EFFECTS OF RECREATIONAL ACTIVITY ON OVERWINTERING BALD EAGLES ON THE SKAGIT WILD AND SCENIC RIVER SYSTEM, WASHINGTON 1986-87

MARK STALMASTER

$2.00 25.00 (212) - 6[illegible]

SKAGIT WILD & SCENIC RIVER SYSTEM BALD EAGLE DISTURBANCE STUDY

Progress Summary - 5 November 1987 Mark Stalmaster

922-5435

Status: 1984-85 Season - Preliminary research and development of experimental designs

1985-86 and 1986-87 Seasons - Observation data from SRBENA and simulated disturbances on SYSTEM, recreational surveys, attitude evaluations, etc.

1986-87 Season - Completion of simulated disturbances on Suiattle, Cascade, and Skagit above SRBENA, observational data at low activity area, recreational surveys, etc.

1987-88 Season - Possible testing of model reliability and sensitivity analysis

PRELIMINARY RESULTS OF FINDINGS -- SUMMARY OF 1986-87 REPORT

(1) A high count of 418 eagles was made during the 3rd week of January 1987 (excludes the Cascade, Skagit above SRBENA, and all tributaries) (F 45).

(2) SRBENA accounted for 25 % of all eagles with generally twice the density of all other river stretches (T 71, 72).

(3) On Lower Skagit (Hamilton to Sedro Woolley), 140 peak count in 1987, but 40 in 1986. What is normal? Other river stretches generally consistent (F 41).

(4) Most feeding activity in December (49 %) and January (46 %), less in February (5 %) (F 1), in morning (65 %) (F 2), and on weekdays (F 6, 10). Food peaks at turn of year.

(5) Feeding activity declines exponentially with human activity (F 18). (Feeding reduced by 50 % with 20 boats on river (F 16), more than 75 % with 40 boats, etc.)

(6) Number of feeding eagles declines at a much faster rate than the amount of feeding activity (F 29). Thus, prevention of feeding by humans is not equally distributed among all eagles. Sensitive eagles leave; a few tolerant birds feed.

(7) Eagles perched in trees are chased off the river in a (somewhat) exponential manner because of human activity (F 29) and subadults are affected most (F 30).

(8) Fewer eagles fly from human activity as a typical day progresses (F 28). Why? Most likely because intolerant birds are being chased off river by humans leaving a few tolerant birds behind (F 32).

(9) Fewer eagles flush as season progresses (F 33). Why? A combination of partial habituation and redistribution likely.

(10) Using flushing from food carcasses as index of reaction and disturbance, type of human activity affected eagles differently (in order of decreasing effect): (T 61)

Type of Activity	Index	Reason
Research Raft	+	Early/late in day floats
Drifting Motorboat	+	Timing and long duration
Running Motorboat	+	Timing and position in sequence
Hiker	+	Extreme sensitivity to foots
Bank Fisher	+	Extreme sensitivity to foots
Dory	+	Timing, duration, and position
Recreate Raft	-	Timing and position
Canoe	-	Timing and position
Kayak	-	Timing and position

Timing is critical: daily, weekly, and seasonal.

(11) Eagles on gravel bars flush from all types of activity with a frequency of 90 percent -- 2 to 4 times that of perched birds (F 26).

(12) Eagles flush from foot traffic with much greater frequency than from boat traffic (F 26). But boats encounter more eagles because they travel farther.

(13) On SRBENA: (A) afternoon counts are lower than morning counts because of human activity and natural behavior (F 46), (B) weekend counts are lower because of human activity (F 46), and (C) subadult percentage is lower on weekend afternoons because subadults are chased off river (F 48).

(14) On SRBENA, fewer eagles fly from human activity (F 56) and when they do, it is at shorter distances (F 49) than all other river stretches. Why? Redistribution of eagles and partial habituation, or both.

(15) Highly variable reaction patterns: "Over 80 % of eagles flush from boats on Suiattle , but as little as 15 % flush on SRBENA on weekend afternoons (F 56)." Human activity probably a major cause.

(16) Width of river channel also affects impact. Wider channels allow more distant views increasing length of flight distance and decreasing likelihood of flushing because of less chances of encroaching on "flight zone."

(17) Up to 1400 activities, mostly boats, pass through SRBENA each winter (T 111). Peak daily count of 115 made. Generally half fishermen and half eagle-watchers on SRBENA (T 115). Eagle-watching almost nonexistent on other river stretches.

(18) Visitors underestimate their effects to eagles in re: flight distance (F 89), flushing responses (F 88), and avoidance distance (F 90).

(19) Development of eagle interpretive display received the most support of any suggested management action by both eagle watchers (80 %) and fishermen (42 %) (T 150, 151).

(20) Preliminary management suggestions? (A) Construction of an interpretive display at WA Eddy pull-out or Sutter Creek rest area. (B) A hillside viewing site would provide an alternative to floating by eagle-watchers. (C) Compliance with suggested 10:00 AM put-in would reduce much feeding disturbance.

EFFECTS OF RECREATIONAL ACTIVITY ON OVERWINTERING BALD EAGLES ON THE SKAGIT WILD AND SCENIC RIVER SYSTEM, WASHINGTON

Report of Research Activities

1986-87

Pacific Northwest Research Station

U.S. Forest Service

U.S.D.A.

Portland, Oregon

Mark V. Stalmaster

30 September 1987

Notice of Study Status

The contents of this report are the preliminary results of research conducted for the Pacific Northwest Research Station, U. S. Forest Service, under Federal Grant No. PNW-86-470. Results reported herein are the preliminary analyses of an ongoing study and interpretations are tentative.

This report is divided into 7 sections, each describing the results of 7 tasks as outlined in the research study plan and grant award. These 7 tasks are:

(1) Observational Monitoring of Human-Eagle Interactions;
(2) Food Analysis;
(3) Weather Monitoring;
(4) Simulated Disturbances and River Censuses;
(5) Heart Rate Monitoring;
(6) Recreational Use Survey; and
(7) User Attitude Evaluation.

The Heart Rate Monitoring task, as described in the research study plan, will not be conducted.

The objectives of this project are to gather information on the effects of recreational activities on bald eagles on the Skagit, Sauk, and Suiattle rivers, to synthesize all data sets into a workable model to predict impacts on eagles, to develop cases of human activity and simulate their effects to eagles, and to provide management recommendations.

The following is the proposed schedule for the study:

Fiscal Year 1985 - Equipment Purchases, Development of Study Plans, and Preliminary Data Collection

Fiscal Year 1986 - Data Collection and Analysis

Fiscal Year 1987 - Data Collection and Analysis

Fiscal Year 1988 - Data Collection on Unfinished Tasks and Experiments and Construction of the Simulation/Management Model

Fiscal Year 1989 - Model Simulations and Field Tests of Model Accuracy

This schedule assumes that the final appropriation request, covering both Fiscal Years 1988 and 1989, will be available. A final report will be available in September 1989 which would also include results of model testing.

This document is a progress report for Fiscal Year 1987. It provides information for interested parties concerning the direction and progress of this project to date. It is not a complete report as it does not include a comprehensive discussion of results, interpretation of data, and comparison with other research and literature. No management recommendations are, as yet, provided.

TABLE OF CONTENTS

TABLE OF CONTENTS

INTRODUCTION

In the early 1970s, the Skagit River became recognized as an important overwintering area for the bald eagle (Haliaeetus leucocephalus). In 1976, the Nature Conservancy bought several parcels of land along the upper reaches of the Skagit River to preserve critical habitat and to protect eagles from interfering human activity. These lands, together with property owned by the Washington Department of Game, were set aside as the Skagit River Bald Eagle Natural Area (SRBENA). This eagle preserve, encompassing 3700 ha between Marblemount and Concrete, was one of the first sanctuaries established to protect wintering bald eagles.

In 1978, the Congress of the United States designated the Skagit, Sauk, Suiattle, and Cascade rivers as a National Wild and Scenic River System (P.L. 95-625). The occurrence of hundreds of overwintering eagles on this Skagit Wild and Scenic River System (SW&SRS) was one reason for this federal classification. The U.S. Forest Service was appointed as the agency responsible for managing the SW&SRS. In 1983, the final management plan for the SW&SRS was completed and an action plan was developed to implement the proposed management plans. These plans described the necessity for determining the effects of any federally-implemented plans on bald eagles.

Also in 1978, The U.S. Fish and Wildlife Service reclassified the bald eagle in the state of Washington to a

threatened species status. As a threatened species, the bald eagle is protected by the Endangered Species Act. Under Section 7 of this Act, any federal action which may affect the "continued existence" of a threatened or endangered species requires consultation with the U.S. Fish and Wildlife Service to ensure that such actions are not detrimental to the species or its habitat. This consultation usually consists of a biological assessment conducted by the responsible agency to determine impacts of the proposed action.

Since the establishment of the SRBENA, recreational use on the Skagit River has increased, primarily as a result of visitation by eagle watchers both on shore and in boats. Steelhead fishing is common throughout most of the SW&SRS and the SRBENA. Because of the potential for these activities to disturb bald eagles, the Nature Conservancy has expressed the need for research to determine if human activities are detrimental to eagles on the sanctuary.

To accomplish the biological assessment for consultation with the U.S. Fish and Wildlife Service and to meet the concerns of The Nature Conservancy, the Pacific Northwest Research Station of the U.S. Forest Service initiated this study. This report describes the preliminary results of this research for work conducted during the winter of 1986-87 combined with results from the winter of 1985-86.

TASK 1 - Observational Monitoring of Human-Eagle Interactions

Methods

An observation point was established on a hillside overlooking the Washington Eddy (River Mile 69 to 70) on the SRBENA. Observations were made at this location dawn to dusk for 80 days from 1 December to 22 February in 1985-86 and for 84 days from 30 November to 22 February in 1986-87. Information was collected using 10X binoculars and a 10-45X spotting scope, recorded on audio tapes, and later transcribed to data sheets.

Scans of eagles perching on shoreline trees (within 50 meters of river), off-river trees (beyond 50 meters of river), and at a communal roost (Barnaby) were made every 10 minutes and scans of eagles feeding and standing on the ground were made every 5 minutes. For each scan, the number, activity, location, age (adult or subadult), and minutes spent feeding or standing were recorded.

Whenever a human activity occurred, its type, duration, time of day, and number of persons involved were recorded. For motorboats, distinguishing characteristics of each boat were recorded so that first passes could be separated from subsequent runs as seen from the observation point. The responses of all eagles present to the human activity included: age (adult or subadult), activity (perching, feeding, or standing), flushing response (whether eagle flew from the activity or not), flight distances of eagles that

flushed (distance between eagle and activity when flushing occurred), and distance of avoidance flight. Flight distances were measured by using distance markers erected in the observation area at 100-meter intervals or by plotting the activity and flushed eagle on a grid map.

Analyses

Feeding Activity.-- Statistical comparisons of feeding activity during each day of the week was by ANOVA using Protected Least Square Difference Tests for paired comparisons. Student's t-tests compared feeding activity between weekdays and weekend. Least squares linear log regression determined the relationship between the extent of feeding activity and the number of recreational activities, because negative exponential curves provided the best fit.

Flight Distances.-- Differences in flight distances from the nine human activity types were tested using ANOVA and Protected Least Square Difference Tests for adults, subadults, and all ages. Student t-tests were used to compare responses of adults to subadults, to compare yearly differences, and to compare responses of eagles engaged in three activity types. ANOVA and Protected Least Square Difference Tests determined significance of distances by day of week. Least squares linear regression described relationships of distances to sequence of human activity, to hour of day, and by day of season.

Flushing Responses.-- Differences in flushing responses

from the nine human activity types were tested using 2 x 2 chi-square contingency tables (ANOVA failed to meet variance assumptions). This test also was used to compare responses of adults to subadults, activity of eagles, yearly differences, and changes occurring by day of week. Least squares cubic regression was used to fit response curves of perched eagles to sequence of activity occurrence using step-wise multiple regression procedures; linear regression was used for ground eagles. Least squares parabolic regression curves showed the relationship between flushing and hour of day using step-wise multiple regression procedures. Linear regression was used for seasonal changes in flush response. Least squares quintic regression curves, determined by step-wise multiple regression, provided the best fit of eagle numbers against sequence of human activity. Linear regression plotted subadult percentages with activity sequence.

Ranking.-- Ranking of activities using the flush index was done by dividing the overall percent of eagles flushed by each activity type by the percent of occurrence of that particular activity type. This index describes the likelihood of flushing as caused by individual human activities. The encounter index was developed similarly and describes the likelihood of particular activities occurring within 500 meters of eagles relative to what would be randomly expected. Percent encountered divided by percent of activity occurrence provides the index.

Results and Discussion

Feeding Activity.-- The time of day when feeding activity occurred at Washington Eddy is listed in table 1 and displayed in figures 1 and 2 for December, January, February, and Total.

Generally, most feeding activity occurred in the morning hours with a peak between 900 and 1100 hours. During these two hours, 38.9 percent of daily feeding occurred; 64.0 percent happened between 800 and 1200 hours. There was a much smaller peak, though often not noticeable, occurring in late afternoon between 1500 and 1700 hours. Feeding could happen during any time of the day, but there was little activity before 800 hours and virtually none after 1700 hours. These patterns were particularly apparent in December and January; feeding in February appeared more sporadic. All season, 65 percent of feeding activity occurred before 1200 hours and 35 percent thereafter.

Feeding at Washington Eddy occurred at similar levels in December (48.7 %) and January (46.5 %), but only 4.8 percent of feeding happened in February (Table 1). Feeding was low in February because scavenging, flooding, and decomposition had reduced the number of salmon biomass to very low levels. Feeding activity was brisk throughout December, it peaked during the first week of the January, and began declining during late January (Table 2, Figure 3).

Human activity was high in January, intermediate in

February, and low in December (see Task 6 for details). Ostensibly, this allowed eagles to feed with greater consistency throughout the day in December and it reduced feeding activity in the afternoons in January; feeding in February was low and sporadic (Figure 1).

Age did not appear to influence the hourly timing of feeding, though subadults were particularly active between 800 and 900 hours (Table 1, Figure 2).

A greater proportion of subadults fed at Washington Eddy in February than in December and January (Table 1, Figures 1, 2). Subadult feeding activity began increasing midway through the study season (Table 2, Figure 3). Although the proportion of subadult birds present gradually increased during the wintering season, the proportion feeding at Washington Eddy was much higher (Figure 4). It is possible that subadults rely on foraging opportunities at high yielding feeding areas, such as Washington Eddy, to a greater extent than adults when food supplies begin dwindling. Perhaps subadults are not as resourceful in seeking and finding scattered food sources and prefer to remain in areas where food was formerly abundant.

There was considerable variability in the daily amount of feeding by eagles at Washington Eddy (Table 3). Although statistical treatments failed to show any significant differences in feeding activity among the days of the week, ostensibly because of a same sample size and high variability, a trend was evident. Bearing in mind these

constraints, feeding activity was lowest on Sundays and Saturdays, intermediate on Tuesdays, Wednesdays, and Thursdays, and highest on Mondays and Fridays (Figures 5, 6) Weekends (Sat-Sun) were not favored for feeding, pre-weekend days (Thu-Fri) had intermediate feeding intensity, and post-weekend days (Mon-Tue) had high levels of feeding (Figures 7, 8), but these patterns were significant only for February (Table 3). Overall, less feeding occurred per day on weekends than on weekdays (Figures 9, 10); these trends were significant for January and February, not December.

There was no evidence of age-related differences in feeding by day of week (Table 3, Figures 5, 6, 7, 8, 9, 10).

Differences in hourly feeding times during each day of the week were many, but ascribing statistical and biological significance to these variations is difficult (Table 4, Figures 11, 12, 13, 14). Feeding depressions, however, were apparent during middays on weekends when human activity was high. Feeding activity was unusually brisk during early morning on Mondays and Tuesdays. Feeding activity was atypically common during midday on Thursdays.

During the winter season, there was a negative correlation between the extent of recreational activities and the time spent feeding by eagles (Table 5, Figures 15, 16). Both adults and subadults fed equally less during periods of human activity. There was a 60 percent reduction in feeding during days with 21 to 40 activities occurring compared to days with 0 to 5 activities. When over 40 human activities

happened, there was almost a 90 percent reduction and feeding only occurred early or late in the day. These data explicitly implicate human activity in depressing feeding by bald eagles on the SRBENA.

Least squares log regressions (negative exponentials) provided the best fit to the curve describing the relationship between feeding activity and recreational activity (Table 6, Figures 17, 18). The curves were steep in December, intermediate in January, and more level in February possibly indicating some habituation of some eagles to humans while feeding over the course of the season. The first activities of each day have the greatest effect on feeding activity. During the peak daily recreationist count of 115, for example, the first 15 human activities had the same effect as the next 100 activities. Generally, feeding activity was nil during days with 80 or more recreational activities.

Flight Distances.-- Average flight distances of perched eagles ranged from 111 meters from canoes to 201 meters from bank fishers, and considerable variation was recorded (Table 7, Figure 19). There were only a few significant differences in flight distances between any types of boating activity (Tables 8, 9, 10). There were, however, considerable differences in flight distances from foot activity compared to boating activity (Tables 8, 9, 10). Flight distances from bank fishers were higher than from all boat types, especially with adults. Flight distances from hikers also were higher

than from all boat types and this was the case with both adults and subadults. The 1986-87 data was similar to the 1985-86 information.

Average flight distances of eagles feeding on the ground ranged from 107 meters from kayaks to 314 meters from bank fishers and considerable variation was recorded (Table 11). Flight distances from bank fishers, hikers, and running motorboats were especially long (Figure 19). Generally, distances from these 3 activities were significantly longer than other types, especially for adults (Tables 12, 13, 14). Results from 1985-86 were similar to those in 1986-87.

Average flight distances of eagles standing on the ground ranged from 114 meters from kayaks to 282 meters from running motorboats, and considerable variation was recorded (Table 15, Figure 19). Flight distances from running motorboats and hikers were particularly long and significantly different from a number of other activity types, especially with adults, but several other differences were recorded (Tables 12, 13, 14). Distances from research rafts were higher than for recreational rafts. More significant differences occurred during the second year because sampling of kayaks did not occur during the first year, but results were similar between years.

Generally, eagles were less tolerant of foot traffic (hiking and bank fishing) than boating traffic; they flew away from these activities at great distances. They also were sensitive to running motorboats when either feeding or

standing on the ground. Sample sizes were small for kayaks and canoes; nonetheless, these types were tolerated at close distances. Foot traffic is an unusual occurrence which suggests that eagles are more sensitive to activity types that they are unfamiliar with. Because boating traffic is more common, some eagles may be partially habituating to it. The sound created by running motorboats could be elevating flight distances, but because only birds on the ground showed longer distances, the sudden appearance of a boat entering the feeding grounds is a more likely explanation. Also, motorboats are more common in early morning; eagles may show more sensitivity at these times. This is the apparent explanation for the disparity in distances between research rafts and recreational rafts; the former occur in morning and late afternoon and the latter occur mostly in midday.

A comparison of the flight distances of the two age groups to each other showed no significant differences for perched eagles though there were a few differences during separate years (Table 16). While feeding on the ground, subadults had longer distances from boat traffic, but not foot traffic (Table 17). For all boat traffic, subadults had distances that were 21 percent longer than those for adults. Why adults are more tolerant while feeding and subadults are more sensitive during feeding is difficult to answer. Perhaps subadults have not yet learned to habituate to some human activities during this critical behavior. There were no significant differences in flight distances of

adult and subadult eagles while standing on the ground for any type of activity for combined years (Table 18).

Eagles of any age perched in trees had significantly shorter flight distances than eagles feeding or standing on the ground for nearly all activity types (Table 19, Figure 20). There were no significant differences in distances between feeding and standing eagles for boat traffic; distances of feeding birds were higher than standing distances for foot traffic. Flight distances from foot traffic was consistently higher than from boat traffic.

Eagles are more sensitive to human activity when they are on the ground ostensibly because they are more vulnerable to danger there and have a reduced visual field so that determining the potential effects of any danger is more difficult. Because salmon on the SW&SRS are too large to carry, eagles must eat them on the ground thereby exposing themselves to potential danger and creating a situation where feeding is difficult when human activity occurs. Foot traffic is particularly disruptive to feeding activity.

Flight distances of perched eagles were shorter during 1986-87 compared to 1985-86 for all activities, including both boat and foot traffic (Table 20, Figure 20). Distances for feeding eagles also tended to be shorter, but significant only for foot traffic, especially hikers (Table 21). Although distances were significantly different for two boat types for standing eagles, this pattern did not hold for totals (Table 22).

Several explanations might account for the shorter distances during the second year of study. Higher food availability could be influential, but this contrasts with previous data on this subject. Perhaps eagles are learning to habituate on a yearly basis. Experimental error can not be discounted as a 50 percent turnover in the research crew, with a possible change in distance estimation abilities, could well have caused this disparity.

Differences in flight distances by day of week were apparent (Table 23, Figure 21) and many were significant especially for eagles on the ground (Table 24). Generally, distances were lower on weekends, tended to be high on early weekdays, and mixed during late weekdays. Low distances on weekends would be expected as more sensitive birds leave the river during heavy activity leaving more tolerant birds with shorter flight distances.

Categorical and cumulative flight distances (Tables 25, 26, respectively) provide information on differences between activity types and a means of defining zones where eagles will not flush at designated distances.

The sequence of daily human activity had a very small effect on flight distances of eagles in trees (Table 27, Figure 22). The decline in distances was significant only when all activities and all ages were combined. In contrast, flight distances dropped substantially for eagles on the ground with sequence of activity occurrence (Table 28, Figure 22). This was especially true for boat traffic. It is

likely that more tolerant birds remain on the river as human activity increases thereby lowering the apparent flight distances of the population, but some habituation on a daily basis might be occurring with some birds.

Although there were significant differences in flight distances by hour of day of eagles in trees and on the ground for a few boat types, no general pattern was evident (Tables 29, 30, Figure 23). These data indicate that flight distances do not change throughout the day unless, as previously stated, high human activity causes such a change.

There were several significant cases of flight distances changing over the course of the winter season for both eagles in trees as well as those on the ground (Tables 31, 32, Figure 24). But because these changes were a mixture of increases and decreases among several activity types, it is difficult to generalize on seasonal variation of flight distance. No change is apparent when considering totals except that distances of adults in trees increased, especially with regard to foot traffic. Information collected during simulated float trips (see Task 4) agree with this finding that distances remain the same throughout the season.

Flushing Responses.-- Flushing responses (percent of eagles flushed/100) of perched eagles ranged from a low of 0.058 from kayaks to a high of 0.647 from bank fishers (Table 33, Figure 25). Nearly all differences among human activity types for perched eagles were significant (Tables 34, 35,

36). Foot traffic caused a large proportion of eagles to fly away. Research rafts and dories also caused high flushing responses. Motorboats, both drifting and running, and recreational rafts had intermediate effects; kayaks and canoes had minimal effects. Significant relationships were evident with both adults and subadults.

The many differences in flushing responses of perched eagles to various activities is caused by several circumstances; the following is an initial interpretation of these results. Foot traffic is highly avoided by eagles because many birds may not have habituated to this type of unusual activity, the long duration of time of such activity causes many birds to fly, and/or most activity occurs on feeding areas (gravel bars) thus precluding any opportunity to eat there. Research rafts are disruptive because they run the river early in the morning and in late afternoon. Because the first few activities of the day are most disruptive to eagle behavior (see later discussion), research rafts cause high flushing responses. This also may be the case with dories. Drifting motorboats might be more disturbing than running motorboats because their duration of stay in the vicinity of eagles is longer (see Task 6). Recreational rafts, canoes, and kayaks tend to run the river in midday and in large groups which minimizes flushing by eagles.

Flushing responses of eagles feeding on the ground were mostly high, ranging from 0.300 to 0.980 (Table 37, Figure

25). There were no significant differences of flushing responses among any of the human activity types in 1985-86, but there were many differences in 1986-87 and totals for both years (Tables 38, 39, 40). The majority of these differences was due to low flushing rates of eagles, particularly adults, to kayaks, canoes, and recreational rafts. This is ostensibly because these 3 types occur in large groups together during midday on weekends.

Flushing responses of eagles standing on the ground were all very high, ranging from 0.608 to 1.000, somewhat similar to the situation with feeding eagles (Table 41, Figure 25). All significant differences were due to low flushing rates from recreational rafts and canoes apparently for the same reasons as for feeding eagles discussed above (Tables 38, 39, 40). Low flushing by adults contributed most to these significant differences.

Eagles on the ground were highly susceptible to flushing whenever humans were present regardless of the mode of travel, purpose, timing, or duration of the activity. The reasons for this pattern presumably are similar to the effects seen with flight distances as previously discussed. Again, because eagles must feed on the ground, human activity is more disruptive to feeding birds than perching birds, all other variables being equal. There was, however, indication that a few adults habituate and are able to feed on the ground despite persistent human activity.

Subadults had higher flushing responses than adults

while perching in trees during passes of running motorboats and research rafts (Table 42). This pattern persisted for totals of all boat traffic and all activities combined. No significant differences in age-related flushing responses existed while eagles were feeding and standing on the ground when both years of data were combined (Tables 43, 44).

One speculative reason why perched adults are less likely to fly from human activity is that they have learned that persecution in the area is low and some have partially habituated to human activities (as long as they are on tree perches). Subadults are more likely to flush from human activity and leave the river system during the day (see later discussion). The high rate of flushing while on the ground possibly masks any age-related differences, but there was an insignificant trend of low adult flushing from canoes, kayaks, and recreational rafts.

Combined flushing response scores shows many of the relationships discussed (Table 45, Figure 26). For all but one situation, eagles in trees flew less often than those on the ground; no significant differences were apparent comparing flushing of feeding and standing birds.

Flushing from foot traffic was always high, for all types of eagle activity (Figure 26). Flushing by eagles perched in trees was, for example, nearly 3 times the rate for foot traffic compared to boat traffic.

Eagles perched in trees flushed from activity at similar rates in 1986-87 as they did in 1985-86 as a whole (Table 46,

Figure 26). Differences occurred for rafts and hikers, but not for totals. In contrast, fewer feeding and standing eagles flushed from human activity, particularly boats, in 1986-87 relative to the previous year (Tables 47, 48, Figure 26). For unexplained reasons, more adult eagles feeding tolerated boat traffic in 1986-87 and more standing eagles of both ages tolerated these passing boats than in 1985-86.

Considerable variation in flushing occurred among the days of the week for birds perched in trees (Tables 49, 50, Figure 27). Low flushing rates were evident on weekends, especially for adults, possibly because of the departure of more sensitive birds, particularly subadults, leaving behind the tolerant portion of the wintering population. Of birds feeding or standing on the ground, flushing was generally significantly lower on weekends, especially Saturdays (Tables 49, 50, Figure 27).

Cubic regressions best predicted the relationship between sequence of occurrence of human activity and flushing responses of perched eagles (Table 51). These relationships were all highly significant except for dories and foot traffic. Responsiveness drops rapidly during the first 20 activities, it then levels off, and approaches zero at about 80 activities (Figure 28). As will be discussed later, this is due to the departure of the more sensitive birds, particularly subadults, from the area resulting in an unusual situation where eagles seemingly, but do not always, habituate to high human activity.

Flushing responses of eagles feeding or standing on the ground also declined with sequence of activity occurrence, but in a linear fashion (Table 52, Figure 28). This drop was greatest with subadults because they leave the river system at a higher rate than adults. Not all activities showed this pattern; several boat types and all foot traffic failed to show significance, but boat traffic total and grand total were highly significant.

As sequence of activity occurrence increases, the number of eagles present on the river decreases rapidly. Quintic regression curves best fit this relationship (Table 53, Figure 29). The first 10 activities of a day has the same effect as the next 50 activities in forcing perched eagles off the river. After 10 activities, the number of eagles feeding is reduced by about 90 percent even though there is only a 35 percent reduction in food ingestion (see Figure 18). Human activity reduces the number of feeding eagles faster than the amount of food eagles acquire meaning that many sensitive birds are leaving without eating and suggests that the tolerant birds are benefiting by reduced food competition with other eagles.

As stated before, when eagles are forced off the river by human activity, the effect to subadults is greatest. A comparison of human activity sequence and percent of subadults present shows this linear pattern for both perched and grounded birds (Table 54, Figure 30). That subadults appear more sensitive to humans is contrary to current

thought.

Changes in flushing response occur throughout the day and follow a parabolic regression curve for birds both in trees and on the ground (Tables 55, 56, Figure 31). The pattern was highly evident for perched eagles subjected to boat traffic; it was not significant when considering foot traffic. The pattern was much less certain for ground birds, but parabolic functions were the best fit for boat totals and grand totals. The likely cause of this U-shaped curve of flushing response is, again, human activity. When the curve is plotted against the occurrence of human activity, a striking correlation is evident (Figure 32). The casual factor appears to be the departure of highly responsive birds from the river, leaving a greater proportion of unresponsive eagles. After activity wanes late in the day, the data suggests that some sensitive birds begin to return.

Seasonal changes in flush response, in contrast to flight distance, declined significantly for both eagles in trees and on the ground (Tables 57, 58, Figure 33). The effect was not seen with foot traffic and it was most pronounced with perched birds rather than feeding or standing birds. The relationship is linear not curvilinear as reported by other researchers. These data are similar to those obtained during simulated float trips (see Task 4). Seasonal habituation is the best explanation for this phenomenon; the effect of food availability may have a secondary, more subtle role.

Ranking.--Ranking of each activity type by its effects on flushing by perched eagles and the likelihood of encounter are listed in tables 59 and 60. Drifting motorboats encountered and disturbed the greatest number of perched eagles in proportion to the number of drifting motorboats present. Research rafts were the second most disturbing activity; dories also were more disturbing than expected. Running motorboats disturbed less perched eagles in proportion to the number encountered. Foot traffic had low encounter rates, because of the smaller area covered, but those eagles encountered likely flushed. Canoes, kayaks, and recreational rafts disturbed eagles far less than expected based on their numbers of occurrence.

For feeding eagles, research rafts, drifting motorboats, and running motorboats disturbed and encountered the most eagles in proportion to their numbers (Tables 61, 62). Foot traffic and dories also were disturbing; recreational rafts, canoes, and kayaks were less disruptive.

For standing eagles, drifting motorboats, hikers, research rafts, running motorboats, and dories were disturbing; canoes, kayaks, recreational rafts, and bank fishermen had a lesser effect (Tables 63, 64).

Time of day, occurrence during the week and season, sequence of occurrence, duration of stay, and mode of travel seem to have caused these differences. Research rafts are especially (purposely) disturbing because they run the river in early morning and late afternoon, coinciding with peak

feeding activity; they often were the first and last activity of the day. Motorboats and dories also occur early in the day when activities are most disruptive to normal behavioral patterns; they too were often the first activities of the day. Motorboats also cover larger distances and, like dories, remain in the area or move up and downstream, for long periods. There seems to be little implicative evident that noise increases the disturbing effects of running motorboats; rather, the fast movement of motorboats may reduce their impact to eagles. Foot traffic, as previously discussed, is highly disturbing to eagles hence the higher than expected ranking for bank fishers and hikers. Foot traffic does not, however, cover as much river as boat traffic. Canoes, kayaks, and recreational rafts are thought to be less disturbing to eagles because they occur mostly in midday and are grouped together both on a daily basis as well as being grouped on weekends and in the latter half of the season. Overall, consumptive activity encounters and disturbs more eagles than naturalistic activity relative to their occurrence on the river.

When the ranking system is scaled to account for the number of passengers in each activity type, recreational rafts become even less disturbing to eagles because these rafts have many more passengers. Thus, in terms of individual recreational experiences, persons in recreational rafts were the least intrusive to eagles.

Table 1. Feeding activity (min/day) by bald eagles at Washington Eddy on the SRBENA partitioned by hour and month for 1985-86 and 1986-87 combined.

Hour of Day	Adult		Subadult		All Ages	
	Mean	%	Mean	%	Mean	%
DECEMBER (n = 56 days, 27,337 min)						
7 - 8	4.0	0.8	2.9	0.6	6.9	1.4
8 - 9	36.1	7.4	25.1	5.1	61.3	12.6
9 - 10	65.7	13.5	31.5	6.4	97.2	19.9
10 - 11	47.6	9.8	19.4	4.0	67.0	13.7
11 - 12	37.8	7.8	18.0	3.7	55.8	11.4
12 - 13	25.4	5.2	9.5	1.9	35.0	7.2
13 - 14	21.9	4.5	11.4	2.3	33.3	6.8
14 - 15	22.4	4.5	15.4	3.2	37.8	7.8
15 - 16	35.2	7.2	20.3	4.2	55.6	11.4
16 - 17	27.1	5.6	10.9	2.2	38.1	7.8
17 - 18	0.2	0.0	0	0.0	0.2	0.0
Totals	323.6	66.4	164.6	33.6	488.2	100.0
JANUARY (n = 60 days, 26,135 min)						
7 - 8	1.5	0.3	0.6	0.1	2.0	0.5
8 - 9	30.0	6.9	25.2	5.8	55.2	12.7
9 - 10	73.5	16.9	39.3	9.0	112.8	25.9
10 - 11	56.0	12.9	31.6	7.3	87.6	20.1
11 - 12	35.6	8.2	24.4	5.6	60.0	13.8
12 - 13	23.9	5.5	13.9	3.2	37.8	8.7
13 - 14	14.7	3.4	12.4	2.8	27.0	6.2
14 - 15	8.2	1.9	5.1	1.2	13.2	3.0
15 - 16	15.0	3.4	7.1	1.6	22.1	5.1
16 - 17	11.9	2.7	5.5	1.3	17.3	4.0
17 - 18	0.4	0.1	0.1	0.0	0.5	0.1
Totals	270.5	62.2	165.1	37.9	435.6	100.1

Table 1. Continued.

Hour of Day	Adult		Subadult		All Ages	
	Mean	%	Mean	%	Mean	%
FEBRUARY (n = 44 days, 2703 min)						
7 - 8	0.5	0.8	0.3	0.6	0.8	1.4
8 - 9	3.9	6.3	5.3	8.7	9.2	15.0
9 - 10	3.9	6.3	4.6	7.4	8.4	13.7
10 - 11	3.5	5.6	2.8	4.6	6.3	10.2
11 - 12	2.5	4.1	3.3	5.4	5.9	9.5
12 - 13	1.7	2.8	2.0	3.3	3.7	6.1
13 - 14	2.9	4.7	4.2	6.9	7.1	11.6
14 - 15	2.4	3.8	3.2	5.1	5.5	9.0
15 - 16	2.0	3.3	2.5	4.0	4.5	7.3
16 - 17	3.9	6.3	4.4	7.2	8.3	13.5
17 - 18	0.7	1.1	1.0	1.6	1.6	2.7
Totals	27.8	45.1	33.6	54.8	61.4	100.0
ALL MONTHS (n = 160 days, 56,175 min)						
7 - 8	2.1	0.6	1.3	0.4	3.4	1.0
8 - 9	25.0	7.1	19.7	5.6	44.7	12.7
9 - 10	51.6	14.7	27.0	7.7	78.6	22.4
10 - 11	38.6	11.0	19.4	5.5	58.0	16.5
11 - 12	27.3	7.8	16.4	4.7	43.7	12.4
12 - 13	18.3	5.2	9.1	2.6	27.4	7.8
13 - 14	14.0	4.0	9.8	2.8	23.8	6.8
14 - 15	11.6	3.3	8.2	2.3	19.7	5.6
15 - 16	18.5	5.3	10.5	3.0	29.0	8.2
16 - 17	15.0	4.3	7.1	2.0	22.1	6.3
17 - 18	0.4	0.1	0.3	0.1	0.7	0.2
Totals	222.4	63.3	128.7	36.7	351.1	99.9

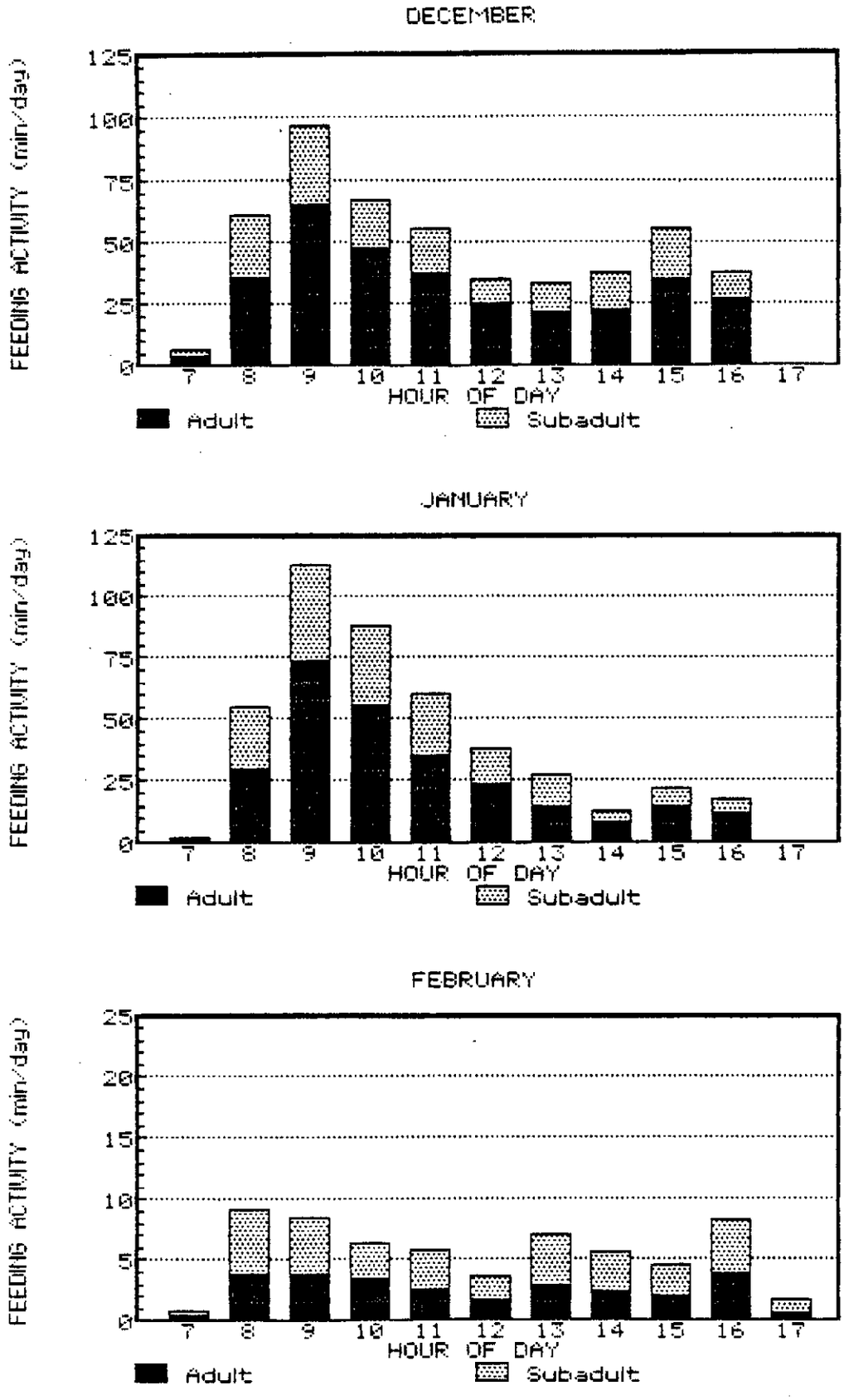


Figure 1. Hourly feeding activity at Washington Eddy during December (upper), January (middle), and February (lower) for 1985-86 and 1986-87 combined.

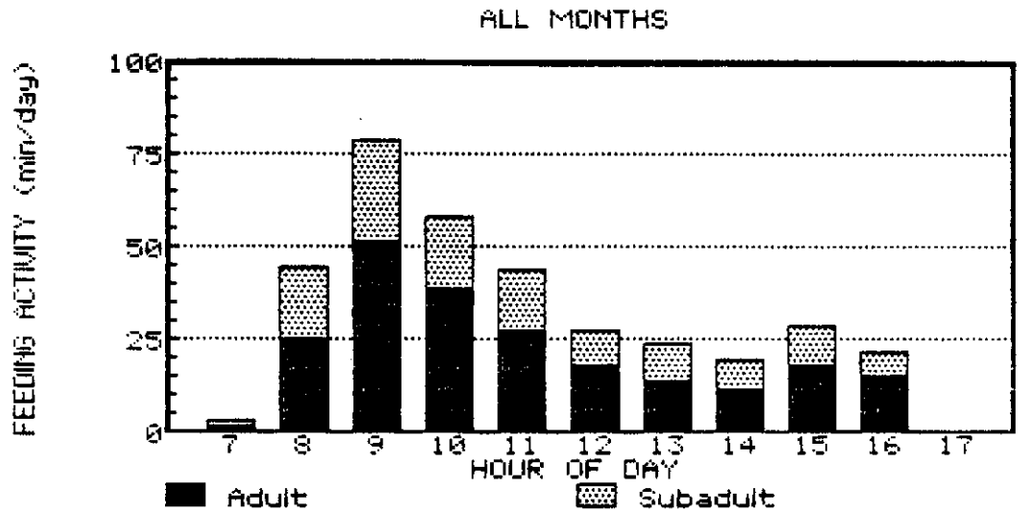


Figure 2. Hourly feeding activity at Washington Eddy for all months during 1985-86 and 1986-87 combined.

Table 2. Daily feeding activity (min/day) by adult (adu) and subadult (sub) bald eagles at Washington Eddy on the SRBENA by week of season from 1 December to 22 February in 1985-86 and 30 November to 22 February in 1986-87.

	1985-86				1986-87				Both Years			
Week	Days	Adu	Sub	All	Days	Adu	Sub	All	Days	Adu	Sub	All
1	7	132	104	236	7	286	168	454	14	218	136	354
2	6	277	128	405	7	236	147	383	13	255	138	393
3	6	305	140	445	7	625	323	948	13	477	239	716
4	6	66	33	99	6	331	233	564	12	198	133	331
5	6	737	260	997	7	549	146	695	13	635	199	834
6	7	428	325	753	7	244	123	367	14	336	224	560
7	7	347	227	574	7	401	201	602	14	374	214	588
8	7	157	112	269	7	115	132	247	14	136	122	258
9	7	26	22	48	7	93	94	187	14	59	58	117
10	7	13	15	28	7	58	50	108	14	36	32	68
11	7	13	17	30	7	34	53	87	14	23	35	58
12	7	13	16	29	8	45	47	92	15	27	33	60

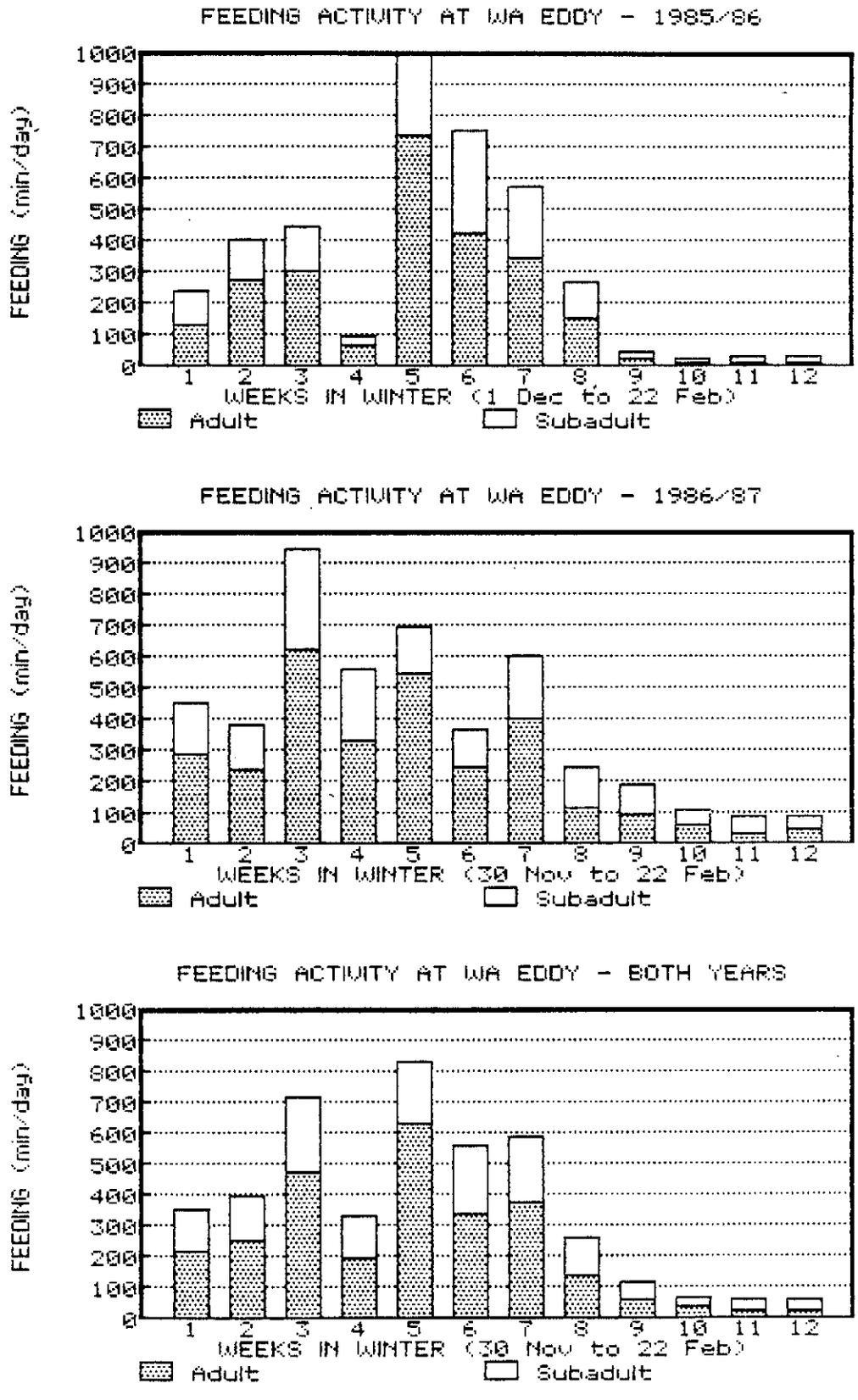


Figure 3. Seasonal feeding activity at Washington Eddy during 1985-86 (upper), 1986-87 (middle), and both years combined (lower).

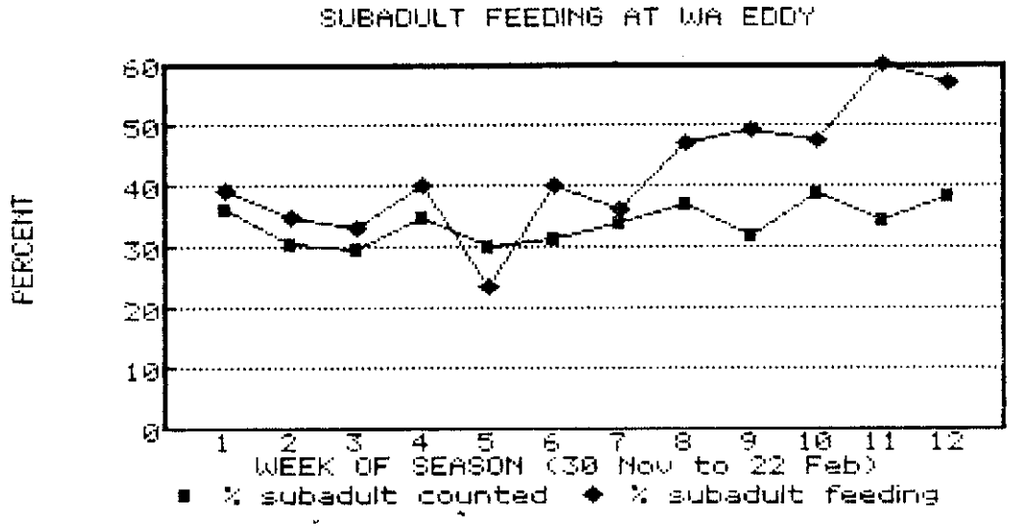


Figure 4. Comparison of the percent of feeding by subadult bald eagles at Washington Eddy and their proportion on the SRBENA during the wintering season.

Table 3. Daily feeding activity (min/day) by bald eagles at Washington Eddy on the SRBENA by month during 1985-86 and 1986-87 combined.*

	Adult			Subadult			All Ages		
Day of Week	n	Mean	SD	n	Mean	SD	n	Mean	SD
DECEMBER									
Sunday	3	311a	359	7	216a	302	7	527a	654
Monday	10	342a	261	10	129a	103	10	470a	360
Tuesday	10	359a	475	10	114a	108	10	473a	575
Wednesday	8	313a	285	8	145a	125	8	458a	396
Thursday	7	223a	155	7	114a	82	7	337a	227
Friday	8	407a	305	8	252a	181	8	659a	474
Saturday	8	302a	216	8	198a	145	8	500a	351
Thu/Fri	15	321a	257	15	188a	156	15	509a	402
Sat/Sun	15	306a	280	15	206a	223	15	512a	495
Mon/Tue	20	350a	373	20	121a	103	20	472a	467
Weekend	15	306a	280	15	206a	223	15	512a	495
Weekday	43	333a	314	43	149a	128	43	482a	424
Totals	58	326	304	58	164	158	58	490	439
JANUARY									
Sunday	8	162a	266	8	68a	86	8	231a	346
Monday	8	485a	459	8	279a	327	8	764a	775
Tuesday	8	319a	438	8	240a	257	8	559a	660
Wednesday	8	231a	270	8	201a	150	8	431a	414
Thursday	10	260a	331	10	142a	195	10	402a	521
Friday	10	316a	310	10	173a	127	10	489a	394
Saturday	9	154a	325	9	67a	97	9	221a	412
Thu/Fri	20	288a	313	20	158a	161	20	445a	452
Sat/Sun	17	158a	289	17	68a	89	17	225a	370
Mon/Tue	16	402a	442	16	259b	285	16	661a	703
Weekend	17	158a	289	17	68a	89	17	225a	370
Weekday	44	319a	357	44	202b	213	44	521b	550
Totals	61	274	345	61	165	196	61	439	521

Table 3. Continued.

Day of Week	Adult			Subadult			All Ages		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
FEBRUARY									
Sunday	7	9a	14	7	17a	24	7	25a	38
Monday	6	59b	40	6	42a	23	6	101a	58
Tuesday	6	38ab	39	6	33a	20	6	70a	51
Wednesday	6	21a	29	6	28a	45	6	49a	74
Thursday	6	20a	25	6	31a	39	6	51a	61
Friday	6	46b	40	6	78a	72	6	124a	108
Saturday	7	10a	17	7	13a	21	7	23a	38
Thu/Fri	12	33ab	34	12	55a	60	12	87a	92
Sat/Sun	14	9a	15	14	15b	22	14	24b	36
Mon/Tue	12	48b	39	12	37ab	21	12	85a	54
Weekend	14	9a	15	14	15a	22	14	24a	36
Weekday	30	36b	36	30	42b	45	30	79b	74
Totals	44	28	33	44	34	41	44	61	69
ALL MONTHS									
Sunday	22	161a	275	22	99a	189	22	260a	453
Monday	24	319a	344	24	157a	214	24	476a	548
Tuesday	24	265a	407	24	136a	177	24	401a	550
Wednesday	22	203a	257	22	133a	135	22	337a	379
Thursday	23	186a	249	23	105a	141	23	291a	385
Friday	24	278a	295	24	176a	148	24	454a	418
Saturday	24	161a	255	24	95a	126	24	256a	367
Thu/Fri	47	233a	274	47	141a	148	47	374a	406
Sat/Sun	46	161a	262	46	97a	157	46	258a	405
Mon/Tue	48	292a	374	48	146a	195	48	438a	544
Weekend	46	161a	262	46	97a	157	46	258a	405
Weekday	117	252a	316	117	142a	165	117	393a	462
Totals	163	226	303	163	129	164	163	355	449

* Statistical comparisons among the 3 types of groupings by month are denoted by letters; different letters indicate significance at the 0.05 level.

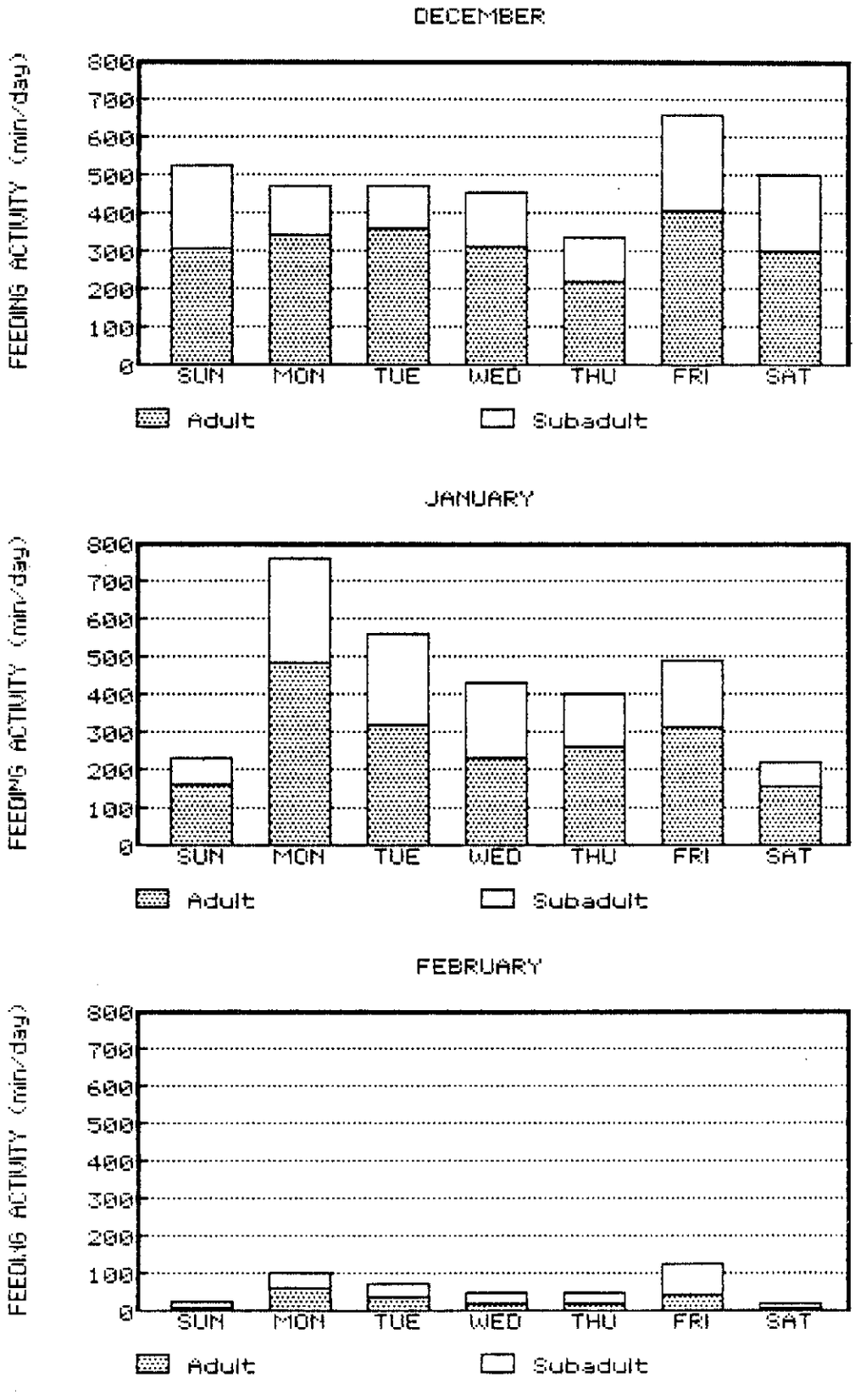


Figure 5. Feeding activity on the seven days of the week at Washington Eddy in December (upper), January (middle), and February (lower) during 1985-86 and 1986-87 combined.

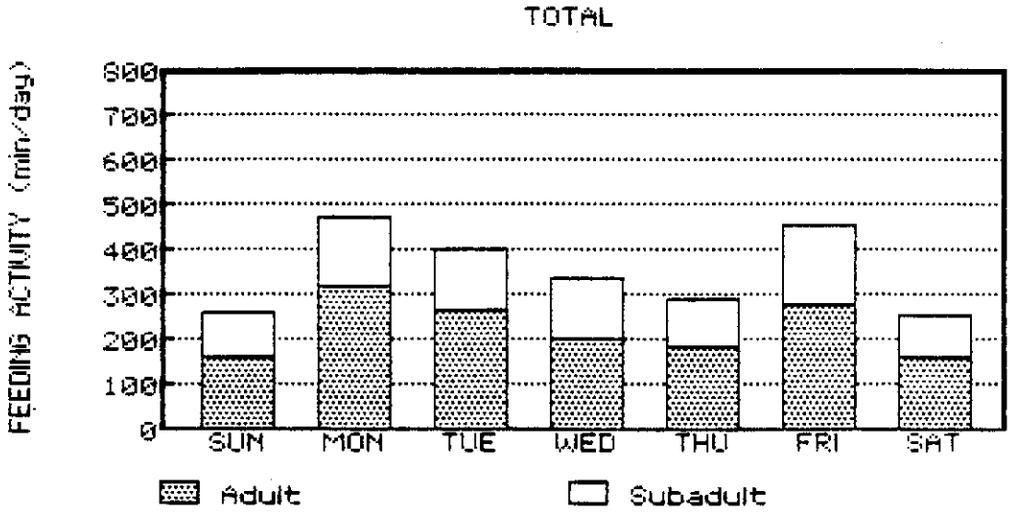


Figure 6. Feeding activity on the seven days of the week at Washington Eddy for all months during 1985-86 and 1986-87 combined.

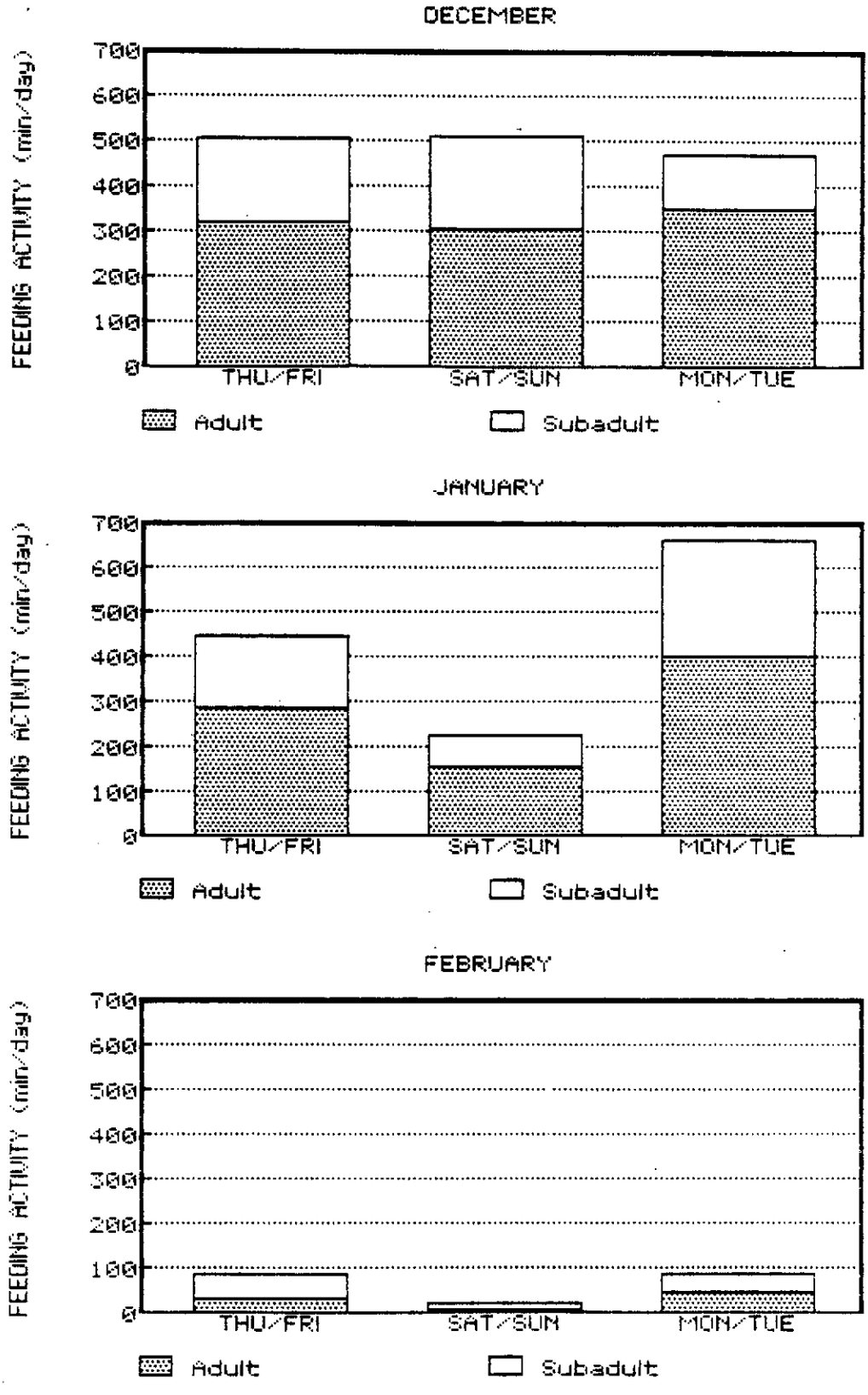


Figure 7. Feeding activity at Washington Eddy for paired days prior to, during, and following the weekend in December (upper), January (middle), and February (lower) during 1985-86 and 1986-87 combined.

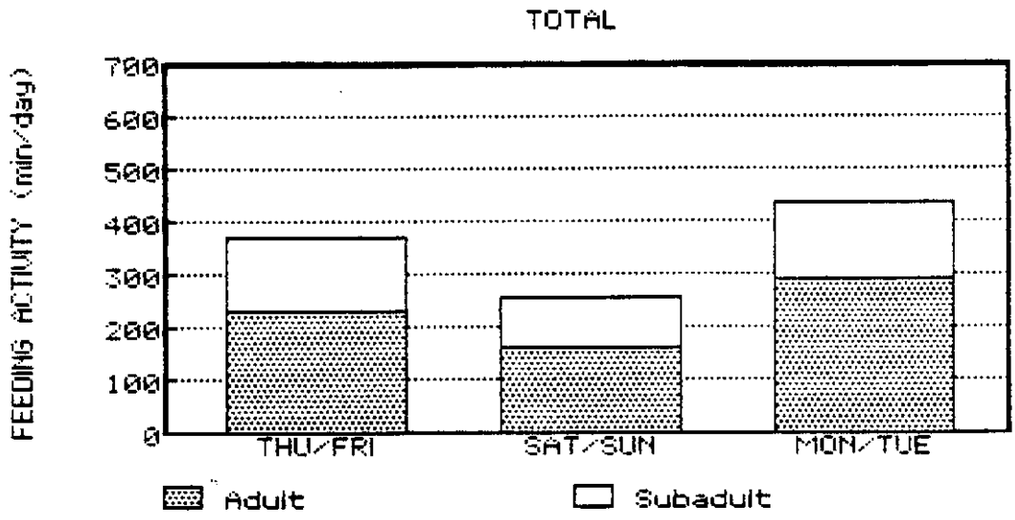


Figure 8. Feeding activity at Washington Eddy for paired days prior to, during, and following the weekend for all months during 1985-86 and 1986-87 combined.

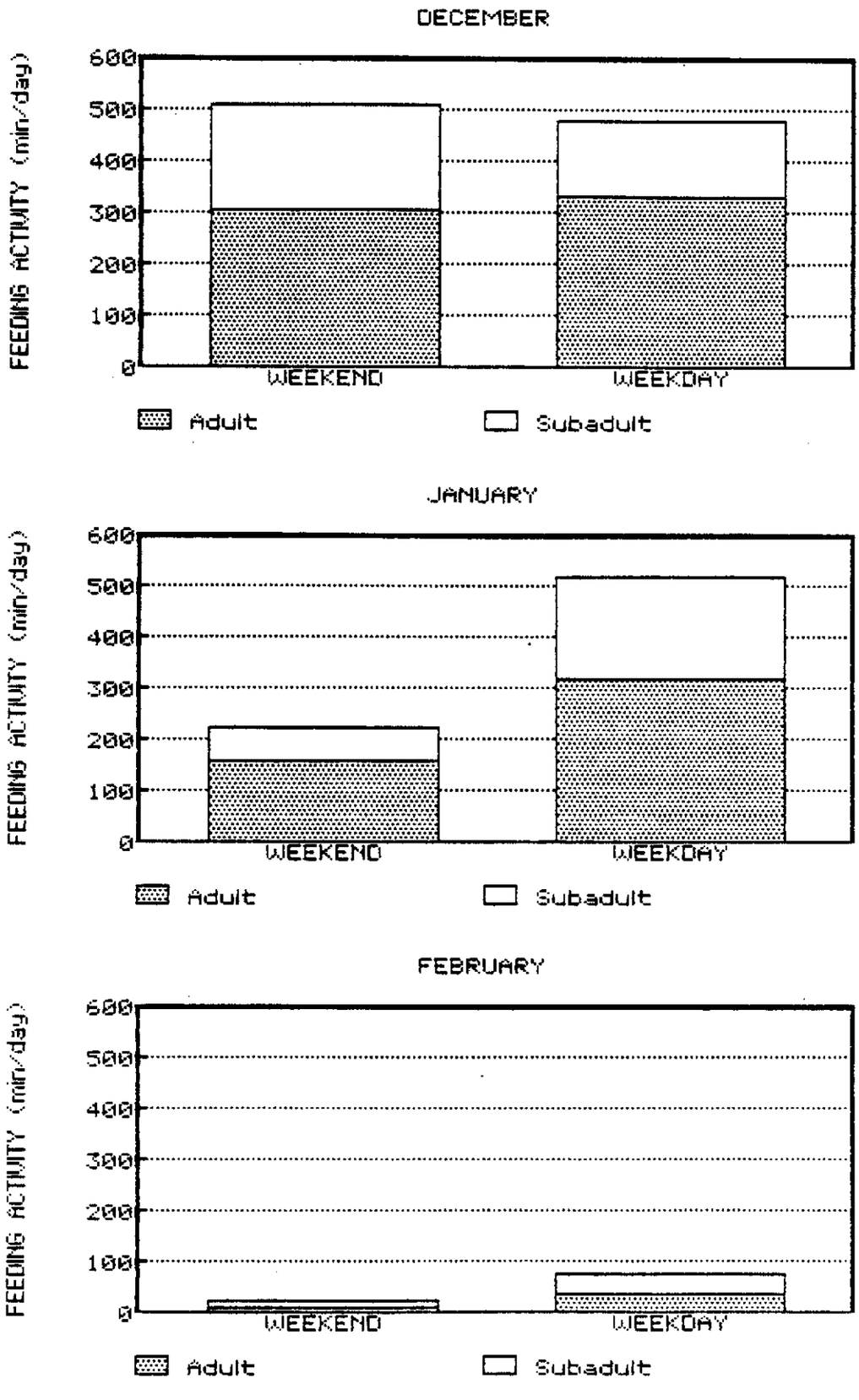


Figure 9. Feeding activity at Washington Eddy on weekends and weekdays for December (upper), January (middle), and February (lower) during 1985-86 and 1986-87 combined.

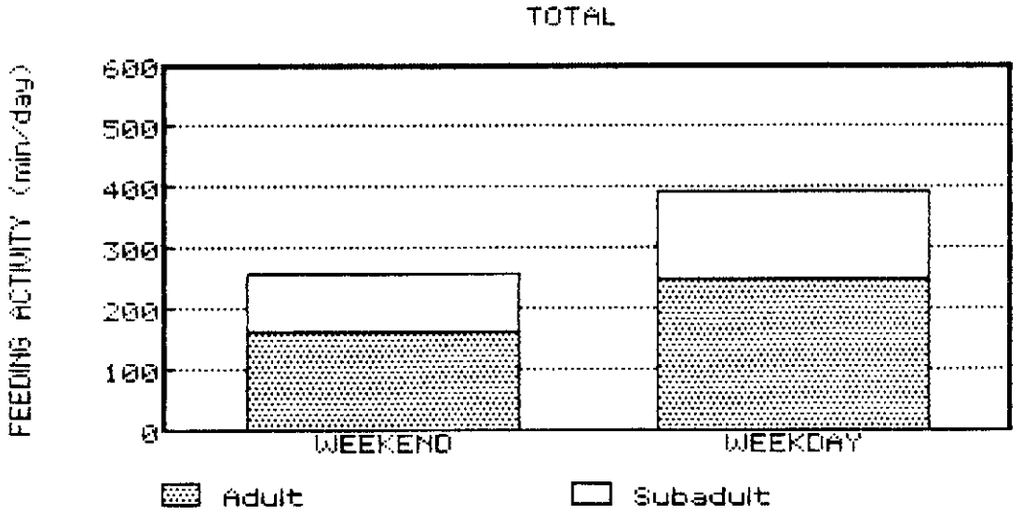


Figure 10. Feeding activity at Washington Eddy on weekends and weekdays for all months during 1985-86 and 1986-87 combined.

Table 4. Feeding activity (min/day) by bald eagles at Washington Eddy on the SRBENA partitioned by hour and day of week for 1985-86 and 1986-87 combined. *

Hour of Day	Adult		Subadult		All Ages	
	Mean	%	Mean	%	Mean	%
SUNDAY (n = 22 days, 5711 min)						
7 - 8	2.6	1.0	0.2	0.1	2.8	1.1
8 - 9	23.2	8.9	19.1	7.4	42.3	16.3
9 - 10	36.5	14.0	24.4	9.4	60.9	23.4
10 - 11	23.9	9.2	11.8	4.6	35.7	13.7
11 - 12	11.0	4.2	10.7	4.1	21.6	8.3
12 - 13	12.8	4.9	4.2	1.6	17.0	6.5
13 - 14	5.0	1.9	3.5	1.4	8.5	3.3
14 - 15	8.2	3.2	5.0	1.9	13.1	5.1
15 - 16	20.7	8.0	14.0	5.4	34.6	13.3
16 - 17	17.2	6.6	5.6	2.2	22.8	8.8
17 - 18	0	0.0	0.3	0.1	0.3	0.1
Totals	160.9	61.9	98.7	38.0	259.6	99.9
MONDAY (n = 22 days, 10,275 min)						
7 - 8	3.0	0.6	1.5	0.3	4.5	1.0
8 - 9	23.5	5.0	22.9	4.9	46.4	9.9
9 - 10	61.9	13.2	32.5	7.0	94.4	20.2
10 - 11	63.8	13.7	28.1	6.0	91.9	19.7
11 - 12	48.7	10.4	24.2	5.2	72.9	15.6
12 - 13	25.6	5.5	6.4	1.4	32.0	6.9
13 - 14	19.9	4.3	13.8	3.0	33.7	7.2
14 - 15	20.2	4.3	7.2	1.5	27.4	5.9
15 - 16	22.8	4.9	13.6	2.9	36.4	7.8
16 - 17	18.5	4.0	7.9	1.7	26.4	5.7
17 - 18	0.5	0.1	0.6	0.1	1.1	0.2
Totals	308.4	66.0	158.7	34.0	467.0	100.1

Table 4. Continued.

Hour of Day	Adult		Subadult		Total	
	Mean	%	Mean	%	Mean	%
TUESDAY (n = 24 days, 9625 min)						
7 - 8	1.2	0.3	1.7	0.4	2.8	0.7
8 - 9	28.8	7.2	21.3	5.3	50.1	12.5
9 - 10	69.1	17.2	39.4	9.8	108.5	27.1
10 - 11	45.2	11.3	22.2	5.5	67.4	16.8
11 - 12	35.2	8.8	14.6	3.6	49.8	12.4
12 - 13	21.2	5.3	10.3	2.6	31.5	7.9
13 - 14	17.0	4.2	8.0	2.0	25.0	6.2
14 - 15	7.1	1.8	3.8	0.9	10.8	2.7
15 - 16	20.7	5.2	9.0	2.3	29.7	7.4
16 - 17	19.4	4.8	5.5	1.4	24.9	6.2
17 - 18	0.4	0.1	0	0.0	0.4	0.1
Totals	265.3	66.2	135.8	33.8	401.0	100.0
WEDNESDAY (n = 22 days, 7402 min)						
7 - 8	3.1	0.9	2.3	0.7	5.5	1.6
8 - 9	29.4	8.7	30.7	9.1	60.0	17.8
9 - 10	54.5	16.2	26.4	7.8	80.9	24.0
10 - 11	33.5	10.0	18.8	5.6	52.4	15.6
11 - 12	27.0	8.0	16.7	5.0	43.6	13.0
12 - 13	20.8	6.2	7.1	2.1	27.9	8.3
13 - 14	12.0	3.6	4.4	1.3	16.4	4.9
14 - 15	10.5	3.1	11.3	3.4	21.9	6.5
15 - 16	5.4	1.6	7.8	2.3	13.2	3.9
16 - 17	6.9	2.1	7.8	2.3	14.7	4.4
17 - 18	0	0.0	0	0.0	0	0.0
Totals	203.1	60.4	133.3	39.6	336.5	100.0

Table 4. Continued.

Hour of Day	Adult		Subadult		Total	
	Mean	%	Mean	%	Mean	%
THURSDAY (n = 23 days, 6688 min)						
7 - 8	0.5	0.2	0.4	0.1	1.0	0.3
8 - 9	10.4	3.6	4.8	1.7	15.3	5.2
9 - 10	27.3	9.4	14.6	5.0	41.8	14.4
10 - 11	28.8	9.9	13.2	4.5	42.0	14.5
11 - 12	42.4	14.6	26.3	9.1	68.7	23.6
12 - 13	22.5	7.7	14.2	4.9	36.7	12.6
13 - 14	20.2	6.9	15.1	5.2	35.3	12.1
14 - 15	11.1	3.8	5.3	1.8	16.4	5.7
15 - 16	12.9	4.4	4.6	1.6	17.5	6.0
16 - 17	9.2	3.2	5.4	1.9	14.6	5.0
17 - 18	0.8	0.3	0.7	0.2	1.5	0.5
Totals	186.0	64.0	104.7	36.0	290.8	99.9
FRIDAY (n = 24 days, 10,897 min)						
7 - 8	3.0	0.7	2.6	0.6	5.6	1.2
8 - 9	35.1	7.7	28.0	6.2	63.1	13.9
9 - 10	74.7	16.5	32.9	7.2	107.6	23.7
10 - 11	51.7	11.4	25.8	5.7	77.5	17.1
11 - 12	16.5	3.6	13.0	2.9	29.5	6.5
12 - 13	18.7	4.1	15.3	3.4	34.0	7.5
13 - 14	12.8	2.8	14.0	3.1	26.8	5.9
14 - 15	16.2	3.6	16.1	3.6	32.3	7.1
15 - 16	29.4	6.5	14.6	3.2	44.0	9.7
16 - 17	19.3	4.3	13.1	2.9	32.4	7.1
17 - 18	1.0	0.2	0.2	0.0	1.2	0.3
Totals	278.4	61.4	175.6	38.8	454.0	100.0

Table 4. Continued.

Hour of Day	Adult		Subadult		Total	
	Mean	%	Mean	%	Mean	%
SATURDAY (n = 23 days, 5577 min)						
7 - 8	1.3	0.5	0.5	0.2	1.8	0.7
8 - 9	23.8	9.8	11.4	4.7	35.2	14.5
9 - 10	35.6	14.7	18.2	7.5	53.8	22.2
10 - 11	22.8	9.4	15.6	6.4	38.4	15.8
11 - 12	10.7	4.4	9.3	3.9	20.0	8.3
12 - 13	6.7	2.8	5.5	2.3	12.2	5.0
13 - 14	10.7	4.4	9.2	3.8	19.9	8.2
14 - 15	7.8	3.2	8.3	3.4	16.1	6.6
15 - 16	16.8	6.9	9.7	4.0	26.5	10.9
16 - 17	14.1	5.8	4.1	1.7	18.3	7.5
17 - 18	0.0	0.0	0.3	0.1	0.3	0.1
Totals	150.3	61.9	92.2	38.0	242.5	99.8

* Excludes 2 Mondays and 1 Saturday where only partial records are available, due to fog.

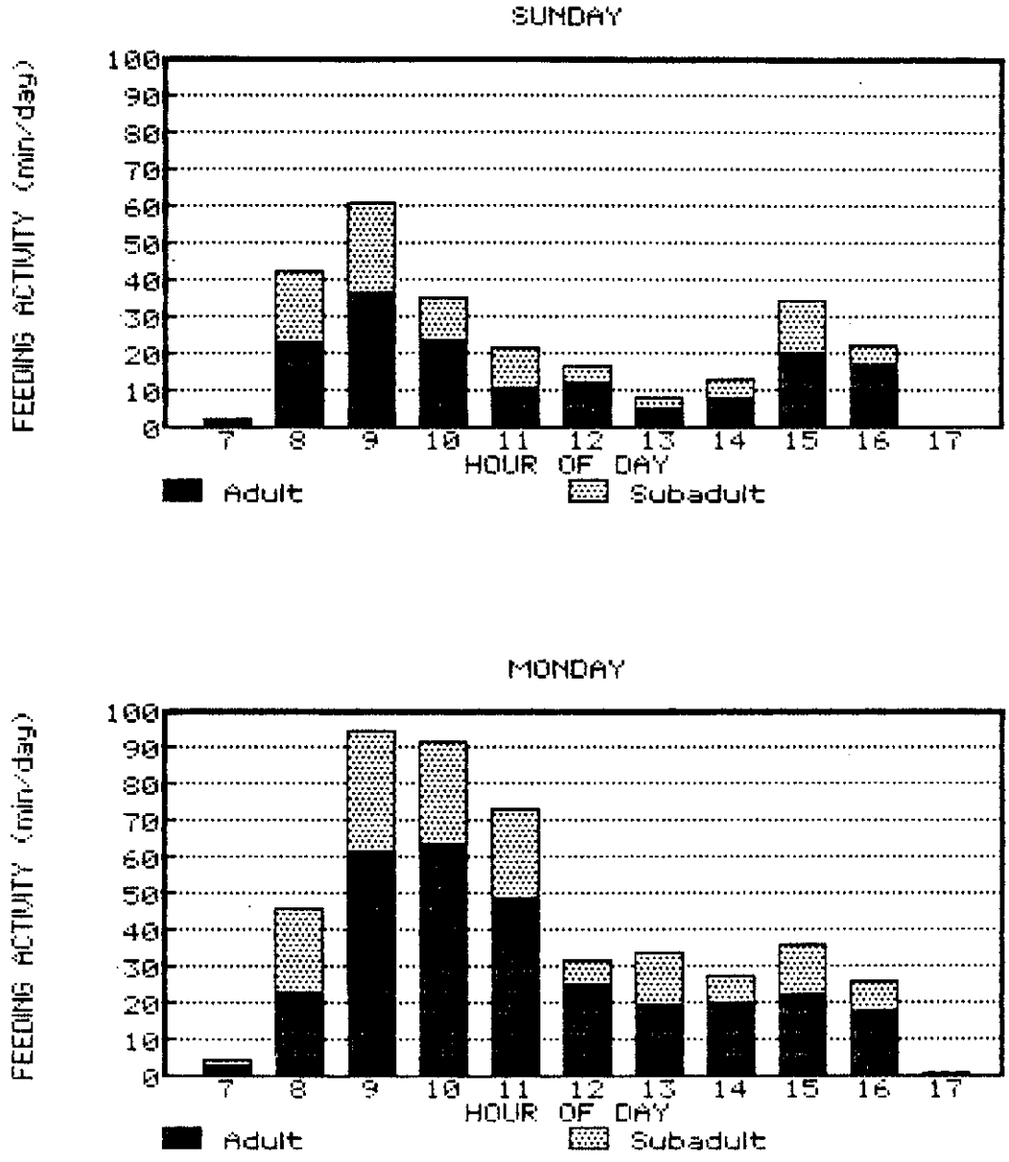


Figure 11. Hourly occurrence of feeding activity at Washington Eddy for Sunday (upper) and Monday (lower) during 1985-86 and 1986-87 combined.

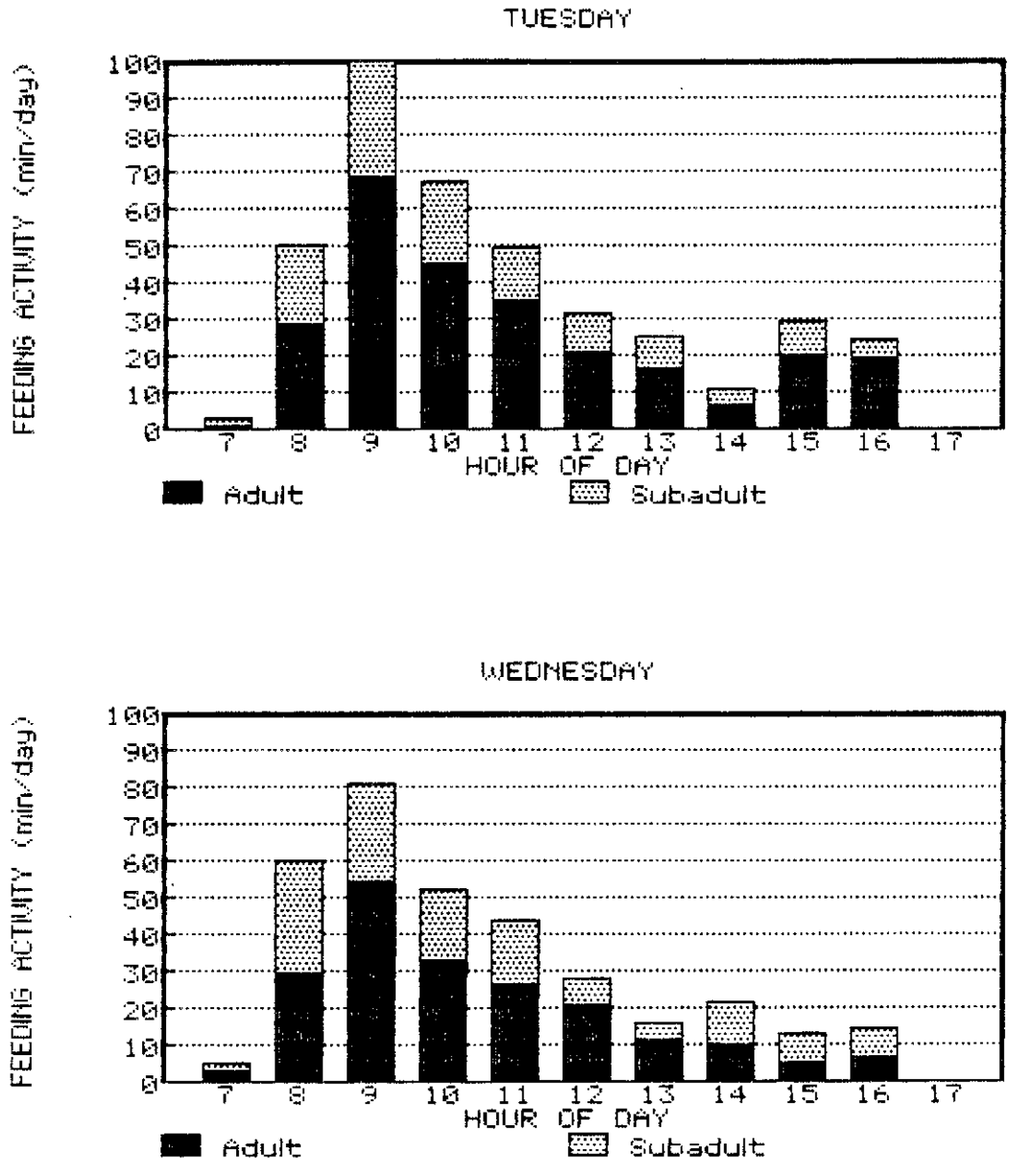


Figure 12. Hourly occurrence of feeding activity at Washington Eddy for Tuesday (upper) and Wednesday (lower) during 1985-86 and 1986-87 combined.

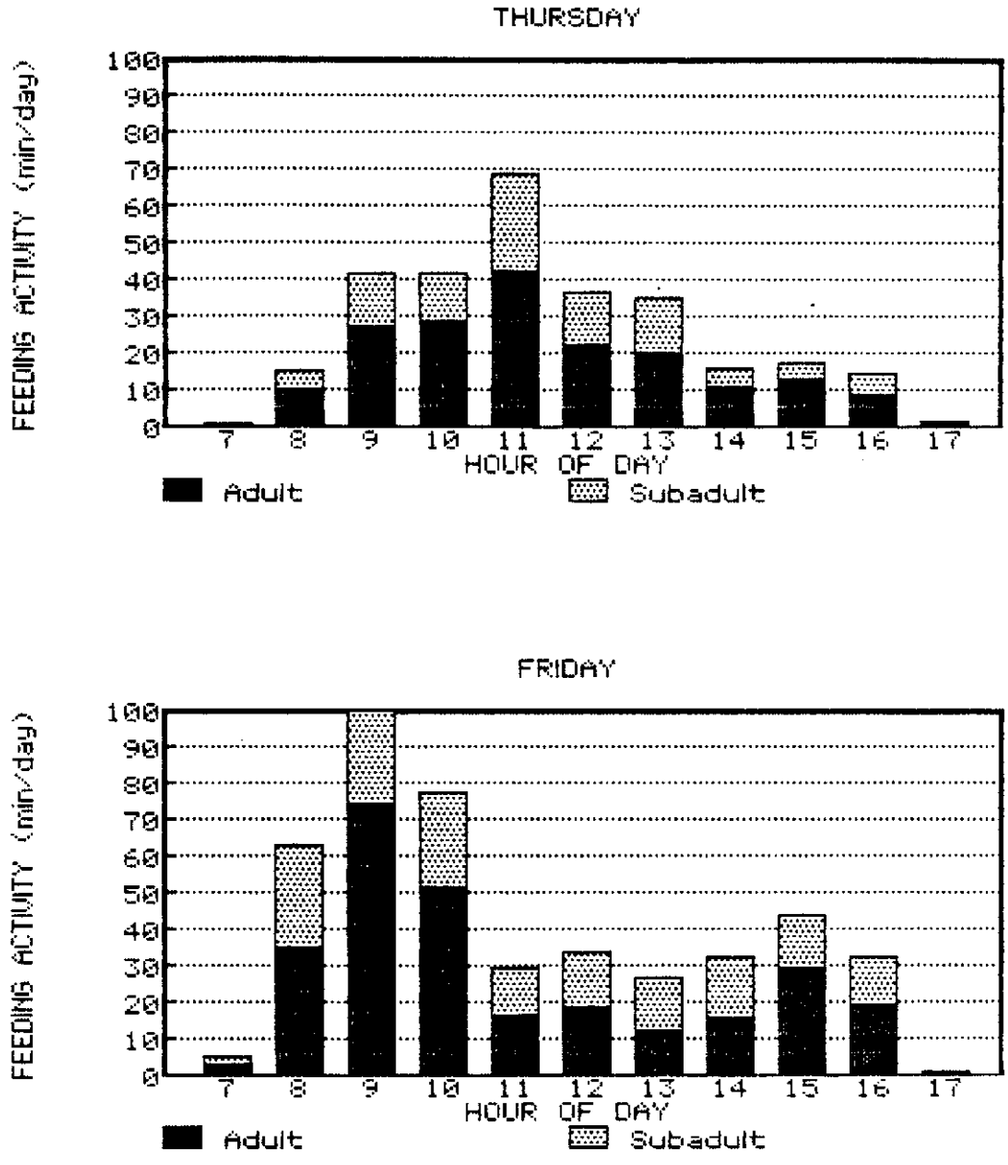


Figure 13. Hourly occurrence of feeding activity at Washington Eddy for Thursday (upper) and Friday (lower) during 1985-86 and 1986-87 combined.

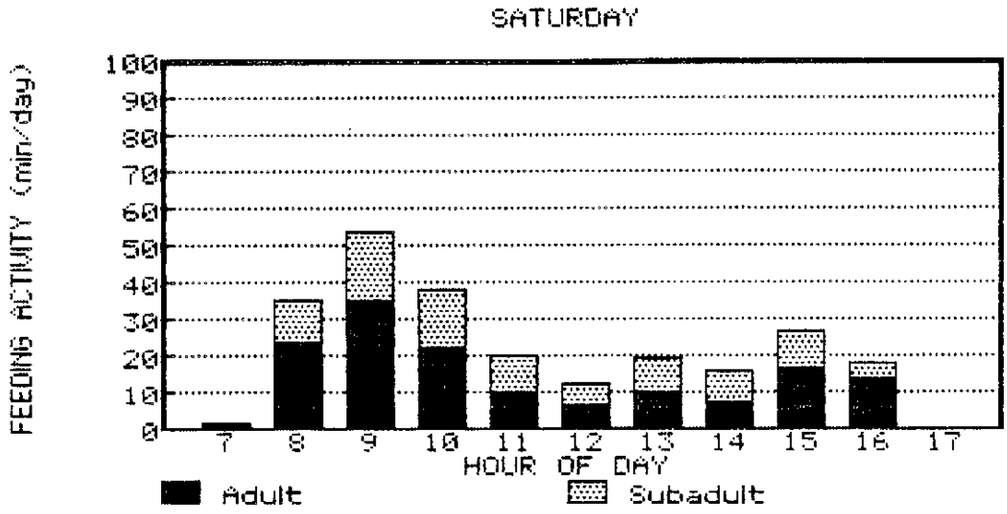


Figure 14. Hourly occurrence of feeding activity at Washington Eddy for Saturday during 1985-86 and 1986-87 combined.

Table 5. Feeding activity (min/day) by bald eagles at Washington Eddy on the SRBENA partitioned by hour and the number of recreational activities occurring per day for 1985-86 and 1986-87 combined.

Hour of Day	Adult		Subadult		All Ages	
	Mean	%	Mean	%	Mean	%
RECREATIONAL ACTIVITIES = 0 - 5 (n = 62 days, 30,780 min)						
7 - 8	3.2	0.6	2.3	0.5	5.4	1.1
8 - 9	29.2	5.9	27.9	5.6	57.0	11.5
9 - 10	65.6	13.2	41.3	8.3	106.9	21.5
10 - 11	66.6	13.4	32.7	6.6	99.3	20.0
11 - 12	40.7	8.2	23.2	4.7	63.9	12.9
12 - 13	23.8	4.8	10.4	2.1	34.3	6.9
13 - 14	22.0	4.4	14.6	2.9	36.6	7.4
14 - 15	17.7	3.6	11.2	2.2	28.9	5.8
15 - 16	23.6	4.8	13.7	2.8	37.3	7.5
16 - 17	17.4	3.5	9.0	1.8	26.4	5.3
17 - 18	0.4	0.1	0.1	0.0	0.5	0.1
Totals	310.2	62.5	186.2	37.5	496.5	100.0
RECREATIONAL ACTIVITIES = 6 - 10 (n = 39 days, 13,537 min)						
7 - 8	2.3	0.7	1.4	0.4	3.7	1.1
8 - 9	24.2	7.0	16.4	4.7	40.7	11.7
9 - 10	53.3	15.4	23.3	6.7	76.7	22.1
10 - 11	27.5	7.9	15.6	4.5	43.2	12.4
11 - 12	30.0	8.6	20.5	5.9	50.5	14.6
12 - 13	21.0	6.1	13.8	4.0	34.8	10.0
13 - 14	12.0	3.5	9.6	2.8	21.6	6.2
14 - 15	11.1	3.2	7.9	2.3	18.9	5.5
15 - 16	20.2	5.8	9.6	2.8	29.8	8.6
16 - 17	19.2	5.5	6.9	2.0	26.1	7.5
17 - 18	0.6	0.2	0.5	0.1	1.1	0.3
Totals	221.5	63.8	125.6	36.2	347.1	100.0

Table 5. Continued.

Hour of Day	Adult		Subadult		Total	
	Mean	%	Mean	%	Mean	%
RECREATIONAL ACTIVITIES = 11 - 20 (n = 21 days, 6800 min)						
7 - 8	0	0.0	0	0.0	0	0.0
8 - 9	30.7	9.5	23.0	7.1	53.8	16.6
9 - 10	57.0	17.6	27.9	8.6	84.8	26.2
10 - 11	25.0	7.7	10.6	3.3	35.6	11.0
11 - 12	25.0	7.7	14.1	4.4	39.1	12.1
12 - 13	18.9	5.8	8.5	2.6	27.3	8.4
13 - 14	9.6	3.0	6.3	1.9	15.9	4.9
14 - 15	7.9	2.4	6.4	2.0	14.2	4.4
15 - 16	17.3	5.4	12.9	4.0	30.2	9.3
16 - 17	15.0	4.6	7.6	2.4	22.6	7.0
17 - 18	0.2	0.1	0	0.0	0.2	0.1
Totals	206.6	63.8	117.2	36.3	323.8	100.0
RECREATIONAL ACTIVITIES = 21 - 40 (n = 20 days, 4026 min)						
7 - 8	2.0	1.0	0.8	0.4	2.8	1.4
8 - 9	23.7	11.7	12.1	6.0	35.8	17.8
9 - 10	30.5	15.1	7.1	3.5	37.6	18.7
10 - 11	18.4	9.1	11.6	5.8	30.0	14.9
11 - 12	7.2	3.6	3.2	1.6	10.4	5.2
12 - 13	11.2	5.5	4.7	2.3	15.8	7.8
13 - 14	9.9	4.9	7.7	3.8	17.6	8.7
14 - 15	7.1	3.5	8.3	4.1	15.4	7.6
15 - 16	14.5	7.2	4.5	2.2	18.9	9.4
16 - 17	11.2	5.5	5.2	2.6	16.4	8.1
17 - 18	0.3	0.1	0.6	0.3	0.9	0.4
Totals	135.7	67.2	65.6	32.6	201.3	100.0

Table 5. Continued.

Hour of Day	Adult		Subadult		Total	
	Mean	%	Mean	%	Mean	%
RECREATIONAL ACTIVITIES = 41 - 115 (n = 18 days, 1032 min)						
7 - 8	0.5	0.9	0	0.0	0.5	0.9
8 - 9	6.9	12.0	3.3	5.8	10.2	17.8
9 - 10	17.1	29.8	6.9	12.1	24.1	42.0
10 - 11	4.5	7.8	1.0	1.7	5.5	9.6
11 - 12	0.3	0.6	1.2	2.0	1.5	2.6
12 - 13	0.9	1.6	0	0.0	0.9	1.6
13 - 14	0.3	0.5	0	0.0	0.3	0.5
14 - 15	0.6	1.1	0.4	0.8	1.1	1.8
15 - 16	3.1	5.3	5.1	8.8	8.1	14.1
16 - 17	2.0	3.5	2.4	4.2	4.4	7.7
17 - 18	0.1	0.1	0.7	1.3	0.8	1.4
Totals	36.3	63.2	21.1	36.7	57.3	100.0

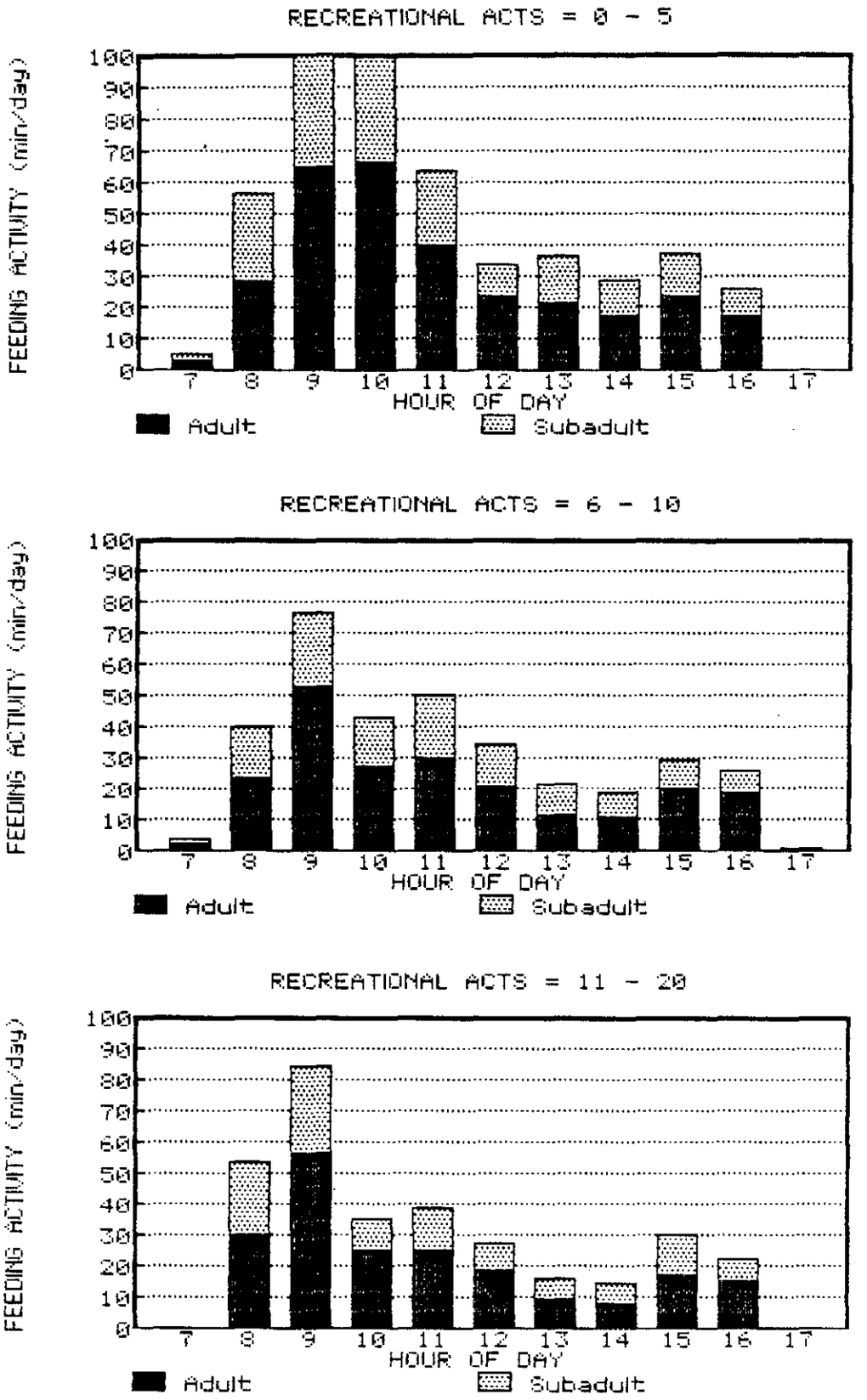


Figure 15. Hourly occurrence of feeding activity at Washington Eddy when the daily number of recreational activities was 0 to 5 (upper), 6 to 10 (middle), and 11 to 20 (lower) during 1985-86 and 1986-87 combined.

