ALASKA DEPARTMENT OF FISH AND GAME
JUNEAU, ALASKA

STATE OF ALASKA
William A. Egan, Governor

DEPARTMENT OF FISH AND GAME
Wallace H. Noerenberg, Commissioner

DIVISION OF GAME
Frank Jones, Acting Director
Donald McKnight, Research Chief

WILDLIFE RESEARCH UNIT STUDIES

by

David R. Klein, Leader

Volume XII
Project Progress Report
Federal Aid in Wildlife Restoration
Project W-17-3, Jobs 19.3R, 19.6R and 19.8R

(Printed November, 1971)

JOB PROGRESS REPORT (RESEARCH)

State: Alaska

Cooperators: Ronald Modafferi and David R. Klein

Project No.: W-17-3 Project Title: Research Unit Studies

Job No.: 19.3R Job Title: Effects of nutritive conditions on clutch size of female rock ptarmigan (*Lagopus mutus*).

Period Covered: July 1, 1970 to June 30, 1971

SUMMARY

In 1969, from April 19 to May 22, 103 female rock ptarmigan were collected from a 20-square-mile area. One hundred and five female rock ptarmigan were collected from this same area during April 19 to May 22 of 1970. During the same time period and from the same locality 108 female rock ptarmigan were collected in 1971. Autopsies yielded weights, measurements, organs and gut contents which will be analyzed in relation to the nutritional status of the birds in various reproductive stages within years and be compared along with the respective clutch size over three years.

OBJECTIVES

This study is proposed to test the following hypothesis on female rock ptarmigan: Nutritive condition of the female during a short period preceding egg-laying effects clutch size.

An attempt will be made to quantify nutritive condition within years which will be compared over three years.

General

During the months of August and September 1970, the following activities were conducted: Two trips were made to the field camp to bring in dry supplies and cut wood for the spring of 1971. Moisture content and total lipids were determined on breast muscles (P. major and P. minor). The investigator completed removing parasites from the small intestines of all females. These samples were oven-dried and weighed to indicate "parasite load" on an individual bird basis. Since the triple beam balance used in the field was not sensitive enough to weigh the spleens, the frozen organs from 1969 and 1970 collections have been dried and were weighed on a mettler balance.

The following activities were conducted during October, November and December: Moisture content and total lipids (petroleum ether extract) were determined on breast muscles (P. major and P. minor). The spleen and kidney from each bird collected in 1969 and 1970 were dried and weighed. Preliminary preparations of tibiotarsus, femur and synsachrum for fat-free dry weight determinations were conducted. Data were transferred into a format for computer analysis. Crop contents of females collected in 1970 were separated into their constituent parts.

From January to March the following work was conducted: All laboratory work from the previous field season (1970) was completed. Data were being transferred into a format for computer analysis.

The majority of time in late March and early April was devoted to preparations necessary for departure to the field camp. On April 17, 1971, the investigator, field assistant, Tyrone Kellems, and field supplies were transported by helicopter to the field camp.

Results

Due to extreme snow depths and generally wintery conditions on the study area most ptarmigan were still in flocks. Flocking persisted for about a week longer than was observed in 1969 and 1970 and made early collecting very difficult. With the onset of spring, flocks dissolved, males became territorial and pairs were common. Despite the persistence of winter conditions into "calendar" spring, egg-laying dates were similar to previous years'. This suggests a more rapid progression of reproductive activities than occurred in the spring of 1969 and 1970.

One hundred and eight female ptarmigan were collected on the study area from date of arrival to May 24. Data obtained from these birds included gut lengths, organ weights and crop contents.

Several noticeable differences between the three field seasons include the following: A good cranberry crop *(Vaccinium vitis-idaea)* occurred in 1969 but not in 1970 or 1971. A good crowberry crop *(Empetrum nigrum)* occurred in 1971 but not in 1969 or 1970.

Although it is not directly related to ptarmigan nutrition, snowshoe hares *(Lepus americanus)* were noted to be scarce in 1969 and abundant in 1970 and 1971. In 1971 voles were frequently seen during collections in the field and this work was not true of 1969 and 1970. Short-eared owls *(Asio flammeus)* and marsh hawks *(Circus cyaneus)* were more common in 1971 than in 1969 and 1970.

