other belaying

the climber and proved to be the quickest and safest method to get to and from the nest.

RESULTS AND DISCUSSION

Numbers and Distribution

Bald Eagle

A minimum of 30 bald eagle territories was present in the study area as of 1979 (Figure 1). The territory located near the channel connecting Lewis and Shoshone Lakes is believed to represent an alternate nest of the pair which nests on Lewis Lake (pers. comm. Jon Swenson, 1978) and is treated as such in this thesis. A minimum of 26 individual territories were classified as active during at least one of the years of study. This represents a minimum number of 52 breeding adults. Two other single adults were seen in association with territories but no breeding activity was observed.

A minimum of two bald eagle territories have existed within Grand Teton National Park since 1956 (Huser, 1968). Records of a third territory first appeared in the mid 1960's, however due to the incompleteness of the records it may have been initiated earlier. Bob Wood (pers. comm.) reported the fourth pair of bald eagles first building their nest in 1973 in an area where no previous nesting activity had been observed.

Murphy (1965) reported 13 territories within Yellowstone National Park, while Swenson (1975) reported 14. An additional territory near the south entrance was first recorded during this study. In addition to the active nest, two alternate nests were present. It is possible that this territory had been occupied previously but that the previous

two researchers overlooked it due to its extreme southern location and obscure position.

The oldest known nesting territory within this population is located on Cliff Lake. Records date back to the early 1930's (pers. comm. Chuck Sundstrom). Neither of the territories located on Hebgen Lake were observed during Baglien's (72-74) study of golden eagles in this area. This suggests that these territories were initiated sometime after 1974. The territory located near the southeast boundary of Red Rocks Refuge was first documented in 1978 (pers. comm. Gene Stroups), and due to its conspicuous position, this is believed to be the initial year of its existence. Due to the lack of available records, histories on territories south of Grand Teton National Park cannot be presented.

The eagle population was divided into 3 units based on nesting chronology and habitat characteristics. The Snake population unit includes those territories from immediately above the confluence of the Snake and Lewis Rivers to south of Jackson. The Yellowstone unit includes those territories on the Yellowstone River and Pelican Creek and on Lewis, Heart, Yellowstone, Tern, and Bridger Lakes. The Madison-Beaverhead unit includes those territories on the Madison River, Hebgen and Cliff Lakes, and adjacent Red Rocks Refuge.