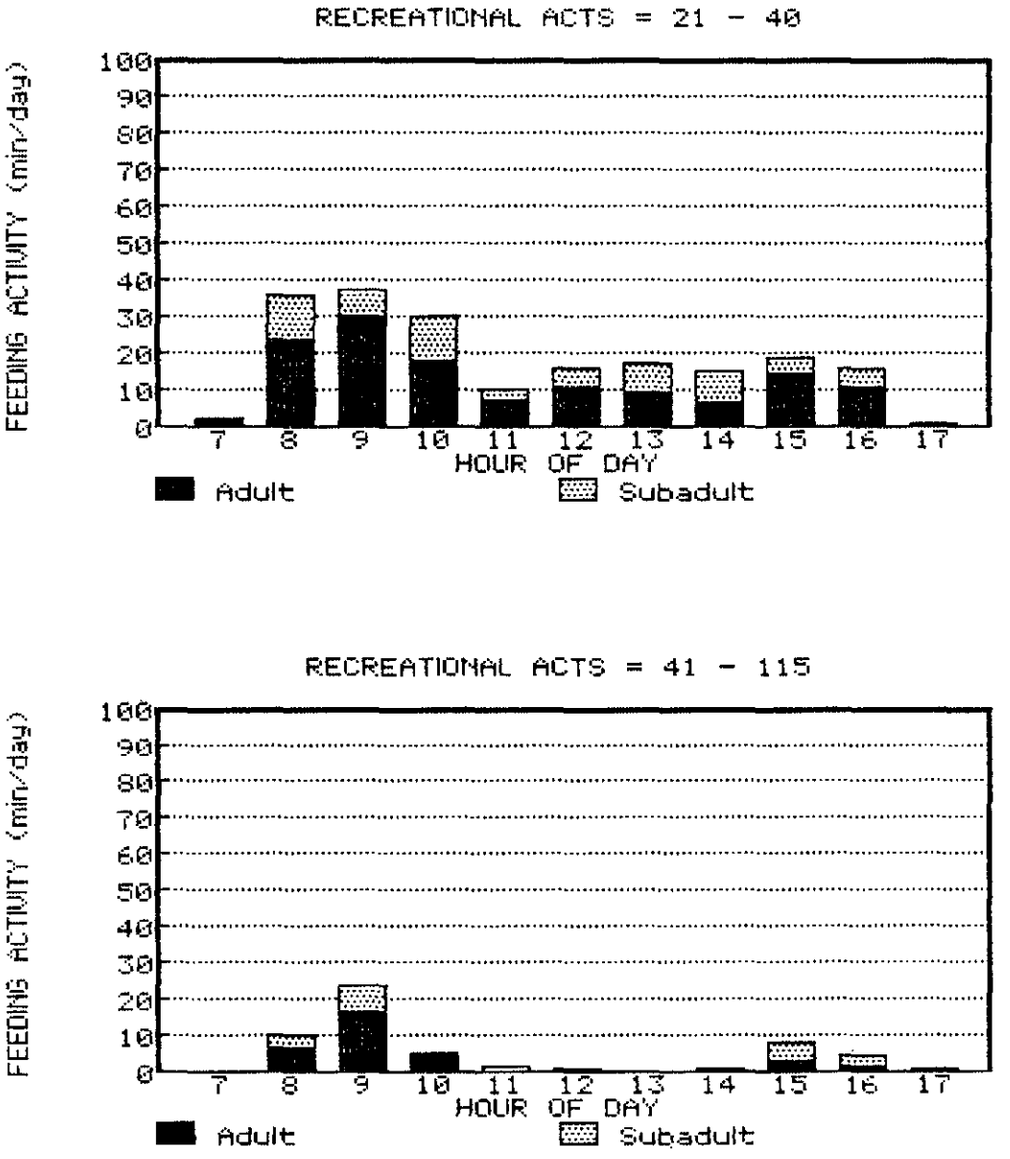


Figure 16. Hourly occurrence of feeding activity at Washington Eddy when the daily number of recreational activities was 21 to 40 (upper) and 41 to 115 (lower) during 1985-86 and 1986-87 combined.

Table 6. Least squares log regression of feeding activity (log-minutes/day) at the Washington Eddy on the SRBENA as a function of the daily number of recreational activities during 1985-86 and 1986-87 combined.

Month/Age	n	Regression Equation	r	F	P
DECEMBER					
Adult	58	LOG(Y) = 2.415 - 0.0227X	-0.280	4.77	0.012
Subadult	58	LOG(Y) = 2.092 - 0.0217X	-0.269	4.35	0.018
All Ages	58	LOG(Y) = 2.609 - 0.0247X	-0.295	5.34	0.008
JANUARY					
Adult	61	LOG(Y) = 2.209 - 0.0152X	-0.457	15.60	0.000
Subadult	61	LOG(Y) = 2.043 - 0.0159X	-0.494	19.04	0.000
All Ages	61	LOG(Y) = 2.450 - 0.0164X	-0.476	17.27	0.000
FEBRUARY					
Adult	44	LOG(Y) = 1.255 - 0.0117X	-0.379	7.05	0.002
Subadult	44	LOG(Y) = 1.266 - 0.0103X	-0.316	4.67	0.015
All Ages	44	LOG(Y) = 1.589 - 0.0139X	-0.396	7.82	0.001
TOTALS					
Adult	163	LOG(Y) = 2.064 - 0.0176X	-0.430	36.43	0.000
Subadult	163	LOG(Y) = 1.871 - 0.0162X	-0.426	35.65	0.000
All Ages	163	LOG(Y) = 2.303 - 0.0186X	-0.445	39.72	0.000

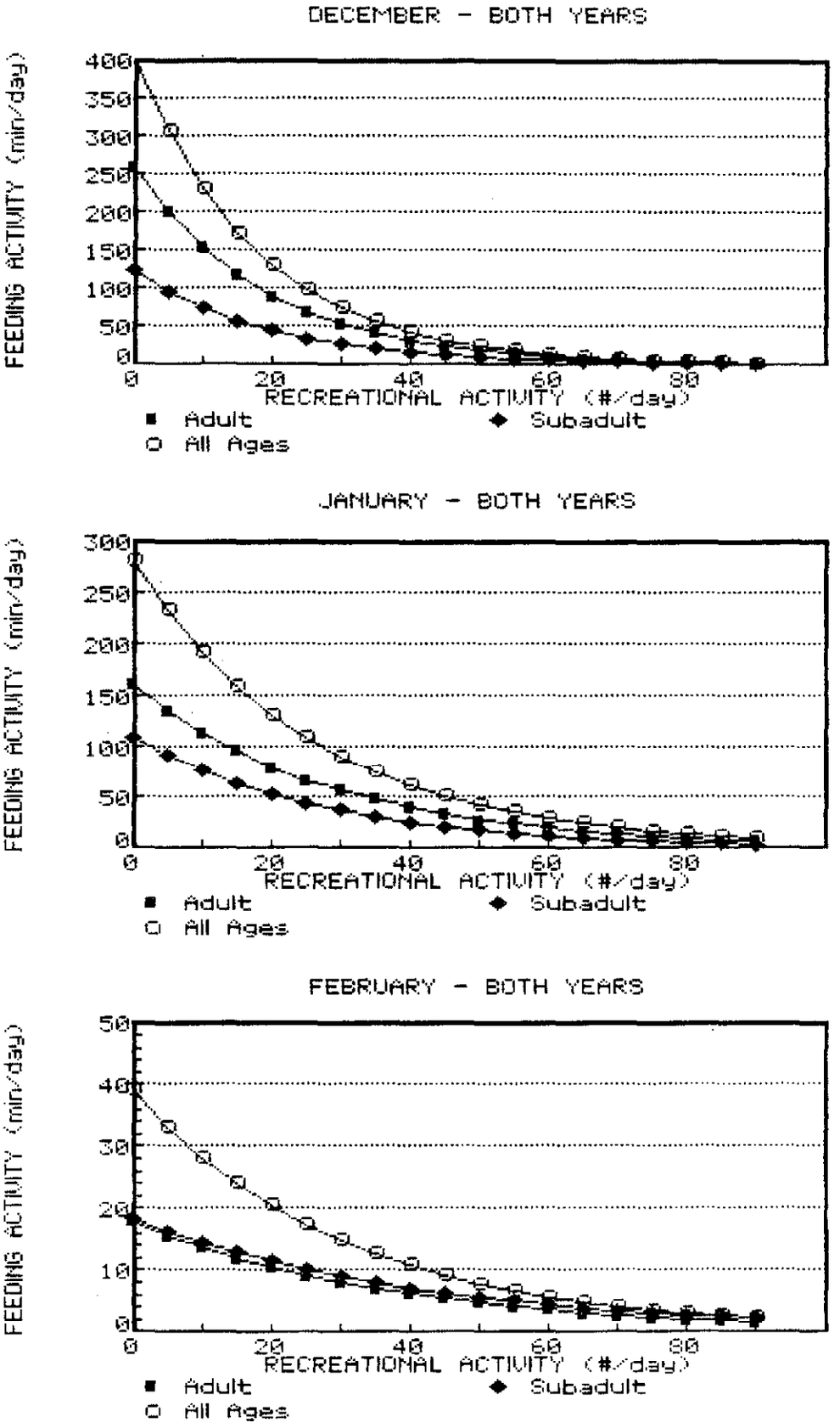


Figure 17. Relationship between daily recreational activity and daily feeding activity at Washington Eddy for December (upper), January (middle), and February (lower) during 1985-86 and 1986-87 combined.

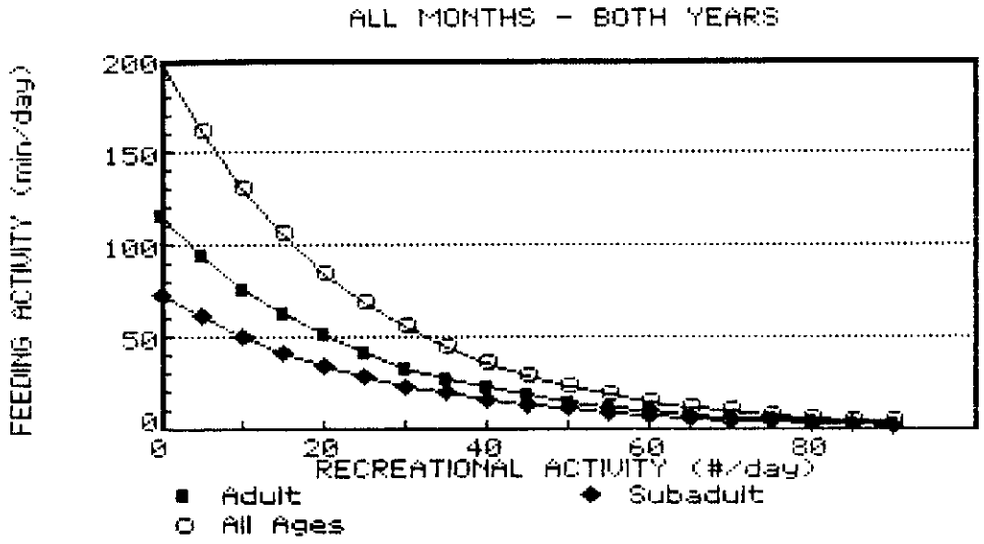


Figure 18. Relationship between daily recreational activity and daily feeding activity at Washington Eddy for all months during 1985-86 and 1986-87 combined.

Table 7. Flight distances (meters) of eagles from nine types of human activities while perched in trees at Washington Eddy on the SRBENA.

Activity & Year	Adult			Subadult			All Ages		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
Motorboat (Running)									
1985-86	122	139.1	82.71	78	131.7	65.16	200	136.2	76.26
1986-87	138	138.0	89.04	69	134.1	73.01	207	136.7	83.85
Both Years	260	138.3	85.86	147	132.8	68.72	407	136.3	80.05
Motorboat (Drifting)									
1985-86	64	121.6	81.60	55	112.7	76.17	119	117.5	78.93
1986-87	159	114.9	75.99	48	133.7	62.66	207	119.3	73.41
Both Years	223	116.8	77.51	103	122.5	70.65	326	118.6	75.35
Raft (Recreation)									
1985-86	94	142.5	127.4	50	134.2	127.4	144	139.6	127.0
1986-87	99	112.4	70.97	58	103.1	54.43	157	109.0	65.32
Both Years	193	127.1	103.2	108	117.5	96.21	301	123.6	100.7
Raft (Research)									
1985-86	56	135.0	88.30	43	144.9	96.82	99	139.3	91.74
1986-87	34	94.4	38.63	24	100.4	64.44	58	96.9	50.48
Both Years	90	119.7	75.91	67	129.0	88.73	157	123.6	81.49
Dory of Drift									
1985-86	84	115.8	89.24	54	134.8	77.77	138	123.3	85.15
1986-87	139	126.7	89.98	78	125.6	96.61	217	126.3	92.21
Both Years	223	122.4	89.48	132	129.4	89.18	355	125.0	89.31
Canoe									
1985-86	6	148.3	64.63	5	62.0	43.82	11	109.1	69.92
1986-87	17	114.1	77.46	2	140.0	0.00	19	116.8	73.49
Both Years	23	123.0	74.49	7	84.3	52.24	30	114.0	71.08
Kayak									
1985-86	5	142.0	147.9	1	40.0	-	6	125.0	138.7
1986-87	14	113.1	58.08	3	90.0	17.32	17	108.7	53.15
Both Years	19	117.9	86.45	4	77.5	28.72	23	110.9	80.45
Bank Fisher									
1985-86	20	220.5	75.43	6	210.0	69.86	26	218.1	72.94
1986-87	21	177.6	93.59	7	207.1	111.5	28	185.0	97.05
Both Years	41	198.5	86.91	13	208.5	90.82	54	200.9	87.10
Hiker									
1985-86	34	202.7	112.8	16	208.1	124.0	50	204.4	115.2
1986-87	57	187.9	78.58	34	142.1	63.43	91	170.8	76.25
Both Years	91	193.4	92.50	50	163.3	91.57	141	182.7	92.98

Table 7. Continued.

Activity & Year	Adult			Subadult			All Ages		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
All Boat Traffic									
1985-86	431	132.3	96.47	286	129.5	88.20	717	131.2	93.21
1986-87	600	121.1	80.36	282	122.0	75.08	882	121.4	78.67
Both Years	1031	125.8	87.59	568	125.8	81.96	1599	125.8	85.61
All Foot Traffic									
1985-86	54	209.3	100.2	22	208.6	110.2	76	209.1	102.4
1986-87	78	185.1	82.38	41	153.2	76.14	119	174.1	81.40
Both Years	132	195.0	90.50	63	172.5	92.54	195	187.7	91.53
All Activities									
1985-86	485	140.9	99.77	308	135.2	92.03	793	138.7	96.82
1986-87	678	128.4	83.09	323	126.0	75.81	1001	127.6	80.78
Both Years	1163	133.6	90.59	631	130.5	84.18	1794	132.5	88.38

Table 8. Statistical probabilities comparing flight distances of bald eagles to nine types of human activities while perched in trees at Washington Eddy on the SRBEMA in 1985-86.

	Motorboat (Run)	Motorboat (Drift)	Raft (Rec)	Raft (Res)	Dory or Drift	Canoe	Kayak	Bank Fisher	Hiker
Motorboat (Run)									
Adult									
Subadult									
All Ages									
Motorboat (Drift)									
Adult	N								
Subadult	N								
All Ages	N								
Raft (Recreate)									
Adult	N	N							
Subadult	N	N							
All Ages	N	N							
Raft (Research)									
Adult	N	N	N						
Subadult	N	N	N						
All Ages	N	N	N						
Dory or Drift									
Adult	N	N	N	N					
Subadult	N	N	N	N					
All Ages	N	N	N	N					
Canoe									
Adult	N	N	N	N	N				
Subadult	N	N	N	N	N				
All Ages	N	N	N	N	N				
Kayak									
Adult	N	N	N	N	N	N			
Subadult	N	N	N	N	N	N			
All Ages	N	N	N	N	N	N			
Bank Fisher									
Adult	0.001	0.001	0.010	0.001	0.001	N	N		
Subadult	0.050	0.050	N	N	N	0.010	N		
All Ages	0.001	0.001	0.001	0.001	0.001	0.010	0.050		
Hiker									
Adult	0.001	0.001	0.010	0.010	0.001	N	N	N	
Subadult	0.010	0.001	0.010	0.050	0.010	0.010	N	N	
All Ages	0.001	0.001	0.001	0.001	0.001	0.010	N	N	

Table 9. Statistical probabilities comparing flight distances of bald eagles to nine types of human activities while perched in trees at Washington Eddy on the SRBENA in 1986-87.

	Motorboat (Run)	Motorboat (Drift)	Raft (Rec)	Raft (Res)	Dory or Drift	Canoe	Kayak	Bank Fisher	Hiker
Motorboat (Run)									
Adult									
Subadult									
All Ages									
Motorboat (Drift)									
Adult	0.050								
Subadult	N								
All Ages	0.050								
Raft (Recreate)									
Adult	0.050	N							
Subadult	0.050	0.050							
All Ages	0.001	N							
Raft (Research)									
Adult	0.010	N	N						
Subadult	N	N	N						
All Ages	0.001	N	N						
Dory or Drift									
Adult	N	N	N	0.050					
Subadult	N	N	N	N					
All Ages	N	N	0.050	0.050					
Canoe									
Adult	N	N	N	N	N				
Subadult	N	N	N	N	N				
All Ages	N	N	N	N	N				
Kayak									
Adult	N	N	N	N	N	N			
Subadult	N	N	N	N	N	N			
All Ages	N	N	N	N	N	N			
Bank Fisher									
Adult	0.050	0.001	0.001	0.001	0.010	0.050	0.050		
Subadult	0.050	0.050	0.001	0.001	0.010	N	0.050		
All Ages	0.010	0.001	0.001	0.001	0.001	0.010	0.010		
Hiker									
Adult	0.001	0.001	0.001	0.001	0.001	0.001	0.010	N	
Subadult	N	N	0.050	0.050	N	N	N	0.050	
All Ages	0.001	0.001	0.001	0.001	0.001	0.010	0.010	N	

Table 10. Statistical probabilities comparing flight distances of bald eagles to nine types of human activities while perched in trees at Washington Eddy on the SRBENA in 1985-86 and 1986-87 combined.

	Motorboat (Run)	Motorboat (Drift)	Raft (Rec)	Raft (Res)	Dory or Drift	Canoe	Kayak	Bank Fisher	Hiker
Motorboat (Run)									
Adult									
Subadult									
All Ages									
Motorboat (Drift)									
Adult	0.010								
Subadult	N								
All Ages	0.010								
Raft (Recreate)									
Adult	N	N							
Subadult	N	N							
All Ages	N	N							
Raft (Research)									
Adult	N	N	N						
Subadult	N	N	N						
All Ages	N	N	N						
Dory or Drift									
Adult	0.050	N	N	N					
Subadult	N	N	N	N					
All Ages	N	N	N	N					
Canoe									
Adult	N	N	N	N	N				
Subadult	N	N	N	N	N				
All Ages	N	N	N	N	N				
Kayak									
Adult	N	N	N	N	N	N			
Subadult	N	N	N	N	N	N			
All Ages	N	N	N	N	N	N			
Bank Fisher									
Adult	0.001	0.001	0.001	0.001	0.001	0.010	0.001		
Subadult	0.010	0.001	0.001	0.010	0.010	0.010	0.010		
All Ages	0.001	0.001	0.001	0.001	0.001	0.001	0.001		
Hiker									
Adult	0.001	0.001	0.001	0.001	0.001	0.001	0.001	N	
Subadult	0.050	0.010	0.010	0.050	0.050	0.050	0.050	N	
All Ages	0.001	0.001	0.001	0.001	0.001	0.001	0.001	N	

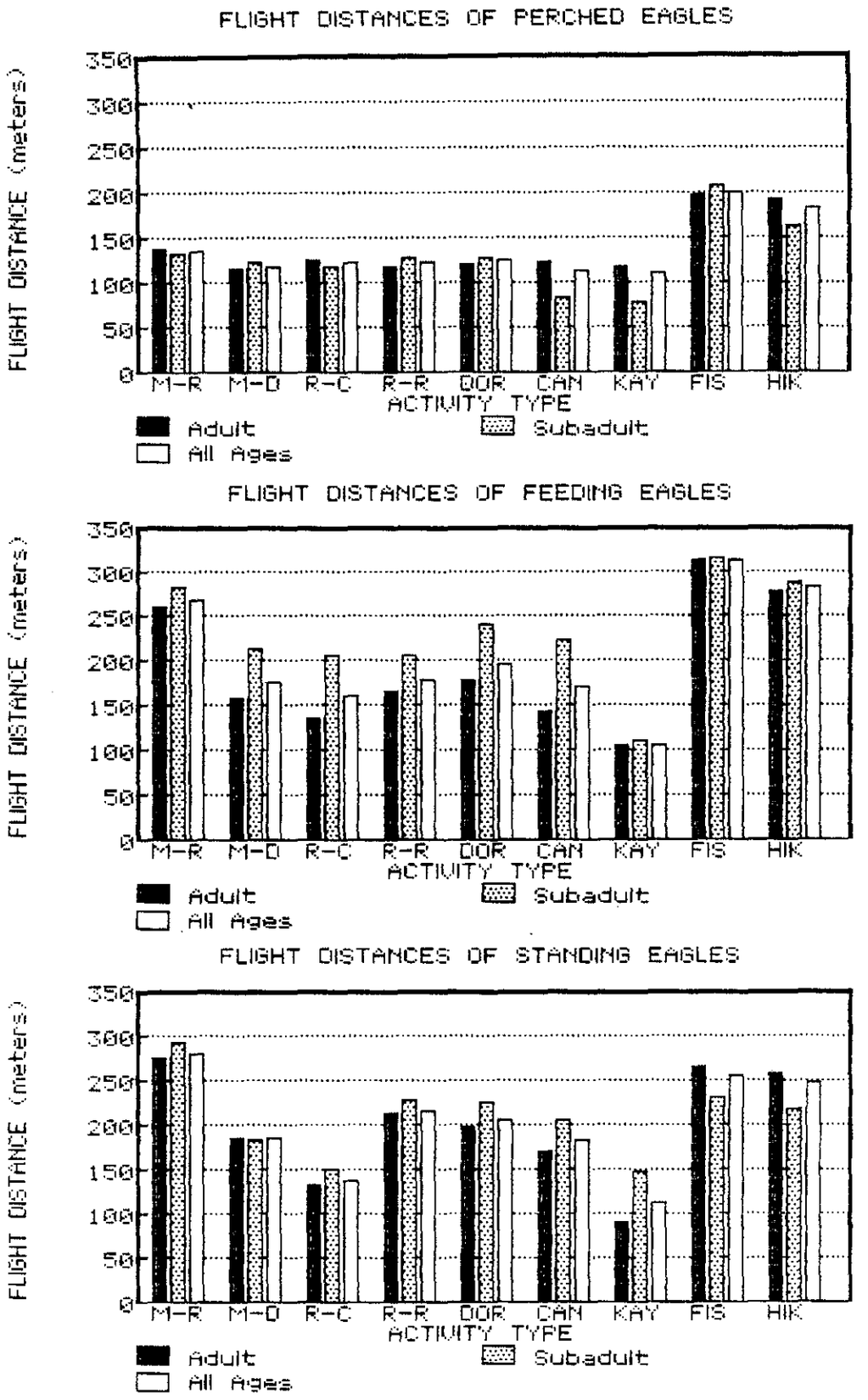


Figure 19. Flight distances (meters) of eagles perching (upper), feeding (middle), and standing (lower) at Washington Eddy from nine human activity types. (M-R = Motorboat-Running, M-D = Motorboat-Drifting, R-C = Raft-Recreational, R-R = Raft-Research, DOR = Dory, CAN = Canoe, KAY = Kayak, FIS = Bank Fisher, and HIK = Hiker.)

Table 11. Flight distances (meters) of eagles from nine types of human activities while feeding on the ground at Washington Eddy on the SRBENA.

Activity & Year	Adult n	Adult Mean	Adult SD	Subadult n	Subadult Mean	Subadult SD	All Ages n	All Ages Mean	All Ages SD
Motorboat (Running)									
1985-86	50	273.4	102.4	21	292.9	127.0	71	279.2	109.7
1986-87	70	252.9	125.2	32	277.5	118.1	102	260.6	122.9
Both Years	120	261.4	116.2	53	283.6	120.7	173	268.2	117.7
Motorboat (Drifting)									
1985-86	13	198.5	107.5	7	205.7	123.4	20	201.0	110.1
1986-87	25	138.4	83.70	11	219.1	132.2	36	163.1	105.9
Both Years	38	158.9	95.52	18	213.9	125.3	56	176.6	108.0
Raft (Recreation)									
1985-86	17	129.4	81.20	5	190.0	60.83	22	143.2	80.02
1986-87	16	145.6	79.41	14	211.4	114.0	30	176.3	101.0
Both Years	33	137.3	79.50	19	205.8	101.5	52	162.3	93.34
Raft (Research)									
1985-86	20	180.0	112.2	6	255.0	162.7	26	197.3	126.1
1986-87	18	151.1	99.29	12	180.0	92.93	30	162.7	96.24
Both Years	38	166.3	105.8	18	205.0	121.2	56	178.7	111.4
Dory of Drift									
1985-86	27	166.7	100.7	11	213.6	138.7	38	180.3	113.1
1986-87	41	185.9	129.2	18	258.9	107.4	59	208.1	126.6
Both Years	68	178.2	118.2	29	241.7	119.9	97	197.2	121.7
Canoe									
1985-86	5	228.0	96.28	0	-	-	5	228.0	96.28
1986-87	5	60.0	39.37	5	224.0	83.25	10	142.0	106.0
Both Years	10	144.0	112.5	5	224.0	83.25	15	170.7	107.9
Kayak									
1985-86	0	-	-	0	-	-	0	-	-
1986-87	2	105.0	63.64	1	110.0	-	3	106.7	45.09
Both Years	2	105.0	63.64	1	110.0	-	3	106.7	45.09
Bank Fisher									
1985-86	3	333.3	152.8	1	300.0	-	4	325.0	125.8
1986-87	8	305.0	174.4	2	325.0	35.36	10	309.0	154.4
Both Years	11	312.7	161.6	3	316.7	28.87	14	313.6	142.2
Hiker									
1985-86	15	318.0	57.97	9	333.3	90.14	24	323.8	70.21
1986-87	17	245.3	90.15	7	231.4	82.95	24	241.2	86.54
Both Years	32	279.4	84.09	16	288.7	99.05	48	282.5	88.40

Table 11. Continued.

Activity & Year	Adult n	Adult Mean	Adult SD	Subadult n	Subadult Mean	Subadult SD	All Ages n	All Ages Mean	All Ages SD
All Boat Traffic									
1985-86	132	209.8	113.3	50	248.4	130.8	182	220.4	119.2
1986-87	177	194.0	123.6	93	239.8	115.3	270	209.8	122.5
Both Years	309	200.7	119.3	143	242.8	120.6	452	214.0	121.2
All Foot Traffic									
1985-86	18	320.6	74.48	10	330.0	85.63	28	323.9	77.19
1986-87	25	264.4	122.9	9	252.2	83.78	34	261.2	112.7
Both Years	43	287.9	108.0	19	293.2	91.53	62	289.5	102.5
All Activities									
1985-86	150	223.1	115.0	60	262.0	127.5	210	234.2	119.7
1986-87	202	202.7	125.4	102	240.9	112.6	304	215.5	122.4
Both Years	352	211.4	121.3	162	248.7	118.4	514	223.2	121.5

Table 12. Statistical probabilities comparing flight distances of bald eagles to nine types of human activities while feeding (upper right half) and standing (lower left half) on the ground at Washington Eddy on the SRBENA in 1985-86.

	Motorboat (Run)	Motorboat (Drift)	Raft (Rec)	Raft (Res)	Dory or Drift	Canoe	Kayak	Bank Fisher	Hiker
Motorboat (Run)									
Adult		0.050	0.001	0.001	0.001	N	-	N	N
Subadult		N	N	N	N	-	-	N	N
All Ages		0.010	0.001	0.001	0.001	N	-	N	N
Motorboat (Drift)									
Adult	0.010		N	N	N	N	-	0.050	0.010
Subadult	0.050		N	N	N	-	-	N	N
All Ages	0.001		N	N	N	N	-	0.050	0.001
Raft (Recreate)									
Adult	0.001	0.010		N	N	N	-	0.010	0.001
Subadult	0.001	N		N	N	-	-	N	N
All Ages	0.001	0.010		N	N	N	-	0.010	0.001
Raft (Research)									
Adult	0.050	N	0.001		N	N	-	0.050	0.001
Subadult	N	N	N		N	-	-	N	N
All Ages	0.010	N	0.001		N	N	-	0.050	0.001
Dory or Drift									
Adult	0.001	N	N	0.050		N	-	0.010	0.001
Subadult	0.001	0.050	N	N		-	-	N	N
All Ages	0.001	0.050	N	0.010		N	-	0.050	0.001
Canoe									
Adult	0.001	N	N	N	N		-	N	N
Subadult	N	N	N	N	N		-	-	-
All Ages	0.001	N	N	N	N		-	N	N
Kayak									
Adult	-	-	-	-	-	-		-	-
Subadult	-	-	-	-	-	-		-	-
All Ages	-	-	-	-	-	-		-	-
Bank Fisher									
Adult	N	N	N	N	N	N	-		N
Subadult	N	N	N	N	N	N	-		N
All Ages	N	N	N	N	N	N	-		N
Hiker									
Adult	N	0.050	0.001	N	0.001	0.010	-	N	
Subadult	0.050	N	N	N	N	N	-	N	
All Ages	N	N	0.001	N	0.001	0.050	-	N	

Table 13. Statistical probabilities comparing flight distances of bald eagles to nine types of human activities while feeding (upper right half) and standing (lower left half) on the ground at Washington Eddy on the SRBENA in 1986-87.

	Motorboat (Run)	Motorboat (Drift)	Raft (Rec)	Raft (Res)	Dory or Drift	Canoe	Kayak	Bank Fisher	Hiker
Motorboat (Run)									
Adult		0.001	0.001	0.001	0.010	0.001	N	N	N
Subadult		N	N	N	N	N	N	N	N
All Ages		0.001	0.001	0.001	0.010	0.010	0.050	N	N
Motorboat (Drift)									
Adult	0.001		N	N	N	N	N	0.001	0.010
Subadult	0.001		N	N	N	N	N	N	N
All Ages	0.001		N	N	N	N	N	0.001	0.050
Raft (Recreate)									
Adult	0.001	N		N	N	N	N	0.010	0.050
Subadult	0.001	N		N	N	N	N	N	N
All Ages	0.001	N		N	N	N	N	0.010	0.050
Raft (Research)									
Adult	0.050	N	N		N	N	N	0.010	0.050
Subadult	N	N	N		N	N	N	N	N
All Ages	0.010	N	0.050		N	N	N	0.001	0.050
Dory or Drift									
Adult	0.050	N	0.010	N		0.050	N	0.010	N
Subadult	N	0.001	0.001	N		N	N	N	N
All Ages	N	0.001	0.001	N		N	N	0.050	N
Canoe									
Adult	N	N	N	N	N		N	0.001	0.010
Subadult	0.050	N	N	N	0.050		N	N	N
All Ages	0.050	N	N	N	N		N	0.010	0.050
Kayak									
Adult	0.001	N	N	0.050	0.010	N		0.050	N
Subadult	0.010	N	N	N	0.010	N		N	N
All Ages	0.001	N	N	0.050	0.001	N		0.010	N
Bank Fisher									
Adult	N	0.050	0.010	N	N	N	0.010		N
Subadult	N	N	N	N	N	N	N		N
All Ages	N	0.050	0.010	N	N	N	0.010		N
Hiker									
Adult	N	0.050	0.010	N	N	N	0.010	N	
Subadult	N	N	N	N	N	N	N	N	
All Ages	N	0.010	0.010	N	N	N	0.010	N	

Table 14. Statistical probabilities comparing flight distances of bald eagles to nine types of human activities while feeding (upper right half) and standing (lower left half) on the ground at Washington Eddy on the SRBENA in 1985-86 and 1986-87 combined.

	Motorboat (Run)	Motorboat (Drift)	Raft (Rec)	Raft (Res)	Dory or Drift	Canoe	Kayak	Bank Fisher	Hiker
Motorboat (Run)									
Adult		0.001	0.001	0.001	0.001	0.010	0.050	N	N
Subadult		0.050	0.050	0.050	N	N	N	N	N
All Ages		0.001	0.001	0.001	0.001	0.010	0.050	N	N
Motorboat (Drift)									
Adult	0.001		N	N	N	N	N	0.001	0.001
Subadult	0.001		N	N	N	N	N	N	N
All Ages	0.001		N	N	N	N	N	0.001	0.001
Raft (Recreate)									
Adult	0.001	0.050		N	N	N	N	0.001	0.001
Subadult	0.001	N		N	N	N	N	N	0.050
All Ages	0.001	0.010		N	N	N	N	0.001	0.001
Raft (Research)									
Adult	0.010	N	0.001		N	N	N	0.001	0.001
Subadult	N	N	N		N	N	N	N	0.050
All Ages	0.001	N	0.001		N	N	N	0.001	0.001
Dory or Drift									
Adult	0.001	N	0.001	N		N	N	0.001	0.001
Subadult	0.010	N	0.050	N		N	N	N	N
All Ages	0.001	N	0.001	N		N	N	0.001	0.001
Canoe									
Adult	0.001	N	N	N	N		N	0.001	0.001
Subadult	0.050	N	N	N	N		N	N	N
All Ages	0.001	N	N	N	N		N	0.001	0.001
Kayak									
Adult	0.001	0.050	N	0.010	0.010	N		0.050	0.050
Subadult	0.010	N	N	N	N	N		N	N
All Ages	0.001	0.050	N	0.010	0.010	N		0.010	0.010
Bank Fisher									
Adult	N	N	0.010	N	N	N	0.010		N
Subadult	N	N	N	N	N	N	N		N
All Ages	N	N	0.010	N	N	N	0.010		N
Hiker									
Adult	N	0.001	0.001	0.050	0.010	0.010	0.001	N	
Subadult	0.010	N	0.050	N	N	N	N	N	
All Ages	0.050	0.001	0.001	N	0.050	0.050	0.001	N	

Table 15. Flight distances (meters) of eagles from nine types of human activities while standing on the ground at Washington Eddy on the SRBENA.

Activity & Year	Adult			Subadult			All Ages		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
Motorboat (Running)									
1985-86	69	281.0	117.1	33	303.0	121.7	102	288.1	118.4
1986-87	67	271.2	132.1	34	285.6	94.75	101	276.0	120.5
Both Years	136	276.2	124.3	67	294.2	108.4	203	282.1	119.3
Motorboat (Drifting)									
1985-86	22	204.6	60.92	14	220.7	89.74	36	210.8	72.68
1986-87	27	171.5	33.42	14	147.9	99.55	41	163.4	82.78
Both Years	49	186.3	69.42	28	184.3	100.1	77	185.6	81.28
Raft (Recreation)									
1985-86	28	126.8	60.50	14	159.3	72.59	42	137.6	65.73
1986-87	23	142.6	93.33	8	135.0	43.09	31	140.6	82.66
Both Years	51	133.9	76.63	22	150.5	63.43	73	138.9	72.87
Raft (Research)									
1985-86	26	223.9	116.1	3	230.0	111.4	29	224.5	113.7
1986-87	14	197.9	88.51	7	227.1	100.6	21	207.6	91.26
Both Years	40	214.8	106.8	10	228.0	89.72	50	217.4	104.2
Dory of Drift									
1985-86	28	162.1	90.77	12	130.0	106.9	40	152.5	95.64
1986-87	40	224.2	126.1	15	303.3	124.5	55	245.8	129.5
Both Years	68	198.7	116.3	27	226.3	144.5	95	206.5	124.8
Canoe									
1985-86	11	169.1	109.4	2	230.0	98.99	13	178.5	106.4
1986-87	3	180.0	165.2	6	196.7	114.3	9	191.1	122.7
Both Years	14	171.4	115.9	8	205.0	104.7	22	183.6	110.6
Kayak									
1985-86	0	-	-	0	-	-	0	-	-
1986-87	7	90.0	32.15	5	148.0	63.40	12	114.2	54.01
Both Years	7	90.0	32.15	5	148.0	63.40	12	114.2	54.01
Bank Fisher									
1985-86	2	200.0	141.4	1	200.0	-	3	200.0	100.0
1986-87	4	297.5	34.03	1	260.0	-	5	290.0	33.91
Both Years	6	265.0	85.03	2	230.0	42.43	8	256.3	75.39
Hiker									
1985-86	32	268.8	81.87	12	214.2	88.67	44	253.9	86.31
1986-87	16	241.3	81.97	7	230.0	87.37	23	237.8	81.80
Both Years	48	259.6	82.08	19	220.0	86.09	67	248.4	84.51

Table 15. Continued.

Activity & Year	Adult			Subadult			All Ages		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
All Boat Traffic									
1985-86	184	215.5	114.8	78	231.2	123.5	262	220.2	117.5
1986-87	181	215.4	124.0	89	235.1	116.2	270	221.9	121.6
Both Years	365	215.5	119.3	167	233.2	119.3	532	221.1	119.5
All Foot Traffic									
1985-86	34	264.7	84.69	13	213.1	84.99	47	250.4	87.03
1986-87	20	252.5	77.59	8	233.7	81.58	28	247.1	77.69
Both Years	54	260.2	81.61	21	221.0	82.27	75	249.2	83.15
All Activities									
1985-86	218	223.2	111.9	91	228.6	118.5	309	224.8	113.8
1986-87	201	219.1	120.6	97	234.9	113.4	298	224.3	118.3
Both Years	419	221.2	116.1	188	231.9	115.6	607	224.5	115.9

Table 16. Probability values comparing the flight distances of adult and subadult eagles while perched in trees at Washington Eddy on the SRBENA for nine types of human activities during 1985-86 and 1986-87.

	Adult - Subadult Comparison		
Activity Type	1985-86	1986-87	Both Years
Motorboat (Running)	N	N	N
Motorboat (Drifting)	N	N	N
Raft (Recreation)	N	N	N
Raft (Research)	N	N	N
Dory or Drift	N	N	N
Canoe	0.050	N	N
Kayak	N	N	N
Bank Fisher	N	N	N
Hiker	N	0.005	N
All Boat Traffic	N	N	N
All Foot Traffic	N	0.050	N
All Activities	N	N	N

Table 17. Probability values comparing the flight distances of adult and subadult eagles while feeding on the ground at Washington Eddy on the SRBENA for nine types of human activities during 1985-86 and 1986-87.

	Adult - Subadult Comparison		
Activity Type	1985-86	1986-87	Both Years
Motorboat (Running)	N	N	N
Motorboat (Drifting)	N	0.050	N
Raft (Recreation)	N	N	0.010
Raft (Research)	N	N	N
Dory or Drift	N	0.050	0.020
Canoe	N	0.005	N
Kayak	N	N	N
Bank Fisher	N	N	N
Hiker	N	N	N
All Boat Traffic	N	0.005	0.001
All Foot Traffic	N	N	N
All Activities	0.050	0.010	0.002

Table 18. Probability values comparing the flight distances of adult and subadult eagles while standing on the ground at Washington Eddy on the SRBENA for nine types of human activities during 1985-86 and 1986-87.

	Adult - Subadult Comparison		
Activity Type	1985-86	1986-87	Both Years
Motorboat (Running)	N	N	N
Motorboat (Drifting)	N	N	N
Raft (Recreation)	N	N	N
Raft (Research)	N	N	N
Dory or Drift	N	0.050	N
Canoe	N	N	N
Kayak	N	N	N
Bank Fisher	N	N	N
Hiker	N	N	N
All Boat Traffic	N	N	N
All Foot Traffic	N	N	N
All Activities	N	N	N

Table 19. Probability values comparing the flight distances of eagles among three types of activities, perching, feeding, and standing, at Washington Eddy on the SRBENA for nine types of human activities.

	Eagle Activity Comparison		
Activity Type	Perch-Feed	Perch-Stand	Feed-Stand
Motorboat (Running)	0.000	0.000	N
Motorboat (Drifting)	0.000	0.000	N
Raft (Recreation)	0.020	N	N
Raft (Research)	0.000	0.000	N
Dory or Drift	0.000	0.000	N
Canoe	0.050	0.010	N
Kayak	N	N	N
Bank Fisher	0.001	N	N
Hiker	0.000	0.000	0.050
All Boat Traffic	0.000	0.000	N
All Foot Traffic	0.000	0.000	0.020
All Activities	0.000	0.000	N

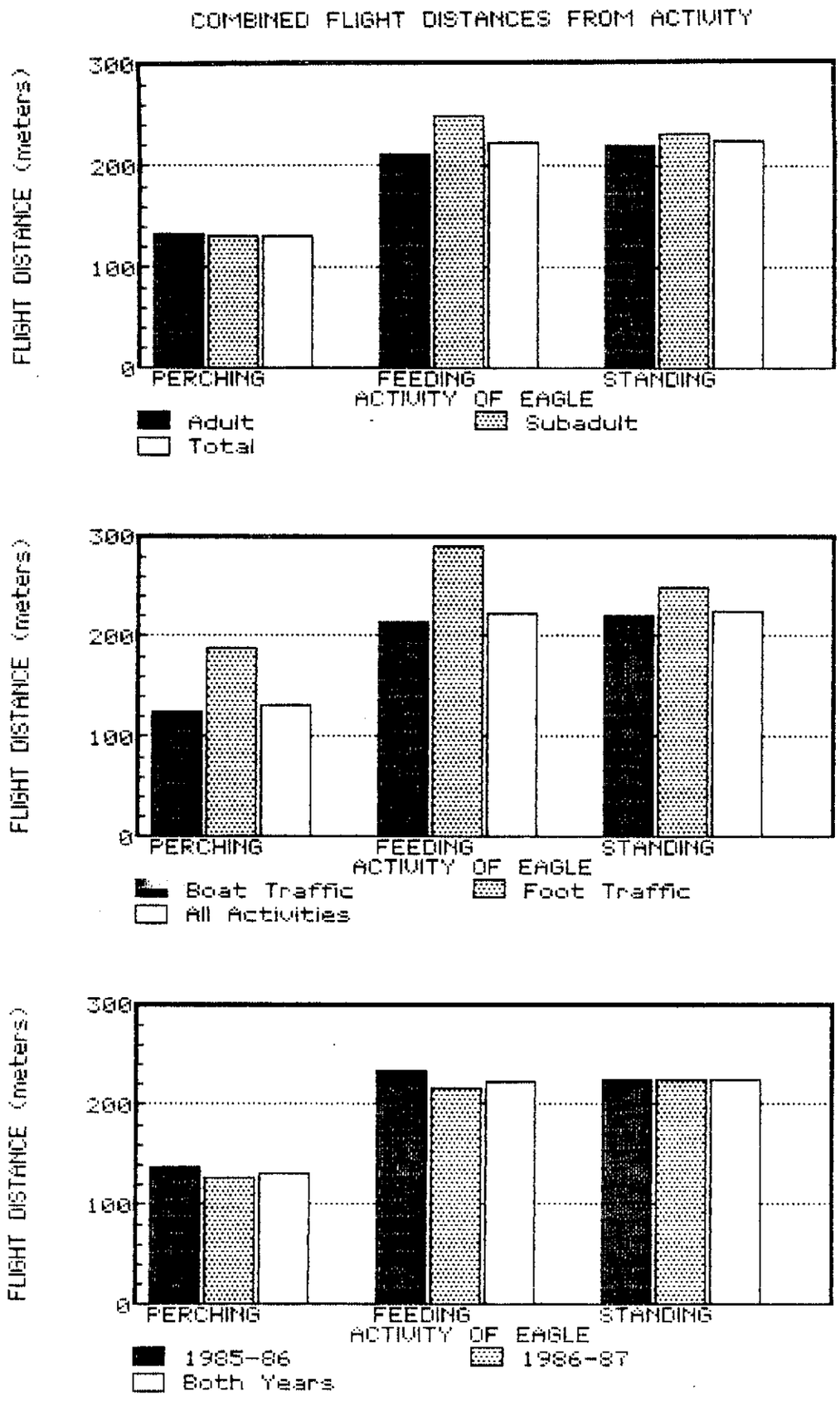


Figure 20. Combined flight distances (meters) of eagles while perching, feeding, and standing at Washington Eddy by age (upper), type of traffic (middle), and year (lower).

Table 20. Probability values comparing the flight distances of eagles between the two years (1985/86 and 1986/87) while perched in trees at Washington Eddy on the SRBENA for nine types of human activities.

	Yearly Comparison		
Activity Type	Adult	Subadult	All Ages
Motorboat (Running)	N	N	N
Motorboat (Drifting)	N	N	N
Raft (Recreation)	0.050	N	0.010
Raft (Research)	0.020	0.050	0.002
Dory or Drift	N	N	N
Canoe	N	N	N
Kayak	N	N	N
Bank Fisher	N	N	N
Hiker	N	0.020	0.050
All Boat Traffic	0.050	N	0.050
All Foot Traffic	N	0.050	0.010
All Activities	0.050	N	0.010

Table 21. Probability values comparing the flight distances of eagles between the two years (1985/86 and 1986/87) while feeding on the ground at Washington Eddy on the SRBENA for nine types of human activities.

	Yearly Comparison		
Activity Type	Adult	Subadult	All Ages
Motorboat (Running)	N	N	N
Motorboat (Drifting)	N	N	N
Raft (Recreation)	N	N	N
Raft (Research)	N	N	N
Dory or Drift	N	N	N
Canoe	0.010	N	N
Kayak	N	N	N
Bank Fisher	N	N	N
Hiker	0.020	0.050	0.001
All Boat Traffic	N	N	N
All Foot Traffic	N	N	0.020
All Activities	N	N	N

Table 22. Probability values comparing the flight distances of eagles between the two years (1985/86 and 1986/87) while standing on the ground at Washington Eddy on the SRBENA for nine types of human activities.

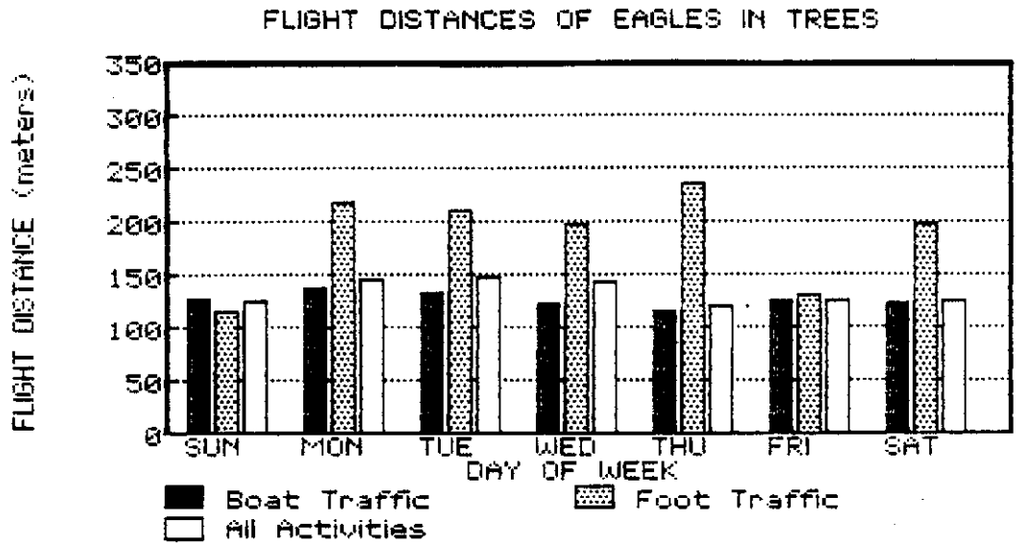
	Yearly Comparison		
Activity Type	Adult	Subadult	All Ages
Motorboat (Running)	N	N	N
Motorboat (Drifting)	N	N	0.010
Raft (Recreation)	N	N	N
Raft (Research)	N	N	N
Dory or Drift	0.050	0.001	0.001
Canoe	N	N	N
Kayak	N	N	N
Bank Fisher	N	N	N
Hiker	N	N	N
All Boat Traffic	N	N	N
All Foot Traffic	N	N	N
All Activities	N	N	N

Table 23. Flight distances (meters) of bald eagles of all ages from nine types of human activities while perching in trees and feeding or standing on the ground subdivided by day of week for 1985-86 and 1986-87 combined.

	Day of Week											
	Sun			Mon			Tue			Wed		
Activity Type	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
Perching in Trees												
Motorboat (Run)	38	143.4	94.59	42	166.7	92.86	66	161.2	102.1	54	128.0	76.51
Motorboat (Drift)	54	121.9	87.33	26	121.2	70.67	65	109.7	59.32	28	101.8	45.71
Raft (Recreate)	75	142.3	121.7	16	126.3	69.56	13	116.9	45.90	8	82.5	50.92
Raft (Research)	72	145.6	102.2	0	-	-	0	-	-	0	-	-
Dory/Drift	59	94.9	57.22	32	119.4	93.39	100	130.9	83.88	17	160.6	110.0
Canoe	13	89.2	45.55	0	-	-	2	110.0	14.14	8	148.8	104.7
Kayak	7	117.1	128.2	7	131.4	63.09	0	-	-	0	-	-
Bank Fisher	2	165.0	49.50	6	243.3	88.69	18	231.1	75.22	8	243.8	32.04
Hiker	27	113.7	85.18	8	201.3	97.75	46	202.6	69.78	35	187.4	97.18
All Boat Traffic	318	128.4	97.69	123	137.5	85.92	246	132.7	83.84	115	124.7	78.98
All Foot Traffic	29	117.2	83.66	14	219.3	92.94	64	210.6	71.91	43	197.9	91.15
All Activity	347	127.3	96.46	137	145.8	89.82	310	148.7	87.26	158	144.6	88.43
Feeding/Standing on Ground												
Motorboat (Run)	33	184.6	113.6	33	264.9	102.6	78	329.2	102.1	29	313.1	146.4
Motorboat (Drift)	12	198.3	125.6	10	166.0	77.06	37	234.3	69.10	3	133.3	57.74
Raft (Recreate)	26	141.2	109.6	1	230.0	-	17	168.2	103.0	4	135.0	47.26
Raft (Research)	66	213.6	110.4	0	-	-	0	-	-	0	-	-
Dory/Drift	37	150.0	106.0	32	167.8	94.72	38	208.2	120.7	8	275.0	84.18
Canoe	17	134.7	94.28	0	-	-	13	225.4	98.71	4	222.5	148.6
Kayak	0	-	-	1	150.0	-	0	-	-	0	-	-
Bank Fisher	0	-	-	0	-	-	5	306.0	26.08	2	200.0	0.0
Hiker	21	169.1	52.81	36	272.5	93.73	13	306.9	33.51	27	284.4	83.69
All Boat Traffic	191	178.4	112.7	77	209.7	105.6	183	262.3	116.5	48	273.1	140.0
All Foot Traffic	21	169.0	52.81	36	272.5	93.73	18	306.7	30.87	29	278.6	83.54
All Activity	212	177.5	108.2	113	229.7	105.7	201	266.5	112.0	77	275.2	121.2

Table 23. Continued.

Activity Type	Day of Week											
	Thu			Fri			Sat			Totals		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
Perching in Trees												
Motorboat (Run)	78	121.2	54.03	41	125.6	63.56	88	123.5	69.58	407	136.3	80.05
Motorboat (Drift)	69	127.1	78.76	23	117.8	80.17	61	122.6	86.75	326	118.6	75.35
Raft (Recreate)	33	101.8	49.27	5	194.0	25.10	151	119.3	105.4	301	123.6	100.7
Raft (Research)	85	105.1	52.36	0	-	-	0	-	-	157	123.6	81.49
Dory/Drift	25	113.6	95.69	68	124.0	101.8	54	145.7	92.50	355	125.0	89.31
Canoe	0	-	-	0	-	-	7	121.4	66.69	30	114.0	71.08
Kayak	0	-	-	0	-	-	9	90.0	40.00	23	110.9	80.45
Bank Fisher	6	233.3	60.55	12	110.8	76.33	2	110.0	98.99	54	200.9	87.10
Hiker	10	236.0	111.5	8	158.8	79.36	7	224.3	102.8	141	182.7	92.98
All Boat Traffic	290	115.0	64.48	137	126.0	86.78	370	124.1	91.33	1599	125.9	85.66
All Foot Traffic	16	235.0	93.17	20	130.0	79.21	9	198.9	108.1	195	187.7	91.53
All Activity	306	121.3	71.29	157	126.5	85.63	379	125.8	92.21	1794	132.5	88.38
Feeding/Standing on Ground												
Motorboat (Run)	72	255.8	107.3	64	275.5	105.6	67	269.1	124.9	376	275.7	118.6
Motorboat (Drift)	32	147.2	76.80	15	179.3	112.9	24	152.9	94.66	133	181.8	93.18
Raft (Recreate)	10	144.0	42.74	1	40.0	-	66	148.5	70.43	125	148.6	82.47
Raft (Research)	40	169.5	102.9	0	-	-	0	-	-	106	197.0	109.3
Dory/Drift	27	226.7	138.2	24	343.8	83.29	27	135.9	82.61	193	202.4	123.0
Canoe	0	-	-	0	-	-	3	163.3	115.0	37	178.4	108.2
Kayak	0	-	-	0	-	-	14	110.0	51.74	15	112.7	50.92
Bank Fisher	7	342.9	198.8	4	215.0	76.81	4	312.5	12.58	22	292.7	123.3
Hiker	3	300.0	0.0	10	325.0	35.36	5	204.0	61.48	115	262.6	87.42
All Boat Traffic	181	207.0	113.5	104	275.1	114.3	201	185.1	112.5	985	217.8	120.3
All Foot Traffic	10	330.0	163.6	14	293.6	69.90	9	252.2	72.25	137	267.4	94.23
All Activity	191	213.5	119.3	118	277.3	110.0	210	188.0	111.7	1122	224.0	118.5



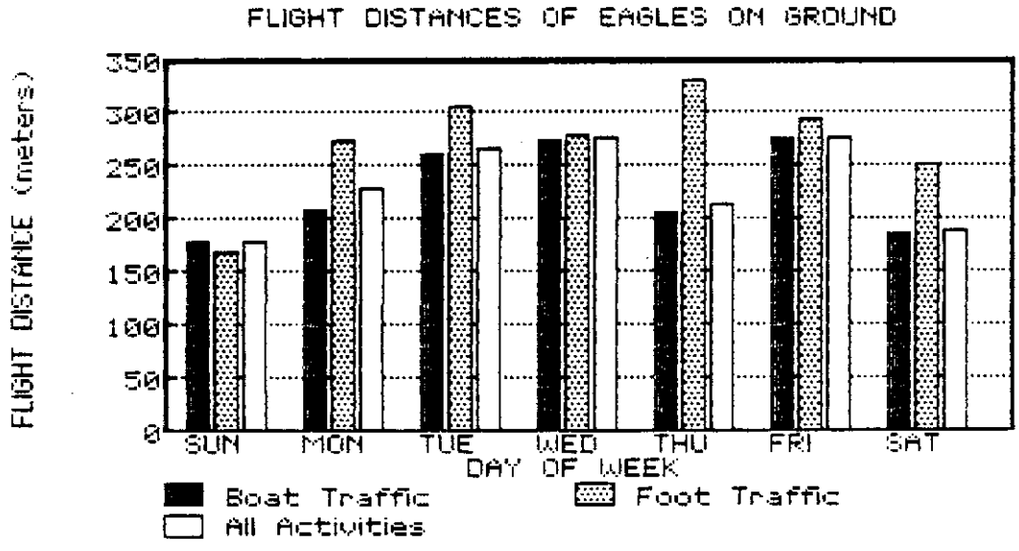


Figure 21. Flight distances (meters) of eagles from boat and foot traffic for the seven days of the week while perching in trees (upper) and feeding/standing on the ground (lower).

Table 24. Statistical probabilities comparing flight distances of bald eagles from foot and boat traffic during the seven days of the week while perching in trees (upper right half) and feeding or standing on the ground (lower left half) at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Sunday							
All Boats		N	N	N	N	N	N
All Foots		0.001	0.001	0.001	0.001	N	0.050
All Activity		0.050	0.010	0.050	N	N	N
Monday							
All Boats	0.050		N	N	N	N	N
All Foots	0.001		N	N	N	0.010	N
All Activity	0.001		N	N	0.010	N	0.050
Tuesday							
All Boats	0.001	0.001		N	N	N	N
All Foots	0.001	N		N	N	0.001	N
All Activity	0.001	0.010		N	0.001	0.050	0.001
Wednesday							
All Boats	0.001	0.010	N		N	N	N
All Foots	0.001	N	N		N	0.010	N
All Activity	0.001	0.010	N		0.010	N	0.050
Thursday							
All Boats	0.050	N	0.001	0.001		N	N
All Foots	0.001	N	N	N		0.001	N
All Activity	0.010	N	0.001	0.001		N	N
Friday							
All Boats	0.001	0.001	N	N	0.001		N
All Foots	0.001	N	N	N	N		0.050
All Activity	0.001	0.010	N	N	0.001		N
Saturday							
All Boats	N	N	0.001	0.001	N	0.001	
All Foots	0.050	N	N	N	0.050	N	
All Activity	N	0.010	0.001	0.001	0.050	0.001	

Table 25. Categorical percentages of flight distances of bald eagles perched in trees and feeding or standing on the ground from nine types of human activities at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

		Flight distances (meters)										
Activity Type	n	0-50	51-100	101-150	151-200	201-250	251-300	301-350	351-400	401-450	451-500	>500
PERCHED IN TREES												
Motorboat (Run)	407	9	35	29	14	6	3	1	1	1	0	0
Motorboat (Drift)	326	14	45	21	10	5	3	1	1	1	0	0
Raft (Recreation)	301	19	43	17	7	6	3	0	1	1	1	1
Raft (Research)	157	19	33	29	8	1	5	3	3	0	0	0
Dory or Drift	355	16	39	21	12	4	3	1	1	1	1	0
Canoe	30	23	33	27	7	3	7	0	0	0	0	0
Kayak	23	17	52	13	9	4	0	0	4	0	0	0
Bank Fisher	54	9	9	9	26	22	20	4	0	0	0	0
Hiker	141	5	21	20	18	16	15	2	3	1	1	0
All Boat Traffic	1599	15	40	23	11	5	3	1	1	1	1	0
All Foot Traffic	195	6	17	17	20	17	16	3	2	1	1	0
All Activities	1794	14	37	22	12	6	5	1	1	1	1	0
FEEDING OR STANDING ON GROUND												
Motorboat (Run)	376	1	9	12	11	14	16	13	13	6	4	1
Motorboat (Drift)	133	5	22	20	24	10	11	5	2	2	1	0
Raft (Recreation)	125	12	26	19	23	10	4	5	0	1	0	0
Raft (Research)	106	8	24	10	9	26	7	9	6	1	1	0
Dory or Drift	193	12	20	11	11	10	14	8	9	4	0	1
Canoe	37	14	19	14	14	11	22	5	3	0	0	0
Kayak	15	0	47	40	7	7	0	0	0	0	0	0
Bank Fisher	22	0	9	0	14	9	41	18	0	0	0	9
Hiker	115	0	1	20	11	12	21	31	2	2	0	0
All Boat Traffic	985	6	18	14	14	13	13	9	8	4	2	1
All Foot Traffic	137	0	2	17	12	12	24	29	1	1	0	1
All Activities	1122	6	16	14	14	13	14	11	7	3	1	1

Table 26. Cumulative percentages of flight distances of bald eagles perched in trees and feeding or standing on the ground from nine types of human activities at Washington Eddy on the SRBEMA during 1985-86 and 1986-87 combined.

		Flight distances (meters)										
Activity Type	n	0-50	51-100	101-150	151-200	201-250	251-300	301-350	351-400	401-450	451-500	>500
PERCHED IN TREES												
Motorboat (Run)	407	9	45	73	88	93	97	98	99	100	100	100
Motorboat (Drift)	326	14	59	79	89	95	98	98	99	100	100	100
Raft (Recreation)	301	19	62	79	86	92	95	95	96	97	99	100
Raft (Research)	157	19	52	81	89	90	94	98	100	100	100	100
Dory or Drift	355	16	55	77	89	92	96	97	98	99	100	100
Canoe	30	23	57	83	90	93	100	100	100	100	100	100
Kayak	23	17	70	83	91	96	96	96	100	100	100	100
Bank Fisher	54	9	19	28	54	76	96	100	100	100	100	100
Hiker	141	5	26	46	63	79	94	96	99	99	100	100
All Boat Traffic	1599	15	54	77	88	93	96	97	98	99	100	100
All Foot Traffic	195	6	24	41	61	78	94	97	99	99	100	100
All Activities	1794	14	51	73	85	91	96	97	98	99	100	100
FEEDING OR STANDING ON GROUND												
Motorboat (Run)	376	1	10	22	33	47	63	76	89	95	99	100
Motorboat (Drift)	133	5	26	46	70	80	91	96	98	99	100	100
Raft (Recreation)	125	12	38	57	80	90	94	99	99	100	100	100
Raft (Research)	106	8	31	42	51	77	84	92	98	99	100	100
Dory or Drift	193	12	32	44	55	65	79	87	95	99	99	100
Canoe	37	14	32	46	59	70	92	97	100	100	100	100
Kayak	15	0	47	87	93	100	100	100	100	100	100	100
Bank Fisher	22	0	9	9	23	32	73	91	91	91	91	100
Hiker	115	0	1	21	32	44	65	97	98	100	100	100
All Boat Traffic	985	6	24	38	52	65	78	87	94	98	99	100
All Foot Traffic	137	0	2	19	31	42	67	96	97	99	99	100
All Activities	1122	6	21	36	49	63	76	88	95	98	99	100

Table 27. Least squares linear regression of flight distances (meters) of eagles by sequence of occurrence of nine types of human activities while perched in trees at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

Activity Type	n	Regression Equation	r	F	P
Motorboat (Run)					
Adult	260	Y=139.6 - 0.251X	-0.020	0.1	N
Subadult	147	Y=135.2 - 0.368X	-0.045	0.3	N
All Ages	407	Y=138.2 - 0.335X	-0.031	0.4	N
Motorboat (Drift)					
Adult	223	Y=116.1 + 0.080X	0.004	0.0	N
Subadult	103	Y=115.9 + 0.765X	0.146	2.2	N
All Ages	326	Y=116.0 + 0.301X	0.053	0.9	N
Raft (Recreate)					
Adult	193	Y=133.7 - 0.586X	-0.066	0.8	N
Subadult	108	Y=118.6 - 0.098X	-0.014	0.0	N
All Ages	301	Y=127.6 - 0.362X	-0.045	0.6	N
Raft (Research)					
Adult	90	Y=131.2 - 2.826X	-0.137	0.0	N
Subadult	67	Y=132.2 - 0.825X	-0.035	0.1	N
All Ages	157	Y=131.5 - 1.976X	-0.089	1.3	N
Dory/Drift					
Adult	223	Y=126.2 - 0.631X	-0.077	1.3	N
Subadult	132	Y=135.7 - 1.201X	-0.146	2.8	N
All Ages	355	Y=129.9 - 0.851X	-0.103	3.8	N
Canoe					
Adult	23	Y=116.2 + 0.355X	0.116	0.3	N
Subadult	7	Y= 93.5 - 0.384X	-0.197	0.2	N
All Ages	30	Y=111.7 + 0.113X	0.045	0.0	N
Kayak					
Adult	19	Y=137.8 - 1.212X	-0.314	1.9	N
Subadult	4	Y= 83.5 - 0.479X	-0.142	0.0	N
All Ages	23	Y=128.7 - 1.132X	-0.290	1.9	N
Bank Fisher					
Adult	41	Y=207.2 - 1.603X	-0.285	3.5	N
Subadult	13	Y=186.1 + 10.05X	0.182	0.4	N
All Ages	54	Y=208.3 - 1.580X	-0.245	3.3	N
Hiker					
Adult	91	Y=184.5 + 1.428X	0.163	2.4	N
Subadult	50	Y=159.5 + 0.888X	0.061	0.2	N
All Ages	141	Y=174.5 + 1.488X	0.148	3.2	N

Table 27. Continued.

Activity Type	n	Regression Equation	r	F	P
All Boat Traffic					
Adult	1031	Y=128.6 - 0.364X	-0.048	2.4	N
Subadult	568	Y=128.2 - 0.325X	-0.046	1.2	N
All Ages	1599	Y=128.4 - 0.350X	-0.047	3.6	N
All Foot Traffic					
Adult	132	Y=195.3 - 0.052X	-0.007	0.0	N
Subadult	63	Y=170.4 + 0.552X	0.034	0.1	N
All Ages	195	Y=187.2 + 0.098X	0.011	0.0	N
All Activities					
Adult	1163	Y=136.7 - 0.415X	-0.053	3.3	N
Subadult	631	Y=133.4 - 0.421X	-0.056	2.0	N
All Ages	1794	Y=135.6 - 0.414X	-0.054	5.2	0.025

Table 28. Least squares linear regression of flight distances (meters) of eagles by sequence of occurrence of nine types of human activities while feeding or standing on the ground at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

Activity Type	n	Regression Equation	r	F	P
Motorboat (Run)					
Adult	256	Y=279.8 - 1.836X	-0.203	10.9	0.002
Subadult	120	Y=283.8 + 1.230X	0.071	0.6	N
All Ages	376	Y=284.1 - 1.559X	-0.152	8.9	0.005
Motorboat (Drift)					
Adult	87	Y=187.2 - 1.133X	-0.257	6.0	0.025
Subadult	46	Y=208.5 - 1.322X	-0.169	1.3	N
All Ages	133	Y=194.7 - 1.203X	-0.222	6.8	0.025
Raft (Recreate)					
Adult	84	Y=141.0 - 0.557X	-0.092	0.7	N
Subadult	41	Y=193.3 - 1.487X	-0.179	1.3	N
All Ages	125	Y=156.2 - 0.707X	-0.103	1.3	N
Raft (Research)					
Adult	78	Y=206.1 - 4.591X	-0.099	0.7	N
Subadult	28	Y=211.7 + 0.353X	0.016	0.0	N
All Ages	106	Y=200.8 - 1.077X	-0.033	0.1	N
Dory/Drift					
Adult	136	Y=196.1 - 1.224X	-0.087	1.0	N
Subadult	57	Y=236.1 - 0.120X	-0.003	0.0	N
All Ages	193	Y=211.6 - 1.743X	-0.104	2.1	N
Canoe					
Adult	24	Y=200.9 - 2.321X	-0.463	6.0	0.025
Subadult	13	Y=331.3 - 3.783X	-0.887	40.5	0.000
All Ages	37	Y=229.0 - 2.249X	-0.478	10.4	0.005
Kayak					
Adult	9	Y=146.3 - 3.482X	-0.608	4.1	N
Subadult	6	Y=218.7 - 6.250X	-0.347	0.5	N
All Ages	15	Y=180.5 - 4.823X	-0.511	4.6	0.050
Bank Fisher					
Adult	17	Y=267.0 + 5.652X	0.149	0.3	N
Subadult	5	Y=309.5 - 11.45X	-0.400	0.6	N
All Ages	22	Y=272.1 + 4.583X	0.130	0.3	N
Hiker					
Adult	80	Y=272.1 - 0.760X	-0.181	2.6	N
Subadult	35	Y=249.2 + 1.390X	0.009	0.0	N
All Ages	115	Y=265.9 - 0.692X	-0.131	2.0	N

Table 28. Continued.

Activity Type	n	Regression Equation	r	F	P
All Boat Traffic					
Adult	674	Y=223.3 - 1.977X	-0.219	33.9	0.000
Subadult	311	Y=252.5 - 2.029X	-0.184	10.8	0.002
All Ages	985	Y=232.6 - 2.000X	-0.208	44.5	0.000
All Foot Traffic					
Adult	97	Y=276.8 - 0.727X	-0.138	1.9	N
Subadult	40	Y=257.7 - 1.450X	-0.014	0.0	N
All Ages	137	Y=270.5 - 0.652X	-0.106	1.5	N
All Activities					
Adult	771	Y=229.5 - 1.769X	-0.208	34.7	0.000
Subadult	351	Y=253.4 - 2.061X	-0.182	12.0	0.001
All Ages	1122	Y=236.9 - 1.846X	-0.201	47.2	0.000

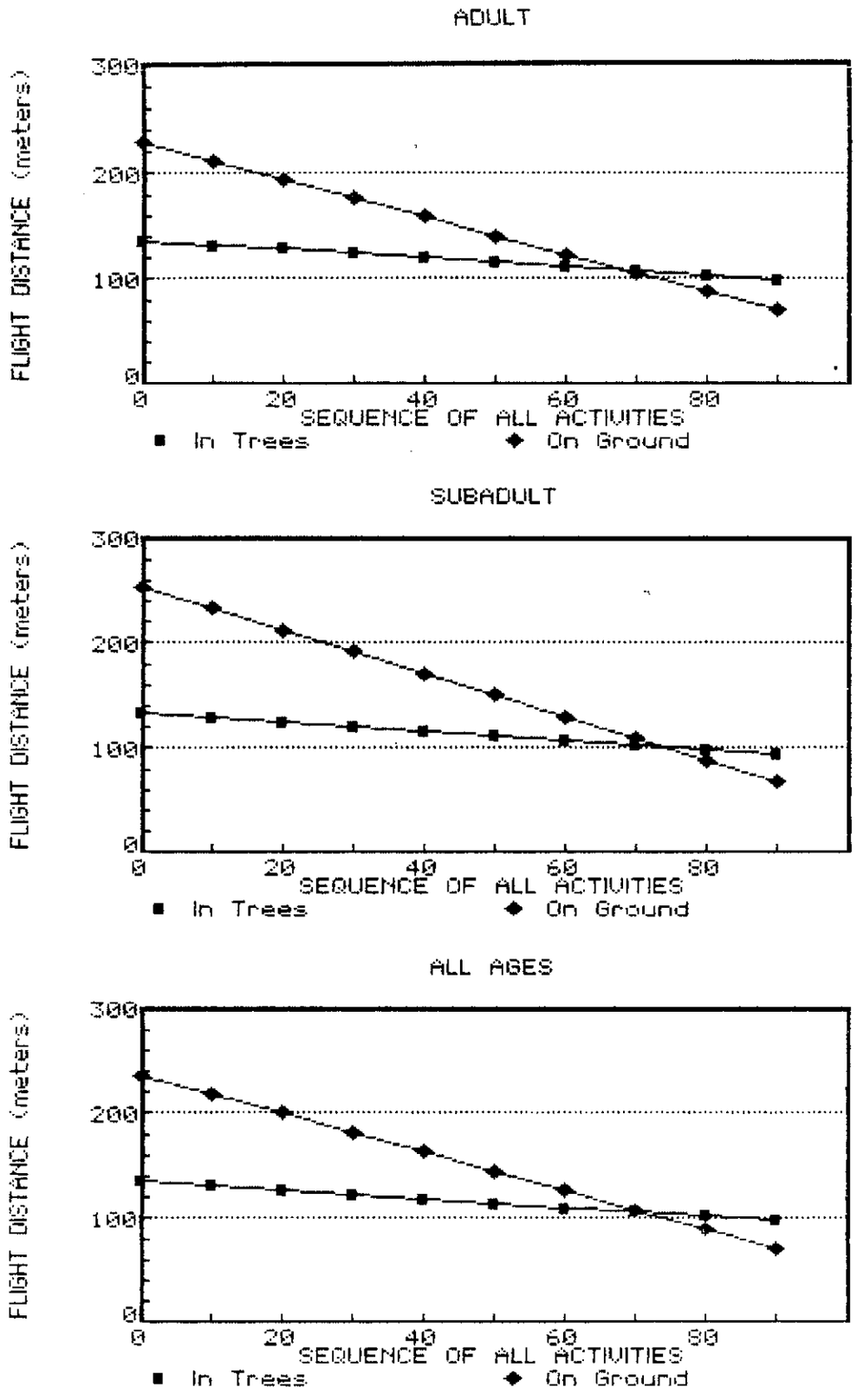


Figure 22. Relationship between the sequence (number) of recreational activities and the flight distances (meters) of eagles for adults (upper), subadults (middle), and all ages (lower) during 1985-86 and 1986-87 combined.

Table 29. Least squares linear regression of flight distances (meters) of eagles by hour of day (X) for nine types of human activities while perched in trees at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

Activity Type	n	Regression Equation	r	F	P
Motorboat (Run)					
Adult	260	Y= 94.9 + 3.772X	0.090	2.1	N
Subadult	147	Y= 79.2 + 4.675X	0.119	2.1	N
All Ages	407	Y= 89.8 + 4.049X	0.098	4.0	0.050
Motorboat (Drift)					
Adult	223	Y=138.0 - 1.812X	-0.051	0.6	N
Subadult	103	Y= 63.4 + 5.054X	0.132	1.8	N
All Ages	326	Y=120.1 - 0.126X	-0.004	0.0	N
Raft (Recreate)					
Adult	193	Y= 71.3 + 4.563X	0.117	2.6	N
Subadult	108	Y= 85.5 + 2.550X	0.048	0.2	N
All Ages	301	Y= 74.3 + 4.000X	0.095	2.7	N
Raft (Research)					
Adult	90	Y=159.5 - 3.308X	-0.088	0.7	N
Subadult	67	Y=217.2 - 7.577X	-0.168	1.8	N
All Ages	157	Y=185.5 - 5.213X	-0.127	2.6	N
Dory/Drift					
Adult	223	Y=138.1 - 1.479X	-0.060	0.8	N
Subadult	132	Y=174.8 - 4.219X	-0.130	2.2	N
All Ages	355	Y=147.8 - 2.137X	-0.080	2.3	N
Canoe					
Adult	23	Y=189.4 - 4.580X	-0.098	0.2	N
Subadult	7	Y= 0.7 + 6.781X	0.360	0.7	N
All Ages	30	Y= 57.7 + 4.019X	0.118	0.4	N
Kayak					
Adult	19	Y=338.2 - 16.11X	-0.243	1.1	N
Subadult	4	Y=163.6 - 6.140X	-0.207	0.1	N
All Ages	23	Y=336.9 - 16.46X	-0.253	1.4	N
Bank Fisher					
Adult	41	Y=177.4 + 2.022X	0.104	0.4	N
Subadult	13	Y=252.8 - 4.782X	-0.244	0.7	N
All Ages	54	Y=198.3 + 0.256X	0.013	0.0	N
Hiker					
Adult	91	Y=182.8 + 0.880X	0.037	0.1	N
Subadult	50	Y= 79.0 + 7.141X	0.257	3.4	N
All Ages	141	Y=149.4 + 2.784X	0.110	1.7	N

Table 29. Continued.

Activity Type	n	Regression Equation	r	F	P
All Boat Traffic					
Adult	1031	Y=123.3 + 0.215X	0.007	0.0	N
Subadult	568	Y=139.2 - 1.155X	-0.030	0.5	N
All Ages	1599	Y=127.4 - 0.143X	-0.004	0.0	N
All Foot Traffic					
Adult	132	Y=181.6 + 1.155X	0.053	0.4	N
Subadult	63	Y=154.2 + 1.629X	0.007	0.3	N
All Ages	195	Y=171.9 + 1.378X	0.060	0.7	N
All Activities					
Adult	1163	Y=129.2 + 0.377X	0.012	0.2	N
Subadult	631	Y=138.8 - 0.724X	-0.020	0.3	N
All Ages	1794	Y=131.4 + 0.092X	0.003	0.0	N

Table 30. Least squares linear regression of flight distances (meters) of eagles by hour of day (X) for nine types of human activities while feeding or standing on the ground at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

Activity Type	n	Regression Equation	r	F	P
Motorboat (Run)					
Adult	256	Y=322.3 - 4.761X	-0.074	1.4	N
Subadult	120	Y=255.9 + 2.989X	0.052	0.3	N
All Ages	376	Y=297.6 - 1.960X	-0.031	0.4	N
Motorboat (Drift)					
Adult	87	Y=117.6 + 5.333X	0.209	3.9	N
Subadult	46	Y=115.8 + 7.053X	0.181	1.5	N
All Ages	133	Y=115.2 + 6.113X	0.204	5.7	0.025
Raft (Recreate)					
Adult	84	Y=134.9 + 0.033X	0.001	0.0	N
Subadult	41	Y=221.5 - 3.758X	-0.109	0.5	N
All Ages	125	Y=155.9 - 0.608X	-0.020	0.0	N
Raft (Research)					
Adult	78	Y=289.0 - 8.606X	-0.151	1.8	N
Subadult	28	Y= 69.4 + 12.95X	0.187	0.9	N
All Ages	106	Y=248.4 - 4.549X	-0.076	0.6	N
Dory/Drift					
Adult	136	Y=158.9 + 2.889X	0.091	1.1	N
Subadult	57	Y= 72.7 + 15.44X	0.284	4.8	0.050
All Ages	193	Y=150.4 + 5.036X	0.138	3.7	N
Canoe					
Adult	24	Y=-56.1 + 14.49X	0.277	1.8	N
Subadult	13	Y=390.3 - 11.65X	-0.125	0.2	N
All Ages	37	Y=-17.6 + 13.03X	0.220	1.8	N
Kayak					
Adult	9	Y=290.1 - 14.10X	-0.444	1.7	N
Subadult	6	Y=406.7 - 20.83X	-0.370	0.5	N
All Ages	15	Y=412.3 - 22.26X	-0.533	5.2	0.050
Bank Fisher					
Adult	17	Y=381.0 - 9.148X	-0.320	1.5	N
Subadult	5	Y=332.4 - 5.562X	-0.561	1.4	N
All Ages	22	Y=368.0 - 8.141X	-0.311	2.1	N
Hiker					
Adult	80	Y=293.7 - 2.240X	-0.048	0.2	N
Subadult	35	Y= -181 + 40.14X	0.560	15.1	0.000
All Ages	115	Y=184.4 + 6.849X	0.135	2.1	N

Table 30. Continued.

Activity Type	n	Regression Equation	r	F	P
All Boat Traffic					
Adult	674	Y=214.3 - 0.496X	-0.012	0.1	N
Subadult	311	Y=210.6 + 2.390X	0.048	0.7	N
All Ages	985	Y=212.8 + 0.453X	0.010	0.1	N
All Foot Traffic					
Adult	97	Y=350.0 - 6.873X	-0.192	3.6	N
Subadult	40	Y=173.1 + 7.781X	0.190	1.4	N
All Ages	137	Y=301.1 - 3.037X	-0.082	0.9	N
All Activities					
Adult	771	Y=229.2 - 1.117X	-0.026	0.5	N
Subadult	351	Y=210.0 + 2.639X	0.055	1.0	N
All Ages	1122	Y=224.8 - 0.072X	-0.002	0.0	N

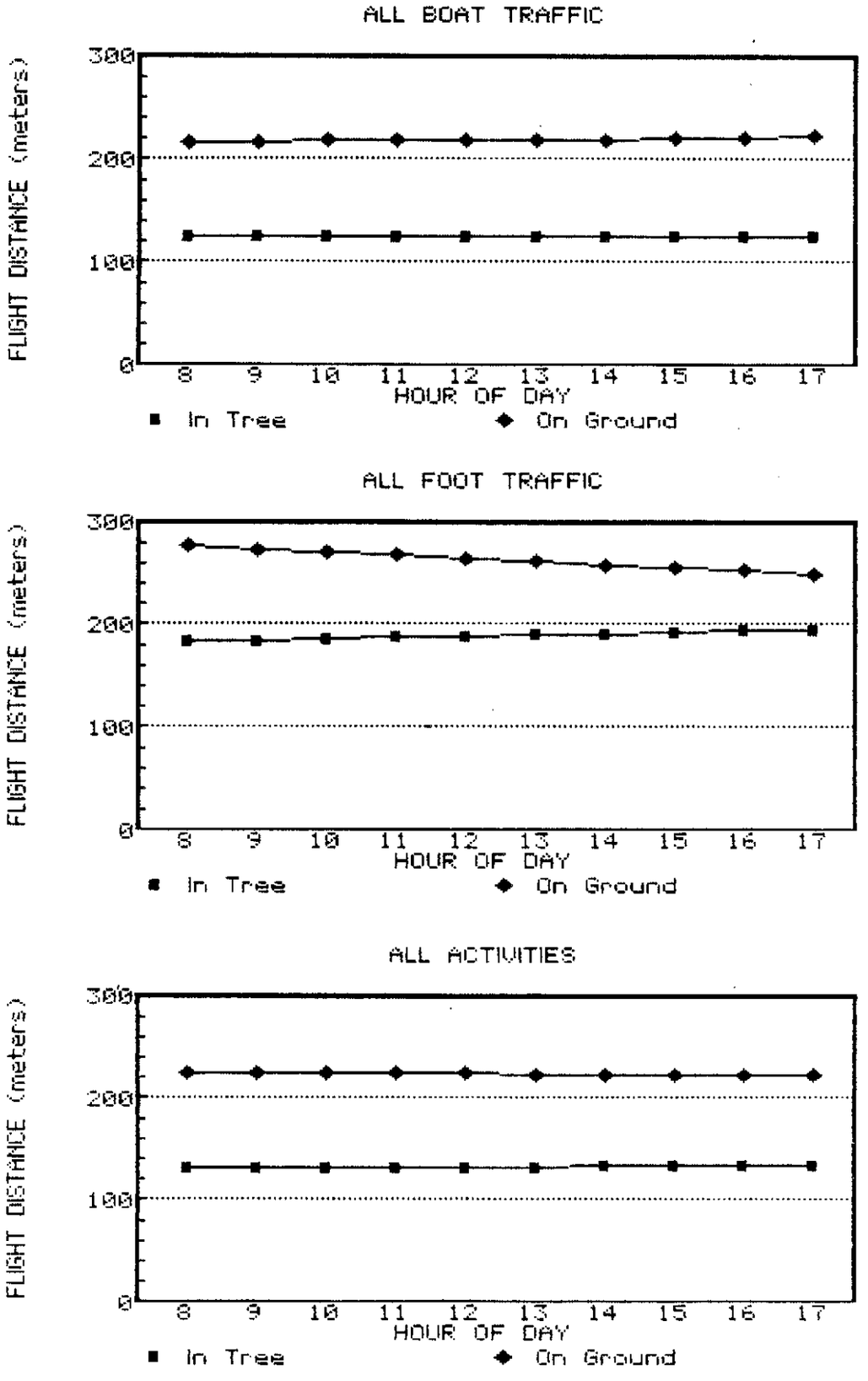


Figure 23. Relationship between the hour of day and the flight distances (meters) of eagles in trees and on the ground from boat traffic (upper), foot traffic (middle), and all human activities (lower).

Table 31. Least squares linear regression of flight distances (meters) of eagles by day of season (84 days) for nine types of human activities while perched in trees at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

Activity Type	n	Regression Equation	r	F	P
Motorboat (Run)					
Adult	260	Y=128.0 + 0.306X	0.075	1.4	N
Subadult	147	Y=123.2 + 0.245X	0.073	0.8	N
All Ages	407	Y=126.9 + 0.263X	0.069	1.9	N
Motorboat (Drift)					
Adult	223	Y=105.2 + 0.307X	0.076	1.3	N
Subadult	103	Y= 90.6 + 0.717X	0.168	2.9	N
All Ages	326	Y=101.7 + 0.424X	0.105	3.6	N
Raft (Recreate)					
Adult	193	Y=136.6 - 0.248X	-0.046	0.4	N
Subadult	108	Y=147.2 - 0.735X	-0.144	2.3	N
All Ages	301	Y=140.5 - 0.432X	-0.081	2.0	N
Raft (Research)					
Adult	90	Y= 96.6 + 0.756X	0.185	3.1	N
Subadult	67	Y= 84.5 + 1.447X	0.304	6.6	0.025
All Ages	157	Y= 91.4 + 1.054X	0.240	9.4	0.002
Dory/Drift					
Adult	223	Y= 78.7 + 1.086X	0.231	12.5	0.000
Subadult	132	Y=139.5 - 0.225X	-0.053	0.4	N
All Ages	355	Y=101.9 + 0.552X	0.123	5.4	0.025
Canoe					
Adult	23	Y=147.8 - 0.754X	-0.241	1.3	N
Subadult	7	Y=198.6 - 2.101X	-0.443	1.2	N
All Ages	30	Y=151.3 - 0.982X	-0.321	3.2	N
Kayak					
Adult	19	Y=137.6 - 0.510X	-0.123	0.3	N
Subadult	4	Y= 84.3 - 0.258X	-0.139	0.0	N
All Ages	23	Y=121.1 - 0.281X	-0.071	0.1	N
Bank Fisher					
Adult	41	Y=225.0 - 1.211X	-0.162	1.1	N
Subadult	13	Y=244.5 - 1.497X	-0.337	1.4	N
All Ages	54	Y=230.5 - 1.321X	-0.213	2.5	N
Hiker					
Adult	91	Y=166.3 + 0.684X	0.153	2.1	N
Subadult	50	Y=124.3 + 0.970X	0.214	2.3	N
All Ages	141	Y=151.9 + 0.773X	0.170	4.1	0.050

Table 31. Continued.

Activity Type	n	Regression Equation	r	F	P
All Boat Traffic					
Adult	1031	Y=114.1 + 0.318X	0.072	5.4	0.025
Subadult	568	Y=121.8 + 0.098X	0.024	0.3	N
All Ages	1599	Y=116.7 + 0.238X	0.055	4.9	0.050
All Foot Traffic					
Adult	132	Y=183.9 + 0.325X	0.072	0.7	N
Subadult	63	Y=166.7 + 0.158X	0.036	0.1	N
All Ages	195	Y=179.6 + 0.234X	0.052	0.5	N
All Activities					
Adult	1163	Y=123.7 + 0.273X	0.060	4.2	0.050
Subadult	631	Y=128.0 + 0.062X	0.015	0.1	N
All Ages	1794	Y=125.4 + 0.189X	0.043	3.3	N

Table 32. Least squares linear regression of flight distances (meters) of eagles by day of season (84 days) for nine types of human activities while feeding or standing on the ground at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

Activity Type	n	Regression Equation	r	F	P
Motorboat (Run)					
Adult	256	Y=252.2 + 0.570X	0.072	1.3	N
Subadult	120	Y=287.4 + 0.062X	0.011	0.0	N
All Ages	376	Y=263.2 + 0.402X	0.057	1.2	N
Motorboat (Drift)					
Adult	87	Y=129.0 + 1.243X	0.208	3.8	N
Subadult	46	Y=106.4 + 2.393X	0.331	5.4	0.025
All Ages	133	Y=118.7 + 1.712X	0.262	9.7	0.002
Raft (Recreate)					
Adult	84	Y=161.0 - 0.684X	-0.135	1.5	N
Subadult	41	Y=293.7 - 2.809X	-0.406	7.7	0.010
All Ages	125	Y=188.0 - 1.006X	-0.177	4.0	0.050
Raft (Research)					
Adult	78	Y=157.2 + 1.178X	0.148	1.7	N
Subadult	28	Y=247.0 - 0.971X	-0.164	0.7	N
All Ages	106	Y=184.6 + 0.407X	0.057	0.3	N
Dory/Drift					
Adult	136	Y=101.4 + 2.353X	0.331	16.5	0.000
Subadult	57	Y=76.62 + 3.599X	0.568	26.2	0.000
All Ages	193	Y= 86.4 + 2.966X	0.436	44.8	0.000
Canoe					
Adult	24	Y=337.7 - 4.321X	-0.589	11.7	0.002
Subadult	13	Y=383.2 - 4.563X	-0.912	54.0	0.000
All Ages	37	Y=359.3 - 4.541X	-0.691	32.1	0.000
Kayak					
Adult	9	Y= 70.0 + 0.968X	0.445	1.7	N
Subadult	6	Y=81.43 + 1.429X	0.347	0.5	N
All Ages	15	Y= 64.8 + 1.526X	0.533	5.2	0.050
Bank Fisher					
Adult	17	Y=325.1 - 1.541X	-0.119	0.2	N
Subadult	5	Y=280.2 + 0.114X	0.020	0.0	N
All Ages	22	Y=313.8 - 1.152X	-0.097	0.2	N
Hiker					
Adult	80	Y=286.2 - 0.606X	-0.083	0.5	N
Subadult	35	Y=280.9 - 0.858X	-0.119	0.5	N
All Ages	115	Y=287.2 - 0.771X	-0.107	1.3	N

Table 32. Continued.

Activity Type	n	Regression Equation	r	F	P
All Boat Traffic					
Adult	674	Y=202.6 + 0.184X	0.024	0.4	N
Subadult	311	Y=226.6 + 0.302X	0.047	0.6	N
All Ages	985	Y=206.7 + 0.323X	0.045	2.0	N
All Foot Traffic					
Adult	97	Y=300.6 - 0.979X	-0.125	1.5	N
Subadult	40	Y=285.9 - 0.955X	-0.147	0.8	N
All Ages	137	Y=298.0 - 1.030X	-0.140	2.7	N
All Activities					
Adult	771	Y=218.3 - 0.049X	-0.006	0.0	N
Subadult	351	Y=233.2 + 0.182X	0.028	0.3	N
All Ages	1122	Y=219.9 + 0.119X	0.017	0.3	N

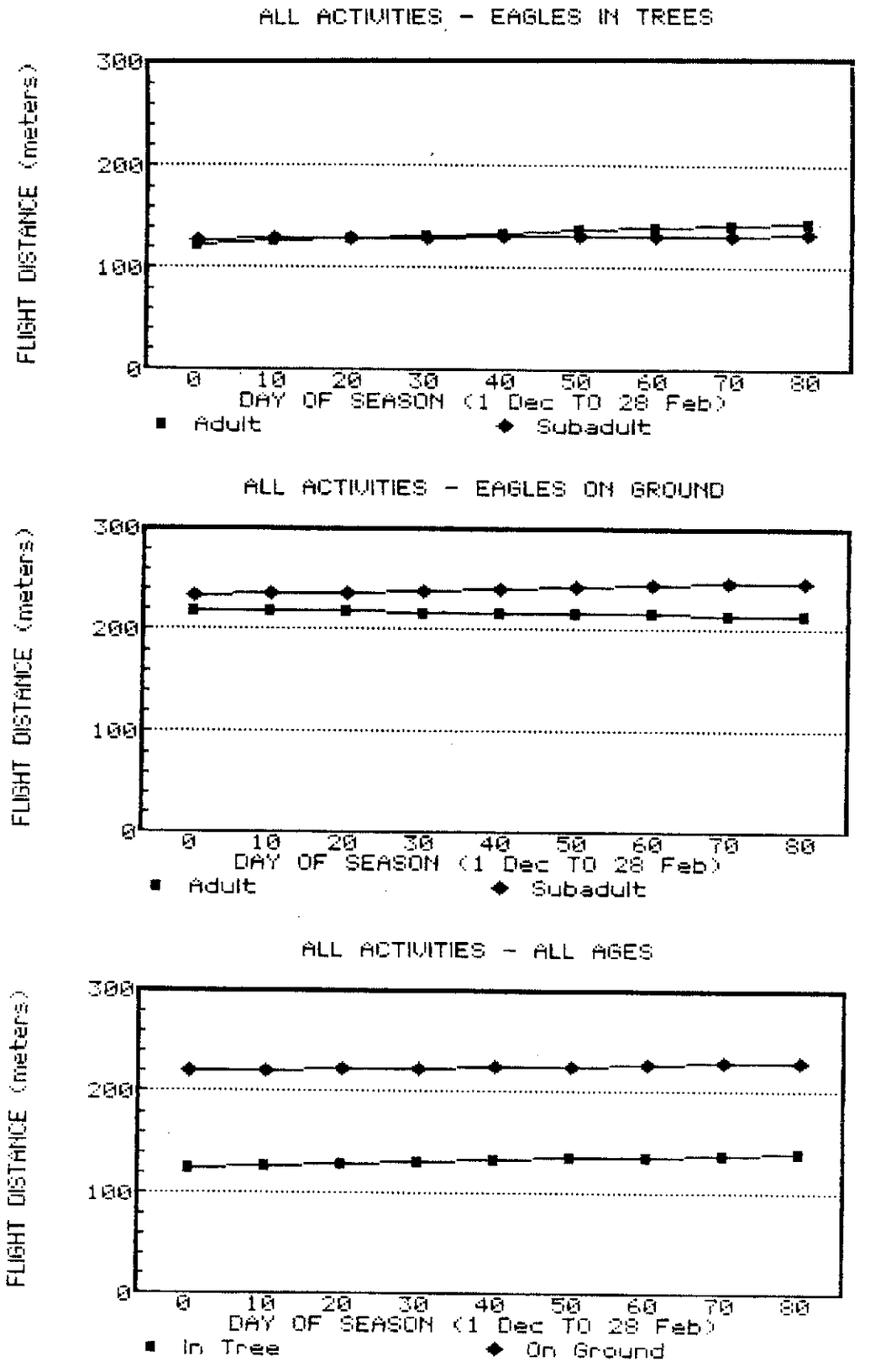


Figure 24. Relationship between the day of season and the flight distances (meters) of adult and subadult eagles in trees (upper), on the ground (middle), and all ages (lower).

Table 33. Flushing responses (% flushed/100) of eagles to nine types of human activities while perched in trees at Washington Eddy on the SRBENA.

	Adult		Subadult		All Ages	
Activity & Year	n	Mean	n	Mean	n	Mean
Motorboat (Running)						
1985-86	586	0.218	351	0.234	937	0.224
1986-87	891	0.177	274	0.299	1165	0.206
Both Years	1477	0.194	625	0.262	2102	0.214
Motorboat (Drifting)						
1985-86	252	0.290	190	0.326	442	0.305
1986-87	617	0.292	167	0.347	784	0.304
Both Years	869	0.291	357	0.336	1226	0.304
Raft (Recreation)						
1985-86	548	0.190	196	0.270	744	0.211
1986-87	706	0.163	378	0.175	1084	0.167
Both Years	1254	0.175	574	0.207	1828	0.185
Raft (Research)						
1985-86	132	0.432	88	0.534	220	0.473
1986-87	173	0.254	74	0.378	247	0.292
Both Years	305	0.311	162	0.463	467	0.377
Dory or Drift						
1985-86	266	0.346	150	0.393	416	0.363
1986-87	451	0.381	216	0.431	667	0.397
Both Years	717	0.368	366	0.415	1083	0.384
Canoe						
1985-86	124	0.057	45	0.111	169	0.071
1986-87	177	0.113	107	0.019	284	0.078
Both Years	301	0.090	152	0.046	453	0.075
Kayak						
1985-86	136	0.037	48	0.021	184	0.033
1986-87	135	0.096	59	0.051	194	0.083
Both Years	271	0.066	107	0.037	378	0.058
Bank Fisher						
1985-86	32	0.656	12	0.500	44	0.614
1986-87	38	0.605	9	0.778	47	0.638
Both Years	70	0.629	21	0.619	91	0.626
Hiker						
1985-86	81	0.469	38	0.553	119	0.496
1986-87	77	0.779	42	0.833	119	0.798
Both Years	158	0.620	80	0.700	238	0.647

Table 33. Continued.

Activity & Year	Adult n	Adult Mean	Subadult n	Subadult Mean	All Ages n	All Ages Mean
All Boat Traffic						
1985-86	2044	0.228	1068	0.289	3112	0.249
1986-87	3150	0.223	1275	0.260	4425	0.234
Both Years	5194	0.225	2343	0.274	7537	0.240
All Foot Traffic						
1985-86	113	0.522	50	0.540	163	0.528
1986-87	115	0.722	51	0.824	166	0.753
Both Years	228	0.623	101	0.683	329	0.641
All Activities						
1985-86	2157	0.243	1118	0.301	3275	0.263
1986-87	3265	0.241	1326	0.283	4591	0.253
Both Years	5422	0.242	2444	0.291	7866	0.257

Table 34. Statistical probabilities comparing flushing responses of bald eagles to nine types of human activities while perched in trees at Washington Eddy on the SRBENA in 1985-86.

	Motorboat (Run)	Motorboat (Drift)	Raft (Rec)	Raft (Res)	Dory or Drift	Canoe	Kayak	Bank Fisher	Hiker
Motorboat (Run)									
Adult									
Subadult									
All Ages									
Motorboat (Drift)									
Adult	0.033								
Subadult	0.026								
All Ages	0.001								
Raft (Recreate)									
Adult	N	0.002							
Subadult	N	N							
All Ages	N	0.003							
Raft (Research)									
Adult	0.000	0.007	0.000						
Subadult	0.000	0.002	0.000						
All Ages	0.000	0.000	0.000						
Dory or Drift									
Adult	0.000	N	0.000	N					
Subadult	0.000	N	0.021	0.048					
All Ages	0.000	N	0.000	0.009					
Canoe									
Adult	0.000	0.000	0.001	0.000	0.000				
Subadult	N	0.007	0.039	0.000	0.001				
All Ages	0.000	0.000	0.000	0.000	0.000				
Kayak									
Adult	0.000	0.000	0.000	0.000	0.000	N			
Subadult	0.001	0.000	0.000	0.000	0.000	N			
All Ages	0.000	0.000	0.000	0.000	0.000	N			
Bank Fisher									
Adult	0.000	0.000	0.000	0.037	0.001	0.000	0.000		
Subadult	N	N	N	N	N	0.009	0.000		
All Ages	0.000	0.000	0.000	N	0.002	0.000	0.000		
Hiker									
Adult	0.000	0.004	0.000	N	N	0.000	0.000	N	
Subadult	0.000	0.014	0.001	N	N	0.000	0.000	N	
All Ages	0.000	0.000	0.000	N	0.012	0.000	0.000	N	

Table 35. Statistical probabilities comparing flushing responses of bald eagles to nine types of human activities while perched in trees at Washington Eddy on the SRBENA in 1986-87.

	Motorboat (Run)	Motorboat (Drift)	Raft (Rec)	Raft (Res)	Dory or Drift	Canoe	Kayak	Bank Fisher	Hiker
Motorboat (Run)									
Adult									
Subadult									
All Ages									
Motorboat (Drift)									
Adult	0.000								
Subadult	N								
All Ages	0.000								
Raft (Recreate)									
Adult	N	0.000							
Subadult	0.000	0.000							
All Ages	0.021	0.000							
Raft (Research)									
Adult	0.024	N	0.007						
Subadult	N	N	0.000						
All Ages	0.004	N	0.000						
Dory or Drift									
Adult	0.000	0.003	0.000	0.004					
Subadult	0.004	N	0.000	N					
All Ages	0.000	0.000	0.000	0.004					
Canoe									
Adult	0.047	0.000	N	0.001	0.000				
Subadult	0.000	0.000	0.000	0.000	0.000				
All Ages	0.000	0.000	0.000	0.000	0.000				
Kayak									
Adult	0.026	0.000	N	0.001	0.000	N			
Subadult	0.000	0.000	0.026	0.000	0.000	N			
All Ages	0.000	0.000	0.004	0.000	0.000	N			
Bank Fisher									
Adult	0.000	0.000	0.000	0.000	0.011	0.000	0.000		
Subadult	0.007	0.024	0.000	N	N	0.000	0.000		
All Ages	0.000	0.000	0.000	0.000	0.002	0.000	0.000		
Hiker									
Adult	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N	
Subadult	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N	
All Ages	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N	

Table 36. Statistical probabilities comparing flushing responses of bald eagles to nine types of human activities while perched in trees at Washington Eddy on the SRBENA in 1985-86 and 1986-87 combined.