The investigator and his field assistant returned to Eagle Summit on June 5 to look for nests on the Alaska Department of Fish and Game Eagle Creek ptarmigan study area. With the help of Jerry McGowan and Terry Bendock (Dept. of Fish and Game employees) six nests were located by June 17. Clutch size in these nests was the following: 8, 8, 7, 6, 6 and 3 (aver. 6.2). This compares to an average clutch size of 6.5 in 1969 and 7.1 in 1970.

Although the clutch size sample in 1971 is very small, it appears to indicate a continuing decline in numbers of ptarmigan and should be reflected in less territorial males in the spring of 1972.

Several findings which seem worth mentioning prior to statistical analysis are the following:

1. 1969 can be characterized as the first year of declining populations, following the 1968 peak.

2. In the past, clutch size has continued to decrease during this phase of the "cycle". During 1970 the anticipated decrease did not occur, as evidenced by clutch size on both collecting area and control area. The breeding population continued to decrease in 1971 and clutch size in the same year suggests a continuing decrease in the 1972 breeding population. (See table below.)

Eagle Creek (Control)	1968	1969	1970	1971
No. of territorial males	120	113	102	92
Ave. clutch size (no. of nests)	7.5(15)	6.5(11)	7.2(13)	6.3(6)
Collection area	-	6.6 (3)	8.0 (8)	-

3. Crop contents of females collected in 1969 contained a higher proportion of berries (high in soluble carbohydrates) and lower in proportion of birch buds (high in N and P) than those females collected in 1970.

4. Cecal length of females in 1970 appears to be greater than those of females collected in 1969. This would be expected with respect to previously mentioned dietary constituents.

5. Linear measurements of spleens indicate those from females collected in 1969 were larger than those from females collected in 1970. Spleens of adult females in 1970 were larger than those of juvenile females. Large spleen size was noted by Chitty (1957) in *Microtus agrestis* and he found that the largest spleens occurred in dense breeding populations. Spleen size of females collected in 1971 appears to be similar to that of 1969 but separation as to age has not been conducted.

6. Preliminary comparisons of females collected in 1969 with females collected in 1970 indicate that the 1969 breeding stock was larger in many of the measurements taken. This appears especially true with respect to birds collected in late April (before any appreciable ovarian growth, i.e., largest follicle 3.5 mm. or less). This evidence suggests that poor winter range may have caused the early seasonal changes observed and/or mortality affecting only a specific segment (birds of light weight) of the population occurred in the winter of 1969 and not during the winter of 1970. At the time egg-laying commenced these apparent differences between females breeding in 1969 and 1970 no longer existed. Since the 1970 females were consuming a diet higher in N and P than the 1969 females, one would expect greater improvements in condition prior to egg-laying, and loss of the apparent differences observed earlier in the breeding season.

Bergerud (1970) reported a decrease in weight of Newfoundland willow ptarmigan during a population decline. However, for reasons stated above, it appears the spring range in 1970 was of higher quality than 1969 enabling breeding females to improve rather than lose condition as might have been expected.

The apparent increase in clutch size from 1969 to 1970 might be explained by the higher quality diet in 1970 but this does not explain the continuing (on to 1971) decrease in the breeding population. Perhaps the improvement in range quality was great enough to improve clutch size and quality of young hatched, but more than the normal number of birds succumbed to the harsh winter of 1970-71, characterized by record snow depths.

Future Plans

Plans for next year include completion of all laboratory work and statistical analysis of data.

Arrangements have been made to have chemical analysis of constituent foods from crops conducted by the Unit of Grouse and Moorland Ecology at the Nature Conservancy in Banchory, Scotland. Analysis will be designed to demonstrate chemical changes that occur in food species within each spring, between each spring over the three years and possible variations between juvenile and adult female birds within and between the three years of study.

REFERENCES

Bergerud, A. T. 1970. Population dynamics of the willow ptarmigan *Lagopus lagopus alleni* L. in Newfoundland 1955 to 1965. Oikos, 21(2):299-325.

Chitty, D. 1957. Self-regulation of numbers through changes in viability. Cold Spring Harbor Symp. Quant. Biol. 22:277-280.

