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JUNEAU, ALASKA

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MARINE MAMMAL REPORT

by

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Volume VIII
Annual Project Segment Report
Federal Aid in Wildlife Restoration
Project W-14-R-1 and 2, Work Plan G

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(Printed April 1967)

WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO.: W-14-R-1 and 2 TITLE: Marine Mammal Investigations

WORK PLAN: G TITLE: Sea Lions, Sea Otters, Hair Seals,
and Beluga Whales

JOB: 1 TITLE: Sea Lions

PERIOD COVERED: January 1, 1966 to December 31, 1966.

OBJECTIVES

To determine factors relating to the breeding biology and productivity of sea lions.

To classify rookery and hauling out grounds in accordance with the type of animals frequenting them.

To obtain data on the movement of sea lions.

To obtain information on the timing of the first molt of pups.

To monitor all commercial operations engaged in the harvest of sea lion pups and adults.

TECHNIQUES

Reproductive tracts and lower jaws were collected from 11 female sea lions on October 24-25, 1966 on Marmot Island. The ovaries were cut into sections of one to two mm in thickness and were examined for Corpora lutea and Corpora albicantia. Each ovary was weighed and the size of Corpora lutea and Corpora albicantia recorded. The reproductive tracts were preserved in 10 percent formaldehyde. The uteri were examined for embryos and when found, a crown-rump measurement was taken.

A preliminary investigation of the molt of sea lion pups was made by examining pelage specimens from animals collected in July, August, and October. From each sea lion, a strip of skin about 10 cm square was cut from the center of the back between the front shoulders. The square was then fleshed, stretched and tacked on a small board which was then submersed in 10 percent formaldehyde. After a week, a piece of skin measuring approximately 2 cm by 8 cm was cut from each square and stored individually in small vials containing formaldehyde. Later, the specimen was prepared for examination by cutting thin

slices parallel to the lay of the roots. A typical slice is about 1 mm thick and 10 mm wide. At least five slices were cut from each specimen. Examination of the slices was made under a low power microscope. Isopropanol or cedarwood oil was used as a medium for mounting the slides.

In conjunction with the molt investigations of sea lions, 16 pups were selected and skinned and later shipped to a tanning firm in Europe where they were examined for bites, scratches, and hair loss before and after tanning.

Sea lion pup harvesting operations on Sugarloaf Island and Marmot Island were monitored by Department personnel. Sugarloaf Island was closed to the taking of pups by emergency regulation on June 16.

FINDINGS

Reproduction

With the prospects of harvesting adult animals becoming more a certainty and the continuation of pup harvesting each year, it is becoming increasingly important that we learn more about reproduction in these animals. Many aspects of reproduction in Steller sea lions are not known or have not been definitely established at this time. Some of the basic facts that must be established are (1) age of sexual maturity (2) age specific birth rates (3) frequency of pup production (4) time of implantation, and (5) embryo development and intra-uterine mortality. In the past, almost all of the specimen material collected has come from animals taken during the summer months when they are giving birth and are breeding. As a result, only a very limited amount of information has been collected. Also, there has been no commercial harvests of adult animals for more than six years and most of those taken were males; so specimen material has been difficult to obtain. The inaccessibility of sea lions, especially during the fall, winter and spring months when weather is particularly bad, has also been a strong deterrent to collecting suitable specimens.

In an attempt to fill these big gaps in our knowledge of the sea lion, an effort is being made to collect a selected number of adult females and males during the fall, winter, and spring months. The first of these collections was made on October 24-25, 1966, when 11 adult females were collected on Marmot Island. The sample size is too small to draw any firm conclusions from the material but a number of preliminary hypotheses can be postulated.

Laboratory examination of the 11 sets of ovaries showed the presence of a Corpus luteum of pregnancy in 9 of them. Two of the sets of ovaries did not have Corpora lutea and cursory examination of the uteri did not reveal any signs of the animals being pregnant. In 7 of the 9 reproductive tracts in which a Corpus luteum of pregnancy was obvious, an embryo was found. These ranged in size from 27 mm to 84 mm, crown-rump length. In 2 instances a Corpus luteum of pregnancy was present but no embryo was found. A blastocyst was not found in the uterus, but a detailed examination was not made and it would have been very easy to overlook the presence of one. On the basis of this small sample, it would seem that implantation is delayed for about 3

months in Steller sea lions. More extensive collecting to be carried on in the future will show whether this tentative conclusion is correct.