	Motorboat (Run)	Motorboat (Drift)	Raft (Rec)	Raft (Res)	Dory or Drift	Canoe	Kayak	Bank Fisher	Hiker
Motorboat (Run)									
Adult									
Subadult									
All Ages									
Motorboat (Drift)									
Adult	0.000								
Subadult	0.017								
All Ages	0.000								
Raft (Recreate)									
Adult	N	0.000							
Subadult	0.030	0.000							
All Ages	0.025	0.000							
Raft (Research)									
Adult	0.000	N	0.000						
Subadult	0.000	0.008	0.000						
All Ages	0.000	0.005	0.000						
Dory or Drift									
Adult	0.000	0.001	0.000	N					
Subadult	0.000	0.034	0.000	N					
All Ages	0.000	0.000	0.000	N					
Canoe									
Adult	0.000	0.000	0.000	0.000	0.000				
Subadult	0.000	0.000	0.000	0.000	0.000				
All Ages	0.000	0.000	0.000	0.000	0.000				
Kayak									
Adult	0.000	0.000	0.000	0.000	0.000	N			
Subadult	0.000	0.000	0.000	0.000	0.000	N			
All Ages	0.000	0.000	0.000	0.000	0.000	N			
Bank Fisher									
Adult	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Subadult	0.001	0.016	0.000	N	N	0.000	0.000		
All Ages	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Hiker									
Adult	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N	
Subadult	0.000	0.000	0.000	0.001	0.000	0.000	0.000	N	
All Ages	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N	

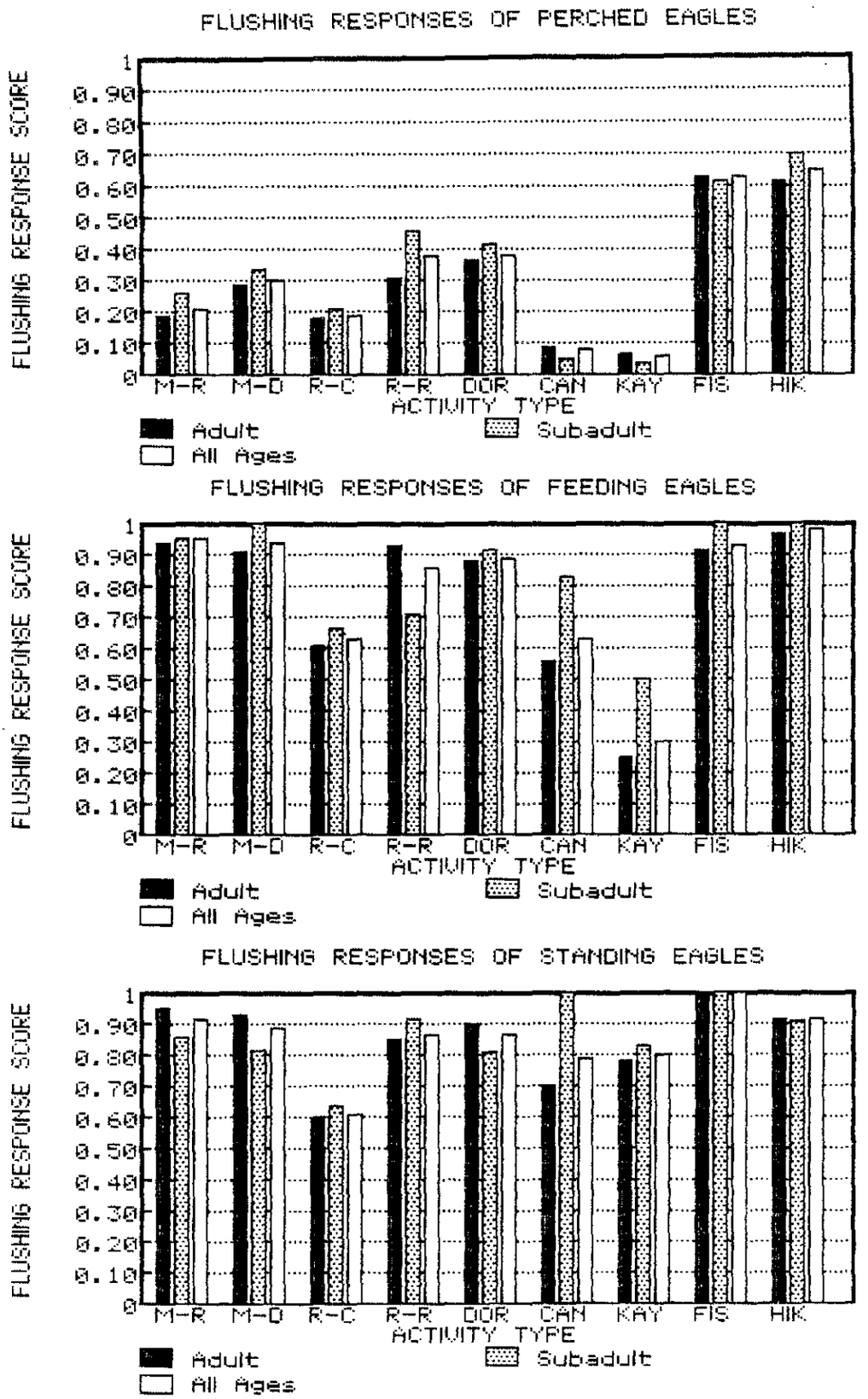


Figure 25. Flushing responses (% flushed/100) of eagles perching (upper), feeding (middle), and standing (lower) at Washington Eddy from nine human activity types. (M-R = Motorboat-Running, M-D = Motorboat-Drifting, R-C = Raft-Recreational, R-R = Raft-Research, DOR = Dory, CAN = Canoe, KAY = Kayak, FIS = Bank Fisher, and HIK = Hiker.)

Table 37. Flushing responses (% flushed/100) of eagles to nine types of human activities while feeding on the ground at Washington Eddy on the SRBENA.

	Adult		Subadult		All Ages	
Activity & Year	n	Mean	n	Mean	n	Mean
Motorboat (Running)						
1985-86	53	0.943	23	0.957	76	0.947
1986-87	73	0.945	35	0.943	108	0.944
Both Years	126	0.944	58	0.948	184	0.946
Motorboat (Drifting)						
1985-86	15	0.867	8	1.000	23	0.913
1986-87	29	0.931	11	1.000	40	0.950
Both Years	44	0.909	19	1.000	63	0.937
Raft (Recreation)						
1985-86	17	1.000	7	0.714	24	0.917
1986-87	39	0.436	23	0.652	62	0.516
Both Years	56	0.607	30	0.667	86	0.628
Raft (Research)						
1985-86	20	1.000	6	0.500	26	0.885
1986-87	21	0.857	15	0.800	36	0.833
Both Years	41	0.927	21	0.714	62	0.855
Dory or Drift						
1985-86	31	0.936	13	0.923	44	0.932
1986-87	50	0.840	24	0.917	74	0.865
Both Years	81	0.877	37	0.919	118	0.890
Canoe						
1985-86	5	1.000	0	-	5	1.000
1986-87	13	0.385	6	0.833	19	0.526
Both Years	18	0.556	6	0.833	24	0.625
Kayak						
1985-86	0	-	0	-	0	-
1986-87	8	0.250	2	0.500	10	0.300
Both Years	8	0.250	2	0.500	10	0.300
Bank Fisher						
1985-86	3	1.000	1	1.000	4	1.000
1986-87	9	0.889	2	1.000	11	0.909
Both Years	12	0.917	3	1.000	15	0.933
Hiker						
1985-86	15	1.000	9	1.000	24	1.000
1986-87	18	0.944	7	1.000	25	0.960
Both Years	33	0.970	16	1.000	49	0.980

Table 37. Continued.

Activity & Year	Adult n	Adult Mean	Subadult n	Subadult Mean	All Ages n	All Ages Mean
All Boat Traffic						
1985-86	141	0.950	57	0.877	198	0.929
1986-87	233	0.773	116	0.853	349	0.799
Both Years	374	0.840	173	0.861	547	0.846
All Foot Traffic						
1985-86	18	1.000	10	1.000	28	1.000
1986-87	27	0.926	9	1.000	36	0.944
Both Years	45	0.956	19	1.000	64	0.969
All Activities						
1985-86	159	0.956	67	0.896	226	0.938
1986-87	260	0.789	125	0.864	385	0.813
Both Years	419	0.852	192	0.875	611	0.859

Table 38. Statistical probabilities comparing flushing responses of bald eagles to nine types of human activities while feeding (upper right half) and standing (lower left half) on the ground at Washington Eddy on the SRBENA in 1985-86.

	Motorboat (Run)	Motorboat (Drift)	Raft (Rec)	Raft (Res)	Dory or Drift	Canoe	Kayak	Bank Fisher	Hiker
Motorboat (Run)									
Adult		N	N	N	N	N	-	N	N
Subadult		N	N	0.026	N	-	-	N	N
All Ages		N	N	N	N	N	-	N	N
Motorboat (Drift)									
Adult	N		N	N	N	N	-	N	N
Subadult	N		N	N	N	-	-	N	N
All Ages	N		N	N	N	N	-	N	N
Raft (Recreate)									
Adult	N	N		N	N	N	-	N	N
Subadult	N	N		N	N	-	-	N	N
All Ages	N	N		N	N	N	-	N	N
Raft (Research)									
Adult	N	N	N		N	N	-	N	N
Subadult	N	N	N		N	-	-	N	N
All Ages	N	N	N		N	N	-	N	N
Dory or Drift									
Adult	N	N	N	N		N	-	N	N
Subadult	N	N	N	N		-	-	N	N
All Ages	N	N	N	N		N	-	N	N
Canoe									
Adult	N	N	N	N	N		-	N	N
Subadult	N	N	N	N	N		-	-	-
All Ages	N	N	N	N	N		-	N	N
Kayak									
Adult	-	-	-	-	-	-		-	-
Subadult	-	-	-	-	-	-		-	-
All Ages	-	-	-	-	-	-		-	-
Bank Fisher									
Adult	N	N	N	N	N	N	-		N
Subadult	N	N	N	N	N	N	-		N
All Ages	N	N	N	N	N	N	-		N
Hiker									
Adult	N	N	N	N	N	N	-	N	
Subadult	N	N	N	N	N	N	-	N	
All Ages	N	N	N	N	N	N	-	N	

Table 39. Statistical probabilities comparing flushing responses of bald eagles to nine types of human activities while feeding (upper right half) and standing (lower left half) on the ground at Washington Eddy on the SRBENA in 1986-87.

	Motorboat (Run)	Motorboat (Drift)	Raft (Rec)	Raft (Res)	Dory or Drift	Canoe	Kayak	Bank Fisher	Hiker
Motorboat (Run)									
Adult		N	0.000	N	N	0.000	0.000	N	N
Subadult		N	0.012	N	N	N	N	N	N
All Ages		N	0.000	N	N	0.000	0.000	N	N
Motorboat (Drift)									
Adult	N		0.000	N	N	0.001	0.000	N	N
Subadult	N		N	N	N	N	N	N	N
All Ages	N		0.000	N	N	0.000	0.000	N	N
Raft (Recreate)									
Adult	0.000	0.000		0.004	0.000	N	N	0.037	0.001
Subadult	0.005	N		N	N	N	N	N	N
All Ages	0.000	0.000		0.004	0.000	N	N	0.036	0.000
Raft (Research)									
Adult	N	N	0.006		N	0.013	0.007	N	N
Subadult	N	N	N		N	N	N	N	N
All Ages	N	N	0.000		N	0.035	0.004	N	N
Dory or Drift									
Adult	N	N	0.000	N		0.003	0.002	N	N
Subadult	N	N	0.010	N		N	N	N	N
All Ages	N	N	0.000	N		0.003	0.000	N	N
Canoe									
Adult	0.000	0.000	N	0.030	0.000		N	N	0.001
Subadult	N	N	0.044	N	N		N	N	N
All Ages	0.009	N	N	N	0.016		N	N	0.002
Kayak									
Adult	N	N	N	N	N	N		0.015	0.000
Subadult	N	N	N	N	N	N		N	N
All Ages	N	N	0.017	N	N	N		0.008	0.000
Bank Fisher									
Adult	N	N	N	N	N	N	N		N
Subadult	N	N	N	N	N	N	N		N
All Ages	N	N	0.041	N	N	N	N		N
Hiker									
Adult	N	N	0.001	N	N	0.011	N	N	
Subadult	N	N	N	N	N	N	N	N	
All Ages	N	N	0.000	N	N	N	N	N	

Table 40. Statistical probabilities comparing flushing responses of bald eagles to nine types of human activities while feeding (upper right half) and standing (lower left half) on the ground at Washington Eddy on the SRBENA in 1985-86 and 1986-87 combined.

	Motorboat (Run)	Motorboat (Drift)	Raft (Rec)	Raft (Res)	Dory or Drift	Canoe	Kayak	Bank Fisher	Hiker
Motorboat (Run)									
Adult		N	0.000	N	N	0.000	0.000	N	N
Subadult		N	0.001	0.013	N	N	N	N	N
All Ages		N	0.000	0.041	N	0.000	0.000	N	N
Motorboat (Drift)									
Adult	N		0.001	N	N	0.005	0.000	N	N
Subadult	N		0.014	0.037	N	N	N	N	N
All Ages	N		0.000	N	N	0.001	0.000	N	N
Raft (Recreate)									
Adult	0.000	0.000		0.001	0.001	N	N	N	0.000
Subadult	0.011	N		N	0.022	N	N	N	0.025
All Ages	0.000	0.000		0.004	0.000	N	N	0.043	0.000
Raft (Research)									
Adult	N	N	0.004		N	0.003	0.000	N	N
Subadult	N	N	N		N	N	N	N	N
All Ages	N	N	0.001		N	0.040	0.001	N	N
Dory or Drift									
Adult	N	N	0.000	N		0.004	0.000	N	N
Subadult	N	N	N	N		N	N	N	N
All Ages	N	N	0.000	N		0.003	0.000	N	N
Canoe									
Adult	0.001	0.032	N	N	N		N	N	0.001
Subadult	N	N	N	N	N		N	N	N
All Ages	N	N	N	N	N		N	N	0.000
Kayak									
Adult	N	N	N	N	N	N		0.010	0.000
Subadult	N	N	N	N	N	N		N	N
All Ages	N	N	N	N	N	N		0.001	0.000
Bank Fisher									
Adult	N	N	N	N	N	N	N		N
Subadult	N	N	N	N	N	N	N		N
All Ages	N	N	N	N	N	N	N		N
Hiker									
Adult	N	N	0.000	N	N	0.038	N	N	
Subadult	N	N	N	N	N	N	N	N	
All Ages	N	N	0.000	N	N	N	N	N	

Table 41. Flushing responses (% flushed/100) of eagles to nine types of human activities while standing on the ground at Washington Eddy on the SRBENA.

	Adult		Subadult		All Ages	
Activity & Year	n	Mean	n	Mean	n	Mean
Motorboat (Running)						
1985-86	75	0.960	38	0.921	113	0.947
1986-87	74	0.932	43	0.814	117	0.889
Both Years	149	0.946	81	0.864	230	0.917
Motorboat (Drifting)						
1985-86	25	0.880	14	1.000	39	0.923
1986-87	29	0.966	20	0.700	49	0.857
Both Years	54	0.926	34	0.824	88	0.886
Raft (Recreation)						
1985-86	30	0.933	15	0.933	45	0.933
1986-87	59	0.424	21	0.429	80	0.425
Both Years	89	0.596	36	0.639	125	0.608
Raft (Research)						
1985-86	30	0.867	3	1.000	33	0.879
1986-87	18	0.833	9	0.889	27	0.852
Both Years	48	0.854	12	0.917	60	0.867
Dory or Drift						
1985-86	35	0.886	16	0.750	51	0.843
1986-87	45	0.911	21	0.857	66	0.894
Both Years	80	0.900	37	0.811	117	0.872
Canoe						
1985-86	11	1.000	2	1.000	13	1.000
1986-87	9	0.333	6	1.000	15	0.600
Both Years	20	0.700	8	1.000	28	0.786
Kayak						
1985-86	0	-	0	-	0	-
1986-87	9	0.778	6	0.833	15	0.800
Both Years	9	0.778	6	0.833	15	0.800
Bank Fisher						
1985-86	2	1.000	1	1.000	3	1.000
1986-87	4	1.000	1	1.000	5	1.000
Both Years	6	1.000	2	1.000	8	1.000
Hiker						
1985-86	34	0.941	15	0.933	49	0.939
1986-87	18	0.889	8	0.875	26	0.885
Both Years	52	0.923	23	0.913	75	0.920

Table 41. Continued.

Activity & Year	Adult n	Adult Mean	Subadult n	Subadult Mean	All Ages n	All Ages Mean
All Boat Traffic						
1985-86	206	0.922	88	0.909	294	0.918
1986-87	243	0.774	126	0.754	369	0.767
Both Years	449	0.842	214	0.818	663	0.834
All Foot Traffic						
1985-86	36	0.944	16	0.938	52	0.942
1986-87	22	0.909	9	0.889	31	0.903
Both Years	58	0.931	25	0.920	83	0.928
All Activities						
1985-86	242	0.926	104	0.914	346	0.922
1986-87	265	0.785	135	0.763	400	0.778
Both Years	507	0.852	239	0.829	746	0.845

Table 42. Probability values comparing the flushing responses of adult and subadult eagles while perched in trees at Washington Eddy on the SRBENA for nine types of human activities during 1985-86 and 1986-87.

	Adult - Subadult Comparison		
Activity Type	1985-86	1986-87	Both Years
Motorboat (Running)	N	0.000	0.001
Motorboat (Drifting)	N	N	N
Raft (Recreation)	0.023	N	N
Raft (Research)	N	N	0.007
Dory or Drift	N	N	N
Canoe	N	0.008	N
Kayak	N	N	N
Bank Fisher	N	N	N
Hiker	N	N	N
All Boat Traffic	0.000	0.009	0.000
All Foot Traffic	N	N	N
All Activities	0.000	0.003	0.000

Table 43. Probability values comparing the flushing responses of adult and subadult eagles while feeding on the ground at Washington Eddy on the SRBENA for nine types of human activities during 1985-86 and 1986-87.

	Adult - Subadult Comparison		
Activity Type	1985-86	1986-87	Both Years
Motorboat (Running)	N	N	N
Motorboat (Drifting)	N	N	N
Raft (Recreation)	N	N	N
Raft (Research)	0.008	N	N
Dory or Drift	N	N	N
Canoe	-	N	N
Kayak	-	N	N
Bank Fisher	N	N	N
Hiker	N	N	N
All Boat Traffic	N	N	N
All Foot Traffic	N	N	N
All Activities	N	N	N

Table 44. Probability values comparing the flushing responses of adult and subadult eagles while standing on the ground at Washington Eddy on the SRBENA for nine types of human activities during 1985-86 and 1986-87.

	Adult - Subadult Comparison		
Activity Type	1985-86	1986-87	Both Years
Motorboat (Running)	N	N	N
Motorboat (Drifting)	N	0.028	N
Raft (Recreation)	N	N	N
Raft (Research)	N	N	N
Dory or Drift	N	N	N
Canoe	N	N	N
Kayak	–	N	N
Bank Fisher	N	N	N
Hiker	N	N	N
All Boat Traffic	N	N	N
All Foot Traffic	N	N	N
All Activities	N	N	N

Table 45. Probability values comparing the flushing responses of eagles among three types of activities, perching, feeding, and standing, at Washington Eddy on the SRBENA for nine types of human activities for 1985-86 and 1986-87 combined.

	Eagle Activity Comparison		
Activity Type	Perch-Feed	Perch-Stand	Feed-Stand
Motorboat (Running)	0.000	0.000	N
Motorboat (Drifting)	0.000	0.000	N
Raft (Recreation)	0.000	0.000	N
Raft (Research)	0.000	0.000	N
Dory or Drift	0.000	0.000	N
Canoe	0.000	0.000	N
Kayak	0.016	0.000	N
Bank Fisher	0.041	N	N
Hiker	0.000	0.000	N
All Boat Traffic	0.000	0.000	N
All Foot Traffic	0.000	0.000	N
All Activities	0.000	0.000	N

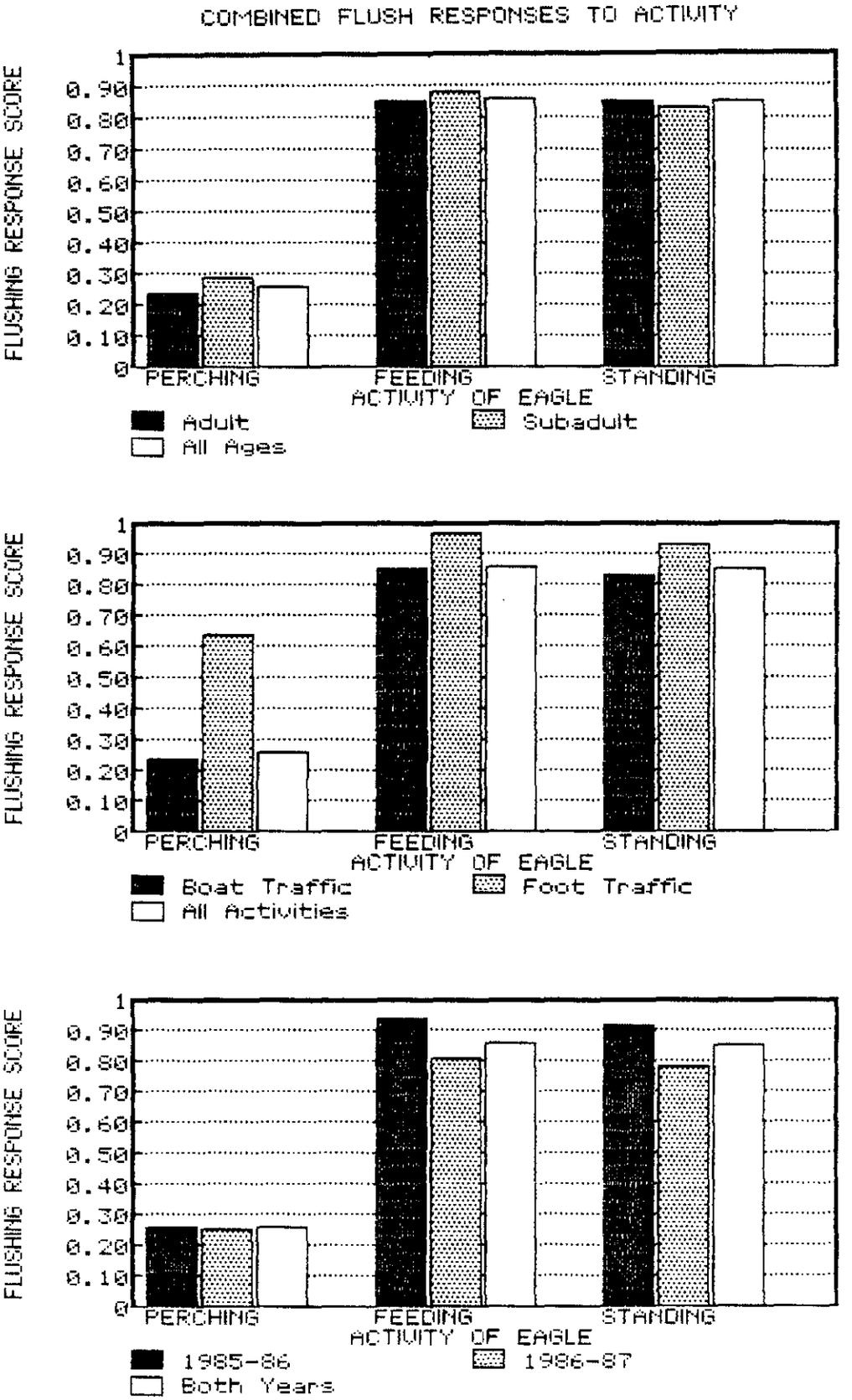


Figure 26. Combined flushing responses (% flushed/100) of eagles while perching, feeding, and standing at Washington Eddy by age (upper), type of traffic (middle), and year (lower).

Table 46. Probability values comparing the flushing responses of eagles between the two years (1985/86 and 1986/87) while perched in trees at Washington Eddy on the SRBENA for nine types of human activities.

Activity Type	Yearly Comparison		
	Adult	Subadult	All Ages
Motorboat (Running)	N	N	N
Motorboat (Drifting)	N	N	N
Raft (Recreation)	N	0.010	0.020
Raft (Research)	0.002	N	0.000
Dory or Drift	N	N	N
Canoe	N	0.040	N
Kayak	N	N	N
Bank Fisher	N	N	N
Hiker	0.000	0.013	0.000
All Boat Traffic	N	N	N
All Foot Traffic	N	N	N
All Activities	N	N	N

Table 47. Probability values comparing the flushing responses of eagles between the two years (1985/86 and 1986/87) while feeding on the ground at Washington Eddy on the SRBENA for nine types of human activities.

	Yearly Comparison		
Activity Type	Adult	Subadult	All Ages
Motorboat (Running)	N	N	N
Motorboat (Drifting)	N	N	N
Raft (Recreation)	0.000	N	0.001
Raft (Research)	N	N	N
Dory or Drift	N	N	N
Canoe	N	-	N
Kayak	-	-	-
Bank Fisher	N	N	N
Hiker	N	N	N
All Boat Traffic	0.000	N	0.000
All Foot Traffic	N	N	N
All Activities	0.000	N	0.000

Table 48. Probability values comparing the flushing responses of eagles between the two years (1985/86 and 1986/87) while standing on the ground at Washington Eddy on the SRBENA for nine types of human activities.

	Yearly Comparison		
Activity Type	Adult	Subadult	All Ages
Motorboat (Running)	N	N	N
Motorboat (Drifting)	N	N	N
Raft (Recreation)	0.000	0.006	0.000
Raft (Research)	N	N	N
Dory or Drift	N	N	N
Canoe	0.002	N	0.035
Kayak	-	-	-
Bank Fisher	N	N	N
Hiker	N	N	N
All Boat Traffic	0.000	0.007	0.000
All Foot Traffic	N	N	N
All Activities	0.000	0.004	0.000

Table 49. Flushing responses (% flushed/100) of bald eagles of all ages from nine types of human activities while perching in trees and feeding or standing on the ground subdivided by day of week for 1985-86 and 1986-87 combined.

	Day of Week							
	Sun		Mon		Tue		Wed	
Activity Type	n	Mean	n	Mean	n	Mean	n	Mean
Perching in Trees								
Motorboat (Run)	255	0.157	200	0.256	278	0.259	227	0.269
Motorboat (Drift)	207	0.261	112	0.321	179	0.425	115	0.287
Raft (Recreate)	517	0.163	107	0.308	30	0.467	41	0.244
Raft (Research)	226	0.345	0	-	0	-	0	-
Dory/Drift	138	0.442	100	0.360	211	0.588	73	0.315
Canoe	181	0.088	13	0.000	16	0.125	27	0.296
Kayak	201	0.030	35	0.200	0	-	0	-
Bank Fisher	5	0.400	9	0.667	32	0.625	8	1.000
Hiker	35	0.771	36	0.250	55	0.836	64	0.641
All Boat Traffic	1725	0.197	567	0.287	714	0.406	483	0.280
All Foot Traffic	40	0.725	45	0.333	87	0.759	72	0.681
All Activity	1765	0.209	612	0.291	801	0.445	555	0.332
Feeding/Standing on Ground								
Motorboat (Run)	36	0.944	33	1.000	82	0.963	36	0.917
Motorboat (Drift)	14	0.857	11	1.000	37	1.000	3	1.000
Raft (Recreate)	35	0.771	1	1.000	17	1.000	9	0.778
Raft (Research)	71	0.901	0	-	0	-	0	-
Dory/Drift	40	0.975	47	0.830	46	0.848	8	1.000
Canoe	24	0.708	0	-	13	1.000	5	0.800
Kayak	4	0.000	2	0.500	0	-	0	-
Bank Fisher	0	-	0	-	5	1.000	2	1.000
Hiker	27	0.852	38	0.947	13	1.000	27	1.000
All Boat Traffic	224	0.862	94	0.904	195	0.949	61	0.902
All Foot Traffic	27	0.852	38	0.947	18	1.000	29	1.000
All Activity	251	0.861	132	0.917	213	0.953	90	0.933

Table 49. Continued.

	Day of Week							
	Thu		Fri		Sat		Totals	
Activity Type	n	Mean	n	Mean	n	Mean	n	Mean
Perching in Trees								
Motorboat (Run)	435	0.202	223	0.220	484	0.184	2102	0.214
Motorboat (Drift)	305	0.266	82	0.329	226	0.292	1226	0.304
Raft (Recreate)	77	0.429	20	0.250	1036	0.154	1828	0.185
Raft (Research)	241	0.407	0	-	0	-	467	0.377
Dory/Drift	133	0.271	219	0.365	209	0.268	1083	0.384
Canoe	3	1.000	0	-	213	0.038	453	0.075
Kayak	6	0.000	0	-	136	0.066	378	0.058
Bank Fisher	16	0.438	14	0.857	7	0.286	91	0.626
Hiker	19	0.737	17	0.588	12	0.583	238	0.647
All Boat Traffic	1200	0.280	544	0.296	2304	0.168	7537	0.240
All Foot Traffic	35	0.600	31	0.710	19	0.474	329	0.641
All Activity	1235	0.289	575	0.318	2323	0.171	7866	0.257
Feeding/Standing on Ground								
Motorboat (Run)	80	0.925	68	0.941	79	0.861	414	0.930
Motorboat (Drift)	37	0.946	20	0.750	29	0.828	151	0.907
Raft (Recreate)	11	0.909	1	1.000	137	0.489	211	0.616
Raft (Research)	51	0.804	0	-	0	-	122	0.861
Dory/Drift	33	0.879	26	1.000	35	0.771	235	0.881
Canoe	0	-	0	-	10	0.300	52	0.712
Kayak	0	-	0	-	19	0.737	25	0.600
Bank Fisher	8	0.875	4	1.000	4	1.000	23	0.957
Hiker	4	0.750	10	1.000	5	1.000	124	0.944
All Boat Traffic	212	0.892	115	0.922	309	0.657	1210	0.840
All Foot Traffic	12	0.833	14	1.000	9	1.000	147	0.946
All Activity	224	0.888	129	0.930	318	0.667	1357	0.851

Table 50. Statistical probabilities comparing flushing responses of bald eagles from foot and boat traffic during the seven days of the week while perching in trees (upper right half) and feeding or standing on the ground (lower left half) at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Sunday							
All Boats		0.000	0.000	0.000	0.000	0.000	0.024
All Foots		0.001	N	N	N	N	N
All Activity		0.000	0.000	0.000	0.000	0.000	0.003
Monday							
All Boats	N		0.000	N	N	N	0.000
All Foots	N		0.000	0.001	0.031	0.003	N
All Activity	N		0.000	N	N	N	0.000
Tuesday							
All Boats	0.005	N		0.000	0.000	0.000	0.000
All Foots	N	N		N	N	N	0.028
All Activity	0.001	N		0.000	0.000	0.000	0.000
Wednesday							
All Boats	N	N	N		N	N	0.000
All Foots	N	N	N		N	N	N
All Activity	N	N	N		N	N	0.000
Thursday							
All Boats	N	N	N	N		N	0.000
All Foots	N	N	N	N		N	N
All Activity	N	N	0.021	N		N	0.000
Friday							
All Boats	N	N	N	N	N		0.000
All Foots	N	N	N	N	N		N
All Activity	N	N	N	N	N		0.000
Saturday							
All Boats	0.000	0.000	0.000	0.000	N	0.000	
All Foots	N	N	N	N	N	N	
All Activity	0.000	0.000	0.000	0.000	0.000	0.000	

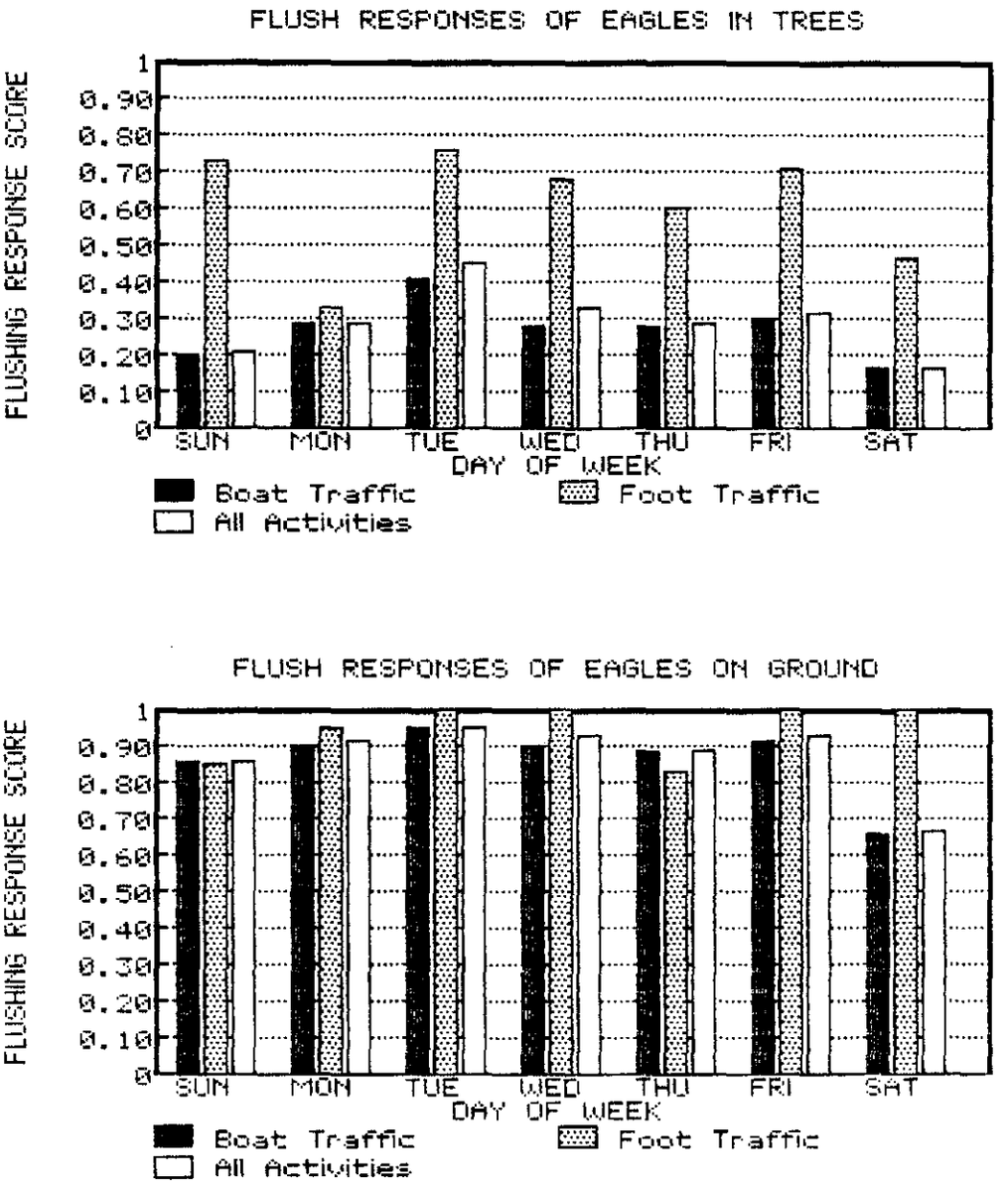


Figure 27. Flushing responses (% flushed/100) eagles from boat and foot traffic for the seven days of the week while perching in trees (upper) and feeding/standing on the ground (lower).

Table 51. Least squares cubic regression of flushing responses (% flushing/100) of eagles by sequence of occurrence for nine types of human activities while perching in trees at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

Activity	n	Regression Equation	R	F	P
Motorboat (Run)					
Adult	61	Y= 0.223 - 0.0055X + 0.00005X^2 - 0.0000002X^3	0.482	5.7	0.001
Subadult	51	Y= 0.335 - 0.0121X + 0.00014X^2 - 0.0000003X^3	0.541	6.5	0.000
All Ages	61	Y= 0.229 + 0.0015X - 0.00023X^2 + 0.0000023X^3	0.462	6.4	0.000
Motorboat (Drift)					
Adult	58	Y= 0.597 - 0.0389X + 0.00098X^2 - 0.0000076X^3	0.551	7.8	0.000
Subadult	46	Y= 0.517 - 0.0235X + 0.00034X^2 - 0.0000012X^3	0.597	7.7	0.000
All Ages	60	Y= 0.472 - 0.0218X + 0.00046X^2 - 0.0000034X^3	0.527	7.2	0.000
Raft (Recreate)					
Adult	71	Y= 0.356 - 0.0220X + 0.00058X^2 - 0.0000049X^3	0.475	6.5	0.000
Subadult	58	Y= 0.507 - 0.0413X + 0.00118X^2 - 0.0000098X^3	0.464	4.9	0.002
All Ages	72	Y= 0.389 - 0.0247X + 0.00063X^2 - 0.0000051X^3	0.631	15.0	0.000
Raft (Research)					
Adult	22	Y= 0.373 - 0.0099X - 0.00021X^2 + 0.0000042X^3	0.513	2.1	N
Subadult	19	Y= 0.527 - 0.0217X - 0.00012X^2 + 0.0000066X^3	0.652	3.7	0.028
All Ages	24	Y= 0.463 - 0.0203X + 0.00014X^2 + 0.0000010X^3	0.612	4.0	0.016
Dory/Drift					
Adult	41	Y= 0.343 - 0.0122X + 0.00047X^2 - 0.0000054X^3	0.332	1.5	N
Subadult	28	Y= 0.429 - 0.0146X + 0.00046X^2 - 0.0000045X^3	0.200	0.3	N
All Ages	42	Y= 0.364 - 0.0157X + 0.00061X^2 - 0.0000067X^3	0.299	1.2	N
Canoe					
Adult	65	Y= 0.278 - 0.0221X + 0.00060X^2 - 0.0000049X^3	0.479	6.0	0.000
Subadult	48	Y=-0.008 + 0.0079X - 0.00021X^2 + 0.0000014X^3	0.180	0.5	N
All Ages	67	Y= 0.234 - 0.0174X + 0.00045X^2 - 0.0000037X^3	0.434	4.9	0.002
Kayak					
Adult	55	Y= 0.224 - 0.0155X + 0.00035X^2 - 0.0000025X^3	0.515	6.1	0.000
Subadult	25	Y= 0.104 - 0.0074X + 0.00017X^2 - 0.0000012X^3	0.464	1.9	N
All Ages	55	Y= 0.162 - 0.0111X + 0.00025X^2 - 0.0000017X^3	0.544	7.1	0.000
Bank Fisher					
Adult	11	Y= 0.695 + 0.0058X - 0.00422X^2 + 0.0001098X^3	0.641	1.6	N
Subadult	6	Y= 2.222 - 1.8201X + 0.57618X^2 - 0.0559370X^3	0.714	0.7	N
All Ages	11	Y= 0.739 - 0.0178X - 0.00213X^2 + 0.0000636X^3	0.635	1.6	N
Hiker					
Adult	24	Y= 0.582 + 0.0256X - 0.00154X^2 + 0.0000181X^3	0.440	1.6	N
Subadult	10	Y= 0.474 + 0.0774X - 0.00720X^2 + 0.0001424X^3	0.480	0.6	N
All Ages	26	Y= 0.587 + 0.0219X - 0.00126X^2 + 0.0000147X^3	0.356	1.1	N

Table 51. Continued.

Activity	n	Regression Equation	R	F	P
All Boat Traffic					
Adult	75	Y= 0.347 - 0.0170X + 0.00036X^2 - 0.0000026X^3	0.804	43.4	0.000
Subadult	75	Y= 0.449 - 0.0274X + 0.00062X^2 - 0.0000045X^3	0.639	16.3	0.000
All Ages	75	Y= 0.380 - 0.0204X + 0.00045X^2 - 0.0000033X^3	0.834	54.2	0.000
All Foot Traffic					
Adult	26	Y= 0.577 + 0.0189X - 0.00133X^2 + 0.0000164X^3	0.438	1.7	N
Subadult	12	Y= 0.510 + 0.0357X - 0.00414X^2 + 0.0000891X^3	0.301	0.3	N
All Ages	28	Y= 0.567 + 0.0165X - 0.00107X^2 + 0.0000132X^3	0.348	1.1	N
All Activities					
Adult	75	Y= 0.371 - 0.0183X + 0.00038X^2 - 0.0000027X^3	0.813	46.2	0.000
Subadult	75	Y= 0.467 - 0.0285X + 0.00065X^2 - 0.0000048X^3	0.649	17.2	0.000
All Ages	75	Y= 0.402 - 0.0216X + 0.00047X^2 - 0.0000034X^3	0.847	60.3	0.000

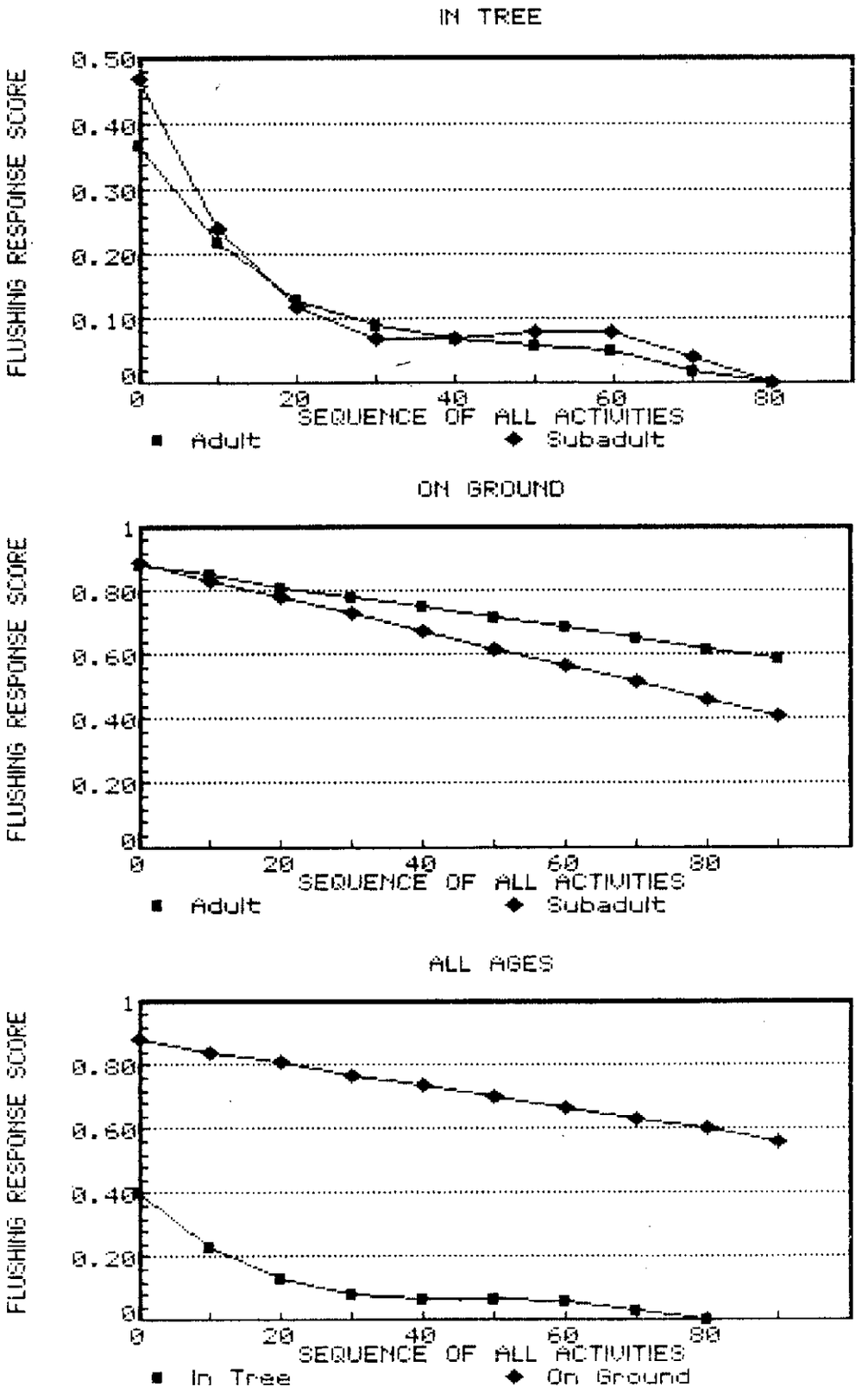


Figure 28. Relationship between the sequence (number) of recreational activities and the flushing responses (% flushed/100) for adult and subadult eagles in trees (upper), on the ground (middle), and all ages (lower) during 1985-86 and 1986-87 combined.

Table 52. Least squares linear regression of flushing responses (% flushing/100) of eagles by sequence of occurrence of nine types of human activities while feeding or standing on the ground at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

Activity Type	n	Regression Equation	r	F	P
Motorboat (Run)					
Adult	275	Y=0.950 - 0.0007X	-0.042	0.5	N
Subadult	139	Y=0.950 - 0.0097X	-0.265	10.3	0.002
All Ages	414	Y=0.941 - 0.0020X	-0.095	3.8	N
Motorboat (Drift)					
Adult	98	Y=0.903 + 0.0014X	0.097	0.9	N
Subadult	53	Y=0.901 - 0.0014X	-0.060	0.2	N
All Ages	151	Y=0.898 + 0.0008X	0.050	0.4	N
Raft (Recreate)					
Adult	145	Y=0.634 - 0.0031X	-0.071	0.7	N
Subadult	66	Y=0.747 - 0.0079X	-0.147	1.4	N
All Ages	211	Y=0.662 - 0.0040X	-0.088	1.6	N
Raft (Research)					
Adult	89	Y=0.863 + 0.0075X	0.053	0.3	N
Subadult	33	Y=0.745 + 0.0103X	0.118	0.4	N
All Ages	122	Y=0.836 + 0.0071X	0.064	0.5	N
Dory/Drift					
Adult	161	Y=0.879 + 0.0015X	0.039	0.2	N
Subadult	74	Y=0.963 - 0.0289X	-0.357	10.5	0.002
All Ages	235	Y=0.889 - 0.0016X	-0.036	0.3	N
Canoe					
Adult	38	Y=0.874 - 0.0093X	-0.462	9.7	0.005
Subadult	14	Y=0.874 + 0.0018X	0.145	0.3	N
All Ages	52	Y=0.886 - 0.0064X	-0.326	6.0	0.025
Kayak					
Adult	17	Y=0.767 - 0.0141X	-0.219	0.8	N
Subadult	8	Y=0.321 + 0.0357X	0.218	0.3	N
All Ages	25	Y=0.831 - 0.0151X	-0.214	1.1	N
Bank Fisher					
Adult	18	Y=0.899 + 0.0092X	0.139	0.3	N
Subadult	5	Y=1.000 + 0.0000X	1.000	0.0	N
All Ages	23	Y=0.932 + 0.0055X	0.910	0.2	N
Hiker					
Adult	85	Y=0.937 + 0.0006X	0.052	0.2	N
Subadult	39	Y=0.924 + 0.0152X	0.043	0.1	N
All Ages	124	Y=0.941 + 0.0006X	0.042	0.2	N

Table 52. Continued.

Activity Type	n	Regression Equation	r	F	P
All Boat Traffic					
Adult	823	Y=0.872 - 0.0038X	-0.143	17.2	0.005
Subadult	387	Y=0.874 - 0.0048X	-0.139	7.5	0.010
All Ages	1210	Y=0.872 - 0.0040X	-0.141	24.4	0.000
All Foot Traffic					
Adult	103	Y=0.938 + 0.0007X	0.052	0.3	N
Subadult	44	Y=0.934 + 0.0123X	0.051	0.1	N
All Ages	147	Y=0.943 + 0.0007X	0.042	0.3	N
All Activities					
Adult	926	Y=0.878 - 0.0032X	-0.128	15.4	0.001
Subadult	431	Y=0.887 - 0.0053X	-0.151	10.0	0.003
All Ages	1357	Y=0.879 - 0.0035X	-0.132	24.0	0.000

Table 53. Least squares quintic regression of the number of eagles counted on one river mile against the sequence (number) of occurrence of recreational activities at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

Location and Age	n	Regression Equation	r	F	P
Perched in Trees					
Adult	60	Y=4.687 - 0.583X + 0.0456X^2 - 0.00167X^3 + 0.0000275X^4 - 0.000000166X^5	-0.974	201.5	0.000
Subadult	60	Y=2.085 - 0.204X + 0.0140X^2 - 0.00050X^3 + 0.0000082X^4 - 0.000000051X^5	-0.965	147.6	0.000
All Ages	60	Y=6.772 - 0.787X + 0.0595X^2 - 0.00217X^3 + 0.0000357X^4 - 0.000000216X^5	-0.982	292.2	0.000
Feeding or Standing on Ground					
Adult	60	Y=1.779 - 0.370X + 0.0293X^2 - 0.00103X^3 + 0.0000163X^4 - 0.000000095X^5	-0.933	72.3	0.000
Subadult	60	Y=0.757 - 0.152X + 0.0125X^2 - 0.00046X^3 + 0.0000077X^4 - 0.000000047X^5	-0.877	35.8	0.000
All Ages	60	Y=2.535 - 0.522X + 0.0417X^2 - 0.00149X^3 + 0.0000239X^4 - 0.000000142X^5	-0.929	67.8	0.000

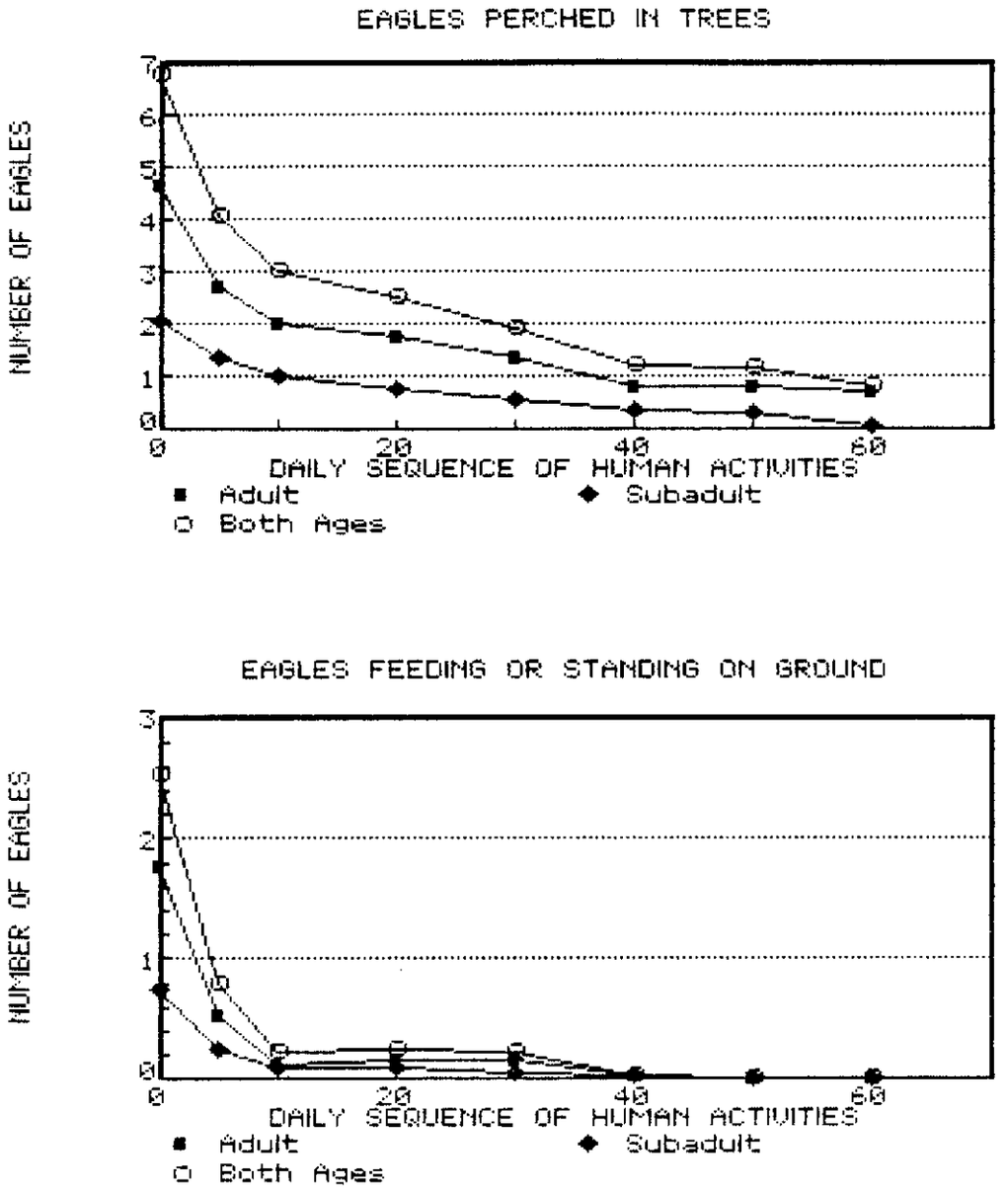


Figure 29. Relationship between the daily sequence (number) of recreational activities and the number of eagles present at tree perches (upper) and on the ground (lower) at Washington Eddy for 1985-86 and 1986-87 combined.

Table 54. Least squares linear regression of the percent of subadult eagles against the sequence (number) of occurrence of recreational activities at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

n	Regression Equation	r	F	P
Perched in Trees				
114	Y = 37.9 - 0.289X	-0.707	111.8	0.000
Feeding or Standing on Ground				
51	Y = 40.3 - 0.402X	-0.458	13.0	0.000

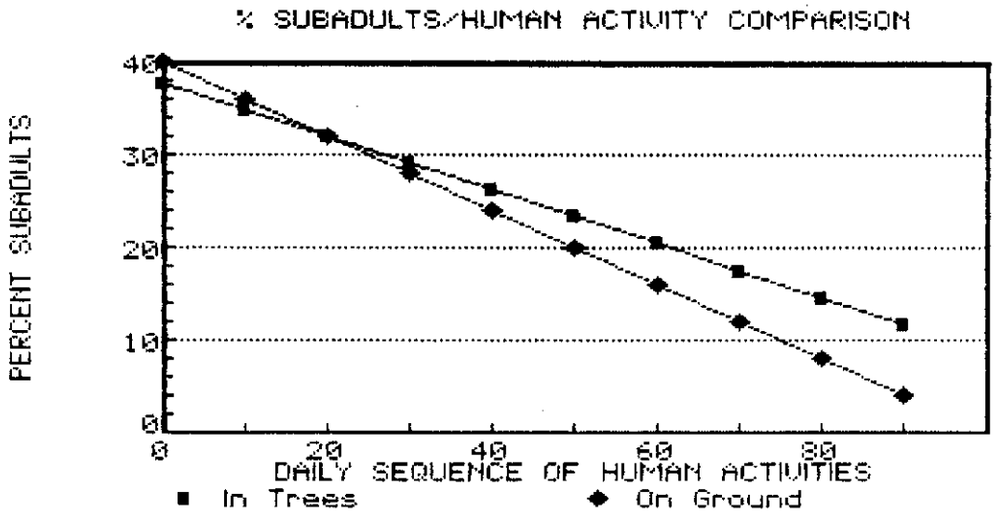


Figure 30. Relationship between the daily sequence (number) of recreational activities and the percentage of subadult eagles present at Washington Eddy.

Table 55. Least squares parabolic regression of flushing responses (% flushing/100) of eagles by hour of day for nine types of human activities while perching in trees at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

Activity	n	Regression Equation	R	F	P
Motorboat (Run)					
Adult	20	Y= 0.190 + 0.021X - 0.0016X^2	0.536	3.4	0.041
Subadult	18	Y=-0.929 + 0.221X - 0.0099X^2	0.663	5.9	0.007
All Ages	20	Y= 0.113 + 0.040X - 0.0025X^2	0.595	4.6	0.015
Motorboat (Drift)					
Adult	18	Y= 1.018 - 0.147X + 0.0071X^2	0.465	2.1	N
Subadult	18	Y= 4.638 - 0.719X + 0.0292X^2	0.640	5.2	0.012
All Ages	18	Y= 1.973 - 0.301X + 0.0132X^2	0.575	3.7	0.035
Raft (Recreate)					
Adult	17	Y=-0.048 + 0.087X - 0.0051X^2	0.550	3.0	N
Subadult	13	Y= 5.141 - 0.804X + 0.0324X^2	0.772	7.4	0.007
All Ages	17	Y=-0.260 + 0.110X - 0.0056X^2	0.545	3.0	N
Raft (Research)					
Adult	8	Y= 1.382 - 0.220X + 0.0114X^2	0.503	0.8	N
Subadult	8	Y= 9.445 - 1.465X + 0.0586X^2	0.521	0.9	N
All Ages	8	Y= 2.459 - 0.360X + 0.0159X^2	0.314	0.3	N
Dory/Drift					
Adult	18	Y= 1.327 - 0.124X + 0.0033X^2	0.669	6.1	0.006
Subadult	17	Y= 1.106 - 0.070X + 0.0007X^2	0.627	4.5	0.020
All Ages	18	Y= 1.097 - 0.080X + 0.0014X^2	0.706	7.4	0.003
Canoe					
Adult	14	Y= 5.849 - 0.932X + 0.0369X^2	0.845	13.7	0.001
Subadult	11	Y= 6.126 - 0.945X + 0.0363X^2	0.801	7.2	0.012
All Ages	14	Y= 6.522 - 1.030X + 0.0404X^2	0.862	15.8	0.000
Kayak					
Adult	11	Y=-1.160 + 0.180X - 0.0066X^2	0.345	0.5	N
Subadult	10	Y=-0.909 + 0.126X - 0.0039X^2	0.288	0.3	N
All Ages	11	Y=-1.172 + 0.180X - 0.0066X^2	0.324	0.5	N
Bank Fisher					
Adult	8	Y= 7.766 - 1.315X + 0.0577X^2	0.677	2.1	N
Subadult	6	Y= 8.669 - 1.463X + 0.0633X^2	0.561	0.7	N
All Ages	8	Y= 8.509 - 1.437X + 0.0625X^2	0.676	2.1	N
Hiker					
Adult	16	Y= 4.608 - 0.679X + 0.0278X^2	0.495	2.1	N
Subadult	15	Y= 0.110 + 0.119X - 0.0058X^2	0.169	0.2	N
All Ages	16	Y= 3.168 - 0.426X + 0.0172X^2	0.356	0.9	N

Table 55. Continued.

Activity	n	Regression Equation	R	F	P
All Boat Traffic					
Adult	20	Y= 2.163 - 0.308X + 0.0119X^2	0.804	15.5	0.000
Subadult	20	Y= 1.908 - 0.262X + 0.0104X^2	0.404	1.7	N
All Ages	20	Y= 1.835 - 0.247X + 0.0093X^2	0.898	35.3	0.000
All Foot Traffic					
Adult	16	Y= 4.295 - 0.651X + 0.0275X^2	0.544	2.7	N
Subadult	15	Y= 0.277 + 0.075X - 0.0036X^2	0.105	0.1	N
All Ages	16	Y= 2.952 - 0.414X + 0.0176X^2	0.423	1.4	N
All Activities					
Adult	20	Y= 2.182 - 0.310X + 0.0121X^2	0.798	14.9	0.000
Subadult	20	Y= 1.851 - 0.248X + 0.0097X^2	0.394	1.6	N
All Ages	20	Y= 1.848 - 0.248X + 0.0094X^2	0.864	25.0	0.000

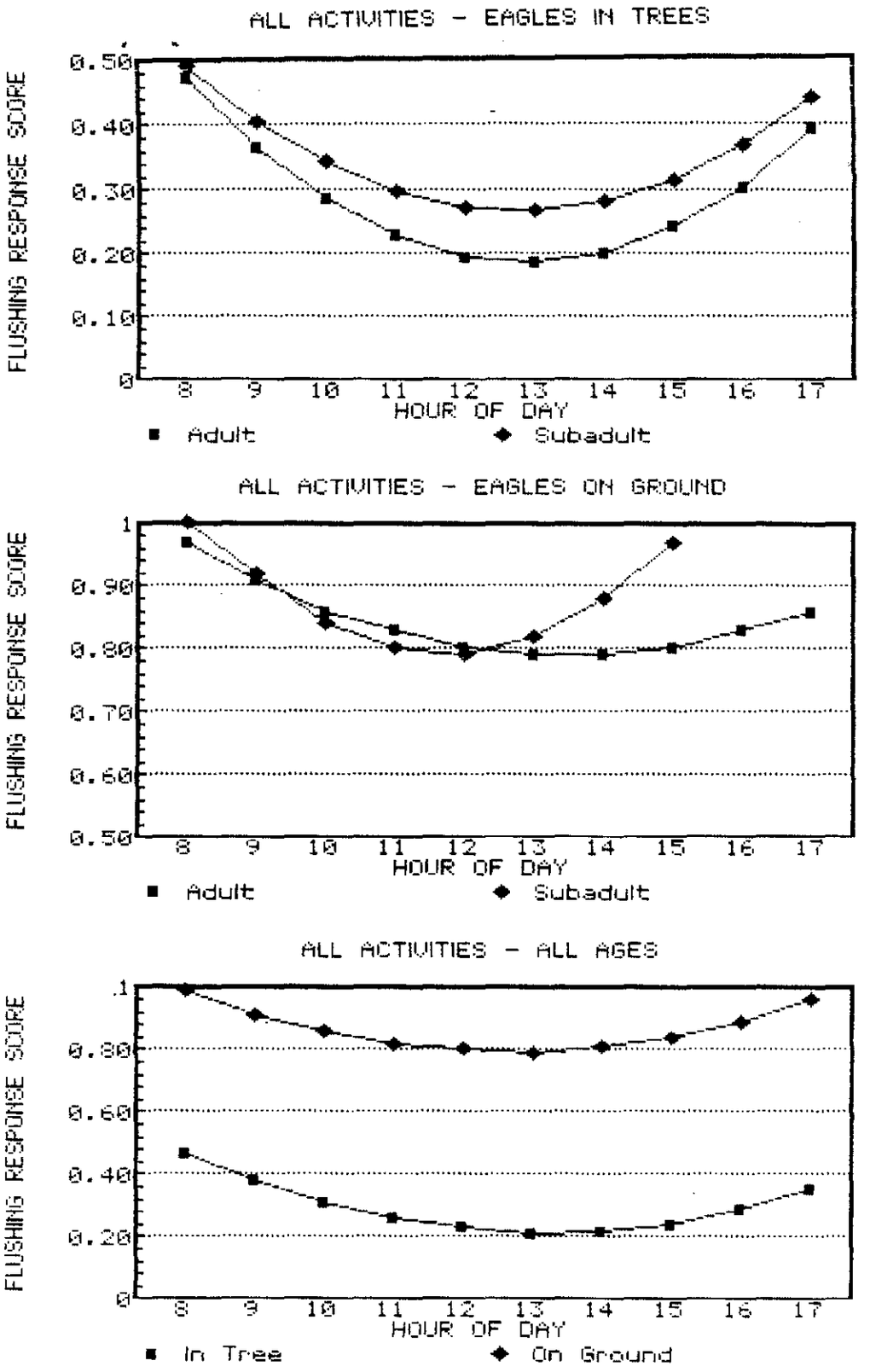


Figure 31. Relationship between the hour of day and the flushing response (% flushed/100) of adult and subadult eagles to all activities while in trees (upper), on the ground (middle), and all ages combined (lower).

Table 56. Least squares parabolic regression of flushing responses (% flushing/100) of eagles by hour of day for nine types of human activities while feeding or standing on the ground at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

Activity	n	Regression Equation	R	F	P
Motorboat (Run)					
Adult	16	Y= 1.944 - 0.183X + 0.0081X^2	0.569	3.1	N
Subadult	15	Y= 3.046 - 0.392X + 0.0173X^2	0.616	3.7	N
All Ages	16	Y= 2.230 - 0.237X + 0.0104X^2	0.599	3.6	N
Motorboat (Drift)					
Adult	12	Y=-4.166 + 0.932X - 0.0418X^2	0.690	4.1	0.044
Subadult	10	Y= 3.449 - 0.463X + 0.0204X^2	0.429	0.8	N
All Ages	13	Y=-0.897 + 0.329X - 0.0146X^2	0.394	0.9	N
Raft (Recreate)					
Adult	13	Y= 2.552 - 0.264X + 0.0089X^2	0.255	0.3	N
Subadult	11	Y=10.119 - 1.574X + 0.0647X^2	0.559	1.8	N
All Ages	13	Y= 2.293 - 0.225X + 0.0074X^2	0.226	0.3	N
Raft (Research)					
Adult	6	Y=-4.175 + 0.897X - 0.0383X^2	0.667	1.2	N
Subadult	5	Y= 4.887 - 0.681X + 0.0281X^2	0.312	0.1	N
All Ages	6	Y=-3.638 + 0.803X - 0.0344X^2	0.624	1.0	N
Dory/Drift					
Adult	15	Y= 3.804 - 0.530X + 0.0227X^2	0.384	1.0	N
Subadult	13	Y= 4.235 - 0.596X + 0.0251X^2	0.382	0.9	N
All Ages	15	Y= 4.029 - 0.571X + 0.0245X^2	0.427	1.3	N
Canoe					
Adult	7	Y= 9.867 - 1.488X + 0.0580X^2	0.682	1.7	N
Subadult	5	Y=-27.19 + 3.788X - 0.1269X^2	0.849	2.6	N
All Ages	8	Y= 5.930 - 0.824X + 0.0319X^2	0.486	0.8	N
Kayak					
Adult	4	Y=81.309 - 12.21X + 0.4584X^2	0.819	1.0	N
Subadult	2	Insufficient Data			
All Ages	4	Y=86.673 - 13.02X + 0.4889X^2	0.837	1.2	N
Bank Fisher					
Adult	6	Y= 1.680 - 0.130X + 0.0057X^2	0.280	0.1	N
Subadult	4	Insufficient Data			
All Ages	6	Y= 1.680 - 0.130X + 0.0057X^2	0.280	0.1	N
Hiker					
Adult	9	Y=-0.630 + 0.252X - 0.0096X^2	0.842	7.3	0.020
Subadult	7	Y= 2.257 - 0.222X + 0.0093X^2	0.475	0.6	N
All Ages	9	Y= 0.228 + 0.113X - 0.0041X^2	0.736	3.5	N

Table 56. Continued.

Activity	n	Regression Equation	R	F	P
All Boat Traffic					
Adult	17	Y= 2.146 - 0.207X + 0.0078X^2	0.514	2.5	N
Subadult	17	Y= 3.104 - 0.399X + 0.0171X^2	0.670	5.7	0.009
All Ages	17	Y= 2.394 - 0.257X + 0.0102X^2	0.492	2.2	N
All Foot Traffic					
Adult	9	Y=-0.521 + 0.231X - 0.0087X^2	0.804	5.5	0.037
Subadult	8	Y= 2.119 - 0.197X + 0.0082X^2	0.497	0.8	N
All Ages	9	Y= 0.320 + 0.097X - 0.0035X^2	0.688	2.7	N
All Activities					
Adult	17	Y= 1.894 - 0.164X + 0.0060X^2	0.479	2.1	N
Subadult	17	Y= 3.084 - 0.391X + 0.0167X^2	0.667	5.6	0.010
Ages	17	Y= 2.224 - 0.226X + 0.0089X^2	0.473	2.0	N

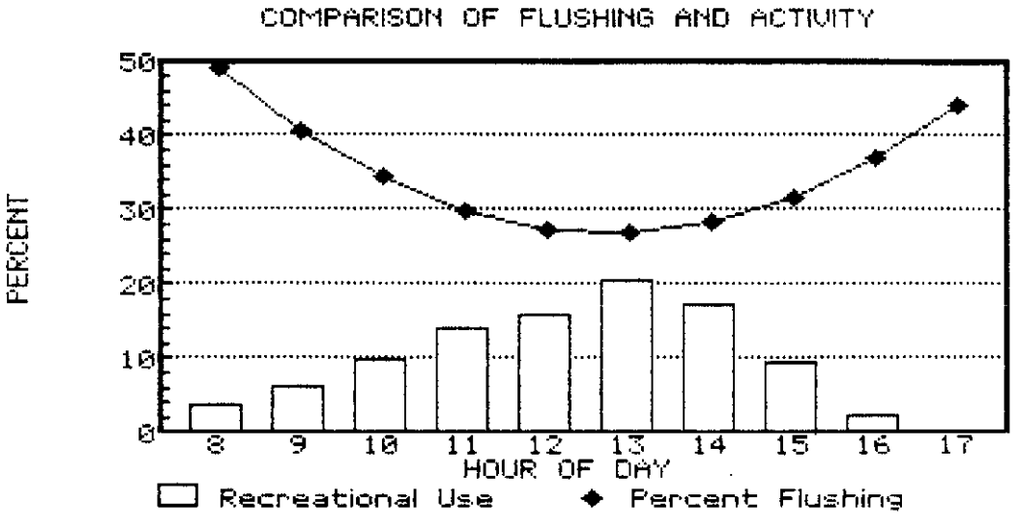


Figure 32. Comparison of the flushing responses of eagles at Washington Eddy from all activities to the hourly occurrence of these activities.

Table 57. Least squares linear regression of flushing responses (% flushing/100) of eagles by season (84 days) for nine types of human activities while perching in trees at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

Activity Type	n	Regression Equation	r	F	P
Motorboat (Run)					
Adult	1477	Y=0.296 - 0.0027X	-0.124	23.2	0.000
Subadult	625	Y=0.476 - 0.0048X	-0.191	23.5	0.000
All Ages	2102	Y=0.331 - 0.0029X	-0.130	36.2	0.000
Motorboat (Drift)					
Adult	869	Y=0.320 - 0.0007X	-0.028	0.7	N
Subadult	357	Y=0.473 - 0.0029X	-0.105	3.9	0.050
All Ages	1226	Y=0.348 - 0.0011X	-0.040	2.0	N
Raft (Recreate)					
Adult	1254	Y=0.361 - 0.0040X	-0.196	50.2	0.000
Subadult	574	Y=0.559 - 0.0072X	-0.274	46.5	0.000
All Ages	1828	Y=0.407 - 0.0047X	-0.214	87.8	0.000
Raft (Research)					
Adult	305	Y=0.469 - 0.0038X	-0.163	8.3	0.005
Subadult	162	Y=0.623 - 0.0044X	-0.183	5.5	0.025
All Ages	467	Y=0.523 - 0.0040X	-0.170	13.8	0.000
Dory/Drift					
Adult	717	Y=0.447 - 0.0018X	-0.071	3.6	N
Subadult	366	Y=0.574 - 0.0033X	-0.130	6.3	0.025
All Ages	1083	Y=0.482 - 0.0022X	-0.086	8.1	0.005
Canoe					
Adult	301	Y=0.329 - 0.0046X	-0.279	25.2	0.000
Subadult	152	Y=0.074 - 0.0005X	-0.035	0.2	N
All Ages	453	Y=0.268 - 0.0036X	-0.228	24.7	0.000
Kayak					
Adult	271	Y=0.258 - 0.0040X	-0.219	13.6	0.000
Subadult	107	Y=0.341 - 0.0060X	-0.392	19.0	0.000
All Ages	378	Y=0.280 - 0.0045X	-0.260	27.2	0.000
Bank Fisher					
Adult	70	Y=0.921 - 0.0110X	-0.357	9.9	0.002
Subadult	21	Y=0.758 - 0.0050X	-0.215	0.9	N
All Ages	91	Y=0.866 - 0.0089X	-0.314	9.8	0.002
Hiker					
Adult	158	Y=0.636 - 0.0004X	-0.016	0.0	N
Subadult	80	Y=0.745 - 0.0011X	-0.045	0.2	N
All Ages	238	Y=0.668 - 0.0005X	-0.021	0.1	N

Table 57. Continued.

Activity Type	n	Regression Equation	r	F	P
All Boat Traffic					
Adult	5194	Y=0.359 - 0.0032X	-0.020	106.2	0.000
Subadult	2343	Y=0.522 - 0.0053X	-0.209	106.8	0.000
All Ages	7537	Y=0.396 - 0.0036X	-0.024	184.8	0.000
All Foot Traffic					
Adult	228	Y=0.716 - 0.0026X	-0.104	2.5	N
Subadult	101	Y=0.739 - 0.0015X	-0.004	0.4	N
All Ages	329	Y=0.719 - 0.0022X	-0.087	2.5	N
All Activities					
Adult	5422	Y=0.388 - 0.0035X	-0.152	128.5	0.000
Subadult	2444	Y=0.548 - 0.0055X	-0.216	119.6	0.000
All Ages	7866	Y=0.425 - 0.0039X	-0.164	218.6	0.000

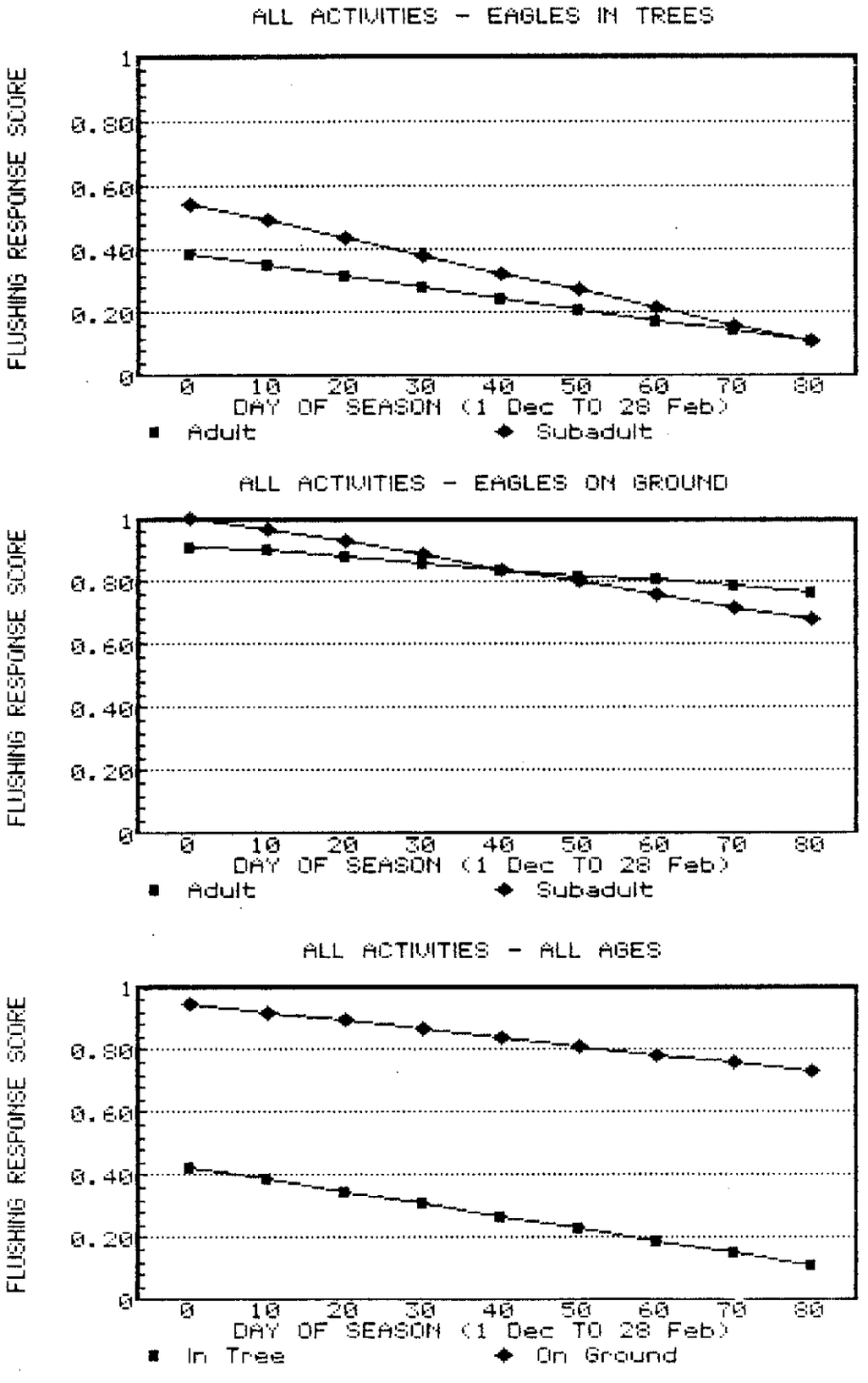


Figure 33. Flushing responses (% flushed/100) of adult and subadult eagles from all activities while perched in trees (upper), feeding/standing on the ground (middle), and all ages (lower).

Table 58. Least squares linear regression of flushing responses (% flushing/100) of eagles by season (84 days) for nine types of human activities while feeding or standing on the ground at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined.

Activity Type	n	Regression Equation	r	F	P
Motorboat (Run)					
Adult	275	Y=0.907 + 0.0013X	0.088	2.1	N
Subadult	139	Y=1.036 - 0.0039X	-0.271	10.9	0.002
All Ages	414	Y=0.974 - 0.0014X	-0.095	3.8	N
Motorboat (Drift)					
Adult	98	Y=0.926 - 0.0002X	-0.010	0.0	N
Subadult	53	Y=1.247 - 0.0088X	-0.507	17.7	0.000
All Ages	151	Y=1.083 - 0.0046X	-0.243	9.4	0.005
Raft (Recreate)					
Adult	145	Y=0.542 + 0.0016X	0.051	0.4	N
Subadult	66	Y=0.984 - 0.0076X	-0.231	3.6	N
All Ages	211	Y=0.639 - 0.0006X	-0.019	0.1	N
Raft (Research)					
Adult	89	Y=0.862 + 0.0009X	0.039	0.1	N
Subadult	33	Y=0.835 - 0.0014X	-0.060	0.1	N
All Ages	122	Y=0.875 - 0.0005X	-0.021	0.1	N
Dory/Drift					
Adult	161	Y=0.931 - 0.0011X	-0.060	0.6	N
Subadult	74	Y=0.913 - 0.0010X	-0.064	0.3	N
All Ages	235	Y=0.928 - 0.0012X	-0.004	1.0	N
Canoe					
Adult	38	Y=1.219 - 0.0128X	-0.403	7.0	0.025
Subadult	14	Y=1.015 - 0.0023X	-0.155	0.3	N
All Ages	52	Y=1.176 - 0.0106X	-0.380	8.4	0.010
Kayak					
Adult	17	Y=0.907 - 0.0119X	-0.436	3.5	N
Subadult	8	Y=1.106 - 0.0082X	-0.218	0.3	N
All Ages	25	Y=0.891 - 0.0082X	-0.291	2.1	N
Bank Fisher					
Adult	18	Y=0.819 + 0.0069X	0.321	1.8	N
Subadult	5	Y=1.000 + 0.0000X	1.000	0.0	N
All Ages	23	Y=0.859 + 0.0055X	0.281	1.8	N
Hiker					
Adult	85	Y=1.000 - 0.0019X	-0.096	0.8	N
Subadult	39	Y=0.937 + 0.0003X	0.021	0.0	N
All Ages	124	Y=0.973 - 0.0009X	-0.051	0.3	N

Table 58. Continued.

Activity Type	n	Regression Equation	r	F	P
All Boat Traffic					
Adult	823	Y=0.899 - 0.0017X	-0.074	4.5	0.050
Subadult	387	Y=1.007 - 0.0043X	-0.227	20.9	0.000
All Ages	1210	Y=0.937 - 0.0027X	-0.129	20.4	0.000
All Foot Traffic					
Adult	103	Y=0.958 + 0.0006X	0.030	0.1	N
Subadult	44	Y=0.960 - 0.0002X	-0.013	0.0	N
All Ages	147	Y=0.955 + 0.0003X	0.020	0.1	N
All Activities					
Adult	926	Y=0.913 - 0.0018X	-0.080	6.0	0.025
Subadult	431	Y=1.011 - 0.0042X	-0.224	22.6	0.000
All Ages	1357	Y=0.947 - 0.0027X	-0.131	23.6	0.000

Table 59. Comparison of recreational activity and extent of flushing caused to perched eagles at the Washington Eddy on the SRBENA in 1985-86 and 1986-87 combined. Flushing occurs when an eagle is displaced from its tree perch. The flush index is the ratio of flushing to occurrence; values greater than one indicate higher than expected disturbance. The ranking system is subdivided by type of activity (per act) and number of persons engaged in each activity type (per num).

Activity Type **	Activity Occurrence		Eagles Flushing		Flush Index	Ranking	
	n	%	n	%		Per Act	Per Num*
Motorboat (Run)	349	17.7	377	21.8	1.2	6	6
Motorboat (Drift)	47	2.4	156	9.0	3.7	1	1
Raft (Recreate)	652	33.1	338	19.5	0.6	7	8
Raft (Research)	89	4.5	176	10.2	2.3	2	2
Dory/Drift	270	13.7	416	24.0	1.8	3	4
Canoe	245	12.4	34	2.0	0.2	8	9
Kayak	169	8.6	22	1.3	0.2	9	7
Bank Fisher	35	1.8	57	3.3	1.8	4	3
Hiker	113	5.7	154	8.9	1.6	5	5
Consumptive	701	35.6	1006	58.2	1.6		
Naturalistic	1268	64.4	724	41.8	0.6		
Total	1969	100.0	1730	100.0	1.0		

* Ranking (per num) is scaled by the average number of persons engaged in each activity type.

** Only first passes of running motorboats and drifting motorboats are included.

Table 60. Comparison of recreational activity and number of perched eagles encountered at the Washington Eddy on the SRBENA in 1985-86 and 1986-87 combined. An encounter occurs when an activity passes within 500 meters of an eagle. The encounter index is the ratio of encounter to occurrence; values greater than one indicate higher than expected interaction. The ranking system is subdivided by type of activity (per act) and number of persons engaged in each activity type (per num).

Activity Type **	Activity Occurrence		Eagle Encounter		Encounter Index	Ranking	
	n	%	n	%		Per Act	Per Num*
Motorboat (Run)	349	17.7	1639	24.5	1.4	3	4
Motorboat (Drift)	47	2.4	500	7.5	3.1	1	1
Raft (Recreate)	652	33.1	1828	27.4	0.8	5	9
Raft (Research)	89	4.5	467	7.0	1.6	2	2
Dory/Drift	270	13.7	1083	16.2	1.2	4	5
Canoe	245	12.4	453	6.8	0.5	9	7
Kayak	169	8.6	378	5.7	0.7	7	3
Bank Fisher	35	1.8	91	1.4	0.8	6	6
Hiker	113	5.7	238	3.6	0.6	8	8
Consumptive	701	35.6	3313	49.6	1.4		
Naturalistic	1268	64.4	3364	50.4	0.8		
Total	1969	100.0	6677	100.0	1.0		

* Ranking (per num) is scaled by the average number of persons engaged in each activity type.

** Only first passes of running motorboats and drifting motorboats are included.

Table 61. Comparison of recreational activity and extent of flushing caused to feeding eagles at the Washington Eddy on the SRBENA in 1985-86 and 1986-87 combined. Flushing occurs when an eagle is displaced from its food carcass. The flush index is the ratio of flushing to occurrence; values greater than one indicate higher than expected disturbance. The ranking system is subdivided by type of activity (per act) and number of persons engaged in each activity type (per num).

Activity Type **	Activity Occurrence		Eagles Flushing		Flush Index	Ranking	
	n	%	n	%		Per Act	Per Num*
Motorboat (Run)	349	17.7	153	32.5	1.8	3	3
Motorboat (Drift)	47	2.4	26	5.5	2.3	2	2
Raft (Recreate)	652	33.1	54	11.5	0.3	7	9
Raft (Research)	89	4.5	53	11.3	2.5	1	1
Dory/Drift	270	13.7	105	22.3	1.6	6	5
Canoe	245	12.4	15	3.2	0.3	8	6
Kayak	169	8.6	3	0.6	0.1	9	8
Bank Fisher	35	1.8	14	3.0	1.7	5	4
Hiker	113	5.7	48	10.2	1.8	4	7
Consumptive	701	35.6	298	63.3	1.8		
Naturalistic	1268	64.4	173	36.7	0.6		
Total	1969	100.0	471	100.0	1.0		

* Ranking (per num) is scaled by the average number of persons engaged in each activity type.

** Only first passes of running motorboats and drifting motorboats are included.

Table 62. Comparison of recreational activity and number of feeding eagles encountered at the Washington Eddy on the SRBENA in 1985-86 and 1986-87 combined. An encounter occurs when an activity passes within 500 meters of an eagle. The encounter index is the ratio of encounter to occurrence; values greater than one indicate higher than expected interaction. The ranking system is subdivided by type of activity (per act) and number of persons engaged in each activity type (per num).

Activity Type **	Activity Occurrence		Eagle Encounter		Encounter Index	Ranking	
	n	%	n	%		Per Act	Per Num*
Motorboat (Run)	349	17.7	161	29.1	1.6	3	3
Motorboat (Drift)	47	2.4	28	5.1	2.1	2	2
Raft (Recreate)	652	33.1	86	15.6	0.5	7	9
Raft (Research)	89	4.5	62	11.2	2.5	1	1
Dory/Drift	270	13.7	118	21.3	1.6	5	4
Canoe	245	12.4	24	4.3	0.3	8	8
Kayak	169	8.6	10	1.8	0.2	9	7
Bank Fisher	35	1.8	15	2.7	1.5	6	5
Hiker	113	5.7	49	8.9	1.6	4	6
Consumptive	701	35.6	322	58.2	1.6		
Naturalistic	1268	64.4	231	41.8	0.6		
Total	1969	100.0	553	100.0	1.0		

* Ranking (per num) is scaled by the average number of persons engaged in each activity type.

** Only first passes of running motorboats and drifting motorboats are included.

Table 63. Comparison of recreational activity and extent of flushing caused to standing eagles at the Washington Eddy on the SRBENA in 1985-86 and 1986-87 combined. Flushing occurs when an eagle is displaced from its ground perch. The flush index is the ratio of flushing to occurrence; values greater than one indicate higher than expected disturbance. The ranking system is subdivided by type of activity (per act) and number of persons engaged in each activity type (per num).

Activity Type **	Activity Occurrence		Eagles Flushing		Flush Index	Ranking	
	n	%	n	%		Per Act	Per Num*
Motorboat (Run)	349	17.7	182	32.3	1.8	4	4
Motorboat (Drift)	47	2.4	40	7.1	3.0	1	1
Raft (Recreate)	652	33.1	76	13.5	0.4	7	9
Raft (Research)	89	4.5	52	9.2	2.0	3	2
Dory/Drift	270	13.7	102	18.1	1.3	5	5
Canoe	245	12.4	22	3.9	0.3	8	8
Kayak	169	8.6	12	2.1	0.2	9	7
Bank Fisher	35	1.8	8	1.4	0.8	6	6
Hiker	113	5.7	69	12.3	2.2	2	3
Consumptive	701	35.6	332	59.0	1.7		
Naturalistic	1268	64.4	231	41.0	0.6		
Total	1969	100.0	563	100.0	1.0		

* Ranking (per num) is scaled by the average number of persons engaged in each activity type.

** Only first passes of running motorboats and drifting motorboats are included.

Table 64. Comparison of recreational activity and number of standing eagles encountered at the Washington Eddy on the SRBENA in 1985-86 and 1986-87 combined. An encounter occurs when an activity passes within 500 meters of an eagle. The encounter index is the ratio of encounter to occurrence; values greater than one indicate higher than expected interaction. The ranking system is subdivided by type of activity (per act) and number of persons engaged in each activity type (per num).

Activity Type **	Activity Occurrence		Eagle Encounter		Encounter Index	Ranking	
	n	%	n	%		Per Act	Per Num*
Motorboat (Run)	349	17.7	193	29.1	1.6	4	4
Motorboat (Drift)	47	2.4	42	6.3	2.6	1	1
Raft (Recreate)	652	33.1	125	18.9	0.6	7	9
Raft (Research)	89	4.5	60	9.0	2.0	2	2
Dory/Drift	270	13.7	117	17.6	1.3	5	5
Canoe	245	12.4	28	4.2	0.3	8	8
Kayak	169	8.6	15	2.3	0.3	9	7
Bank Fisher	35	1.8	8	1.2	0.7	6	6
Hiker	113	5.7	75	11.3	2.0	3	3
Consumptive	701	35.6	360	54.3	1.5		
Naturalistic	1268	64.4	303	45.7	0.7		
Total	1969	100.0	663	100.0	1.0		

* Ranking (per num) is scaled by the average number of persons engaged in each activity type.

** Only first passes of running motorboats and drifting motorboats are included.

TASK 2 - Food Analysis

Methods

Six transects were walked each week of both winter seasons to determine the number and species composition of salmon carcasses at the Washington Eddy on SRBENA. Notes on the condition of each carcass were made including degree of use (consumed, partially consumed, whole), species, depth in water, distance from river and road, and specific location on each transect. Weights of most whole carcasses were measured with a Pesola hanging scale.

Analyses

For the purpose of this report, all salmon carcasses tallied on all six transects were grouped together. Total biomass available was the total sum of the mass of all whole carcasses. Edible biomass is total biomass less 21 percent to account for the amount of each salmon that is not edible by eagles.

Results and Discussion

The peak number of salmon carcasses recorded at any one time was 123 which was far below historical counts of salmon at this same location (Table 65). The 1985-86 season was an odd-numbered year; the chum salmon escapement was expected to be low, whereas the pink salmon escapement was expected to be high, and this seemed to be the case. In 1986-87, counts

were 38.6 percent higher because of the aforementioned chum bi-yearly cycle. As expected, counts of coho and sockeye salmon were very low, representing an incidental food source for eagles at this location.

In addition to higher salmon numbers in 1986-87, these salmon weighed more ($t = 3.52$, $P > 0.001$) and therefore provided more edible biomass to eagles (Table 65).

While the salmon availability index increased 39 percent from 1985-86 to 1986-87, the eagle population on all of the SW&SRS increased 37 percent during the same period (see Task 4) indicating the intimate relationship between eagles and fish. It also suggests that the number of eagles may be predicted with reasonable accuracy if the quantity of available food is known as has been done in past studies in other areas.

Peaks counts of salmon were made from late December to mid-January (Figure 34) during both years. Salmon were scarce during the first half of December and after January. Two floods late in the 1985-86 season removed many carcasses from the transects and, by mid-February, virtually none were left. A December flood in 1986-87 also removed carcasses, but extensive flooding in November just before this wintering season had no apparent effect on carcass availability.

The salmon to eagle index of abundance also indicated that food availability was most favorable to eagles during late December and early January (Figure 34). Low food stress would be most likely during this time of winter. The data

suggests high food stress during early December and late February.

Peak counts of salmon biomass were poorly correlated with the influx of the eagle population on the SRBENA and SW&SRS during both years (see Task 4 for population curves). There was an early influx of eagles to the area this season with many high counts in many river sections occurring in early December. This phenomenon may have been caused by the extraordinary cold, snowy weather in November and early December of 1985, but eagles arrived well before peak salmon counts in 1986-87 as well. These data suggest that weather influences fall migration and that many eagles had previous knowledge of the food supply on the Skagit River or other means of acquiring this information; they arrived before the bulk of the food became available.

Table 65. Availability of chum, coho, and sockeye salmon carcasses on six transects (1.75 km total length) on gravel bars at the Washington Eddy on the SRBENA in 1985-86 and 1986-87. (Pink salmon were not surveyed due to their advanced stage of decomposition and insignificant food value to eagles. No chinook salmon were present.)

Date	Species			Total	Edible Biomass (kg)**	Index of Abundance ***
	Chum*	Coho	Sockeye			
4 Dec	7	0	0	7	29.9	0.11
11 Dec	8	0	0	8	23.9	0.13
18 Dec	14	0	0	14	39.1	0.16
26 Dec	77	0	1	78	247.0	1.63
1 Jan	79	0	0	79	251.3	1.28
8 Jan	82	1	0	83	278.7	0.70
16 Jan	51	0	1	52	154.3	0.72
23 Jan	18	0	0	18	57.3	0.22
30 Jan	16	2	0	18	57.3	0.61
6 Feb	8	0	0	8	25.4	0.43
12 Feb	3	0	0	3	9.5	0.79
19 Feb	0	0	0	0	0.0	0.28
26 Feb	0	0	0	0	0.0	0.05
Totals	363	3	2	368	1173.7	
3 Dec	5	0	0	5	18.4	0.13
9 Dec	6	0	1	7	25.8	0.09
16 Dec	41	0	0	41	151.1	0.57
23 Dec	79	0	0	79	291.2	0.56
30 Dec	123	1	0	124	457.0	2.44
6 Jan	75	0	0	75	276.4	0.91
13 Jan	61	0	0	61	224.8	0.90
20 Jan	46	0	0	46	169.5	0.48
27 Jan	32	1	0	33	121.6	0.48
3 Feb	20	0	0	20	73.7	0.91
10 Feb	11	0	0	11	40.5	0.65
17 Feb	8	0	0	8	29.5	0.76
24 Feb	0	0	0	0	0.0	0.04
Totals	507	2	1	510	1879.5	

* Nine additional chums artificially supplied in 1985-86 and 39 in 1986-87.

** Whole carcass masses for 1985-86: n = 206, Mean = 4.04 kg, SD = 1.66, Range = 0.90 to 9.20 kg. For 1986-87: n = 118, Mean = 4.68 kg, SD = 1.43, Range = 2.3 to 8.9. Both Years: n = 324, Mean = 4.28 kg, SD = 1.61, Range = 0.9 to 9.2 kg. Edible Biomass = Total Biomass X 0.787.

*** Index of Abundance is the number of salmon per eagles counted during SRBENA AM censuses which provides a relative value of availability scaled for competition by other eagles.

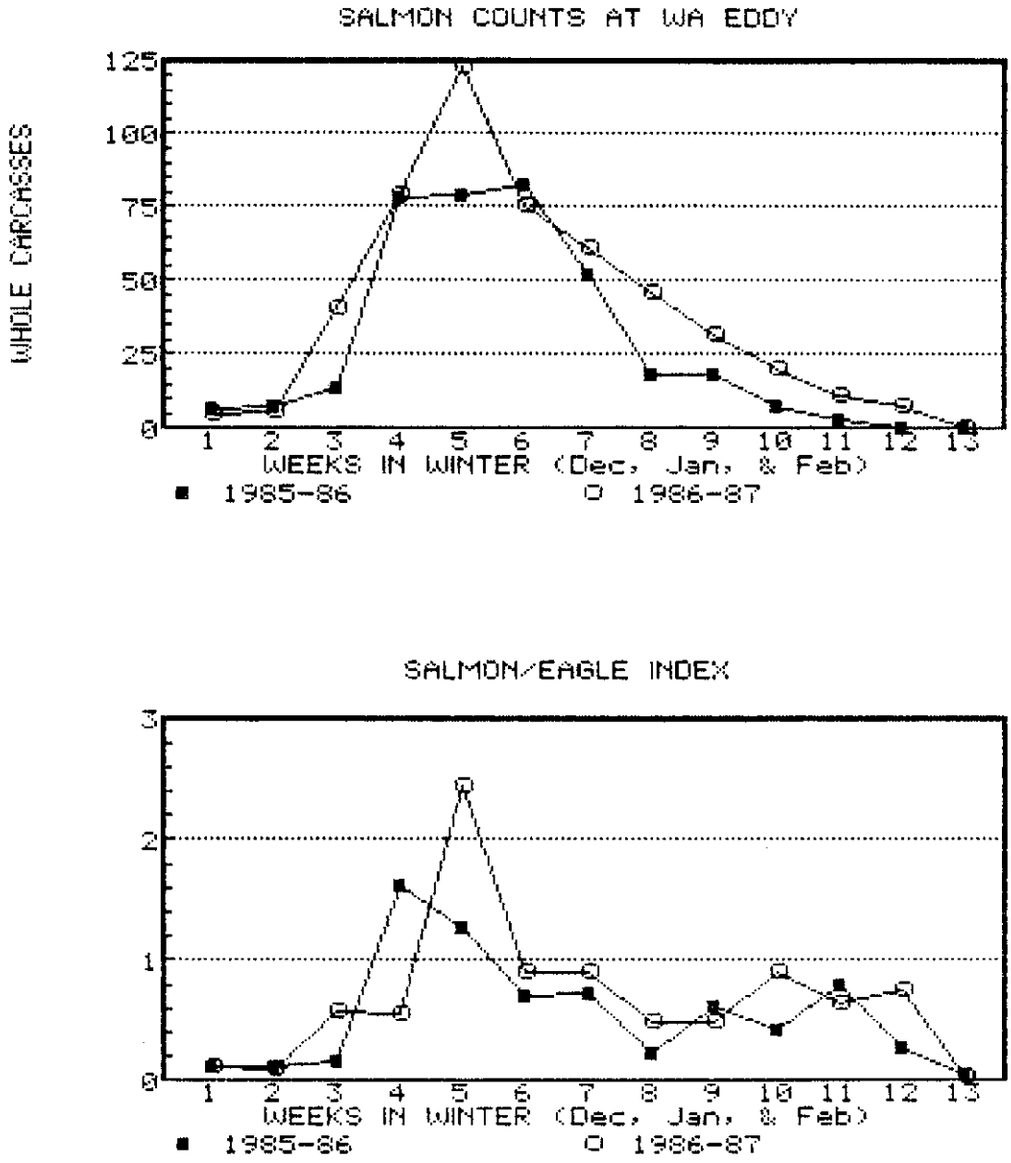


Figure 34. Number of salmon carcasses counted weekly on 1.6 km of transects at Washington Eddy (upper) and the number of salmon carcasses per number of eagles present on the SRBENA (lower) from 1 December to 28 February during 1985-86 and 1986-87.

TASK 3 - Weather Monitoring

Methods

A weather monitoring station was established at Clark's Cabins on SRBENA at River Mile 75.5 approximately 200 meters from the river and was continuously monitored from 1 December to 28 February during both 1985-86 and 1986-87.

Ambient temperature was measured at 2-hour intervals with a hygrothermograph positioned 1.5 meters above the substrate shielded from the sky and sun. Wind velocity was measured with a sensitive 3-cup anemometer positioned 5 meters above the substrate. Cumulative readings were taken at dawn and dusk of each day so that a comparison between day and night could be made. Rainfall was measured with a rain gauge with a 300 square centimeter collecting area positioned 1 meter above the substrate. Readings also were taken at dawn and dusk to compare day and night rainfall patterns. Cloud cover was visually estimated at 3-hour intervals when convenient.

Analyses

Basic statistics (sample size, mean, standard deviation) were calculated for all weather readings. Daily readings as well as monthly totals were tallied.

Results and Discussion

Ambient temperature patterns showed unusual lows for

December, unusual highs for January, and moderate weather for February in 1985-86 (Table 66). The winter of 1986-87 was warmer especially in December and February; temperatures in January were slightly lower than the previous year.

Wind was high in January and February, but low in December in 1985-86 (Table 67). In 1986-87, wind velocity was high in February, intermediate in December, and low in January.

Rain also was low in December, though snow was common, and rainfall increased later in the winter season of 1985-86 (Table 68). Rain late in the season caused 2 floods. In 1986-87, rainfall was mostly in January and December, not February. There was an approximately 32 percent reduction in rainfall in 1986-87 compared to 1985-86.

Cloud cover was low in December but higher in January and February (Table 69). Low cloud cover in December contributed to cold temperatures and heavy cloud cover later contributed to rain and flooding. There was a general increase in cloudiness over the course of the 3 months of 1986-87.

Weather data are being collected to analyze eagle activity patterns and to predict eagle energetics; these aspects will be compiled at a later date.