PREPARED BY:

Ronald Modaferri
Graduate Student

SUBMITTED BY:

David R. Klein
Wildlife Unit Leader

JOB PROGRESS REPORT (RESEARCH)

State: Alaska

Cooperators: Wayman E. Walker and David R. Klein

Project No.: W-17-3 Project Title: Research Unit Studies

Job No.: 19.6R Job Title: Ecological Investigations of the Gyrfalcon in Alaska

Period Covered: July 1, 1970 to June 30, 1971

SUMMARY

Comparisons were made between 183 "prepesticide" gyrfalcon eggshells at the Museum for Vertebrate Zoology, University of California, and 13 recent eggshells from the Seward Peninsula. The Seward sample was 8 per cent lighter in weight significance ($P < .05$). A 3 per cent difference in shell thickness was not statistically significant.

Only a small number of breeding gyrfalcons could be located on the Seward Peninsula in 1971 compared to 1970 (1971 - 9 nests, 1970 - 49 nests). Nesting pairs of other cliff-nesting raptors were also greatly reduced. Some nonbreeders were located; however, it is possible that many pairs that formerly nested on the Peninsula may have bred elsewhere this spring. The unfavorable winter conditions on the Seward Peninsula are described briefly.

OBJECTIVES

To investigate the breeding biology and ecology of Alaskan gyrfalcons *(Falco rusticolis)* and to assess the chlorinated hydrocarbon pesticide contamination in the gyrfalcon and its important prey species.

RESULTS

Fieldwork, Summer of 1970

Investigations into the breeding biology and ecology of the gyrfalcon were carried out on the Seward Peninsula during the period 25 May to 24 August, 1970, using Nome as operational base. Fifteen active gyrfalcon nests were visited a total of 30 times, with an additional 23 visits made to sites either known to harbor gyrfalcons during previous years, or a habitat type favored by the birds. Most of these additional sites were used by one of the other large, cliff-nesting birds found in the area; namely, rough-legged hawks *(Buteo lagopus)*, golden eagles *(Aquila chrysaetos)* or ravens *(Corvus corax)*.

Hatching was highly asynchronous between pairs, with the earliest hatch occurring on or about 16 May and the latest observed on 15 June. The majority of nests observed had hatched before 26 May. It is possible, however, to accurately age young in the nest and establish a hatching date to the nearest two days. Mean clutch size was 3.55 (n=11) with about equal numbers of 3-egg and 4-egg clutches. Two clutches (13%) failed to hatch. Another two nesting attempts failed, one because the stick nest fell off the cliff face, the other because of human interference.

Fledging was likewise asynchronous. Nestlings spent about 50 days in the nest, with most young flying by 21 July. Mean fledging was 3.00 (n=11) for those pairs which successfully hatched young. The sex ratio was 14 female to 11 male young.

Thirty-eight gyrfalcons were banded, including eight breeding adults (six female, two male). In addition, 21 nestling rough-legged hawks were banded. One young gyrfalcon, banded at a study nest, was trapped 39 days after fledging about 12 miles from the nest site.

Fieldwork, Winter of 1971

The week of 23 February to 2 March was spent on the study area, based at Nome. No gyrfalcons were seen during this time. Coverage included over 200 miles of snowmachine travel, checking known eyries and perches for sign, and luring with pigeons. The area containing the Penney, Snake, Flambeau and Eldorado rivers was searched in a radius of about 25 miles from Nome. One group of 20-25 ptarmigan was sighted at the mouth of the Flambeau River on 1 March; only two other ptarmigan were encountered the entire time.

Snow conditions at Nome were unusually severe: deep snow had left very little willow *(Salix spp.)* exposed, and an ice crust capable of supporting a man's weight had formed on top. It appears that the lack of food and shelter had precluded the presence of larger numbers of ptarmigan in the area. Reliable local sources reported ptarmigan numbers near Nome to be very low.

Gyrfalcon Eggshell-thickness Studies

Ratcliffe (1967) showed that a marked change in the weight and the ratio of weight/size occurred in the eggshells of *Falco peregrinus* and *Accipiter nisus* coincident with the introduction of DDT into general use. This ratio (Ratcliffe's or shell-thickness index) was thought to be indicative of eggshell thickness; and, in fact, Hickey and Anderson (1968) showed this index was indeed a meaningful statistic. They were also able to conclude that the spectacular raptor population crashes in both the U. S. and Western Europe have had a common physiological basis, and signifcant decreases in shell thickness and weight are characteristic of those crashes. Breakage increases with thinner shelled eggs, resulting in the population declines. As shown by Peakall (1967), such eggshell thinning can result from the derangement of calcium metabolism caused by the breakdown of steriods by hepatic microsomal enzymes induced by exposure to low dietary levels of chlorinated hydrocarbons.