Molt

A cursory examination of collected sea lion pup pelage specimens was made to gain an understanding of the timing of the first molt of pups and to pave the way for future, more detailed studies of the structure, growth and replacement of the fur fibers.

In 1965, pelage specimens were taken from 60 pups on Sugarloaf Island. Ten specimens from freshly killed pups were collected each week, starting on June 5 and ending on July 6. Examination of the hair roots revealed all to be in a resting state. On July 25, pelage specimens were taken from 10 sea lion pups on Marmot Island and on August 3, six additional specimens were collected. A few hair roots from each specimen exhibited some follicular activity, indicating the very first stages of the molting process had begun. No collections were made after August 3 in 1965.

In 1966, a total of 26 pelage specimens were collected on Marmot Island. Examination of ten specimens collected on July 23 revealed all hair roots to be in a resting state. Ten specimens collected on July 30 had a number of hair roots which were just beginning to grow new hair fibers. Examination of six specimens collected on October 25, revealed all to be molting with all the hair roots showing a high degree of follicular activity.

The findings, therefore, indicate that Steller sea lion pups in the latitude between 58° North and 59° North begin to molt about the last week in July and are still molting as late as October 25. No pelage specimens were collected after that date and it is not known at this time when the molt is completed.

While the harvest of sea lion pups was taking place on Sugarloaf Island during June 1966, 16 selected pups were skinned, salted and sent to a tannery in Norway where they were tanned and examined for defects in the hide. Pups harvested in 1965 and 1964 had shown that up to 60 percent of the animals harvested had patches of hair missing, and it was not known what was causing the hair loss.

The pups selected for the sample were all looked over carefully before and after they were collected. Notes were taken on the appearance of the hide, fat disposition, bruise marks, age of the animal and how the pelt was handled between the time it was killed and the time it was salted. Air temperatures and weather conditions were also recorded.

Before the animals were collected it was felt that the high number of damaged skins may have been due to poor handling techniques of the hunters. As a result, particular attention was given to the manner in which the skins were handled from the time they were collected to the time they were shipped to Europe.

Because there are so many variables which may affect the quality of any one pelt, it was not possible with the small sample collected to arrive at any definite conclusions. However, the experiment did indicate that the cause of hair loss probably was not due to poor handling techniques on the part of the hunter. Rather, it appears that the pelts are damaged as a result of females and occasionally males picking the pups up with their teeth. Surface scars and skin punctures were evident on a number of pelts, resulting in hair loss. Even when the teeth of the adult animals did not penetrate the hide of the pup, sufficient tissue damage often resulted to later cause a loss of hair at that spot.

Overall, pelt quality diminished as the season progressed, and it is doubtful that they should be taken after June 30. By that time the number of pelts with hair missing in spots is so great that it is not economically feasible for a furrier to repair the skin and make it suitable for the garment industry.

Harvest

Sea lion pups were harvested during June on three islands with the total harvest amounting to 3,907 animals. Sugarloaf Island produced a take of 1,400 pelts, Marmot Island yielded 1,650 pelts and 857 were taken on Akutan Island. Sugarloaf Island was the only area where the harvest amounted to 50 percent of the pup production on the island, and as a result was closed to harvesting on June 16. The take on Marmot and Akutan Islands was considerably below the limit of 50 percent of the pup production now imposed on each island.

The harvest on Sugarloaf Island in 1966 was 605 pelts less than the harvest in 1965 and was at least 1,500 pelts less than what could have been taken in 1964. The adult sea lion population, as indicated by ground surveys made during June, 1966 has been falling off each year since 1963, when the island was first visited. The cause of the decline is not clearly understood: no adults are harvested, and the harvest of pups has not been large enough to cause a decrease. At least three possibilities exist: 1) The decline is due to a normal fluctuation in animal numbers, 2) The Island sank approximately 5 feet as a result of the March 27, 1964 earthquake which may have resulted in a significant reduction of suitable habitat on the island, and 3) The constant disturbance by the sea lion hunters may be causing a number of females to go to other islands to give birth to their young.