Table 66. Ambient temperatures (C) recorded at river mile 75.5 (Clark's Cabins) on the SRBENA in 1985-86 and 1986-87. *

1985-86

	December			January			February		
Date	Day	Night	Total	Day	Night	Total	Day	Night	Total
1	-7.4	-5.4	-6.3	0.4	-0.4	-0.1	6.8	2.7	4.8
2	-1.4	-1.4	-1.4	-0.2	-0.4	-0.3	3.7	3.7	3.7
3	-0.2	0.3	0.1	0.8	-0.9	-0.2	5.8	1.0	3.4
4	2.2	1.6	1.8	0.0	1.9	1.1	4.3	4.2	4.3
5	3.0	1.6	2.2	2.8	2.7	2.8	4.5	2.5	3.5
6	2.6	1.7	2.1	3.2	1.0	1.9	3.2	-0.2	1.5
7	3.4	0.3	1.6	3.2	3.0	3.1	2.0	-1.0	0.5
8	0.4	-1.9	-0.9	5.6	3.0	4.1	-0.2	-1.2	-0.7
9	-1.4	-3.4	-2.6	4.4	4.7	4.6	-0.5	-1.0	-0.8
10	-1.2	-2.9	-2.2	5.4	5.9	5.7	1.3	0.5	0.9
11	-2.0	-3.1	-2.7	5.2	2.3	3.5	3.2	-0.5	1.3
12	-2.8	-5.6	-4.4	5.2	3.1	4.0	1.2	-0.8	0.2
13	-3.0	-1.3	-2.0	5.6	4.1	4.8	2.2	0.8	1.5
14	-0.4	-0.6	-0.5	4.4	3.3	3.8	3.3	1.5	2.4
15	1.2	0.0	0.5	4.2	4.3	4.3	-0.2	0.3	0.1
16	2.3	0.1	1.1	4.6	4.1	4.3	-0.2	-1.0	-0.6
17	2.2	-1.6	0.0	4.6	2.4	3.3	-0.8	-1.8	-1.3
18	-0.8	-2.0	-1.5	5.0	6.6	5.9	-1.5	-6.8	-4.2
19	1.4	-2.1	-0.7	5.8	4.0	4.8	-3.3	-5.3	-4.3
20	-1.4	-2.7	-2.2	3.8	1.1	2.3	-2.7	-1.8	-2.3
21	-1.2	-1.6	-1.4	3.2	3.0	3.1	-0.7	-0.5	-0.6
22	-0.4	-1.7	-1.2	3.0	1.9	2.3	0.2	0.2	0.2
23	-0.6	-2.1	-1.5	2.2	1.9	2.0	1.2	2.2	1.7
24	0.0	-2.4	-1.4	2.8	-0.3	1.0	3.7	4.3	4.0
25	-0.8	-2.6	-1.8	3.6	1.4	2.3	5.8	4.5	5.2
26	-2.0	-2.0	-2.0	4.0	5.0	4.6	6.3	3.3	4.8
27	-1.2	-3.7	-2.7	6.0	4.7	5.3	9.2	6.0	7.6
28	-3.2	-3.6	-3.4	4.0	4.0	4.0	8.8	6.7	7.8
29	-1.2	-1.6	-1.4	6.0	5.9	5.9			
30	0.4	-1.3	-0.6	6.4	5.9	6.1			
31	-1.0	-0.9	-0.9	6.8	6.9	6.8			
n	155	217	372	155	217	372	168	168	336
Mean	-0.5	-1.7	-1.2	3.9	3.1	3.4	3.6	0.8	1.6
SD	2.7	2.0	2.4	2.2	2.2	2.3	3.6	3.1	3.5

Table 66. Continued.

	1986-87								
	December			January			February		
Date	Day	Night	Total	Day	Night	Total	Day	Night	Total
1	5.8	1.1	3.1	4.0	3.6	3.8	6.7	2.8	4.8
2	2.4	0.7	1.4	4.0	5.0	4.6	3.5	4.5	4.0
3	2.8	1.3	1.9	6.0	5.1	5.5	6.5	6.0	6.3
4	4.8	3.7	4.2	6.2	2.9	4.3	6.8	6.8	6.8
5	4.2	0.9	2.3	2.4	0.4	1.3	8.7	5.2	6.9
6	1.4	-1.4	-0.3	1.8	-0.4	0.5	8.0	4.3	6.2
7	2.4	1.4	1.8	0.8	-1.4	-0.5	9.0	5.3	7.2
8	2.0	-1.0	0.3	0.8	0.4	0.6	10.3	8.3	9.3
9	2.4	-1.9	-0.1	3.2	4.0	3.7	11.7	7.8	9.8
10	3.0	-1.0	0.7	6.0	7.0	6.6	10.0	8.5	9.3
11	2.4	2.7	2.6	9.8	9.1	9.4	9.0	4.3	6.7
12	4.0	1.9	2.8	7.2	3.9	5.3	9.0	7.8	8.4
13	4.6	4.3	4.4	3.2	1.3	2.1	9.3	7.7	8.5
14	5.4	5.0	5.2	0.6	-2.3	-1.1	8.5	6.0	7.3
15	5.0	1.3	2.8	-0.8	-3.0	-2.1	8.2	6.3	7.3
16	3.6	2.1	2.8	-0.6	-2.3	-1.6	7.2	4.7	5.9
17	4.4	1.6	2.8	-0.6	1.3	0.5	5.0	1.8	3.4
18	4.6	4.1	4.3	2.2	1.3	1.7	2.5	3.3	2.9
19	6.0	1.9	3.6	0.8	0.7	0.8	6.3	5.2	5.8
20	4.4	5.0	4.8	1.8	0.3	0.9	6.7	5.2	5.9
21	5.8	6.7	6.3	3.4	1.6	2.3	6.5	3.5	5.0
22	7.6	5.6	6.4	4.4	1.9	2.9	4.3	2.2	3.3
23	6.6	5.7	6.1	4.0	3.9	3.9	5.5	4.2	4.8
24	6.0	4.1	4.9	3.8	3.0	3.3	6.3	0.7	3.5
25	4.4	5.0	4.8	4.2	2.9	3.4	5.2	0.0	2.6
26	6.2	4.7	5.3	3.2	2.1	2.6	5.5	4.3	4.9
27	5.6	5.4	5.5	4.8	5.1	5.0	4.3	2.8	3.6
28	6.2	7.1	6.8	5.6	5.1	5.3	5.2	1.8	3.5
29	6.6	5.7	6.1	6.6	6.1	6.3			
30	5.8	2.0	3.6	6.4	4.0	5.0			
31	3.8	4.9	4.4	4.6	4.1	4.3			
n	155	217	372	155	217	372	168	168	336
Mean	4.5	2.9	3.6	3.5	2.5	2.9	7.0	4.7	5.8
SD	1.6	2.5	2.0	2.5	2.8	2.6	2.2	2.3	2.1

* Recorded at 2-hour intervals 1.5 meters above ground and averaged for day, night, and total values.

Table 67. Wind velocity (m/sec) recorded at river mile 75.5 (Clark's Cabins) on the SRBENA in 1985-86 and 1986-87. *

	1985-86								
	December			January			February		
Date	Day	Night	Total	Day	Night	Total	Day	Night	Total
1	0.99	0.98	0.99	0.51	0.00	0.17	0.04	0.06	0.05
2	0.99	0.06	0.39	0.09	0.03	0.05	0.10	0.08	0.09
3	0.00	0.08	0.06	0.00	0.24	0.13	0.11	0.00	0.04
4	0.28	0.18	0.21	0.45	0.48	0.46	0.00	0.15	0.09
5	0.05	0.00	0.02	0.10	0.27	0.21	0.24	0.00	0.09
6	0.00	0.14	0.09	0.05	0.27	0.19	0.38	0.11	0.21
7	0.17	0.00	0.06	0.40	0.21	0.28	0.51	0.00	0.17
8	0.00	0.03	0.02	0.20	0.12	0.15	0.30	0.00	0.11
9	0.05	0.42	0.28	0.20	0.27	0.24	0.58	0.00	0.24
10	0.55	0.00	0.21	0.40	0.25	0.30	0.84	0.00	0.30
11	0.00	0.00	0.00	0.14	0.24	0.20	0.42	0.13	0.24
12	0.05	0.03	0.04	0.55	0.45	0.48	0.76	0.43	0.57
13	0.00	0.00	0.00	0.10	0.06	0.08	0.42	0.40	0.41
14	0.04	0.00	0.02	0.45	0.00	0.16	0.72	0.40	0.53
15	0.06	0.06	0.06	0.00	0.03	0.02	0.26	0.86	0.64
16	0.00	0.06	0.04	0.30	0.30	0.30	0.52	0.00	0.20
17	0.05	0.03	0.04	0.04	0.32	0.19	0.05	0.03	0.04
18	0.10	0.03	0.06	0.09	0.30	0.21	0.63	0.18	0.36
19	0.20	0.03	0.09	0.26	0.06	0.13	0.33	0.08	0.20
20	0.05	0.00	0.02	0.11	0.06	0.08	0.08	0.03	0.05
21	0.05	0.06	0.06	0.20	0.12	0.15	0.10	0.03	0.06
22	0.05	0.00	0.02	0.15	0.09	0.12	0.00	0.06	0.04
23	0.00	0.06	0.04	0.18	0.11	0.13	0.12	0.27	0.22
24	0.20	0.03	0.09	0.06	0.12	0.10	0.05	0.03	0.04
25	0.06	0.27	0.15	0.25	0.15	0.19	0.00	0.03	0.02
26	0.25	0.03	0.11	0.20	0.21	0.21	0.25	0.59	0.46
27	0.00	0.00	0.00	0.27	0.22	0.24	0.19	0.15	0.17
28	0.00	0.00	0.00	0.25	0.23	0.24	0.10	0.31	0.05
29	0.00	0.00	0.00	0.21	0.06	0.12			
30	0.00	0.03	0.02	0.09	0.09	0.09			
31	0.05	0.00	0.02	0.50	0.13	0.29			
n	31	31	62	31	31	62	28	28	56
Mean	0.14	0.08	0.10	0.22	0.18	0.19	0.29	0.16	0.20
SD	0.26	0.19	0.19	0.16	0.12	0.10	0.25	0.18	0.18

Table 67. Continued.

	1986-87								
	December			January			February		
Date	Day	Night	Total	Day	Night	Total	Day	Night	Total
1	0.38	0.06	0.19	0.06	0.05	0.05	0.50	0.09	0.24
2	0.69	0.57	0.62	0.13	0.40	0.32	0.45	0.00	0.17
3	0.64	0.68	0.67	0.00	0.00	0.00	0.05	0.25	0.17
4	0.38	0.20	0.26	0.09	0.00	0.04	0.32	0.33	0.32
5	0.15	0.03	0.08	0.13	0.07	0.10	0.54	0.89	0.75
6	0.09	0.00	0.04	0.36	0.12	0.21	0.35	0.60	0.50
7	0.00	0.00	0.00	0.13	0.10	0.11	0.30	0.51	0.43
8	0.20	0.18	0.19	0.56	0.51	0.53	0.61	0.41	0.50
9	0.09	0.03	0.05	0.26	0.09	0.15	0.25	0.03	0.12
10	0.14	0.06	0.09	0.06	0.09	0.08	0.12	0.42	0.29
11	0.00	0.00	0.00	0.10	0.21	0.17	0.06	0.09	0.08
12	0.00	0.29	0.18	0.26	0.80	0.60	0.39	0.13	0.21
13	0.28	0.14	0.20	0.49	0.00	0.20	0.05	0.18	0.12
14	0.11	0.06	0.08	0.14	0.16	0.15	0.19	0.22	0.21
15	0.15	0.03	0.08	0.19	0.08	0.14	0.30	0.03	0.13
16	0.49	0.86	0.71	0.07	0.00	0.02	0.00	0.06	0.04
17	0.45	0.22	0.31	0.00	0.00	0.00	0.00	0.00	0.00
18	0.45	0.38	0.41	0.05	0.00	0.02	0.05	0.00	0.02
19	0.27	0.45	0.40	0.05	0.00	0.02	0.05	0.03	0.04
20	0.42	0.21	0.28	0.00	0.06	0.04	0.09	0.00	0.04
21	0.26	0.39	0.35	0.16	0.06	0.09	0.85	0.00	0.36
22	0.22	0.00	0.08	0.11	0.06	0.07	0.00	0.00	0.00
23	0.00	0.03	0.02	0.00	0.21	0.14	1.03	0.68	0.82
24	0.00	0.12	0.07	0.06	0.06	0.06	0.99	0.52	0.70
25	0.18	0.06	0.09	0.05	0.03	0.04	0.52	0.00	0.20
26	0.00	0.03	0.02	0.35	0.18	0.25	0.35	0.22	0.27
27	0.13	0.18	0.16	0.76	0.03	0.32	0.89	0.16	0.45
28	0.64	0.51	0.56	0.00	0.06	0.04			
29	0.00	0.17	0.11	0.17	0.27	0.23			
30	0.13	0.32	0.25	0.42	0.06	0.21			
31	0.06	0.27	0.21	0.00	0.65	0.38			
n	31	31	62	31	31	62	27	27	54
Mean	0.23	0.21	0.22	0.17	0.14	0.16	0.34	0.22	0.28
SD	0.21	0.22	0.21	0.19	0.20	0.19	0.31	0.25	0.29

* Recorded continuously 4 meters above ground.

Table 68. Rainfall (cm/day) recorded at river mile 75.5 (Clark's Cabins) on the SRBENA in 1985-86 and 1986-87. *

	1985-86								
	December			January			February		
Date	Day	Night	Total	Day	Night	Total	Day	Night	Total
1	0.000	0.000	0.000	0.181	0.000	0.059	0.029	0.000	0.012
2	0.000	0.064	0.041	0.008	0.000	0.003	0.006	0.007	0.006
3	0.102	0.024	0.050	0.025	0.000	0.011	0.000	0.000	0.000
4	0.048	0.003	0.019	0.006	0.059	0.039	0.000	0.071	0.044
5	0.020	0.010	0.014	0.071	0.225	0.167	0.000	0.000	0.000
6	0.003	0.000	0.001	0.014	0.000	0.005	0.000	0.000	0.000
7	0.019	0.000	0.007	0.003	0.012	0.008	0.000	0.000	0.000
8	0.000	0.000	0.000	0.085	0.000	0.032	0.000	0.000	0.000
9	0.006	0.000	0.002	0.000	0.034	0.021	0.000	0.000	0.000
10	0.000	0.000	0.000	0.042	0.061	0.054	0.000	0.000	0.000
11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13	0.000	0.000	0.000	0.000	0.015	0.010	0.000	0.000	0.000
14	0.000	0.028	0.013	0.000	0.016	0.010	0.000	0.018	0.010
15	0.000	0.000	0.000	0.003	0.039	0.027	0.299	0.210	0.243
16	0.000	0.000	0.000	0.065	0.154	0.121	0.321	0.017	0.135
17	0.000	0.000	0.000	0.058	0.335	0.205	0.056	0.009	0.027
18	0.000	0.000	0.000	0.452	0.207	0.305	0.051	0.000	0.020
19	0.000	0.000	0.000	0.006	0.005	0.005	0.000	0.000	0.000
20	0.000	0.000	0.000	0.000	0.003	0.002	0.046	0.000	0.020
21	0.000	0.000	0.000	0.000	0.008	0.005	0.000	0.083	0.052
22	0.000	0.000	0.000	0.040	0.140	0.102	0.089	0.198	0.156
23	0.000	0.000	0.000	0.173	0.018	0.077	0.589	0.423	0.479
24	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.129	0.086
25	0.000	0.000	0.000	0.000	0.000	0.000	0.042	0.042	0.042
26	0.000	0.000	0.000	0.000	0.034	0.021	0.000	0.000	0.000
27	0.000	0.000	0.000	0.025	0.004	0.013	0.000	0.003	0.002
28	0.000	0.000	0.000	0.000	0.003	0.002	0.000	0.000	0.000
29	0.056	0.005	0.024	0.003	0.060	0.039			
30	0.000	0.000	0.000	0.040	0.034	0.036			
31	0.006	0.105	0.070	0.000	0.040	0.023			
n	31	31	62	31	31	62	28	28	56
Mean	0.009	0.009	0.008	0.043	0.049	0.045	0.064	0.045	0.053
SD	0.023	0.023	0.024	0.090	0.049	0.063	0.315	0.045	0.076

Table 68. Continued.

	1986-87								
	December			January			February		
Date	Day	Night	Total	Day	Night	Total	Day	Night	Total
1	0.008	0.000	0.003	0.135	0.090	0.104	0.042	0.017	0.026
2	0.000	0.000	0.000	0.029	0.134	0.105	0.000	0.009	0.006
3	0.000	0.000	0.000	0.102	0.034	0.056	0.000	0.011	0.006
4	0.000	0.003	0.002	0.000	0.000	0.000	0.018	0.012	0.014
5	0.003	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	0.000	0.033	0.022	0.000	0.010	0.006
11	0.000	0.079	0.049	0.000	0.179	0.112	0.010	0.000	0.003
12	0.000	0.000	0.000	0.036	0.091	0.070	0.000	0.030	0.020
13	0.043	0.056	0.051	0.015	0.000	0.006	0.040	0.041	0.040
14	0.070	0.043	0.052	0.000	0.000	0.000	0.031	0.000	0.014
15	0.008	0.000	0.003	0.000	0.000	0.000	0.008	0.028	0.022
16	0.000	0.000	0.000	0.000	0.000	0.000	0.105	0.074	0.086
17	0.000	0.000	0.000	0.000	0.023	0.013	0.009	0.000	0.004
18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.071	0.045	0.000	0.000	0.000	0.000	0.000	0.000
21	0.117	0.019	0.053	0.000	0.000	0.000	0.000	0.022	0.012
22	0.089	0.174	0.145	0.000	0.000	0.000	0.053	0.000	0.021
23	0.035	0.038	0.037	0.011	0.067	0.048	0.000	0.000	0.000
24	0.006	0.003	0.004	0.073	0.008	0.029	0.000	0.000	0.000
25	0.054	0.006	0.022	0.073	0.015	0.037	0.000	0.000	0.000
26	0.000	0.000	0.000	0.156	0.081	0.109	0.000	0.021	0.013
27	0.000	0.000	0.000	0.008	0.054	0.036	0.051	0.000	0.020
28	0.186	0.169	0.176	0.012	0.008	0.010			
29	0.270	0.049	0.124	0.000	0.025	0.017			
30	0.000	0.000	0.000	0.086	0.069	0.076			
31	0.000	0.054	0.038	0.023	0.359	0.222			
n	31	31	62	31	31	62	27	27	54
Mean	0.029	0.025	0.027	0.024	0.041	0.033	0.014	0.010	0.012
SD	0.062	0.046	0.054	0.043	0.074	0.061	0.025	0.017	0.021

* Recorded continuously 1 meter above ground.

Table 69. Sky conditions (% cloud cover) recorded at river mile 75.5 (Clark's Cabins) on the SRBENA in 1985-86 and 1986-87. *

	1985-86								
	December			January			February		
Date	Day	Night	Total	Day	Night	Total	Day	Night	Total
1	10	95	44	100	100	100	-	-	-
2	100	100	100	100	100	100	90	95	92
3	100	95	98	-	-	-	43	0	26
4	80	95	86	23	85	48	97	100	98
5	97	100	98	100	100	100	100	95	98
6	100	100	100	20	45	30	3	20	10
7	100	100	100	-	-	-	0	0	0
8	100	100	100	100	100	100	0	0	0
9	23	45	32	100	100	100	0	0	0
10	10	0	6	83	95	88	40	55	46
11	43	75	56	13	0	8	100	60	84
12	7	10	8	80	80	80	0	0	0
13	-	-	-	100	90	96	100	90	96
14	-	-	-	83	95	88	97	90	94
15	-	-	-	100	100	100	100	100	100
16	-	-	-	100	100	100	100	100	100
17	90	90	90	100	100	100	100	90	96
18	0	0	0	100	100	100	100	100	100
19	10	10	10	100	100	100	100	100	100
20	23	20	22	100	90	96	100	100	100
21	0	0	0	97	75	88	100	100	100
22	50	75	60	100	80	92	100	100	100
23	20	20	20	100	100	100	100	100	100
24	0	0	0	73	15	50	100	100	100
25	0	0	0	-	-	-	100	100	100
26	0	0	0	50	75	60	67	55	62
27	0	0	0	100	100	100	67	0	40
28	0	0	0	27	95	54	93	45	74
29	-	-	-	100	100	100			
30	-	-	-	-	-	-			
31	-	-	-	-	-	-			
n	72	48	120	78	52	130	81	54	135
Mean	40.1	47.1	42.9	82.7	85.4	83.8	74.0	66.5	71.0
SD	42.3	44.6	43.2	30.4	26.5	28.8	40.8	42.3	41.4
Clear			34.2			4.6			20.7
Partly Cloudy			40.8			31.5			23.0
Overcast			25.0			63.9			56.3
Cloudy Cover**			43.9			63.2			63.9

Table 69. Continued.

	1986-87								
	December			January			February		
Date	Day	Night	Total	Day	Night	Total	Day	Night	Total
1	90	10	58	100	100	100	97	100	98
2	3	0	2	100	100	100	90	100	94
3	27	40	32	100	100	100	73	100	84
4	87	100	92	83	0	50	100	100	100
5	20	0	12	0	0	0	80	55	70
6	10	0	6	0	0	0	80	65	74
7	83	100	90	0	0	0	63	65	64
8	50	0	30	0	0	0	-	-	-
9	0	0	0	43	95	64	-	-	-
10	0	0	0	100	100	100	97	100	98
11	73	100	84	100	100	100	97	95	96
12	73	95	82	100	100	100	63	90	74
13	100	100	100	100	100	100	100	95	98
14	100	100	100	97	100	98	100	95	98
15	80	30	60	27	50	36	-	-	-
16	3	5	4	20	60	36	100	100	100
17	0	0	0	-	-	-	100	100	100
18	70	95	80	100	100	100	100	100	100
19	3	0	2	60	10	36	-	-	-
20	97	100	98	93	15	62	-	-	-
21	100	100	100	57	35	48	97	80	90
22	100	100	100	30	10	22	100	100	100
23	100	100	100	100	85	94	20	0	12
24	97	90	94	100	100	100	0	0	0
25	-	-	-	97	100	98	0	0	0
26	100	100	100	100	100	100	93	95	94
27	-	-	-	100	100	100	-	-	-
28	100	100	100	100	100	100	100	100	100
29	100	100	100	100	100	100			
30	40	0	24	100	100	100			
31	100	100	100	100	100	100			
n	87	58	145	90	60	150	66	44	110
Mean	62.3	57.4	60.3	73.6	69.2	71.6	78.5	78.9	78.6
SD	42.5	47.3	44.4	38.8	42.9	40.5	33.0	35.7	34.8
Clear			26.9			18.0			11.3
Partly Cloudy			27.6			22.0			35.7
Overcast			45.5			60.0			53.0
Cloudy Cover**			54.9			52.7			72.8

* Recorded at 3-hour intervals by visual observation.
** Mean percent cloud cover recorded during partly cloudy skies.

TASK 4 - Simulated Disturbances and Eagle Censuses

Methods

A total of 208 float trips, 104 each season, were conducted from 1 December to 28 February on the SRBENA and the SW&SRS to record eagle avoidance behavior in response to simulated rafting activity and to census eagles. Six river stretches were floated totaling approximately 69 river miles (Table 70).

Except for minor deviations, the following float schedule was used every week for 13 weeks during both years:

Sunday - 2 floats on SRBENA, morning and afternoon;
Monday - 1 float on the Upper Sauk (also Suiattle);
Tuesday - 1 float on the Lower Sauk and Upper Skagit;
Wednesday - No float;
Thursday - 2 floats on SRBENA, morning and afternoon;
Friday - 1 float on the Middle Skagit;
Saturday - 1 float on the Lower Skagit.

On SRBENA, floats were made from 900 to 1100 hours in the morning and from 1300 to 1500 hours in the afternoon. Four floats were made on the Suiattle River in 1986-87 during the afternoon during favorable river conditions. All other floats were started between 900 and 1000 hours.

Float trips were taken in a 13-foot gray raft with blue accessories normally by 2 persons. One researcher rowed and

spotted eagles while the other measured flight distances with an optical range-finder and recorded data.

For each eagle sighting, the following data were tallied: age (adult or subadult), flight distance (or closest distance approached without flying), flushing response (yes or no), direction of flight, location (tree or ground), grouping (within 25 meters of other eagles or not), and location by river mile.

Analyses

Censuses.-- Notes were kept of eagles passed on the river more than once to exclude them from census counts and of those flying downstream after flushing. Censuses were divided into 2 count figures: one excluding those flying downstream after flushing and one including them. For the purposes of this report, only the second type of count (including downstream flyers) is given; it includes a small percentage of duplicate counts. Duplication is higher on the river stretches where flushing responses were higher, particularly the Suiattle and Sauk rivers.

Differences in counts among the four day and time periods on SRBENA were tested with ANOVA and the Protected Least Square Difference Test.

Flight Distances.--Differences in flight distances of the four time periods on SRBENA and six other river stretches were tested using ANOVA and Protected Least Square Difference Tests for adults, subadults, and all ages combined. Students

t-tests were used to determine if there were significant differences between the two age classes (adult vs. subadult), yearly changes (1985-86 vs. 1986-87), social grouping (solitary vs. group), and eagle location (tree vs. ground). Least squares linear regression analyzed seasonal trends in flight distances and compared flight distances to river-channel widths.

Flushing Responses.--Differences in flushing responses of the four time periods on SRBENA and six other river stretches were tested using 2 x 2 chi-square contingency tables (ANOVA failed to meet variance assumptions). This test also was used to compare responses of the two age classes (adults vs. subadults), yearly changes (1985-86 vs. 1986-87), social grouping (solitary vs. group), and eagle location (tree vs. ground). Least squares linear regression analyzed seasonal trends in flushing responses with data pooled on a weekly basis. Linear regression also compared flush responses to river-channel widths.

Results and Discussion

Censuses.- Census data are provided for 1985-86 (Table 71) and 1986-87 (Table 72). Density patterns for both years combined are presented in table 73.

Counts of eagles on SRBENA during Sunday mornings were high in December and January, and dropped rapidly to the end of February in both years (Figure 35). The percentage of subadults appeared to increase during the winter season.

Distribution was somewhat uniform between miles 68 to 73, but lower in the remaining river miles.

Counts of eagles on SRBENA during Sunday afternoons were similar to AM counts for seasonal trends, but significantly lower (Figure 36). Seasonal changes in subadult numbers were nil, but numbers were much less than those recorded in the AM. Distribution was highest between river miles 70 and 73.

Counts of eagles on SRBENA during Thursday mornings were moderate in early December, consistently high in January, and much lower throughout February (Figure 37). There was a slight increase in subadult percentage over the winter. Distribution was highest on river mile 70 to 71 with the concentration declining up and downstream from there.

Counts of eagles on SRBENA during Thursday afternoons were high but variable in December, high in early January and moderate in late January, and much reduced in February (Figure 38). The subadult proportion was similar to the AM trend, but lower. Distribution was highest on river mile 70 to 71 with the concentration declining up and downstream from there.

Counts of eagles on the Upper Skagit were low in 1985-86 with a slight peak in late January (Figure 39). In 1986-87, counts were higher with an exceptional peak of 100 birds in late January. Subadult trends were highly variable perhaps because of the smaller sample size. Distribution was strikingly concentrated on river mile 66 to 67. (Note: Part of this river mile occurs within the SRBENA in a disjunct

parcel downstream from Rockport.)

Counts of eagles on the Middle Skagit were variable in December, high in January, and low in February (Figure 40). The 1986-87 population was much higher than the 1985-86 population. Percent subadults declined over the course of the winter season. Distribution was concentrated between river miles 57 and 61 with a secondary peak at mile 51.

Counts of eagles on the Lower Skagit were very low in 1985-86, but very high in 1986-87 especially in January (Figure 41). The disparity in counts between years was extraordinary. The percent of birds that were subadults declined in 1985-86 over winter, but increased in 1986-87; it was the highest overall percentage on the SW&SRS. Distribution was concentrated between river miles 28 and 34.

Counts of eagles on the Upper Sauk were high in December and moderate throughout the remainder of winter in 1985-86 (Figure 42). In 1986-87, there was a much lower early season population with moderate counts occurring most of the winter. Subadults counts were high and variable. Distribution was concentrated on the upper half of this river section, especially between river miles 15 and 18.

Counts of eagles on the Lower Sauk were very similar to the situation on the Upper Sauk with the early season peak lacking in the second study season (Figure 43). Subadults were equally abundant throughout both winters. Distribution was concentrated in two areas: between river miles 0 and 4, just above the Skagit River, and between miles 8 and 12.

Counts of eagles on the Suiattle were made only 4 times during the latter part of the 1986-87 wintering season (Figure 44). Numbers were higher than expected with a peak of 42 birds. The subadult percentage was the lowest recorded on the SW&SRS and young birds were concentrated on the lower reaches. Distribution was high on the 3 miles above the Sauk River and below the boundary bridge (miles 9 to 12).

The total population of the SW&SRS, excluding the Suiattle River, was high in December, moderate in January, and low in February in 1985-86 (Figure 45). In 1986-87, the population peaked in January, which is probably the more normal pattern, with nearly 500 birds tallied. If other river stretches were censused, the total peak count would likely exceed 500. One-third of all birds were subadults with the subadult proportion slightly increasing in late winter.

On SRBENA, AM counts were significantly higher than the PM counts during both Sunday and Thursday (Figure 46). The Sunday AM counts were significantly lower than the Thursday AM counts; there was no difference in PM counts between Sunday and Thursday. The lower afternoon counts are ostensibly caused by both human activity forcing eagles off the river system and normal daily distribution patterns; eagles use the river mostly in the morning. The lower weekend counts are likely wholly due to human activity. Declines in subadult numbers between AM and PM counts were significantly higher than for adults because subadults are more likely to leave the river when human activity occurs

(Figure 46). That subadults are more sensitive to humans is supported by flushing response, but not flight distance.

Density of eagles was highest on SRBENA and low to moderate on all other river stretches (Figure 47). Density was higher on the SRBENA in 1986-87 compared to 1985-86. Density on the Upper, Middle, and Lower Skagit was much higher in 1986-87 than in 1985-86; there were considerably lower densities on the Upper and Lower Sauk in 1986-87 compared to 1985-86.

The percentage of subadults on the SRBENA was consistently between 31 and 32 percent during AM counts in both years (Figure 48). During PM counts, however, subadult counts were significantly lower and more variable. As previously discussed, this is caused by human activity forcing the departure of the more sensitive young birds from the river system. On the other river stretches of the SW&SRS, subadult percentages were surprisingly similar from one year to the next indicating that the differences among stretches is real (Figure 48). The Lower Skagit had, by far, the greatest proportion of young birds and the Suiattle the least; other areas were intermediate.

Bald eagles arrived unusually early on the SW&SRS in 1985-86 as evidenced by most of these population curves. This early fall movement was ostensibly caused by cold, snowy weather in November and December. Several populations peaked in number well before the peak in food abundance. The population in 1986-87 seemed more typical, relative to prior

studies, with peak counts occurring in January. Lack of food, caused by flooding, decomposition, and ingestion by scavengers, caused a departure from the study area in February during both years.

Eagle use of the Upper Skagit seemed somewhat delayed compared to the SRBENA population, perhaps because carcasses washed there from SRBENA late in winter. This was not the case with the Middle Skagit, but on the Lower Skagit, the population increased dramatically during the second winter of study. The Sauk population was initially high in 1985-86, but declined rapidly thereafter; it was much lower in the second winter.

Distribution of eagles is highly correlated with the availability of food, especially salmon. Areas of high concentration as shown on the graphs also are the locations of preferred feeding sites.

As expected, the highest density of eagles was found on the SRBENA, but a densely populated river mile on the Upper Skagit is also part of SRBENA. The other stretches of river had less eagles presumably because there is less salmon spawning habitat.

Flight Distances.-- Mean flight distances of bald eagles perched in trees varied between 100 and 157 meters for the six river stretches and four time periods on SRBENA (Table 74, Figure 49). Flight distances were significantly different among a number of river stretches, especially with SRBENA compared to the Middle and Lower Skagit and the Upper

and Lower Sauk (Tables 75, 76, 77). Generally, many of the differences were attributable to high tolerance of adults compared to subadults, especially during the first winter season.

The following observations are offered to account for these differences. Because human activity is high on SRBENA, many human-intolerant eagles, especially the subadults, are departing and/or avoiding this river stretch leaving behind an unusually tolerant sub-population of eagles. Eagles there may also have habituated to humans, with adults habituating faster than subadults. The width of the river channel plays some role in affecting flight distance, as will be discussed later, but this factor is most important for birds on the ground. The river channel on the Lower Skagit is exceptionally wide causing high flight distances. Distances are higher on the Sauk River perhaps because human activity is rare there and eagles have not adapted to humans as much as on the Skagit. Distances on the Upper Skagit are low because human activity is very high there and because this section was floated in afternoons when less tolerant birds presumably had moved from the river. The Middle and Lower Skagit have low to moderate human activities levels and moderate flight distances.

Mean flight distances for bald eagles feeding or standing on the ground varied between 90 and 204 meters for the six river stretches and four time periods on SRBENA (Table 78, Figure 49). Sample sizes were low on the

Suiattle. Most of the significant differences were attributable to short distances on the SRBENA on Thursday afternoons and long distances on the Lower Skagit.

Habituation and redistribution of sensitive and tolerant birds could explain these patterns for the SRBENA. Wide river channels on the Lower Skagit is likely the cause for long distances there; eagles are able to see approaching boats farther away and thus have the opportunity to response more quickly. In contrast, the narrow Suiattle channel causes interactions at short distances between eagles on the ground and boats.

When all data are analyzed by age, year, and social grouping, there were many significant differences for birds in trees (Tables 79, 80, 81, 82, Figure 50). Flight distances of adult eagles were higher than subadults, for all rivers combined, but was especially true for the Lower Skagit, Upper Sauk, and Suiattle. Distances were higher in 1986-87 than in 1985-86 for all rivers combined, especially for adults. Flight distances also were longer for solitary bird perched in trees compared to those in groups.

For birds standing or feeding on the ground, there were no significant differences in flight distances between the age classes (Tables 80, 81, 82, 83, Figure 51). Distances were, however, higher in the 1986-87 compared to the previous year, especially on the SRBENA on Sundays. There was no significant difference in flight distances of solitary and grouped birds while on the ground.

Categorical and cumulative percentages of flight distances at specific intervals are presented in tables 84 and 85, respectively. These data are useful in delineating boundaries of zones where eagles can engage in normal activities without being disturbed by humans.

For combined years, there were few significant changes in flight distances over the course of the wintering season (Tables 86, 87, 88, 89, 90, 91, Figures 52, 53, 54, 55). For birds perched in trees, distances declined on the Lower Skagit, but distances were already very high at the beginning of the season. Similar significant declines were recorded for ground birds on the Lower Skagit as well as the Upper Sauk. There were a few other significant differences during individual years. Most differences were attributable to data in 1986-87; there were no differences in the 1985-86 data sets. These data suggest a slight season habituation of eagles to boating activity and/or seasonal departure of less tolerant birds at least on a few stretches of river, but this change is difficult to detect.

Flight distances of eagles on the ground are highly significantly longer than distances of birds perched in trees for almost all river stretches (Table 92). Eagles are more sensitive to human activity when forced to forage on the ground.

The widths of river channels varied among river stretches (Table 93) and this contributed to differences in flight distances of birds on the ground (Table 94). As the

channel width increases, so does the sighting ability of eagles on the ground consequently increasing the likelihood that they will fly at greater distances.

Flushing Responses.-- Flushing response scores (percent flushed by approaching raft/100) of eagles perched in trees ranged widely among the six river stretches and four time periods on SRBENA (Table 95, Figure 56). Less than 20 percent flushed on the SRBENA on Sunday afternoons, but more than 80 percent flushed on the Suiattle River. More often than not, these differences were significant (Tables 96, 97, 98). These many trends indicate that there are numerous factors affecting the decision to flush or not.

Flushing was highest on the Suiattle and Sauk rivers. Perhaps eagles are not habituated to humans there because it is a relatively secluded area compared to other river stretches. But the river channels are narrow; the raft passes closer to eagles there than in other areas thereby causing more birds to fly. These areas also may be refuges for eagles that can not tolerate human activity.

Flushing was high on the Middle Skagit, low on the Upper Skagit, and intermediate on the Lower Skagit. Eagles on the Upper Skagit may have habituated to humans to a greater extent and eagles there were approached in the afternoon when the flushing response would be expected to be lower because sensitive birds had left the area. Perhaps flushing is high on the Lower Skagit because the wide channel allows eagles to see boats farther away thereby increasing

the duration of the activity in view of the bird.

On SRBENA, differences there supported several hypotheses concerning the effects of human activity on eagle behavior. First, flushing response was lower in the afternoon for both Sundays and Thursdays. This suggests that some eagles partially habituate to humans on a daily basis and/or the more sensitive eagles leave the river after the morning disturbances. (This pattern is supported by census information previously discussed.) Second, because human activity is more prevalent on weekends, the drop in flushing response is more pronounced on Sundays; more birds are forced to leave or habituate on Sundays. Responses were similar during mornings when comparing Sundays to Thursdays, but they were different in the afternoon suggesting changes attributable to human activity.

Flushing responses of eagles feeding or standing on the ground varied less than for eagles perched in trees (Table 99, Figure 56). From 73 to 100 percent of all birds on the ground flushed; this is much higher than for birds in trees. Most significant differences were attributable to the low response on the Lower Skagit and the high response on the Sauk and Suiattle (Tables 96, 97, 98). Because the river channel is very wide on the Lower Skagit, many birds on the ground can be passed in a boat without encroaching on the space that they need to keep between humans in order to carry out normal activities. On the Sauk and Suiattle, the river channels are narrow which ostensibly causes more encroachment

on the eagles' tolerance boundaries. On SRBENA, flushing responses were generally not significantly different from other SRBENA floats, although Sunday morning was different from Thursday afternoon. Afternoon flushing of ground birds on the SRBENA was not significantly lower than flushing in the morning.

Important differences were found when comparisons of age, year, and social grouping were made, especially for eagles perched in trees (Tables 100, 101, 102, 103, 104, Figure 57). Subadults flushed with greater frequency than adults for all rivers combined, but especially on the SRBENA, and the Upper and Middle Skagit. This pattern prevailed during both years. There were no yearly differences in flushing for totals, but flushing declined on the SRBENA and increased on the Upper Skagit and Lower Sauk. Solitary birds flushed with greater frequency than grouped birds especially in the first year and particularly with subadults.

Perched subadults are more sensitive to human activity which causes them to flush and often leave the river. Lone birds may not derive the security as would a bird in a group situation and is therefore more likely to fly from humans. This seems especially the case with the less experienced young eagles.

For birds on the ground, flushing was not significantly different between ages for total (Tables 96, 97, 98, 99, 100, 101, 102, 103, Figure 58). This was the case, however, on Thursday morning on the SRBENA and on the Upper Sauk;

subadults flushed more often on these stretches. An overall comparison between the two years also showed no differences except for the same two river stretches; flushing was higher in the second year on SRBENA, lower the second year on the Upper Sauk. Birds in groups on the ground had higher flushing rates than single birds.

Because flushing response is very high for ground birds, any differences in age may have been masked. Subadults were, however, more flighty on two river stretches. Yearly differences were small and variable; no pattern was evident. High sensitivity to danger and increased alertness may have caused groups of birds on the ground to flush more readily than single birds.

On the different river stretches, there were many significant declines in flushing of eagles perched in trees and several declines of eagles on the ground over the course of the wintering season (Tables 105, 106, 107, 108, 109, 110, Figures 59, 60, 61, 62). Seasonal drops in flushing by tree birds was very consistent among rivers. On Sunday afternoons on the SRBENA, however, flushing approached zero late in winter. Particularly steep declines in flushing occurred with ground birds on the SRBENA on Sunday afternoons and on the Upper Sauk.

Seasonal habituation and adaptive redistribution by eagles may explain the recorded decline in flushing responsiveness. This trend was most evident on SRBENA where human activity is most common; human activity is perhaps so

common as to necessitate some habituation in order for eagles to engage in normal daily activities or prevent sensitive birds from living there. Habituation could also have developed on the Middle Skagit and Lower Sauk, even though human activities there are lower in intensity (see Task 6). It seems likely that eagle distribution should be influenced, in part, by human activity; sensitive birds winter in secluded stretches and tolerant birds stay in populated stretches. This human-induced redistribution can cause the effect recorded. An additional influential factor could be food abundance; as food declines over the course of the season, eagles may be more tolerant of human activity in order to stay on the river and feed. But because the flushing responses for many river stretches declined in December when the food supply was increasing, it seems that food availability may be a secondary factor influencing the flushing response.

Flushing response of ground birds, as previously alluded to, was linked to the width of the river channel (see Table 93) with less flushing occurring on wide channels (see Table 94). This occurs because some boats can pass by feeding eagles at such a far distance as to not elicit flight.

Flushing was much higher for eagles feeding or standing on the ground compared to eagles perched in trees (see Table 92). Eagles are more sensitive to human activity while forced to feed on ground where large salmon carcasses can not be carried to tree perches.

Table 70. Characteristics of float trips used to simulate boating activity and census eagles.

River Section	River Miles			Time	Put-in	Take-out
	From	To	Total			
SRBENA	75.5	67.5	8.0	AM & PM	Clark's	Rockport
Upper Skagit	67.5	62.0	5.5	PM	Rockport	Faber's
Middle Skagit	62.0	47.0	15.0	AM	Faber's	Presentin
Lower Skagit	40.5	24.0	16.5	AM	Hamilton	Pipeline
Upper Sauk	24.0	13.0	11.0	AM	Darrington	Suiattle
Lower Sauk	13.0	0.0	13.0	AM	Suiattle	Skagit
Suiattle	12.0	0.0	12.0	PM	Bridge	Sauk

Table 71. Counts of eagles while rafting the SRBENA during four times and six other stretches of the SW&SRS in 1985-86.

	Week of Season (1 Dec to 28 Feb)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	Totals
SRBENA Sun-AM														
Adult	34	49	38	44	27	83	14	21	18	25	13	8	15	389
Subadult	21	14	13	23	6	34	6	18	13	18	6	0	10	182
All Ages	55	63	51	67	33	117	20	39	31	43	19	8	25	571
SRBENA Sun-PM														
Adult	37	24	27	13	30	34	6	33	8	18	6	8	12	256
Subadult	10	8	7	2	9	21	2	16	4	2	0	1	5	87
All Ages	47	32	34	15	39	55	8	49	12	20	6	9	17	343
SRBENA Thu-AM														
Adult	40	47	94	26	65	88	78	75	21	19	7	13	11	584
Subadult	29	18	29	3	25	33	46	48	7	13	2	8	5	266
All Ages	69	65	123	29	90	121	124	123	28	32	9	21	16	850
SRBENA Thu-PM														
Adult	51	24	61	13	49	40	25	29	19	10	2	10	8	341
Subadult	43	10	18	2	20	28	14	17	8	4	1	5	7	177
All Ages	94	34	79	15	69	68	39	46	27	14	3	15	15	518
Upper Skagit														
Adult	7	8	4	7	9	16	10	17	17	8	6	4	8	121
Subadult	7	3	2	2	5	1	4	4	8	5	0	4	3	48
All Ages	14	11	6	9	14	17	14	21	25	13	6	8	11	169
Middle Skagit														
Adult	44	24	12	9	19	22	26	17	10	12	7	7	5	214
Subadult	23	20	8	5	6	10	7	18	5	6	0	5	2	115
All Ages	67	44	20	14	25	32	33	35	15	18	7	12	7	329
Lower Skagit														
Adult	11	6	3	8	4	9	12	21	11	13	17	14	10	139
Subadult	22	6	3	19	5	4	6	15	7	8	7	12	10	124
All Ages	33	12	6	27	9	13	18	36	18	21	24	26	20	263
Upper Sauk														
Adult	70	43	24	20	31	35	14	12	26	24	24	21	8	352
Subadult	32	34	40	16	21	7	10	6	12	7	11	16	1	213
All Ages	102	77	64	36	52	42	24	18	38	31	35	37	9	565
Lower Sauk														
Adult	39	37	43	41	18	26	22	24	11	11	24	7	16	319
Subadult	5	12	24	59	13	8	11	4	6	14	8	4	7	175
All Ages	44	49	67	100	31	34	33	28	17	25	32	11	23	494
Suiattle														
Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subadult	-	-	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 72. Counts of eagles while rafting the SRBENA during four times and six other stretches of the SW&SRS in 1986-87.

	Week of Season (30 Nov to 28 Feb)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	Totals
SRBENA Sun-AM														
Adult	16	58	50	69	20	62	56	51	32	18	18	15	12	477
Subadult	6	18	15	37	6	16	19	41	18	11	14	7	14	222
All Ages	22	76	65	106	26	78	75	92	50	29	32	22	26	699
SRBENA Sun-PM														
Adult	5	36	34	46	34	31	24	23	29	18	10	9	10	309
Subadult	3	7	5	18	5	8	6	6	7	7	0	4	4	80
All Ages	8	43	39	64	39	39	30	29	36	25	10	13	14	389
SRBENA Thu-AM														
Adult	36	34	56	126	61	51	35	79	80	21	22	14	14	629
Subadult	18	19	22	48	14	36	26	19	30	14	17	14	6	283
All Ages	54	53	78	174	75	87	61	98	110	35	39	28	20	912
SRBENA Thu-PM														
Adult	15	53	47	65	38	39	24	34	52	25	9	12	13	426
Subadult	4	9	17	26	5	20	1	9	13	21	8	6	4	143
All Ages	19	62	64	91	43	59	25	43	65	46	17	18	17	569
Upper Skagit														
Adult	4	14	1	3	0	8	65	47	19	29	5	10	4	209
Subadult	0	9	0	0	0	2	35	13	6	11	2	8	2	88
All Ages	4	23	1	3	0	10	100	60	25	40	7	18	6	297
Middle Skagit														
Adult	8	28	19	25	47	33	55	44	49	21	15	16	18	378
Subadult	6	18	13	33	25	22	20	26	18	3	5	10	6	205
All Ages	14	46	32	58	72	55	75	70	67	24	20	26	24	583
Lower Skagit														
Adult	6	8	11	10	30	67	65	44	35	13	21	13	20	343
Subadult	11	0	4	4	28	41	73	72	45	43	19	13	10	363
All Ages	17	8	15	14	58	108	138	116	80	56	40	26	30	706
Upper Sauk														
Adult	16	23	15	14	6	19	20	24	24	38	17	13	9	238
Subadult	10	20	9	3	10	16	2	19	16	24	11	8	10	158
All Ages	26	43	24	17	16	35	22	43	40	62	28	21	19	396
Lower Sauk														
Adult	13	18	9	29	23	28	13	26	19	35	14	12	2	241
Subadult	7	11	5	5	19	11	6	15	4	15	15	3	2	118
All Ages	20	29	14	34	42	39	19	41	23	50	29	15	4	359
Suiattle														
Adult	-	-	-	-	-	-	37	-	-	16	-	20	3	76
Subadult	-	-	-	-	-	-	5	-	-	9	-	14	1	29
All Ages	-	-	-	-	-	-	42	-	-	25	-	34	4	105

Table 73. Density of eagles (number per river mile) recorded while rafting the SRBENA during AM and six other stretches of the SW&SRS in 1985-86 and 1986-87 combined.

	Week of Season (30 Nov to 28 Feb)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean
SRBENA (AM)	6.3	8.0	9.9	11.8	7.0	12.6	8.8	11.0	6.8	4.3	3.1	2.5	2.7	7.3
Upper Skagit	1.6	3.1	0.6	1.1	1.3	2.5	10.4	7.4	4.5	4.8	1.2	2.4	1.5	3.3
Middle Skagit	2.7	3.0	1.7	2.4	3.2	2.9	3.6	3.5	2.7	1.4	0.9	1.3	1.0	2.3
Lower Skagit	1.5	0.6	0.6	1.2	2.0	3.7	4.7	4.6	3.0	2.3	1.9	1.6	1.5	2.3
Upper Sauk	5.8	5.5	4.0	2.4	3.1	3.5	2.1	2.8	3.5	4.2	2.9	2.6	1.3	3.4
Lower Sauk	2.5	3.0	3.1	5.2	2.8	2.8	2.0	2.7	1.5	2.9	2.3	1.0	1.0	2.5
Suiattle	-	-	-	-	-	-	3.5	-	-	2.1	-	2.8	0.3	2.2
Totals	3.2	3.4	3.0	3.6	3.1	4.3	4.3	4.7	3.3	2.8	2.0	1.9	1.3	3.2

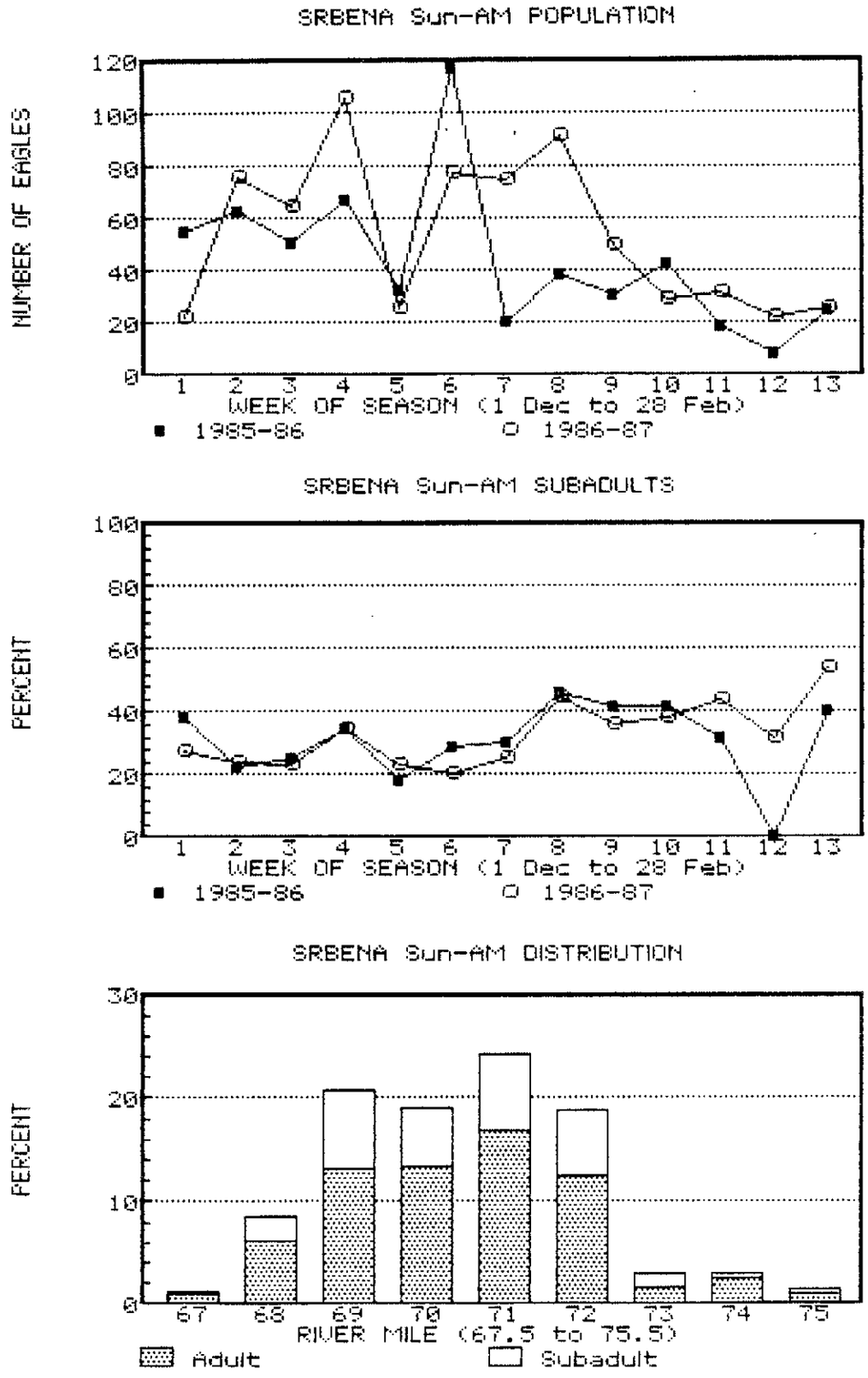


Figure 35. Number of eagles (upper), percent subadults (middle), and distribution (lower) on the SRBENA during Sunday mornings in both 1985-86 and 1986-87.

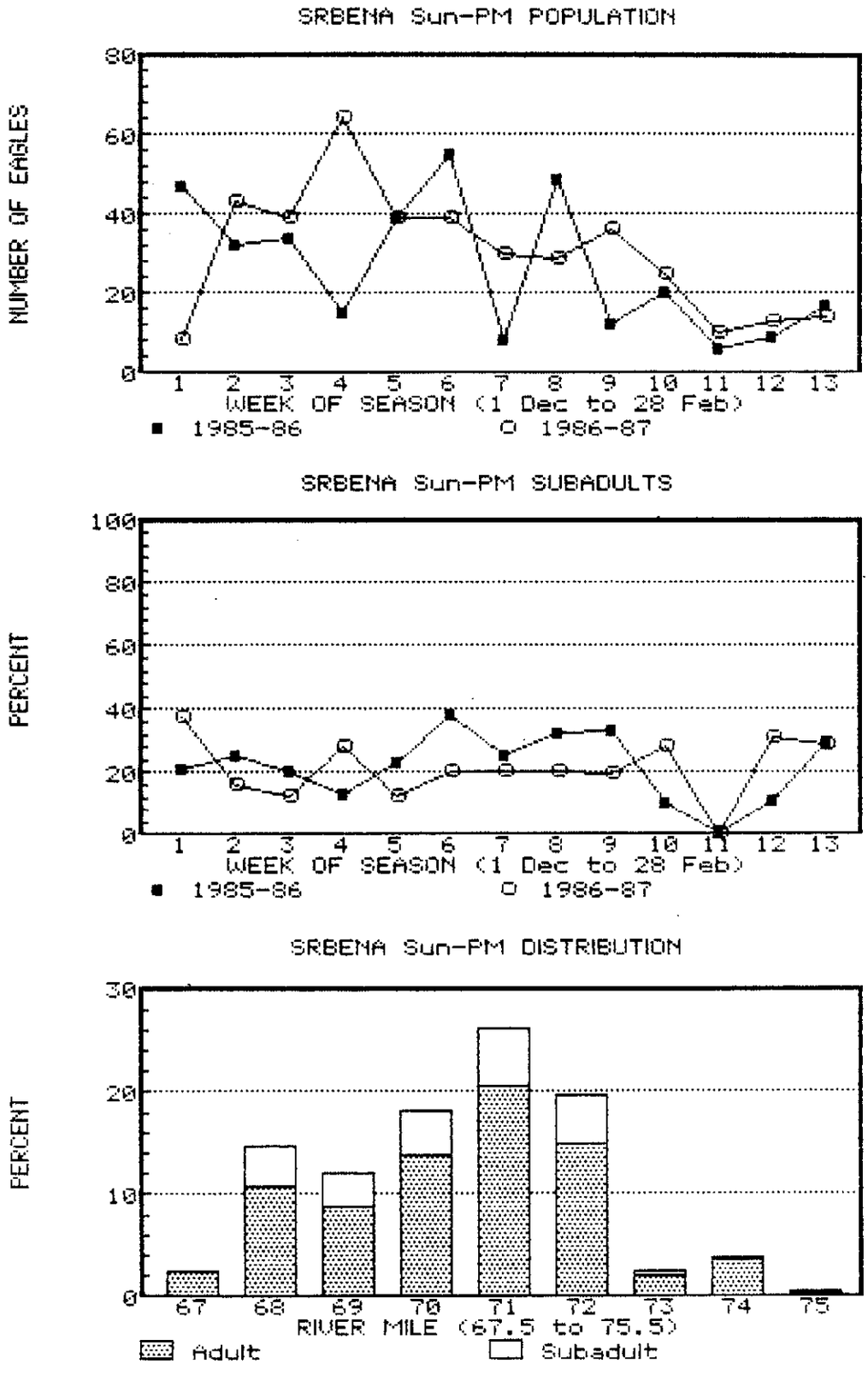


Figure 36. Number of eagles (upper), percent subadults (middle), and distribution (lower) on the SRBENA during Sunday afternoons in both 1985-86 and 1986-87.

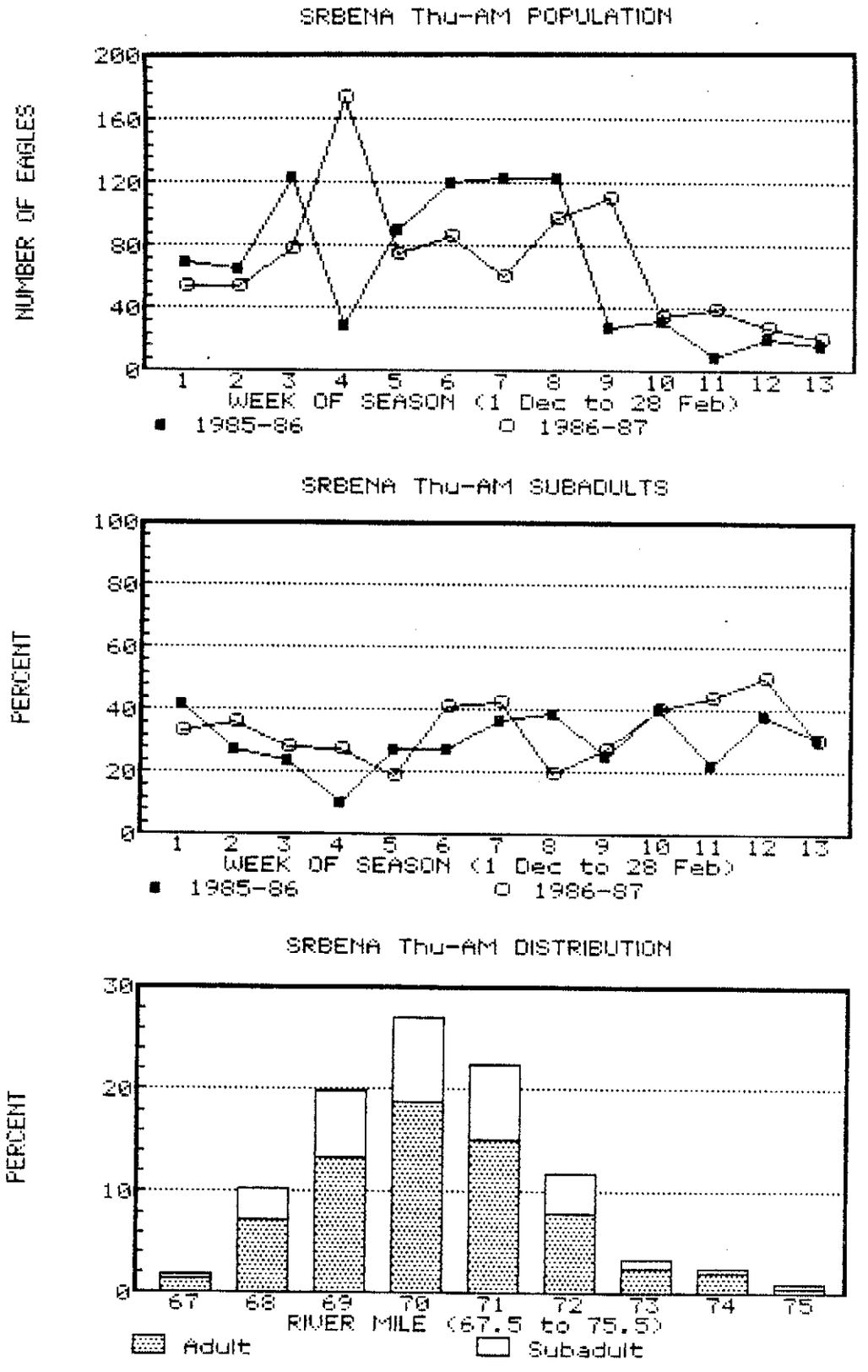


Figure 37. Number of eagles (upper), percent subadults (middle), and distribution (lower) on the SRBENA during Thursday mornings in both 1985-86 and 1986-87.

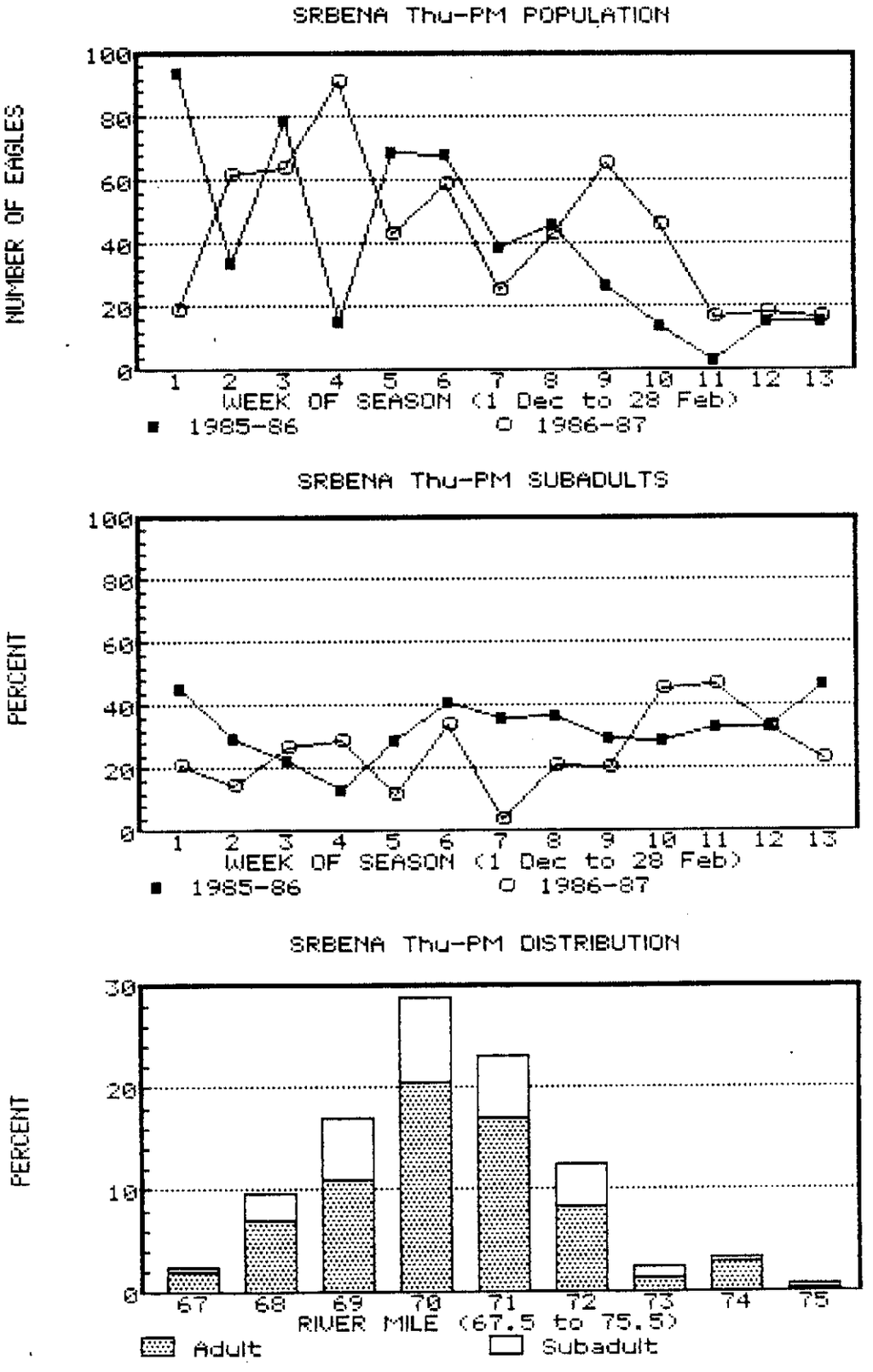


Figure 38. Number of eagles (upper), percent subadults (middle), and distribution (lower) on the SRBENA during Thursday afternoons in both 1985-86 and 1986-87.

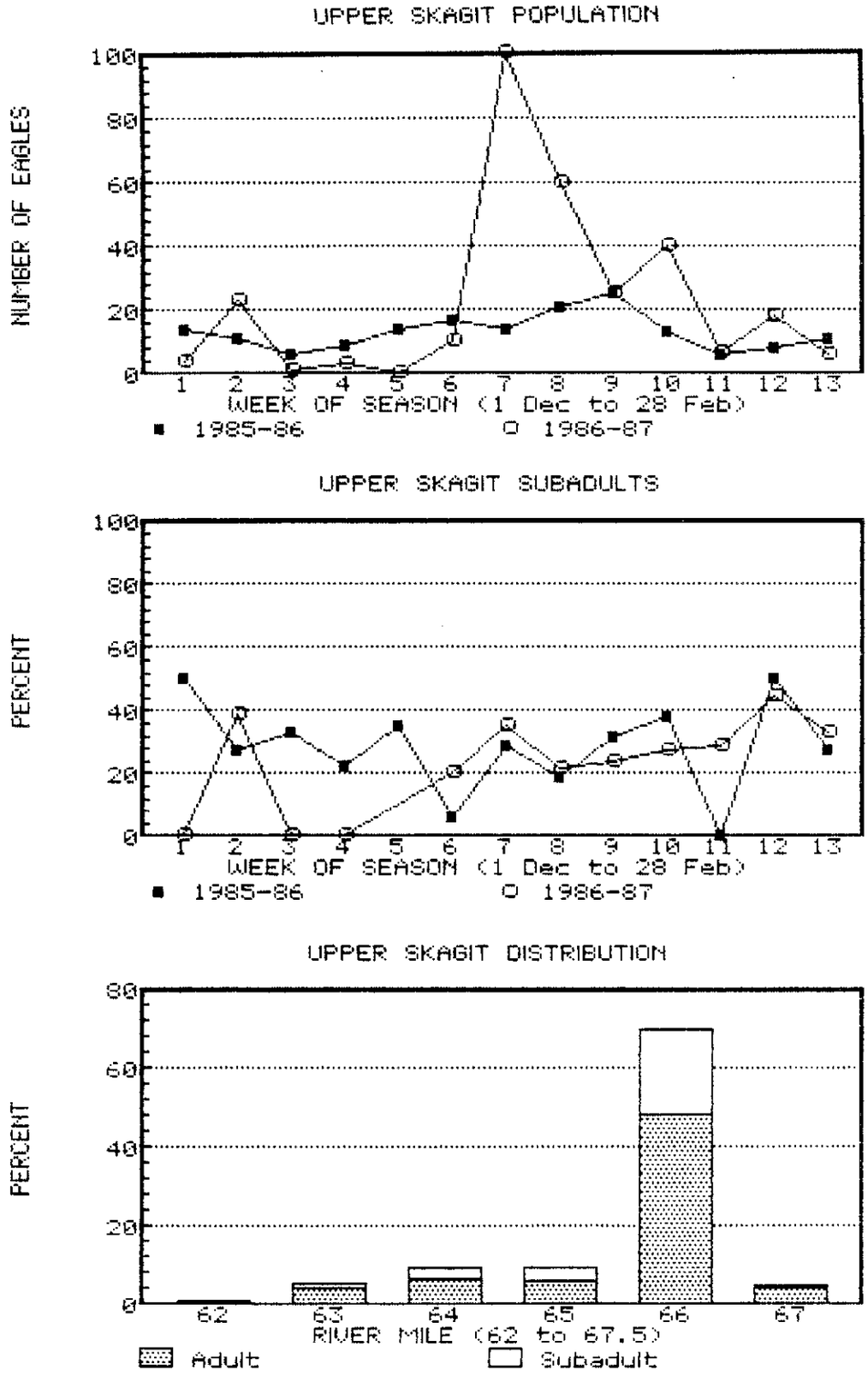


Figure 39. Number of eagles (upper), percent subadults (middle), and distribution (lower) on the Upper Skagit during Tuesday afternoons in both 1985-86 and 1986-87.

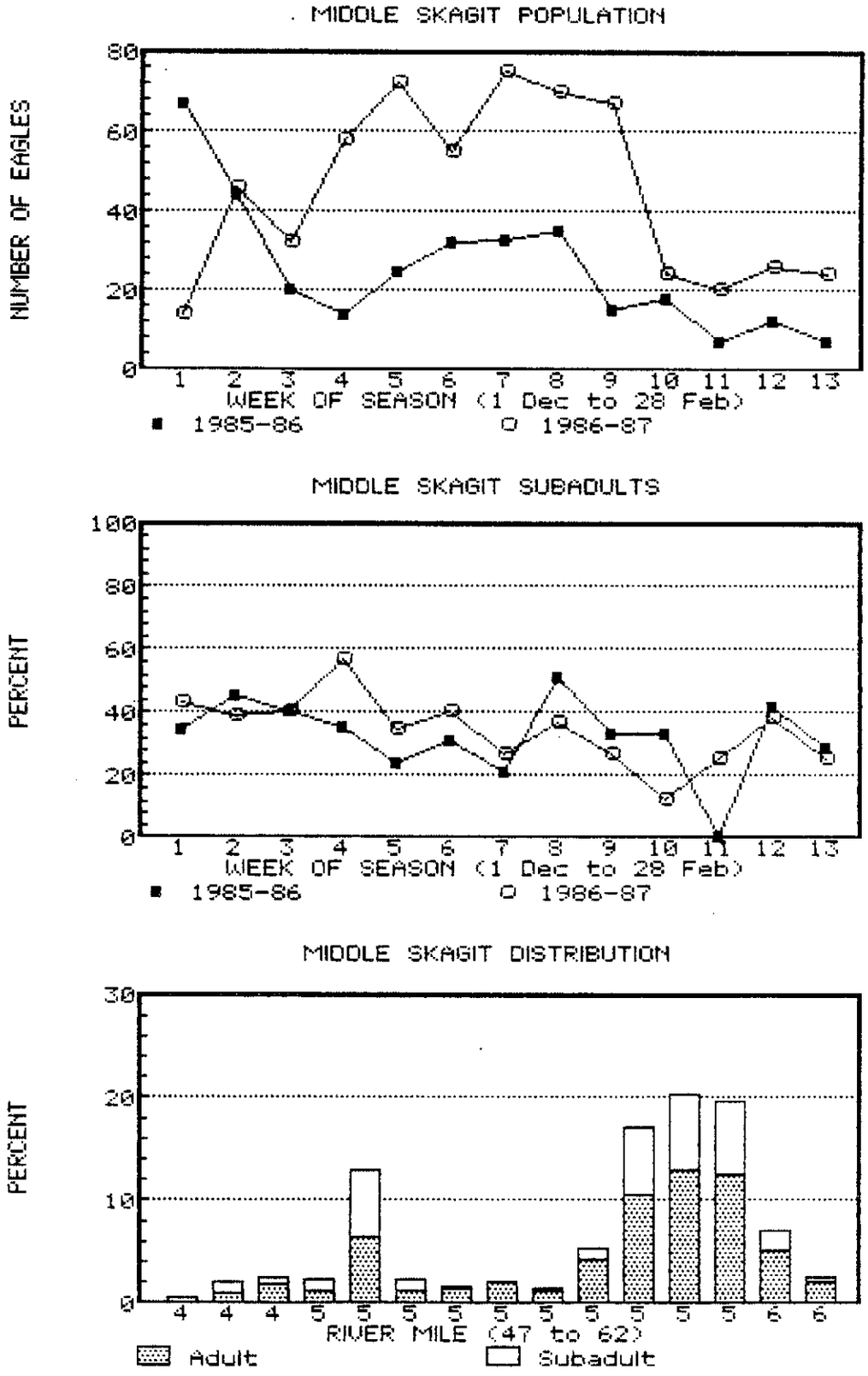


Figure 40. Number of eagles (upper), percent subadults (middle), and distribution (lower) on the Middle Skagit during Friday mornings in both 1985-86 and 1986-87.

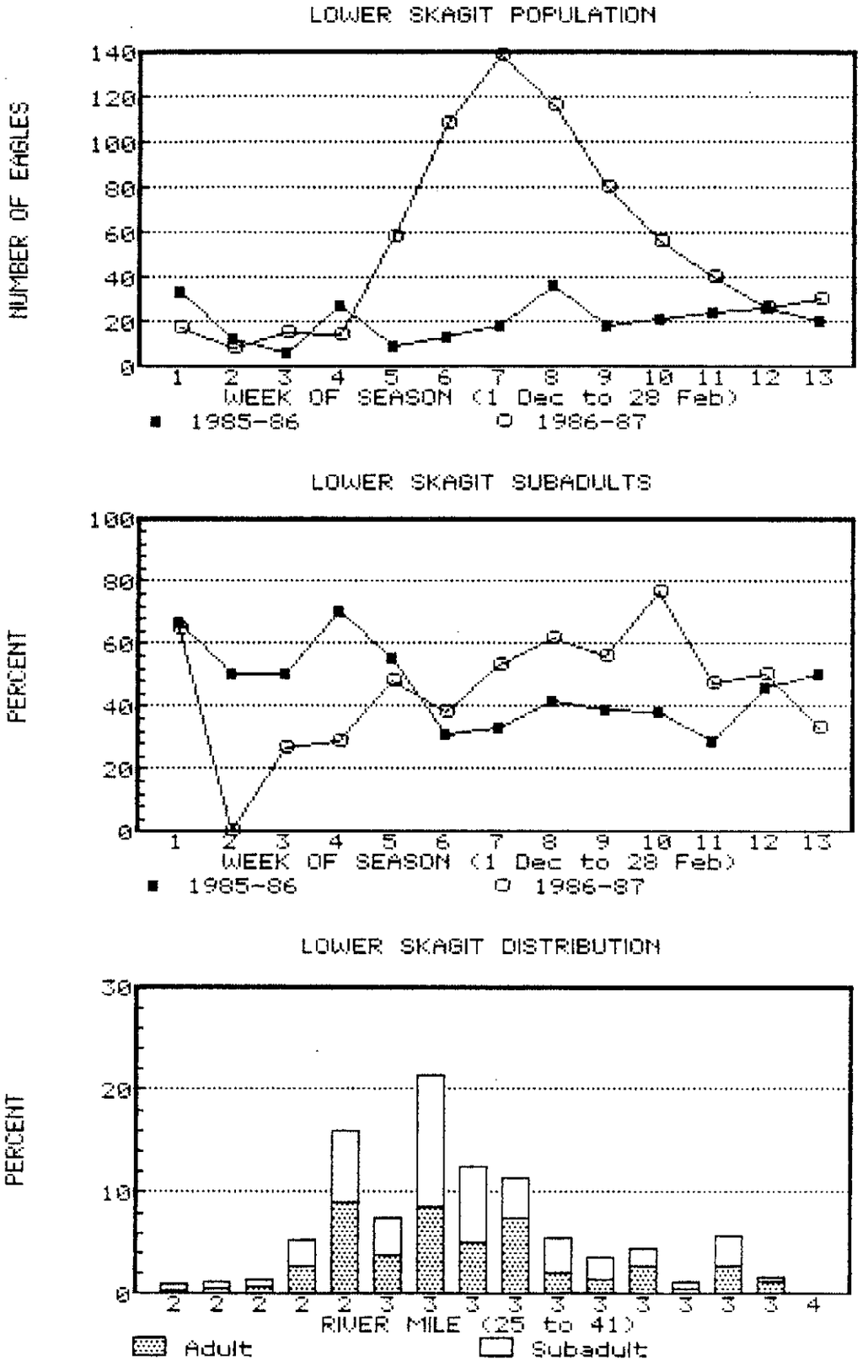


Figure 41. Number of eagles (upper), percent subadults (middle), and distribution (lower) on the Lower Skagit during Saturday mornings in both 1985-86 and 1986-87.

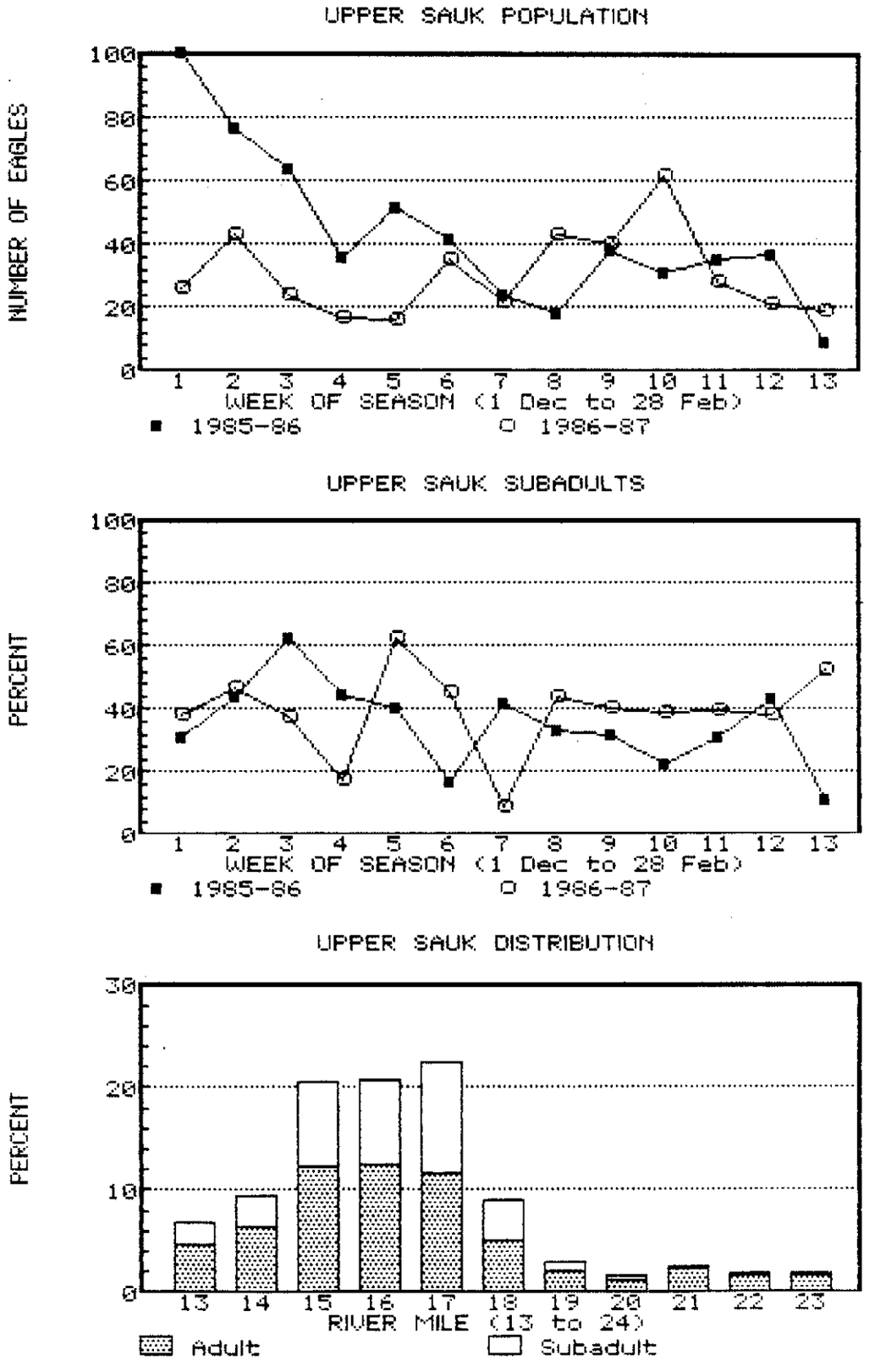


Figure 42. Number of eagles (upper), percent subadults (middle), and distribution (lower) on the Upper Sauk during Monday mornings in both 1985-86 and 1986-87.

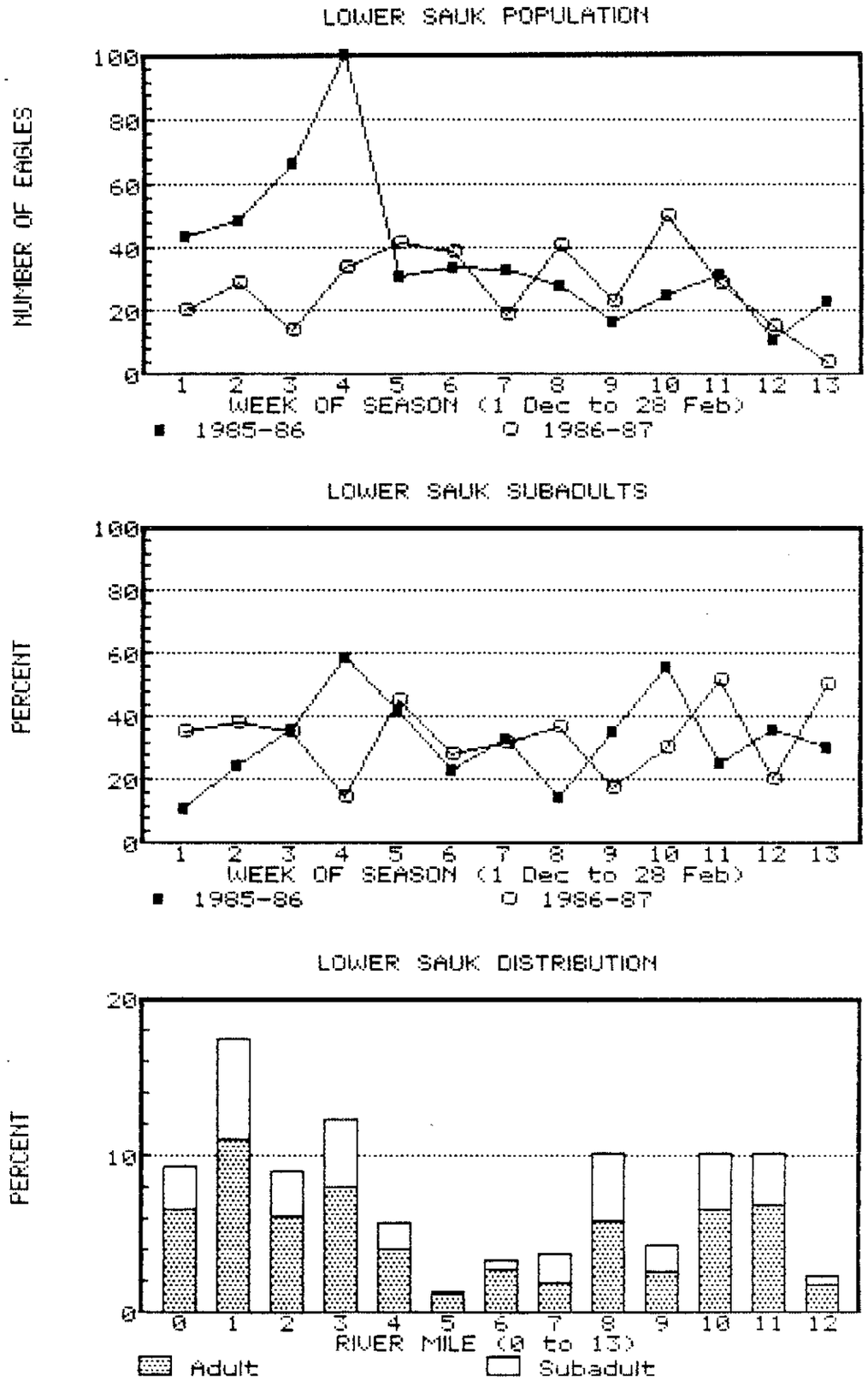


Figure 43. Number of eagles (upper), percent subadults (middle), and distribution (lower) on the Lower Sauk during Tuesday mornings in both 1985-86 and 1986-87.

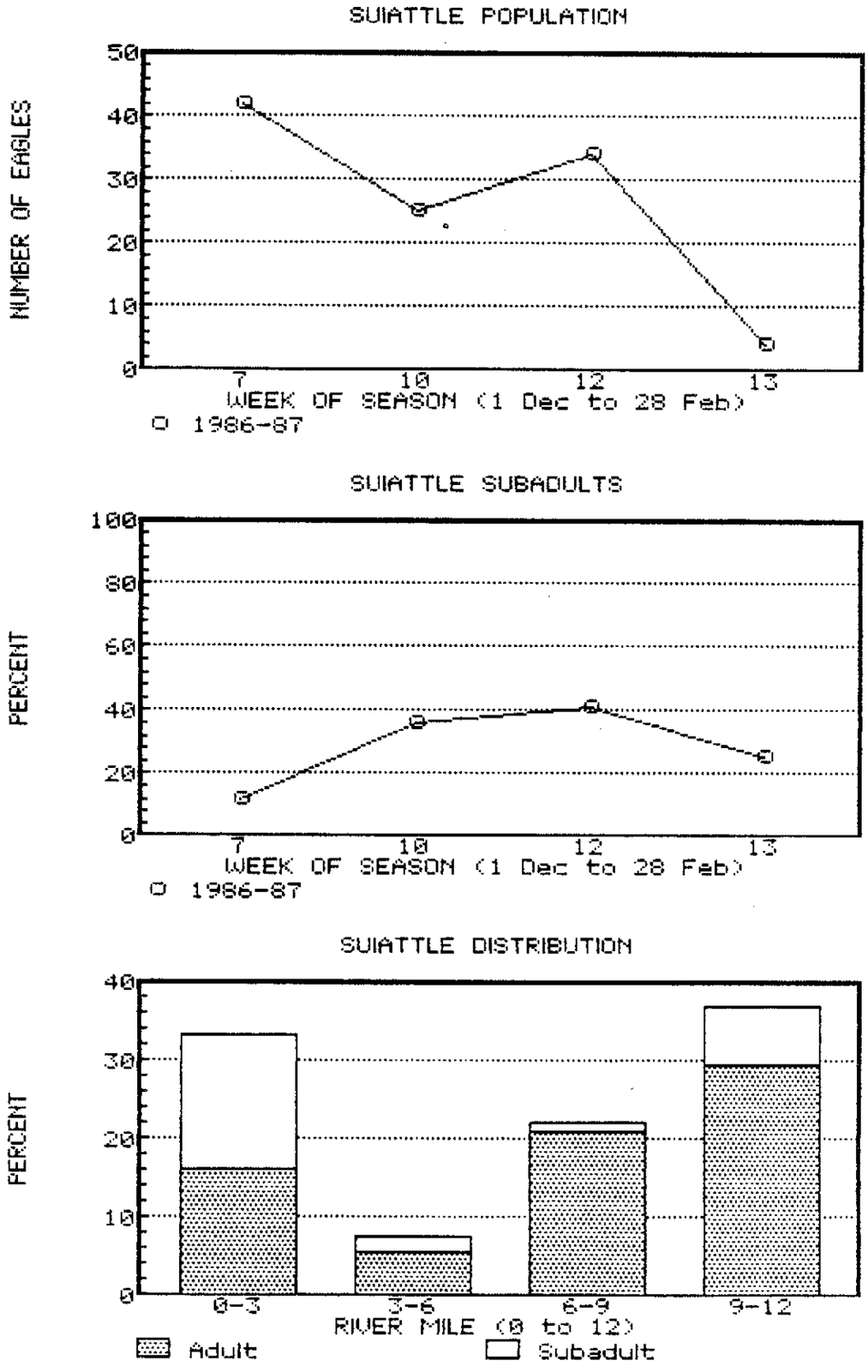


Figure 44. Number of eagles (upper), percent subadults (middle), and distribution (lower) on the Suiattle during Monday afternoons in both 1985-86 and 1986-87.

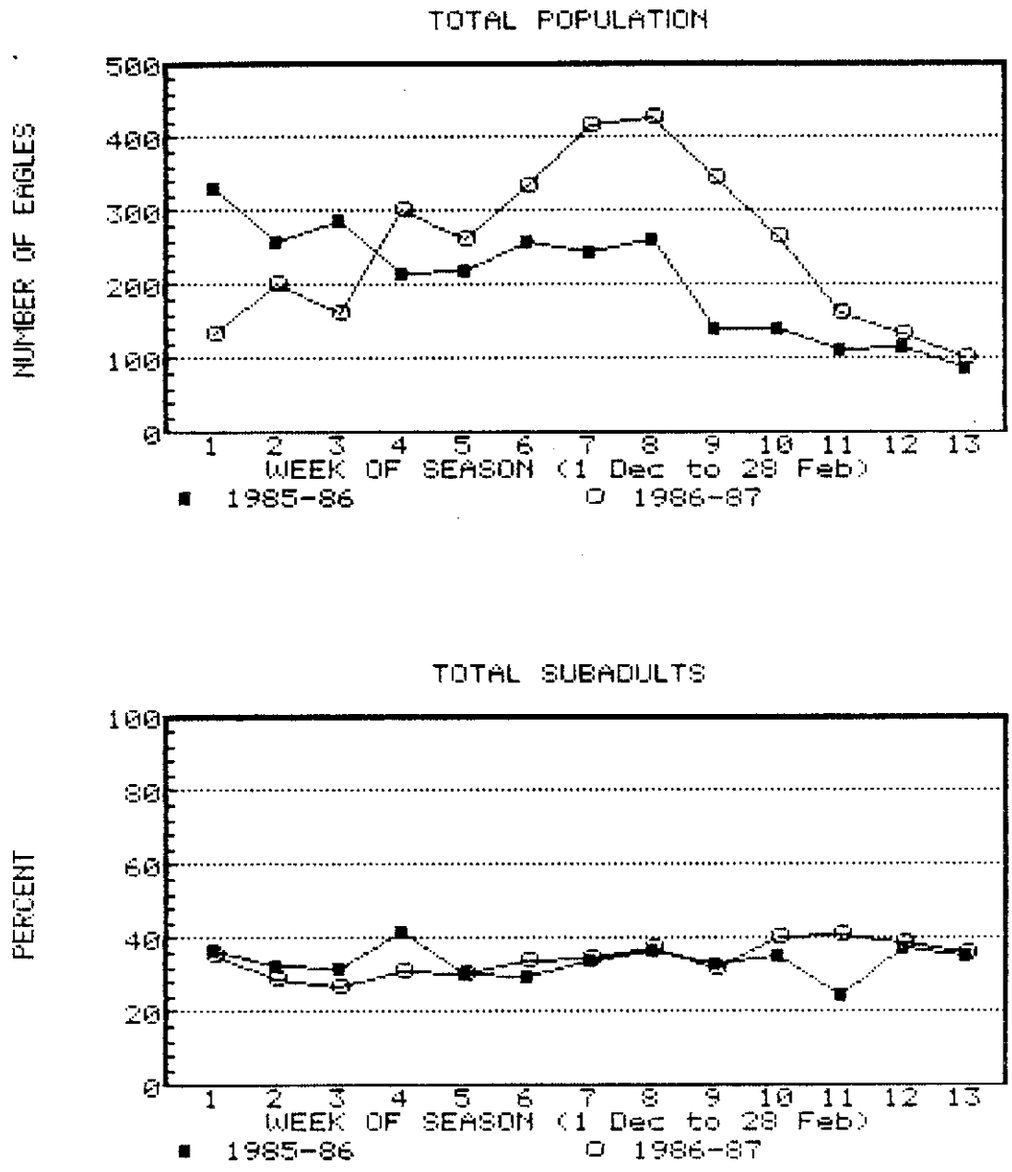


Figure 45. Total population of eagles (upper) excluding the Suiattle and using Thursday morning for the SRBENA count and the percentage of subadults (lower).

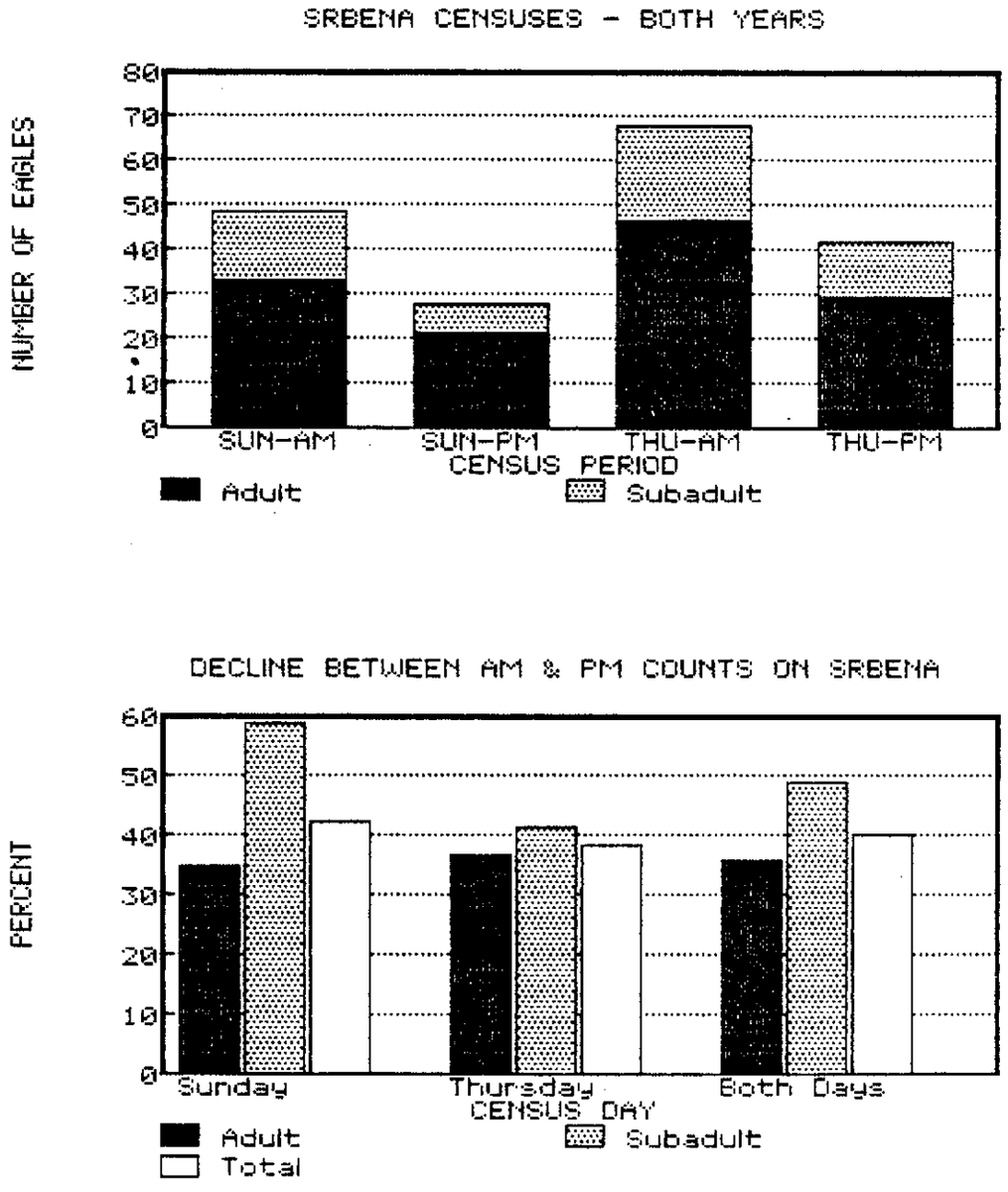
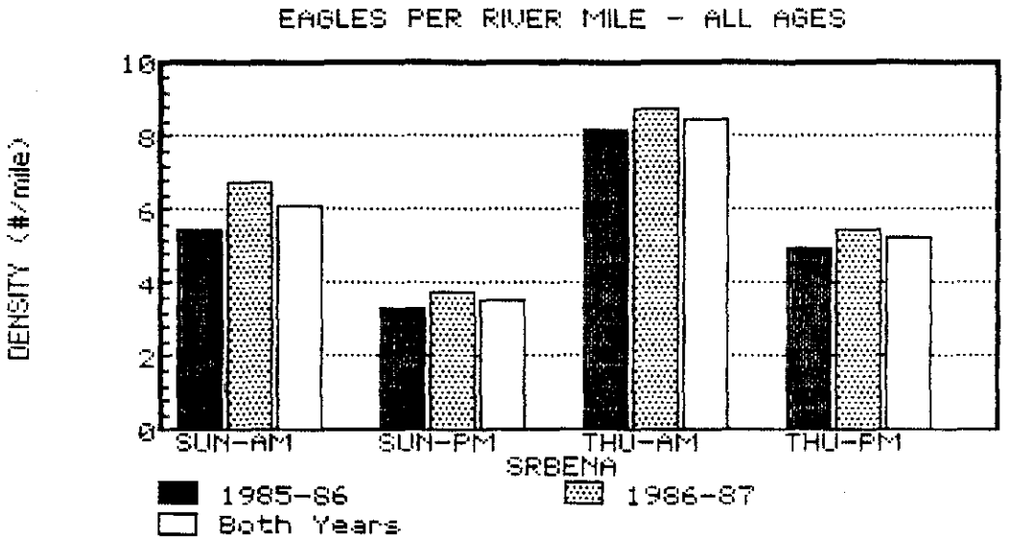


Figure 46. Counts of eagles on the SRBENA during the four time periods (upper) and percent decline in eagle numbers between morning and afternoon counts (lower) for 1985-86 and 1986-87 combined.



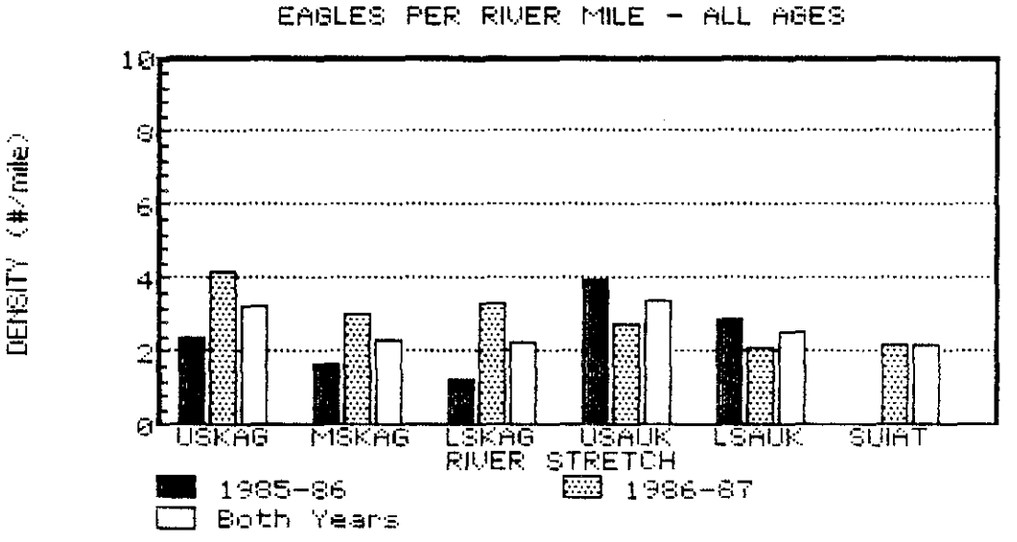
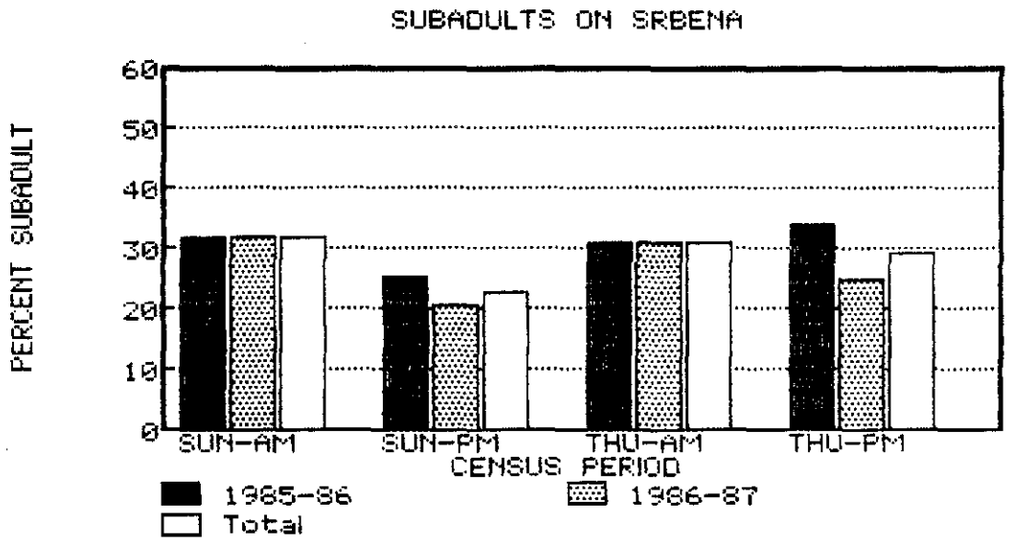


Figure 47. Density of eagles on the SRBENA during the four time periods (upper) and on the six river stretches of the SW&SRS (lower) for both 1985-86 and 1986-87.