Consequently, measurement of eggshell thickness has become an important parameter in trying to assess the present condition of other raptor species with regard to possible extinction (Enderson and Berger, 1970). Levels of chlorinated hydrocarbon pesticides, especially the major contaminant found in biological systems, o, p'-DDE, have been shown to be correlated to eggshell thickness (Hickey and Anderson, 1968; Enderson and Berger, 1970). For these reasons, recent gyrfalcon eggshells were measured and compared to a prepesticide data base.

Thirteen whole gyrfalcon eggshells are available from the study area: nine collected during 1970 and four from 1968. The 1968 eggshells were blown through holes less than 2 mm. in diameter. Shells from 1970 were measured, then halved with a scalpel, and the contents stored frozen for later pesticide determinations. Insides of all shells were thoroughly rinsed to wash out any adhering contents, then shells were dried at room temperature for five months. All shells were weighed with the shell membrane intact. Data are presented in Table 1.

While visiting the Museum for Vertebrate Zoology at Berkely, Dr. L. G. Swartz weighed and measured 183 prepesticide gyrfalcon eggshells. This information was punched on Hollerith cards and processed by computer. This sample serves as a data base for comparison with recent eggshells.

Ratcliffe's index (wt./length x breadth) was calculated for all eggshells. Eggshell weight and index statistics are summarized in Table 2. Both eggshell weight and thickness are lower in the recent Seward Peninsula sample. The recent shells differed significantly ($P < .05$) by weight, with means 8 per cent lower than the prepesticide sample. The 3 per cent difference in thickness index was not significant.

Table 1. Gyrfalcon Eggs from the Seward Peninsula.

Sample No.	Weight Whole g	Length x Breadth cm	Eggshell Weight* g	Thickness** Index
1968				
$68\text{-}E_1$	42.6	5.44 x 4.09	5.203	2.34
$68\text{-}E_2$	41.6	5.15 x 4.10	5.344	2.53
$68\text{-}E_3$	65.0	5.94 x 4.70	6.482	2.32
$68\text{-}E_4$	63.6	6.28 x 4.59	6.103	2.12
1970				
$70\text{-}E_1$	53.95	5.68 x 4.35	5.62	2.27
$70\text{-}E_2$	--	5.67 x 4.43	5.34	2.13
$70\text{-}E_3$	--	5.70 x 4.48	5.09	1.99
$70\text{-}E_6$	62.2	5.90 x 4.71	5.75	2.07
$70\text{-}E_7$	59.7	5.89 x 4.63	5.86	2.15
$70\text{-}E_8$	60.4	5.93 x 4.63	5.84	2.13
$70\text{-}E_9$	57.3	5.93 x 4.57	5.17	1.91
$70\text{-}E_{10}$	54.6	5.90 x 4.55	5.10	1.90
$70\text{-}E_{11}$	47.9	5.93 x 4.39	5.90	2.67
$70\text{-}EH_{12}$	--	6.10 x 4.40	--	--
$70\text{-}EH_{13}$	--	5.80 x 4.53	--	--
$70\text{-}EH_{14}$	--	5.85 x 4.52	--	--
$70\text{-}EH_{15}$	--	5.86 x 4.67	--	--

* Weight of whole shells with shell membrane attached.

** Index = weight/(length x breadth).

Table 2. Statistical Summary.

	N	$\bar{X}$±95% C.L.	Standard Deviation	Variance	Range
Eggshell Weights					
Prepesticide (Museum)	183	6.097±0.055	0.3771	0.6140	4.34-7.82
All Seward Peninsula	13	5.600±0.1201	0.1878	0.4333	5.09-6.48
1970 Seward Peninsula	9	5.519±0.091	0.1176	0.3429	5.09-5.90
Ratcliffe's Index					
Prepesticide (Museum)	183	2.268±0.004	0.0288	0.1697	1.81-2.76
All Seward Peninsula	13	2.195±0.0033	0.0518	0.2275	1.90-2.67
1970 Seward Peninsula	9	2.136±0.042	0.0544	0.2332	1.90-2.67

Comparison to Prepesticide Sample

	% Change	T-test Value	Probability of Occurrence
Eggshell Weights			
All Seward Peninsula	-8	2.230	< .025
1970 Seward Peninsula	-9	2.181	< .025
Ratcliffe's Index			
All Seward Peninsula	-3	0.611	< .30
1970 Seward Peninsula	-6	0.931	< .20

Significant eggshell thinning has been observed in U. S. peregrine (Hickey and Anderson, 1968) and prairie falcons (Enderson and Berger, 1970), with the recent shell thickness indices respectively 19% and 15% lower than in prepesticide shells. Canadian prairie falcon indices are 11% lower, which change is apparently sufficient to cause population decline (Fyfe, et al., 1969), while peregrines at Ungava laid shells with indices 21% lower than prepesticide indices (Berger, et al., 1970).