Marmot Island, on which harvesting of pups has taken place in 1965 and 1966, shows no signs of the sea lion population declining. In fact, the population may actually be increasing. It is possible that females from Sugarloaf Island may be going there to have their young. Marmot Island is approximately 50 miles from Sugarloaf Island.

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WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO.: W-14-R-1 and 2

TITLE: Marine Mammal Investigations

WORK PLAN: G

TITLE: Sea Lions, Sea Otters, Hair Seals
and Beluga Wales

JOB: 2

TITLE: Sea Otter

PERIOD COVERED: January 1, 1966 to December 31, 1966

OBJECTIVES

To determine population abundance, distribution, and trends of sea otters in coastal areas from Prince William Sound to the Shumagin Islands.

To obtain information relating to the molt, breeding biology and food habits of the sea otter in selected parts of its range.

To refine techniques already developed for transplanting sea otters and to transplant animals to various sites in Southeastern Alaska.

TECHNIQUES

In 1965, twenty-three sea otters were transplanted from Prince William Sound to Southeastern Alaska (Figure I). A detailed description of catching, holding and transporting techniques, and equipment utilized appeared in Volume VII, Annual Project Segment Report, Federal Aid in Wildlife Restoration, Project W-6-R-6 and W-14-R-1, Work Plans G-b, G, Title - Sea Otter. In 1966, a similar transplant was carried out in much the same manner. Since the various techniques and equipment have been previously described, they will not be repeated here except in a general way and where the operations deviated significantly from the procedures first described.

Capture

Sea otters were captured in the area surrounding Port Chalmers and Green Island in Prince William Sound. Seven large mesh nylon gillnets were again used as in 1965 and were set in kelp beds normally frequented by otters. The nets were held in place by attaching an anchor and line to a large float tied to one end of the cork line. The opposite end of the net was free to drift with the tidal currents.

When weather permitted, the nets were checked twice a day; once early in the morning and again late in the evening. At this time any otters that were entangled in the net were removed and the nets cleaned of debris and straightened.