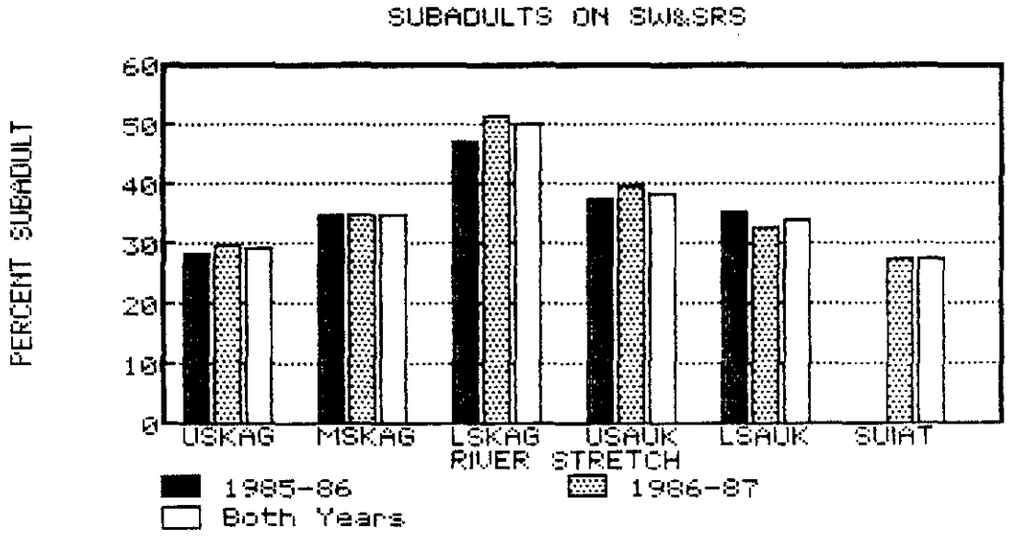


Figure 48. Percent subadults on the SRBENA during the four time periods (upper) and on the six river stretches of the SW&SRS (lower) for both 1985-86 and 1986-87.

Table 74. Flight distances (meters) of eagles from simulated rafting activity while perched in trees on the SRBENA at four times and on six other rivers stretches of the SW&SRS.

River/ Time/ Year	Adult			Subadult			All Ages		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
SRBENA-Sun-AM									
1985-86	108	119.1	66.34	92	112.3	60.02	200	115.9	63.44
1986-87	149	119.1	71.07	98	115.9	62.57	247	117.8	67.71
Both Years	257	119.1	68.99	190	114.2	61.21	447	117.0	65.77
SRBENA-Sun-PM									
1985-86	54	99.6	42.56	21	114.8	80.35	75	103.9	55.58
1986-87	24	125.0	103.2	11	112.7	63.73	35	121.1	91.80
Both Years	78	107.4	67.56	32	114.1	74.00	110	109.4	69.22
SRBENA-Thu-AM									
1985-86	196	108.6	59.47	118	109.7	61.66	314	109.0	60.20
1986-87	204	123.7	76.52	134	111.3	67.37	338	118.8	73.19
Both Years	400	116.3	69.03	252	110.5	64.64	652	114.1	67.37
SRBENA-Thu-PM									
1985-86	97	93.7	61.53	62	98.7	60.88	159	95.7	61.13
1986-87	87	105.2	53.42	32	105.6	78.78	119	105.3	60.91
Both Years	184	99.1	57.96	94	101.1	67.16	278	99.8	61.11
Upper Skagit									
1985-86	16	96.3	47.17	16	103.1	68.38	32	99.7	57.89
1986-87	49	139.4	93.99	32	138.1	86.11	81	138.9	90.42
Both Years	65	128.8	86.59	48	126.5	81.62	113	127.8	84.15
Middle Skagit									
1985-86	92	142.2	82.34	57	124.4	58.62	149	135.4	74.46
1986-87	167	134.3	70.73	106	136.8	69.65	273	135.3	70.19
Both Years	259	137.1	75.00	163	132.5	66.08	422	135.3	71.64
Lower Skagit									
1985-86	35	129.7	89.72	39	127.7	85.76	74	128.6	87.06
1986-87	119	185.8	96.98	104	143.8	83.97	223	166.2	93.34
Both Years	154	173.1	97.98	143	139.4	84.46	297	156.8	93.10
Upper Sauk									
1985-86	206	149.7	83.92	114	124.3	70.25	320	140.6	80.13
1986-87	140	150.3	90.94	87	125.1	73.13	227	140.6	85.28
Both Years	346	149.9	86.70	201	124.6	71.33	547	140.6	82.23

Table 74. Continued.

River/ Time/ Year	Adult			Subadult			All Ages		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
Lower Sauk									
1985-86	208	143.8	79.23	106	131.6	74.09	314	139.6	77.63
1986-87	197	158.3	106.0	97	153.1	123.1	294	156.6	111.7
Both Years	405	150.8	93.35	203	141.9	100.9	608	147.8	95.94
Suiattle									
1985-86	-	-	-	-	-	-	-	-	-
1986-87	78	135.5	88.56	25	98.4	58.07	103	126.5	83.49
Both Years	-	-	-	-	-	-	-	-	-

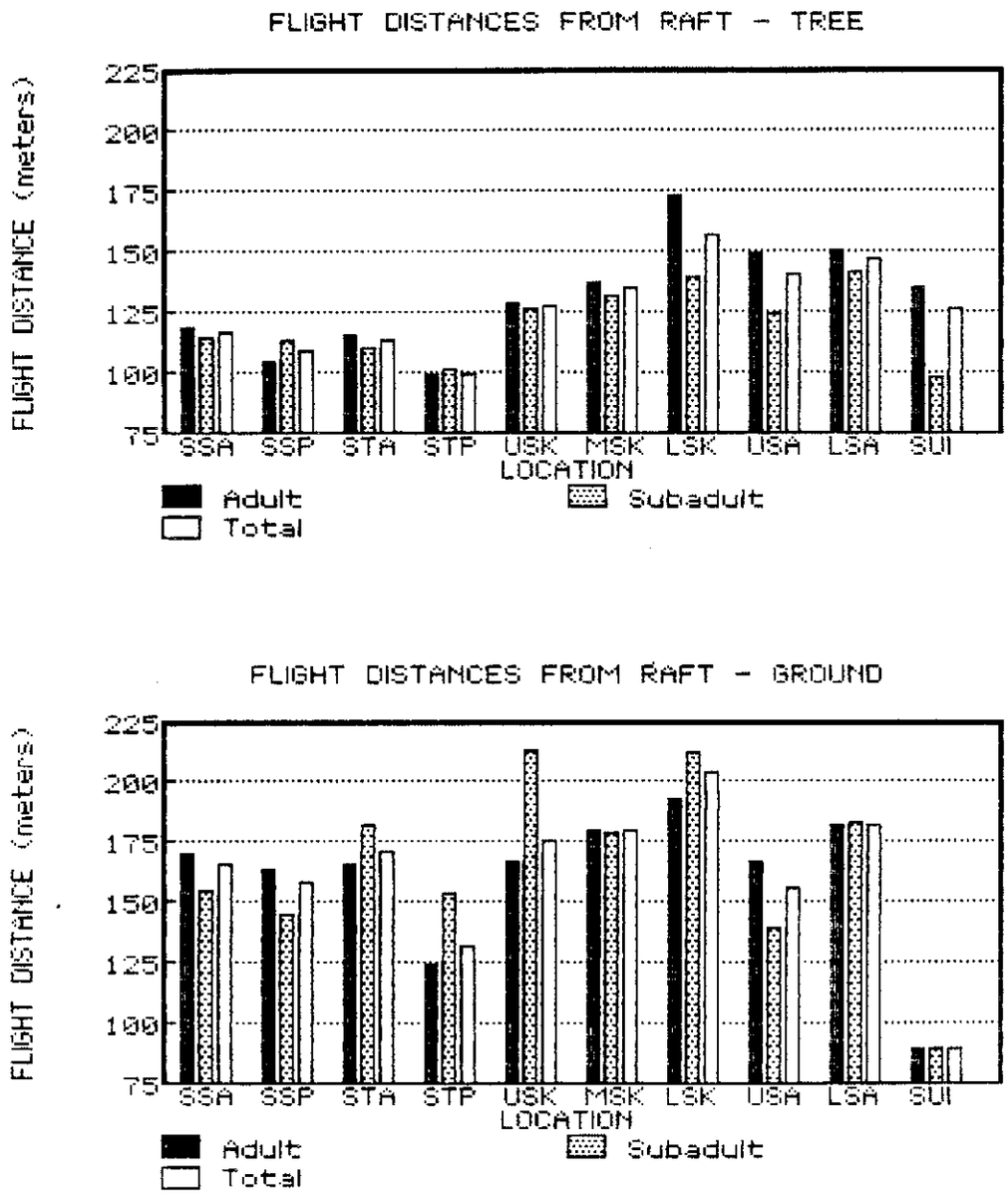


Figure 49. Flight distances (meters) of eagles in trees (upper) and on the ground (lower) from the research raft on the SRBENA during four times and on six river stretches of the SW&SRS for 1985-86 and 1986-87 combined. SSA = SRBENA/Sunday AM, SSP = SRBENA/Sunday PM, STA = SRBENA/Thursday AM, STP = SRBENA/Thursday PM, USK = Upper Skagit, MSK = Middle Skagit, LSK = Lower Skagit, USA = Upper Sauk, LSA = Lower Sauk, SUI = Suiattle.

Table 75. Statistical probabilities comparing flight distances of bald eagles from simulated rafting activity while in trees (upper right half) and on ground (lower left half) in 1985-86.

	SRBENA Sun-AM	SRBENA Sun-PM	SRBENA Thu-AM	SRBENA Thu-PM	Upper Skagit	Middle Skagit	Lower Skagit	Upper Sauk	Lower Sauk	Suiattle
SRBENA Sun-AM										
Adult		N	N	0.05	N	0.05	N	0.001	0.01	-
Subadult		N	N	N	N	N	N	N	N	-
All Ages		N	N	0.01	N	0.05	N	0.001	0.001	-
SRBENA Sun-PM										
Adult	N		N	N	N	0.001	N	0.001	0.001	-
Subadult	N		N	N	N	N	N	N	N	-
All Ages	N		N	N	N	0.01	0.05	0.001	0.001	-
SRBENA Thu-AM										
Adult	0.01	N		N	N	0.001	N	0.001	0.001	-
Subadult	N	N		N	N	N	N	N	N	-
All Ages	0.01	N		N	N	0.001	0.05	0.001	0.001	-
SRBENA Thu-PM										
Adult	N	N	0.05		N	0.001	0.05	0.001	0.001	-
Subadult	N	N	N		N	N	N	N	N	-
All Ages	N	N	0.05		N	0.001	0.001	0.001	0.001	-
Upper Skagit										
Adult	N	N	N	N		0.05	N	0.01	0.05	-
Subadult	N	N	N	N		N	N	N	N	-
All Ages	N	N	N	N		0.01	N	N	N	-
Middle Skagit										
Adult	N	N	N	N	N		N	N	N	-
Subadult	N	N	N	N	N		N	N	N	-
All Ages	0.05	N	N	0.05	N		N	N	N	-
Lower Skagit										
Adult	N	N	N	N	N	N		N	N	-
Subadult	N	N	N	N	N	N		N	N	-
All Ages	0.01	0.05	N	0.01	N	N		N	N	-
Upper Sauk										
Adult	N	N	N	N	N	N	N		N	-
Subadult	N	N	N	N	N	N	N		N	-
All Ages	N	N	N	N	N	N	N		N	-
Lower Sauk										
Adult	0.01	N	N	0.01	N	N	N	N		-
Subadult	N	N	N	N	N	N	N	N		-
All Ages	0.01	0.05	N	0.05	N	N	N	N		-
Suiattle										
Adult	-	-	-	-	-	-	-	-	-	
Subadult	-	-	-	-	-	-	-	-	-	
All Ages	-	-	-	-	-	-	-	-	-	

Table 76. Statistical probabilities comparing flight distances of bald eagles from simulated rafting activity while in trees (upper right half) and on ground (lower left half) in 1986-87.

	SRBENA Sun-AM	SRBENA Sun-PM	SRBENA Thu-AM	SRBENA Thu-PM	Upper Skagit	Middle Skagit	Lower Skagit	Upper Sauk	Lower Sauk	Suiattle
SRBENA Sun-AM										
Adult		N	N	N	N	N	0.001	0.01	0.001	N
Subadult		N	N	N	N	N	0.05	N	0.01	N
All Ages		N	N	N	0.05	0.05	0.001	0.01	0.001	N
SRBENA Sun-PM										
Adult	N		N	N	N	N	0.01	N	N	N
Subadult	N		N	N	N	N	N	N	N	N
All Ages	N		N	N	N	N	0.01	N	0.05	N
SRBENA Thu-AM										
Adult	0.05	N		N	N	N	0.001	0.01	0.001	N
Subadult	N	N		N	N	0.05	0.01	N	0.001	N
All Ages	N	N		N	N	0.05	0.001	0.01	0.001	N
SRBENA Thu-PM										
Adult	0.001	N	0.05		0.05	0.01	0.001	0.001	0.001	0.05
Subadult	N	N	N		N	N	0.05	N	0.01	N
All Ages	0.01	N	0.05		0.01	0.01	0.001	0.001	0.001	N
Upper Skagit										
Adult	N	N	N	N		N	0.01	N	N	N
Subadult	N	N	N	N		N	N	N	N	N
All Ages	N	N	N	N		N	0.05	N	N	N
Middle Skagit										
Adult	N	N	N	0.05	N		0.001	N	0.01	N
Subadult	N	N	N	N	N		N	N	N	0.05
All Ages	N	N	N	0.05	N		0.001	N	0.01	N
Lower Skagit										
Adult	N	N	N	0.01	N	N		0.001	0.01	0.001
Subadult	N	N	N	N	N	N		N	N	0.05
All Ages	N	N	0.01	0.001	N	N		0.01	N	0.001
Upper Sauk										
Adult	N	N	N	0.05	N	N	N		N	N
Subadult	N	N	N	N	N	N	N		0.05	N
All Ages	N	N	N	N	N	N	0.05		0.05	N
Lower Sauk										
Adult	N	N	N	0.05	N	N	N	N		0.05
Subadult	N	N	N	N	N	N	N	N		0.01
All Ages	N	N	N	0.05	N	N	N	N		0.01
Suiattle										
Adult	N	N	N	N	N	N	N	N	N	
Subadult	N	N	N	N	N	N	N	N	N	
All Ages	N	N	N	N	N	N	0.05	N	N	

Table 77. Statistical probabilities comparing flight distances of bald eagles from simulated rafting activity while in trees (upper right half) and on ground (lower left half) during 1985-86 and 1986-87 combined.

	SRBENA Sun-AM	SRBENA Sun-PM	SRBENA Thu-AM	SRBENA Thu-PM	Upper Skagit	Middle Skagit	Lower Skagit	Upper Sauk	Lower Sauk	Suiattle
SRBENA Sun-AM										
Adult		N	N	0.01	N	0.05	0.001	0.001	0.001	N
Subadult		N	N	N	N	0.05	0.01	N	0.001	N
All Ages		N	N	0.01	N	0.001	0.001	0.001	0.001	N
SRBENA Sun-PM										
Adult	N		N	N	N	0.01	0.001	0.001	0.001	0.05
Subadult	N		N	N	N	N	N	N	N	N
All Ages	N		N	N	N	0.01	0.001	0.001	0.001	N
SRBENA Thu-AM										
Adult	N	N		0.05	N	0.01	0.001	0.001	0.001	N
Subadult	N	N		N	N	0.01	0.001	0.05	0.001	N
All Ages	N	N		0.05	N	0.001	0.001	0.001	0.001	N
SRBENA Thu-PM										
Adult	0.01	0.05	0.01		0.05	0.001	0.001	0.001	0.001	0.001
Subadult	N	N	N		N	0.01	0.001	0.05	0.001	N
All Ages	0.05	N	0.01		0.01	0.001	0.001	0.001	0.001	0.01
Upper Skagit										
Adult	N	N	N	0.05		N	0.001	N	N	N
Subadult	N	N	N	N		N	N	N	N	N
All Ages	N	N	N	0.05		N	0.001	N	0.05	N
Middle Skagit										
Adult	N	N	N	0.01	N		0.001	N	N	N
Subadult	N	N	N	N	N		N	N	N	0.05
All Ages	N	N	N	0.01	N		0.001	N	0.05	N
Lower Skagit										
Adult	N	N	N	0.001	N	N		0.01	0.01	0.001
Subadult	0.01	0.05	N	0.05	N	N		N	N	0.05
All Ages	0.001	0.01	0.01	0.001	N	N		0.01	N	0.001
Upper Sauk										
Adult	N	N	N	0.05	N	N	N		N	N
Subadult	N	N	0.05	N	N	N	0.01		0.05	N
All Ages	N	N	N	N	N	N	0.001		N	N
Lower Sauk										
Adult	N	N	N	0.001	N	N	N	N		N
Subadult	N	N	N	N	N	N	N	N		0.01
All Ages	N	N	N	0.001	N	N	N	N		0.05
Suiattle										
Adult	N	N	N	N	N	N	N	N	N	
Subadult	N	N	N	N	N	N	N	N	N	
All Ages	N	N	N	N	N	N	0.05	N	N	

Table 78. Flight distances (meters) of eagles from simulated rafting activity while feeding or standing on the ground on the SRBENA at four times and on six other rivers stretches of the SW&SRS.

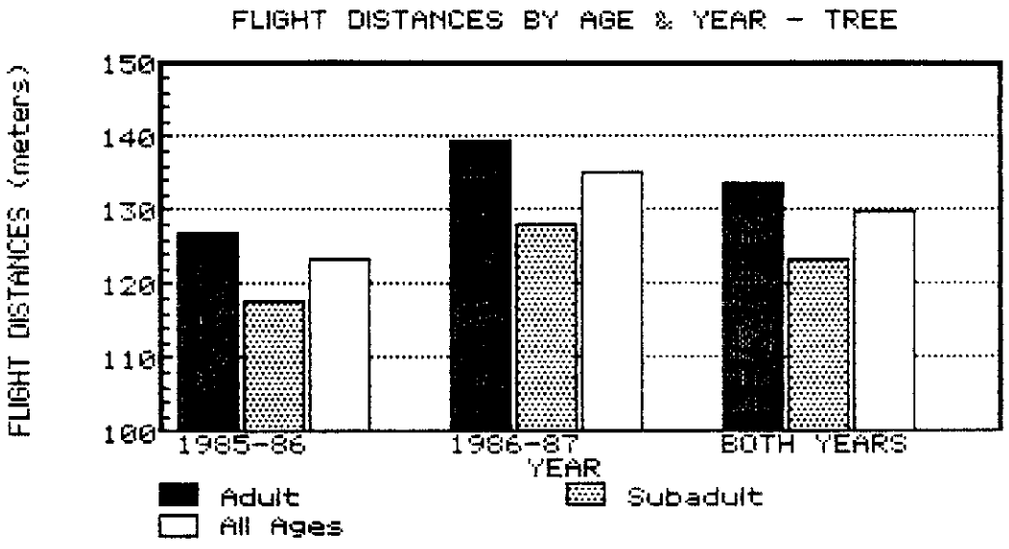
River/ Time/ Year	Adult			Subadult			All Ages		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
SRBENA-Sun-AM									
1985-86	54	123.9	56.21	30	145.0	87.05	84	131.4	69.06
1986-87	84	199.5	102.7	30	164.3	108.7	114	190.3	105.0
Both Years	138	169.9	94.80	60	154.7	98.13	198	165.3	95.83
SRBENA-Sun-PM									
1985-86	22	151.8	89.64	13	116.2	39.27	35	138.6	76.24
1986-87	24	175.4	92.31	8	192.5	81.55	32	179.7	88.77
Both Years	46	164.1	90.81	21	145.2	68.53	67	158.2	84.40
SRBENA-Thu-AM									
1985-86	106	162.5	102.6	57	179.3	102.5	163	168.4	102.6
1986-87	142	169.1	84.89	48	184.8	106.6	190	173.1	90.82
Both Years	248	166.3	92.75	105	181.8	103.9	352	170.9	96.32
SRBENA-Thu-PM									
1985-86	29	121.7	57.76	8	150.0	106.9	37	127.8	70.40
1986-87	30	128.0	61.33	12	156.7	62.28	42	136.2	62.23
Both Years	59	124.9	59.17	20	154.0	80.42	79	132.3	65.89
Upper Skagit									
1985-86	13	174.6	107.4	0	-	-	13	174.6	107.4
1986-87	16	161.2	85.63	6	213.3	118.6	22	175.5	95.65
Both Years	29	167.2	94.45	6	213.3	118.6	35	175.1	98.62
Middle Skagit									
1985-86	21	167.6	81.23	16	179.4	91.69	37	172.7	84.87
1986-87	38	186.8	98.94	24	179.2	99.17	62	183.9	98.29
Both Years	59	180.0	92.77	40	179.2	95.04	99	179.7	93.21
Lower Skagit									
1985-86	13	169.2	58.52	13	216.9	191.3	26	193.1	140.7
1986-87	35	201.1	133.2	51	211.8	136.4	86	207.4	134.4
Both Years	48	192.5	118.0	64	212.8	147.5	112	204.1	135.4
Upper Sauk									
1985-86	27	145.6	82.62	19	163.7	145.8	46	153.0	111.9
1986-87	24	190.8	106.7	16	111.9	49.43	40	159.2	95.87
Both Years	51	166.9	96.49	35	140.0	114.1	86	155.9	104.2

Table 78. Continued.

River/ Time/ Year	Adult			Subadult			All Ages		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
Lower Sauk									
1985-86	29	186.6	97.66	15	173.3	57.15	44	182.0	85.52
1986-87	34	178.8	118.1	20	190.0	78.27	54	183.0	104.5
Both Years	63	182.4	108.4	35	182.9	69.56	98	182.6	95.94
Suiattle									
1985-86	-	-	-	-	-	-	-	-	-
1986-87	2	90.0	0.0	1	90.0	0.0	3	90.0	0.0
Both Years	-	-	-	-	-	-	-	-	-

Table 79. Flight distances (meters) of solitary eagles and eagles in groups from simulated rafting activity while perched in trees on the SRBENA at four times and on six other rivers stretches of the SW&SRS combined.

Age and Social Grouping	1985-86			1986-87			Both Years		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
Adult									
Solitary	667	130.3	79.60	739	146.2	91.50	1406	138.7	86.39
Group	345	120.5	65.29	475	129.0	80.19	820	125.4	74.37
Total	1012	127.0	75.15	1214	139.4	87.62	2226	133.8	82.40
Subadult									
Solitary	390	123.4	71.62	402	132.7	84.45	792	128.1	78.48
Group	235	108.6	60.09	324	122.3	78.49	559	116.5	71.60
Total	625	117.8	67.84	726	128.0	81.95	1351	123.3	75.90
All Ages									
Solitary	1057	127.8	76.79	1141	141.4	89.27	2198	134.9	83.76
Group	580	115.7	63.45	799	126.3	79.53	1379	121.8	73.36
Total	1637	123.5	72.56	1940	135.2	85.70	3577	129.8	80.16



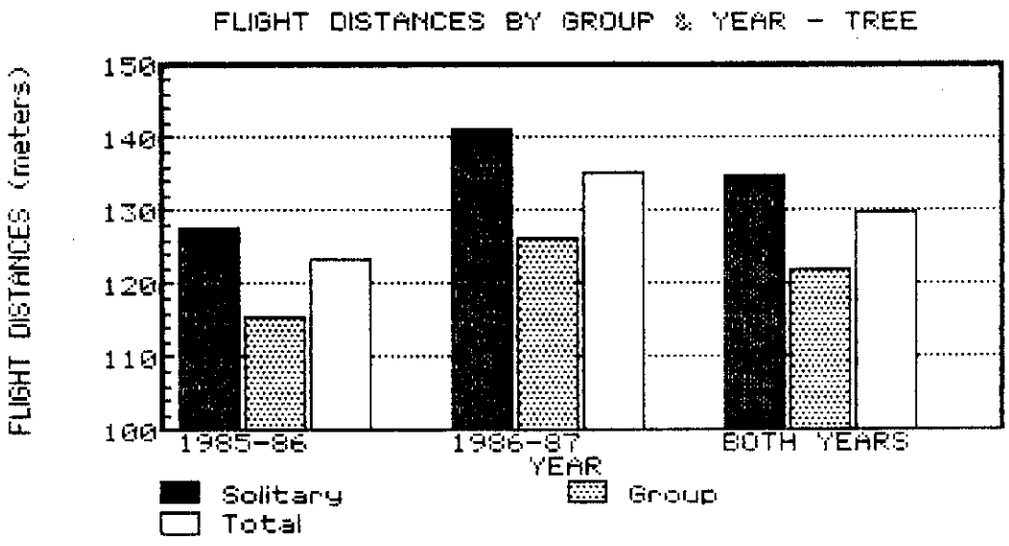


Figure 50. Flight distances (meters) of eagles in trees from the research raft on all river stretches combined for the different ages (upper) and for birds alone or in groups (lower) during both 1985-86 and 1986-87.

Table 80. Probability values comparing the flight distances of adult and subadult bald eagles to simulated rafting activity while perched in trees and feeding or standing on the ground on the SRBENA during four time periods and on six other river sections of the SW&SRS for 1985-86 and 1986-87.

	Adult-Subadult Comparison					
	In Trees			On Ground		
River/Time	1985-86	1986-87	Both Years	1985-86	1986-87	Both Years
SRBENA-Sun AM	N	N	N	N	N	N
SRBENA-Sun PM	N	N	N	N	N	N
SRBENA-Thu AM	N	N	N	N	N	N
SRBENA-Thu PM	N	N	N	N	N	N
Upper Skagit	N	N	N	-	N	N
Middle Skagit	N	N	N	N	N	N
Lower Skagit	N	0.001	0.002	N	N	N
Upper Sauk	0.004	0.021	0.000	N	0.003	N
Lower Sauk	N	N	N	N	N	N
Suiattle	-	0.020	0.020	-	-	-
Totals	0.011	0.004	0.000	N	N	N

Table 81. Probability values comparing the flight distances of eagles between the two years (1985/86 and 1986/87) to simulated rafting activity while perched in trees and feeding or standing on the ground on the SRBENA during four time periods and on six other river sections of the SW&SRS.

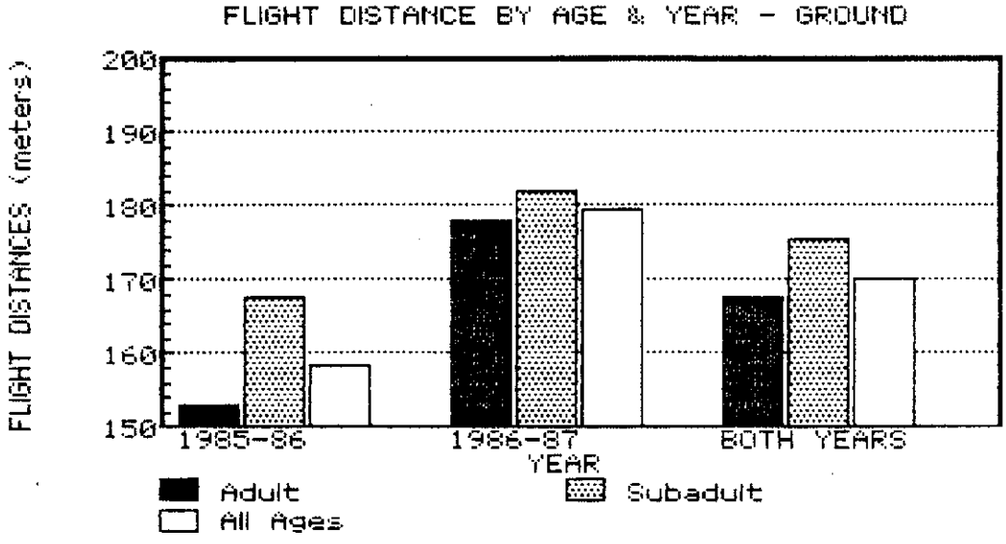
	1985/86 - 1986/87 Comparison					
	In Trees			On Ground		
River/Time	Adult	Subadult	All Ages	Adult	Subadult	All Ages
SRBENA-Sun AM	N	N	N	0.000	N	0.000
SRBENA-Sun PM	N	N	N	N	0.035	0.043
SRBENA-Thu AM	0.026	N	N	N	N	N
SRBENA-Thu PM	N	N	N	N	N	N
Upper Skagit	0.019	N	0.008	N	-	N
Middle Skagit	N	N	N	N	N	N
Lower Skagit	0.003	N	0.003	N	N	N
Upper Sauk	N	N	N	N	N	N
Lower Sauk	N	N	0.030	N	N	N
Suiattle	-	-	-	-	-	-
Totals	0.000	0.007	0.000	0.000	N	0.001

Table 82. Probability values comparing the flight distances of solitary and grouped eagles to simulated rafting activity while perched in trees and feeding or standing on the ground on the SRBENA during four time periods and on six other river sections of the SW&SRS combined.

	Solitary-Group Comparison					
	In Trees			On Ground		
	1985-86	1986-87	Both Years	1985-86	1986-87	Both Years
Adult	0.033	0.001	0.000	0.040	N	N
Subadult	0.006	N	0.005	N	N	N
All Ages	0.008	0.000	0.000	N	N	N

Table 83. Flight distances (meters) of solitary eagles and eagles in groups from simulated rafting activity while feeding or standing on the ground on the SRBENA at four times and on six other rivers stretches of the SW&SRS combined.

Age and Social Grouping	1985-86			1986-87			Both Years		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
Adult									
Solitary	135	142.1	69.80	140	180.4	110.3	275	161.6	94.43
Group	179	161.6	98.92	289	176.9	92.70	468	171.0	95.31
Total	314	153.2	88.00	429	178.0	98.66	743	167.6	95.03
Subadult									
Solitary	76	170.1	117.4	68	168.2	125.7	144	169.2	120.9
Group	95	165.8	101.1	148	188.1	98.52	243	179.4	99.94
Total	171	167.7	108.3	216	181.9	107.9	387	175.6	108.2
All Ages									
Solitary	211	152.2	90.60	208	176.4	115.4	419	164.2	104.2
Group	274	163.1	99.53	437	180.7	94.75	711	173.9	96.93
Total	485	158.4	95.80	645	179.3	101.8	1130	170.3	99.76



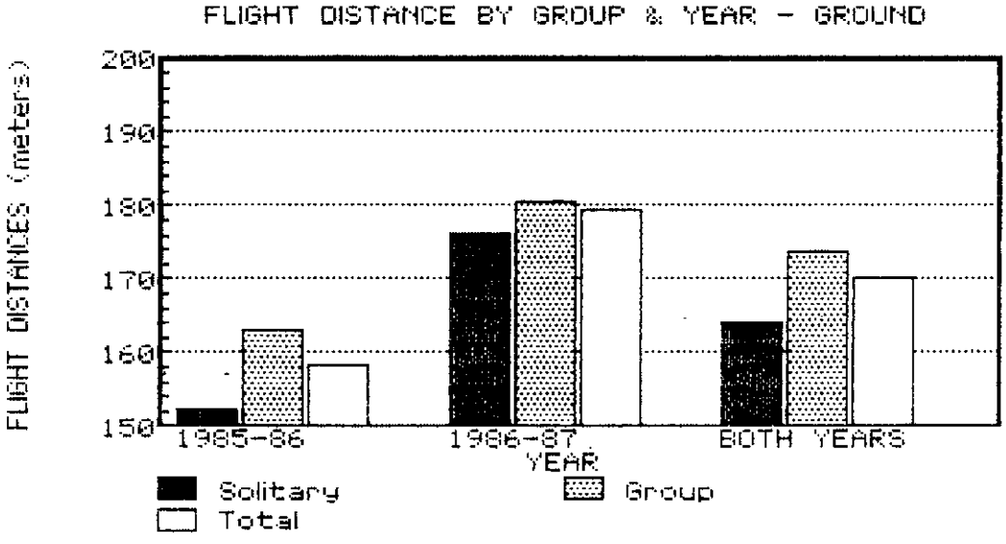


Figure 51. Flight distances (meters) of eagles on the ground from the research raft on all river stretches combined for the different ages (upper) and for birds alone or in groups (lower) during both 1985-86 and 1986-87.

Table 84. Categorical percentages of flight distances of bald eagles from simulated rafting activity while perched in trees and feeding or standing on the ground on the SRBENA at four times and on six other river stretches of the SW&SRS during 1985-86 and 1986-87 combined.

		Flight distances (meters)										
River/Time	n	0-50	51-100	101-150	151-200	201-250	251-300	301-350	351-400	401-450	451-500	>500
PERCHED IN TREES												
SRBENA-Sun-AM	447	13	41	24	14	4	2	2	0	0	0	0
SRBENA-Sun-PM	110	12	46	31	6	1	4	0	1	0	1	0
SRBENA-Thu-AM	652	17	35	29	11	4	2	1	0	1	0	0
SRBENA-Thu-PM	278	25	39	22	8	5	1	0	0	0	0	0
Upper Skagit	113	12	39	23	12	5	0	6	2	0	0	0
Middle Skagit	422	5	34	32	17	6	3	2	1	0	0	0
Lower Skagit	297	8	26	24	18	12	7	2	1	1	0	0
Upper Sauk	547	9	31	25	18	8	3	3	1	1	0	0
Lower Sauk	608	9	32	24	14	8	7	3	1	0	0	1
Suiattle	103	10	48	21	5	7	5	1	3	1	0	0
All SRBENA	1487	17	38	26	11	4	2	1	0	0	0	0
Other Rivers	2090	9	32	26	16	8	5	3	1	0	0	0
All Rivers	3577	12	35	26	14	7	4	2	1	0	0	0
FEEDING OR STANDING ON GROUND												
SRBENA-Sun-AM	198	9	20	24	22	11	7	3	3	0	1	1
SRBENA-Sun-PM	67	5	33	19	21	8	9	5	2	0	0	0
SRBENA-Thu-AM	353	5	26	22	18	11	9	5	1	2	0	0
SRBENA-Thu-PM	79	9	34	25	22	4	5	1	0	0	0	0
Upper Skagit	35	11	17	20	17	6	23	3	3	0	0	0
Middle Skagit	99	2	16	31	19	15	9	1	4	0	1	1
Lower Skagit	112	3	10	29	29	14	5	4	4	0	1	4
Upper Sauk	86	8	30	23	16	9	6	1	2	0	4	0
Lower Sauk	98	3	8	36	24	17	6	2	1	1	1	1
Suiattle	-	-	-	-	-	-	-	-	-	-	-	-
All SRBENA	697	7	26	22	20	10	8	4	2	1	0	0
Other Rivers	430	4	16	29	22	14	8	2	3	0	2	2
All Rivers	1127	6	22	25	21	11	8	3	2	1	1	1

Table B5. Cumulative percentages of flight distances of bald eagles from simulated rafting activity while perched in trees and feeding or standing on the ground on the SRBENA at four times and on six other river stretches of the SW&SRS during 1985-86 and 1986-87 combined.

		Flight distances (meters)										
River/Time	n	0-50	51-100	101-150	151-200	201-250	251-300	301-350	351-400	401-450	451-500	>500
PERCHED IN TREES												
SRBENA-Sun-AM	447	13	53	78	92	96	98	100	100	100	100	100
SRBENA-Sun-PM	110	12	57	88	94	95	98	98	99	99	100	100
SRBENA-Thu-AM	652	17	52	81	92	96	98	99	100	100	100	100
SRBENA-Thu-PM	278	25	63	85	93	98	100	100	100	100	100	100
Upper Skagit	113	12	51	74	87	92	92	99	100	100	100	100
Middle Skagit	422	5	40	71	88	94	97	99	100	100	100	100
Lower Skagit	297	8	34	58	76	88	95	97	99	100	100	100
Upper Sauk	547	9	40	65	84	92	95	98	99	99	100	100
Lower Sauk	608	9	41	65	79	87	94	98	99	99	99	100
Suiattle	103	10	57	79	84	90	95	96	99	100	100	100
All SRBENA	1487	17	55	81	92	97	99	99	100	100	100	100
Other Rivers	2090	9	41	67	82	90	95	98	99	99	99	100
All Rivers	3577	12	47	73	86	93	96	99	99	100	100	100
FEEDING OR STANDING ON GROUND												
SRBENA-Sun-AM	198	9	29	53	75	86	93	95	98	98	99	100
SRBENA-Sun-PM	67	5	37	57	78	85	94	99	100	100	100	100
SRBENA-Thu-AM	353	5	31	53	71	82	91	96	98	99	100	100
SRBENA-Thu-PM	79	9	43	68	90	94	99	100	100	100	100	100
Upper Skagit	35	11	29	49	66	71	94	97	100	100	100	100
Middle Skagit	99	2	18	50	69	84	93	94	98	98	99	100
Lower Skagit	112	3	13	41	70	84	89	92	96	96	97	100
Upper Sauk	86	8	38	62	78	87	93	94	97	98	100	100
Lower Sauk	98	3	11	47	71	88	94	96	97	98	99	100
Suiattle	-	-	-	-	-	-	-	-	-	-	-	-
All SRBENA	697	7	32	55	75	85	93	97	98	99	100	100
Other Rivers	430	4	20	49	71	85	92	94	97	97	99	100
All Rivers	1127	6	28	53	73	85	93	96	98	99	99	100

Table 86. Least squares linear regression of the seasonal changes in flight distances (meters) of eagles from simulated rafting activity while perched in trees during 1985-86.

River/Time/Age	n	Regression Equation	r	F	P
SRBENA-Sun-AM					
Adult	108	Y=112.9 + 0.252X	0.076	0.62	N
Subadult	92	Y=129.3 - 0.517X	-0.206	4.00	0.021
All Ages	200	Y=121.9 - 0.193X	-0.067	0.90	N
SRBENA-Sun-PM					
Adult	54	Y= 96.2 + 0.221X	0.084	0.04	N
Subadult	21	Y= 88.8 + 1.343X	0.285	1.68	N
All Ages	75	Y= 94.1 + 0.588X	0.174	2.28	N
SRBENA-Thu-AM					
Adult	197	Y=122.1 - 0.431X	-0.140	3.89	N
Subadult	118	Y=104.3 - 0.160X	-0.056	0.36	N
All Ages	315	Y=114.6 - 0.179X	-0.060	1.12	N
SRBENA-Thu-PM					
Adult	97	Y= 93.6 + 0.002X	0.001	0.00	N
Subadult	61	Y= 97.9 + 0.051X	0.020	0.03	N
All Ages	158	Y= 95.3 + 0.018X	0.008	0.01	N
Upper Skagit					
Adult	16	Y= 73.8 + 0.566X	0.311	1.50	N
Subadult	16	Y=106.9 - 0.112X	-0.050	0.03	N
All Ages	32	Y= 93.8 + 0.159X	0.077	0.18	N
Middle Skagit					
Adult	92	Y=147.9 - 0.249X	-0.077	0.53	N
Subadult	57	Y=125.8 - 0.051X	-0.024	0.03	N
All Ages	149	Y=140.3 - 0.200X	-0.070	0.72	N
Lower Skagit					
Adult	35	Y=140.0 - 0.188X	-0.054	0.01	N
Subadult	39	Y=116.5 + 0.227X	0.081	0.24	N
All Ages	74	Y=125.1 + 0.068X	0.022	0.03	N
Upper Sauk					
Adult	207	Y=135.7 + 0.433X	0.126	3.30	0.038
Subadult	114	Y=125.0 - 0.023X	-0.010	0.01	N
All Ages	321	Y=130.7 + 0.319X	0.095	2.93	N
Lower Sauk					
Adult	207	Y=134.3 + 0.316X	0.100	2.05	N
Subadult	106	Y=142.7 - 0.351X	-0.092	0.88	N
All Ages	313	Y=135.0 + 0.154X	0.046	0.66	N

Table 87. Least squares linear regression of the seasonal changes in flight distances (meters) of eagles from simulated rafting activity while feeding or standing on the ground during 1985-86.

River/Time/Age	n	Regression Equation	r	F	P
SRBENA-Sun-AM					
Adult	53	Y=103.2 + 0.825X	0.228	2.79	N
Subadult	30	Y=145.4 - 0.015X	-0.000	0.00	N
All Ages	83	Y=121.3 + 0.393X	0.108	0.95	N
SRBENA-Sun-PM					
Adult	22	Y=123.8 + 0.101X	0.154	0.49	N
Subadult	13	Y=131.9 - 0.981X	-0.427	2.46	N
All Ages	35	Y=130.0 + 0.390X	0.076	0.19	N
SRBENA-Thu-AM					
Adult	106	Y=160.1 + 0.069X	0.010	0.02	N
Subadult	57	Y=145.3 + 0.767X	0.155	1.35	N
All Ages	163	Y=151.5 + 0.441X	0.084	1.15	N
SRBENA-Thu-PM					
Adult	29	Y=110.8 + 0.446X	0.118	0.38	N
Subadult	8	Y= 99.7 + 1.656X	0.343	0.80	N
All Ages	37	Y=103.5 + 0.942X	0.226	1.88	N
Upper Skagit					
Adult	13	Y=173.3 + 0.056X	0.010	0.00	N
Subadult	0				
All Ages	13	Y=173.3 + 0.056X	0.010	0.00	N
Middle Skagit					
Adult	21	Y=147.9 + 0.506X	0.166	0.54	N
Subadult	16	Y=204.0 - 0.692X	-0.183	0.49	N
All Ages	37	Y=171.5 + 0.032X	0.010	0.00	N
Lower Skagit					
Adult	13	Y=171.6 - 0.044X	-0.020	0.00	N
Subadult	13	Y= 96.6 + 2.157X	0.295	1.05	N
All Ages	26	Y=133.7 + 1.072X	0.195	0.95	N
Upper Sauk					
Adult	27	Y=165.1 - 0.583X	-0.189	0.92	N
Subadult	19	Y=209.1 - 1.732X	-0.302	1.71	N
All Ages	46	Y=185.1 - 1.053X	-0.246	2.84	N
Lower Sauk					
Adult	29	Y=160.5 + 0.861X	0.198	1.10	N
Subadult	15	Y=151.6 + 0.539X	0.204	0.56	N
All Ages	44	Y=159.7 + 0.664X	0.174	1.32	N

Table 88. Least squares linear regression of the seasonal changes in flight distances (meters) of eagles from simulated rafting activity while perched in trees during 1986-87.

River/Time/Age	n	Regression Equation	r	F	P
SRBENA-Sun-AM					
Adult	148	Y=119.4 - 0.021X	-0.001	0.01	N
Subadult	98	Y=104.9 + 0.282X	0.108	1.14	N
All Ages	246	Y=113.9 + 0.109X	0.036	0.31	N
SRBENA-Sun-PM					
Adult	24	Y=173.3 - 2.124X	-0.346	2.99	N
Subadult	11	Y= 88.7 + 0.712X	0.294	0.85	N
All Ages	35	Y=139.2 - 0.688X	-0.154	0.80	N
SRBENA-Thu-AM					
Adult	204	Y=139.0 - 0.422X	-0.119	2.92	N
Subadult	134	Y=112.6 - 0.034X	-0.010	0.02	N
All Ages	338	Y=129.3 - 0.277X	-0.085	2.44	N
SRBENA-Thu-PM					
Adult	87	Y= 98.6 + 0.192X	0.072	0.44	N
Subadult	32	Y=117.0 - 0.273X	-0.065	0.13	N
All Ages	119	Y=102.4 + 0.080X	0.026	0.08	N
Upper Skagit					
Adult	49	Y=193.4 - 1.227X	-0.214	2.24	N
Subadult	32	Y=208.5 - 1.656X	-0.368	4.69	0.017
All Ages	81	Y=200.7 - 1.424X	-0.274	6.42	0.003
Middle Skagit					
Adult	167	Y=138.5 - 0.100X	-0.026	0.12	N
Subadult	106	Y=133.7 + 0.082X	0.022	0.05	N
All Ages	273	Y=136.6 - 0.033X	-0.010	0.02	N
Lower Skagit					
Adult	119	Y=221.1 - 0.809X	-0.152	2.76	N
Subadult	104	Y=220.6 - 1.600X	-0.317	11.41	0.000
All Ages	223	Y=224.5 - 1.277X	-0.241	13.58	0.000
Upper Sauk					
Adult	140	Y=175.0 - 0.569X	-0.157	3.51	0.032
Subadult	86	Y=167.3 - 0.881X	-0.273	6.79	0.002
All Ages	226	Y=172.9 - 0.713X	-0.203	9.64	0.000
Lower Sauk					
Adult	195	Y=151.6 + 1.684X	0.035	0.23	N
Subadult	97	Y=151.4 + 4.250X	0.010	0.01	N
All Ages	292	Y=151.6 + 0.126X	0.024	0.18	N

Table 89. Least squares linear regression of the seasonal changes in flight distances (meters) of eagles from simulated rafting activity while feeding or standing on the ground during 1986-87.

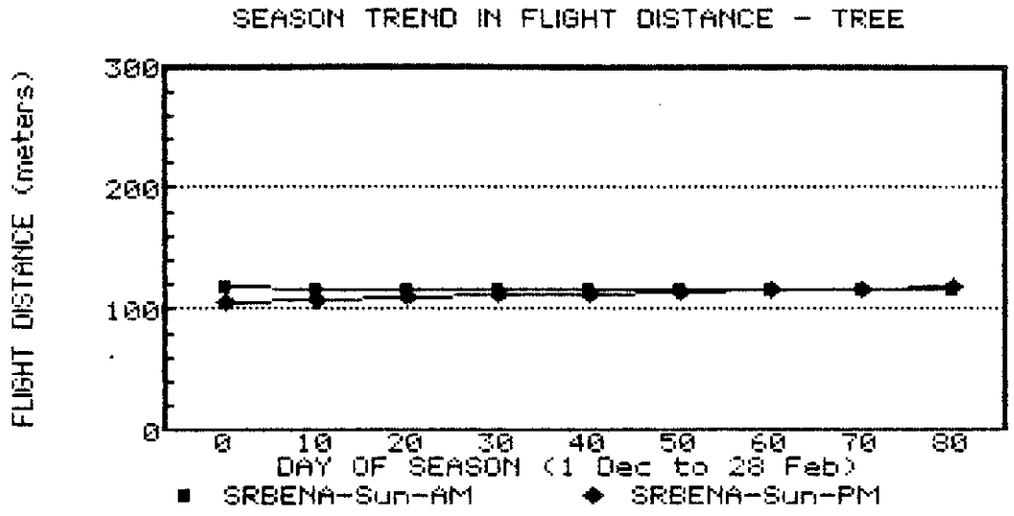
River/Time/Age	n	Regression Equation	r	F	P
SRBENA-Sun-AM					
Adult	84	Y=218.0 - 0.643X	-0.108	0.96	N
Subadult	30	Y=153.9 + 0.328X	0.062	0.11	N
All Ages	114	Y=201.7 - 0.386X	-0.066	0.50	N
SRBENA-Sun-PM					
Adult	24	Y=121.5 + 3.427X	0.318	2.48	N
Subadult	8	Y=106.8 + 4.082X	0.495	1.95	N
All Ages	32	Y=118.4 + 3.592X	0.366	4.65	0.017
SRBENA-Thu-AM					
Adult	142	Y=166.8 + 0.071X	0.014	0.03	N
Subadult	48	Y=227.1 - 1.347X	-0.284	4.03	0.024
All Ages	190	Y=188.4 - 0.481X	-0.096	1.74	N
SRBENA-Thu-PM					
Adult	30	Y=175.0 - 1.719X	-0.486	10.02	0.001
Subadult	12	Y=126.6 + 0.759X	0.320	1.14	N
All Ages	42	Y=149.4 - 0.428X	-0.146	0.88	N
Upper Skagit					
Adult	16	Y= 5.1 + 3.413X	0.572	6.80	0.009
Subadult	6	Y=317.7 - 1.837X	-0.452	1.03	N
All Ages	22	Y=143.0 + 0.665X	0.135	0.37	N
Middle Skagit					
Adult	38	Y=174.7 + 0.308X	0.048	0.08	N
Subadult	24	Y=189.1 - 0.265X	-0.048	0.05	N
All Ages	62	Y=181.6 + 0.059X	0.010	0.01	N
Lower Skagit					
Adult	35	Y=372.7 - 3.154X	-0.380	5.57	0.008
Subadult	51	Y=399.8 - 3.666X	-0.433	11.29	0.000
All Ages	86	Y=389.3 - 3.459X	-0.413	17.30	0.000
Upper Sauk					
Adult	24	Y=235.9 - 1.070X	-0.250	1.46	N
Subadult	16	Y=112.4 - 0.012X	-0.000	0.00	N
All Ages	40	Y=198.3 - 0.872X	-0.222	1.98	N
Lower Sauk					
Adult	33	Y=171.1 + 0.337X	0.057	0.10	N
Subadult	20	Y=206.6 - 0.423X	-0.133	0.33	N
All Ages	53	Y=185.3 + 0.001X	0.000	0.00	N

Table 90. Least squares linear regression of the seasonal changes in flight distances (meters) of eagles from simulated rafting activity while perched in trees during 1985-86 and 1986-87 combined.

River/Time/Age	n	Regression Equation	r	F	P
SRBENA-Sun-AM					
Adult	256	Y=116.5 + 0.088X	0.026	0.17	N
Subadult	190	Y=117.5 - 0.092X	-0.036	0.25	N
All Ages	446	Y=117.7 - 0.022X	-0.010	0.02	N
SRBENA-Sun-PM					
Adult	78	Y=113.8 - 0.358X	-0.088	0.60	N
Subadult	32	Y= 92.7 + 0.880X	0.255	2.09	N
All Ages	110	Y=106.2 + 0.161X	0.042	0.20	N
SRBENA-Thu-AM					
Adult	401	Y=129.2 - 0.385X	-0.115	5.32	0.005
Subadult	252	Y=108.6 + 0.052X	0.017	0.08	N
All Ages	653	Y=121.2 - 0.203X	-0.065	2.76	N
SRBENA-Thu-PM					
Adult	184	Y= 95.5 + 0.118X	0.044	0.34	N
Subadult	93	Y=100.7 + 0.022X	0.010	0.01	N
All Ages	277	Y= 97.4 + 0.080X	0.030	0.24	N
Upper Skagit					
Adult	65	Y=143.3 - 0.338X	-0.074	0.35	N
Subadult	48	Y=152.8 - 0.664X	-0.191	1.74	N
All Ages	113	Y=148.7 - 0.503X	-0.125	1.77	N
Middle Skagit					
Adult	259	Y=144.5 - 0.211X	-0.066	1.10	N
Subadult	163	Y=130.2 + 0.065X	0.022	0.08	N
All Ages	422	Y=139.0 - 0.106X	-0.033	0.48	N
Lower Skagit					
Adult	154	Y=210.5 - 0.813X	-0.171	4.59	0.012
Subadult	143	Y=168.2 - 0.597X	-0.150	3.24	0.041
All Ages	297	Y=192.1 - 0.747X	-0.168	8.55	0.000
Upper Sauk					
Adult	347	Y=149.7 + 0.014X	0.000	0.01	N
Subadult	200	Y=137.0 - 0.330X	-0.114	2.58	N
All Ages	547	Y=144.9 - 0.109X	-0.033	0.59	N
Lower Sauk					
Adult	402	Y=140.1 + 3.073X	0.079	2.51	N
Subadult	203	Y=142.9 - 0.027X	-0.000	0.01	N
All Ages	605	Y=140.5 + 0.210X	0.051	1.56	N

Table 91. Least squares linear regression of the seasonal changes in flight distances (meters) of eagles from simulated rafting activity while feeding or standing on the ground during 1985-86 and 1986-87 combined.

River/Time/Age	n	Regression Equation	r	F	P
SRBENA-Sun-AM					
Adult	137	Y=170.0 + 0.023X	0.000	0.00	N
Subadult	60	Y=149.9 + 0.154X	0.035	0.07	N
All Ages	197	Y=164.4 + 0.048X	0.010	0.02	N
SRBENA-Sun-PM					
Adult	46	Y=141.4 + 1.115X	0.143	0.92	N
Subadult	21	Y=140.2 + 0.281X	0.060	0.07	N
All Ages	67	Y=142.0 + 0.827X	0.124	1.01	N
SRBENA-Thu-AM					
Adult	248	Y=164.6 + 0.051X	0.010	0.02	N
Subadult	105	Y=193.8 - 0.291X	-0.063	0.41	N
All Ages	353	Y=172.5 - 0.040X	-0.010	0.02	N
SRBENA-Thu-PM					
Adult	59	Y=146.3 - 0.822X	-0.234	3.30	0.044
Subadult	20	Y=117.1 + 1.027X	0.313	1.96	N
All Ages	79	Y=129.8 + 0.086X	0.024	0.05	N
Upper Skagit					
Adult	29	Y=135.8 + 0.881X	0.174	0.84	N
Subadult	6	Y=317.7 - 1.837X	-0.452	1.03	N
All Ages	35	Y=161.6 + 0.345X	0.076	0.19	N
Middle Skagit					
Adult	59	Y=163.0 + 0.434X	0.093	0.50	N
Subadult	40	Y=197.6 - 0.497X	-0.107	0.44	N
All Ages	99	Y=177.8 + 0.050X	0.010	0.01	N
Lower Skagit					
Adult	48	Y=282.9 - 1.658X	-0.267	3.53	0.037
Subadult	64	Y=285.0 - 1.382X	-0.173	1.91	N
All Ages	112	Y=285.6 - 1.532X	-0.211	5.11	0.008
Upper Sauk					
Adult	51	Y=190.3 - 0.625X	-0.168	1.43	N
Subadult	35	Y=184.9 - 1.231X	-0.291	3.05	N
All Ages	86	Y=188.2 - 0.870X	-0.219	4.23	0.018
Lower Sauk					
Adult	62	Y=165.2 + 0.598X	0.117	0.84	N
Subadult	35	Y=186.3 - 0.086X	-0.028	0.03	N
All Ages	97	Y=173.0 + 0.311X	0.072	0.49	N



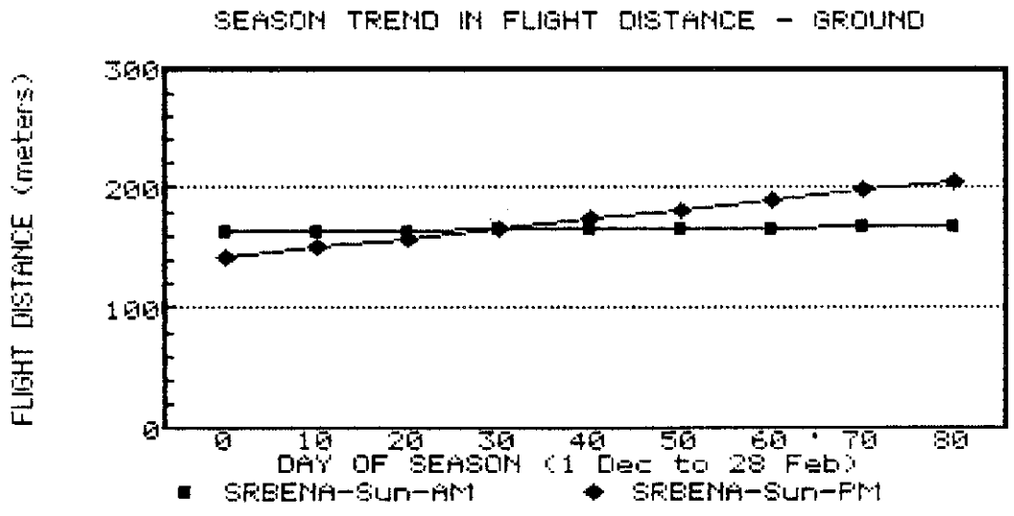


Figure 52. Seasonal changes in the flight distances of eagles in trees (upper) and on the ground (lower) to simulated rafting activity on the SRBENA during Sunday mornings and afternoons during 1985-86 and 1986-87 combined.

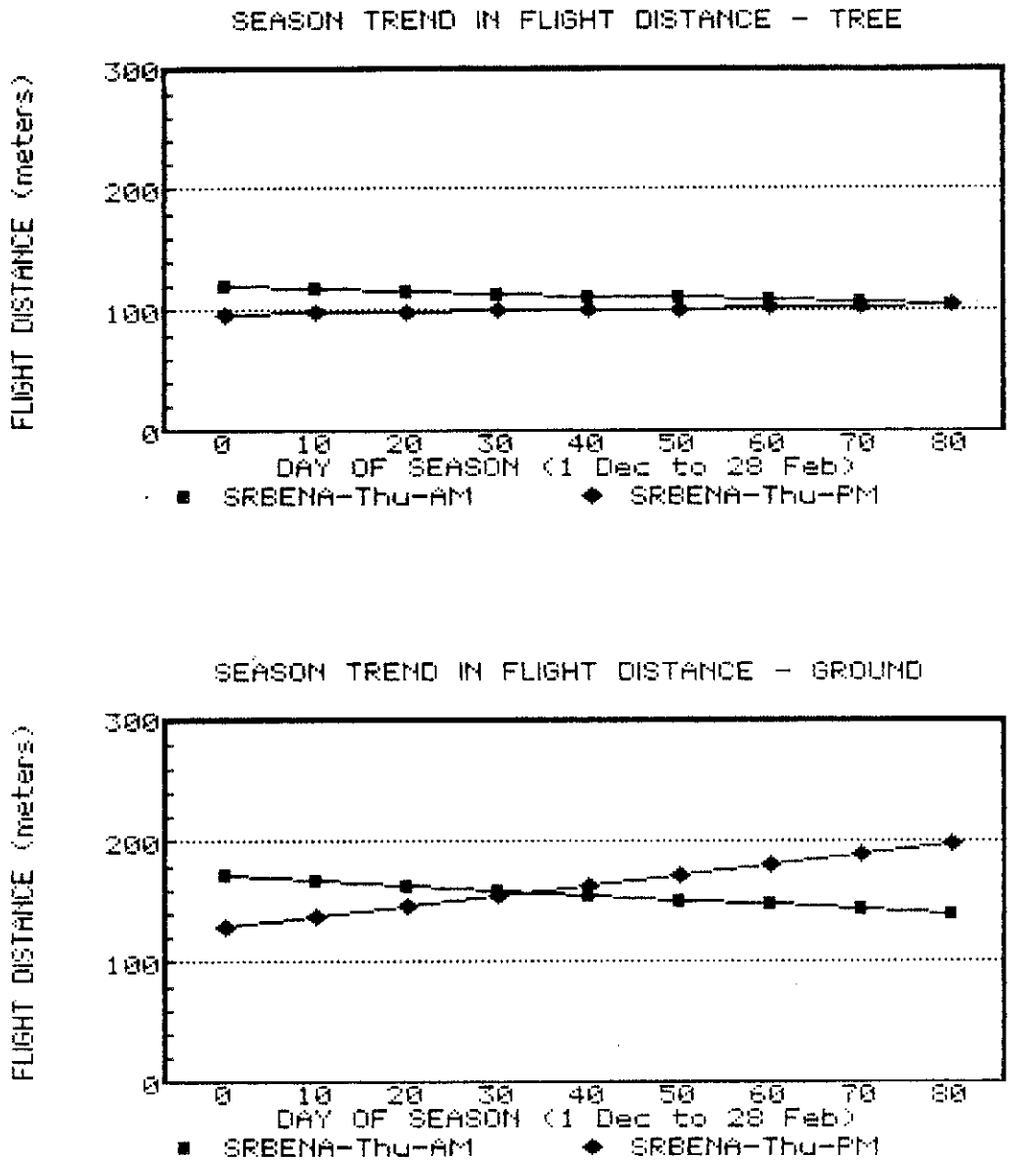


Figure 53. Seasonal changes in the flight distances of eagles in trees (upper) and on the ground (lower) to simulated rafting activity on the SRBENA during Thursday mornings and afternoons during 1985-86 and 1986-87 combined.

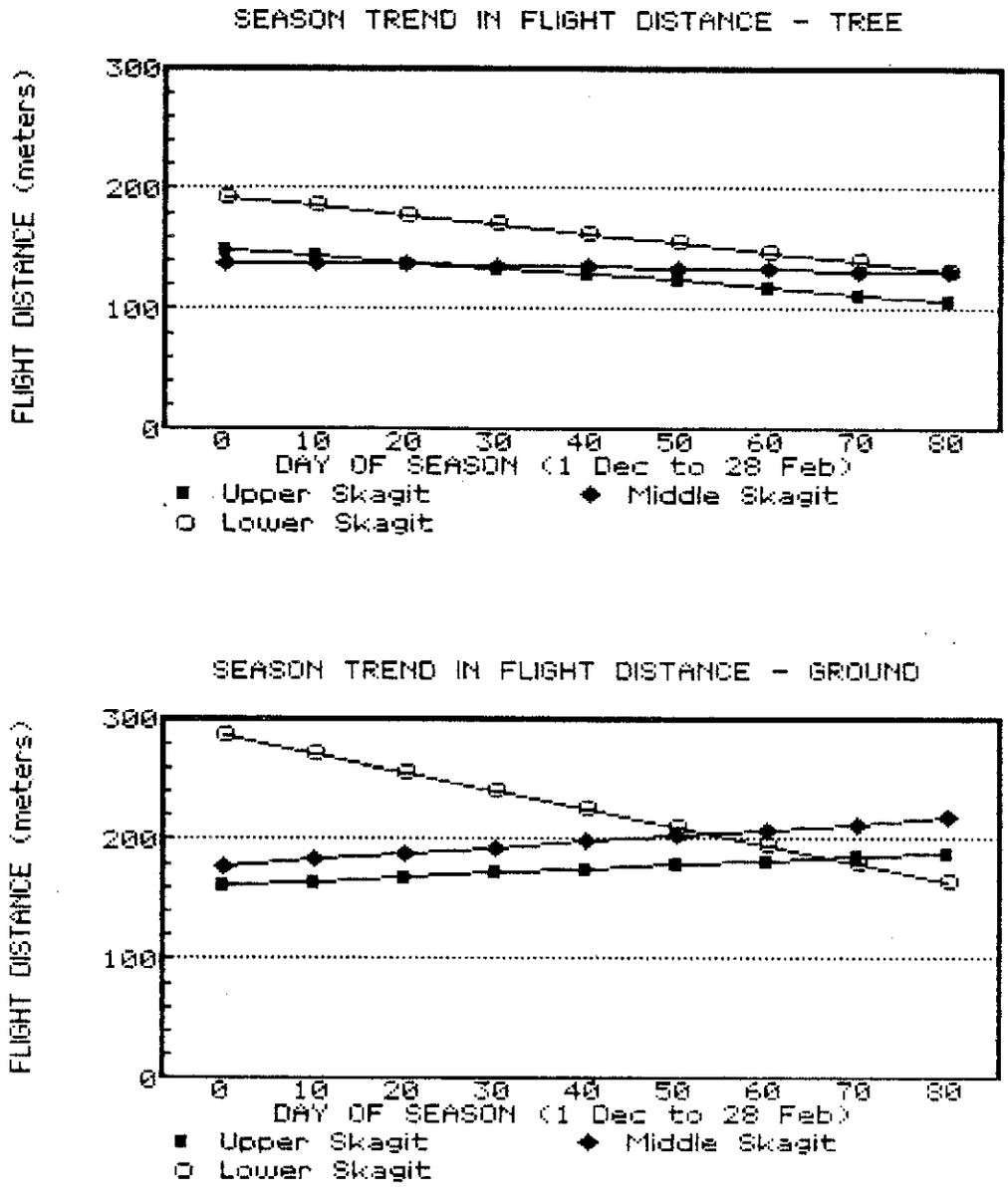
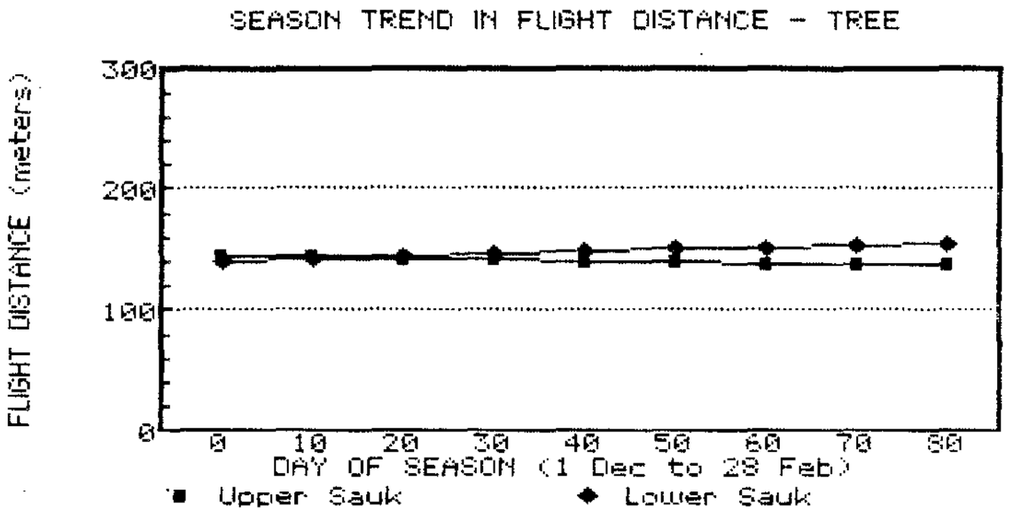


Figure 54. Seasonal changes in the flight distances of eagles in trees (upper) and on the ground (lower) to simulated rafting activity on the Upper, Middle, and Lower Skagit during 1985-86 and 1986-87 combined.



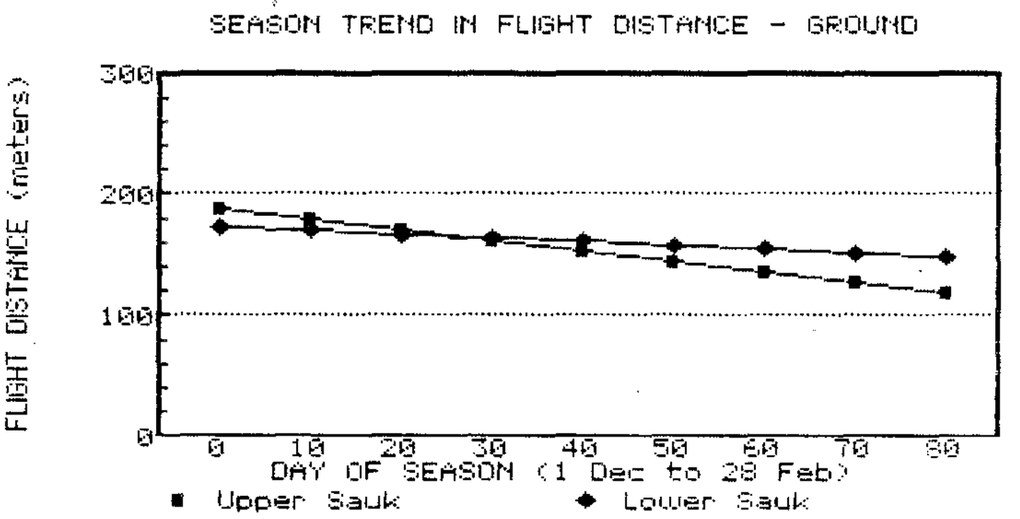


Figure 55. Seasonal changes in the flight distances of eagles in trees (upper) and on the ground (lower) to simulated rafting activity on the Upper and Lower Sauk during 1985-86 and 1986-87 combined.

Table 92. Probability values comparing the flushing responses and flight distances of eagles of all ages to simulated rafting activity while perched in trees and feeding or standing on the ground on the SRBENA during four time periods and on six other river sections of the SW&SRS for 1985-86 and 1986-87 combined.

	Tree-Ground Comparison	
River/Time	Flushing Response	Flight Distance
SRBENA-Sun AM	0.000	0.000
SRBENA-Sun PM	0.000	0.000
SRBENA-Thu AM	0.000	0.000
SRBENA-Thu PM	0.000	0.000
Upper Skagit	0.000	0.010
Middle Skagit	0.000	0.000
Lower Skagit	0.000	0.000
Upper Sauk	0.000	N
Lower Sauk	0.000	0.001
Suiattle	N	N
Totals	0.000	0.000

Table 93. Mean river channel widths (meters) of the seven river stretches measured at half river mile intervals.

River Stretch	Width (meters)		
	n	Mean	SD
SRBENA	17	147.4	57.61
Upper Skagit	11	155.9	41.52
Middle Skagit	31	161.5	37.78
Lower Skagit	33	213.6	79.91
Upper Sauk	23	180.3	103.9
Lower Sauk	26	169.2	68.26
Suiattle	31	66.6	41.72
Totals	172	156.3	71.57

Table 94. Least squares linear regression of the flushing responses (% flushed/100) and flight distances (meters) of eagles perched in trees and standing or feeding on ground against the mean width of the river channel (meters) for the seven stretches of the SW&SRS surveyed.

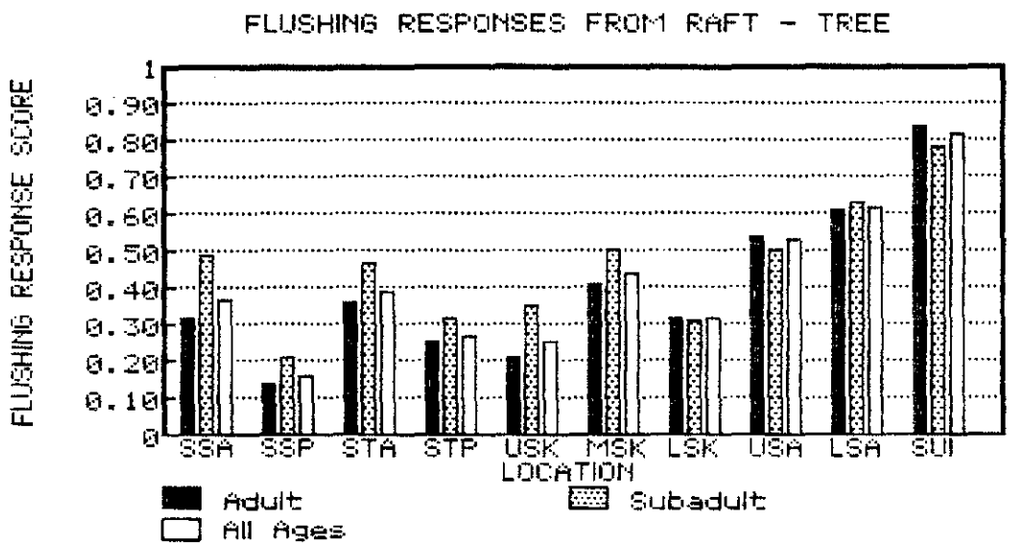
	n	Regression Equation	r	F	P
Flushing Response					
In Trees	7	Y=0.950 - 0.0030X	-0.692	4.59	N
On Ground	7	Y=1.144 - 0.0019X	-0.751	6.47	0.041
Flight Distance					
In Trees	7	Y=103.8 + 0.204X	0.659	3.84	N
On Ground	7	Y= 49.5 + 0.740X	0.920	27.58	0.002

Table 95. Flushing responses (% flushed/100) of eagles to simulated rafting activity while perched in trees on the SRBENA at four times and on six other rivers stretches of the SW&SRS.

	Adult		Subadult		All Ages	
River/Time/Year	n	Mean	n	Mean	n	Mean
SRBENA-Sun-AM						
1985-86	347	0.317	165	0.570	512	0.393
1986-87	470	0.319	225	0.436	695	0.357
Both Years	817	0.318	390	0.485	1207	0.372
SRBENA-Sun-PM						
1985-86	251	0.219	80	0.263	331	0.230
1986-87	300	0.080	75	0.147	375	0.093
Both Years	551	0.143	155	0.206	706	0.157
SRBENA-Thu-AM						
1985-86	544	0.358	251	0.462	795	0.391
1986-87	568	0.361	287	0.467	855	0.396
Both Years	1112	0.360	538	0.465	1650	0.394
SRBENA-Thu-PM						
1985-86	335	0.296	186	0.382	521	0.326
1986-87	423	0.206	136	0.235	559	0.213
Both Years	758	0.245	322	0.320	1080	0.268
Upper Skagit						
1985-86	112	0.143	53	0.302	165	0.194
1986-87	200	0.245	83	0.386	283	0.286
Both Years	312	0.208	136	0.353	448	0.252
Middle Skagit						
1985-86	239	0.381	122	0.475	361	0.413
1986-87	392	0.426	207	0.517	599	0.457
Both Years	631	0.409	329	0.502	960	0.441
Lower Skagit						
1985-86	136	0.257	118	0.331	254	0.291
1986-87	345	0.345	344	0.302	689	0.324
Both Years	481	0.320	462	0.310	943	0.315
Upper Sauk						
1985-86	376	0.551	231	0.494	607	0.529
1986-87	262	0.534	168	0.518	430	0.528
Both Years	638	0.544	399	0.504	1037	0.528

Table 95. Continued.

River/Time/Year	Adult n	Adult Mean	Subadult n	Subadult Mean	All Ages n	All Ages Mean
Lower Sauk						
1985-86	363	0.570	181	0.586	544	0.575
1986-87	295	0.668	142	0.683	437	0.673
Both Years	658	0.614	323	0.628	981	0.619
Suiattle						
1985-86	-	-	-	-	-	-
1986-87	93	0.839	32	0.781	125	0.824
Both Years	-	-	-	-	-	-



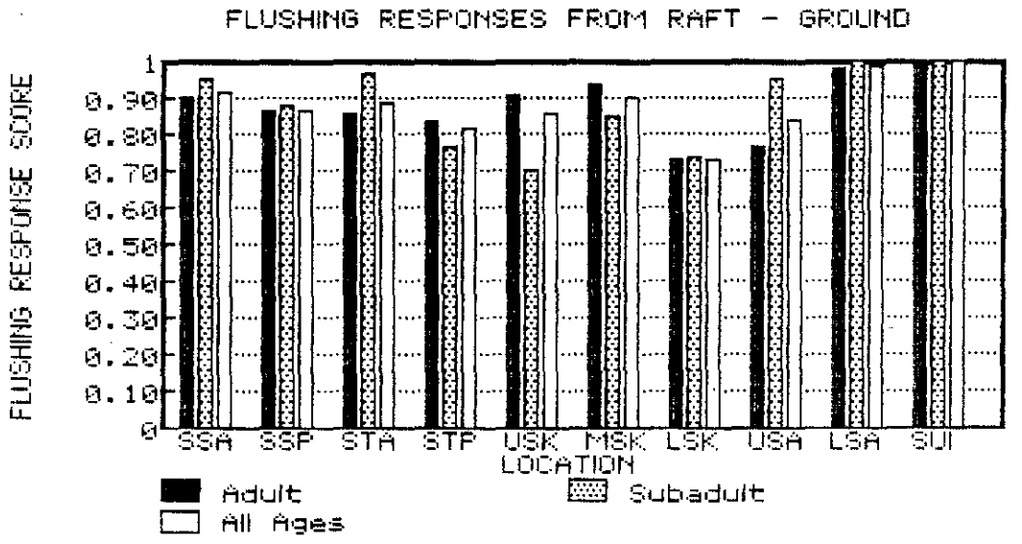


Figure 56. Flushing responses (% flushed/100) of eagles in trees (upper) and on the ground (lower) from the research raft on the SRBENA during four times and on six river stretches of the SW&SRS for 1985-86 and 1986-87 combined. SSA = SRBENA/Sunday AM, SSP = SRBENA/Sunday PM, STA = SRBENA/Thursday AM, STP = SRBENA/Thursday PM, USK = Upper Skagit, MSK = Middle Skagit, LSK = Lower Skagit, USA = Upper Sauk, LSA = Lower Sauk, SUI = Suiattle.

Table 96. Statistical probabilities comparing flushing responses of bald eagles during simulated rafting activity while in trees (upper right half) and on ground (lower left half) in 1985-86.

	SRBENA Sun-AM	SRBENA Sun-PM	SRBENA Thu-AM	SRBENA Thu-PM	Upper Skagit	Middle Skagit	Lower Skagit	Upper Sauk	Lower Sauk	Suiattle
SRBENA Sun-AM										
Adult		0.011	N	N	0.001	N	N	0.000	0.000	-
Subadult		0.000	N	0.002	0.003	N	0.000	N	N	-
All Ages		0.000	N	0.031	0.000	N	0.008	0.000	0.000	-
SRBENA Sun-PM										
Adult	N		0.000	0.047	N	0.000	N	0.000	0.000	-
Subadult	N		0.003	N	N	0.004	N	0.001	0.000	-
All Ages	N		0.000	0.003	N	0.000	N	0.000	0.000	-
SRBENA Thu-AM										
Adult	N	N		N	0.000	N	0.033	0.000	0.000	-
Subadult	N	N		N	0.047	N	0.023	N	0.015	-
All Ages	N	N		0.020	0.000	N	0.005	0.000	0.000	-
SRBENA Thu-PM										
Adult	N	N	N		0.002	0.040	N	0.000	0.000	-
Subadult	N	N	0.008		N	N	N	0.029	0.000	-
All Ages	N	0.046	N		0.002	0.011	N	0.000	0.000	-
Upper Skagit										
Adult	N	N	N	N		0.000	0.039	0.000	0.000	-
Subadult	N	N	N	N		0.049	N	0.018	0.001	-
All Ages	N	N	N	N		0.000	0.033	0.000	0.000	-
Middle Skagit										
Adult	N	N	N	N	N		0.020	0.000	0.000	-
Subadult	N	N	N	N	N		0.031	N	N	-
All Ages	N	N	N	N	N		0.003	0.001	0.000	-
Lower Skagit										
Adult	N	N	N	N	N	N		0.000	0.000	-
Subadult	0.008	N	0.000	N	N	N		0.005	0.000	-
All Ages	0.002	0.002	0.002	N	N	0.007		0.000	0.000	-
Upper Sauk										
Adult	N	N	N	N	N	N	0.026		N	-
Subadult	N	N	N	N	N	N	0.014		N	-
All Ages	N	N	N	0.013	N	N	0.000		N	-
Lower Sauk										
Adult	N	N	0.048	N	N	N	0.020	N		-
Subadult	N	N	N	N	N	N	0.012	N		-
All Ages	N	N	0.037	0.006	N	N	0.000	N		-
Suiattle										
Adult	-	-	-	-	-	-	-	-	-	
Subadult	-	-	-	-	-	-	-	-	-	
All Ages	-	-	-	-	-	-	-	-	-	

Table 97. Statistical probabilities comparing flushing responses of bald eagles during simulated rafting activity while in trees (upper right half) and on ground (lower left half) in 1986-87.

	SRBENA Sun-AM	SRBENA Sun-PM	SRBENA Thu-AM	SRBENA Thu-PM	Upper Skagit	Middle Skagit	Lower Skagit	Upper Sauk	Lower Sauk	Suiattle
SRBENA Sun-AM										
Adult		0.000	N	0.000	N	0.002	N	0.000	0.000	0.000
Subadult		0.000	N	0.000	N	N	0.002	N	0.000	0.001
All Ages		0.000	N	0.000	0.041	0.000	N	0.000	0.000	0.000
SRBENA Sun-PM										
Adult	N		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Subadult	N		0.000	N	0.001	0.000	0.010	0.000	0.000	0.000
All Ages	0.010		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SRBENA Thu-AM										
Adult	N	N		0.000	0.004	0.049	N	0.000	0.000	0.000
Subadult	N	N		0.000	N	N	0.000	0.000	0.000	0.001
All Ages	0.010	0.025		0.000	0.001	0.024	0.004	0.000	0.000	0.000
SRBENA Thu-PM										
Adult	N	N	N		N	0.000	0.000	0.000	0.000	0.000
Subadult	N	N	N		0.027	0.000	N	0.000	0.000	0.000
All Ages	N	N	N		0.023	0.000	0.000	0.000	0.000	0.000
Upper Skagit										
Adult	N	N	N	0.008		0.000	0.019	0.000	0.000	0.000
Subadult	N	N	N	N		N	N	N	0.000	0.000
All Ages	N	N	N	N		0.000	N	0.000	0.000	0.000
Middle Skagit										
Adult	N	N	N	N	N		0.029	0.008	0.000	0.000
Subadult	N	N	N	N	N		0.000	N	0.003	0.009
All Ages	N	N	N	N	N		0.000	0.030	0.000	0.000
Lower Skagit										
Adult	0.005	N	0.004	N	N	0.021		0.000	0.000	0.000
Subadult	0.019	N	0.023	N	N	N		0.000	0.000	0.000
All Ages	0.000	N	0.000	N	N	N		0.000	0.000	0.000
Upper Sauk										
Adult	0.000	N	0.000	0.014	N	0.001	N		0.002	0.000
Subadult	N	N	N	N	N	N	N		0.005	0.011
All Ages	0.000	N	0.000	N	N	0.025	N		0.000	0.000
Lower Sauk										
Adult	N	0.021	N	N	N	N	0.004	0.000		0.002
Subadult	N	N	N	N	N	N	N	N		N
All Ages	N	0.002	N	0.024	0.016	0.044	0.000	0.000		0.002
Suiattle										
Adult	N	N	N	N	N	N	N	N	N	
Subadult	N	N	N	N	N	N	N	N	N	
All Ages	N	N	N	N	N	N	N	N	N	

Table 98. Statistical probabilities comparing flushing responses of bald eagles from simulated rafting activity while in trees (upper right half) and on ground (lower left half) during 1985-86 and 1986-87 combined.

	SRBENA Sun-AM	SRBENA Sun-PM	SRBENA Thu-AM	SRBENA Thu-PM	Upper Skagit	Middle Skagit	Lower Skagit	Upper Sauk	Lower Sauk	Suiattle
SRBENA Sun-AM										
Adult		0.000	N	0.002	0.000	0.000	N	0.000	0.000	0.000
Subadult		0.000	N	0.000	0.010	N	0.000	N	0.000	0.002
All Ages		0.000	N	0.000	0.000	0.001	0.007	0.000	0.000	0.000
SRBENA Sun-PM										
Adult	N		0.000	0.000	0.018	0.000	0.000	0.000	0.000	0.000
Subadult	N		0.000	0.014	0.008	0.000	0.018	0.000	0.000	0.000
All Ages	N		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SRBENA Thu-AM										
Adult	N	N		0.000	0.000	0.047	N	0.000	0.000	0.000
Subadult	N	N		0.000	0.025	N	0.000	N	0.000	0.001
All Ages	N	N		0.000	0.000	0.022	0.000	0.000	0.000	0.000
SRBENA Thu-PM										
Adult	N	N	N		N	0.000	0.005	0.000	0.000	0.000
Subadult	0.025	N	0.001		N	0.000	N	0.000	0.000	0.000
All Ages	0.018	N	N		N	0.000	0.022	0.000	0.000	0.000
Upper Skagit										
Adult	N	N	N	N		0.000	0.001	0.000	0.000	0.000
Subadult	0.035	N	0.003	N		0.005	N	0.003	0.000	0.000
All Ages	N	N	N	N		0.000	0.020	0.000	0.000	0.000
Middle Skagit										
Adult	N	N	N	N	N		0.003	0.000	0.000	0.000
Subadult	N	N	0.013	N	N		0.000	N	0.001	0.005
All Ages	N	N	N	N	N		0.000	0.000	0.000	0.000
Lower Skagit										
Adult	0.002	N	0.015	N	N	0.003		0.000	0.000	0.000
Subadult	0.001	N	0.000	N	N	N		0.000	0.000	0.000
All Ages	0.000	0.029	0.000	N	N	0.001		0.000	0.000	0.000
Upper Sauk										
Adult	0.019	N	N	N	N	0.017	N		0.012	0.000
Subadult	N	N	N	N	N	N	0.016		0.001	0.004
All Ages	0.045	N	N	N	N	N	N		0.000	0.000
Lower Sauk										
Adult	N	0.034	0.009	0.007	N	N	0.000	0.001		0.000
Subadult	N	N	N	0.011	0.008	0.047	0.002	N		N
All Ages	0.023	0.003	0.003	0.000	0.004	0.013	0.000	0.000		0.000
Suiattle										
Adult	N	N	N	N	N	N	N	N	N	
Subadult	N	N	N	N	N	N	N	N	N	
All Ages	N	N	N	N	N	N	N	N	N	

Table 99. Flushing responses (% flushed/100) of eagles to simulated rafting activity while feeding or standing on the ground on the SRBENA at four times and on six other rivers stretches of the SW&SRS.

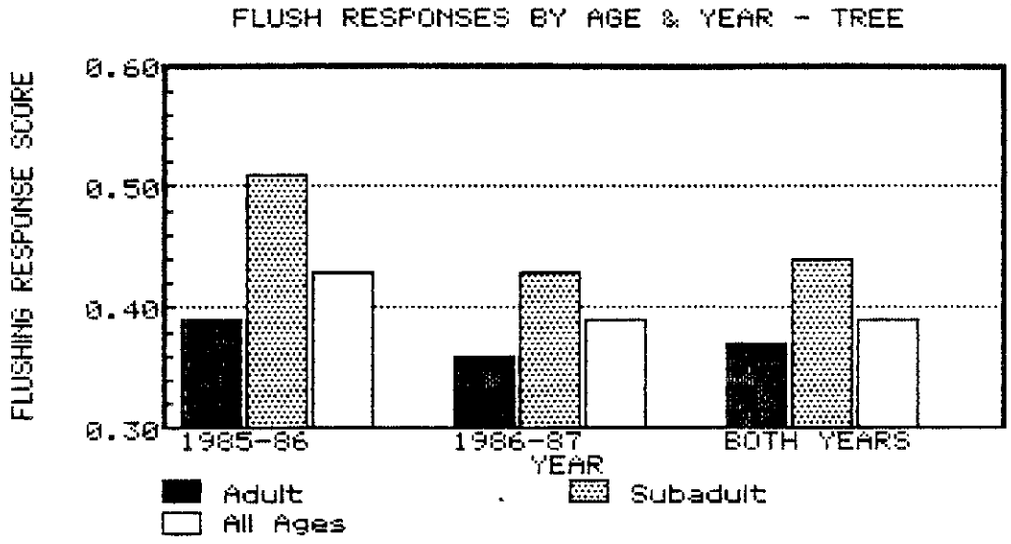
River/Time/Year	Adult n	Adult Mean	Subadult n	Subadult Mean	All Ages n	All Ages Mean
SRBENA-Sun-AM						
1985-86	63	0.857	34	0.912	97	0.876
1986-87	90	0.933	30	1.000	120	0.950
Both Years	153	0.902	64	0.953	217	0.917
SRBENA-Sun-PM						
1985-86	23	0.957	14	0.929	37	0.946
1986-87	30	0.800	10	0.800	40	0.800
Both Years	53	0.868	24	0.875	77	0.870
SRBENA-Thu-AM						
1985-86	147	0.796	59	0.983	206	0.850
1986-87	157	0.917	50	0.960	207	0.928
Both Years	304	0.859	109	0.972	413	0.889
SRBENA-Thu-PM						
1985-86	40	0.775	11	0.727	51	0.765
1986-87	33	0.909	15	0.800	48	0.875
Both Years	73	0.836	26	0.769	99	0.818
Upper Skagit						
1985-86	14	0.929	2	0.500	16	0.875
1986-87	18	0.889	8	0.750	26	0.846
Both Years	32	0.906	10	0.700	42	0.857
Middle Skagit						
1985-86	23	0.913	18	0.889	41	0.902
1986-87	40	0.950	29	0.828	69	0.899
Both Years	63	0.937	47	0.851	110	0.900
Lower Skagit						
1985-86	19	0.684	24	0.583	43	0.628
1986-87	47	0.745	64	0.797	111	0.775
Both Years	66	0.727	88	0.739	154	0.734
Upper Sauk						
1985-86	28	0.964	20	0.950	48	0.958
1986-87	38	0.632	17	0.941	55	0.727
Both Years	66	0.773	37	0.946	103	0.835

Table 99. Continued.

River/Time/Year	Adult n	Adult Mean	Subadult n	Subadult Mean	All Ages n	All Ages Mean
Lower Sauk						
1985-86	30	0.967	15	1.000	45	0.978
1986-87	34	1.000	20	1.000	54	1.000
Both Years	64	0.984	35	1.000	99	0.990
Suiattle						
1985-86	-	-	-	-	-	-
1986-87	2	1.000	1	1.000	3	1.000
Both Years	-	-	-	-	-	-

Table 100. Flushing responses (% flushed/100) of solitary eagles and eagles in groups from simulated rafting activity while perching in trees on the SRBENA at four times and on six other rivers stretches of the SW&SRS combined.

Age and Social Grouping	1985-86		1986-87		Both Years	
	n	Mean	n	Mean	n	Mean
Adult						
Solitary	1706	0.392	2050	0.361	3756	0.375
Group	997	0.347	1298	0.366	2295	0.358
Total	2703	0.376	3348	0.363	6051	0.369
Subadult						
Solitary	782	0.508	921	0.437	1703	0.469
Group	605	0.388	778	0.418	1383	0.405
Total	1387	0.456	1699	0.428	3086	0.440
All Ages						
Solitary	2488	0.428	2971	0.385	5459	0.405
Group	1602	0.363	2076	0.385	3678	0.375
Total	4090	0.403	5047	0.385	9137	0.393



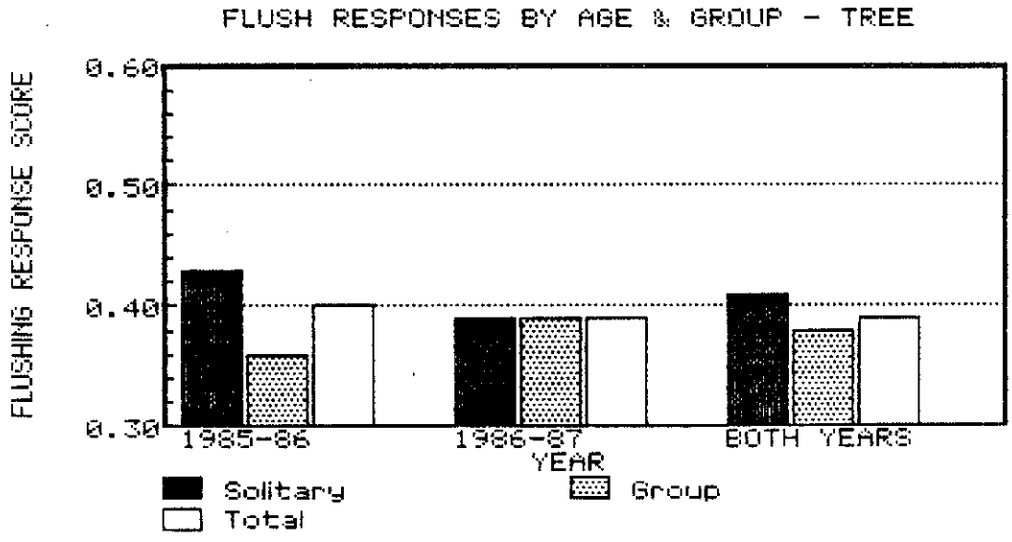


Figure 57. Flushing responses (% flushed/100) of eagles in trees from the research raft on all river stretches combined for the different ages (upper) and for birds alone or in groups (lower) during both 1985-86 and 1986-87.

Table 101. Probability values comparing the flushing responses of adult and subadult bald eagles to simulated rafting activity while perched in trees and feeding or standing on the ground on the SRBENA during four time periods and on six other river sections of the SW&SRS for 1985-86 and 1986-87.

	Adult-Subadult Comparison					
	In Trees			On Ground		
River/Time	1985-86	1986-87	Both Years	1985-86	1986-87	Both Years
SRBENA-Sun AM	0.000	0.004	0.000	N	N	N
SRBENA-Sun PM	N	N	N	N	N	N
SRBENA-Thu AM	0.007	0.004	0.000	0.002	N	0.002
SRBENA-Thu PM	N	N	0.014	N	N	N
Upper Skagit	0.028	0.025	0.002	N	N	N
Middle Skagit	N	0.042	0.008	N	N	N
Lower Skagit	N	N	N	N	N	N
Upper Sauk	N	N	N	N	0.040	0.046
Lower Sauk	N	N	N	N	N	N
Suiattle	-	N	N	-	N	N
Totals	0.000	0.000	0.000	N	N	N

Table 102. Probability values comparing the flushing responses of eagles between the two years (1985/86 and 1986/87) to simulated rafting activity while perched in trees and feeding or standing on the ground on the SRBENA during four time periods and on six other river sections of the SW&SRS.

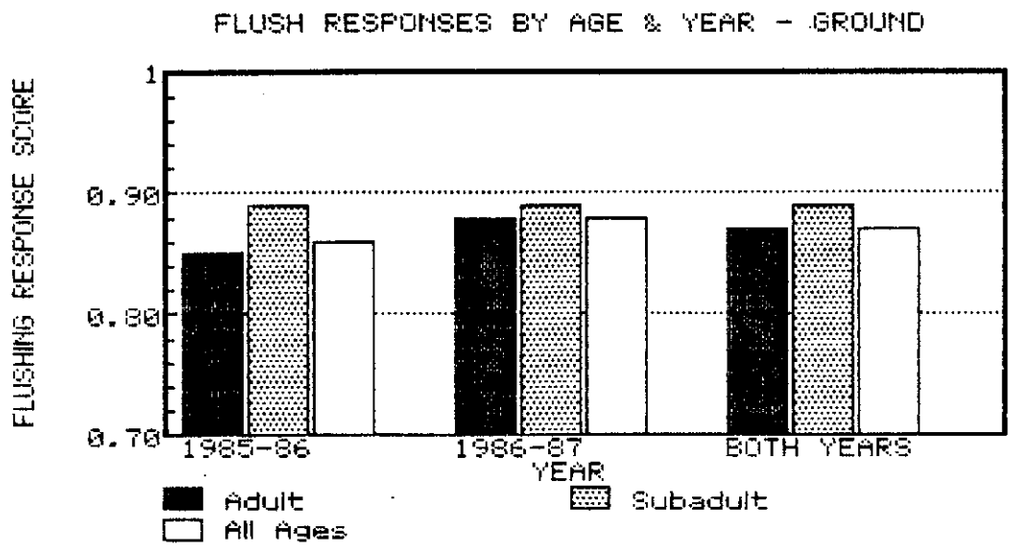
	1985/86 - 1986/87 Comparison					
	In Trees			On Ground		
River/Time	Adult	Subadult	All Ages	Adult	Subadult	All Ages
SRBENA-Sun AM	N	0.031	N	N	N	N
SRBENA-Sun PM	0.000	N	0.000	N	N	N
SRBENA-Thu AM	N	N	N	0.004	N	0.018
SRBENA-Thu PM	0.006	0.008	0.000	N	N	N
Upper Skagit	0.047	N	0.040	N	N	N
Middle Skagit	N	N	N	N	N	N
Lower Skagit	N	N	N	N	N	N
Upper Sauk	N	N	N	0.004	N	0.004
Lower Sauk	0.013	N	0.002	N	N	N
Suiattle	-	-	-	-	-	-
Totals	N	N	N	N	N	N

Table 103. Probability values comparing the flushing responses of solitary and grouped eagles to simulated rafting activity while perched in trees and feeding or standing on the ground on the SRBENA during four time periods and on six other river sections of the SW&SRS combined.

	Solitary-Group Comparison					
	In Trees			On Ground		
	1985-86	1986-87	Both Years	1985-86	1986-87	Both Years
Adult	0.022	N	N	N	0.028	0.004
Subadult	0.000	N	0.000	0.031	0.000	0.000
All Ages	0.000	N	0.006	0.013	0.000	0.000

Table 104. Flushing responses (% flushed/100) of solitary eagles and eagles in groups from simulated rafting activity while feeding or standing on the ground on the SRBENA at four times and on six other rivers stretches of the SW&SRS combined.

Age and Social Grouping	1985-86		1986-87		Both Years	
	n	Mean	n	Mean	n	Mean
Adult						
Solitary	168	0.810	169	0.834	337	0.822
Group	219	0.872	320	0.906	539	0.892
Total	387	0.845	489	0.881	876	0.865
Subadult						
Solitary	96	0.833	87	0.782	183	0.809
Group	101	0.941	157	0.943	258	0.942
Total	197	0.888	244	0.885	441	0.887
All Ages						
Solitary	264	0.818	256	0.816	520	0.817
Group	320	0.894	477	0.918	797	0.908
Total	584	0.860	733	0.883	1317	0.872



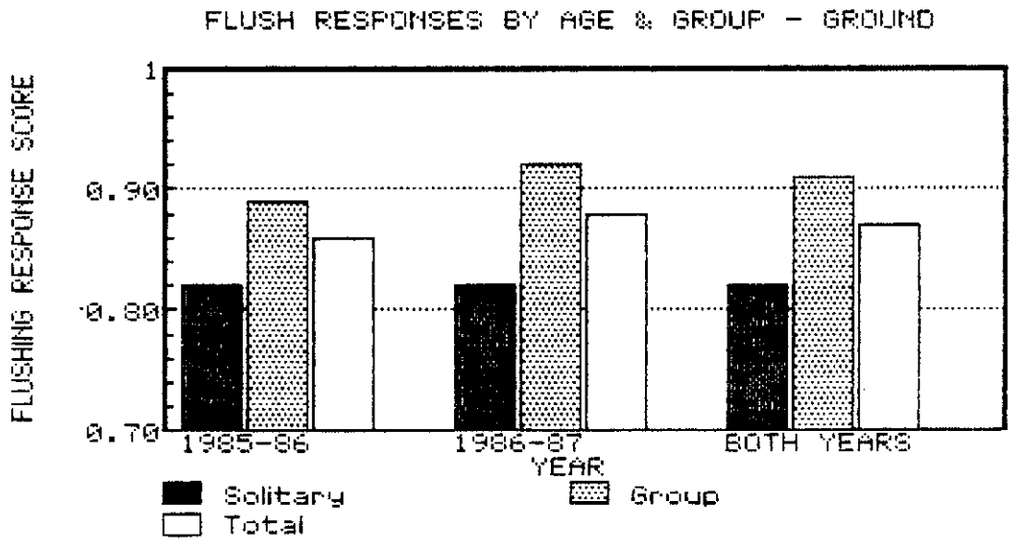


Figure 58. Flushing responses (% flushed/100) of eagles on the ground from the research raft on all river stretches combined for the different ages (upper) and for birds alone or in groups (lower) during both 1985-86 and 1986-87.

Table 105. Least squares linear regression of the seasonal changes in flushing responses (% flushing/100) of eagles to simulated rafting activity while perched in trees during 1985-86.