Although gyrfalcon eggshells from the Seward Peninsula do not presently show significantly lower indices, it is probable that the observed differences are the result of chlorinated hydrocarbon contamination. It is interesting to note that weights do differ significantly. This implies that the prepesticide sample may be grouped by locality, and that Alaska is not sufficiently represented, or that weight may be a more sensitive indicator of eggshell change. The prepesticide sample is presently being tested for grouping. The actual thicknesses of the recent sample will be measured and compared to the thickness-index data. Together, these tests may explain the observed differences in eggshell weights.

Preliminary Results of Fieldwork, Summer, 1971

The 1971 breeding season was markedly different for gyrfalcons compared to 1970. A drastic reduction in the number of breeding pairs has occurred to the extent that, with the surveying work essentially completed, the breeding located number not more than 10% of those found in 1970. This condition is not unique to gyrfalcons among the cliff-nesters, nor is a highly localized area only affected; it is evident over the entire Seward Peninsula. A comparison of the two summers is made in Table 3.

Table 3. Nesting raptors* located - Seward Peninsula.

Species	1970	1971
Gyrfalcon	49	9**
Rough-legged hawk	84	7***
Golden eagle	16	5
Ravens	21	4

* Ravens included as they occupy identical nesting situations, and do, in fact, create suitable nesting situations for gyrfalcons by their nest constructions.

** Three as yet unconfirmed, one failed.

*** Two failed, two unconfirmed.

It is clear the small number of breeding gyrfalcons during this year is a drastic reduction from the 1970 population, and in fact, is unprecedented during the three previous breeding seasons. The cause of this reduction is, of course, the intriguing biological question. Starvation has been considered the principal killing factor for gyrfalcons (Cade, 1960 p. 209 and others) and of this there can be little doubt. In particular, low gyrfalcon numbers are found corresponding to "cyclic lows" of ptarmigan or other food sources. The year-to-year variation of gyrfalcon numbers seems to be large when compared to either peregrines or prairie falcons.

An attractive conclusion is that a severe winter limited food supply and many gyrfalcons starved, thus few are breeding the following summer. However, major prey species are now numerous; if anything there are more ptarmigan in 1971 than in two preceding summers. Although perhaps not south of the Kigluaik Mountains, these ptarmigan were available food for gyrfalcons during the winter. For gyrfalcons to starve, they must have been unable to follow the movements of ptarmigan flocks. But this seems highly unlikely as "Nome-area" ptarmigan probably did not leave the Seward Peninsula, which should be well within the movement capability of gyrfalcons.

If gyrfalcons did not starve during the winter, it is clear they moved, and perhaps simply did not return to the area which was left. This would be especially well-supported if gyrfalcons were found doing well elsewhere on the Peninsula. Unfortunately, this is not the case. Gyrfalcon are as scarce in the northern half as in the Nome area; the reduction is Peninsula-wide. This leaves the possibility that if gyrfalcons moved during winter, it was completely off the Peninsula, to which few returned. Cade (pers. corres. with L. G. Swartz) states that gyrfalcons on the Colville River as of June 21 are "doing great" which lends at least preliminary support to the premise that movement off the Peninsula might have occurred.

Another possibility is that gyrfalcons survived the winter, moved and returned, yet found conditions unfavorable enough to abort any nesting attempts early in the spring. This is suggested by observed instances of nonbreeding individuals. To date, four examples of single birds at least partially "residing" at rock outcrops and two examples of paired birds not breeding have been found. However, these few examples are not sufficient to support any general conclusions.

Whatever the cause or causes of the observed reduction in breeding gyrfalcons, the present study has been placed in a good position to document a gyrfalcon population drop and recovery. Three years of population data exist for the area. This fourth season witnesses the reduction, and following years should see a recovery of the population. Fluctuations in gyrfalcon numbers have been thought to be irregular events. This decline affords the first chance to document such an event on a meaningful scale.