River/Time/Age	n	Regression Equation	r	F	P
SRBENA-Sun-AM					
Adult	13	Y=0.455 - 0.0049X	-0.740	13.32	0.001
Subadult	12	Y=0.615 - 0.0034X	-0.387	1.76	N
All Ages	13	Y=0.524 - 0.0047X	-0.701	10.61	0.003
SRBENA-Sun-PM					
Adult	13	Y=0.417 - 0.0058X	-0.842	26.70	0.000
Subadult	12	Y=0.572 - 0.0081X	-0.740	12.11	0.002
All Ages	13	Y=0.450 - 0.0063X	-0.867	33.40	0.000
SRBENA-Thu-AM					
Adult	13	Y=0.445 - 0.0032X	-0.680	9.47	0.004
Subadult	13	Y=0.695 - 0.0052X	-0.594	6.01	0.017
All Ages	13	Y=0.492 - 0.0034X	-0.749	14.06	0.001
SRBENA-Thu-PM					
Adult	13	Y=0.336 - 0.0011X	-0.230	0.61	N
Subadult	13	Y=0.433 - 0.0027X	-0.426	2.44	N
All Ages	13	Y=0.364 - 0.0015X	-0.395	2.04	N
Upper Skagit					
Adult	13	Y=0.271 - 0.0025X	-0.433	2.54	N
Subadult	12	Y=0.472 - 0.0043X	-0.408	2.00	N
All Ages	13	Y=0.357 - 0.0034X	-0.446	2.73	N
Middle Skagit					
Adult	13	Y=0.512 - 0.0046X	-0.598	6.13	0.016
Subadult	13	Y=0.530 - 0.0041X	-0.388	1.95	N
All Ages	13	Y=0.530 - 0.0044X	-0.563	5.11	0.027
Lower Skagit					
Adult	13	Y=0.289 - 0.0001X	-0.018	0.00	N
Subadult	13	Y=0.240 - 0.0013X	-0.143	0.23	N
All Ages	13	Y=0.242 - 0.0009X	-0.149	0.25	N
Upper Sauk					
Adult	13	Y=0.639 - 0.0025X	-0.508	3.83	N
Subadult	13	Y=0.555 - 0.0023X	-0.278	0.09	N
All Ages	13	Y=0.607 - 0.0021X	-0.436	2.58	N
Lower Sauk					
Adult	13	Y=0.668 - 0.0037X	-0.573	5.39	0.023
Subadult	13	Y=0.705 - 0.0040X	-0.397	2.05	N
All Ages	13	Y=0.699 - 0.0039X	-0.641	7.65	0.008

Table 106. Least squares linear regression of the seasonal changes in flushing responses (% flushing/100) of eagles to simulated rafting activity while feeding or standing on the ground during 1985-86.

River/Time/Age	n	Regression Equation	r	F	P
SRBENA-Sun-AM					
Adult	9	Y=0.833 - 0.0034X	-0.205	0.31	N
Subadult	11	Y=0.915 + 0.0003X	0.048	0.02	N
All Ages	11	Y=0.846 + 0.0002X	0.032	0.01	N
SRBENA-Sun-PM					
Adult	5	Y=1.118 - 0.0083X	-0.704	2.94	N
Subadult	5	Y=0.905 + 0.0025X	0.575	1.48	N
All Ages	6	Y=1.009 - 0.0036X	-0.501	1.34	N
SRBENA-Thu-AM					
Adult	9	Y=0.838 - 0.0030X	-0.202	0.30	N
Subadult	11	Y=1.047 - 0.0020X	-0.361	1.35	N
All Ages	12	Y=0.791 + 0.0002X	0.019	0.00	N
SRBENA-Thu-PM					
Adult	7	Y=0.876 - 0.0032X	-0.494	1.61	N
Subadult	6	Y=0.964 - 0.0066X	-0.443	0.98	N
All Ages	9	Y=0.908 - 0.0030X	-0.335	0.88	N
Upper Skagit					
Adult	6	Y=0.845 + 0.0042X	0.564	1.86	N
Subadult	2	Insufficient Data			
All Ages	7	Y=0.806 + 0.0035X	0.650	3.66	N
Middle Skagit					
Adult	9	Y=0.815 + 0.0035X	0.689	6.32	0.027
Subadult	7	Y=0.643 + 0.0059X	0.350	0.70	N
All Ages	9	Y=0.774 + 0.0039X	0.716	7.36	0.019
Lower Skagit					
Adult	8	Y=1.064 - 0.0093X	-0.621	3.77	N
Subadult	9	Y=0.517 + 0.0016X	0.129	0.12	N
All Ages	11	Y=0.800 - 0.0040X	-0.366	1.39	N
Upper Sauk					
Adult	7	Y=1.011 - 0.0008X	-0.435	1.17	N
Subadult	8	Y=1.123 - 0.0059X	-0.502	2.02	N
All Ages	9	Y=1.142 - 0.0064X	-0.543	2.93	N
Lower Sauk					
Adult	10	Y=0.945 + 0.0010X	0.479	2.38	N
Subadult	7	Y=1.000 + 0.0000X	1.000	0.00	N
All Ages	10	Y=0.945 + 0.0010X	0.479	2.38	N

Table 107. Least squares linear regression of the seasonal changes in flushing responses (% flushing/100) of eagles to simulated rafting activity while perched in trees during 1986-87.

River/Time/Age	n	Regression Equation	r	F	P
SRBENA-Sun-AM					
Adult	13	Y=0.384 - 0.0025X	-0.632	7.32	0.010
Subadult	13	Y=0.493 - 0.0022X	-0.308	1.15	N
All Ages	13	Y=0.408 - 0.0020X	-0.419	2.34	N
SRBENA-Sun-PM					
Adult	13	Y=0.111 - 0.0013X	-0.506	3.78	N
Subadult	13	Y=0.156 - 0.0005X	-0.072	0.06	N
All Ages	13	Y=0.111 - 0.0009X	-0.338	1.42	N
SRBENA-Thu-AM					
Adult	13	Y=0.468 - 0.0030X	-0.635	7.41	0.009
Subadult	13	Y=0.509 - 0.0009X	-0.141	0.22	N
All Ages	13	Y=0.472 - 0.0020X	-0.434	2.55	N
SRBENA-Thu-PM					
Adult	13	Y=0.222 - 0.0014X	-0.258	0.79	N
Subadult	13	Y=0.256 - 0.0006X	-0.057	0.04	N
All Ages	13	Y=0.224 - 0.0011X	-0.212	0.52	N
Upper Skagit					
Adult	12	Y=0.198 - 0.0013X	-0.213	0.48	N
Subadult	8	Y=0.981 - 0.0117X	-0.714	6.23	0.034
All Ages	12	Y=0.243 - 0.0015X	-0.211	0.47	N
Middle Skagit					
Adult	13	Y=0.638 - 0.0052X	-0.815	21.71	0.000
Subadult	13	Y=0.753 - 0.0056X	-0.650	8.05	0.007
All Ages	13	Y=0.693 - 0.0057X	-0.854	29.53	0.000
Lower Skagit					
Adult	13	Y=0.609 - 0.0056X	-0.723	12.07	0.002
Subadult	12	Y=0.596 - 0.0054X	-0.765	14.09	0.001
All Ages	13	Y=0.580 - 0.0051X	-0.771	16.11	0.001
Upper Sauk					
Adult	13	Y=0.562 - 0.0003X	-0.056	0.03	N
Subadult	12	Y=0.382 - 0.0024X	-0.247	0.65	N
All Ages	13	Y=0.518 - 0.0003X	-0.096	0.10	N
Lower Sauk					
Adult	13	Y=0.734 - 0.0023X	-0.448	2.76	N
Subadult	13	Y=0.889 - 0.0059X	-0.650	8.04	0.007
All Ages	13	Y=0.793 - 0.0038X	-0.629	7.21	0.010

Table 108. Least squares linear regression of the seasonal changes in flushing responses (% flushing/100) of eagles to simulated rafting activity while feeding or standing on the ground during 1986-87.

River/Time/Age	n	Regression Equation	r	F	P
SRBENA-Sun-AM					
Adult	8	Y=0.883 + 0.0019X	0.420	1.28	N
Subadult	11	Y=1.000 + 0.0000X	1.000	0.00	N
All Ages	11	Y=0.929 + 0.0011X	0.435	2.10	N
SRBENA-Sun-PM					
Adult	7	Y=1.100 - 0.0206X	-0.759	6.82	0.037
Subadult	5	Y=1.167 - 0.0130X	-0.920	16.52	0.024
All Ages	8	Y=0.982 - 0.0137X	-0.766	8.54	0.018
SRBENA-Thu-AM					
Adult	12	Y=0.983 - 0.0035X	-0.314	1.10	N
Subadult	11	Y=0.930 + 0.0008X	0.259	0.65	N
All Ages	12	Y=0.910 + 0.0000X	0.026	0.01	N
SRBENA-Thu-PM					
Adult	9	Y=0.777 + 0.0026X	0.268	0.54	N
Subadult	5	Y=0.723 + 0.0040X	0.435	0.70	N
All Ages	9	Y=0.782 + 0.0023X	0.272	0.56	N
Upper Skagit					
Adult	5	Y=1.345 - 0.0121X	-0.815	5.94	N
Subadult	6	Y=1.051 - 0.0054X	-0.360	0.60	N
All Ages	7	Y=1.195 - 0.0091X	-0.649	3.64	N
Middle Skagit					
Adult	9	Y=1.114 - 0.0041X	-0.697	6.60	0.025
Subadult	10	Y=0.897 - 0.0037X	-0.215	0.39	N
All Ages	10	Y=0.994 - 0.0028X	-0.366	1.24	N
Lower Skagit					
Adult	11	Y=1.077 - 0.0042X	-0.502	3.03	N
Subadult	10	Y=0.962 - 0.0018X	-0.249	0.53	N
All Ages	12	Y=1.031 - 0.0035X	-0.569	4.78	0.035
Upper Sauk					
Adult	10	Y=1.208 - 0.0102X	-0.698	7.61	0.014
Subadult	8	Y=0.904 - 0.0007X	-0.054	0.02	N
All Ages	11	Y=1.158 - 0.0090X	-0.640	6.23	0.020
Lower Sauk					
Adult	9	Y=1.000 + 0.0000X	1.000	0.00	N
Subadult	10	Y=1.000 + 0.0000X	1.000	0.00	N
All Ages	11	Y=1.000 + 0.0000X	1.000	0.00	N

Table 109. Least squares linear regression of the seasonal changes in flushing responses (% flushing/100) of eagles to simulated rafting activity while perched in trees during 1985-86 and 1986-87 combined.

River/Time/Age	n	Regression Equation	r	F	P
SRBENA-Sun-AM					
Adult	26	Y=0.420 - 0.0037X	-0.676	20.21	0.000
Subadult	25	Y=0.553 - 0.0028X	-0.347	3.15	N
All Ages	26	Y=0.465 - 0.0032X	-0.576	11.90	0.000
SRBENA-Sun-PM					
Adult	26	Y=0.261 - 0.0035X	-0.623	15.25	0.000
Subadult	25	Y=0.358 - 0.0042X	-0.458	6.10	0.008
All Ages	26	Y=0.278 - 0.0035X	-0.609	14.16	0.000
SRBENA-Thu-AM					
Adult	26	Y=0.457 - 0.0031X	-0.653	17.84	0.000
Subadult	26	Y=0.601 - 0.0030X	-0.400	4.58	0.021
All Ages	26	Y=0.483 - 0.0027X	-0.583	12.38	0.000
SRBENA-Thu-PM					
Adult	26	Y=0.277 - 0.0012X	-0.211	1.12	N
Subadult	26	Y=0.343 - 0.0016X	-0.186	0.86	N
All Ages	26	Y=0.292 - 0.0013X	-0.249	1.59	N
Upper Skagit					
Adult	25	Y=0.235 - 0.0019X	-0.321	2.65	N
Subadult	20	Y=0.600 - 0.0060X	-0.479	5.36	0.015
All Ages	25	Y=0.301 - 0.0025X	-0.331	2.82	N
Middle Skagit					
Adult	26	Y=0.576 - 0.0049X	-0.670	19.56	0.000
Subadult	26	Y=0.643 - 0.0048X	-0.482	7.27	0.003
All Ages	26	Y=0.612 - 0.0051X	-0.675	20.12	0.000
Lower Skagit					
Adult	26	Y=0.452 - 0.0029X	-0.420	5.13	0.014
Subadult	25	Y=0.401 - 0.0018X	-0.222	1.19	N
All Ages	26	Y=0.415 - 0.0021X	-0.332	3.00	N
Upper Sauk					
Adult	26	Y=0.600 - 0.0014X	-0.292	2.24	N
Subadult	25	Y=0.472 - 0.0002X	-0.017	0.01	N
All Ages	26	Y=0.561 - 0.0009X	-0.220	1.22	N
Lower Sauk					
Adult	26	Y=0.702 - 0.0030X	-0.479	7.14	0.004
Subadult	26	Y=0.799 - 0.0050X	-0.508	8.33	0.002
All Ages	26	Y=0.748 - 0.0039X	-0.611	14.27	0.000

Table 110. Least squares linear regression of the seasonal changes in flushing responses (% flushing/100) of eagles to simulated rafting activity while feeding or standing on the ground during 1985-86 and 1986-87 combined.

River/Time/Age	n	Regression Equation	r	F	P
SRBENA-Sun-AM					
Adult	17	Y=0.839 - 0.0003X	-0.022	0.01	N
Subadult	22	Y=0.956 + 0.0002X	0.041	0.03	N
All Ages	22	Y=0.883 + 0.0008X	0.140	0.40	N
SRBENA-Sun-PM					
Adult	12	Y=1.080 - 0.0138X	-0.608	5.85	0.021
Subadult	10	Y=1.093 - 0.0088X	-0.703	7.81	0.013
All Ages	14	Y=1.050 - 0.0120X	-0.688	10.78	0.002
SRBENA-Thu-AM					
Adult	21	Y=0.901 - 0.0028X	-0.224	1.01	N
Subadult	22	Y=0.989 - 0.0007X	-0.150	0.46	N
All Ages	24	Y=0.853 + 0.0001X	0.010	0.00	N
SRBENA-Thu-PM					
Adult	16	Y=0.840 - 0.0005X	-0.057	0.04	N
Subadult	11	Y=0.869 - 0.0030X	-0.226	0.48	N
All Ages	18	Y=0.856 - 0.0008X	-0.084	0.11	N
Upper Skagit					
Adult	11	Y=1.105 - 0.0070X	-0.588	4.77	0.039
Subadult	8	Y=0.541 + 0.0028X	0.184	0.21	N
All Ages	14	Y=0.975 - 0.0037X	-0.361	1.80	N
Middle Skagit					
Adult	18	Y=0.924 + 0.0005X	0.099	0.16	N
Subadult	17	Y=0.784 + 0.0002X	0.010	0.00	N
All Ages	19	Y=0.875 + 0.0008X	0.124	0.27	N
Lower Skagit					
Adult	19	Y=1.069 - 0.0061X	-0.473	4.90	0.021
Subadult	19	Y=0.767 - 0.0004X	-0.036	0.02	N
All Ages	23	Y=0.904 - 0.0034X	-0.340	2.75	N
Upper Sauk					
Adult	17	Y=1.127 - 0.0064X	-0.547	6.41	0.010
Subadult	16	Y=1.024 - 0.0037X	-0.292	1.30	N
All Ages	20	Y=1.147 - 0.0077X	-0.589	9.57	0.002
Lower Sauk					
Adult	19	Y=0.969 + 0.0006X	0.356	2.47	N
Subadult	17	Y=1.000 + 0.0000X	1.000	0.00	N
All Ages	21	Y=0.971 + 0.0005X	0.344	2.55	N

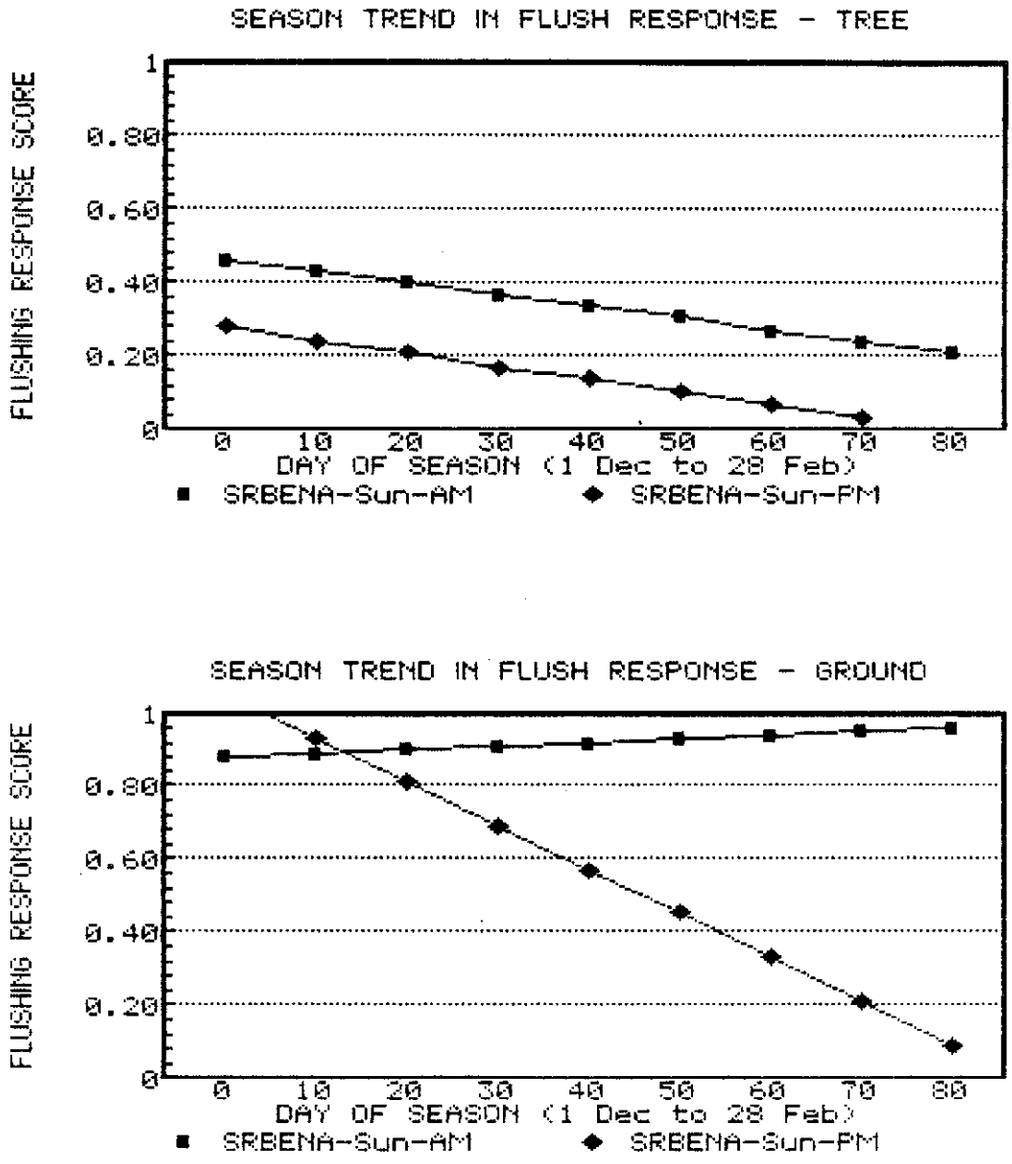
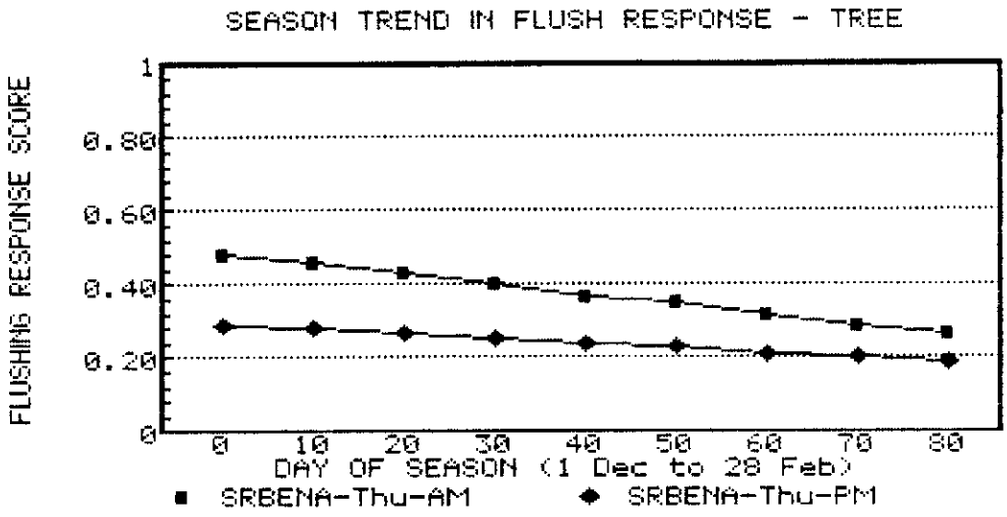


Figure 59. Seasonal changes in the flushing responses of eagles in trees (upper) and on the ground (lower) to simulated rafting activity on the SRBENA during Sunday mornings and afternoons during 1985-86 and 1986-87 combined.



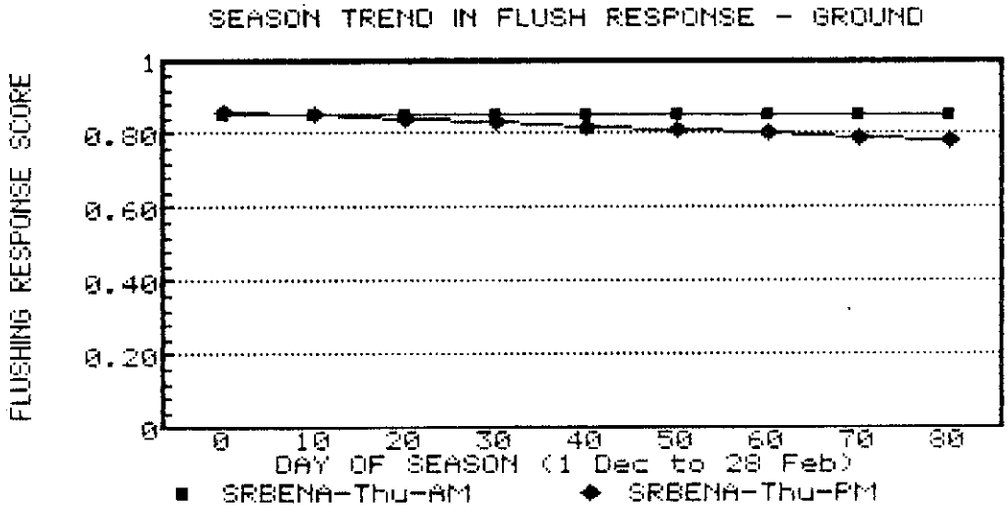


Figure 60. Seasonal changes in the flushing responses of eagles in trees (upper) and on the ground (lower) to simulated rafting activity on the SRBENA during Thursday mornings and afternoons during 1985-86 and 1986-87 combined.

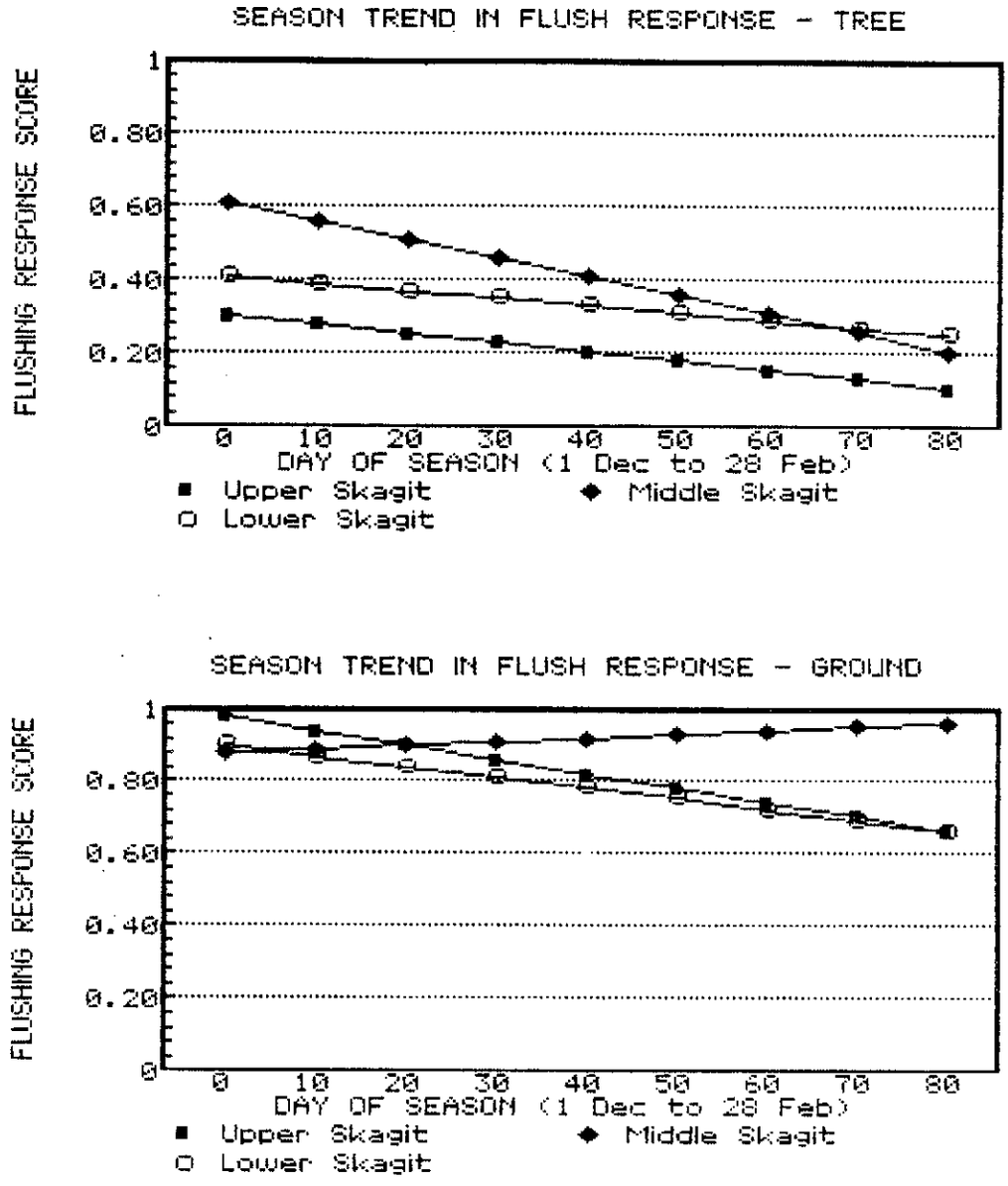
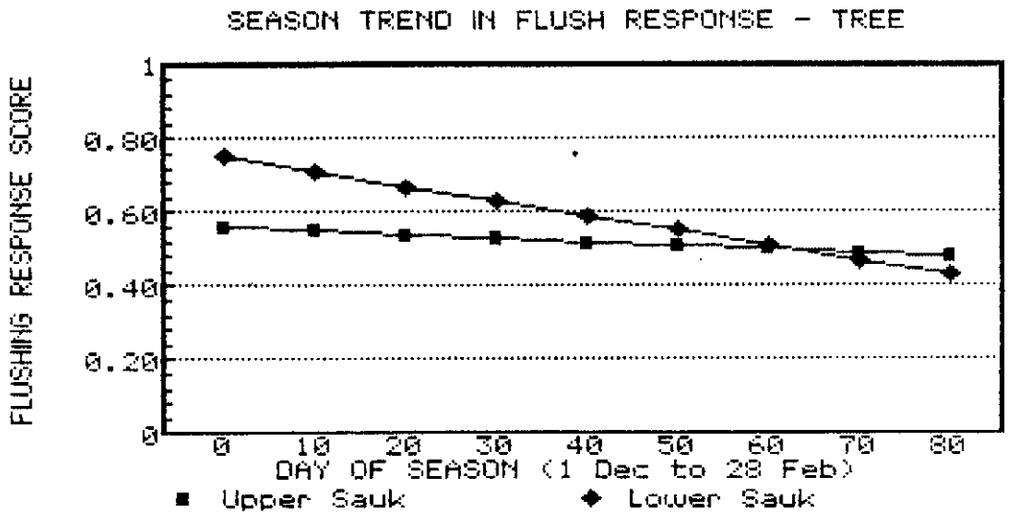


Figure 61. Seasonal changes in the flushing responses of eagles in trees (upper) and on the ground (lower) to simulated rafting activity on the Upper, Middle, and Lower Skagit during 1985-86 and 1986-87 combined.



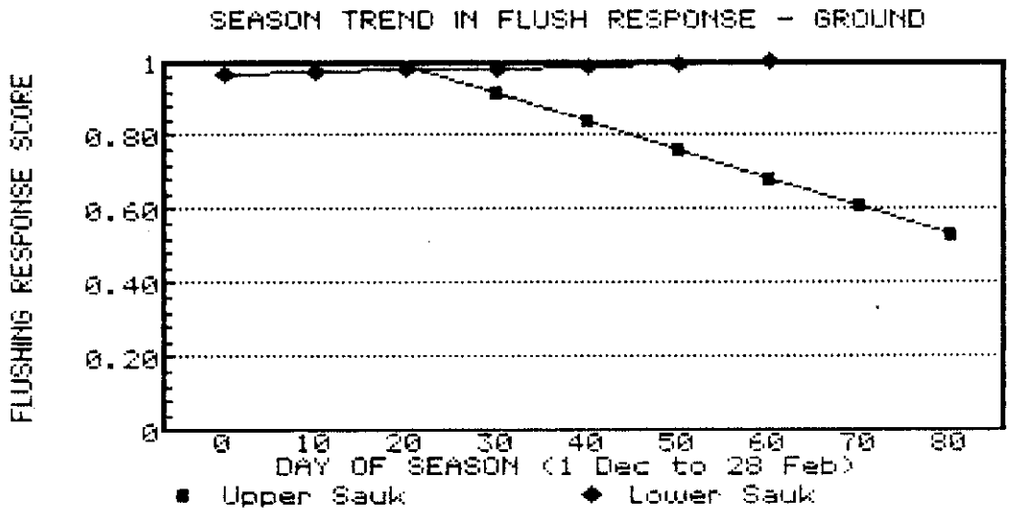


Figure 62. Seasonal changes in the flushing responses of eagles in trees (upper) and on the ground (lower) to simulated rafting activity on the Upper and Lower Sauk during 1985-86 and 1986-87 combined.

TASK 5 - Heart Rate Monitoring

This task was discontinued because of inadequate funding.

Previous discussions per Tasks 1 and 4 indicate the complexity of eagle responses to varying human activities. By using flight distances, flushing responses, and alterations in daily activity as indices to understand eagle avoidance behavior, many questions will remain unresolved or, at least, not completely understood.

Heart rate monitoring may very well be the best means of refining this approach and analyzing the intricate response patterns of eagles. It is a technique to acquire a physiological (and psychological) index of an eagle's perception of its environment and the effects of the many components there that it must contend with.

Telemetered eagles also could provide valuable data on movements, distribution, and mortality as may be affected by human activity as well as success of the reproductive effort by adult birds in the post-wintering season.

An investigation of the survival abilities and reproductive efforts of eagles will provide answers to the questions concerning the ultimate effects of winter human activity; this study addresses only the proximate effects.

This approach should be considered in future studies of the bald eagle where human activity is thought to be influencing their behavior.

TASK 6 - Recreational Use Survey

Methods

Observations on SRBENA.-- During continuous observations at Washington Eddy on SRBENA (per Task 1), the following recreational data were collected for all activities seen: (1) type of activity, (2) date, (3) time of day, (4) sequence of occurrence, and (5) number of persons in each activity event. Motorboats were recorded as running with their motors on or drifting with their motors off; they also were subdivided by the first appearance during the day and repeat appearances.

Observations during Float Trips.-- During the floats trips on SRBENA and the SW&SRS (per Task 4), the following recreational data were collected for all activities seen: (1) type of activity, (2) date, (3) location by river mile, and (4) number of persons in each activity event.

Time-lapse Photography.-- Three time-lapse cameras (Minolta Super-8, Models 401 or 601) were placed on the Upper and Lower Sauk and Upper Skagit rivers to record the amount, type, date, and time of day of recreational activities in 1985-86. Late in the season, two cameras were stolen; one on the Upper Sauk and one on the Upper Skagit. In 1986-87, the Upper, Middle, and Lower Skagit were photographed. The Upper Skagit camera was stolen after 2 months of recording and the data set for February is not available.

Analyses

Observational data were compiled according to the above parameters. Time-lapse film was analyzed by playing film on a Super-8 Movie Projector or Film Analyzer. Because specific times were not recorded during time-lapse photography, daily sequences are divided into quarter days based on when the camera was turned on and off by a photocell

Results and Discussion

Observations on SRBENA.-- During the winter season of 1985-86, 1273 recreational activities were recorded at Washington Eddy on SRBENA; 156 in December, 683 in January, and 434 in February (Table 111, Figure 63). In 1986-87, 1428 activities occurred; 272 in December, 660 in January, and 496 in February (Table 111, Figure 64). A daily high count of 115 and 87 was made during 1985-86 and 1986-87, respectively. Of these 2701 acts, 53 percent were consumptive users (fishermen) and 47 percent were naturalistic users (eagle watchers) (Tables 112, 113, 114, 115). Passes by motorboats were the most common type of activity (42 %) followed by recreational rafts (24 %) (Table 115, Figure 65). Each of the other activities comprised less than 10 percent of total.

The amount, type, and purpose of activities depended on the day of the week when they occurred (Tables 112, 113, 114, 115, Figure 66). Exactly two-thirds of all activity happened on weekends. Consumptive use was proportionally higher on

weekdays; naturalistic use was higher on weekends. A higher percentage of motorboats and dories occurred on weekdays (Figure 67); recreational rafts, canoes, and kayaks were more common on weekends (Figure 68).

The amount, type, and purpose of activities was related to the week of season (Table 116). Recreational activity began building in the fourth week of December, during the holiday season, and remained high until the observations terminated in late February (Figure 69). The proportion of consumptive use was highest in early season and, beginning in mid-January, naturalistic activity was often more common than consumptive use (Figures 70, 71). Canoeing and kayaking, for examples, were much more common during the second half of the wintering season.

The amount, type, and purpose of activities also was related to the hour of occurrence (Table 117). Activity peaked in early-afternoon, especially between 1200 and 1500 hours, with consumptive activity peaking generally earlier in the day, whereas naturalistic activity happened mostly in afternoons (Figure 72). As a percent of total, consumptive activity was more prevalent in the morning (Figure 73); naturalistic activity did not start in appreciable numbers until after 1100 hours (Figure 74). Dories were the most common early-morning activity type; motorboats also occurred early in the day. Rafts peaked in mid-day, but canoes and kayaks occurred almost entirely in the afternoon.

The hourly occurrence of activity differed between

weekends and weekdays (Table 118). Recreational activity was more likely to occur earlier in the day on weekdays and later in the day on weekends (Figure 75). This happens because consumptive activity occurs more often on weekdays and this type of activity is more common in morning hours.

The daily sequence of recreational activity on the SRBENA was dependent on the type of activity (Table 119). Consumptive activities were more likely to be the first activities of the day because they occurred early in the morning (Figure 76). Naturalistic activities, in contrast, occurred in large groups in mid- to late-day and were concentrated on weekends. This results in naturalistic activities occurring late in the daily sequence and is an important reason why these activities have less effect on eagles than consumptive users (Figure 77).

The duration of human activities at Washington Eddy on the SRBENA was different among activity types (Table 120). Motorboats were relatively fast while running, and dories were slow because they anchored and were rowed upstream. The slowness of dories was a contributing factor to the high disturbance they caused to eagles. Bank fishers and hikers stayed longer and this too contributed to the relatively high sensitively that eagles exhibited to them.

Recreational rafts had the largest number of persons in each individual activity simply because rafts accommodate more passengers (Table 121). Kayaks had the lowest number of passengers. Hiking groups were larger than bank-fishing

groups. (These data were used in compiling the ranking system in tables 59 through 64.)

A survey of shoreline eagle viewers, as recorded at the vehicle turn-out at Washington Eddy on the SRBENA, showed that visitation began increasing in late-December and remained high over the course of the season (Table 122, Figure 78). When these data are projected to all days of the week, about 63 percent of shoreline eagle-viewing occurs on weekends. There was much weekday viewing, however, in late-December during the holiday season. Hourly occurrence followed a somewhat bell-shaped curve (Figure 78).

In summary, there are two main groups of recreationists on the SRBENA: fishermen (consumptive users) and eagle-watchers (naturalistic users). Fishermen occur more consistently throughout the season, week, and day (depending on water conditions that affect fishing success). They are present on the river early in the morning and do not follow the guidelines prohibiting boating before 1000 hours. Eagle-watchers occur mostly in January and February (when eagle numbers peak), during weekends, and in early-afternoon. Nearly all follow the activity-restriction guideline; they launch their boats after 1000 hours. As was discussed per tasks 1 and 4, these differences explain much about how these two groups affect eagles.

Observations during Float Trips.-- Activity types and purposes of activity were different among several rivers (Table 123). On the SRBENA, both fishermen and eagle-

watchers occurred, but the latter were very rare in any other river sections (Figure 79). Fishermen are common throughout most of the SW&SRS and are, by far, the dominant recreational activity on the river. On the Sauk River, dories and bank fishermen are the most common activities (Figure 79). Presumably, the shallow waters precluded extensive use by motorboats. On the Upper, Middle, and Lower Skagit River, most activity is motorboating followed by bank fishing and a smaller number of dory fishermen (Figure 79). The wide and deep Skagit lends itself to powerboating. During four float trips on the Suiattle River, no human activity of any kind was seen.

Time-lapse Photography.-- Photographic records of activity have, to date, been made on the Upper, Middle, and Lower Skagit and the Lower Sauk. These data thus far provide information on type of use and time of occurrence; information on extent of use is, as yet, sketchy.

Motorboats comprised over 90 percent of all activity on the Upper Skagit (Table 124, Figure 80). Boating activity was extremely high, possibly higher than on the SRBENA above Rockport. In addition, there was more early-morning activity here than in any other area (Table 125). The Middle Skagit had a higher diversity of activity, but motorboats were still most common (Table 126, Figure 81). Activity peaked in early afternoon (Table 127). On the Lower Skagit, over 93 percent of all activity recorded were motorboats (Table 128, Figure 82), and they peaked in late morning (Table 129). In

contrast, dory activity was most common on the Lower Sauk followed by rafts and bank fishers (Table 130, Figure 83). Boating activity was concentrated in mid-day, but foot traffic occurred in the morning (Table 131).

It is important to realize the inherent biases and constraints involved in interpreting these recreational activity patterns. The three sampling techniques, observation from a fixed point, observation from a moving raft, and time-lapse photography from a fixed position, do not sample randomly. In particular, a fixed reference point fails to record many fixed activities (generally foot traffic) and moving reference points could fail to record moving activities if these activities travel in the same direction (boats). Floating references probably provide higher accuracy regarding type of activity and fixed references best record number and timing of activities. Another complicating variable, the length of river covered by a particular activity type, was not recorded but has obvious implications in terms of affecting bald eagles.

Thus, observations during raft floats on the SRBENA recorded many more bank fishermen and hikers and less boats, except dories, than fixed observations at Washington Eddy (Figure 84). (Dories are slow moving and are intermediate between fixed and moving activity types.) Similar disparities occurred on the Upper, Middle, and Lower Skagit (Figure 85). As one travels downstream on the Skagit, there is an increasing disparity between the number of bank

fishermen and the number of motorboats as recorded by the two different techniques. A similar disparity between dories and bank fishermen on the Sauk River also is evident (Figure 86). In summary, there is much more foot traffic on all rivers than recorded by time-lapse photography.

Table 111. Number of human activities occurring each day at Washington Eddy on the SRBENA in 1985-86 and 1986-87. Weekend days are in boldface.

	December		January		February	
Day	1985-86	1986-87	1985-86	1986-87	1985-86	1986-87
1	**3**	5	-	88	**57**	**31**
2	1	0	8	10	**33**	0
3	0	3	4	**25**	2	4
4	5	7	**29**	**33**	21	13
5	2	2	**16**	13	7	11
6	0	**8**	3	10	9	15
7	**3**	**10**	3	12	9	**87***
8	-	0	4	15	**72**	**84**
9	2	7	14	19	**60**	7
10	0	1	2	**64**	2	6
11	4	3	**115***	**36**	2	3
12	5	5	**92**	1	11	7
13	3	**20**	3	3	10	6
14	**9**	**3**	9	5	1	**66**
15	-	22	18	5	**24**	**47**
16	11	8	17	4	**59**	28
17	1	2	7	**39**	6	7
18	2	7	**38**	**57**	1	11
19	4	3	**6**	20	7	8
20	1	**5**	3	1	8	0
21	**6**	**8**	3	0	7	**36**
22	**8**	2	1	8	**26**	**19**
23	3	9	5	5		
24	1	10	5	**57**		
25	-	-	**99**	**36**		
26	17	27	**102**	1		
27	22	**41**	7	8		
28	**27**	**25**	23	0		
29	**6**	6	16	8		
30	6	12	15	3		
31	4	11	7	**74**		

* Seasonal high count.

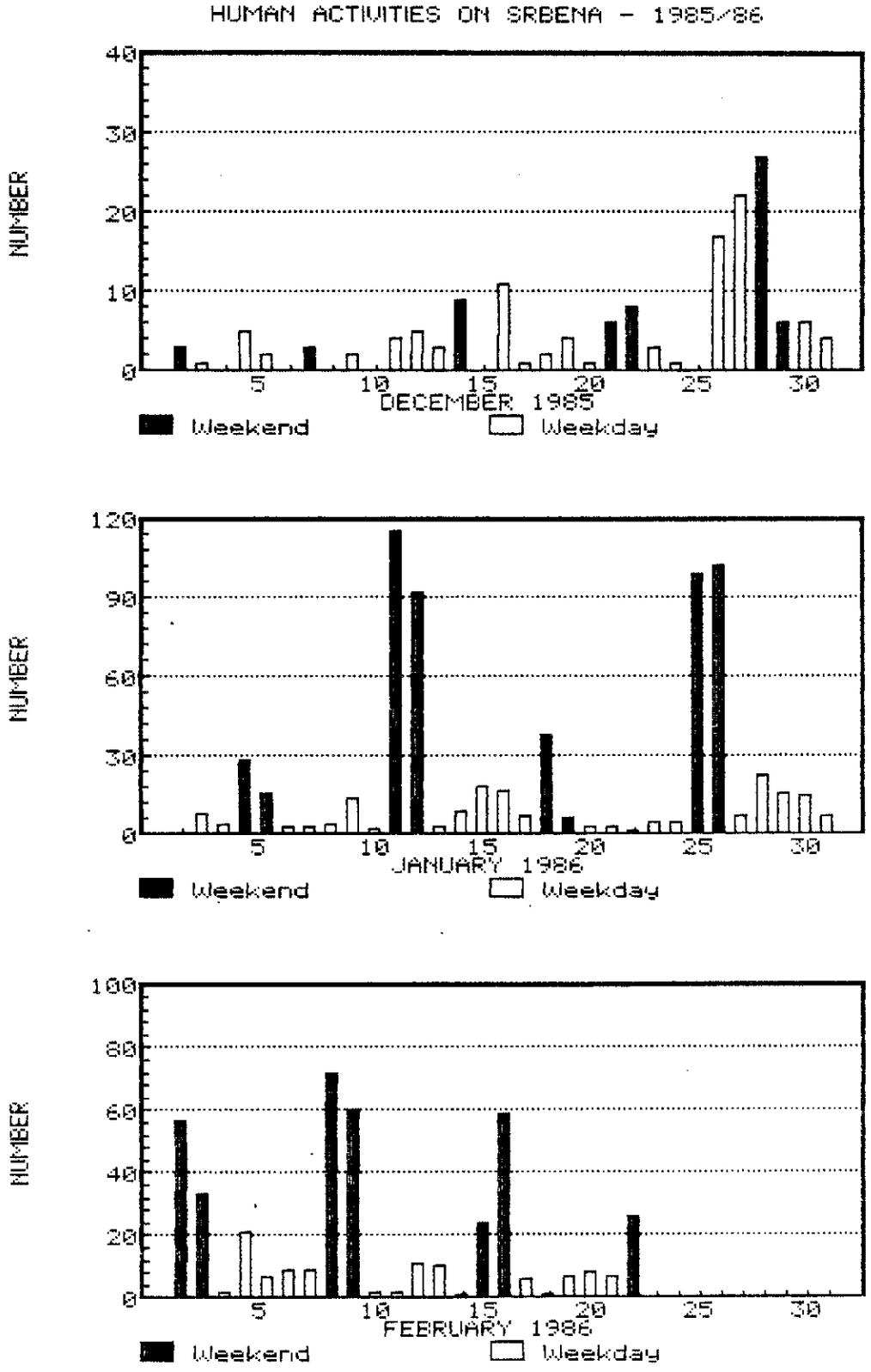


Figure 63. Number of recreational activities recorded at Washington Eddy on the SRBENA in December (upper), January (middle), and February (lower) in 1985-86.

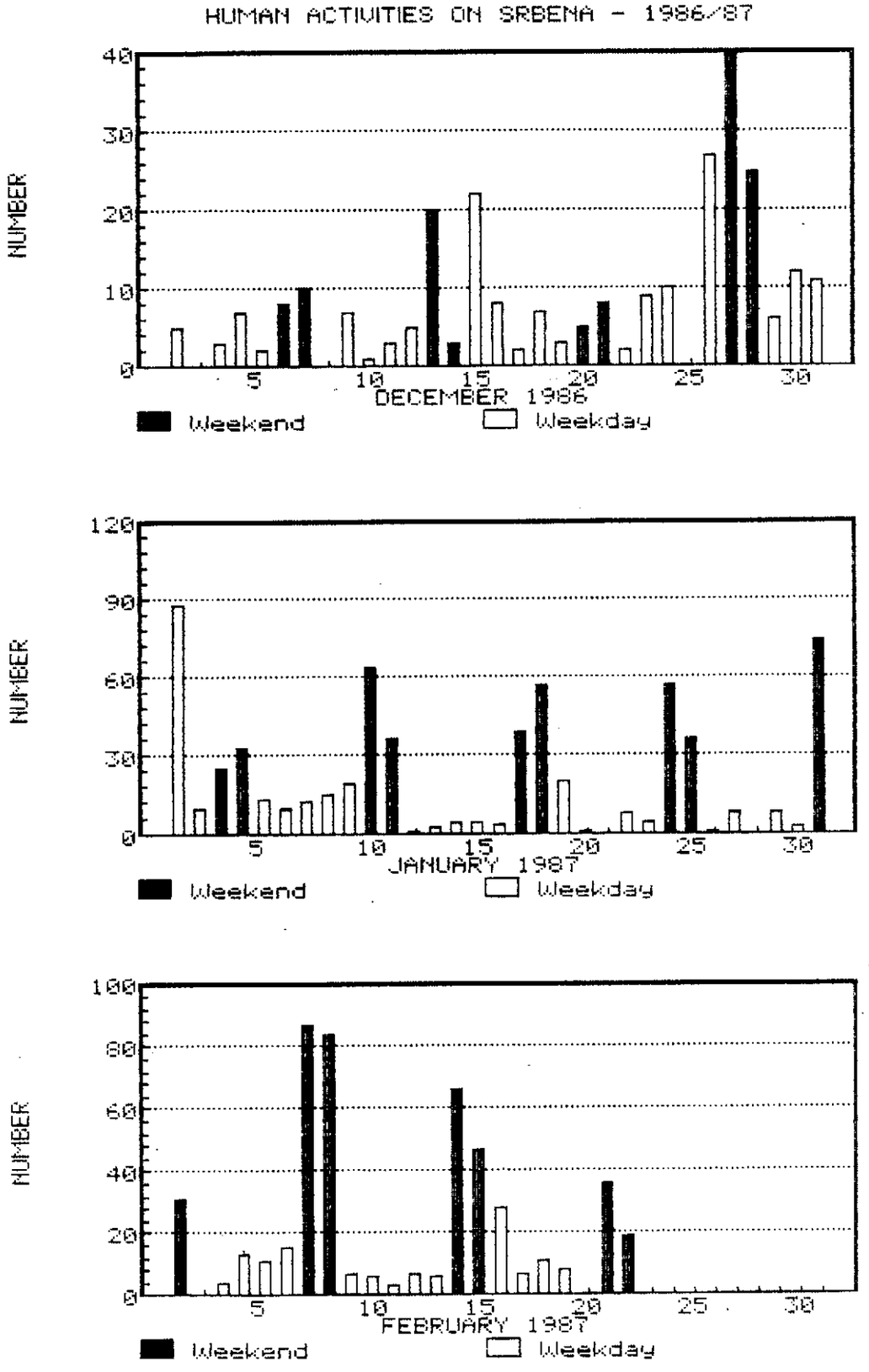


Figure 64. Number of recreational activities recorded at Washington Eddy on the SRBENA in December (upper), January (middle), and February (lower) in 1986-87.

Table 112. Number of recreational activities recorded at Washington Eddy on the SRBENA on each day of the week for 28 days in 1985-86 and 30 days in 1986-87 in December. *

Activity Type	Day of Week **							
	Sun		Mon		Tue		Wed	
	n	%	n	%	n	%	n	%
Motorboat (Run)								
1985-86	3	17.6	13	56.5	3	50.0	6	54.5
1986-87	12	26.1	19	54.3	13	36.1	12	44.4
Both Years	15	23.8	32	55.2	16	38.1	18	47.4
Motorboat (Drift)								
1985-86	0	0.0	1	4.3	0	0.0	2	18.2
1986-87	8	17.4	13	37.1	7	19.4	9	33.3
Both Years	8	12.7	14	24.1	7	16.7	11	28.9
Raft (Recreation)								
1985-86	4	23.5	5	21.7	1	16.7	0	0.0
1986-87	7	15.2	0	0.0	2	5.6	2	7.4
Both Years	11	17.5	5	8.6	3	7.1	2	5.3
Raft (Research)								
1985-86	6	35.3	0	0.0	0	0.0	0	0.0
1986-87	7	15.2	0	0.0	0	0.0	0	0.0
Both Years	13	17.5	0	0.0	0	0.0	0	0.0
Dory/Drift								
1985-86	1	5.9	1	4.3	1	16.7	0	0.0
1986-87	9	19.6	2	5.7	4	11.1	2	7.4
Both Years	10	15.9	3	5.2	5	11.9	2	5.3
Canoe								
1985-86	0	0.0	0	0.0	1	16.7	0	0.0
1986-87	2	4.3	0	0.0	1	2.8	1	3.7
Both Years	2	3.2	0	0.0	2	4.8	1	2.6
Kayak								
1985-86	0	0.0	0	0.0	0	0.0	0	0.0
1986-87	0	0.0	0	0.0	0	0.0	0	0.0
Both Years	0	0.0	0	0.0	0	0.0	0	0.0
Bank Fisher								
1985-86	3	17.6	2	8.7	0	0.0	1	9.1
1986-87	0	0.0	0	0.0	3	8.3	0	0.0
Both Years	3	4.8	2	3.4	3	7.1	1	2.6
Hiker								
1985-86	0	0.0	1	4.3	0	0.0	2	18.2
1986-87	1	2.2	1	2.9	6	16.7	1	3.7
Both Years	1	1.6	2	3.4	6	14.3	3	7.9

Table 112. Continued.

Activity Type	Day of Week							
	Sun		Mon		Tue		Wed	
	n	%	n	%	n	%	n	%
Consumptive								
1985-86	7	41.2	17	73.9	4	66.7	9	81.8
1986-87	29	63.0	34	97.1	27	75.0	23	85.2
Both Years	36	57.1	51	87.9	31	73.8	32	84.2
Naturalistic								
1985-86	10	58.8	6	26.1	2	33.3	2	18.2
1986-87	17	37.0	1	2.9	9	25.0	4	14.8
Both Years	27	42.9	7	12.1	11	26.2	6	15.8
Totals								
1985-86	17	100.0	23	100.0	6	100.0	11	100.0
1986-87	46	100.0	35	100.0	36	100.0	27	100.0
Both Years	63	100.0	58	100.0	42	100.0	38	100.0

Table 112. Continued.

Activity Type	Day of Week							
	Thu		Fri		Sat		Totals	
	n	%	n	%	n	%	n	%
Motorboat (Run)								
1985-86	7	25.0	9	34.6	9	20.0	50	32.1
1986-87	3	17.6	11	29.7	24	32.4	94	34.6
Both Years	10	22.2	20	31.7	33	27.7	144	33.6
Motorboat (Drift)								
1985-86	1	3.6	1	3.8	3	6.7	8	5.1
1986-87	1	5.9	14	37.8	17	23.0	69	25.4
Both Years	2	4.4	15	23.8	20	16.8	77	18.0
Raft (Recreation)								
1985-86	3	10.7	5	19.2	17	37.8	35	22.4
1986-87	0	0.0	1	2.7	20	27.0	32	11.8
Both Years	3	6.7	6	9.5	37	31.1	67	15.7
Raft (Research)								
1985-86	7	25.0	0	0.0	0	0.0	13	8.3
1986-87	6	35.3	0	0.0	0	0.0	13	4.8
Both Years	13	28.9	0	0.0	0	0.0	26	6.1
Dory/Drift								
1985-86	4	14.3	6	23.1	3	6.7	16	10.3
1986-87	4	23.5	9	24.3	8	10.8	38	14.0
Both Years	8	17.8	15	23.8	11	9.2	54	12.6
Canoe								
1985-86	0	0.0	0	0.0	7	15.6	8	5.1
1986-87	1	5.9	0	0.0	0	0.0	5	1.8
Both Years	1	2.2	0	0.0	7	5.9	13	3.0
Kayak								
1985-86	0	0.0	0	0.0	0	0.0	0	0.0
1986-87	0	0.0	0	0.0	1	1.4	1	0.4
Both Years	0	0.0	0	0.0	1	0.8	1	0.2
Bank Fisher								
1985-86	2	7.1	0	0.0	4	8.9	12	7.7
1986-87	1	5.9	1	2.7	1	1.4	6	2.2
Both Years	3	6.7	1	1.6	5	4.2	18	4.2
Hiker								
1985-86	4	14.3	5	19.2	2	4.4	14	9.0
1986-87	1	5.9	1	2.7	3	4.1	14	5.1
Both Years	5	11.1	6	9.5	5	4.2	28	6.5

Table 112. Continued.

Activity Type	Day of Week: Thu n	Thu %	Fri n	Fri %	Sat n	Sat %	Totals n	Totals %
Consumptive								
1985-86	14	50.0	16	61.5	19	42.2	86	55.1
1986-87	9	52.9	35	94.6	50	67.6	207	76.1
Both Years	23	51.1	51	81.0	69	58.0	293	68.5
Naturalistic								
1985-86	14	50.0	10	38.5	26	57.8	70	44.9
1986-87	8	47.1	2	5.4	24	32.4	65	23.9
Both Years	22	48.9	12	19.0	50	42.0	135	31.5
Totals								
1985-86	28	100.0	26	100.0	45	100.0	156	100.0
1986-87	17	100.0	37	100.0	74	100.0	272	100.0
Both Years	45	100.0	63	100.0	119	100.0	428	100.0

* Excludes 12/8, 12/15, 12/25 in 1985-86 and 12/25 in 1986-87.

** Sample Days: 1985-86 - Sun=3, Mon=5, Tue=5, Wed=3, Thu=4, Fri=4, Sat=4. 1986-87 - Sun=4, Mon=5, Tue=5, Wed=5, Thu=3, Fri=4, Sat=4.

Table 113. Number of recreational activities recorded at Washington Eddy on the SRBENA on each day of the week for 31 days in both 1985-86 and 1986-87 in January.

Activity Type	Day of Week *							
	Sun		Mon		Tue		Wed	
	n	%	n	%	n	%	n	%
Motorboat (Run)								
1985-86	29	13.4	2	12.5	20	52.6	16	33.3
1986-87	27	16.6	10	28.6	8	36.4	8	44.4
Both Years	56	14.8	12	23.5	28	46.7	24	36.4
Motorboat (Drift)								
1985-86	31	14.4	1	6.3	15	39.5	11	22.9
1986-87	20	12.3	9	25.7	7	31.8	4	22.2
Both Years	51	13.5	10	19.6	22	36.7	15	22.7
Raft (Recreation)								
1985-86	43	19.9	2	12.5	2	5.3	4	8.3
1986-87	62	38.0	7	20.0	0	0.0	2	11.1
Both Years	105	27.7	9	17.6	2	3.3	6	9.1
Raft (Research)								
1985-86	8	3.7	0	0.0	0	0.0	0	0.0
1986-87	7	4.3	0	0.0	0	0.0	0	0.0
Both Years	15	4.0	0	0.0	0	0.0	0	0.0
Dory/Drift								
1985-86	13	6.0	8	50.0	1	2.6	7	14.6
1986-87	9	5.5	0	0.0	4	18.2	3	16.7
Both Years	22	5.8	8	15.7	5	8.3	10	15.2
Canoe								
1985-86	46	21.3	0	0.0	0	0.0	5	10.4
1986-87	18	11.0	1	2.9	0	0.0	1	5.6
Both Years	64	16.9	1	2.0	0	0.0	6	9.1
Kayak								
1985-86	36	16.7	0	0.0	0	0.0	0	0.0
1986-87	16	9.8	7	20.0	0	0.0	0	0.0
Both Years	52	13.7	7	13.7	0	0.0	0	0.0
Bank Fisher								
1985-86	2	0.9	1	6.3	0	0.0	0	0.0
1986-87	0	0.0	0	0.0	0	0.0	0	0.0
Both Years	2	0.5	1	2.0	0	0.0	0	0.0
Hiker								
1985-86	8	3.7	2	12.5	0	0.0	5	10.4
1986-87	4	2.5	1	2.9	3	13.6	0	0.0
Both Years	12	3.2	3	5.9	3	5.0	5	7.6

Table 113. Continued.

Activity Type	Day of Week							
	Sun		Mon		Tue		Wed	
	n	%	n	%	n	%	n	%
Consumptive								
1985-86	75	34.7	12	75.0	36	94.7	34	70.8
1986-87	56	34.4	19	54.3	19	86.4	15	83.3
Both Years	131	34.6	31	60.8	55	91.7	49	74.2
Naturalistic								
1985-86	141	65.3	4	25.0	2	5.3	14	29.2
1986-87	107	65.6	16	45.7	3	13.6	3	16.7
Both Years	248	65.4	20	39.2	5	8.3	17	25.8
Totals								
1985-86	216	100.0	16	100.0	38	100.0	48	100.0
1986-87	163	100.0	35	100.0	22	100.0	18	100.0
Both Years	379	100.0	51	100.0	60	100.0	64	100.0

Table 113. Continued.

Activity Type	Day of Week							
	Thu		Fri		Sat		Totals	
	n	%	n	%	n	%	n	%
Motorboat (Run)								
1985-86	22	37.3	13	52.0	64	22.8	166	24.3
1986-87	53	43.1	16	39.0	35	13.6	157	23.8
Both Years	75	41.2	29	43.9	99	18.4	323	24.1
Motorboat (Drift)								
1985-86	17	28.8	7	28.0	49	17.4	131	19.2
1986-87	46	37.4	11	26.8	26	10.1	123	18.6
Both Years	63	34.6	18	27.3	75	13.9	254	18.9
Raft (Recreation)								
1985-86	3	5.1	0	0.0	92	32.7	146	21.4
1986-87	2	1.6	1	2.4	123	47.7	197	29.8
Both Years	5	2.7	1	1.5	215	39.9	343	25.5
Raft (Research)								
1985-86	9	15.3	0	0.0	0	0.0	17	2.5
1986-87	10	8.1	0	0.0	0	0.0	17	2.6
Both Years	19	10.4	0	0.0	0	0.0	34	2.5
Dory/Drift								
1985-86	5	8.5	4	16.0	15	5.3	53	7.8
1986-87	10	8.1	10	24.4	24	9.3	60	9.1
Both Years	15	8.2	14	21.2	39	7.2	113	8.4
Canoe								
1985-86	0	0.0	0	0.0	22	7.8	73	10.7
1986-87	0	0.0	0	0.0	26	10.1	46	7.0
Both Years	0	0.0	0	0.0	48	8.9	119	8.9
Kayak								
1985-86	0	0.0	0	0.0	29	10.3	65	9.5
1986-87	0	0.0	0	0.0	18	7.0	41	6.2
Both Years	0	0.0	0	0.0	47	8.7	106	7.9
Bank Fisher								
1985-86	1	1.7	0	0.0	3	1.1	7	1.0
1986-87	0	0.0	1	2.4	1	0.4	2	0.3
Both Years	1	0.5	1	1.5	4	0.7	9	0.7
Hiker								
1985-86	2	3.4	1	4.0	7	2.5	25	3.7
1986-87	2	1.6	2	4.9	5	1.9	17	2.6
Both Years	4	2.2	3	4.5	12	2.2	42	3.1

Table 113. Continued.

Activity Type	Day of Week							
	Thu		Fri		Sat		Totals	
	n	%	n	%	n	%	n	%
Consumptive								
1985-86	45	76.3	24	96.0	131	46.6	357	52.3
1986-87	109	88.6	38	92.7	86	33.3	342	51.8
Both Years	154	84.6	62	93.9	217	40.3	699	52.0
Naturalistic								
1985-86	14	23.7	1	4.0	150	53.4	326	47.7
1986-87	14	11.4	3	7.3	172	66.7	318	48.2
Both Years	28	15.4	4	6.1	322	59.7	644	48.0
Totals								
1985-86	59	100.0	25	100.0	281	100.0	683	100.0
1986-87	123	100.0	41	100.0	258	100.0	660	100.0
Both Years	182	100.0	66	100.0	539	100.0	1343	100.0

* Sample Days: 1985-86 - Sun=4, Mon=4, Tue=4, Wed=5, Thu=5, Fri=5, Sat=5. 1986-87 - Sun=4, Mon=4, Tue=4, Wed=4, Thu=5, Fri=5, Sat=5.

Table 114. Number of recreational activities recorded at Washington Eddy on the SRBENA on each day of the week for 22 days in both 1985-86 and 1986-87 in February.

Activity Type	Day of Week *							
	Sun		Mon		Tue		Wed	
	n	%	n	%	n	%	n	%
Motorboat (Run)								
1985-86	28	18.4	6	60.0	8	33.3	13	52.0
1986-87	11	6.1	12	34.3	4	23.5	9	33.3
Both Years	39	11.7	18	40.0	12	29.3	22	42.3
Motorboat (Drift)								
1985-86	30	19.7	2	20.0	7	29.2	10	40.0
1986-87	5	2.8	9	25.7	4	23.5	8	29.6
Both Years	35	10.5	11	24.4	11	26.8	18	34.6
Raft (Recreation)								
1985-86	34	22.4	0	0.0	1	4.2	1	4.0
1986-87	59	32.6	6	17.1	1	5.9	5	18.5
Both Years	93	27.9	6	13.3	2	4.9	6	11.5
Raft (Research)								
1985-86	6	3.9	0	0.0	0	0.0	0	0.0
1986-87	9	5.0	0	0.0	0	0.0	0	0.0
Both Years	15	4.5	0	0.0	0	0.0	0	0.0
Dory/Drift								
1985-86	21	13.8	1	10.0	5	20.8	0	0.0
1986-87	13	7.2	5	14.3	4	23.5	2	7.4
Both Years	34	10.2	6	13.3	9	22.0	2	3.8
Canoe								
1985-86	13	8.6	0	0.0	0	0.0	0	0.0
1986-87	48	26.5	2	5.7	1	5.9	0	0.0
Both Years	61	18.3	2	4.4	1	2.4	0	0.0
Kayak								
1985-86	9	5.9	0	0.0	0	0.0	0	0.0
1986-87	26	14.4	1	2.9	0	0.0	0	0.0
Both Years	35	10.5	1	2.2	0	0.0	0	0.0
Bank Fisher								
1985-86	1	0.7	1	10.0	1	4.2	0	0.0
1986-87	3	1.7	0	0.0	0	0.0	0	0.0
Both Years	4	1.2	1	2.2	1	2.4	0	0.0
Hiker								
1985-86	10	6.6	0	0.0	2	8.3	1	4.0
1986-87	7	3.9	0	0.0	3	17.6	3	11.1
Both Years	17	5.1	0	0.0	5	12.2	4	7.7

Table 114. Continued.

Activity Type	Day of Week							
	Sun		Mon		Tue		Wed	
	n	%	n	%	n	%	n	%
Consumptive								
1985-86	80	52.6	10	100.0	21	87.5	23	92.0
1986-87	32	17.7	26	74.3	12	70.6	19	70.4
Both Years	112	33.6	36	80.0	33	80.5	42	80.8
Naturalistic								
1985-86	72	47.4	0	0.0	3	12.5	2	8.0
1986-87	149	82.3	9	25.7	5	29.4	8	29.6
Both Years	221	66.4	9	20.0	8	19.5	10	19.2
Totals								
1985-86	152	100.0	10	100.0	24	100.0	25	100.0
1986-87	181	100.0	35	100.0	17	100.0	27	100.0
Both Years	333	100.0	45	100.0	41	100.0	52	100.0

Table 114. Continued.

Activity Type	Day of Week: Thu n	Thu %	Fri n	Fri %	Sat n	Sat %	Totals n	Totals %
Motorboat (Run)								
1985-86	6	22.2	9	52.9	32	17.9	102	23.5
1986-87	5	19.2	9	42.9	37	19.6	87	17.5
Both Years	11	20.8	18	47.4	69	18.8	189	20.3
Motorboat (Drift)								
1985-86	3	11.1	5	29.4	21	11.7	78	18.0
1986-87	4	15.4	5	23.8	32	16.9	67	13.5
Both Years	7	13.2	10	26.3	53	14.4	145	15.6
Raft (Recreation)								
1985-86	1	3.7	0	0.0	74	41.3	111	25.6
1986-87	3	11.5	0	0.0	57	30.2	131	26.4
Both Years	4	7.5	0	0.0	131	35.6	242	26.0
Raft (Research)								
1985-86	6	22.2	0	0.0	0	0.0	12	2.8
1986-87	6	23.1	0	0.0	0	0.0	15	3.0
Both Years	12	22.6	0	0.0	0	0.0	27	2.9
Dory/Drift								
1985-86	7	25.9	3	17.6	18	10.1	55	12.7
1986-87	4	15.4	6	28.6	12	6.3	46	9.3
Both Years	11	20.8	9	23.7	30	8.2	101	10.9
Canoe								
1985-86	0	0.0	0	0.0	20	11.2	33	7.6
1986-87	0	0.0	0	0.0	29	15.3	80	16.1
Both Years	0	0.0	0	0.0	49	13.3	113	12.2
Kayak								
1985-86	0	0.0	0	0.0	6	3.4	15	3.5
1986-87	2	7.7	0	0.0	18	9.5	47	9.5
Both Years	2	3.8	0	0.0	24	6.5	62	6.7
Bank Fisher								
1985-86	1	3.7	0	0.0	1	0.6	5	1.2
1986-87	0	0.0	0	0.0	0	0.0	3	0.6
Both Years	1	1.9	0	0.0	1	0.3	8	0.9
Hiker								
1985-86	3	11.1	0	0.0	7	3.9	23	5.3
1986-87	2	7.7	1	4.8	4	2.1	20	4.0
Both Years	5	9.4	1	2.6	11	3.0	43	4.6

Table 114. Continued.

Activity Type	Day of Week							
	Thu		Fri		Sat		Totals	
	n	%	n	%	n	%	n	%
Consumptive								
1985-86	17	63.0	17	100.0	72	40.2	240	55.3
1986-87	13	50.0	20	95.2	81	42.9	203	40.9
Both Years	30	56.6	37	97.4	153	41.6	443	47.6
Naturalistic								
1985-86	10	37.0	0	0.0	107	59.8	194	44.7
1986-87	13	50.0	1	4.8	108	57.1	293	59.1
Both Years	23	43.4	1	2.6	215	58.4	487	52.4
Totals								
1985-86	27	100.0	17	100.0	179	100.0	434	100.0
1986-87	26	100.0	21	100.0	189	100.0	496	100.0
Both Years	53	100.0	38	100.0	368	100.0	930	100.0

* Sample Days: 1985-86 - Sun=3, Mon=3, Tue=3, Wed=3, Thu=3, Fri=3, Sat=4. 1986-87 - Sun=4, Mon=3, Tue=3, Wed=3, Thu=3, Fri=3, Sat=3.

Table 115. Number of recreational activities recorded at Washington Eddy on the SRBENA on each day of the week for 81 days in 1985-86 and 83 days 1986-87 in December, January, and February. *

Activity Type	Day of Week **							
	Sun		Mon		Tue		Wed	
	n	%	n	%	n	%	n	%
Motorboat (Run)								
1985-86	60	15.6	21	42.9	31	45.6	35	41.7
1986-87	50	12.8	41	39.0	25	32.5	29	40.3
Both Years	110	14.2	62	40.3	56	38.6	64	41.0
Motorboat (Drift)								
1985-86	61	15.8	4	8.2	22	32.4	23	27.4
1986-87	33	8.5	31	29.5	18	23.4	21	29.2
Both Years	94	12.1	35	22.7	40	27.6	44	28.2
Raft (Recreation)								
1985-86	81	21.0	7	14.3	4	5.9	5	6.0
1986-87	128	32.8	13	12.4	3	3.9	9	12.5
Both Years	209	27.0	20	13.0	7	4.8	14	9.0
Raft (Research)								
1985-86	20	5.2	0	0.0	0	0.0	0	0.0
1986-87	23	5.9	0	0.0	0	0.0	0	0.0
Both Years	43	5.5	0	0.0	0	0.0	0	0.0
Dory/Drift								
1985-86	35	9.1	10	20.4	7	10.3	7	8.3
1986-87	31	7.9	7	6.7	12	15.6	7	9.7
Both Years	66	8.5	17	11.0	19	13.1	14	9.0
Canoe								
1985-86	59	15.3	0	0.0	1	1.5	5	6.0
1986-87	68	17.4	3	2.9	2	2.6	2	2.8
Both Years	127	16.4	3	1.9	3	2.1	7	4.5
Kayak								
1985-86	45	11.7	0	0.0	0	0.0	0	0.0
1986-87	42	10.8	8	7.6	0	0.0	0	0.0
Both Years	87	11.2	8	5.2	0	0.0	0	0.0
Bank Fisher								
1985-86	6	1.6	4	8.2	1	1.5	1	1.2
1986-87	3	0.8	0	0.0	8	10.4	0	0.0
Both Years	9	1.2	4	2.6	9	6.2	1	0.6
Hiker								
1985-86	18	4.7	3	6.1	2	2.9	8	9.5
1986-87	12	3.1	2	1.9	9	11.7	4	5.6
Both Years	30	3.9	5	3.2	11	7.6	12	7.7

Table 115. Continued.

Activity Type	Day of Week							
	Sun		Mon		Tue		Wed	
	n	%	n	%	n	%	n	%
Consumptive								
1985-86	162	42.1	39	79.6	61	89.7	66	78.6
1986-87	117	30.0	79	75.2	63	81.8	57	79.2
Both Years	279	36.0	118	76.6	124	85.5	123	78.8
Naturalistic								
1985-86	223	57.9	10	20.4	7	10.3	18	21.4
1986-87	273	70.0	26	24.8	14	18.2	15	20.8
Both Years	496	64.0	36	23.4	21	14.5	33	21.2
Totals								
1985-86	385	100.0	49	100.0	68	100.0	84	100.0
1986-87	390	100.0	105	100.0	75	100.0	72	100.0
Both Years	775	100.0	154	100.0	143	100.0	156	100.0

Table 115. Continued.

Activity Type	Day of Week							
	Thu		Fri		Sat		Totals	
	n	%	n	%	n	%	n	%
Motorboat (Run)								
1985-86	35	30.7	31	45.6	105	20.8	318	25.0
1986-87	61	36.7	36	36.4	96	18.4	338	23.7
Both Years	96	34.3	67	40.1	201	19.6	656	24.3
Motorboat (Drift)								
1985-86	21	18.4	13	19.1	73	14.5	217	17.0
1986-87	51	30.7	30	30.3	75	14.4	259	18.1
Both Years	72	25.7	43	25.7	148	14.4	476	17.6
Raft (Recreation)								
1985-86	7	6.1	5	7.4	183	36.2	292	22.9
1986-87	5	3.0	2	2.0	200	38.4	360	25.2
Both Years	12	4.3	7	4.2	383	37.3	652	24.1
Raft (Research)								
1985-86	22	19.3	0	0.0	0	0.0	42	3.3
1986-87	22	13.3	0	0.0	0	0.0	45	3.2
Both Years	44	15.7	0	0.0	0	0.0	87	3.2
Dory/Drift								
1985-86	16	14.0	13	19.1	36	7.1	124	9.7
1986-87	18	10.8	25	25.3	44	8.4	144	10.1
Both Years	34	12.1	38	22.8	80	7.8	268	9.9
Canoe								
1985-86	0	0.0	0	0.0	49	9.7	114	9.0
1986-87	1	0.6	0	0.0	55	10.6	131	9.2
Both Years	1	0.4	0	0.0	104	10.1	245	9.1
Kayak								
1985-86	0	0.0	0	0.0	35	6.9	80	6.3
1986-87	2	1.2	0	0.0	37	7.1	89	6.2
Both Years	2	0.7	0	0.0	72	7.0	169	6.3
Bank Fisher								
1985-86	4	3.5	0	0.0	8	1.6	24	1.9
1986-87	1	0.6	2	2.0	2	0.4	11	0.8
Both Years	5	1.8	2	1.2	10	1.0	35	1.3
Hiker								
1985-86	9	7.9	6	8.8	16	3.2	62	4.9
1986-87	5	3.0	4	4.0	12	2.3	51	3.6
Both Years	14	5.0	10	6.0	28	2.7	113	4.2

Table 115. Continued.

Activity Type	Day of Week: Thu n	Thu %	Fri n	Fri %	Sat n	Sat %	Totals n	Totals %
Consumptive								
1985-86	76	66.7	57	83.8	222	44.0	683	53.7
1986-87	131	78.9	93	93.9	217	41.7	752	52.7
Both Years	207	73.9	150	89.8	439	42.8	1435	53.1
Naturalistic								
1985-86	38	33.3	11	16.2	283	56.0	590	46.3
1986-87	35	21.1	6	6.1	304	58.3	676	47.3
Both Years	73	26.1	17	10.2	587	57.2	1266	46.9
Totals								
1985-86	114	100.0	68	100.0	505	100.0	1273	100.0
1986-87	166	100.0	99	100.0	521	100.0	1428	100.0
Both Years	280	100.0	167	100.0	1026	100.0	2701	100.0

* Excludes 2/23 to 2/28.

** Sample Days: 1985-86 - Sun=3, Mon=3, Tue=3, Wed=3, Thu=3, Fri=3, Sat=4. 1986-87 - Sun=4, Mon=3, Tue=3, Wed=3, Thu=3, Fri=3, Sat=3.

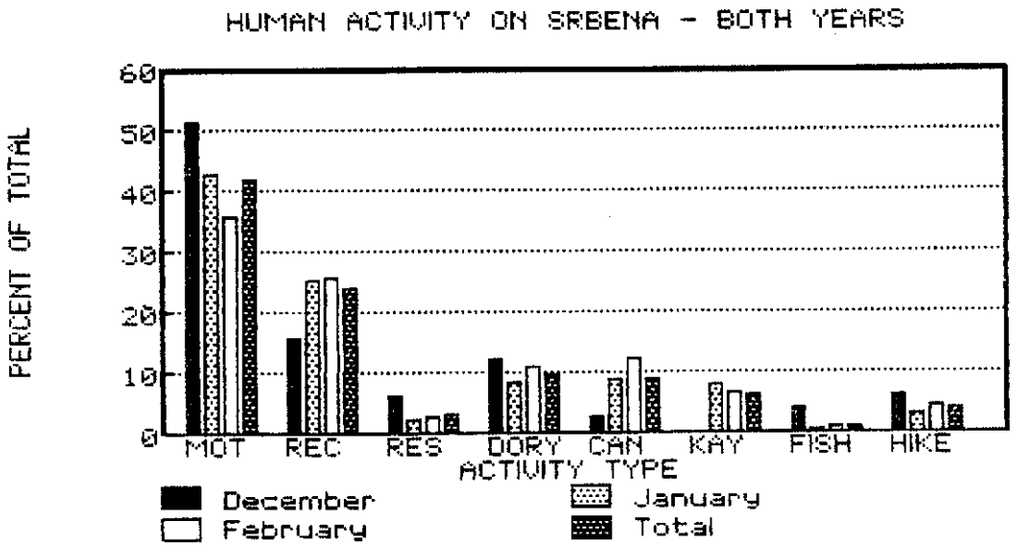


Figure 65. Percent occurrence of the different types of recreational activity recorded at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined. Includes repeat passes by motorboats. MOT = Motorboat, REC = Recreation Raft, RES = Research Raft, DORY = Dory, CAN = Canoe, KAY = Kayak, FISH = Bank Fisher, HIKE = Hiker.

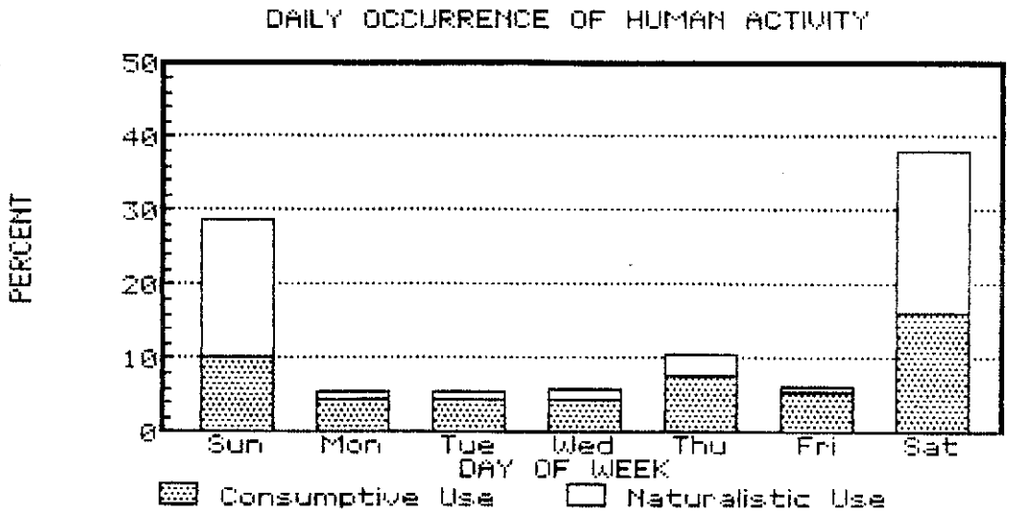


Figure 66. Percent occurrence of recreational activity at Washington Eddy on the SRBENA during each day of the week partitioned by consumptive (fishing) and naturalistic (eagle viewing) use. Excludes research raft.

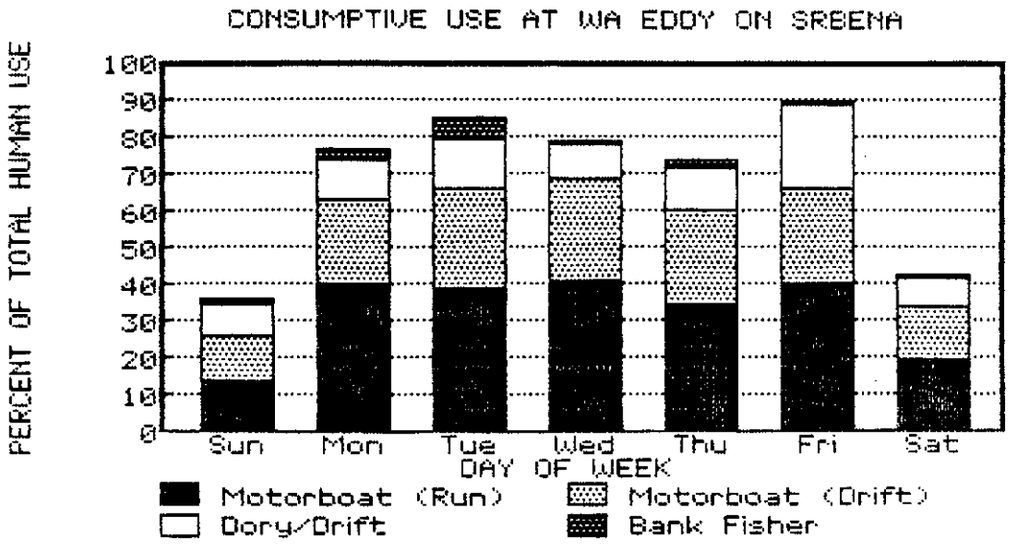


Figure 67. Daily visitation patterns of consumptive (fishing) users at Washington Eddy on the SRBENA during each day of the week. Values are daily percent of all activity. Compare to figure 68.

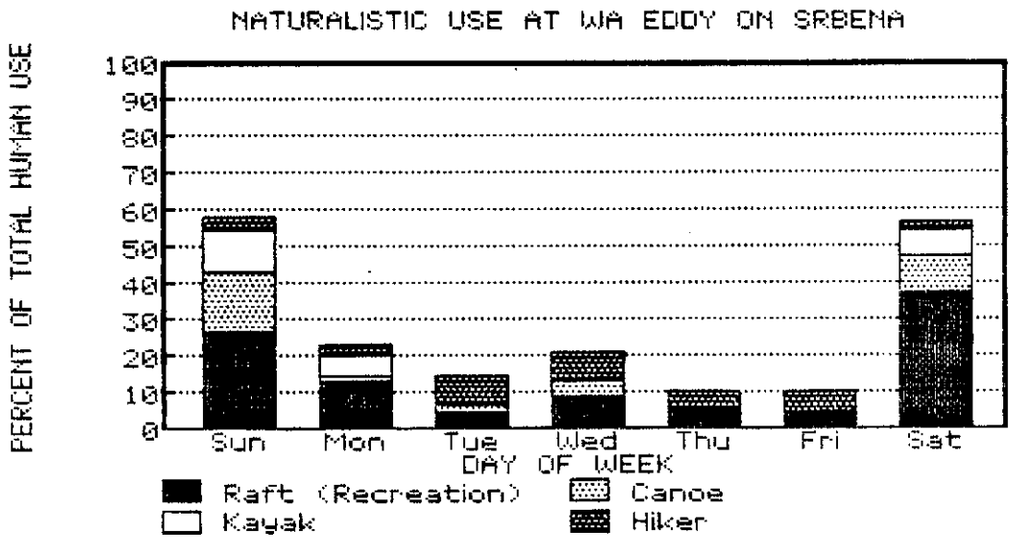


Figure 68. Daily visitation patterns of naturalistic (eagle viewing) users at Washington Eddy on the SRBENA during each day of the week. Values are daily percent of all activity, excluding research rafts. Compare to figure 67.

Table 116. Number of recreational activities recorded during 12 weeks of the wintering season (from 1 December to 22 February) at Washington Eddy on the SRBENA in both 1985-86 and 1986-87.

Activity Type	Week 1		Week 2		Week 3		Week 4	
	n	%	n	%	n	%	n	%
Motorboat (Run)								
1985-86	4	28.6	10	43.5	13	52.0	19	24.4
1986-87	9	26.5	13	33.3	21	38.2	39	34.2
Both Years	13	27.1	23	37.1	34	42.5	58	30.2
Motorboat (Drift)								
1985-86	2	14.3	0	0.0	1	4.0	5	6.4
1986-87	5	14.7	8	20.5	14	25.5	34	29.8
Both Years	7	14.6	8	12.9	15	18.8	39	20.3
Raft (Recreation)								
1985-86	3	21.4	7	30.4	4	16.0	16	20.5
1986-87	10	29.4	5	12.8	3	5.5	12	10.5
Both Years	13	27.1	12	19.4	7	8.8	28	14.6
Raft (Research)								
1985-86	4	28.6	2	8.7	2	8.0	3	3.8
1986-87	4	11.8	4	10.3	4	7.3	1	0.9
Both Years	8	16.7	6	9.7	6	7.5	4	2.1
Dory/Drift								
1985-86	0	0.0	0	0.0	1	4.0	12	15.4
1986-87	4	11.8	3	7.7	8	14.5	21	18.4
Both Years	4	8.3	3	4.8	9	11.3	33	17.2
Canoe								
1985-86	0	0.0	1	4.3	2	8.0	4	5.1
1986-87	1	2.9	0	0.0	1	1.8	2	1.8
Both Years	1	2.1	1	1.6	3	3.8	6	3.1
Kayak								
1985-86	0	0.0	0	0.0	0	0.0	0	0.0
1986-87	0	0.0	1	2.6	0	0.0	0	0.0
Both Years	0	0.0	1	1.6	0	0.0	0	0.0
Bank Fisher								
1985-86	0	0.0	3	13.0	1	4.0	8	10.3
1986-87	1	2.9	2	5.1	1	1.8	0	0.0
Both Years	1	2.1	5	8.1	2	2.5	8	4.2
Hiker								
1985-86	1	7.1	0	0.0	1	4.0	11	14.1
1986-87	0	0.0	3	7.7	3	5.5	5	4.4
Both Years	0	2.1	3	4.8	4	5.0	16	8.3

Table 116. Continued.

Activity Type	Week 1		Week 2		Week 3		Week 4	
	n	%	n	%	n	%	n	%
Consumptive								
1985-86	6	42.9	13	56.5	16	64.0	44	56.4
1986-87	19	55.9	26	66.7	44	80.0	94	82.5
Both Years	25	52.1	39	62.9	60	75.0	138	71.9
Naturalistic								
1985-86	8	57.1	10	43.5	9	36.0	34	43.6
1986-87	15	44.1	13	33.3	11	20.0	20	17.5
Both Years	23	47.9	23	37.1	20	25.0	54	28.1
Totals								
1985-86	14	100.0	23	100.0	25	100.0	78	100.0
1986-87	34	100.0	39	100.0	55	100.0	114	100.0
Both Years	48	100.0	62	100.0	80	100.0	192	100.0

Table 116. Continued.

Activity Type	Week 5		Week 6		Week 7		Week 8	
	n	%	n	%	n	%	n	%
Motorboat (Run)								
1985-86	10	15.2	46	29.3	33	17.9	30	24.6
1986-87	72	38.7	54	32.1	5	4.4	17	13.4
Both Years	82	32.5	100	30.8	38	12.8	47	18.9
Motorboat (Drift)								
1985-86	3	4.5	39	24.8	18	9.8	22	18.0
1986-87	59	31.7	38	22.6	4	3.5	12	9.4
Both Years	62	24.6	77	23.7	22	7.4	34	13.7
Raft (Recreation)								
1985-86	23	34.8	25	15.9	47	25.5	37	30.3
1986-87	24	12.9	45	26.8	52	45.6	47	37.0
Both Years	47	18.7	70	21.5	99	33.2	84	33.7
Raft (Research)								
1985-86	3	4.5	4	2.5	4	2.2	4	3.3
1986-87	2	1.1	4	2.4	4	3.5	4	3.1
Both Years	5	2.0	8	2.5	8	2.7	8	3.2
Dory/Drift								
1985-86	9	13.6	11	7.0	21	11.4	4	3.3
1986-87	15	8.1	17	10.1	13	11.4	9	7.1
Both Years	24	9.5	28	8.6	34	11.4	13	5.2
Canoe								
1985-86	6	9.1	7	4.5	26	14.1	12	9.8
1986-87	2	1.1	4	2.4	20	17.5	18	14.2
Both Years	8	3.2	11	3.4	46	15.4	30	12.0
Kayak								
1985-86	4	6.1	18	11.5	25	13.6	8	6.6
1986-87	5	2.7	2	1.2	11	9.6	17	13.4
Both Years	9	3.6	20	6.2	36	12.1	25	10.0
Bank Fisher								
1985-86	2	3.0	2	1.3	3	1.6	0	0.0
1986-87	3	1.6	1	0.6	0	0.0	0	0.0
Both Years	5	2.0	3	0.9	3	1.0	0	0.0
Hiker								
1985-86	6	9.1	5	3.2	7	3.8	5	4.1
1986-87	4	2.2	3	1.8	5	4.4	3	2.4
Both Years	10	4.0	8	2.5	12	4.0	8	3.2

Table 116. Continued.

Activity Type	Week 5		Week 6		Week 7		Week 8	
	n	%	n	%	n	%	n	%
Consumptive								
1985-86	24	36.4	98	62.4	75	40.8	56	45.9
1986-87	149	80.1	110	65.5	22	19.3	38	29.9
Both Years	173	68.7	208	64.0	97	32.6	94	37.8
Naturalistic								
1985-86	42	63.6	59	37.6	109	59.2	66	54.1
1986-87	37	19.9	58	34.5	92	80.7	89	70.1
Both Years	79	31.3	117	36.0	201	67.4	155	62.2
Totals								
1985-86	66	100.0	157	100.0	184	100.0	122	100.0
1986-87	186	100.0	168	100.0	114	100.0	127	100.0
Both Years	252	100.0	325	100.0	298	100.0	249	100.0

Table 116. Continued.

Activity Type	Week 9		Week 10		Week 11		Week 12	
	n	%	n	%	n	%	n	%
Motorboat (Run)								
1985-86	69	30.4	29	19.0	23	20.9	32	28.1
1986-87	21	16.8	38	17.8	31	21.8	18	16.5
Both Years	90	25.6	67	18.3	54	21.4	50	22.4
Motorboat (Drift)								
1985-86	58	25.6	23	15.0	21	19.1	25	21.9
1986-87	18	14.4	24	11.2	27	19.0	16	14.7
Both Years	76	21.6	47	12.8	48	19.0	41	18.4
Raft (Recreation)								
1985-86	37	16.3	43	28.1	30	27.3	20	17.5
1986-87	43	34.4	63	29.4	32	22.5	24	22.0
Both Years	80	22.7	106	28.9	62	24.6	44	19.7
Raft (Research)								
1985-86	4	1.8	4	2.6	4	3.6	4	3.5
1986-87	5	4.0	4	1.9	4	2.8	5	4.6
Both Years	9	2.6	8	2.2	8	3.2	9	4.0
Dory/Drift								
1985-86	18	7.9	13	8.5	15	13.6	20	17.5
1986-87	10	8.0	16	7.5	17	12.0	11	10.1
Both Years	28	8.0	29	7.9	32	12.7	31	13.9
Canoe								
1985-86	27	11.9	22	14.4	6	5.5	1	0.9
1986-87	16	12.8	36	16.8	9	6.3	22	20.2
Both Years	43	12.2	58	15.8	15	6.0	23	10.3
Kayak								
1985-86	10	4.4	7	4.6	7	6.4	1	0.9
1986-87	8	6.4	20	9.3	19	13.4	6	5.5
Both Years	18	5.1	27	7.4	26	10.3	7	3.1
Bank Fisher								
1985-86	0	0.0	3	2.0	0	0.0	2	1.8
1986-87	0	0.0	3	1.4	0	0.0	0	0.0
Both Years	0	0.0	6	1.6	0	0.0	2	0.9
Hiker								
1985-86	4	1.8	9	5.9	4	3.6	9	7.9
1986-87	4	3.2	10	4.7	3	2.1	7	6.4
Both Years	8	2.3	19	5.2	7	2.8	16	7.2

Table 116. Continued.

Activity Type	Week 9		Week 10		Week 11		Week 12	
	n	%	n	%	n	%	n	%
Consumptive								
1985-86	145	63.9	68	44.4	59	53.6	79	69.3
1986-87	49	39.2	81	37.9	75	52.8	45	41.3
Both Years	194	55.1	149	40.6	134	53.2	124	55.6
Naturalistic								
1985-86	82	36.1	85	55.6	51	46.4	35	30.7
1986-87	76	60.8	133	62.1	67	47.2	64	58.7
Both Years	158	44.9	218	59.4	118	46.8	99	44.4
Totals								
1985-86	227	100.0	153	100.0	110	100.0	114	100.0
1986-87	125	100.0	214	100.0	142	100.0	109	100.0
Both Years	352	100.0	367	100.0	252	100.0	223	100.0

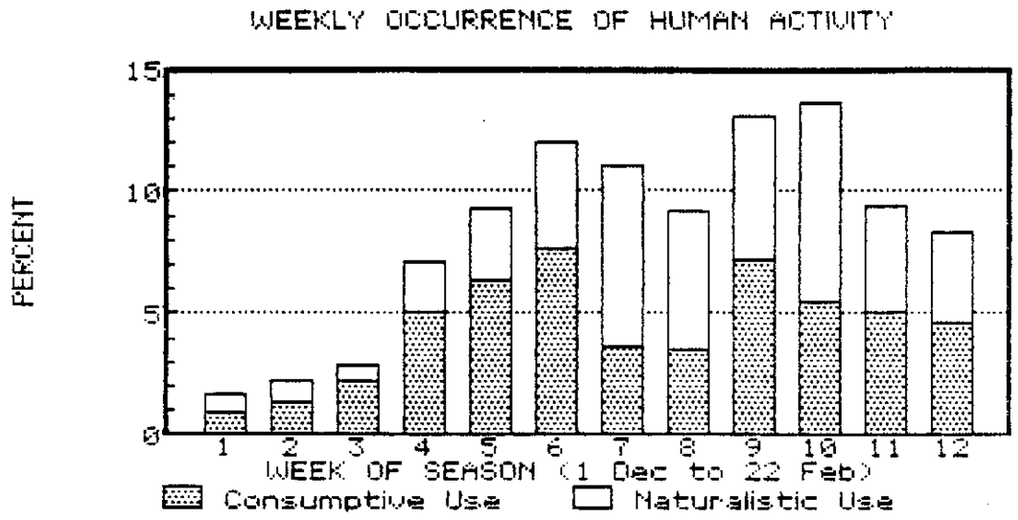


Figure 69. Percent occurrence of recreational activity at Washington Eddy on the SRBENA during each week of the season partitioned by consumptive (fishing) and naturalistic (eagle viewing) use. Excludes research rafts.

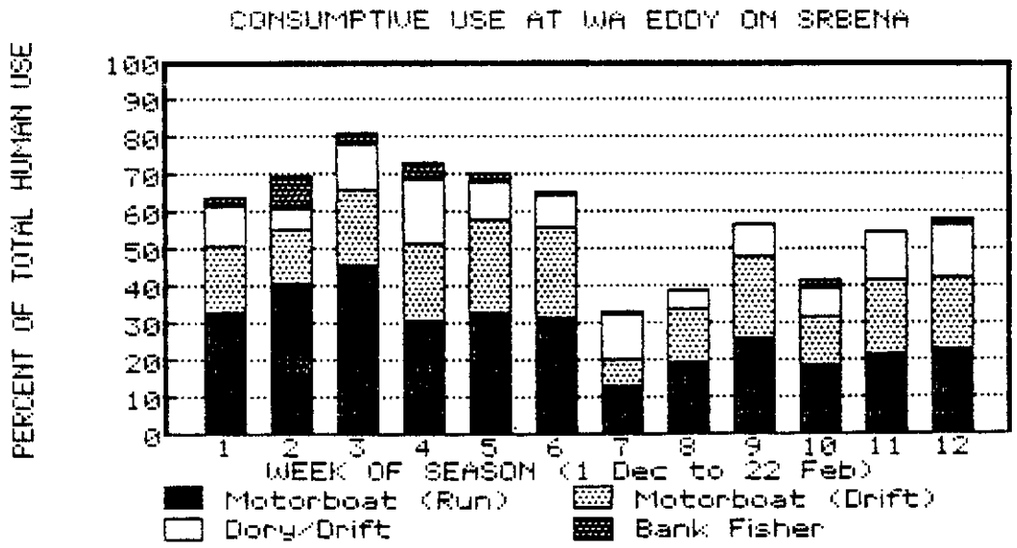


Figure 70. Seasonal visitation patterns of consumptive (fishing) users at Washington Eddy on the SRBENA during each week of the wintering season. Values are weekly percent of all activity. Compare to figure 71.

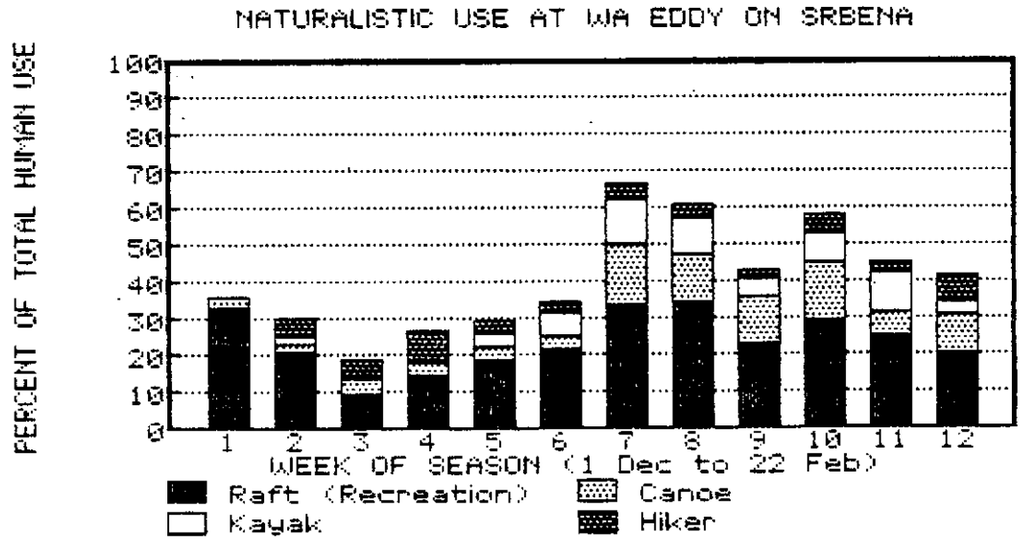


Figure 71. Seasonal visitation patterns of naturalistic (eagle viewing) users at Washington Eddy on the SRBENA during each week of the wintering season. Values are weekly percent of all activity, excluding research rafts. Compare to figure 70.

Table 117. Number of recreational activities recorded by hour of day at Washington Eddy on the SRBENA for 80 days in 1985-86 and 82 days in 1986-87 from 1 December to 22 February.

Activity Type	Hour of Day							
	7 - 8		8 - 9		9 - 10		10 - 11	
	n	%	n	%	n	%	n	%
Motorboat (Run)								
1985-86	0	0.0	29	50.9	40	50.6	47	41.2
1986-87	2	28.6	22	44.0	36	42.4	68	45.0
Both Years	2	22.2	51	47.7	76	46.3	115	43.4
Motorboat (Drift)								
1985-86	0	0.0	11	19.3	20	25.3	33	28.9
1986-87	2	28.6	9	18.0	23	27.1	39	25.8
Both Years	2	22.2	20	18.7	43	26.2	72	27.2
Raft (Recreation)								
1985-86	0	0.0	3	5.3	2	2.5	3	2.6
1986-87	0	0.0	0	0.0	0	0.0	6	4.0
Both Years	0	0.0	3	2.8	2	1.2	9	3.4
Raft (Research)								
1985-86	0	0.0	0	0.0	2	2.5	17	14.9
1986-87	0	0.0	0	0.0	3	3.5	19	12.6
Both Years	0	0.0	0	0.0	5	3.0	36	13.6
Dory/Drift								
1985-86	1	50.0	13	22.8	6	7.6	6	5.3
1986-87	3	42.9	19	38.0	19	22.4	12	7.9
Both Years	4	44.4	32	29.9	25	15.2	18	6.8
Canoe								
1985-86	0	0.0	0	0.0	1	1.3	0	0.0
1986-87	0	0.0	0	0.0	0	0.0	0	0.0
Both Years	0	0.0	0	0.0	1	0.6	0	0.0
Kayak								
1985-86	0	0.0	0	0.0	0	0.0	0	0.0
1986-87	0	0.0	0	0.0	0	0.0	1	0.7
Both Years	0	0.0	0	0.0	0	0.0	1	0.4
Bank Fisher								
1985-86	1	50.0	0	0.0	4	5.1	2	1.8
1986-87	0	0.0	0	0.0	2	2.4	4	2.6
Both Years	1	11.1	0	0.0	6	3.7	6	2.3
Hiker								
1985-86	0	0.0	1	1.8	4	5.1	6	5.3
1986-87	0	0.0	0	0.0	2	2.4	2	1.3
Both Years	0	0.0	1	0.9	6	3.7	8	3.0

Table 117. Continued.