Other Activities

Chromatographic pesticide analyses are underway at the Department of Biological Science, University of Alaska, with the capability of qualitative and quantitative determination of lindane, aldrin, heptachlor, heptachlor epoxide, o, p'-DDT, p, p'-DDT, p, p'-DDE (TDE), o, p'-DDE, dieldrin, endrin, and the PCB compounds known as Arochlor 1254, 1260, and 1262. Of these, o, p'-DDE, DDT dieldrin, and PCB constitute the major constituents found in falconiform residue analyses.

Techniques pertinent to the determination of these substances, especially the polychlorinated biphenysl (PCB) were studied during several days at the laboratory of R. W. Risebrough, University of California at Berkeley, in January.

Pesticide analyses will continue, with the majority of samples finished before summer. Replicate samples of both whole-body homogenates and extracted fat are being kept frozen to allow the application of techniques of pooling the reanalysis with modified procedure. Furthermore, these will in part be analyzed at some other laboratory to check determinations made here.

Radio-tracking

The present model of micro transmitter weighs 10 grams and measures 2 1/2 x 1 1/4 x 1 1/4 mm., excluding the whip antenna. The life of these units exceeds two weeks, but greater life expectancy can be achieved by substituting larger mercury cells. Ranges greater than six miles, surface-to-surface, have been achieved. The lack of birds breeding on the study area has thwarted plans to radio-track adjacent gyrfalcon pairs during the summer.

Time-lapse Photography

Time-lapse 35 mm. photographs of a single nesting site were obtained during 1970. Photographs were taken during the period post-hatch to fledging. Female nest attendance, brooding, feeding times and frequencies, and other behavior associated with successful production of young were easily extracted from these photographs.

This time-lapse study indicated a powerful tool was available in time-lapse studies of bird nestings. Four camera units have been constructed to expose "super-8" movie film frame-by-frame at a preset interval. Each unit is contained in a weatherproof ammunition box. The present triggering method is a variable timer, allowing preset intervals of 10 seconds to four minutes with accuracy near ± 1% at three minutes. Other triggering methods can be used, however. Camera firing is quiet. The power sources are a single number 732 12-volt Lantern cell and 4 AA alkaline penlight cells.

Only one gyrfalcon nesting has been available for photography--ruining plans to have four units running simultaneously. This nesting failed during incubation so that only a brief record will be available this year.

Incubation Temperature

Two dummy eggs were constructed and a temperature-sensitive Hartley oscillator designed and built. Placing these transmitters into the dummy eggs resulted in a temperature transmitter accurate to ± 0.5°C operating continuously. The signal from this transmitter can be picked up on any transistor AM radio, without modification. Ranges can be extended where necessary most cheaply by a length of coaxial cable. The lack of gyrfalcon breeding attempts and the failure of one attempt made it impossible to determine incubation temperature this year.

LITERATURE CITED

Cade, T. J. 1960. Ecology of the peregrine and gyrfalcon populations in Alaska. Univ. of California Publications in Zoology, Vol. 63, p. 209.

Enderson, J. H. and D. D. Berger. 1970. Pesticides: eggshell thinning and lowered reproduction of young in prairie falcons. Bioscience, 20:356-357.

Fyfe, R. W., et al. 1969. Regional population declines are organochlorine insecticides in Canadian prairie falcons. Can. Field. Nat., 83(3): 191.

Hickey, J. and D. W. Anderson. 1968. Chlorinated hydrocarbons and egg-shell changes in raptorial and fish-eating birds. Science, 162:271.

Peakall, D. B. 1967. Pesticide-induced enzyme breakdown of steriods in birds. Nature, 211:505.

Ratcliffe, D. A. 1967. Decrease in eggshell weight in certain birds of prey. Nature, 215:208.

PREPARED BY:

Wayman E. Walker
Graduate Student

SUBMITTED BY:

David R. Klein
Wildlife Unit Leader

JOB PROGRESS REPORT (RESEARCH)

State: Alaska

Cooperators: Donald Calkins and Peter C. Lent (Assistant Unit Leader)

Project No.: W-17-3 Project Title: Research Unit Studies

Job No.: 19.8R Job Title: Ecology and Behavior of Sea Otters in Prince William Sound

Period Covered: July 1, 1970 to June 30, 1971

SUMMARY

Results of four surveys taken between May 1 and June 18 are presented. Preliminary indications are that the feeding habits of the otters in Prince William Sound differ greatly from otter feeding habits at Amchitka.

OBJECTIVES

To gather information on the feeding behavior diurnal and seasonal movements activity patterns, and intraspecific competition of sea otters *(Enhydra lutris)* in Prince William Sound, Alaska.

General

Field work on this project began on September 13, 1970, when the investigator, advisor and field assistant went to Prince William Sound. One week was spent in the field. During this week we familiarized ourselves with the study area and the sea otter populations in Prince William Sound.

The trip began with aerial surveys of both Hinchenbrook and Montague islands. Large concentrations of otters (30 or more) were sighted in Constantine Harbor on Hinchenbrook Island, on the southeast side of Green Island, and in Stockdale Harbor on Montague Island. Stockdale Harbor lies north of and adjacent to Port Chalmers. We landed and set up our camp at this location having previously decided this area was the best possible site for the study.

The following week was spent in daily observations of the sea otters' behavior carried out both from land and from a boat. No specific conclusions can be drawn from these observations but it was noted at that time that the feeding habits of the otters appeared to differ from those studied at Amchitka Island.

The Stockdale Harbor area on Montague Island, Port Chalmers and the shallow straits between Green Island and Montague Island were selected as the best locations for this study to take place.

Field work was halted on September 20, 1970, and begun again on May 17, 1971, when the investigator and field assistant were transported to Montague Island aboard the vessel "Montague."

A permanent base camp was established on a small inlet between Port Chalmers and Stockdale Harbor. Problems were encountered in obtaining a boat suitable for the study. A 16-foot aluminum skiff was delivered by U. S. Fish and Wildlife Service aircraft on June 10. At this time the study got fully underway and continued until September 1, 1971.

Results

At this time only a few preliminary observations can be reported.

Surveys

Three aerial surveys of the area have been accomplished and one survey has been taken by boat. The results of these surveys are as follows:

1. May 7, 1971: Aerial survey in U. S. Fish and Wildlife Service goose of Montague Island coastline from Graveyard Point to logging camp, around the coastline of Green, Little Green and Channel islands, and over the area between Green Island and Montague Island.

Total otters sighted: 119.

Groups and Concentrations: 35 at north end of Little Green Island, 20 one-half mile south of Port Chalmers, 10 at south tip of Port Chalmers, 5 in inlet of present camp. Remainder of animals were in pairs or singles scattered throughout study area.

2. May 24, 1971: Aerial survey of Montague Island coastline from Graveyard Point to logging camp from U. S. Fish and Wildlife Service supercub.

Total otters sighted: 17.

Groups and Concentrations: The largest group sighted was three on the south side of Stockdale Harbor. The rest were scattered singly or in pairs along the coast.

3. June 16, 1971: Aerial survey using a BLM Grumman goose from Graveyard Point along Montague Island coastline to logging camp, around coastlines of Green, Little Green and Channel islands and the waters between Montague Island and Green Island.

Total otters sighted: 176.

Groups and Concentrations: 30 between Channel Island and Green Island, 13 at southern tip of Green Island, 8 one mile south of Port Chalmers one-half mile out, 7 at southwestern side of Green Island. The remainder were scattered throughout study area with many concentrated in Gibbon Anchorage and the west side of Green Island.

4. June 18, 1971: Boat survey of Montague Island coastline from Graveyard Point to logging camp.

Total otters sighted: 27.

Groups and Concentrations: The largest group sighted was three in the lagoon called Ookshilk Lagoon after the Eskimo village which was located on the south side of Stockdale Harbor. The rest were scattered singly or in pairs along the coastline.

Behavioral Observations

Two observation posts on land at advantageous points were established and a blind obstructed at one. The first site was selected on the south side of Stockdale Harbor and the second in the middle of Port Chalmers.

The efforts have been concentrated on gathering information of the feeding habits of the otters in the area. Food items which appear to be important to otters in the Montague Straits area are clams, crabs and sea stars. A total of 48 close observations have been made of otters eating clams, 13 eating crabs, 5 eating sea stars and 17 observations of unidentified foods.

No attempt at species identification has been made so far but collections of food species represented in the area have been started and are preserved for later identification.

PREPARED BY:

Donald Calkins
Graduate Student

SUBMITTED BY:

Peter C. Lent
Wildlife Assistant Unit Leader