Activity Type	Hour of Day							
	7 - 8		8 - 9		9 - 10		10 - 11	
	n	%	n	%	n	%	n	%
Consumptive								
1985-86	2	100.0	53	93.0	70	88.6	88	77.2
1986-87	7	100.0	50	100.0	80	94.1	123	81.5
Both Years	9	100.0	103	96.3	150	91.5	211	79.6
Naturalistic								
1985-86	0	0.0	4	7.0	9	11.4	26	22.8
1986-87	0	0.0	0	0.0	5	5.9	28	18.5
Both Years	0	0.0	4	3.7	14	8.5	54	20.4
Totals								
1985-86	2	100.0	57	100.0	79	100.0	114	100.0
1986-87	7	100.0	50	100.0	85	100.0	151	100.0
Both Years	9	100.0	107	100.0	164	100.0	265	100.0

Table 117. Continued.

Activity Type	Hour of Day							
	11 - 12		12 - 13		13 - 14		14 - 15	
	n	%	n	%	n	%	n	%
Motorboat (Run)								
1985-86	49	29.9	44	21.8	59	22.3	29	12.3
1986-87	75	34.2	48	20.9	45	15.4	15	6.5
Both Years	124	32.4	92	21.3	104	18.7	44	9.5
Motorboat (Drift)								
1985-86	28	17.1	30	14.9	39	14.8	34	14.5
1986-87	67	30.6	40	17.4	40	13.7	12	5.2
Both Years	95	24.8	70	16.2	79	14.2	46	9.9
Raft (Recreation)								
1985-86	46	28.0	80	39.6	78	29.5	56	23.8
1986-87	52	23.7	94	40.9	94	32.1	78	33.9
Both Years	98	25.6	174	40.3	172	30.9	134	28.8
Raft (Research)								
1985-86	1	0.6	0	0.0	1	0.4	18	7.7
1986-87	0	0.0	0	0.0	2	0.7	21	9.1
Both Years	1	0.3	0	0.0	3	0.5	39	8.4
Dory/Drift								
1985-86	24	14.6	14	6.9	21	8.0	18	7.7
1986-87	16	7.3	20	8.7	22	7.5	18	7.8
Both Years	40	10.4	34	7.9	43	7.7	36	7.7
Canoe								
1985-86	5	3.0	8	4.0	35	13.3	36	15.3
1986-87	2	0.9	10	4.3	53	18.1	37	16.1
Both Years	7	1.8	18	4.2	88	15.8	73	15.7
Kayak								
1985-86	2	1.2	11	5.4	16	6.1	27	11.5
1986-87	0	0.0	8	3.5	24	8.2	39	17.0
Both Years	2	0.5	19	4.4	40	7.2	66	14.2
Bank Fisher								
1985-86	4	2.4	2	1.0	4	1.5	4	1.7
1986-87	2	0.9	1	0.4	0	0.0	0	0.0
Both Years	6	1.6	3	0.7	4	0.7	4	0.9
Hiker								
1985-86	5	3.0	13	6.4	11	4.2	13	5.5
1986-87	5	2.3	9	3.9	13	4.4	10	4.3
Both Years	10	2.6	22	5.1	24	4.3	23	4.9

Table 117. Continued.

Activity Type	Hour of Day							
	11 - 12		12 - 13		13 - 14		14 - 15	
	n	%	n	%	n	%	n	%
Consumptive								
1985-86	105	64.0	90	44.6	123	46.6	85	36.2
1986-87	160	73.1	109	47.4	107	36.5	45	19.6
Both Years	265	69.2	199	46.1	230	41.3	130	28.0
Naturalistic								
1985-86	59	36.0	112	55.4	141	53.4	150	63.8
1986-87	59	26.9	121	52.6	186	63.5	185	80.4
Both Years	118	30.8	233	53.9	327	58.7	335	72.0
Totals								
1985-86	164	100.0	202	100.0	264	100.0	235	100.0
1986-87	219	100.0	230	100.0	293	100.0	230	100.0
Both Years	383	100.0	432	100.0	557	100.0	465	100.0

Table 117. Continued.

Activity Type	Hour of Day						Totals	
	15 - 16		16 - 17		17 - 18			
	n	%	n	%	n	%	n	%
Motorboat (Run)								
1985-86	12	9.9	8	22.9	1	100.0	318	25.0
1986-87	22	16.5	5	17.2	0	0.0	338	23.7
Both Years	34	13.4	13	20.3	1	50.0	656	24.3
Motorboat (Drift)								
1985-86	12	9.9	10	28.6	0	0.0	217	17.0
1986-87	17	12.8	10	34.5	0	0.0	259	18.1
Both Years	29	11.4	20	31.2	0	0.0	476	17.6
Raft (Recreation)								
1985-86	20	16.5	4	11.4	0	0.0	292	22.9
1986-87	35	26.3	1	3.4	0	0.0	360	25.2
Both Years	55	21.7	5	7.8	0	0.0	652	24.1
Raft (Research)								
1985-86	3	2.5	2	5.7	0	0.0	42	3.3
1986-87	0	0.0	0	0.0	0	0.0	45	3.2
Both Years	3	1.2	2	3.1	0	0.0	87	3.2
Dory/Drift								
1985-86	19	15.7	2	5.7	0	0.0	124	9.7
1986-87	12	9.0	3	10.3	0	0.0	144	10.1
Both Years	31	12.2	5	7.8	0	0.0	268	9.9
Canoe								
1985-86	24	19.8	5	14.3	0	0.0	114	9.0
1986-87	22	16.5	6	20.7	1	100.0	131	9.2
Both Years	46	18.1	11	17.2	1	50.0	245	9.1
Kayak								
1985-86	23	19.0	1	2.9	0	0.0	80	6.3
1986-87	15	11.3	2	6.9	0	0.0	89	6.2
Both Years	38	15.0	3	4.7	0	0.0	169	6.3
Bank Fisher								
1985-86	2	1.7	1	2.9	0	0.0	24	1.9
1986-87	2	1.5	0	0.0	0	0.0	11	0.8
Both Years	4	1.6	1	1.6	0	0.0	35	1.3
Hiker								
1985-86	6	5.0	2	5.7	0	0.0	62	4.9
1986-87	8	6.0	2	6.9	0	0.0	51	3.6
Both Years	14	5.5	4	6.3	0	0.0	113	4.2

Table 117. Continued.

Activity Type	Hour of Day							
	15 - 16		16 - 17		17 - 18		Totals	
	n	%	n	%	n	%	n	%
Consumptive								
1985-86	45	37.2	21	60.0	1	100.0	683	53.7
1986-87	53	39.8	18	62.1	0	0.0	752	52.7
Both Years	98	38.6	39	60.9	1	50.0	1435	53.1
Naturalistic								
1985-86	76	62.8	14	40.0	0	0.0	590	46.3
1986-87	80	60.2	11	37.9	1	100.0	676	47.3
Both Years	156	61.4	25	39.1	1	50.0	1266	46.9
Totals								
1985-86	121	100.0	35	100.0	1	100.0	1273	100.0
1986-87	133	100.0	29	100.0	1	100.0	1428	100.0
Both Years	254	100.0	64	100.0	2	100.0	2701	100.0

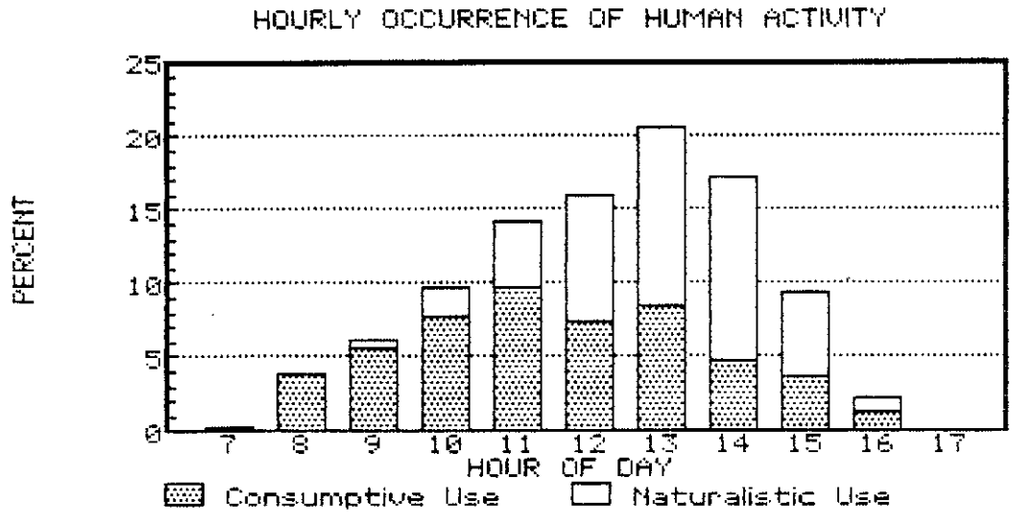


Figure 72. Percent occurrence of recreational activity at Washington Eddy on the SRBENA during each hour of the day partitioned by consumptive (fishing) and naturalistic (eagle viewing) use. Excludes research rafts.

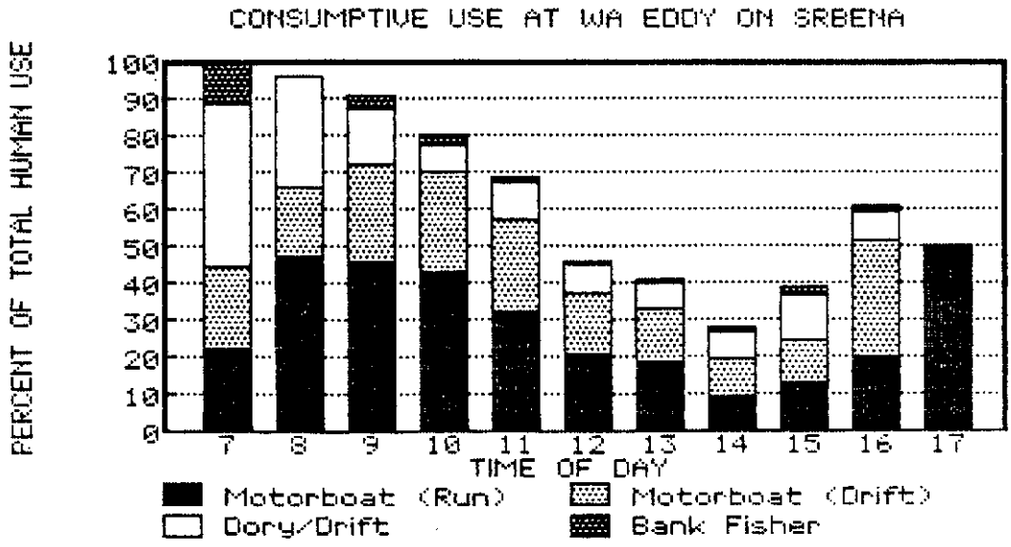


Figure 73. Hourly visitation patterns of consumptive (fishing) users at Washington Eddy on the SRBENA during each hour of the day. Values are hourly percent of all activity. Compare to figure 74.

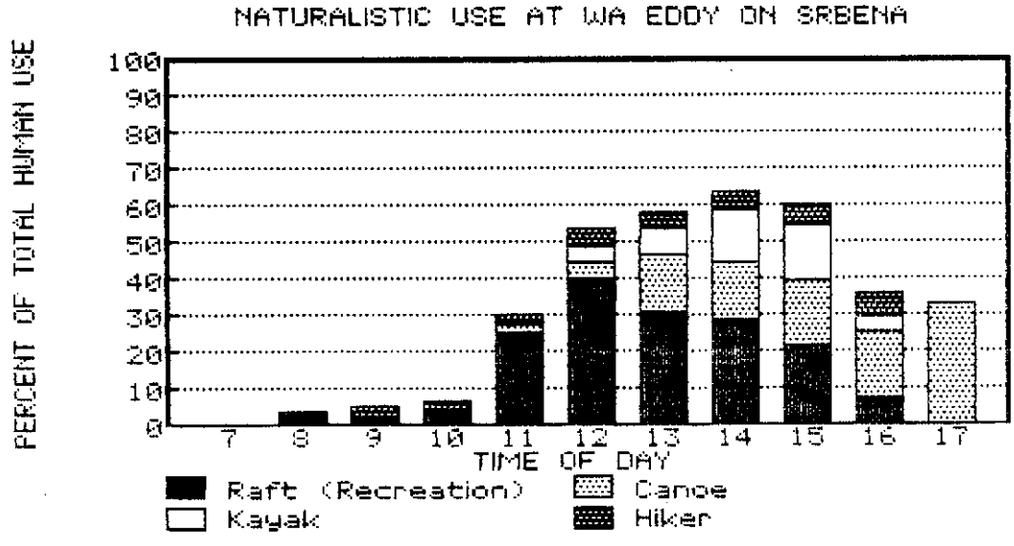


Figure 74. Hourly visitation patterns of naturalistic (eagle viewing) users at Washington Eddy on the SRBENA during each hour of the day. Values are hourly percent of all activity. Compare to figure 73.

Table 118. Comparison of the hourly occurrence of all recreational activities at Washington Eddy on the SRBENA between the weekend and weekdays during 1985-86 and 1986-87 combined.

Hour	Weekday		Weekend	
	n	%	n	%
7 - 8	4	0.4	4	0.2
8 - 9	36	4.0	73	4.0
9 - 10	63	7.0	101	5.6
10 - 11	133	14.8	133	7.4
11 - 12	159	17.7	224	12.4
12 - 13	130	14.5	303	16.8
13 - 14	164	18.2	394	21.8
14 - 15	118	13.1	348	19.3
15 - 16	80	8.9	174	9.6
16 - 17	11	1.2	51	2.8
17 - 18	1	0.1	1	0.1
Totals	899	33.2	1806	66.8

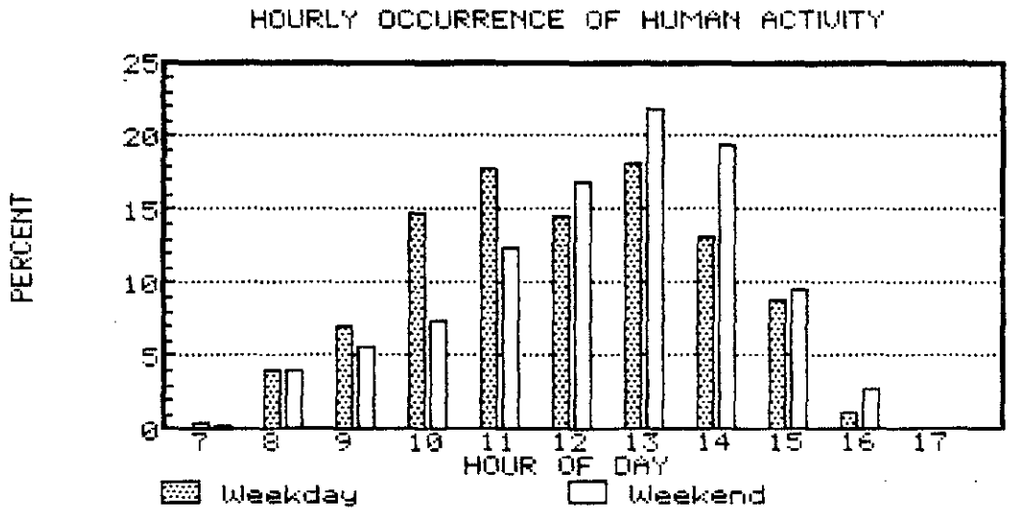


Figure 75. Hourly occurrence of all recreational activity at Washington Eddy on the SRBENA comparing weekday and weekend visitation during 1985-86 and 1986-87 combined.

Table 119. Daily sequence of occurrence of different types of recreational activities at Washington Eddy on the SRBENA during 1985-86 and 1986-87.

Activity Type	Sequence of Occurrence									
	1 - 5		6 - 10		11 - 20		21 - 40		41 -115	
	n	%	n	%	n	%	n	%	n	%
Motorboat (Run)										
1985-86	130	40.9	57	31.5	61	28.4	32	14.3	38	11.3
1986-87	126	36.7	66	28.7	58	21.3	47	14.8	41	15.4
Both Years	256	38.7	123	29.9	119	24.4	79	14.6	79	13.1
Motorboat (Drift)										
1985-86	47	14.8	38	21.0	47	21.9	33	14.8	52	15.5
1986-87	65	19.0	61	26.5	57	21.0	39	12.3	37	13.9
Both Years	112	16.9	99	24.1	104	21.4	72	13.3	89	14.8
Raft (Recreate)										
1985-86	35	11.0	37	20.4	52	24.2	88	39.5	80	23.8
1986-87	30	8.7	50	21.7	73	26.8	133	42.0	74	27.8
Both Years	65	9.8	87	21.2	125	25.7	221	40.9	154	25.6
Raft (Research)										
1985-86	21	6.6	9	5.0	7	3.3	1	0.4	4	1.2
1986-87	27	7.9	7	3.0	3	1.1	6	1.9	2	0.8
Both Years	48	7.3	16	3.9	10	2.1	7	1.3	6	1.0
Dory										
1985-86	46	14.5	18	9.9	17	7.9	24	10.8	19	5.7
1986-87	68	19.8	20	8.7	22	8.1	18	5.7	16	6.0
Both Years	114	17.2	38	9.2	39	8.0	42	7.8	35	5.8
Canoe										
1985-86	5	1.6	5	2.8	9	4.2	18	8.1	77	22.9
1986-87	3	0.9	8	3.5	29	10.7	43	13.6	48	18.0
Both Years	8	1.2	13	3.2	38	7.8	61	11.3	125	20.8
Kayak										
1985-86	0	0.0	4	2.2	12	5.6	13	5.8	51	15.2
1986-87	2	0.6	3	1.3	23	8.5	24	7.6	37	13.9
Both Years	2	0.3	7	1.7	35	7.8	37	6.9	88	14.6
Bank Fisher										
1985-86	14	4.4	3	1.7	2	0.9	4	1.8	1	0.3
1986-87	5	1.5	3	1.3	1	0.4	0	0.0	2	0.8
Both Years	19	2.9	6	1.5	3	0.6	4	0.7	3	0.5
Hiker										
1985-86	20	6.3	10	5.5	8	3.7	10	4.5	14	4.2
1986-87	17	5.0	12	5.2	6	2.2	7	2.2	9	3.4
Both Years	37	5.6	22	5.4	14	2.9	17	3.1	23	3.8

Table 119. Continued.

Activity Type	Sequence of Occurrence									
	1 - 5		6 - 10		11 - 20		21 - 40		41 -115	
	n	%	n	%	n	%	n	%	n	%
Consumptive Use										
1985-86	237	74.5	116	64.1	127	59.1	93	41.7	110	32.7
1986-87	264	77.0	150	65.2	138	50.7	104	32.8	96	36.1
Both Years	501	75.8	266	64.7	265	54.4	197	36.5	206	34.2
Naturalistic Use										
1985-86	81	25.5	65	35.9	88	40.9	130	58.3	226	67.3
1986-87	79	23.0	80	34.8	134	49.3	213	67.2	170	63.9
Both Years	160	24.2	145	35.3	222	45.6	343	63.5	396	65.8
Totals										
1985-86	318	100.0	181	100.0	215	100.0	223	100.0	336	100.0
1986-87	343	100.0	230	100.0	272	100.0	317	100.0	266	100.0
Both Years	661	100.0	411	100.0	487	100.0	540	100.0	602	100.0

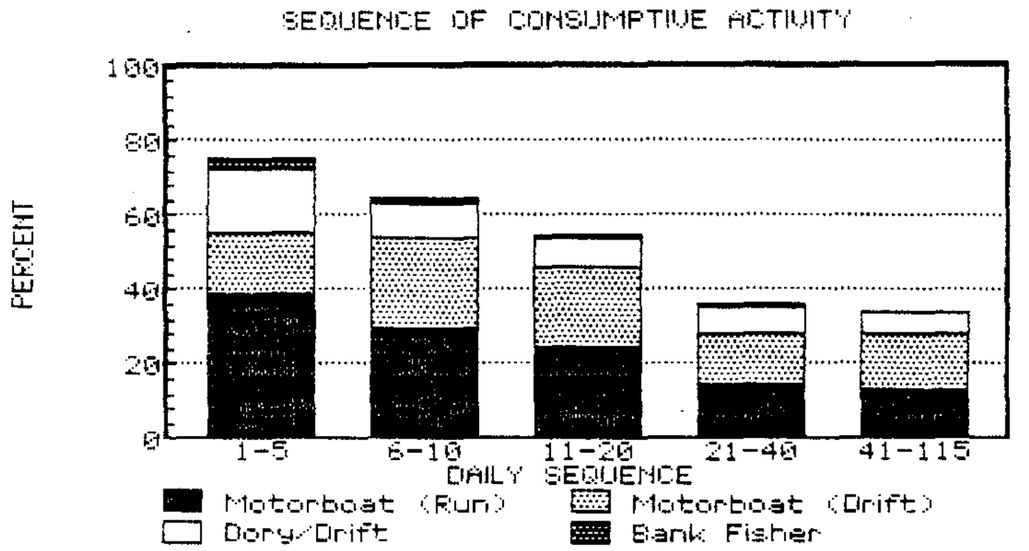


Figure 76. Daily sequence of occurrence of consumptive (fishing) users at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined. Values are percent of all activity within each sequence group. Compare to figure 77.

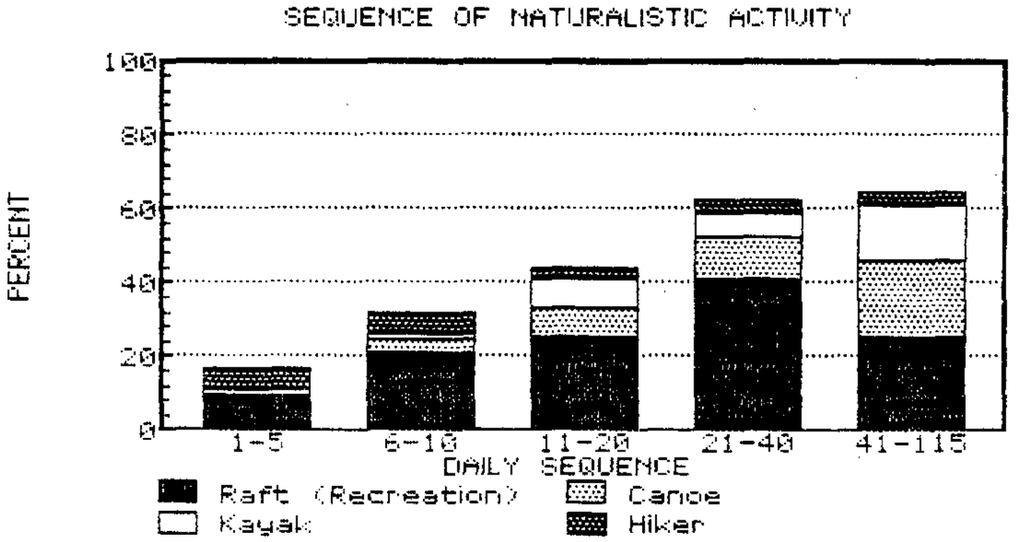


Figure 77. Daily sequence of occurrence of naturalistic (eagle viewing) users at Washington Eddy on the SRBENA during 1985-86 and 1986-87 combined. Values are percent of all activity within each sequence group, excluding research rafts. Compare to figure 76.

Table 120. Duration (min) of recreational activities at Washington Eddy on the SRBENA over the course of one mile of river during 1985-86 and 1986-87 combined.

Activity Type	Duration (min)		
	n	Mean	SD
Motorboat (Run)	645	4.0	8.1
Motorboat (Drift)	467	11.1	11.8
Raft (Recreate)	645	10.6	9.6
Raft (Research)	89	11.7	5.5
Dory	260	28.8	26.2
Canoe	243	9.8	6.5
Kayak	164	11.7	12.1
Bank Fisher	33	57.1	58.2
Hiker	110	37.0	35.1
Totals	2656	12.6	18.2

Table 121. Number of persons in each human activity type at the Washington Eddy on the SRBENA in 1985-86 and 1986-87.

Activity Type	1985-86		1986-87		Both Years	
	n	Mean	n	Mean	n	Mean
Motorboat	194	2.5	192	2.5	386	2.5
Raft (Recreate)	290	6.3	355	6.5	645	6.4
Raft (Research)	40	2.7	46	2.4	86	2.5
Dory/Drift	124	2.4	137	2.6	261	2.5
Canoe	113	2.2	126	2.3	239	2.3
Kayak	80	1.3	89	1.2	169	1.2
Bank Fisher	26	1.8	49	2.7	75	2.4
Hiker	59	3.1	9	1.1	68	2.8

Table 122. Number of vehicles counted each hour at the Washington Eddy parking area on the SRBENA from 16 December to 21 February in 1986-87 during 2 weekly sampling days.

	Hour of Day							
	7 - 8		8 - 9		9 - 10		10 - 11	
Date	n	%	n	%	n	%	n	%
Week 1								
Tuesday	0	0.0	0	0.0	0	0.0	1	0.2
Saturday	0	0.0	1	0.2	0	0.0	1	0.2
Both Days	0	0.0	1	0.2	0	0.0	2	0.4
Week 2								
Tuesday	0	0.0	0	0.0	1	0.2	0	0.0
Saturday	0	0.0	1	0.2	4	0.7	8	1.5
Both Days	0	0.0	1	0.2	5	0.9	8	1.5
Week 3								
Tuesday	0	0.0	1	0.2	1	0.2	1	0.2
Saturday	0	0.0	1	0.2	3	0.6	2	0.4
Both Days	0	0.0	2	0.4	4	0.8	3	0.6
Week 4								
Tuesday	0	0.0	0	0.0	0	0.0	0	0.0
Saturday	2	0.4	3	0.6	11	2.0	6	1.1
Both Days	2	0.4	3	0.6	11	2.0	6	1.1
Week 5								
Tuesday	0	0.0	0	0.0	1	0.2	2	0.4
Saturday	0	0.0	0	0.0	4	0.7	4	0.7
Both Days	0	0.0	0	0.0	5	0.9	6	1.1
Week 6								
Tuesday	0	0.0	1	0.2	1	0.2	0	0.0
Saturday	0	0.0	2	0.4	5	0.9	5	0.9
Both Days	0	0.0	3	0.6	6	1.1	5	0.9
Week 7								
Tuesday	0	0.0	0	0.0	1	0.2	2	0.4
Saturday	0	0.0	0	0.0	0	0.0	6	1.1
Both Days	0	0.0	0	0.0	1	0.2	8	1.5
Week 8								
Tuesday	0	0.0	1	0.2	1	0.2	1	0.2
Saturday	1	0.2	4	0.7	16	2.9	7	1.3
Both Days	1	0.2	5	0.9	17	3.1	8	1.5
Week 9								
Tuesday	0	0.0	0	0.0	1	0.2	1	0.2
Saturday	0	0.0	0	0.0	2	0.4	1	0.2
Both Days	0	0.0	0	0.0	3	0.6	2	0.4
Week 10								
Tuesday	0	0.0	0	0.0	0	0.0	0	0.0
Saturday	0	0.0	1	0.2	2	0.4	2	0.4
Both Days	0	0.0	1	0.2	2	0.4	2	0.4
Totals								
Tuesday	0	0.0	3	0.6	7	1.3	8	1.5
Saturday	3	0.6	13	2.4	47	8.7	42	7.7
Both Days	3	0.6	16	3.0	54	10.0	50	9.2

Table 122. Continued.

Activity Type	Hour of Day							
	11 - 12		12 - 13		13 - 14		14 - 15	
	n	%	n	%	n	%	n	%
Week 1								
Tuesday	1	0.2	2	0.4	0	0.0	0	0.0
Saturday	0	0.0	0	0.0	0	0.0	3	0.6
Both Days	1	0.2	2	0.4	0	0.0	3	0.6
Week 2								
Tuesday	3	0.6	0	0.0	0	0.0	1	0.2
Saturday	3	0.6	7	1.3	7	1.3	5	0.9
Both Days	6	1.2	7	1.3	7	1.3	6	1.1
Week 3								
Tuesday	3	0.6	2	0.4	8	1.5	6	1.1
Saturday	2	0.4	9	1.7	1	0.2	3	0.6
Both Days	5	1.0	11	2.1	9	1.7	9	1.7
Week 4								
Tuesday	2	0.4	1	0.2	0	0.0	1	0.2
Saturday	8	1.5	8	1.5	11	2.0	13	2.4
Both Days	10	1.9	9	1.7	11	2.0	14	2.6
Week 5								
Tuesday	1	0.2	2	0.4	1	0.2	1	0.2
Saturday	20	3.7	5	0.9	15	2.8	5	0.9
Both Days	21	3.9	7	1.3	16	3.0	6	1.1
Week 6								
Tuesday	2	0.4	2	0.4	5	0.9	1	0.2
Saturday	5	0.9	7	1.3	6	1.1	3	0.6
Both Days	7	1.3	9	1.7	11	2.0	4	0.8
Week 7								
Tuesday	1	0.2	1	0.2	0	0.0	2	0.4
Saturday	8	1.5	6	1.1	10	1.8	3	0.6
Both Days	9	1.7	7	1.3	10	1.8	5	1.0
Week 8								
Tuesday	1	0.2	2	0.4	1	0.2	2	0.4
Saturday	8	1.5	14	2.6	14	2.6	12	2.2
Both Days	9	1.7	16	3.0	15	2.8	14	2.6
Week 9								
Tuesday	5	0.9	3	0.6	1	0.2	1	0.2
Saturday	7	1.3	6	1.1	10	1.8	5	0.9
Both Days	12	2.2	9	1.7	11	2.0	6	1.1
Week 10								
Tuesday	1	0.2	0	0.0	0	0.0	3	0.6
Saturday	5	0.9	2	0.4	2	0.4	6	1.1
Both Days	6	1.1	2	0.4	2	0.4	9	1.7
Totals								
Tuesday	20	3.7	15	2.8	16	2.9	18	3.3
Saturday	66	12.2	64	11.8	76	14.0	58	10.7
Both Days	86	15.9	79	14.6	92	16.9	76	14.0

Table 122. Continued.

Activity Type	Hour of Day							
	15 - 16		16 - 17		17 - 18		Totals	
	n	%	n	%	n	%	n	%
Week 1								
Tuesday	0	0.0	0	0.0	0	0.0	4	0.7
Saturday	0	0.0	0	0.0	0	0.0	5	0.9
Both Days	0	0.0	0	0.0	0	0.0	9	1.6
Week 2								
Tuesday	0	0.0	0	0.0	0	0.0	5	0.9
Saturday	4	0.7	1	0.2	0	0.0	40	7.4
Both Days	4	0.7	1	0.2	0	0.0	45	8.3
Week 3								
Tuesday	3	0.6	0	0.0	0	0.0	25	4.6
Saturday	3	0.6	5	0.9	0	0.0	29	5.3
Both Days	6	1.2	5	0.9	0	0.0	54	9.9
Week 4								
Tuesday	1	0.2	1	0.2	0	0.0	6	1.1
Saturday	4	0.7	0	0.0	0	0.0	66	12.2
Both Days	5	0.9	1	0.2	0	0.0	72	13.3
Week 5								
Tuesday	2	0.4	1	0.2	0	0.0	11	2.0
Saturday	8	1.5	6	1.1	2	0.4	69	12.7
Both Days	10	1.9	7	1.3	2	0.4	80	14.7
Week 6								
Tuesday	1	0.2	1	0.2	0	0.0	14	2.6
Saturday	3	0.6	3	0.6	0	0.0	39	7.2
Both Days	4	0.8	4	0.8	0	0.0	53	9.8
Week 7								
Tuesday	1	0.2	0	0.0	0	0.0	8	1.5
Saturday	2	0.4	0	0.0	0	0.0	35	6.4
Both Days	3	0.6	0	0.0	0	0.0	43	7.9
Week 8								
Tuesday	3	0.6	0	0.0	1	0.2	13	2.4
Saturday	9	1.7	4	0.7	0	0.0	89	16.4
Both Days	12	2.3	4	0.7	1	0.2	102	18.8
Week 9								
Tuesday	1	0.2	1	0.2	0	0.0	14	2.6
Saturday	6	1.1	5	0.9	0	0.0	42	7.7
Both Days	7	1.3	6	1.1	0	0.0	56	10.3
Week 10								
Tuesday	0	0.0	1	0.2	0	0.0	5	0.9
Saturday	3	0.6	1	0.2	0	0.0	24	4.4
Both Days	3	0.6	2	0.4	0	0.0	29	5.3
Totals								
Tuesday	12	2.2	5	0.9	1	0.2	105	19.3
Saturday	42	7.7	25	4.6	2	0.4	438	80.7
Both Days	54	9.9	30	5.5	3	0.6	543	100.0

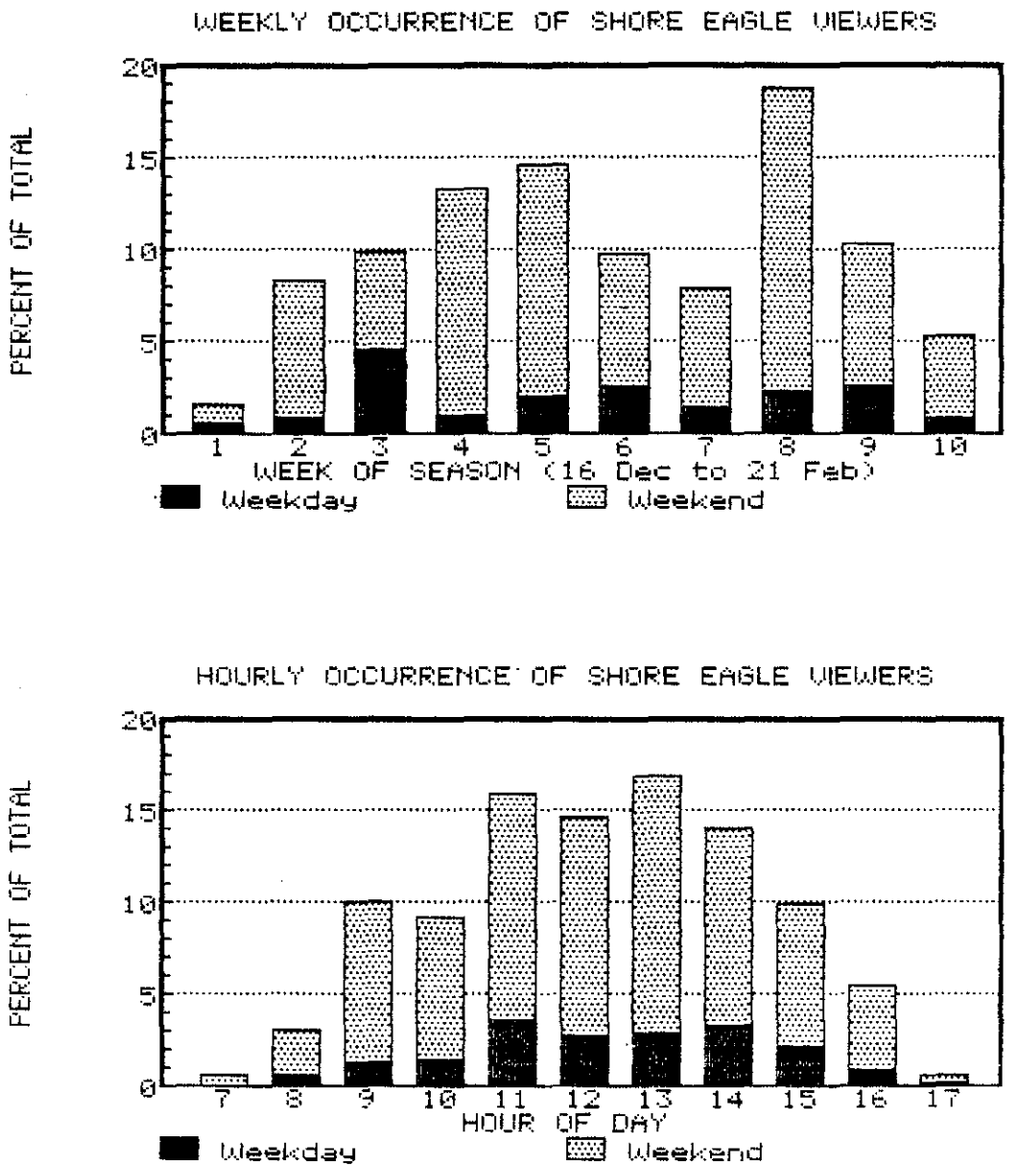


Figure 78. Weekly (upper) and hourly (lower) occurrence of roadside eagle viewers at the Washington Eddy parking area on the SRBENA during 1986-87 as determined by counting vehicles during Tuesdays and Saturdays.

Table 123. Human activities seen during float trips on the SRBENA and the SW&SRS from 23 Dec to 28 Feb in 1985-86 and 30 Nov to 28 Feb in 1986-87 combined. *

Activity Type	SRBENA (weekend)		SRBENA (weekday)		Upper Sauk		Lower Sauk	
	n	%	n	%	n	%	n	%
MOTORBOAT								
December	15	3.3	14	7.0	2	2.9	2	2.7
January	39	8.5	35	17.4	0	0.0	5	6.7
February	24	5.2	8	4.0	0	0.0	0	0.0
Subtotals	78	17.0	57	28.4	2	2.9	7	9.3
DORY/DRIFT								
December	12	2.6	8	4.0	5	7.4	6	8.0
January	24	5.2	11	5.5	7	10.3	3	4.0
February	36	7.9	11	5.5	13	19.1	17	22.7
Subtotals	72	15.7	30	14.9	25	36.8	26	34.7
RAFT								
December	0	0.0	1	0.5	0	0.0	0	0.0
January	20	4.4	1	0.5	0	0.0	0	0.0
February	27	5.9	6	3.0	0	0.0	0	0.0
Subtotals	47	10.3	8	4.0	0	0.0	0	0.0
CANOE								
December	0	0.0	0	0.0	1	1.5	0	0.0
January	20	4.4	0	0.0	0	0.0	0	0.0
February	24	5.2	0	0.0	0	0.0	0	0.0
Subtotals	44	9.6	0	0.0	1	1.5	0	0.0
KAYAK								
December	0	0.0	0	0.0	0	0.0	0	0.0
January	8	1.7	0	0.0	0	0.0	0	0.0
February	10	2.2	0	0.0	0	0.0	0	0.0
Subtotals	18	3.9	0	0.0	0	0.0	0	0.0

Table 123. Continued.

Activity Type	SRBENA (weekend)		SRBENA (weekday)		Upper Sauk		Lower Sauk	
	n	%	n	%	n	%	n	%
BANK FISHER								
December	27	5.9	18	9.0	8	11.8	8	10.7
January	37	8.1	40	19.9	7	10.3	11	14.7
February	43	9.4	18	9.0	23	33.8	21	28.0
Subtotals	107	23.4	76	37.8	38	55.9	40	53.3
HIKER								
December	6	1.3	5	2.5	0	0.0	0	0.0
January	58	12.7	16	8.0	2	2.9	1	1.3
February	28	6.1	9	4.5	0	0.0	1	1.3
Subtotals	92	20.1	30	14.9	2	2.9	2	2.7
TOTALS								
December	60	13.1	46	22.9	16	23.5	16	21.3
January	206	45.0	103	51.2	16	23.5	20	26.7
February	192	41.9	52	25.9	36	52.9	39	52.0
Totals	458	100.0	201	100.0	68	100.0	75	100.0

Table 123. Continued.

Activity Type	Upper Skagit		Middle Skagit		Lower Skagit		Totals	
	n	%	n	%	n	%	n	%
MOTORBOAT								
December	17	16.7	7	6.4	32	7.7	89	6.2
January	24	23.5	16	14.5	59	14.1	178	12.4
February	25	24.5	28	25.5	103	24.6	188	13.1
Subtotals	66	64.7	51	46.4	194	46.4	455	31.8
DORY/DRIFT								
December	5	4.9	1	0.9	4	1.0	41	2.9
January	3	2.9	2	1.8	3	0.7	53	3.7
February	8	7.8	7	6.4	1	0.2	93	6.5
Subtotals	16	15.7	10	9.1	8	1.9	187	13.1
RAFT								
December	0	0.0	0	0.0	0	0.0	1	0.1
January	1	1.0	0	0.0	0	0.0	22	1.5
February	0	0.0	0	0.0	0	0.0	33	2.3
Subtotals	1	1.0	0	0.0	0	0.0	56	3.9
CANOE								
December	0	0.0	0	0.0	0	0.0	1	0.1
January	0	0.0	0	0.0	0	0.0	20	1.4
February	0	0.0	1	0.9	0	0.0	25	1.7
Subtotals	0	0.0	1	0.9	0	0.0	46	3.2
KAYAK								
December	0	0.0	0	0.0	0	0.0	0	0.0
January	0	0.0	0	0.0	0	0.0	8	0.6
February	0	0.0	0	0.0	0	0.0	10	0.7
Subtotals	0	0.0	0	0.0	0	0.0	18	1.3

Table 123. Continued.

Activity Type	Upper Skagit		Middle Skagit		Lower Skagit		Total	
	n	%	n	%	n	%	n	%
BANK FISHER								
December	2	2.0	8	7.3	49	11.7	120	8.4
January	10	9.8	15	13.6	71	17.0	191	13.3
February	3	2.9	17	15.5	88	21.1	213	14.9
Subtotals	15	14.7	40	36.4	208	49.8	524	36.6
HIKER								
December	2	2.0	3	2.7	7	1.7	23	1.6
January	1	1.0	4	3.6	1	0.2	83	5.8
February	1	1.0	1	0.9	0	0.0	40	2.8
Subtotals	4	3.9	8	7.3	8	1.9	146	10.2
TOTALS								
December	26	25.5	19	17.3	92	22.0	275	19.2
January	39	38.2	37	33.6	134	32.1	555	38.8
February	37	36.3	54	49.1	192	45.9	602	42.0
Totals	102	100.0	110	100.0	418	100.0	1432	100.0

* No activities seen on the Suiattle River.

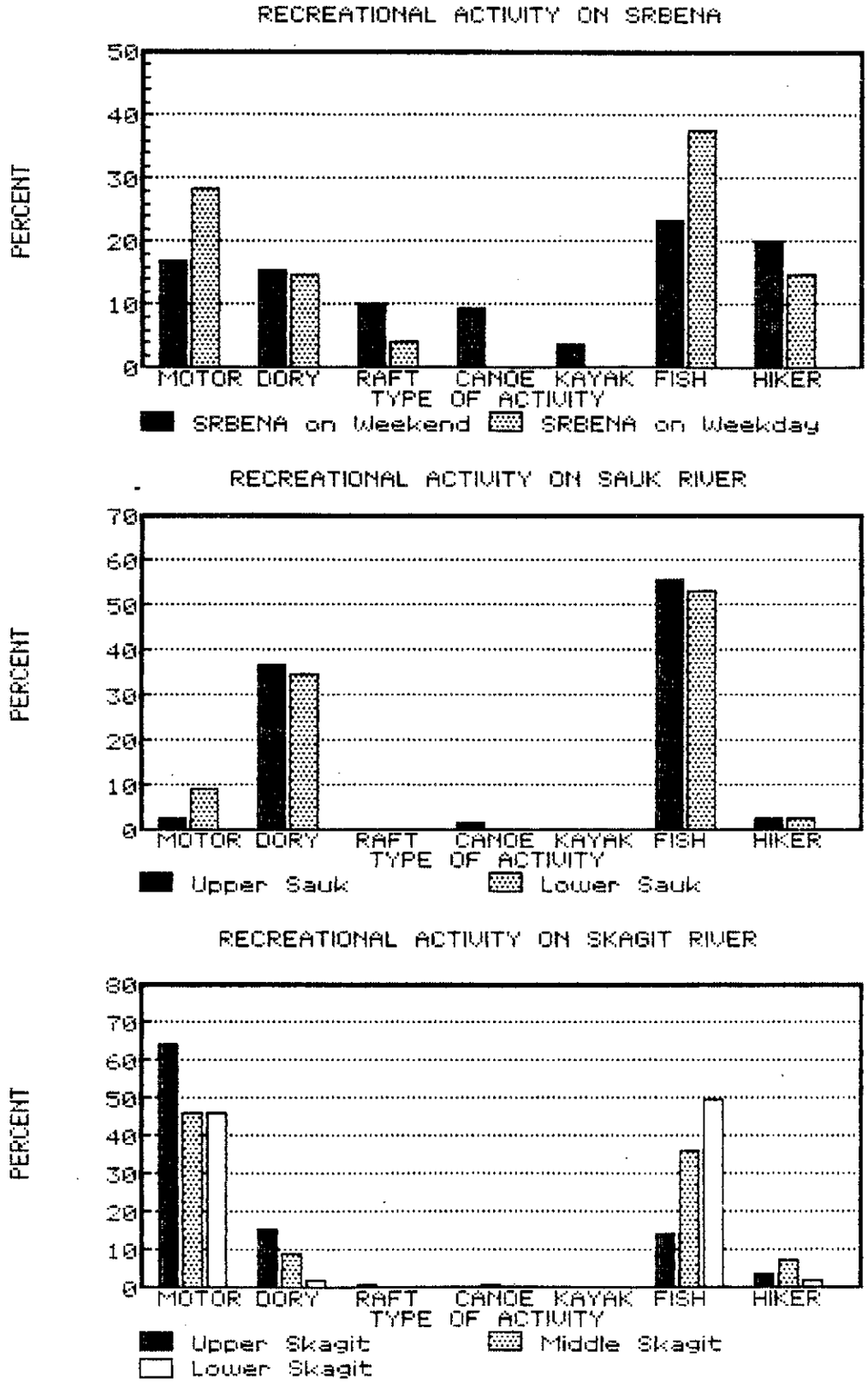


Figure 79. Comparison of the types of recreational activity as seen during float trips on the SRBENA (upper), the Sauk (middle), and the Skagit (lower) in both 1985-86 and 1986-87.

Table 124. Number of recreational activities recorded by time-lapse photography on the Upper Skagit River from 1 December 1986 to 31 January 1987.

Activity Type	Month						Totals	
	Dec		Jan		Feb *			
	n	%	n	%	n	%	n	%
Motorboat (Run)	284	63.3	477	59.0	-	-	761	60.5
Motorboat (Drift)	111	24.7	264	32.6	-	-	375	29.8
Raft (Recreate)	16	3.6	13	1.6	-	-	29	2.3
Raft (Research)	2	0.4	4	0.5	-	-	6	0.5
Dory	32	7.1	40	4.9	-	-	72	5.7
Canoe	1	0.2	8	1.0	-	-	9	0.7
Kayak	0	0.0	1	0.1	-	-	1	0.1
Bank Fisher	0	0.0	2	0.2	-	-	2	0.2
Hiker	3	0.7	0	0.0	-	-	3	0.2
Unknown Boat	0	0.0	0	0.0	-	-	0	0.0
Totals	449	100.0	809	99.9	-	-	1258	100.0

* Camera stolen in early February.

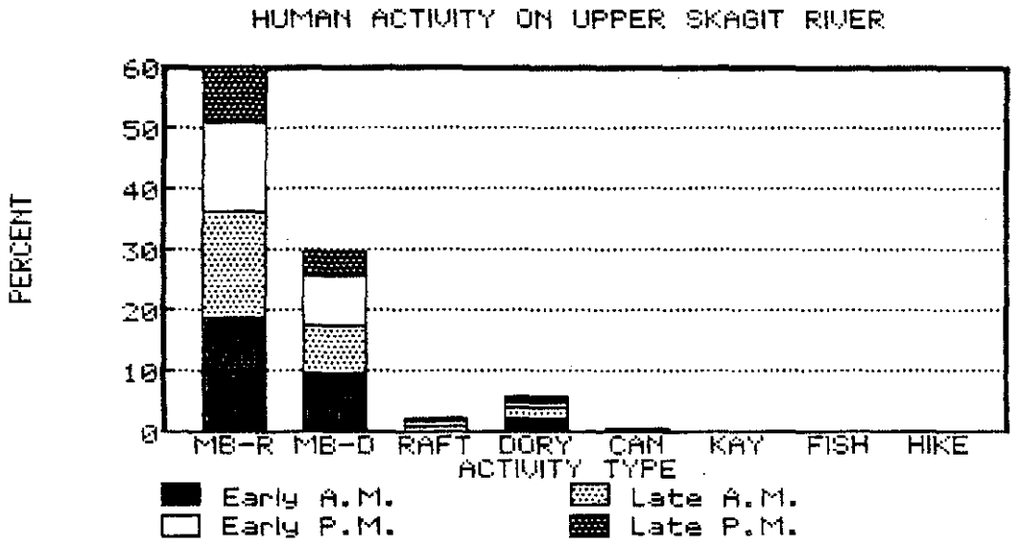


Figure 80. Type and timing of 1258 recreational activities on the Upper Skagit as determined by time-lapse photography from 1 December 1986 to 31 January 1987. Excludes research rafts.

Table 125. Number of recreational activities recorded by time-lapse photography on the Upper Skagit River during four time periods of the day in 1986-87.

Activity Type	Time of Day							
	Early AM		Late AM		Early PM		Late PM	
	n	%	n	%	n	%	n	%
Motorboat (Run)	235	59.2	222	61.7	189	58.3	115	65.0
Motorboat (Drift)	124	31.2	100	27.8	102	31.5	49	27.7
Raft (Recreate)	3	0.8	10	2.8	13	4.0	3	1.7
Raft (Research)	0	0.0	3	0.8	2	0.6	1	0.6
Dory	31	7.8	19	5.3	15	4.6	7	4.0
Canoe	4	1.0	1	0.3	2	0.6	2	1.1
Kayak	0	0.0	1	0.3	0	0.0	0	0.0
Bank Fisher	0	0.0	2	0.6	0	0.0	0	0.0
Hiker	0	0.0	2	0.6	1	0.3	0	0.0
Unknown Boat	0	0.0	0	0.0	0	0.0	0	0.0
Totals	397	31.6	360	28.6	324	25.8	177	14.1

Table 126. Number of recreational activities recorded by time-lapse photography on the Middle Skagit River from 1 December 1986 to 25 February 1987.

Activity Type	Month						Totals	
	Dec		Jan		Feb			
	n	%	n	%	n	%	n	%
Motorboat (Run)	32	48.5	54	50.9	97	43.9	183	46.6
Motorboat (Drift)	12	18.2	44	41.5	64	29.0	120	30.5
Raft (Recreate)	7	10.6	3	2.8	15	6.8	25	6.4
Raft (Research)	3	4.5	1	0.9	2	0.9	6	1.5
Dory	4	6.1	0	0.0	26	11.8	30	7.6
Canoe	2	3.0	2	1.9	6	2.7	10	2.5
Kayak	0	0.0	0	0.0	0	0.0	0	0.0
Bank Fisher	6	9.1	2	1.9	3	1.4	11	2.8
Hiker	0	0.0	0	0.0	5	2.3	5	1.3
Unknown Boat	0	0.0	0	0.0	3	1.4	3	0.8
Totals	66	16.8	106	27.0	221	56.2	393	100.0

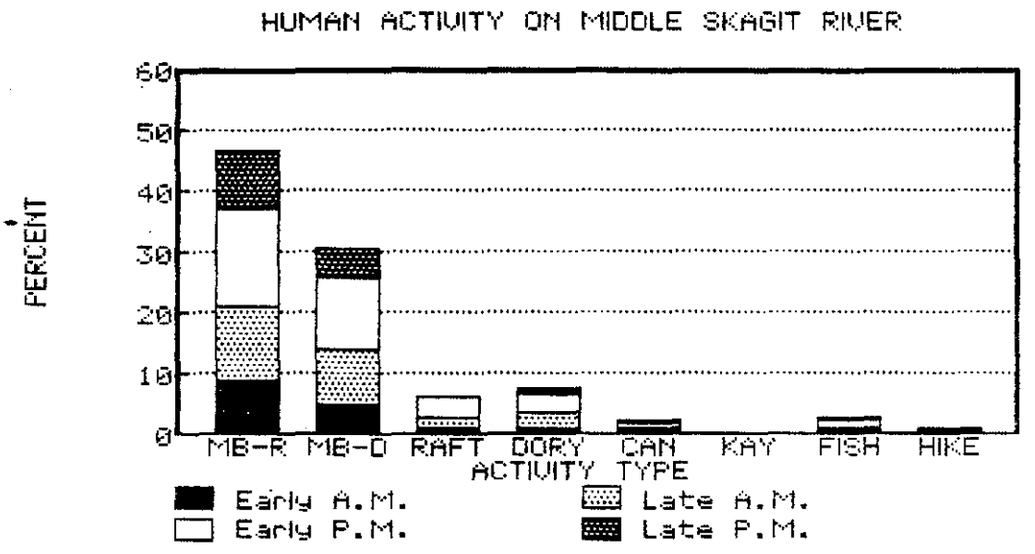


Figure 81. Type and timing of 393 recreational activities on the Middle Skagit as determined by time-lapse photography from 1 December 1986 to 25 February 1987. Excludes research rafts.

Table 127. Number of recreational activities recorded by time-lapse photography on the Middle Skagit River during four time periods of the day in 1986-87.

Activity Type	Time of Day							
	Early AM		Late AM		Early PM		Late PM	
	n	%	n	%	n	%	n	%
Motorboat (Run)	34	47.9	49	43.0	63	44.1	37	56.9
Motorboat (Drift)	20	28.2	36	31.6	45	31.5	19	29.2
Raft (Recreate)	4	5.6	8	7.0	13	9.1	0	0.0
Raft (Research)	2	2.8	4	3.5	0	0.0	0	0.0
Dory	5	7.0	10	8.8	11	7.7	4	6.2
Canoe	2	2.8	3	2.6	3	2.1	2	3.1
Kayak	0	0.0	0	0.0	0	0.0	0	0.0
Bank Fisher	2	2.8	3	2.6	5	3.5	1	1.5
Hiker	0	0.0	1	0.9	2	1.4	2	3.1
Unknown Boat	2	2.8	0	0.0	1	0.7	0	0.0
Totals	71	18.1	114	29.0	143	36.4	65	16.5

Table 128. Number of recreational activities recorded by time-lapse photography on the Lower Skagit River from 13 December 1986 to 25 February 1987.

Activity Type	Month						Totals	
	Dec		Jan		Feb			
	n	%	n	%	n	%	n	%
Motorboat (Run)	11	100.0	21	70.0	41	83.7	73	81.1
Motorboat (Drift)	0	0.0	8	26.7	3	6.1	11	12.2
Raft (Recreate)	0	0.0	0	0.0	2	4.1	2	2.2
Raft (Research)	0	0.0	1	3.3	2	4.1	3	3.3
Dory	0	0.0	0	0.0	0	0.0	0	0.0
Canoe	0	0.0	0	0.0	0	0.0	0	0.0
Kayak	0	0.0	0	0.0	0	0.0	0	0.0
Bank Fisher	0	0.0	0	0.0	0	0.0	0	0.0
Hiker	0	0.0	0	0.0	0	0.0	0	0.0
Unknown Boat	0	0.0	0	0.0	1	2.0	1	1.1
Totals	11	12.2	30	33.3	49	54.4	90	100.0

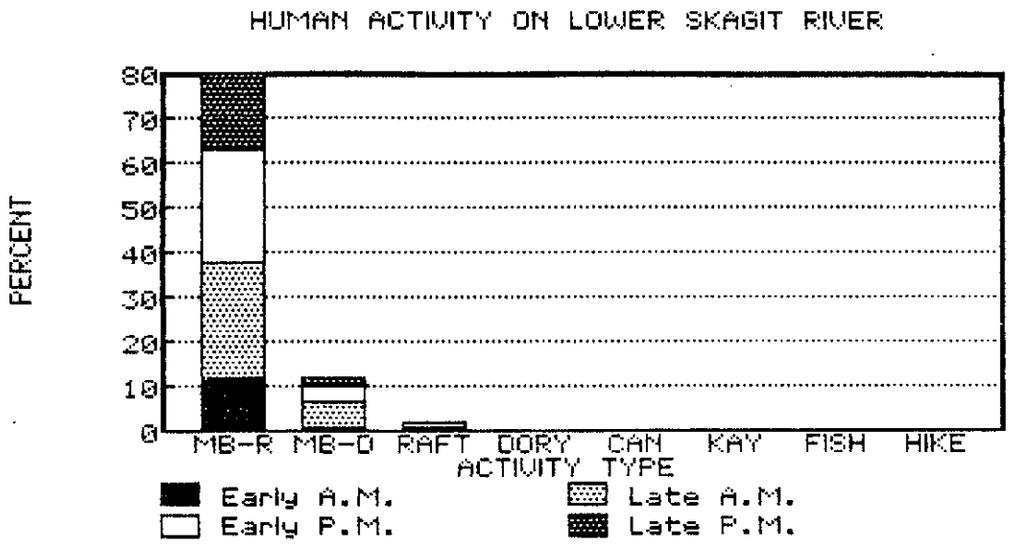


Figure 82. Type and timing of 90 recreational activities on the Lower Skagit as determined by time-lapse photography from 13 December 1986 to 25 February 1987. Excludes research rafts.

Table 129. Number of recreational activities recorded by time-lapse photography on the Lower Skagit River during four time periods of the day in 1986-87.

Activity Type	Time of Day							
	Early AM		Late AM		Early PM		Late PM	
	n	%	n	%	n	%	n	%
Motorboat (Run)	11	78.6	23	74.2	23	85.2	16	88.9
Motorboat (Drift)	1	7.1	5	16.1	3	11.1	2	11.1
Raft (Recreate)	1	7.1	1	3.2	0	0.0	0	0.0
Raft (Research)	0	0.0	2	6.5	1	3.7	0	0.0
Dory	0	0.0	0	0.0	0	0.0	0	0.0
Canoe	0	0.0	0	0.0	0	0.0	0	0.0
Kayak	0	0.0	0	0.0	0	0.0	0	0.0
Bank Fisher	0	0.0	0	0.0	0	0.0	0	0.0
Hiker	0	0.0	0	0.0	0	0.0	0	0.0
Unknown Boat	1	7.1	0	0.0	0	0.0	0	0.0
Totals	14	15.6	31	34.4	27	30.0	18	20.0

Table 130. Number of recreational activities recorded by time-lapse photography on the Lower Sauk River from 10 December 1985 to 28 February 1986.

Activity Type	Month						Totals	
	Dec		Jan		Feb			
	n	%	n	%	n	%	n	%
Motorboat (Run)	1	5.6	0	0.0	6	9.8	7	7.2
Motorboat (Drift)	0	0.0	0	0.0	0	0.0	0	0.0
Raft (Recreate)	1	5.6	5	27.8	11	18.0	17	17.5
Raft (Research)	3	16.7	1	5.6	3	4.9	7	7.2
Dory	10	55.6	10	55.6	34	55.7	54	55.7
Canoe	1	5.6	0	0.0	1	1.6	2	2.1
Kayak	0	0.0	0	0.0	0	0.0	0	0.0
Bank Fisher	2	11.1	1	5.6	6	9.8	9	9.3
Hiker	0	0.0	1	5.6	0	0.0	1	1.0
Unknown Boat	0	0.0	0	0.0	0	0.0	0	0.0
Totals	18	18.6	18	18.6	61	62.9	97	100.0

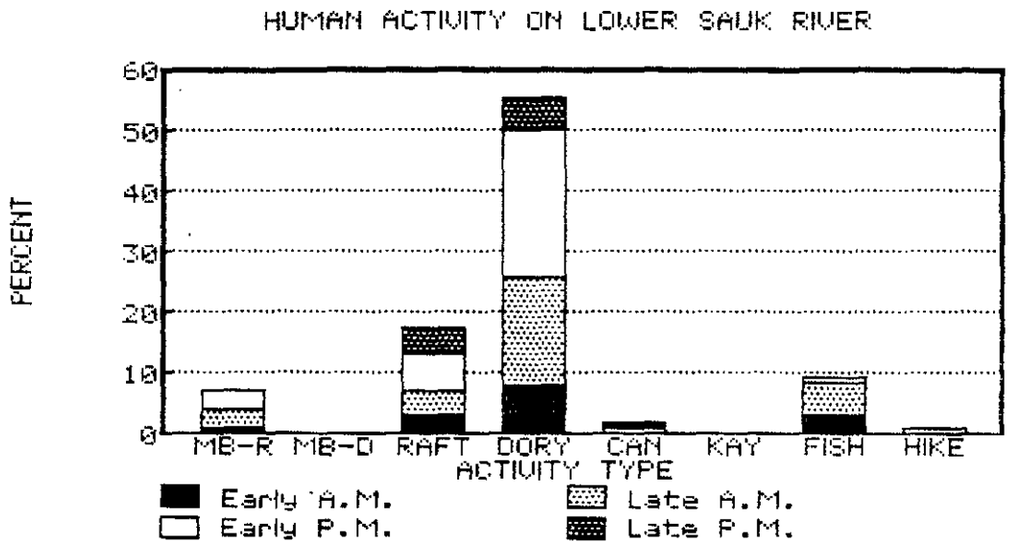


Figure 83. Type and timing of 97 recreational activities on the Lower Sauk as determined by time-lapse photography from 10 December 1985 to 28 February 1986. Excludes research rafts.

Table 131. Number of recreational activities recorded by time-lapse photography on the Lower Sauk River during four time periods of the day in 1985-86.

Activity Type	Time of Day							
	Early AM		Late AM		Early PM		Late PM	
	n	%	n	%	n	%	n	%
Motorboat (Run)	1	5.6	3	8.8	3	8.6	0	0.0
Motorboat (Drift)	0	0.0	0	0.0	0	0.0	0	0.0
Raft (Recreate)	3	16.7	4	11.8	6	17.1	4	40.0
Raft (Research)	3	16.7	4	11.8	0	0.0	0	0.0
Dory	8	44.4	17	50.0	24	68.6	5	50.0
Canoe	0	0.0	1	2.9	0	0.0	1	10.0
Kayak	0	0.0	0	0.0	0	0.0	0	0.0
Bank Fisher	3	16.7	5	14.7	1	2.9	0	0.0
Hiker	0	0.0	0	0.0	1	2.9	0	0.0
Unknown Boat	0	0.0	0	0.0	0	0.0	0	0.0
Totals	18	18.6	34	35.1	35	36.1	10	10.3

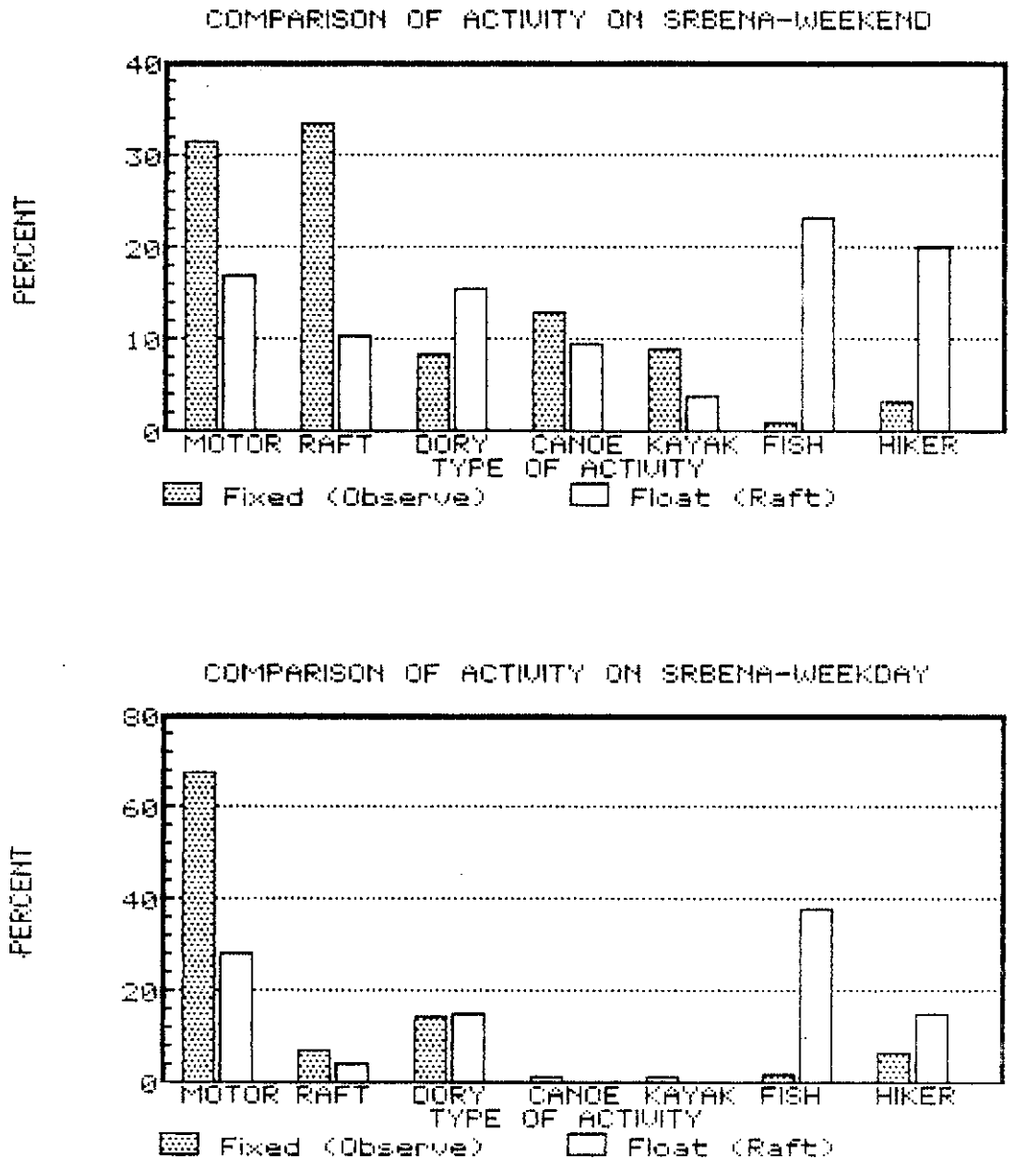


Figure 84. Comparison of recreational activity recorded by direct observation at Washington Eddy and direct observation during raft float trips on the SRBENA during weekends (upper) and weekdays (lower).

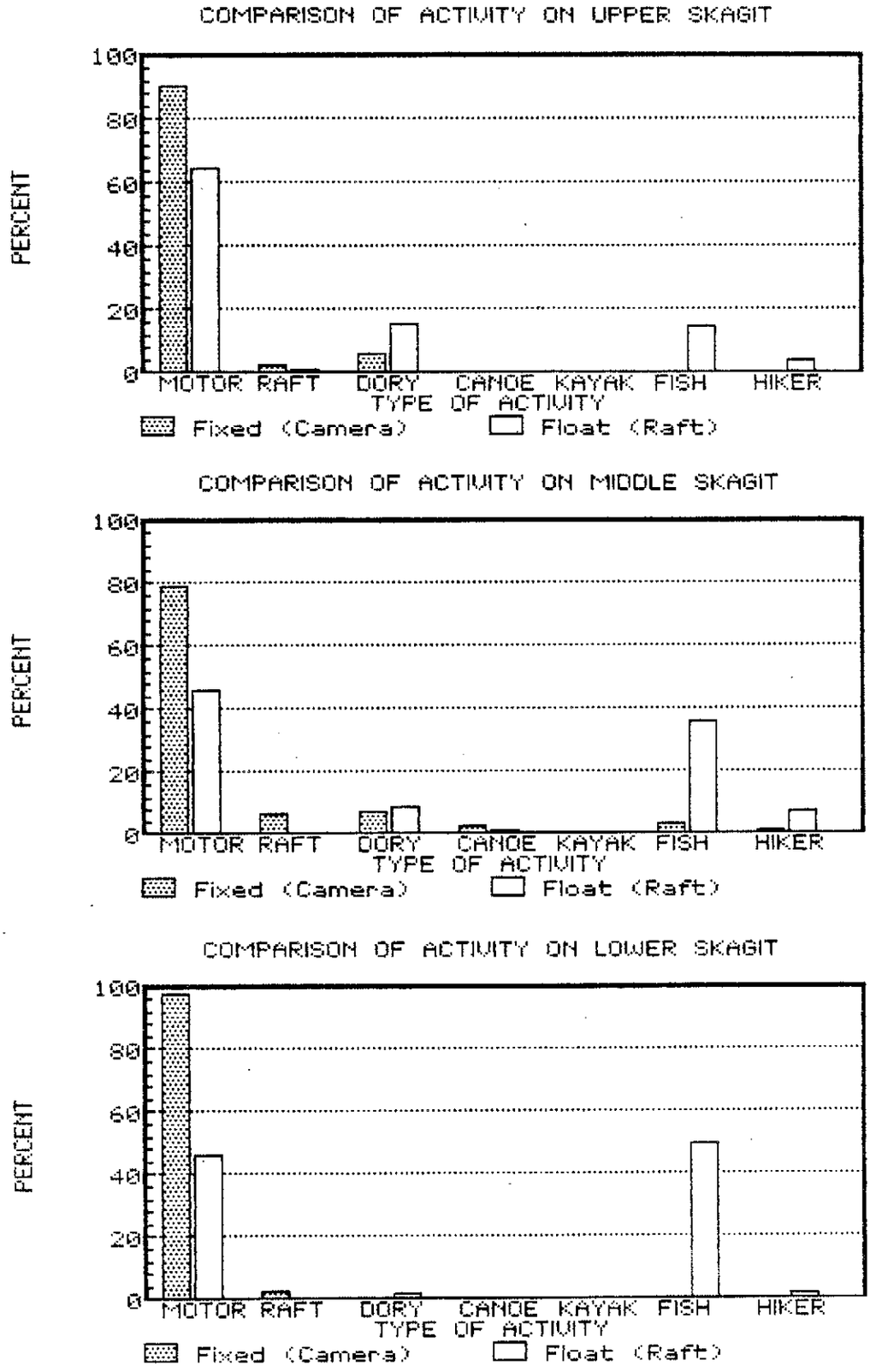


Figure 85. Comparison of recreational activity recorded by time-lapse photography and direct observation during raft float trips on the Upper (upper), Middle (middle), and Lower (lower) Skagit.

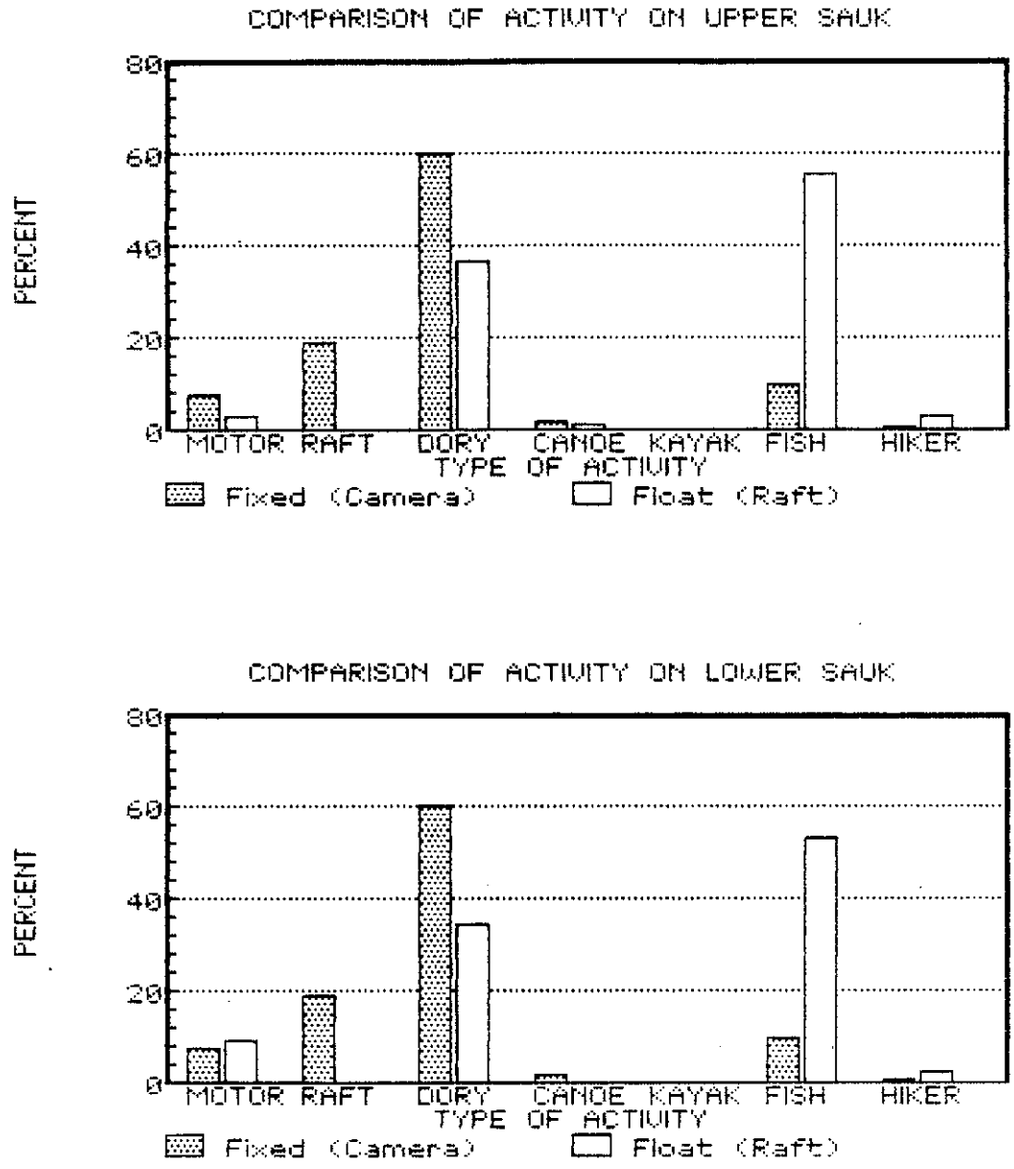


Figure 86. Comparison of recreational activity recorded by time-lapse photography and direct observation during raft float trips on the Upper (upper) and Lower (lower) Sauk.

Task 7 - User Attitude Evaluation

Methods

Visitors were contacted on the river and asked if they would be willing to participate in an anonymous recreational survey. If they answered "Yes", they were given a questionnaire and asked to complete it at their convenience and return it by mail using the self-addressed, stamped envelope provided. Of 300 questionnaires distributed in 1985-86 and 500 distributed in 1986-87, 413 (52 %) were returned. A separate register was kept of pertinent information of each visitor contact. Questionnaires were distributed in late January and February during 1985-86 and in December, January, and February during 1986-87.

Analyses

Summary statistical procedures (n, mean, standard deviation, percentages) were used to evaluate all patterns of public opinions.

Results and Discussion

Profile of Visitors.-- The average age of interviewees was 43 years and ranged from 13 to 81 years. The average participant was well educated with a mean of 15.5 years of schooling. More than 29 percent spent 4 years in college; 15 percent had more than 4 years of college. Eighty percent of all participants said they would be interested in learning

about the findings of the study with more fishermen (86 %) interested than eagle-viewers (77 %).

A wide range of user groups was surveyed. The 413 participants were eagle-viewers in boats (27 %), fishermen in motorboats (19 %), eagle-viewers on shore (19 %), eagle-viewers on road (18 %), fishermen in drift boats (8 %), fishermen on shore (7 %), hikers (< 1 %), river-runners (< 1 %), and other (2 %).

Recreationists used different types of boats depending on the purpose of their visit (Figure 87). Motorboats with propellers and jets were almost exclusively used by fishermen whereas rafts, canoes, and kayaks were used for eagle-viewing. Some eagle-viewers use dories, but this mode of recreation is used more for fishing than the data suggests.

Most participants have been visiting the river for a number of years, especially the fishermen. Eagle-viewers have been visiting for an average of 6.5 years, whereas fishermen have been returning an average of 19.3 years. Of eagle-viewers on shore and in boats, 64 and 55 percent of them were first-time visitors, respectively. This compares to fishermen on shore and in boats who were first-time users only 2 and 15 percent of the time, respectively.

Recreationists learned about the Skagit River from several sources (Table 132). Most fishermen (ca. 90 %) live in the area or visited the area on the advice of a friend or relative. In contrast, eagle-viewers used a number of sources of information: most in boats (47 %) were informed by

a friend or relative, or lived in the area (23 %), whereas those on shore relied on information from more sources. The media was particularly responsible in attracting shore eagle-viewers to the area.

Generally, the recreational experience of survey participants was better than expected (Table 133). This was especially true of eagle-viewers while either in boats or on shore, but fishermen in boats rated their experience high as well. Fishermen on shore rated their experience lower than other groups. This occurred perhaps because shore fishermen have been visiting the river for longer periods than eagle-viewers and thus are more familiar with situation.

Perception of Problems.-- On average, 16 percent of survey participants believed there were conflicts between different groups of river recreationists (Table 134). This was especially true with eagle-viewers, but shore fishermen also had this opinion. More eagle-viewers in boats thought a conflict existed than other groups; few fishermen in boats expressed this opinion. There was a tendency for long-term fishermen and early-term eagle-viewers in boats to think that more conflicts were occurring.

On average, 25 percent believed that the river environment was being degraded by recreational use (Table 135). Many eagle-viewers had this impression, especially first-time boaters. Fishermen, particularly boaters, believed that less degradation or damage was occurring. There was a tendency for repeat visitors to believe that

degradation was not occurring, except for shore fishermen. This might imply that first-time users perceive problems easier and/or repeat visitors accept existing conditions.

A similar number, 26 percent, thought that recreational use was adversely affecting bald eagles (Table 136). This opinion was strongest with eagle-viewers, especially those in boats. Few fishermen in boats thought impacts were occurring, but more shore fishermen perceived this as true. There was a tendency for repeat eagle-viewers to believe that impacts were not as prevalent, and repeat fishermen perceived more impacts were occurring.

A ranking of problems as perceived by eagle-viewers is provided in Table 137. Most boaters (66 %) thought that "motorboats scaring eagles" was the major problem followed by "litter," "crowding at boat launches," "inadequate toilet facilities," "too many buildings," and "inadequate information services." Those on shore (64 %) thought that the major problem was "inadequate information services," followed by "litter," "inadequate toilets facilities," "motorboats scaring eagles," and "too few parking areas."

A ranking of problems as perceived by steelhead fishermen is provided in Table 138. "Crowding at boat launches" (55 %) and "litter" (41 %) were the main concerns of boaters. "Litter" was of particular concern to shore fishermen (77 %) followed by "inadequate toilet facilities" and "motorboats creating waves."

Perception of problems was higher for eagle-viewers (32

%) than fishermen (20 %) for both boat and shore users (Tables 137 and 138). Slightly more eagle-viewers in boats perceived problems than those on shore, but the opposite was true with fishermen; boat fishers thought less problems existed than shore fishers.

More problems were perceived by eagle-viewers that had been returning to the river for a number of years (Table 139). For fishermen, long-term visitors perceived less problems than short-term visitors (Table 140).

Disturbance to Eagles.-- Eagle-viewers saw less eagles than they expected, but fishermen saw slightly more than they expected (Table 141). More fishermen had expectations on the number of eagles likely to be seen; shore viewers had the least expectations. Of fishermen, those on shore saw fewer eagles than expected compared to boaters.

Boaters saw twice the number of eagles than visitors on shore presumably because boats travel greater distances (Table 142). Boat viewers saw the most perched birds followed by boat fishers, shore viewers, and shore fishers. Viewers saw more eagles in trees, but fishermen saw more on the ground. This seems likely because viewers are more aware of eagles and fishermen tend to flush more eagles from the ground. Very few eagles were seen on the ground by either group. Data per Task 4 indicates that flushing responses and flight distances are higher for ground birds which could explain why these eagles are less frequently seen.

Eagle-viewers thought eagles flew away at their approach

less often than from other activities, which according to research data is generally true (Table 143). Viewing from shore was thought to be least disruptive than viewing from boats. Only 1 percent of all respondents thought eagles always flew from them.

Recreationists believed that 7 and 15 percent of eagles perched in trees and on the ground flew away from them (flushing response), respectively (Table 144). Two to three times more were thought to flush from boats compared to visitors on shore and ground birds compared to perched eagles. Viewing from boats was perceived to be the most disruptive activity and viewing from shore was the least; fishing was thought to have intermediate effects.

Many more eagles flushed from human activity than the public perceived (Figure 88). With the exception of the effects of boat viewers on perched eagles, flushing response is several to many times the rate that recreationists perceived. The disparity is particularly high when eagles feeding or standing on the ground are considered. Although public opinion greatly underestimated the degree of flushing of eagles, there was a general consensus that eagles on the ground were more likely to flush than those perched in trees and this is what the research data indicates.

Recreationists believed that eagles flew away from their approach at distances averaging 87 and 64 meters for eagles in trees and on the ground, respectively (Table 145). These flight distances were thought to be higher for birds in trees

than those on ground, and higher for shore activity compared to boating activity.

Respondents underestimated flight distances, especially with eagles on the ground, as compared to research data (Figure 89). Their perception that distances were lower for ground birds is opposite to the true situation. Although recreationists underestimated distances and failed to discern differences between tree and ground birds, they perceived that flight distances from foot traffic was much higher than from boat traffic. Research data confirms this belief.

Distances that recreationists believed eagles were flying away from them (avoidance distance) are in Table 146. Eagles flying from perches were perceived to fly farther distances than those from the ground, and eagles flushed from the foot traffic flew farther away than for boat traffic.

Recreationists greatly underestimated the avoidance distances that eagles flew after flushing from human activity, particularly with perched birds (Figure 90). (Note: Avoidance distances are not presented elsewhere in this report.) Both public opinion and research data agree, however, that avoidance distances are higher for birds flushed from tree perches compared to birds flushed from the ground. Avoidance distance is an index of dispersal from favored foraging habitat as well as a measure of energy expenditure induced by humans; it is perceived by the public to be lower than is occurring.

When asked to rank twelve human activity types by the

degree to which they caused eagles to fly away and/or to stop feeding, results were somewhat consistent among all user groups (Table 147). Helicopter flights and motorboating was perceived as most disturbing; viewing from shore or road and driving on road were thought to be least disturbing. Fishermen in boats seemed to believe their activity was of lesser consequence to eagles than many viewing activities, but they too thought that motorboating was particularly disturbing to eagles. Many respondents were concerned that the noise created by motorboats was disturbing to eagles. Motorboats were indeed relatively more disturbing than other activities, however, their noise did not seem to be the cause (see Task 1). Many of these opinions, excluding boat fishermen's opinions of themselves, are in general agreement with research data.

Ranking data are further refined in table 148 for eagle viewers and table 149 for fishermen. Again, helicopter and motorboat activity is believed to be exceptionally disruptive to eagles; eagle-viewing from road and driving along the river is perceived as the least disturbing.

Management Actions.-- When asked to express their opinions regarding possible management actions to protect eagles, eagle-viewers (Table 150) supported activity restriction much more than fishermen (Table 151). Forty-three percent of suggested actions were supported by eagle-viewers, but only 18 percent of fishermen supported the actions. Most viewers strongly supported the development of

eagle interpretative displays, but they also supported the limitation of boating to certain areas and times, the posting of regulations and using river-rangers to enforce rules, and the restriction of boat fishing. Opposition by fishermen to any restriction on their activity was high. They supported more boat launching facilities, but also believe the development of eagle interpretive displays has highest priority. Increasing camping and parking facilities has more support by fishermen than most other suggestions.

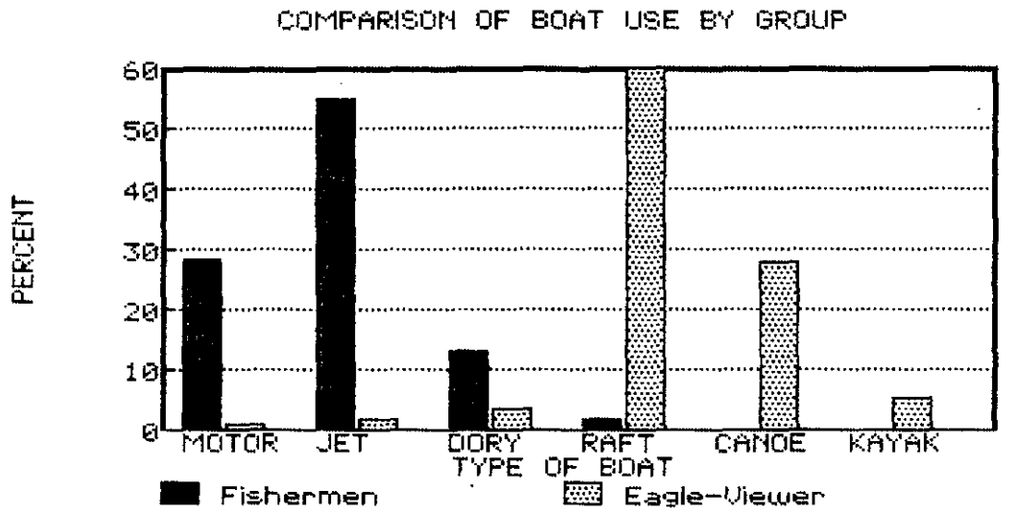


Figure 87. Comparison of the types of boats used by consumptive users (fishermen) and naturalistic users (eagle-viewers) as recorded during interviews.

Table 132. Percent of sources of information by which visitors learned about the area and the recreational opportunity that they participated in.

Information Source	Eagle Viewer (n = 261)		Steelhead Fishermen (n = 138)	
	Shore	Boat	Shore	Boat
By living in the area	23	23	57	69
Friend or relative	30	47	30	23
Newspaper	24	8	0	1
Television	7	0	0	0
Magazine	7	3	0	2
Radio	1	0	0	1
Other	9	19	13	4

Table 133. How recreationists rated their experience while visiting the river.

Type of Activity	Better than expected	About as expected	Poorer than expected
Viewing from shore (n = 151)	50	38	11
Viewing from boat (n = 108)	59	35	6
Fishing from shore (n = 30)	27	57	16
Fishing from boat (n = 107)	48	44	8
Viewing subtotal (n = 259)	54	37	9
Fishing subtotal (n = 137)	43	47	10
Grand total (n = 405)	50	41	9

Table 134. Percent (and number) of respondents answering "Yes" to the following question: "For the area of river that you visited, do you feel there were conflicts between different groups of river recreationists?"

User Group	Length of Experience on River			Totals
	1st Yr. Visitor	1-5 Yr. Visitor	> 5 Yr. Visitor	
Viewing from boat	26 (19)	25 (55)	14 (22)	23 (96)
Viewing from shore	13 (15)	20 (69)	19 (51)	19 (135)
Fishing from boat	0 (3)	7 (15)	7 (88)	7 (106)
Fishing from shore	- (0)	10 (10)	20 (20)	16 (30)
Total	18 (37)	20 (149)	13 (181)	16 (367)

Table 135. Percent (and number) of respondents answering "Yes" to the following question: "Do you feel that the river environment is being degraded or damaged by recreational use?"

User Group	Length of Experience on River			Totals
	1st Yr. Visitor	1-5 Yr. Visitor	> 5 Yr. Visitor	
Viewing from boat	42 (19)	25 (55)	33 (22)	30 (96)
Viewing from shore	33 (15)	34 (69)	27 (51)	32 (135)
Fishing from boat	33 (3)	7 (15)	11 (88)	11 (106)
Fishing from shore	- (0)	20 (10)	25 (20)	23 (30)
Total	38 (37)	27 (149)	20 (181)	25 (367)

Table 136. Percent (and number) of respondents answering "Yes" to the following question: "Do you feel that recreational use is having adverse effects on bald eagles on the river?"

User Group	Length of Experience on River			
	1st Yr. Visitor	1-5 Yr. Visitor	> 5 Yr. Visitor	Totals
Viewing from boat	44 (18)	36 (55)	36 (22)	38 (95)
Viewing from shore	33 (15)	38 (68)	28 (50)	34 (133)
Fishing from boat	0 (3)	7 (15)	7 (88)	7 (106)
Fishing from shore	- (0)	10 (10)	20 (20)	17 (30)
Total	36 (36)	32 (148)	18 (180)	26 (364)

Table 137. Percent of visitors viewing eagles from shore and boat agreeing that a particular problem exists, ranked in order of the degree of problem for the total column.

Type of Problem	Shore (n=140)	Boat (n=108)	Total (n=248)
Motorboats scaring eagles	55	66	60
Litter in river and on shore	58	59	58
Inadequate information services	64	48	57
Inadequate toilet facilities	57	52	54
Too few parking areas	53	34	45
Too many buildings along river	31	50	40
Roads within sight of river	32	45	38
Crowding at boat launches	19	57	37
Utility poles and lines	36	36	36
Motorboats creating waves	31	37	34
Drift boats scaring eagles	38	30	34
Logging activities	33	29	31
Crowding at eagle viewing areas	30	29	30
Too few rules and regulations	25	33	28
People on shore scaring eagles	26	25	26
Roadside viewers scaring eagles	25	24	25
Anglers on shore scaring eagles	28	21	25
Too many boats affecting fishing	17	22	19
Livestock along river	15	24	19
Too many anglers reducing success	13	13	13
Too many rules and regulations	10	13	12
Frightening rapids	5	5	5
Mean	32	34	32

Table 138. Percent of visitors steelhead fishing from shore and boat agreeing that a particular problem exists, ranked in order of the degree of problem for the total column.

Type of Problem	Shore (n=30)	Boat (n=106)	Total (n=135)
Crowding at boat launches	37	55	51
Litter in river and on shore	77	41	49
Inadequate toilet facilities	43	32	34
Logging activities	27	30	29
Too many rules and regulations	31	26	27
Too few parking areas	33	26	27
Motorboats creating waves	40	22	26
Inadequate information services	30	23	25
Too many boats affecting fishing	28	23	24
Too many anglers reducing success	17	24	22
Motorboats scaring eagles	31	16	18
Crowding at eagle viewing areas	23	14	16
Roads within sight of river	20	14	16
Too many buildings along river	17	15	15
Utility poles and lines	23	10	13
People on shore scaring eagles	17	11	12
Drift boats scaring eagles	24	6	10
Roadside viewers scaring eagles	14	9	10
Too few rules and regulations	24	5	9
Livestock along river	7	7	7
Anglers on shore scaring eagles	7	6	6
Frightening rapids	0	2	2
Mean	26	19	20

Table 139. Percent of visitors viewing eagles agreeing that a particular problem exists, subdivided by the length of time that they have been visiting the river.

Type of Problem	Length of Experience on River		
	1st Yr. Visitor	1-5 Yr. Visitor	> 5 Yr. Visitor
Motorboats scaring eagles	58	56	66
Inadequate information services	52	56	57
Too few parking areas	44	46	42
Crowding at boat launches	32	32	40
Drift boats scaring eagles	23	33	38
Anglers on shore scaring eagles	24	22	33
Crowding at eagle viewing areas	25	25	32
Too few rules and regulations	20	30	30
Roadside viewers scaring eagles	16	28	24
Too many boats affecting fishing	21	14	23
Too many anglers reducing fishing	7	11	19
Too many rules and regulations	9	11	14
Mean	28	30	35

Table 140. Percent of visitors steelhead fishing agreeing that a particular problem exists, subdivided by the length of time that they have been visiting the river.

Type of Problem	Length of Experience on River	
	0-5 Yr. Visitor	> 5 Yr. Visitor
Crowding at boat launches	54	51
Inadequate information services	32	23
Too many boats affecting fishing	33	21
Too many anglers reducing fishing	29	20
Too few parking areas	18	30
Motorboats scaring eagles	32	15
Too many rules and regulations	14	31
Crowding at eagle viewing areas	25	13
Drift boats scaring eagles	18	8
Roadside viewers scaring eagles	14	9
Too few rules and regulations	11	9
Anglers on shore scaring eagles	11	5
Mean	24	20

Table 141. Number of bald eagles seen by recreationists while visiting the river (percent agreeing with statement).

Type of Activity	Fewer than expected	About as expected	More than expected
Viewing from shore (n = 149)	52	22	26
Viewing from boat (n = 106)	42	40	19
Fishing from shore (n = 27)	37	52	11
Fishing from boat (n = 103)	15	56	29
Viewing subtotal (n = 255)	48	29	23
Fishing subtotal (n = 130)	19	55	25
Grand total (n = 393)	37	38	24

Table 142. Number of eagles seen by recreationists during their visit to the river.

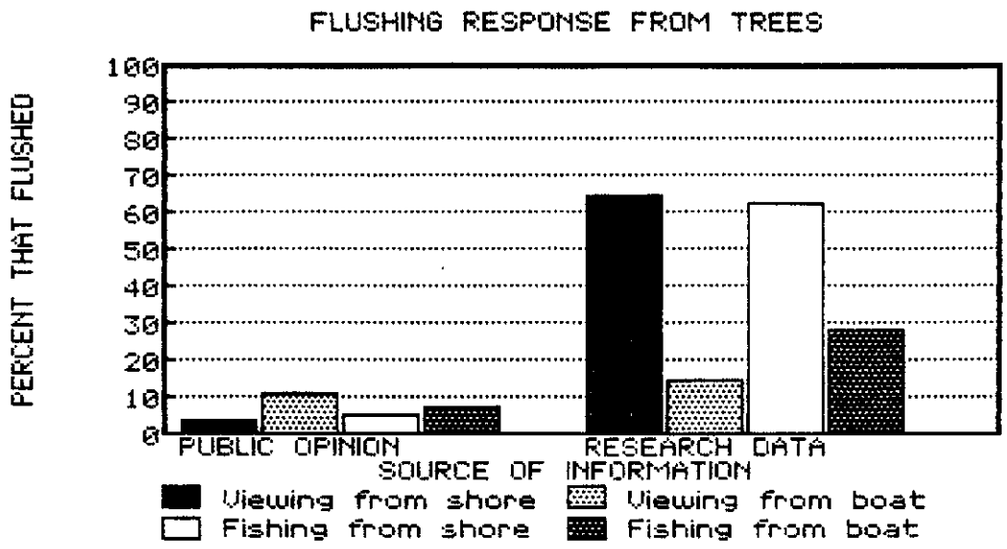
User Group	Eagles in Perches			Eagles on Ground		
	n	Mean	SD	n	Mean	SD
Viewing from shore	153	12.0	10.7	140	2.5	3.8
Viewing from boat	110	28.3	17.7	105	1.8	2.6
Fishing from shore	28	7.5	11.2	30	1.4	1.8
Fishing from boat	105	17.8	19.2	100	6.6	11.7
Viewing subtotal	263	18.8	16.2	245	2.2	3.3
Fishing subtotal	133	15.6	18.3	130	5.4	10.5
On shore subtotal	181	11.3	10.9	170	2.3	3.5
In boat subtotal	215	23.1	19.2	205	4.1	8.7
Grand total	396	17.7	17.0	375	3.3	6.9

Table 143. Extent to which recreationists believed their own presence caused eagles to fly away.

Type of Activity	Eagles Flew Away			
	None	Sometimes	Often	Always
Viewing from shore (n = 144)	72	27	1	0
Viewing from boat (n = 109)	48	44	9	0
Fishing from shore (n = 24)	54	38	4	4
Fishing from boat (n = 104)	58	40	2	1
Viewing subtotal (n = 253)	61	34	4	0
Fishing subtotal (n = 128)	56	40	2	2
Grand total (n = 381)	60	36	4	1

Table 144. Percent of eagles seen by recreationists that flew away at their approach (flushing response).

User Group	Eagles in Perches			Eagles on Ground		
	n	Percent	SD	n	Percent	SD
Viewing from shore	150	3.7	9.3	133	7.0	22.0
Viewing from boat	110	10.9	19.8	97	24.9	39.9
Fishing from shore	28	5.1	11.7	25	17.6	47.0
Fishing from boat	105	7.3	16.1	97	13.8	23.9
Viewing subtotal	260	6.7	15.1	230	14.6	31.9
Fishing subtotal	133	6.8	15.3	122	14.6	29.9
On shore subtotal	178	3.9	9.7	158	8.8	27.3
In boat subtotal	215	9.1	18.1	194	19.4	33.3
Grand total	393	6.8	15.1	352	14.6	31.1



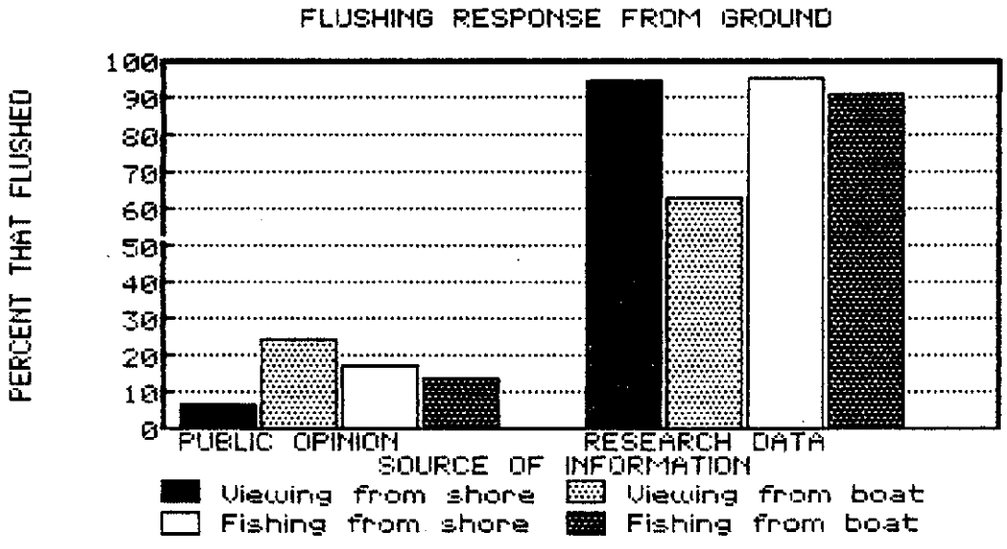


Figure 88. Comparison of the flushing responses (percent that flushed) of eagles perched in trees (upper) and feeding/standing on the ground (lower) between what the public perceived and what the research data indicated.

Table 145. Distances (meters) that recreationists perceived they were from eagles when flight occurred because of their approach (flight distance).

User Group	Eagles in Perches			Eagles on Ground		
	n	Mean	SD	n	Mean	SD
Viewing from shore	31	137.3	140.5	21	96.7	87.7
Viewing from boat	24	53.0	55.4	20	42.3	61.4
Fishing from shore	4	133.4	175.7	5	143.3	124.6
Fishing from boat	23	45.7	30.8	32	44.4	37.6
Viewing subtotal	55	100.5	118.5	41	70.1	79.9
Fishing subtotal	27	58.7	73.3	37	57.8	64.2
On shore subtotal	35	136.9	141.9	26	105.6	94.8
In boat subtotal	47	49.4	44.8	52	43.6	47.6
Grand total	82	86.7	107.2	78	64.3	72.7

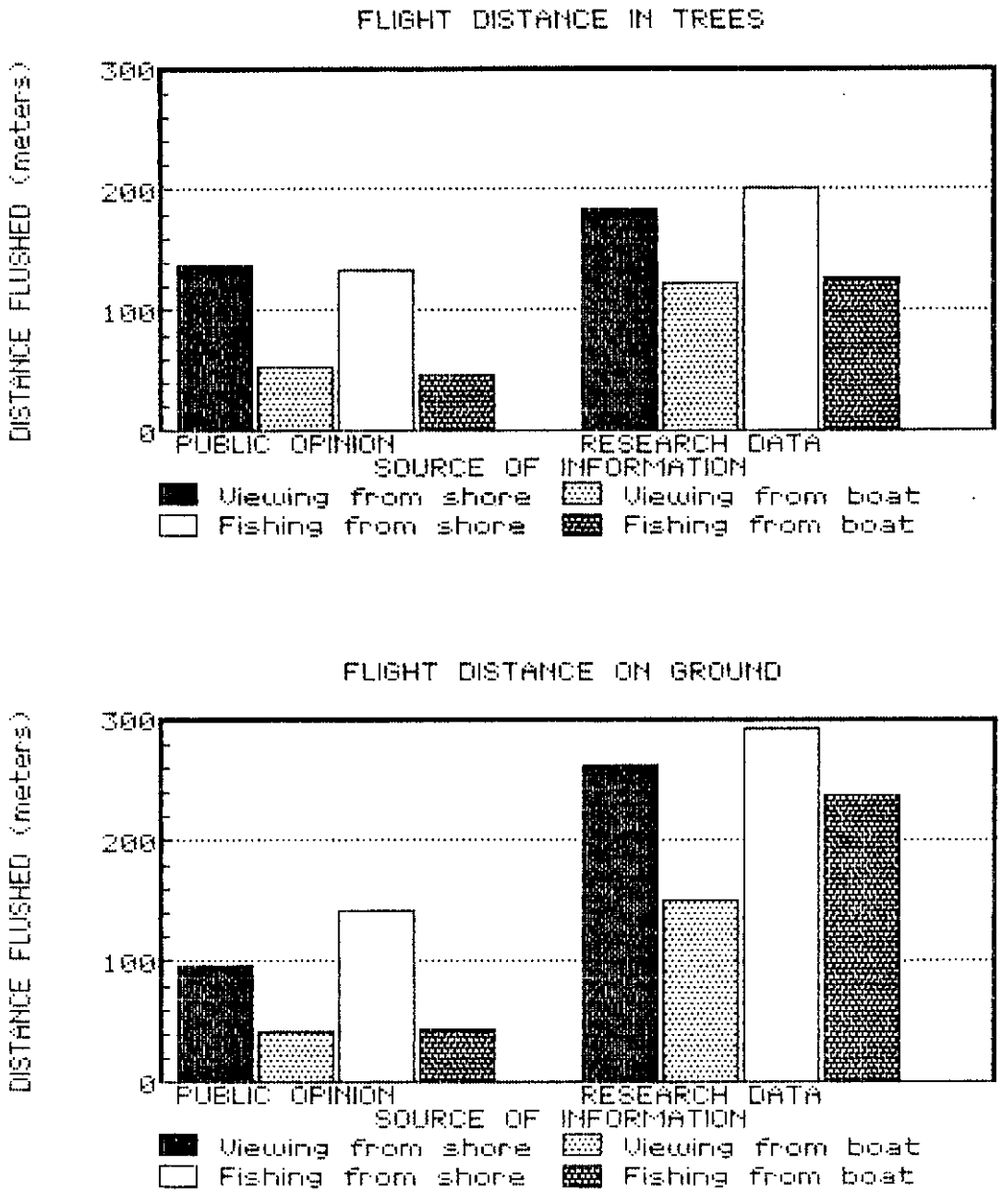


Figure 89. Comparison of the flight distance (distance at flushing in meters) of eagles perched in trees (upper) and feeding/standing on the ground (lower) between what the public perceived and what the research data indicated.

Table 146. Distances (meters) that recreationists perceived eagles flew after flushed by their approach (avoidance distance).

User Group	Eagles in Perches			Eagles on Ground		
	n	Mean	SD	n	Mean	SD
Viewing from shore	15	80.7	117.3	8	30.5	65.2
Viewing from boat	24	79.3	129.9	13	47.1	48.6
Fishing from shore	6	87.4	110.5	5	68.3	64.6
Fishing from boat	20	72.0	91.4	17	34.3	43.5
Viewing subtotal	39	79.8	123.6	21	40.8	54.5
Fishing subtotal	26	75.6	94.0	22	42.0	49.5
On shore subtotal	21	82.6	112.6	13	45.0	65.1
In boat subtotal	44	76.0	112.8	30	39.9	45.4
Grand total	65	78.1	111.9	43	41.4	51.4

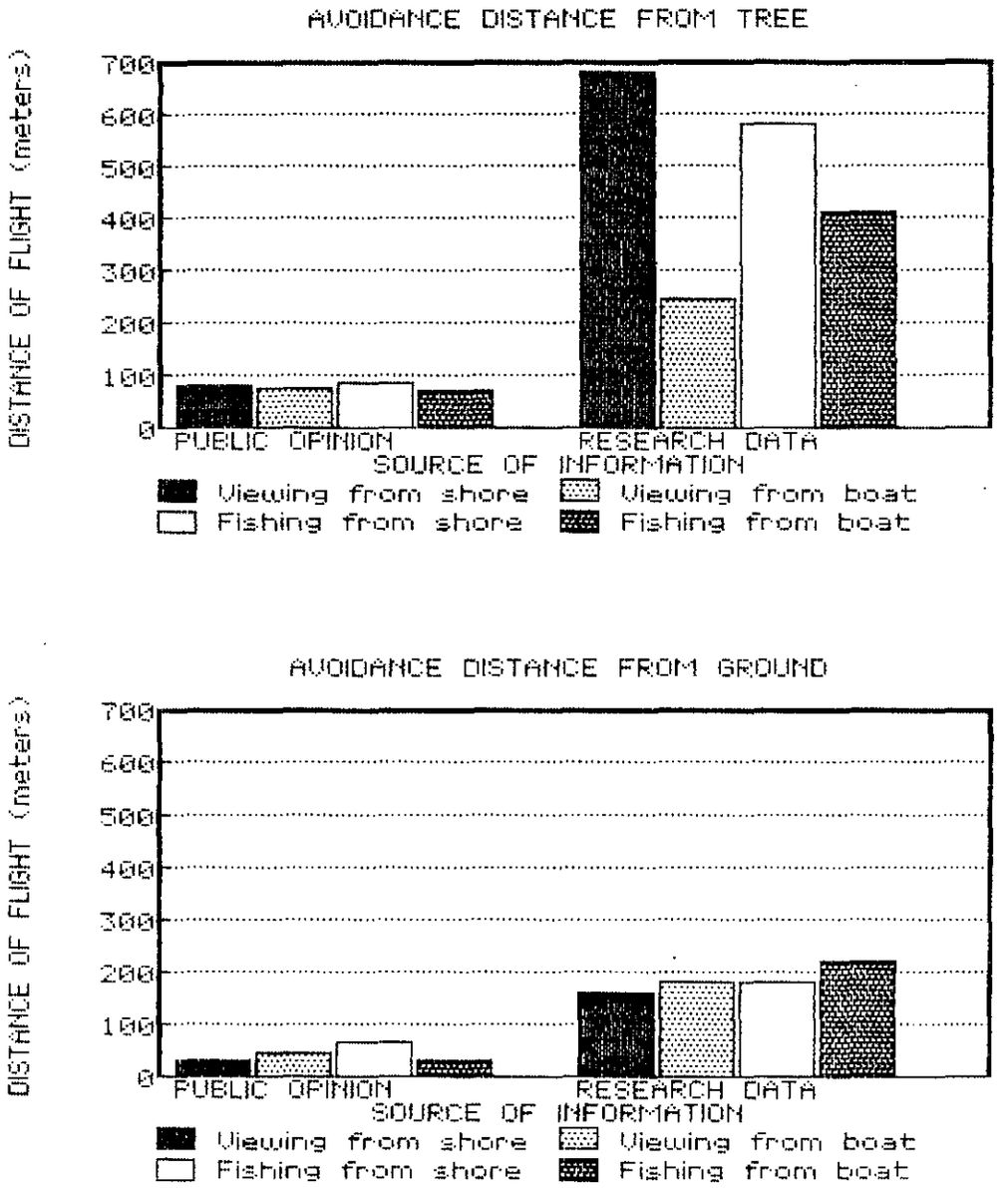


Figure 90. Comparison of the avoidance distance (distance of flight after flushing in meters) of eagles perched in trees (upper) and feeding/standing on the ground (lower) between what the public perceived and what the research data indicated.

Table 147. Ranking of the degree to which recreational activity is perceived to cause eagles to fly away and/or to stop feeding by both eagle viewers and steelhead fishermen, in order of degree of disturbance.

Type of Activity	Eagle Viewer (n = 228)		Steelhead Fishermen (n = 129)	
	Shore	Boat	Shore	Boat
Helicopter flights	2	2	1	1
Motorboating	1	1	2	2
Eagle viewing from boats	3	5	4	4
Hiking along river	6	4	8	3
Rafting	7	6	3	6
Angling from boats	4	7	5	8
Drift boating	5	3	7	9
Canoeing or kayaking	8	8	4	10
Angling from shore	9	9	11	5
Eagle viewing from shore	10	10	12	7
Driving along river	11	11	9	11
Eagle viewing from road	12	12	10	12

Table 148. Extent to which eagle viewers believed specific recreational activities caused eagles to fly away and/or to stop feeding, ranked according to degree of disturbance (n = 228).

Human Activity	Eagles Fly Away/Stop Feeding			
	None	Sometimes	Often	Always
Helicopter flights	28	11	21	40
Motorboating	20	25	32	23
Drift boating	40	36	21	2
Eagle-viewing from boats	41	32	25	2
Angling from boats	42	34	21	3
Hiking along river	42	37	19	2
Rafting	44	32	22	2
Canoeing or kayaking	46	36	17	1
Angling from shore	48	37	12	3
Eagle-viewing from shore	50	40	9	0
Driving along river	57	30	11	3
Eagle-viewing from road	63	32	5	0
Mean	43	32	18	7

Table 149. Extent to which steelhead fishermen believed specific recreational activities caused eagles to fly away and/or to stop feeding, ranked according to degree of disturbance (n = 129).

Human Activity	Eagles Fly Away/Stop Feeding			
	None	Sometimes	Often	Always
Helicopter flights	37	24	25	14
Motorboating	38	43	13	6
Hiking along river	50	35	13	2
Eagle-viewing from boats	51	36	10	2
Rafting	52	34	12	2
Angling from boats	54	36	9	1
Angling from shore	55	38	6	1
Eagle-viewing from shore	57	36	6	2
Drift boating	57	36	6	1
Canoeing or kayaking	58	31	10	2
Driving along river	64	28	7	1
Eagle-viewing from road	66	30	2	1
Mean	53	34	10	3

Table 150. Opinions of visitors viewing eagles concerning possible management actions to reduce conflicts between eagles and recreationists, ranked according to the most support.

Management Action	Percent (n = 247)		
	Oppose	Neutral	Support
Develop eagle interpretive displays	11	10	80
Limit boating to certain hours	14	22	64
Post more regulation signs	20	23	58
Limit boats to certain river stretches	17	25	58
Use river-rangers to enforce rules	18	25	57
Reduce or restrict boat fishing	23	24	53
Reduce or restrict rafting	36	18	46
Prohibit camping	35	21	44
Provide more parking facilities	34	25	41
Develop hiking trails along river	51	10	38
Reduce or restrict shore fishing	36	26	38
Reduce or restrict canoeing/kayaking	40	23	36
Reduce boat launch facilities	35	40	26
Reduce or restrict shore eagle viewing	59	16	25
Enlarge boat launch facilities	54	33	13
Increase camping facilities	61	26	13
Mean	34	23	43

Table 151. Opinions of visitors steelhead fishing concerning possible management actions to reduce conflicts between eagles and recreationists, ranked according to the most support.

Management Action	Percent (n = 135)		
	Oppose	Neutral	Support
Develop eagle interpretive displays	22	37	42
Enlarge boat launch facilities	39	26	35
Provide more parking facilities	32	39	29
Increase camping facilities	37	35	28
Post more regulation signs	55	23	22
Limit boats to certain river stretches	69	10	21
Use river rangers to enforce rules	56	23	21
Develop hiking trails along river	48	31	21
Reduce or restrict rafting	52	30	18
Reduce or restrict shore eagle-viewing	65	21	13
Limit boating to certain hours	80	10	10
Reduce or restrict canoeing/kayaking	60	30	10
Reduce or restrict boat fishing	84	7	9
Prohibit camping	75	19	6
Reduce boat launch facilities	84	13	3
Reduce or restrict shore fishing	91	8	2
Mean	59	23	18

Specific Opinions on Potential Problems.-- Interview participants were asked to write specific comments in regards to three questions concerning possible conflicts and problems on the river, on their suggestions for protective management of eagles, and any comments in the general context of the questionnaire. Opinions are subdivided by each year and the four main groups of river users; numbers preceding each comment is the reference number of the questionnaire.

COMMENTS - CONFLICTS BETWEEN USER GROUPS

If interviewees stated that they thought conflicts were occurring between different groups of river recreationists, they were asked "what conflicts existed between which groups?" (Note: Comments not edited)

Comments of Eagle Viewers on Shore:

1985-86

10 Motors boats and eagle watchers; motors scare birds

45 Boat anglers and eagle-watchers. Saw or heard two occasions of guns being fired from boats which scared eagles away. Don't know what they were shooting at. Also boats with motors were very noisy.

69 Motorboats too loud

72 Eagle watchers--motorboats; loud motorboats scaring off eagles

77 motor boats and eagle watchers and eagles; noise frightens eagles away

79 shore eagle watchers and boaters; it is distracting to both watchers and eagles to have a power boat moving on the river at this time of year

107 Eagle watchers -- motorboats; noise disturbance of power boat motors

134 the noise of boats disturbed me I think the eagles

265 Shore Eagle-Watchers and Boaters in general; too much water activity! It just has to disturb the eagles.

279 Eagle watchers and motorboats; We were advised not to walk even out on the river bars for fear of disturbing the eagles but I feel that motorboats zooming up and down river were more likely to disturb the eagles than people quietly sneaking up just to get a view. Eagle watchers and fisherman. I feel that fishing should be prohibited at least during the morning and evening hours when the eagles feed. Any people on the shore or in the water will disturb the birds wanting to land and feed.

1986-87

25 motorboats and eagle watchers scare the eagles away

27 shore eagle watcher & boat anglers; boats travel very fast upstream--very high noise factors--they also generate a considerable wake (some, not all)

117 boaters and eagles; the boaters disturbed the feeding eagles by cruising by when feeding (before the 10am time limit)

158 shore eagle watchers and power boaters; power boaters scared away eagles eating on shore.

187 shore eaglewatchers and boaters; the boat people scare away the eagles

210 people with loud motor boats vs. everybody else; the motors are loud and obnoxious to everyone: the other fisher people, the eagles, the eagle watchers, the rafters on shore or on water

232 motorboats/boaters and shore eaglewatchers; noise pollution of motor boats and congestion of boaters on river overall inhibit quiet viewing

250 Noise from river boats (motor powered) seemed disturbing to bird watchers

257 Some fishermen scared away an eagle on a sand bar that we (women) and another group were viewing

258 motorboats & eagle watchers; motor noise scaring eagles away

284 shore watchers & boaters; boaters would get out of boats near eagles, possibly interfering

299 Shore eagle watchers and boaters; BOATS MADE EAGLES LEAVE

316 shore eagle watchers and boaters; boaters frighten eagles on or near river banks, bars.

318 didn't see any today; boaters tend to be boisterous, scream a lot, may bother shore people or birds

320 shore eage watchers and boaters; boaters scare eagles off, making viewing difficult. Ruining photography.

343 motorboats conflict with nature watchers

344 (No) Because I/we didn't see any fisherman in boats or on shore

365 road eagle watchers vs. locals thugs

381 eagle watchers & kayakers; kayakers in refuge. Kayakers had beached their craft in refuge

399 No one was on river

461 boat anglers and eagle watchers; motor fishing boats, I believe, disturb the serenity eagle watchers prefer and also disturb the eagles.

489 shore anglers and eagle watchers

Comments of Eagle Viewers in Boats:

1985-86

56 Motor Boaters and all other groups; Motor Boaters, scared Eagles away Detracted significantly from peace and quite

73 Eagle watchers and Motor Boats; Motor Boats flushing eagles

74 eagle watchers and motorboat-fisherman; motorboat noise

85 motorized and non-motorized boats; noise, waves

112 Motor and Paddle boats; Motors are inappropriate and dangerous in the eagle stretch of the river

114 Canoeists and powerboats; Powerboat offends canoeists. We wonder about disturbing eagles.

115 Motorized boats and non-motorized; Motorized boats are very noisy and detract from scenery

133 Motorboats and canoes; canoist were quiet watching eagles; and loud motorboats disrupted that

174 Motorboats and everyone else; noise; conflict betwn. fishers w/motor/jet boats and those using drift/paddle boats.

251 Canoe vs motors vs rafters; Canoe and rafts wish to experience a quiet river - drifting and viewing - motorboats too noisy, smelly

293 River rafters/fisher people; Put-in and parking space

294 boat anglers and boat eagle watchers; shore eagle watcher's boaters; Anglers and rafters get into each others way on the river; shore watchers and boaters watchers seem to walk in and try to get better view

1986-87

90 Every one was very Nice.

99 Power Boats/non power boats; The jet boats are loud & seem to disturb those in rafts, kayaks, canoes & the eagles. These boats also are not always driven safely

166 There is some resentment of motor boats by Rafters because they are noise and smelly

470 none apparent from our river journey. It appeared the different groups represented coexisted peacefully.

493 Fishermen with motor boats. I wish that motors would not be allowed.

Comments of Fishermen on Shore:

1985-86

219 Shore Anglers and Motorboats; to noisey

241 shore anglers, boat Eagle watchers; share of the fishing holes and respect of the angler fishing

274 Jet power boats and bank fisherman; jet power boats crowding bank fishermen

1986-87

81 (No) There are always a few jerks who don't act responsibly in any group regardless of the posted regulations.

167 Power Boats floaters, power boats blast up river noise & sudden movement scare eagles

173 motor boaters & eagle watchers; there was loud boats racing up & down the river -- dirt bike racing on the shore -- was disruptive to natural setting & I believe to the eagles

201 motorboats extremely noisy, although motorboats slowed when going through groups of rafters...could hear motors a long time coming and a long time going!

204 motorboats and floating boats (Both anglers and eaglewatchers) Noise of jet boats is extremely irritating -- Some had come up river almost to Marblemount.

207 motorboats and most others -- aesthetic considerations

326 Group on island gravel bar (boaters) had fire going and a dog loose -- no eagles in vicinity (naturally), I feel this activity should be limited to the lunch stop area.

330 Between motorboats and all others; Motorboats scare eagles, created unsafe wakes, and created noise.

349 Boat anglers & shore anglers; motor boats & everyone. Shore anglers have limited access; boat anglers should respect the water, the shore anglers, fish & vice versa; motorboats disturb the natural setting

354 Motor Boats and Shore Fisherman; The noise caused by both the car's and boats

363 (No) Legitimate User conflicts are not between groups. They exist, rather, between individuals, at least one of which must be ignorant or disrespectful of the other's needs. Primary offenders: Power-boaters, novices, + summertime drunks. Commercial trips are also suspect, due to preponderance of novices.

423 Boat Floaters & Anglers; Noise from Boat Anglers' Motors

498 Motor boats should not be allowed in prime eagle viewing sanctuary areas.

500 powerboats are a little obnoxious

Comments of Fishermen in Boats:

1985-86

66 Fly Fisherman and Boon doggers; Fly Fishing on wrong sections of river

186 Between boat anglers and boat eagle watchers; crowding at boat launches, both for parking of vehicles and launching boats. Fishermen do not like to see boats full of eagle-watchers go through the fishing holes ahead of them and spook the fish.

286 Eagle watchers in rafts float over fishing water instead of easily floating around it.

1986-87

9 (No) I beleive that if you want to watch the eagles, or catch fish, you can do both together. We have been fishing long before anyone started watching the eagles

15 (No) The eagles are Fishing. The Boaters are Fishing. Eagle watchers are not and it bothers them. Because of the

people. Groups from the city don't know the Facts. The eagles are our pets like people and there dog and cats at home.

32 (No) The only conflicts that I saw, are that between the dip (expletive deleted) handing out this questionair and the reasoning behind it

48 The Nature Conservancy & my fishing group; TNC told us we were on private property, (theirs) we could not get out of our boat to shore fish and they own all the land between Marblemount and Rockport which is totally untrue, (ie. Johnson River Ranch)

162 (No) no reason to be any

198 Stationary boat angling/drifting boat angling; Drift boat anglers not respecting area being fished by anchored boat fishermen. Passing over "hole" and cast lines

435 Those floating river vs. jet sleds; those operating jet sleds did not appear to yeild to drifters - acted with no regard to safety, i.e. running full throttle to close to non motorized smaller craft.

Comments of Other River Users:

1985-86

8 landowners--eagle-watchers; shoreline usage

106 motor boats an bank fishermen

1986-87

44 State boat running motor for no reason

103 Landowners & shore anglers & eagle watchers - I'm a land owner. Litter (both groups); Tearing up Roads (eagle-watchers); Preennial Problems of Shore Fishers & Drift & Motorboats in drifting in holes. I think some Eagle watchers want to make Boat Fishermen into orgres. They don't scare Birds any more than Drift Watchers. Lot of "Feelings" Little overt "Conflict."

152 Indians and fishermen; the Indians are depleting the Salmon and Steelhead Runs

298 (No) Number of boats & rafts at times designated restricted, in eagle wintering areas that stopped to view eagles

? eagle watchers & kayaker; large kayak group had beached and built lunch fire against regs.

COMMENTS - ENVIRONMENTAL DAMAGE

If interviewees believed that the river environment was being degraded by recreational use, they were asked "what kinds of environmental damage were occurring?" (Note: Comments not edited)

Comments of Eagle Viewers on Shore:

1985-86

24 litter

33 dogs doing their bathroom duty along the roadside areas and quite some amount of litter in these areas also

45 noise pollution, litter, general degradation of the area due to ignorant or uncaring individuals

78 Noise from fishing boats disturbs eagle watchers

82 I feel I did not see enough of the river environment to come to a conclusion-perhaps viewing from a boat would have helped conclude.

97 road ruts and garbage

134 A gunshot was fired from the location of a resort

159 litter

184 If people are scaring the birds, it would be damaging.

256 There are too many boats on the river and trash along it. Motor use should be prohibited and rafting greatly restricted in the eagle area. (visual damage and trash)

265 Too much human activity will eventually destroy this area for the eagles.

279 Anywhere people go, the environment will be damaged to some extent. We picked up little litter along the road. That is always a problem - along the road and shore and in the river itself. Also pollution from motor boats - it may not be a problem now but it will in the future. Also, having no toilet facilities in such a high-use area will eventually become a problem.

1986-87

25 number of eagles less because salmon population less due to fishing

45 BOATING!

77 That much boat traffic/people traffic cannot help but impact the river--to what degree I do not know.

83 vandalism/noise of motors

105 trash & garbage

117 only the noise of boat engines before the specified times

122 (No) not from this site

140 noise, boats, pollution (air & litter)

158 Litter

161 Trash is being left behind by viewers

164 Fast more boats frighten eagles & other wild life & pollute the river and air

183 shoreline littering, roadside littering

184 Getting to be to many people; it is going to get worse

186 power boats disturbing birds

187 Trash from Boaters and they should not be allowed to beach to frighten birdlife and erode shore.

188 motorboats are disrupting the peaceful environment

191 (No) not that I noticed

209 (No) not from what we saw & hopefully it will never be damaged

232 Noise & traffic pollution. Thinning populations of birds & animals.

250 Probably. Environmental damage has to become quite extensive before it is obvious. The area is getting quite a lot of use so some damage seems inevitable.

257 but I don't know what it looked liked before it was being used for recreation.

273 ruts in soft ground at picnic areas etc.

284 pollution, trampling of vegetation

299 LITTER!

312 I noticed that boats & rafts disturbed some of the eagles.

318 Didn't see any today. Fishing line tangles & hooks are dangerous to animals--may entangle or hook mergansers, eagles, & fish--I have seen bodies in them in other areas; boaters should take more care not to scream when near eagles

320 Litter on shore line.

336 Garbage

338 (No) Not that was visible at this time.

343 noise pollution (for wildlife & human life) due to motoring fishermen

344 Anytime motorboats are on river there is environmental damage--i.e. gas pollution of river, air pollution, noise pollution. Although I'm a fisherman as well as an ardent environmentalist it's unfortunate but shore fishermen do litter -- so there's also pollution

373 litter

381 impact on feeding & nesting eagles by boaters

383 Litter along river banks

390 Jet boats -- Too much noise & motors are just as good.

399 garbage on shore & banks

445 I would say primarily that of trash and garbage.

452 (No) having only been here once I don't feel qualified to determine what effect recreational use has on the eagles.

461 motor boats scare wild life -- erode shoreline -- pollute river -- eagle watchers need to be respectful of the environment

462 (No) Except litter

466 Motor boats -- noise & chemical pollution effecting eagles & river

468 garbage on shore. A lot of fishing line on rocks (animals could get tangled)

Comments of Eagle Viewers in Boats:

1985-86

17 disturbance to eagles

50 some evidence of pollution - saw bottle floating down river

63 the use of motorboats in the eagle nesting area

74 noise pollution

88 noise pollution by jet/motor craft consequently disturbing the wildlife.

92 Any amount of garbage in or along the river disturbs me - and I always find some.

111 Motor boats make too damn much noise which ruins the tranquil pleasures of a quiet float along the river.

112 Noise pollution from the motor boats

133 noise damage from boats

171 Power boats "Noise"

174 Don't know

223 We saw a large amount of waste plastic, "littering"

249 human activity preventing eagles from feeding

251 Litter, oil and gas leaks

277 pollution - wastes, cars

293 Bald eagle populations on the river have dwindled dramatically since I began commercial trips there (1979)

294 Noise pollution from the outboard motors; impact on land from people landing on shore

1986-87

46 "Trail Blazing" (No marked foot trails of Do Not Access Signs. Need Foot Trails "Marked"

159 Only because of litter left by fishermen (beer cans etc) or campers

166 litter in river -- noise pollution by motors oil & gas pollution in river

167 I'm not certain but, power boat disturbing eagles? I don't know how fragile eagles are.

173 the disruption of the eagles

201 (both yes and no) No - Float trips are low impact and increase river awareness. Yes - Motors on the river are a nuisance

207 All use does some damage but this needs to be kept in perspective; it is a dammed river. Water and air pollution, noise pollution, and impact of human presence on wildlife.

218 Eagle disturbance from too many rafters

241 excessive number of people disturbing the eagles

254 shoreline damage

269 only from the hiway being close to river, as for quiet, small groups of floaters, there is a positive impact (as in taking out extra litter, reporting hazards or other problems)

325 Maybe but can't say for sure since it's my 1st trip on this river

330 Noise from motorcraft

331 Need of Toilet Facilities

356 only out of boat for lunch - some (not extensive) evidence of litter on shore.

429 trash on site road noise pollution

430 (No) Note: I saw nothing -- and I am sure there are inconsiderate people who don't care.

463 disturbs eagle habitat & patterns - reduction of fish runs

470 noise pollution, stress upon habitats and wildlife from human encroachment and use

493 People don't care where they walk or if they disturb things

497 garbage left on shore

498 noise disturbance (motorboats)

500 everything looked pretty clean

Comments of Fishermen on Shore:

1985-86

145 Pepole dumpin brush along shore so when river come's up they don't have to look at it

274 Power boats, noise, bank errossion over fishing for to few fish

1986-87

28 people throwing their garbage all over

41 Litter, beer cans etc

81 Only somewhat! There is more garbage and debris laying around.

349 littering & disturbing wild life; poaching of wild/native steelhead

448 Litter and vandalism

503 If the motorized boats I saw at Steelhead Park continue farther up the river, there will be problems w/birders and the eagles will be disturbed

Comments of Fishermen in Boats:

1985-86

29 only environmental damage is caused by indians commercial fishing river

62 litter, some pollution, modifications of the land for human access and recreation, noise, human intrusion

132 Too much human presence for birds and mammals.

186 Pollution of the water by garbage and by boat motor oil and tons of litter along the banks of the river and along the highway.

247 Garbage - Styrofoam Containers

272 Generally not - but there should be some limits on #'s - especially the upper river.

286 Too many people eagle watching from shore/raft

297 Garbage being dumped or thrown into the river - sewage waste in river, mainly below Nookachamps near Burlington

300 Noise pollution of loud outboard motors

1986-87

8 litter is a constant problem

73 To much noise from Jet Boats

112 Garbage on the parks, ramps & river banks are still a problem.

141 Yes - by down stream fish netting

475 1. Littering 2. Found abandoned drift net used to poach fish along with canoe hidden by bank of river

Comments of Other River Users:

1985-86

8 more littering and destruction

94 disturbing eagles and Indians taking salmon, the primary eagle food.

1986-87

103 What about industry & agriculture, road & shore use. Litter is big one. People get on Back Trails and Tear (Expletive Deleted) out of em. But all-in-all the effect is little - Most People are pretty good. Effects of Industry and Agriculture are much more impacting. Why not ask about that?

152 Litter

298 Possible harassment of eagles by rafters -- not boaters -- which seem to disturb birds more than boats.

474 There seems to be many camper trailers & campers along the south side of the river between Rockport & Concrete & I wonder what they are doing with thier refuse, as some of them appear to be almost permanent residences

COMMENTS - EFFECTS TO EAGLES

If interviewees believed that recreational use was adversely affecting bald eagles on the river, they were asked "what specific problems were happening?" (Note: Comments not edited)

Comments of Eagle Viewers on Shore:

1985-86

23 Motor boats disturbing eagles

44 Noise is disturbing

45 Boat anglers and Eagle watchers. Saw or heard two occasions of guns being fired from boats which scared eagles away.

68 Time limit for boating; no boating between 8:30-11:30 am feeding time for eagles

75 Heavy boat fishing

79 It would appear that the eagles are upset by the power boaters, but not to much

97 no eagles on Mondays after excessive flushing from boats and shore on weekends

134 the shooting caused the eagles to leave the area

159 Nothing specific. Mankind generally has an adverse affect wherever we go

161 some people don't know that their noise and by going out into the gravel bars for a closer look disturbed the eagles

183 very slight though

184 no, but I could see how it could happen w/noise and garbage, etc...

256 No, but the boats do go very close to the eagles and if one boat stops so do several others. This seems to make the eagles nervous.

265 Too many humans! Develop specific on shore view points for eagle-watching and leave the balance of all land and all the river for the eagles

268 seems to scarring them

279 I don't know any specific facts on the problems but I'm sure they exist.

1986-87

45 The recreational boating is a hazard to the bald eagle.

120 don't know of specifics other than the presence of people cannot have a positive effect

127 (No) not from what we saw

136 I think it is well controlled

140 people frightening birds

158 Power boats disturbing feeding

184 The public could be a bit more concerned with the wild life

187 Just that if eagles keep being frightened they won't come back

188 the motorboats we heard scared the eagles that we were watching away.

209 I would think that the number of rafts in the river would affect the eagles if it is like that continuously during the day. we saw 10+ rafts in roughly 2 hours.

232 Its obvious the birds aren't going to hang around the noise & traffic areas.

250 It is my understanding that their feeding is being disrupted.

271 I'm sure they were happier before two leggeds came.

284 Don't have any idea, but I would imagine they'd prefer to be left alone.

299 Birds are disturbed by Boat motors as well as small children and/or dogs being "exercised"

316 floaters i.e. boat fishermen & rafters & canoers interfere with bald eagles' use of river banks & gravel & sand bars

318 (No) didn't see any

320 Birds are spooked easily.

336 Need for patience and being quiet. Driving slower.

338 Too much advertising & too many raft trips.

342 (No) But I am not knowledgable enuf to be a good judge

343 Boats (motorized & otherwise) should be restricted during eagle feeding time -- also limited (and possible fine) distance.

344 Probably. I know of no specific problems only that the eagles and their environment are very fragile and a surplus of humans can impact not only physically but psychologically as well.

364 Too frequent passage of float boats flushing eagles; kayakers landing on feeding shores within the Preserve -- all observed today

365 rafts & fish boats scare the eagles

372 It seems that boats with motors would frighten the eagles

373 an increase would be a problem

374 I don't know

381 Human pressure disrupting normal habits.

383 Rafting and Boating scares the Birds

390 Jet boats

399 boats should be banned from shore depending on no. of visitors, blinds & fences might be advisable

445 It would seem to me that the large amount of people floating the river would be causing the eagles to go some place else to do their fishing

446 The people seemed to respect the eagles.

449 Nothing to base an opinion on

461 Not sure about this, but I imagine too many people out on river eagle watching - being noisy, etc, could effect the population of eagles on river

468 motor boats during feeding time. observation boats close to opposite shore during feeding time.

Comments of Eagle Viewers in Boats:

1985-86

? They move off the rivers edge - too many boats try to get close to them

2 Eagles are being distrubed by to much river activity

17 too much activity thus birds normal activities are interupted

56 Motor boats scared eagles away

63 The increasing traffic on the river must be making the eagles nervous

73 Eagles feeding is disturbed by boats

74 disturbance: feeding displacement, greater movements

88 Noise pollution inevitably disturbs the eagles. Note: I feel little disturbance is caused by drift/paddle craft.

114 Perhaps on weekends when human traffic may be high

135 Don't know if anything specific; however the numbers of eagles we've seen have dropped in the past several years

137 possibly too many motor boats - however I was on the river when the activity level was elevated

174 Too many float trips and motorboats and fishing in area that is restricted

190 dogs

248 motor noise

249 human activity preventing eagles from feeding.

251 Noise - scaring off feeding eagles

277 How could it not? Though I don't know enough yet to be specific

293 Bald eagle population on the river have dwindled dramatically since I began commercial trips there (1979)

294 Disturbing the Eagles with their presence; too many people.

1986-87

46 Boat traffic seems to spook them.

99 Only the noise of the powered boats

153 Hope not

166 Some Eagle watchers are noisy and scare birds, Motor Boats also scare Eagles

169 Only from extended use by large groups

170 We scared eagles eating a salmon on shore

173 the motorboats were disrupting the eagles feeding -- I feel motor boating should not be allowed where eagles are.

201 I can't believe that noisy motors improve the situation. Even float trips may be a compromise to habitat.

218 Eagles flying away from shore because of the many rafters.

221 Too many boats on river on weekends scaring eagles away

231 We saw so few -- are they gone because of people being on the river?

234 It is obvious that the eagles are very attentive to boaters and easily take to flight while eating

239 disturbing feeding

241 saw boats come near eagles on shore - feeding. Eagles became wary of people & flew away -- left food on bank

254 no idea

269 Declining Fish Runs, (although issues, such as, pollution and over logging are probably more to blame than Recreational Fishing)

292 Maybe

322 DON'T KNOW

325 Maybe - several large groups were seen stopped along the shore

326 (No) We always see quite a few eagles

352 Don't Know

354 Motor Boats and shore fisherman scare the eagles

356 I don't know...we saw plenty of eagles and the area is certainly not wilderness nor has it been for some time (i.e.

numerous farms, etc.). This surprised me as I expected that there would be little habitation (human) in an area frequented by eagles.

415 If the courtesy of being quiet and not throwing things are followed and spreading the boats out.

423 Noise from Both Watchers and Anglers

429 (No) did not seem to bother them

430 I am assuming this response based on some articles I read. They did not seem to even notice us -- just watched us as if we were nothing important.

433 Bird watchers in boats sometimes disturb eagles

463 too many people (fishing & eagle watching).

470 Increased flushing rates resulting in decreased feeding opportunities, unnecessary energy expenditure and stress.

493 Too much noise

497 keep them away

Comments of Fishermen on Shore:

1985-86

95 Boats run the eagles from the bars when they are feeding. All boats and rafts

241 Eagles are moving out of main areas of feeding to more seculded areas

274 power boats, noise, bank erosion over fishing for to few fish

1986-87

41 Uncertain in this regard.

138 I didnt notice any adverse affects. I estmate 25 to 30 eagles sitting in one tree close to where we fished - 2 hrs. I think they were watching us.

349 Can if the eagles are not respected & left undisturbed

437 PERHAPS TO MANY PEOPLE ON THE RIVER, SOMETIMES CAUSING EAGLES TO TEMPORARILY FLY ELESWHERE

503 I didn't see any where I was

Comments of Fishermen in Boats:

1985-86

62 Eagles are probably less inclined to feed in the presence of humans and will stay in the trees or move to an area with less people.

72 Probably some but have not observed any specifics.

1986-87

9 (No) I feel the Bolt Decision is having more damaging effect

32 (No) If no why - from what Ive seen the Eagles are not affected by any person using the river from shore or boat

73 I only saw five, the trip before I saw 60, there were only two Jet Boats.

91 (No) seems that there are more eagles around then a few years ago

135 (No) More Eagles now than 25 years ago

141 (No) Unless birds are shot at or unduly harassed.

Comments of Other River Users:

1985-86

3 not sure

8 Shore people disturbing nesting

94 only hearsay but feel that too many people are frequenting the Skagit river especially, consequently disturbing eagles. Have personally seen many motor and float boats at one time on Skagit as we drove past

106 get motors off river above Rockport

206 Motor boat or boat with motors shouldn't be use between Marble Mt. and Rockport and I fish the Sauk River mostly the lower Sauk River and there deffentely shouldn't be any (motor boat) boat with motors between the Gov. Bridge and the mouth of the Sauk joining the Skagit River, they do disturb the eagle, I have fish that river approx. 24 to 30 days each year for the past 38 yrs. Bank fishing.

1986-87

48 Motor boats should be banned from the river between Marblemount & Rockport or at least a horsepower limit (20 horse or 35 NPW or less). The motor boats disturb the eagles more so than the people, also not to mention damage to the (natural) river habitat for different fish species.

103 (No) Haven't observed any specific Problems, disturbance, or Hampering. Most people are pretty protective of the Birds.

298 Possibly clearing of shoreline of natural roosting, etc. Building of homes & cottages in now undeveloped area. Not really from present recreation use

COMMENTS - MANAGEMENT ACTIONS

Interview participants were asked to write specific comments on "what management actions they believe would be most helpful to prevent eagles from being disturbed?"

(Note: Comments not edited)

Comments of Eagle Viewers on Shore:

1985-86

? Area visited seemed quite adequate for viewing, did not encourage any other eagle watching.

4 Keeping off road vehicles out of the area. No outboards or boats in eagle areas.

10 Ask people to remain at roadside and not go down to river edge or in woods.

11 Keep motor boats and cars at a distance.

12 No commercial float trips, no power boats, view only from roadside.

15 Limit areas of access to river, limit types of access (motor boats, cars). Increase educational displays and posting of regulations, develop areas where people can see eagles with least disturbance.

23 Restriction on boats with motors, did not see float party so cannot judge, but imagine noisy group would be just as disturbing as motors, but would not like to see them prohibited

24 Good pamphlets explaining habits of eagles such as: feeding time, feeding materials, perching, etc...and how visitors should conduct themselves.

25 Move information on eagles and what to do to prevent from being disturbed.

30 I saw no evidence of harassment by viewers. Most of us were senior citizens. The young men I saw were interested only in photography. I would hope that with education of public it will be possible for people to continue to view eagles

31 Not allowing people to approach to close to the eagles. We mainly saw them from across the river except one who flew

across to the north side by the road to the top of a big tree and sat there while many people walked from their cars to see him and photograph him.

33 Keep people out of nesting areas and perching areas across the river from the highway 20.

44 No boats on river until eagles have fed in morning.

45 Reduce motor boat use on river. Restrict guns on river.

46 We heard shooting in the area which was probably disruptive to the eagles.

68 More education to the public, how to view them, what is best time to see them without bothering them.

72 Viewpoints with blinds away from cars and road. Signs that give info about eagles and how to not scare them (ex. Don't wear red and scream). Limit use of motorboats. Habitat preservation, nesting and perching sites.

75 Control heavy boating on rivers, both fishing and recreation.

77 Restrict noise from boats and limit rafting

78 1. Eliminate helicopters and small aircraft low altitude flights 2. Better signing at viewing areas. 3. Permit system for boats and rafts if traffic is heavy

79 The use of power boats of all types should be restricted upstream from the bridge at Rockport during the winter months

80 I do not know.

82 Provide lots of trees along river suitable for bald eagles to perch in and to feel protected; provide cover along river so eagles are able to feed without being disturbed by people in boats getting to close to them; post signs to designate areas for viewing, and of possible hazards to bald eagles if people disturb them

97 Boating of any kind should be prohibited on weekends until after eagles are through feeding in the morning i.e. until after 10am

107 Limit different boats to different river stretches

134 Noise abatement - motor boats - firearms

159 restrict activities during times when eagles are present in great numbers (Jan-Feb?) eliminate motor boats completely increase educational signage

162 You tell us! Are there huge noisey crowds on some days? If so, shoot 'em!

183 limit river access

184 stop motor boats and/or rafters (cut down noise)

188 control number of rafters and floaters

195 More signs about the eagle and there habit.

196 I can't answer this question as this was our first time to view the eagles and only one other couple was there and one on river

221 Perhaps allow boating and rafting, but motors not to be used in certain areas i.e. Rockport to Marblemount. (may not be practical however!)

237 To prevent the eagles form being disturbed you should restrict any motor craft from the river i.e. motor boats, helicopters, in order to allow people to still see the eagles I would like to see a trail system establish with an interpretive center at the trail head, with information on how not to disturb the eagles and why

256 close the river to boating or greatly restrict boating from Rockport to Marblemount

265 reduce human infrigement into this unique eagle wintering area. keep the area for the eagles

279 no boats during eagle season prohibit fishing/ boating/floating of all kinds during the feeding hours provide more parking prohibit people walking out to the shore or bars at least during the feeding hours if not always post the rules and regulations inform the public and enforce these rules

1986-87

77 Develop eagle interpretive displays at ranger station. Develop hiking trails along river. Trails along the river would be difficult to build, maintain and protect from high water. Several access points to sand and gravel bars permit reasonable access.

105 Restrict netting

142 From this visit I am ignorant of some of the current regulations. I've canoed and camped in this area several years ago. At this time I don't know what the restrictions are so I can't say increase or decrease.

164 Keep motor boats off river particularly at high speed. Kayaks and rafts OK if occupants keep still. I watched eagles through binoculars. They observe every movement of people, boats or cars on road -- but flew only from motor boats.

187 There are better things you can do with your money (other than use river rangers to enforce rules).

191 Limit boating to certain hours or not allow at all. Limit boats to different river stretches or discontinue boat usage in eagle areas.

271 Provide more parking facilities only if situated a walk away from view areas. Car doors slamming startle then -- I think they come first.

272 Develop hiking trails along the roadside

318 Prohibit camping close to river; Increase camping facilities away from river

336 Off River Facilities

338 Educate people (using) Rangers and inter. displays

344 Reduce/restrict eagle viewing on shore by creating hiking trails on certain stretches which could camaflauge human presence and use River Rangers!

374 Anything that would protect the eagles

390 No jet boats

399 People should stay on road and parking area. Increase camping facilities if put in right place so that eagles are not disturbed.

466 Bar any development along river such as campsites for R.V.s, buildings, grills, ect. Access only on hikeing trails and strict off trail restrictions. The Eagles have few areas, the boaters, campers, fishermen have many. What ever is done should be decided in faver of the wildlife.

468 permanent photo/observation blind, requiring permit for use.

482 Eagles should come first!

Comments of Eagle Viewers in Boats:

1985-86

? Reduce number of boaters. Mandatory 10-3, post Illabot slough to no boating.

17 Limit number of raft trips, restrict motors boats, educating as to danger to eagles, restriction on planed, studying and possibly limiting fishing-study.

50 don't know.

56 Limit number of people, limit number partys per day, limit boating or exclude. Make signs to ask people to be quite or stay at a distance from eagles.

61 none

63 Limit party size drifting down river, limit power boats in prime nesting areas, more info on eagles - what not to do around them.

73 Limit time of boat trips restrict motorized boats to certain portions of the river

74 minimize nest location awareness minimize morning floating activities

83 restrict launch times to limit impact as I understand is currently being done - education of visitors

88 Eliminate the use of jet/motor boats along feeding area of river.

92 enforce rules prohibiting boating during feeding times. No shore traffic in areas preferred by eagles - i.e. in sanctuary area.

105 Suggest to boaters to avoid coming too close to eagles - eliminate power boats. I would support restricted fishing if it could be done democratically. I think jet boats are the single biggest hazard and would restrict there to below Rockport or even farther; all users should be encouraged to stay away from eagles

111 Outlaw noisey motorboats; prohibit hiking along shores

112 I don't know enough about what disturbs them to offer an intelligent opinion. I doubt if other occasional users of the eagle stretch can offer any opinions that are worth anything. Money needs to be spent on a naturalist study - not on a public opinion survey.

114 No human activity on the south bank of the river.

115 Need to enforce rule that people stay in boats and do not land on shore.

133 no power boats

137 1. regulating number of vehicles on river/shore 2. regulating areas where motorized vehicles are allowed

156 Present educational actions leading to public cooperation are helpful

163 Forbid motorized transport on river

171 No motor boats, education on eagles at put in. A large sign explaining some of the problems

174 Restrict commercial activity during peak months when eagles are there; prohibit or reduce motorized activity on the river

190 Inform the public more about how nice the area is and what they really have

222 No motors - ground viewing in designated areas only - no stopping rafts or boats in sanctuary - have toilet facility on river at entrance to sanctuary - pass an ordinance to enforce rules

223 ?

225 Get rid of motorboats

248 no motors

249 shoreline activity restriction zones - not allowing any boats on river or people near river until after eagles feed in morning - position food in area where eagles cannot be disturbed. Insure adequate food for eagles.

251 restricting motorboats upriver of Rockport

268 limit time boats can get on river. morning hours left for eagles to feed. regulate number of boats bye permits. more signs.

277 the noise from the road especially trucks was very noticeable

294 (user) boating permits for commercial boats; restriction of hikers alongside the river bed; restriction of motor boats along a designated area, able to use bars, but no motor

1986-87

159 Provide more parking at a good launch above Marblemount (canoe) Limit motorboats to certain stretches

201 Enlarge boat launch.facilities at top of river

204 perhaps only certain # of boat/people per hour down river - with permits necessary for large commercial groups

218 Develop hiking trails along river if this will not disturb eagles. Reduce boat launch facilities if you reduce rafting too. This question needs to be rewritten it is ambigous. For example, if there is least impact on eagles by roadside watchers then make more parking facilities. If roadside watching affects eagles then don't develop them. Just to have us answer these questions, without giving us data gives answers to the survey question little merit.

241 Prohibit Camping During Eagle Seasons

283 restrict commercial raft use

326 Add toilet facilities @ launch site and lunch site (to reduce bank stops along the way)

330 shouldn't allow commercial rafting prohibit motorboats

352 boats w/motors, restrict

355 increase parking and add toilet at put in.

363 What kind of regulations? I distrust any U.S. Park Service "Police" mentality.

413 No conflict

419 Who will make determination of conflict? If it is determined a valid conflict exists we support regulations to minimize the conflict.

428 ban large engine power boats

429 save the eagles

430 no ideas

433 Reduce river traffic

440 Since I saw no problems, I don't feel a need for any of below changes

470 need for interpretation

498 Reduce or restrict commercial rafting

500 Use river-rangers to enforce rules occasionally

Comments of Fishermen on Shore:

1985-86

20 None. If the Skagit were a nesting area some restrictions would be appropiate, in a feeding area it would take a major change such as logging or a hotel operation to cause a problem. If are eagle leaves a food source due to a disturbance another will find it as soon as the disturbance removes itself.

21 none

37 I can't see where all the concern is. I've lived and fished on the river all my life and I can't see where people bother the eagles. I have come under the trees and the eagles are in with my boat and they sit right where they are.

42 I think the eagles are not disturbed by fishing or boating or drifting, but by gun shots or low flying planes or helicopters.

95 stop all boats with motors from the Rockport Bridge up river

122 Moter boats mainly - they fly over and perch near the camp ground - cars here do not seem to bother them

219 Restrict power boating along upper river: Concrete to Marblemount, to many (motorboats) for this stretch of river

233 None. Eagles have flown right over head while I was fishing; they seem to do their own thing without our presence disturbing them.

234 No problem

241 Eagle viewing at 2 to 3 points on the river that would be at a distance to protect the birds natural feeding grounds

274 no power boats on the river

291 more fish for feed

1986-87

28 Use river-rangers to enforce rules only if they know the rules. Increase camping facilities in areas away from eagle nests and to close to their feeding areas. Post more regulations and simplify the fishing & limits so anyone can read them and not be confused.

53 Leave as is, in other words

277 Open all areas to shore anglers

437 STOP NETTING OF CHUM SALMON & STEELHEAD TO PROVIDE ADEQUATE FOOD FOR EAGLES -- ALSO ATTRACTING MORE EAGLES!

448 Enforce existing regulations

Comments of Fishermen in Boats:

1985-86

18 Things are fine the way they are now. Specific designated areas for canoe and rafts for launching and picking up their equipment - these are hand loaded and in conflict with bigger water vehicles which are loaded on to trailers - traffic jam!

22 No yelling or screaming river users, most boating activity seemed to be regarded as routine river for the eagles.

29 none

38 It seems to me there doing good.

48 Develop unbiased surveys and observers.

51 No power boats above the Baker river during the months of eagle activity. Prohibit all netting of all fish on the skagit river - giving the eagles more fish to feed on, a hungry eagle is an unhappy eagle.

62 Prevent boating on critical stretches of the river, at critical times, but I do not advocate this approach. Limit the number of commercial eagle watching tours.

66 Plant more fish

67 none

93 none

132 establish times and areas when food is available so birds can feed unmolested

136 Power boats running up and down river

143 Leave them alone they are predators; they will take care of themselves. (protect from people shooting them)

149 I don't believe they are being disturbed

155 Management action is sufficiant

167 I have visited the river many times and have seen no

evidence of a decline in the eagle population. In fact in the last 10 years I would say the population has increased. The people pay to support recreation. I would ask you to have people buy a license so they could help support the eagles. This license fee would be charged only to eagle viewers.

176 Stop close up observation, injoy eagles as you float by or pass at a distance don't get as close as you can and stop witch makes them uncofertable

186 I believe the quantity of eagles on the river is more closely related to the quantity of available food than anything else. If you increase the available food supplies the number of eagles will increase also. I don't believe that mans presence or absence has much of an immediate impact on the eagles.

186 Establish seasons for eagle watching the same as fishing seasons have been regulated.

203 Allow salmon to spawn and die without netting of river. Eagles will stick around where food is. Logging helicopters are a bit much. Close up flash photography isn't comforting for baldies i'm sure.

204 The eagles have got use to the boats on the river, we don't bother them, we like to look at them if there feeding on gravel bars they might fly away but usually come back and continue eating. People walking up on them will scare the birds much more such as viewers photo sessions. The boat traffic just drifts by or anchors out away from weve been living with these birds long before it became popular to look at them.

214 can't think of any

218 keep hunters out

227 I believe that the eagles are not bothered any at all by the fishermen. They are just like crows and other birds they aren't bothered a bit.

242 none

254 less logging around the river

255 more fish

257 Interpretive displays that explain the need for people to keep their distance from the eagles particularly those that are on the ground feeding. People also need to be quiet when near the birds, large rafts full of people are not very conducive to this.

270 the eagles are never disturbed by anyone, or any boats. there is no problem with these birds being bothered in any way.

272 some feeding time restrictions on river use-viewing, boating etc...possibly in morning couple days a week or whatever is necessary; possibly some patrol work to deter people intentionally harassing eagles

286 too many regulations on river transportation already - please don't add more - little will help eagles - if they survive they will do it on their own like they have for years and years

289 stop commercial fishing in Puget Sound/more salmon to return to spawning beds for eagle food/don't put in trails that would really be destructive to eagles

292 I don't believe they are being disturbed

295 don't think this is a problem - if food is available and the bird is hungry - they'll eat

300 are they really being disturbed? if they are being disturbed, the obvious answer would be to restrict the disturbing activities during these times that the eagles are using the river. I believe that if the regulating agency promotes and develops the river in any way, it will create and increase management problems, and where will the money come from to pay for salaries etc? Promotion = regulations = park-like atmosphere.

1986-87

8 Seems contrary to enlarge, increase or develop anything if "conflict" is determined

15 If there is a problem - the boaters have been fishing longer than city slickers have been watching eagles.

30 Make sure they are not disturbed in there way of life

35 Fisheries Enhancement (Eagle Food) plus fishing

75 Again, I beleive that restrictions against human beings will not be useful in maintaining or increasing eagle populations. The key element is maintaining or increasing the chum salmon population - their primary food source in the winter.

114 Reduce Rain

129 Strongly support more enhancement programs with reduction in commercial netting on the river.

139 Litter Controll

141 Establish eagle shoreline sanctuaries and prohibit entry by humans. Boat viewing areas far enough away from perch trees or shore line feeding areas to prevent disturbing the birds.

162 viewing should be in small groups only developing hiking trails along river would bring in some large groups which I believe would be abusive no restrictions or reduction on boat fishing, shore fishing, shore eagle-viewing, rafting, canoes, kayaks; boating is usually during daylight only anyway anybody that goes out in dark is crazy don't limit boating to certain hours possibly post more regulation signs Don't use river-rangers as it would be extra cost to tax payers don't limit different boats to different river stretches Prohibit camping on bank keep camping facilities away from eagle areas

177 Prohibit the use of any part of the river that the Eagles are feading in. They will stay if they get plenty of food

200 There isn't any conflicts between boats & eagles

288 Reduce or restrict rafting in large groups

393 Driving motor driven vehical on river bank

435 Regulate the use of motorized water craft

459 I can see the eagles anytime I go up the river in my jetboat or drift boat to fish. They watch me - I watch them - we're doing just fine.

467 Let locally elected county officials regulate the resource --- not federal beaurocrat that is tranferred in & out of area with no feel or backgrond of the area.

475 Develop eagle interpretive displays only if not overdone I would restrict canoes and kayaks because they are not very safe on the river Didn't see very many people watching birds on shore (no need for restriction of eagle-watchers)

Comments of Other River Users:

1985-86

? Less netting of Chum, Silver, Pink and Steelhead by whites and Indian fisherman alike. It is a depletion of their food source. More fish, more eagles.

8 Set-up eagle wilderness for distant viewing and no

motorized vehicles.

53 For the biologists and hikers to leave the eagles alone.

94 restict strongly the number of boats and time in the strategic areas

100 I believe management actions to prevent eagle disturbances would be detrimental to peoples enjoyment of the river. I don't percieve any detrimental imparts to eagles from present uses of the river.

106 take motor boats off river

206 Restrict motor boats from Marble Mt. to Rockport leaving drift boat only because what 2 did observe was approx. 5 eagles that we drift right under or almost under the trees they were perch and they just look at us and didn't become uneasy with the drift boat.

1986-87

44 Leave it alone Keep the biolgist out of it

54 Reduce or restrict boat fishing from motor boats Limit motorboating to certain hours

64 The large numbers of eagle watchers per raft would seem more disturbing to eagles than fisherman 2 or 3 to the boat. As a fisherman and eagle watcher I've seen many eagles and most will just watch us to see what the fisherman is up to.

103 Add some boat launch facilities - Don't enlarge - Education about Impact - and What will Help - Be Quiet - Don't get Close - Don't Try to walk up to em - Understand What they are Doing.

414 schedule boats

474 Possibly prohibit camping

? How can I have opinions on all these from one brief eagle trip? My other visits have been in summer. I don't know how much fishing - boat launching - camping take place.

GENERAL COMMENTS

Interview participants were invited to write any comments and opinions they had regarding their experience during their visit to the river. (Note: Comments not edited)

Comments of Eagle Viewers on Shore:

1985-86

4 we went on a overcast sunday not too many people. Way more Eagles than what I expected. It was great! My Family and I went up to watch the eagles on a Sunday afternoon. I had read and clipped out an article in the Skagit Valley herald about 3 years ago. I had been meaning to go up river (Concrete-Marblemount) since then. But every year I remembered it to late in the season. The Friday before we went to watch the eagles I had a customer come in and tell me they were going to watch the eagles. So I thought I'd look for my article and take my wife and kids upriver so we could take some pictures with our 35mm camera. But I couldnt find the article. So we just drove upriver looking for them. There is a great need for signs or maps telling where to look for the eagles as we stumbled on to the eagle watching area by accident. We had a great time watching and taking pictures of the magestic birds. We saw probably 25 to 30 Bald eagles at that sight and probably 25 others along the way.

15 fewer eagles

24 Very pleasant viewing Eagles from distance

30 I was pleased that we saw Eagles both soaring and on the sand bar - though we were some distance. I enjoyed the one perched close to where we were. I really enjoyed the time we spent. I am happy for the opportunity to see wild life in natural habitat. I hope it will be possible for viewers and viewees to remain in harmony.

31 A chance to see these beautiful birds in their natural state was an experience we will never forget.

33 I always enjoy the river and surroundings on any given day.

45 Having the road next to the river makes it easy to get to but does reduce the enjoyment by having the cars so close.

46 Enjoyable, but we had hoped to see more eagles.

47 We were on the river only two hours almost entirely from the road. We saw no conflicts betw eagles and recreationists but suspect there is particularly if people on foot get too close to the birds

72 Most eagles were on the opposite side of the river than the road is. Perhaps they have adapted to its presence.

75 We have seen more adult Eagles this winter than others. Indian net fishing and sports boat fishing appears to "overfish" the river. Reduced Salmon runs will endanger the Eagle population. The Sauk river from the Skagit to the government bridge has a strong Eagle population. A few days ago we saw 7 Eagles in one tree.

80 Had a very enjoyable day. Love eagles. Wish I could have seen more. Happy to fill out the questionnaire.

125 We saw few eagles - they were all a considerable distance away

159 Saw 16 mature eagles, 2 immatures. Spent only 2 hours or so. Saw 3 at close range along in trees in fields. Saw a mule deer swiming the river.

162 I commend your efforts to gather opinions. Unfortunately, I am not well informed (as I suspect most are not) on the possible impact on bald eagles of us human visitors. Perhaps a brief paper to accompany this questionnaire, giving basic data, fears, eagle stats, etc., would help us be more insightful in our answers. Otherwise, and as it is now, you'll get a lot of uninformed busy-body "strong opinions" that are as useless as they are stupid.

188 Liked the area. Enjoyed seeing the bald eagles.

196 These answers are only for today and we weren't good judges on river conditions (as to litter etc.) we were only on the road for about an hour.

262 We had expected to see more eagles. Apparently we arrived too late in the season.

279 We expected to see more eagles. We saw no dead fish on shores so maybe that's why there were so few eagles at this time - no food? I would also like some information on your organization. What type of company are you and what other types of work do you perform? I'm just interested, that's all. Thanks. We had thought there was a trail to go down onto the bar (by the billboard sign) but found there wasn't. After considering, I think it's best not to go on the shore anyway, but I feel that is a poor place to have the sign and all the parking because you can't see the eagles because the river is so far away. All we could see were a few specks in

the trees and fisherman and boats going up and down river.

1986-87

117 Plan to come back many times!!

124 We enjoyed the sighting of eagles and realize we all have to share the area -- not exclusive to humans or to eagles -- We realize that there have to be safe areas without harassment to the eagles but also feel a limited use to people is important.

127 First of all I am very sorry for the delay in getting this in the mail and the condition of this survey. January 1, 1987 was a very rainy day and most of the questions were answered en route back to Seattle. It was exciting to see the eagles! Due to the weather conditions I was quite surprised at the number of people driving/looking for eagles. The two men drifting in the boat were either crazy or very dedicated to eagle watching. So due to what we saw, there were no conflicts between recreational groups but I do feel there easily could be. My interest is the eagles. I'm sure they have adjusted to man changing their environment so for but constant motorboats, increasing mans access to the river (for motor vehicles, boats, etc.) may damage their (the eagles') well being. It mentions rules and regulations in question #11. None are posted to my knowledge but why pollute the beauty of the landscape anymore by doing so? I do believe there should be restrictions for motor boating, helicopter flights, etc. which would cause excessive noise and possibly scare away the eagles or cause them to change their normal habits in any way. The fishermen could cause a decrease in the food supply for the eagles but I do not know the amount of fish required for the livelyhood of the eagles and the amount of eagles usually present. If there is any doubt in there being a decrease in the delicate balance then restrict fishing. Please do not develop the area for hiking, parking of vehicles, etc. because this means more people, more litter, more noise, more hassles for those that appreciate the eagles and more problems for the forestry service. River rangers should be used to enforce the rules and regulations of the area to the fullest.

140 more information about time to view would be good

142 Appreciate the "contact" by fish and wildlife agent and this survey. It was nice to have the fish and wildlife agent in evidence. He was helpful in guiding me to areas for viewing.

147 One area (going east) we stopped at (an area made for that) the river was aways away. Actually we didn't see any eagles till we used the binoculars. Then saw a lot in trees. A couple flew down to the river. The next area we stopped

(church across street) we saw 1 eagle eating at the edge of river. He stayed there a long time before flying up to a tree so I don't think we bothered him. Could see him without binoculars. The next stop (water close to road with cement side) saw lots of salmon in river and no eagles anywhere. We didn't go away from parking areas as we had a brochure that stated not to. Of course we would have liked to see them closer but if that is harmful for the eagles we understand.

148 The Day of my visit was very late in the afternoon of a cold rainy fogie Day. Because of this there were no boaters. Nor did I see a fisherman. I feel letting people veiu aminials in their natural envirement will help to give them more respect for nature which will be of benafit to preserving the wild. But this need to be done in such a way as to disturbe the habit of them as little as posiable.

161 This year we saw 16 eagles -- some fairly closely. Last year only saw 3 at a distance.

163 We expected to see more eagles! Please send me any Information pretaining to eagle veiwing.

164 I think some manned telescopes, near the road, away from eagles would provide satisfaction from viewers and still protect the eagles. People should keep a good distance from the eagles & stay off the river where they fish.

176 beautiful area

183 The young man who gave us this questionnaire was courteous and well-informed about the area and eagles

184 It is very relaxing for us older folks. Beautiful country, lets not let people spoil it.

187 Ranger station very helpful and nice. I like walking along the river to veiw not just from the road -- makes me feel more a part of it. Hope I was some help and sorry it took me so long to respond.

188 The area was undeveloped -- I liked that -- yet I could envision how noisy and crowded it could get

191 I enjoyed it very much... Would have liked to have seen more eagles but found out I was not there at the best time. Nevertheless, it was wonderful seeing the eagles!

195 Not many were showing but what we saw was very satisfying

206 There were only a few visitors -- 25 on the river and 15 on the shore and road I think too many visitors at one time and motor boats and helicopters are the problem; please - no

helicopters or motor boats. I'm not sure what exactly does disturb the eagles. I imagine too many people in the area at one time and particularly on the river in boat or rafts or fishing from shore would disturb them. Helicopters and motor boats would spoil the experience for me as well as disturb the eagles. I think camping areas should be far enough away that both visitors and eagles are not disturbed.

209 If you have any information (or where to get any information) on Bald Eagles and their habitat in the Northwest available I would appreciate hearing about it - I enjoy learning more about them and from them.

225 I'm very pleased to see your use study and hope this questionaire will give the eagles first use for nesting and feeding.

250 Again, we love the eagles and any restrictions on human intrusion into their habitat is acceptable to me if it will benefit them. I have seen them disturbed by mere presence of humans nearby. This questionnaire is a good start in discussing the problem. However, it seems to measure public feelings and is not a scientific instrument to measure our impact on the eagles in an objective way. So let me stress, if restrictions are called for by the people who know/study eagles, based on evidence that we disturb them, I am happy to comply.

257 To long a survey

266 It would be nice to have picnic tables at some of the pull off areas.

271 We really were cautious and respectful of the eagles - still they were disturbed by human presense. The fish and the river belong to the eagles. A video prestentation and private viewing station would help alot. (How about a donations box too) Also, I never saw 1 game warden or anyone thier to protect the birds -- except the person who gave me this pamphlet.

272 I do not have sufficient info to form an opinion. Saw no boats or fishermen on this visit.

297 Someone let us look thru his 40 power telescope & the sight of the eagle was incredible. I drive along the river frequently to get to backpacking places in Pasayten & North Cascade Wilderness Areas but do not participate in any river activities except this one time eagle watching.

301 We have a cabin at Cape Horn, just 3 miles west of Concrete and on the South side of the Skagit. Eagles (3 or 4) flew regularly on each of 3 days near our place at about 10 A.M. and stood on the gravel bank on the north side of the

River (Just below highway #20). Occasionally the eagles would fly over and perch on trees about 40 feet from our cabin.

302 Our group didn't think the eagles minded people. They were in trees one day right by our cabin on the river.

312 Just watching the eagles from a distance with binoculars is a thrill. They are magnificent.

316 Always a good experience however this time more restrictions at west viewing areas did nothing to enhance my visit. I didn't think these were necessary. I think the Skagit river between Rockport & Marblemount should be limited in access only in regards to boat traffic. I think this disturbs the eagles much more than shore or road viewing. I have had the opportunity to raft the Skagit & have not because I felt I would disturb the eagles while they're feeding only. I don't think they are disturbed at all when they feel safe in trees or in flight. I believe they're only vulnerable when they are on the river. I think eliminating all boat traffic in early morning Dec 1 - Feb 1, is a good solution. The fact that the eagles return year after year (with no noticeable decrease in numbers in the years I've been enjoying them) proves that they can co-exist with man provided that their feeding times and places are noted and they are left alone during that time. I think viewing from a distance during these times does not affect their feeding habits or threaten them in any way. (Distance being 100 yards or more from gravel bars) I think motors on the river bother them all the time. Usually the tendencys of government agencies during and after studies like these is to overkill in favor of the wildlife. I have seen this happen (Protection Island) and the effect has been that no one can enjoy the wildlife in its natural setting or be so restricted that there is little left to enjoy. It should be noted also that the eagles are not nesting during the winter along the Skagit; only feeding. I would hate to see so many rules, regulations & restrictions as to take away any enjoyment that is left either from shore or from the river. I hope you can come up with a program that benefits users of the river - eagles & men.

320 This was a very satisfying and enjoyable rendevous w/a magnificent animal

336 Always an exciting experience -- Eagles, scenery, nature. Even w/rain + snow. We are appreciative with the work being done for this sanctuary. Keep improving, and making a comfortable winter area for the wildlife, and still keeping area a natural habitat.

337 We saw about 35 eagles - a few flying, none feeding. It was a most rewarding day.

338 "Cold!" Thank You for your time, effort and concern. I am also a Trumpeter Swan Fan.

342 access to river near eagles was too restricted

343 Thank you!

344 I was surprised by the amt of interest in the Eagles. They are truly wondrous. I feel that any time there is a Human presence in an area that there is always going to be some sort of impact (be it bad or good) on that same area. I feel that the eagles, like the salmon, are an integral part of the ecosystem. That ecosystem must be protected in a way so that everyone can enjoy and understand that ecosystem to its fullest. Public education on the subject and continuing research plus regulations (i.e. thoughtful planning) all serve to conserve our diminishing wild beauty. Logging must be looked into if the eagles (and salmon) are to continue returning to the Skagit River system.

365 hostile locals

370 This was our first time viewing the eagles and found it an outstanding experience. (We plan to return) I have fished the lower Skagit in the past, but not recently.

374 I was surprised at the lack of public information about eagle watching. We didn't know if our actions (getting out of the car, walking along shore or road) were disturbing the eagles. If people hadn't been nearby, would more eagles have been in the area?

390 Nice day!

399 Saw eagles eat salmon on bank

402 It was a Friday, raining hard so birds weren't moving about much - but it was a nice experience. Your staff was most helpful in telling us about good viewing areas. Traffic was minimum but access to river somewhat limited. Also - local businesses weren't too friendly about providing directions - in fact many uninformative! Almost as though they really didn't want you there even though you purchased some items. This surprised us - you'd think they would want our business!!

403 We always enjoy the Skagit - We think the Fred Martin & Scott Paper Co. did a great thing giving land for an Eagle Preserve on the River But we hope it won't be too restrictive - We hope the People can enjoy the area, also.

411 Everyone we encountered was really excited about seeing the eagles and were careful to not scare them, remained quiet, etc.

436 Would like to see more eagles.

445 The amount of eagles was far below what we had seen before.

450 We had a good scope and a very cooperative eagle who stayed in one area for over an hour.

452 not as many eagles as expected

454 these are the first eagles we've ever seen -- not being from the area, it was an enriching experience for our children

461 not many eagles, but perhaps I was late in the feeding & nesting time I lived in Rockport for a few years -- now I reside in Sedro Wolley. I love the area along the Skagit River along Hwy 20 -- would like to see it's natural beauty preserved. Yet, I would also like to see an increase of tourism in the area as I feel the communities up here will benefit financially. I feel we can have the tourists and the environment preserved if regulations are enforced.

468 let's see some interpretive info. A lot of people don't know what they're seeing. An understanding is needed.

473 We visited on a Thur. afternoon - which meant low usage recreationally. It was a poor day for eagle watching - as they were not perching near the shore.

477 Beautiful day Not crowded Nice people This is about the prettiest place in the state. We have been enjoying this area for the last 30 years. I sure hope we can keep it rugged as it is now.

479 The Eagles I saw were across the river in trees, or high on the hillside, both areas difficult to reach by people. This led me to believe they don't like people getting too close, but they can find areas where they feel safe. These areas need to be left isolated from people or the eagles will move on.

482 We were not aware there were eagles in this area -(more info would be appreciated). As residents of ARIZONA, having been through the area in fall of '86, we returned to this very beautiful spot, and were happily surprised to find that eagles are here. To see so many was a thrilling experience for us. We shall return, hoping to see them again, but abiding by whatever rules are necessary to SAVE THE EAGLES! Thank you for your efforts.

489 fewer eagles seen than last visit

490 This was my first trip, spent a couple hours and left.

I enjoyed seeing the eagles very much. However, from the sound of your questions there must be problems in people and eagles coexisting along the river. I'm not aware of it, have no data on the subject and therefore can not register a fair opinion. I saw no problems during my 2 hours. My only problem was that my telephoto lens was not powerful enough to bring the eagles closer for a good picture. If you are having problems with people bothering the eagles then the only way to control it is to restrict/patrol the area to a particular quantity of people. It's too bad people are too inconsiderate of animal privatecy. I live in Kent. A few years ago a bald eagle landed in one of my 100 ft tall fir trees and scared the (Expletive Deleted) out of my cat. We all coexisted pretty well for a few minutes anyway - except for my cat - He was glad the eagle moved on - I wasn't.

Comments of Eagle Viewers in Boats:

1985-86

? Too many people

17 I saw 40 Eagles in quiet restful float trip.

83 weather was beautiful, river was running high and people on river and shore were quiet, non disruptive, non-invasive

85 Certainly did not expect the noise of motorboats in a conservancy district

92 Some major flaws in this survey form folks: You didn't ask what day, date or hour I was on the river - an important question in interpreting the data. (Weekend, weekday, holiday, early late, etc. ...) As it happens I put in at steelhead park at 4:30 pm which is late for a day in late Jan. It was today, a Sunday which is significant. It was also a clear, beuatiful day - also a factor. Were it not so late I would have been surprised to see only 10 people or so near the years. From years of experience living near and canoeing on the Skagit I could answer this questionnaire differently, but it specifically asks me to consider today's experience only. In supporting actions listed in #19 I'd emphasize that you'd need to prove to me that good was being achieved ... and love boating on the Skagit. I don't feel that my activity adversely affects the eagles. If anything, it serves to gently "galvanize" them against being alarmed by other less-sensitive river-goers. But the eagles and river comes first, and I'd abide by rulings based on factual observations and not simple Forest Service heavy-handed management. I appreciate your efforts to preserve the magic Skagit and her creatures ... I'm one of them.

105 Regarding fishing - consider doing what Canadians have

done - restrict number of fish or number days any angler can catch or use per season. - say 2 fish per season or 2 days per season. Altenately you could say there are only so many "fisherman days" allowed per years and have a lottery. Perhaps consider a 1 (one) fish limit instead of 2.

112 If the time comes when competing uses on the river have to be regulated, I think this survey could be useful to understanding what river-users will agree to and support. The questions that solicit opinions or management that will enhance the river environment for eagles are useless because very few people answering this questionnaire have enough knowledge of eagle habitats to offer any insights. More ignorant opinions are not needed. If there are major gaps in information about eagles, then we need biological/naturalists studies that will offer insights.

114 Beautiful day. Nice wide river for novices.

137 Beautiful area but would have enjoyed seeing more eagles

171 I've canoed southeast Alaska and have seen eagles in a natural area. The Skagit will never be returned to that type of condition. But we need to do what will protect the eagle winter feeding areas. The motor boats are on my get-rid-of list. They bother me so they must bother the eagles (not facts to support that)! Is this a government supported ($) survey? I would be very interested in hearing the results of the survey and what the overall plan will be.

223 Sunny "warm" afternoon is not ordinarily best time to view eagles - we were rewarded! I am not knowledgable- but do wish the Skagit River to serve eagles - and nature - and recreationistis, too, if possible.

222 Lets get all motors off this section of river. This includes chainsaws on shore. Lets also some rules (ordinances) established and enforced.

190 Very few young eagles age 2-4

268 Had an exciting time. Really enjoyed the time you spent with us and knowledge you shared answering questions.

277 Only because of the weather and because we saw so few eagles.

293 The smallest number of birds I've ever viewed, rain and snow all day - otherwise, a good day.

294 Dissappointed on the amount of humans, the motor boats with engines on. I am very glad to see this project happening. As a commercial raft guide and a student of

Environmental Studies I see what happens on the river due to excess amount of people. I feel the birds do come first since man can relocate elsewhere with no troubles. Permitng the Skagit River as the Sauk is would be a good step, but I am sure there will be an outcry from all involved. I hope all goes smoothly with your study and that a fair judgement can come out of it.

1986-87

46 No rules or regulations posted. No access routes posted. No eagle info. posted. Lack of info.

90 Every one was very friendly, from the people fishing to the people, that were on the road side, has been one of the nicest river's weve been on.

99 In the years I have been on the river I have found most persons respectful of the birds. The fisherman & other boaters (RAFTS, CANOES, KAYAKS) co-exist peacefully for the most part. The jet boats are a menace to all and many are piloted by incompetant people. Also ... drinking and boating is like drinking & driving -- STUPID!!

153 The eagles were fantastic

159 Weather was great. The lack of apparent management (as any wilderness or Scenic Area should appear) indicates to me whomever is responsible is doing a good job. Construction of more "facilities" would degrade experience. It's only a few that leave cows and flotsom and I believe a "hands off" approach as far as regulations are concerned would be helpful. Canoeist fishermen and shore observers should be able to get along well. Were all after the same thing. Why all the questions about "conflict?"

169 I support 100% of sensible conservation laws. More wilderness areas. Protect all land from ignorant hands.

173 I enjoyed the eagles (was great). Disappointed in motors and lack of more of a natural setting.

201 too much development in river and clearcutting a visual eyesore

204 Great except for jet boaters. Comments from drift-boaters indicated the same sentiment. Takeout was busy, but very cordial between boaters. I was actually quite favorably impressed with how clean both boat launch areas we used, and river banks were. There tends to be more toilet paper/pop bottles at the average trail head than these areas. Fishermen were all very friendly.

207 Saw motorboats higher up river than ever before. I

would like to see motorboats restricted to below Rockport. All native steelhead should be required to be released all the time.

218 It appears that several govt. agencies are not sensitive to bald eagle protection (logging in the area, dikes on the river). Can the Endangered Species Act be used to bring about stricter regulations that all levels of government must adhere to?

234 I'm concerned about man's impact on the eagles. It is far more a "man's" river than an eagle preserve. It is better for us to err conservatively than chase the eagles away. I can canoe on other rivers when I want to canoe. I don't have to be on that stretch of the Skagit. The same applies to all other forms of recreation. Don't misunderstand, I love to see the eagles from the river, in my canoe; I just want them to still be there for my children when they are my age.

269 Because of float being on a "week" day, and very clear but cold weather, and having "first time" rafters on board, this was an excellent trip. Thank you for this "extra" input. Most questionnaires don't allow for opinion. I think that the way for public support to be gained for helping the Skagit Valley Eagles is for the people to see them, of course, being a rafter, I am "sold" on quiet river floating. I am in favor of responsible commercial companies providing a way to sight see. Under question 12 - a mention of helicopters came up. On a sight seeing level, I oppose this. Where as I have not seen helicopters on this river, it did take away from a 18 day Grand Canyon Float I make in 1984, but I do not favor totally banning the airspace for purpose of search & rescue, law enforcement, scientific research -- these are important -- unfortunitly, aside from the old carbodies used as retaining walls, the next thing that I thought was unsightly was the large "blaze" orange squares, I assume these are used in the Eagle Survey from the Road. So, if this and the Surveyor's Ribbon that I saw coming down river is helping the Eagles, I can live with it. It is not, let's get it back to a "scenic" river run -- I spend just about all my recreation budget on river running and it seems the sport is growing. It does look like the U.S.F.S. is planning ahead -- to that I say Good Job.

283 Greatest human impact on eagles by commercial rafting. Greatest impact on habit by Rip Rap placement (shoreline management) and removal of Snags by whoever placed the rip rap.

325 very pleasant even with large number

330 prohibit motorboats

331 In years past I have had only one conflict of groups using the river.

334 Crispy weather Beautiful mountain views Quiet ride

352 This was the first trip down this river and had a wonderful time - the weather, (it was raining off & on) might have some bearing on this survey. I think there might have been more boats, people, etc.

355 Id floated the river before so I knew what to expect. The only negative to the float was the weather. Thats the only aspect that prevented me from rating it outstanding Ive drifted thousands of miles since I took up rafting nine years ago, including wilderness areas in Idaho, Colorado, Oregon and California. Ive seen maybe 8 eagles during all these trips. So I consider the Skagit float a very special opportunity to see so many of these great birds. Im very happy with the experience as it is. The only improvements I can suggest are more parking and toilets at the Marblemont put in and removal of the wrecked cars on the north bank.

359 Good/Great

363 Regarding interpretive/education displays: Estacada Ranger District (Mt. Hood Nat'l Forest) has an excellent design which could be adapted for your seasonal use. Theirs is a whitewater information display, posted during the river-running season, and removed entirely during the remainder of the year to avoid vandalism. Its content and form were put together by private boaters and clubs that were interested in river safety, hence it lacks the often offensive "bureaucratese" form inherent in many displays. I am sure the idea could be adapted to meet the needs of the Skagit River Recreational Area and its fantastic resources.

387 Believe fishing with a motor should be restricted to no higher than 1/2 mile above bridge at Rockport - up to the Barnaby Slough? One way drift down would be OK - no use of motor and thus no increase in noise - OK to fish on the drift down. We were there on "Super Bowl Sunday" and it was raining lightly - saw fewer boats fishing at Rockport than usual...have seen it very crowded on some Saturdays during the winter and wonder if there is a need to restrict the number of fishing boats during the eagle visits (Dec/Jan?) Believe the viewing area (above Rockport) is in a good spot for viewing large numbers. Possibly could have more information for public at this area - re: eagles - life cycle - migration - groups interested in preservation and ways to contact. Believe there is public support for this preserve (?) but hard for the public to give input easily.

419 Many more eagles than expected (and people)

429 Rain stopped when we got in the boat. Lots of eagles!

430 Was really neat. Such wonderful birds to see.

431 Montana is a good example of wildlife & fish development 1) Don't stock fish -- maintain & improve habitat 2) Don't blame weekend recreation for spooked eagles, a bulldozer and the men that follows is the culprit. I'm not pro wilderness I'm for proper management & regulation to ensure everyone can participate & enjoy

433 We enjoyed the opportunity to view the eagles in their natural habitat. We feel that the impact on the birds may outweigh the advantages to the people bird watching. The number of river travelers should be limited, and travelers especially birdwatchers need to be educated about disturbing the birds by trying to approach too closely.

491 Beautiful day -- The eagles were soaring -- Not too many perched.

493 No motor boats please - more rangers to enforce it. Silence for the eagles. Not disturb the dead salmon (kids were picking up).

Comments of Fishermen on Shore:

1985-86

42 Fishing was Terrible. The Indian Gill netters on the Skagit scare the Eagles more than anybody and kill a few besides.

95 Fishing was terrible

234 Raised on river. Fish ladders on all dams. Fish hatcheries similar to Cowlitz River. Abolish netting on and near spawning areas and nesting areas. Improve logging practice near feeder streams. Remove obstructions from feeder streams. Reduce retrictions for benefit of local users of fishing activities and hunting. Lesser emphasis on select groups, eagle watching, fly fishing only, etc.

219 No fish today! Water to low and clear.

274 Too many power boats. I'd like to see, for my children: A) No powerboats on the river. B) Salmon and steelhead release throughout the river system and tribuitaries. C) No gill netting or commercial fishing in Puget Sound or in any river. D) Other species of trout.

291 Not enough fish.

1986-87

28 Good day fishing and the eagles that flew by were a bonus, they watched us fish for over 20 minutes and came back about 6 times to check up on us.

41 We had a beautiful day - caught nothing. We still enjoyed an outing - sunshine and scenery worthwhile.

81 I do not believe that the Eagles are being disturbed by the recreational activities on our rivers. I fish both the Skagit and the Nooksack and boat and fish in the San Juan Islands. There are more people participating in all of these activities than there were 15-20 years ago and there are also more Eagles by far than there were 15-20 years ago. At that time on either the Nooksack or the Skagit, one never even saw an Eagle either perched or flying!

85 The area and the day were very enjoyable

121 I think Eagles are of most inportant and will live with what ever rules are made

138 In summary, I beleive if people using the area are decently quite and behave themselves, it would keep any disturbance created to a minumim. I suppose fisherman are bound to create some. I just didn't notice any.

437 Note: I live near Marblemount at Cascade River Park. I fish a lot, photograph some. Afraid to many eagles have been poached. I feel there is to much river activity and not enough fish allowed to migrate upstream, and also eagle poaching. We need a couple laws changed and more enforcement -- MAYBE MORE FEDERAL ASSISTANCE, TOO! ALSO, FIREARMS SHOULD BE BANNED ALONG RIVERS DURING THE EAGLE SEASON. ALSO MOTORBOATS & HELICOPTERS.

448 River was high and out of shape for fishing

503 I can understand the concern with disruption of the eagles, but I believe there are real benefits to wildlife if people see and appreciate it -- especially kids.

<u>Comments of Fishermen in Boats</u>:

1985-86

18 I have used the river for a number of years. I believe that people are becoming better educated about their responsibities in the out of doors. I've seen less abuse of mother nature in recent years. I think more trash facilities in eagle viewing areas and boat launching areas are necessary.

29 No fish today. There has been a significant increase in the number of Eagles I have seen in the last 10 years, Both up river and in the islands. Probably due to enforcement of protection laws on Indian reservations.

41 We onely have less than one half the eagles that was here in the 50s-60s. When the nets went in the water the eagles starved for 2 years then they said the heck with it and went some where or died, they were a good run of fish this year with the humpy run but that onely hapens every 4 year. Some time you cant even count them fishing and bird watching if they are a lot of birds they will not fly from you a few in nuber they will not stay around by boat or foot.

48 No steelhead

49 Need more enforcement of native release program on Nooksack River, check the plunkers pickups and campers. There keeping a lot of natives.

51 Pour Fishing Management - Fishing is better than in the years past but there is plenty of room for improvement

66 Not enough steel Head Trout

84 I have been watching the eagle's for quite some time before it was popular for the general public to view them. The biggest determining factor is the availibility of dead salmon for them to eat. When there are plenty of dead fish on the sandbars - bank the present amount of human activity will not bother the eagles to any great extent. The most cost effective way to do the most for the least amount of money would be to hire someone to pull out the numerous dead salmon that are underwater, and put them where the eagles can reach them.

140 I have been visiting the Skagit and Nooksack Rivers for the last 15 years. The number of eagles has remained fairly constant over the years, except for one year when their was not many eagles on the Skagit due to the reason that theire were very few dead salmon. That year there was more eagles than usual on the Nooksack. Eagles are a wild bird any time you approach them wheather in a boat, on foot or in a car, you are going to disturb them. Some are more timid than others or haven't adapted to civilization.

176 I've fished in Alaska, where I feed eagle fish by throwing it to them they would sit on the top of our crab boats and watch us work, while we were tides up at the citys dock. I work a Similk Bay for Dunlap Towing in Laconner Wash. There are two bald eagles there witch I injoy watching very much, and they don't give a dam about us as long as you don't give them to much attinstion. These birds are very smart and very territorial at times. But they definatly

aren't scared of man or noise, as long as they dont feed overly threaton. Ive only fished the Skagit for three years, but in that time Ive seen an increase of eagles and Im glad of it, but the people have increased to at lease fishing wise. Rules can be good and bad. I hope before you think of some new rules you do your home work well and not fly off half cocked on decisions. I injoy fishing, but hooking a fish is only part of the injoyment, the beuty of the river and eagles, mountains, ducks, clouds and just plain fresh air, are all worth there wait in gold. But when something as fragit as all of the is so popular, I know the population of all the out siders will probably be the end of this solitude. Rules or not.

186 I was able to enjoy viewing many types of wildlife and had a very pleasant day. I am however becoming very concerned about the amount of litter than I encountered.

203 No fish caught (steelhead). I'm from Missouri, originally, and used to float midwest waterways viewing bald eagles, Roaring River, Buffalo River in Arkansas, White River, Current River, St. Francis, Big and Little Nianguas. It would seem to me that if the government continues to allow the special few to net spawning salmon and steelhead, the eagles will diminish in number by virtue of a decreased food resource.

204 This trip was great we should be able to use this river with common sense and keep the restriction to a minimum. We used this river for years, we've been able to view the eagles, and fish at the same time. The birds don't seem to be bothered by the fishing boat traffic. Because we don't spend much time harrassing the birds. We are fishing. What I have seen is people walking up on them to take pictures, or looking at them. I'd hate to see any restrictions put on the river that would keep boats from certain sections. But rather keep the viewing parking lots to a minimum. We were here enjoying these creatures long before it became popular to view the birds, we have a lot of respect for the birds. River section restrictions would be a waste of this river. When there is a good run of salmon there's alot of eagles, when the run is down so are the birds (Nature has its own restrictions). Please let us enjoy this river as it has been for years. It will stay this way if left alone. Come, take a trip. Enjoy.

242 Like the man said, "Don't fix it if it isn't broke."

240 Outstanding every time on the river. There is not a problem with to many people or to many boats, scaring eagles in any way. As far as I can see, everone has done a very good job of keeping the river clean, and taking care of this resourse. I have lived on this river all of my life, and I have never seen a problem with the eagles in any way.

The river has been managed very well and everyone has done a good job of taking care of it.

218 2 fish.

255 There are problem from Mt. Vernon down river. But none here for some fisher men.

257 I was surprised by the number of rafting parties on the river.

272 I visit often and it is usually pleasant and relaxing sometimes I even catch a fish.

292 I am curious about the significance of the question on education. I suspect any conclusions regarding this would be highly arbitrary. Knowledge consernig wildlife is not generally taught in any detail unless one is major in wildlife management. For example I know a man who didn't get past the fourth grade who knows more of the animals of this area and their ways they interact than any one I've ever met (I've worked professionally with biologists many times). I also know many people with college degrees that know virtually nothing about the woods. (excuse the bad writing, I dont get much practice anymore).

295 Two days and two fish for the group - had a good time anyway. Wind - rain and snow along with high and dirty water. I'm ready to go again. My turn to get a bite. The Skagit Valley needs cash flow - recreational use should be promoted. No one group should over power another. Certain parts of the river are good one time/not good at others. No rules wuld be fair. Let it be supply and demand - if an area is to crowded - move to another spot. Encurage buffer strips - access to the river for camping/bank fishing or eagle watching if thats what people want to do. Building in flood zones should not be allowed - even for 100 year floods. Rod and reel fishing only in the river, "sport fishing". There is more money spent in this valley for fishing than any other river use. The dams need to control water flow, more even (daily). Push for cleaner water - from poor logging and road building practices to the barn lot and the out dated septic systems. How about tax breaks to timer land owners, farmers and etc. to let trees grow, but still leave areas open to users (with restrictions in certain areas). If your big worry is abut the eagles - nice to look at but not really that important: except no fish = no birds. We need to see the birds! I see no reason to cut off activities that allows a few hundred or even several thousnad people to drive from the Big City to a crowded view point (that is causing traffic hazards) or floating the river in crowded rafts with unskilled people in charge to see the birds. "Thats for the birds". I would like to point out, long before the eagle watching became so popular we have seen the eagles drifting

by them for years in our power/drift boats without a "killing" proble. The point I'm trying to make is: if the food is there the birds are hungry they will eat. When the food runs out they will move on. Each year a fishing boat has pulled rafters from the river and saved lives. Remove these power boats and start counting the victims. For what??

297 I lived all my life on the Skagit System. I believe that the biggest factor in the decline of eagle populations on the Skagit System is mainly due to logging throughout the region. These operations have caused snow runoff, and rain to cause too much fluctuations of water level. At the time of year when the eagles are in the area to feed on spawning salmon. The carcasses are washed away causing feeding problems for the eagles and hatching fish. It has been my experience that boating fishing does not usually scare the eagles away. I know of no cure for the problem but reforestation of logged areas would help in future years I'm sure.

300 Fishing is not so wonderful, but I enjoy scenery, weather, and relative solitude.

1986-87

8 The weather was (Expletive Deleted) and your solicitor could have been a bit more friendly!

9 I love to go out in my boat. For the relaxation. Its ok if the fish don't bite.

13 although I don't believe the noise of the Jet Boats were of much consequence as far as disturbing Eagles, I do think the constant "roar" got me personally. Maybe others like solitude also and perhaps there is a way to manufacture a Jet Boat motor that has its sound muffled and still maintain its power efficiency.

14 I think they should leave the Skagit open for catch & release until the end of April like the Sauk.

15 A group of us use both rivers from Dec-thru-April fishing, eagle watching, trapping, photography, etc. Know were the eagle stay - habits etc. Spend months on the river and caught many steelhead; any other special question in your study I could try to help.

16 There seems to be in this Questionaire, a strong slant against fishermen in general, and powerboaters in particular. I hope that your organization, and the USFS who is using the study is going to use the information in an unbiased manner.

23 I love the eagles. They have been peacefully coexisting

with fishermen on the Skagit for decades. Now some Johnny-come-latelys are concerned that we'll scare them off. Well, we haven't in the past, and we won't in the future. The river should remain open to boats and rafts.

30 I thought it would be over crowded with Boats and People. I think the Judge Boldt Decision has to be done away with. We can't live 100 years ago; everybody has got to live by the same rules. There are too many different races to live any other way.

35 I am a serious steelhead and salmon fishermen. All Fish killed in my party are cleaned and the remains are left on isolated beaches. I feel this is good for eagles. Also, I believe fishermen have no detrimental effect on eagles.

36 Eagles on the ground will move if a motorboat comes within 50 feet of them. But if we pull into the beach the eagles fly only a short distance to see if we are cleaning fish. If we are, they sometimes will start returning closer to the area to feed on the entrails before we are through cleaning the fish.

93 No fish but a nice trip. There is not enough recreational areas in our state now and we should try and increase these areas while we still can.

101 Went Steelhead fishing caught fish, had Good Time. From my sevral years of experience on the Skagit River, what I find holds the Eagles, is how many fish are on the banks. High water washes them back in the river and they move to another section. In Years Past there used to be a lot more Boats on the River, a lot more Bank fisherman and the Eagles are still there, as Long as the fish are there. I have drifted within 50' of eagles in trees and they never flew away. All though it does not happen all the time. On the bank it varies from 150' or more.

103 Who is sponsoring study? This implies Forest Service, but doesn't say so; Sponsorship is Unclear! Survey Seems Biased toward limited positive effects - and only Problems. So What is the Problem? - If there isn't one, Let's Do a Survey to show there is one - (Expletive Deleted), anyone can do that. Is there a problem that needs analyzed? What? Declining Numbers of Birds, Too many? Complaints? From Whom? Eagles? Rafters? Fishermen? Campers? Audubon? Forest Service? OR WHO? Is it Preventative? - or what? I saw two people from one Raft get Surveys -- yet I was told "one per Party." I fished the Bank all morning alone - am I a party? I fished Boat all P.M. - is that a party?

112 The eagles showed calm behavior to our quiet presence. The findings must be posted at launch facilities and road side parks for all to see!

114 Too Wet

129 It is always a pleasure to be on the Skagit. However picking up a fish or two would be a definite bonus. As a member of Trout Unlimited, Northwest Steelhead and Salmon Council, Wildcat Steelhead Club of Sedro Woolley and Drayton Harbor Enhancement Organiztion, I cannot over Emphasize the seriousness of netting the river. More restrictions and regulations with proper enforcement is needed. The return cycle of these salmon and steelhead is the key factor in the food and recreation chain that has been all but lost and only now is slowly coming back. The Skagit River not too long ago was number one in the State for fishing and hopefully in my lifetime will be again! Thank you for letting me air my opinion.

135 Keep Indian nets out of River -- would increase steelhead Run. Keep Green Peace & Indians out of River & all things will Improve!! Thank you for this opportunity to express my views.

139 It is to bad that the Peiple and the Eagles can't get along - there is laws to protect everything. It is time to enforce them.

146 Opinion - Bird populations are dependant on availability of fish and any human incrochment seems to be a momentary disruption - but remember no fish - no birds.

162 it is always a relaxing experience

198 would have liked to have seen better fishing, but the river was great

259 Eagle presence (better than expected); Steelhead presence (poorer than expected)

265 Fishing for Sealhead was very poor and the highth of the river was very high because of Generating power on the Skagit Dams. I have been fishing the Skagit River from a boat since 1962 and in the 70's the eagle population increased to quite a number of eagles. The boat fishing in the Rockport area was tremendous at this time because fishing was the best in the state. I can remember in these years drifting a few feet under eagles perched over head in trees and many times not flying away. They became very accustom to the heavy boat traffic. Now in 1987 the eagles still seem to be very high in numbers in the Rockport area but the boat fishing is not as great and the eagles seem to startle a little easier. The number of eagles returning and staying in this area is in direct correlation to the number of Salmon carcasses on the river banks and in the past few years including this year, the number has been very high. It is my opinion there is room for all river users and the bald eagle.

285 NO FISH As a Jet Boat Fisherman I didn't have any problems with Eagles or any user groups.

328 We are very fortunate to have in our area the Nooksack and Skagit rivers to have both fishing and Eagles to winter in a natual enviroment such as we have. Eagles become acustomed to human being as long as they don't shoot or harm them. We feed eagles at Point Lawrence rock fish in summer time, they will come down and take them 30 ft from boat. A fantastic sight most people don't have apportunity to see. 351 The eagles were less bothered by boats etc in high traffic areas i.e. below Rockport than above. Eagles that were feeding were the least disturbed. None seemed upset.

388 Over the past 35 years I have seen the eagle population steadily increase therefore I don't believe our current use of the river is a threat to the eagle population.

391 During our trip some eagles flew when we got to close, But about 80% returned to there perches or to the salmon they were feeding on.

393 The Skagit River is a great part of our area. 1) As one who has been on the river system for a number of years it is my opinion that in so far as the eagles are concerned -- they are far less concerned with our activities on the river than we are about how we effect them. On this trip, as with 98% of former trips, our use of a outboard-powered jet boat caused slight, if any disturbance to the eagle population. As long as we are in the boat the eagles seem to take us for granted however if we were to get out on a gravel bar etc where they are feeding we would undoubtedly cause a great disturbance therefore we refrain from going ashore in areas where the feeding is active. My point is that motor driven craft on water seem to be accepted as a fact of life - however the few times that I have witnessed the inadvertant or unintensional enterance into one of these areas by a motor vehicle (motorcycle in these cases) was totally unacceptable to the eagles & without fail they all left the area. 2) In a few cases, questions were directed to the quality of fishing? The number of fisherman (Sport/both shore & boat) has had no effect on my success and I do not see it as a problem of the number of fisherman. What does effect my success is netting fish while migrating up stream -- not only is the escapement near impossible, all species are caught no matter what season therefore adding to the lessening of the totals. Thank you for reading this.

395 I always like being in a boat on the upper River During this time of year. Seeing the Eagles, the Mountians with Snow on them and the River itself. Makes catching a fish a bonus during a great day. I have photographed Eagles from the Roadside viewpoints before and I can see a need in the future for larger or more viewpoints. These Roadside

viewpoints seem to have no effect on the birds and offer a convienient place for people to look at them. I would like to see more information posted about the Eagles. - such as their lifespan and Migration Route, at the viewpoints as it would better inform people who stopped: As the Eagle population has increased. I would worry more about the amount of food availible to them, than I would about Recreational use problems. A good example of how well the Eagles co-exist with people is that the birds released from the Zoo don't act any different around people than the wild birds do. I think the Eagles have accepted people in the area as part of their daily routine and that current Recreational use practices should be left as they are.

417 We got 1 fish and lost 1 and saw 15 eagles (approx.) But Fishing would be 10 times better without indian nets

418 Fishing was poor but had relaxing day

459 Fishing was great - the catching was poor

467 Questionnaire is not being distributed in an unbiased manner - i.e. one per boat of 4 individuals & told to share. Also, fisherman's request for questionnaire are ignored sometimes.

Comments of Other River Users:

1985-86

? It is good that we look at the impact we have on the river and the lives that make it their home. I feel that I'm on good terms with the eagles, ducks, dippers, beavers and all of the other animals that live on the river. As long as we move quietly they do not mind. I try to clean my catch on a bar point so the animals will have a chance for the food, I have had eagles on more than one occasion take the food while we were within 20 feet of them; very exciting. I try to show my guest's all of the wildlife big and small, and explain what I know of their life and habits so they will have a better understanding. I hope that when the final decision is made that boats will still be allowed to float, fish and enjoy the river, in an orderly fashion the river is my life.

53 everything on the Skagit is enjoyable; no one should be refused the right to fish, sightsee, ect on it. River traffic and people in general viewing the Eagle population of the upper Skagit have very little effect on the eagles' lifestyle. Sports fishing has very little effect on reducing the fish carcass and/or Eagle food in the River System High waters and commercial fisheries have more impact on the numbers of fish and fish carcass' in the river system, effecting the Eagles food supply. The best way to insure the

survival of Eagles is to control the Indian Fisheries in the River system and the ramping of the Dam systems. Being on the Skagit River from November through April at least 5 days/week I have found very little trouble with eagle watchers - fisherman and/or other people, enjoying the beauty of this wild and scenic River.

94 as property owners we just enjoy being near the river (except when it floods)

206 As I stated I have fish these rivers for the past 39 years. Every year including this year, if a motor boat hit a fish or get a fish in the Sauk River, they go back and forth about 6 or seven times and when there is eagles around perched they will get nervous and fly away. To much noise from motorboats and the people in the boat. I have use drift boat every year and I do not think in my better judgment that the eagles worry to much in fact they seem to enjoy it when a drift boat goes by. I think that an eagle on his first trip to these rivers might get uneasy and about the 3rd or 4th time he sees a drift boat he finally realizes that he wont be bothered. There is plenty of rivers from Rockport toward the Bay for motorboats and they are becoming a problem not only for the eagles but for raft and driftboats too.

1986-87

48 Except for motor boats and TNC people, had a great time on the river, just like I have for the last 15-20 yrs. I look forward to taking my family on outings as my parents did me.

52 Need drifting campground

54 Jet Boats are disturbing to wildlife and recreation

55 I am a lover of eagles and enjoy watching them. Areas that there is a concentration or feed they should be watched a 1/4 mile away.

152 1) Saw lots of Eagles (better than expected) 2) fishing was lousy (terrible)

298 I feel number of roadside parking is adequate for now. Your questions regarding camping along the river are vague. The is only one campground west of Newhalem, at Rockport, and it does not pose a threat. If you are referring to casual camps from boats & rafts at unspecified locations, this is to be discovered. Fishing does not seem to present a problem at present, but education of anglers is necessary to prevent more restrictive regulations. Rafting seems to disturb the birds the most, particular those "naturalists" that try and slow or stop near the birds to photograph them.

414 We had a marvelous time -- I could only wish for more quiet (less rafts at once on river)

474 I didn'd catch any fish, but as with my hunting, I feel that, getting game or fish is a bonus to having a great day out of doors. You are welcome, and I hope that this doesn't restrict the use of boats on the river, because over the number of years I have been doing this, I have been close enough to eagles while drifting the river and boating back up the river, to be able to see bands on thier legs with the naked eye, and drifting or motor boating never seemed to scare them any more than a cow walking down to the river on the opposit bank. When they want to fly they do, and if they want to do some people watching, they just sit there and watch or keep eating witch ever they want.