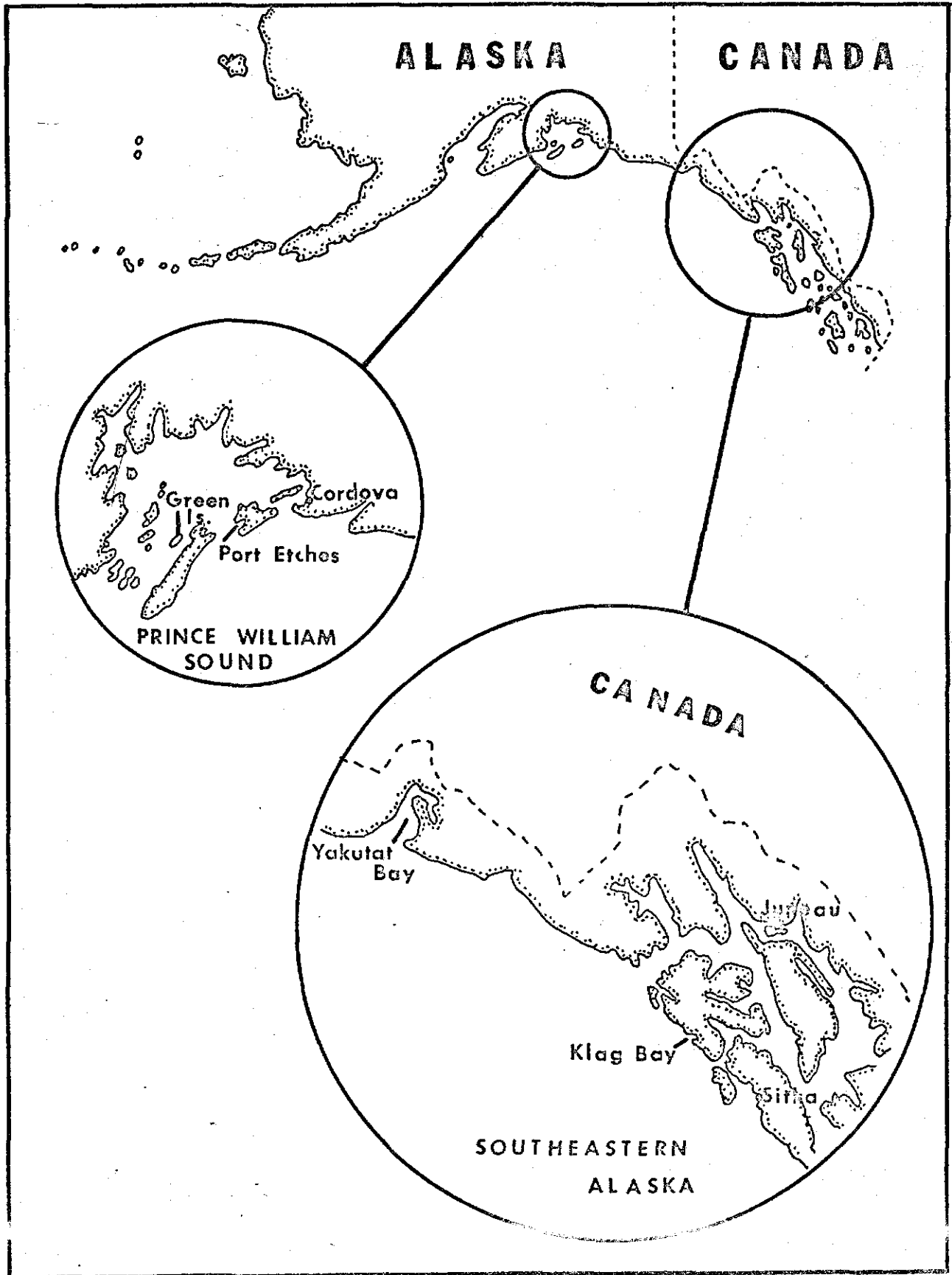


Figure 1. Capture and Release Sites, 1966, Sea Otter Transplants

A monel cattle ear tag (Style M-19 of National Band and Tag Company, Newport, Kentucky) was attached to one of the hind flippers of each animal, generally before it was removed from the net. In some instances, the tag was attached after the animal was cut free. By lifting the animal by its hind flippers and getting most or all of its body off the ground, a tag can be clamped on without too much difficulty and without injury to the animal.

During the 1965 transplant operation all otters captured were first given an injection of a tranquilizer (Tranvet) before they were removed from the net. The dosage varied with the size of the animal. This procedure was changed in 1966, with only a few of the animals receiving a small injection (less than 5 mg.). Animals which appeared to be extremely excited were given a small injection. Also, when two animals were entangled in the net close to one another, an injection of tranvet was occasionally administered to facilitate removal of the otter.

Holding

Once captured, the otters were held in a floating enclosure. The enclosure consisted of a styrofoam log catwalk from which a 2" stretched mesh nylon net was suspended to form a pool which measured approximately 4' deep by 19' long, by 14' wide. A chicken wire fence which surrounded the outside edge of the enclosure in 1965 was replaced with a 2" mesh knotless nylon net.

The enclosure was anchored offshore where tidal currents passing through the webbing kept the pool area clean.

The otters were generally fed live Dungeness crab four times daily with each otter receiving an average of about three crab per meal. A live-box constructed by cutting the bottom out of a two man rubber life raft and suspending a small mesh nylon net from it provided a means of holding up to 800 lbs. of crab.

Transporting

When ten or more animals suitable for transplanting were held in the enclosure, an amphibious Grumman "Goose" was flown to the area and the otters were readied for shipment. A 30" salmon landing net was used to recapture the animals within the enclosure. While still in the landing net, the animal was placed in a squeeze box (Figure II) to facilitate injection of "Tranvet". The dosage administered varied depending on the size of the animal, but never exceeded 10 mg at a time. An otter weighing 50 to 60 pounds was generally given 5 mg. Otters transplanted in 1965 were given a minimum of 10 mg and large animals were given as much as 30 mg.

From the squeeze box the otter was transferred to a cage 18" x 40" x 20" high and placed aboard the aircraft. The cages were constructed to hold about three inches of water in the bottom and had 2" stretched mesh knotless nylon around the sides to allow air to circulate within the pen. Water was poured into the pens prior to take-off and additional water, carried in 5 gallon

2" Foam rubber covered with canvas

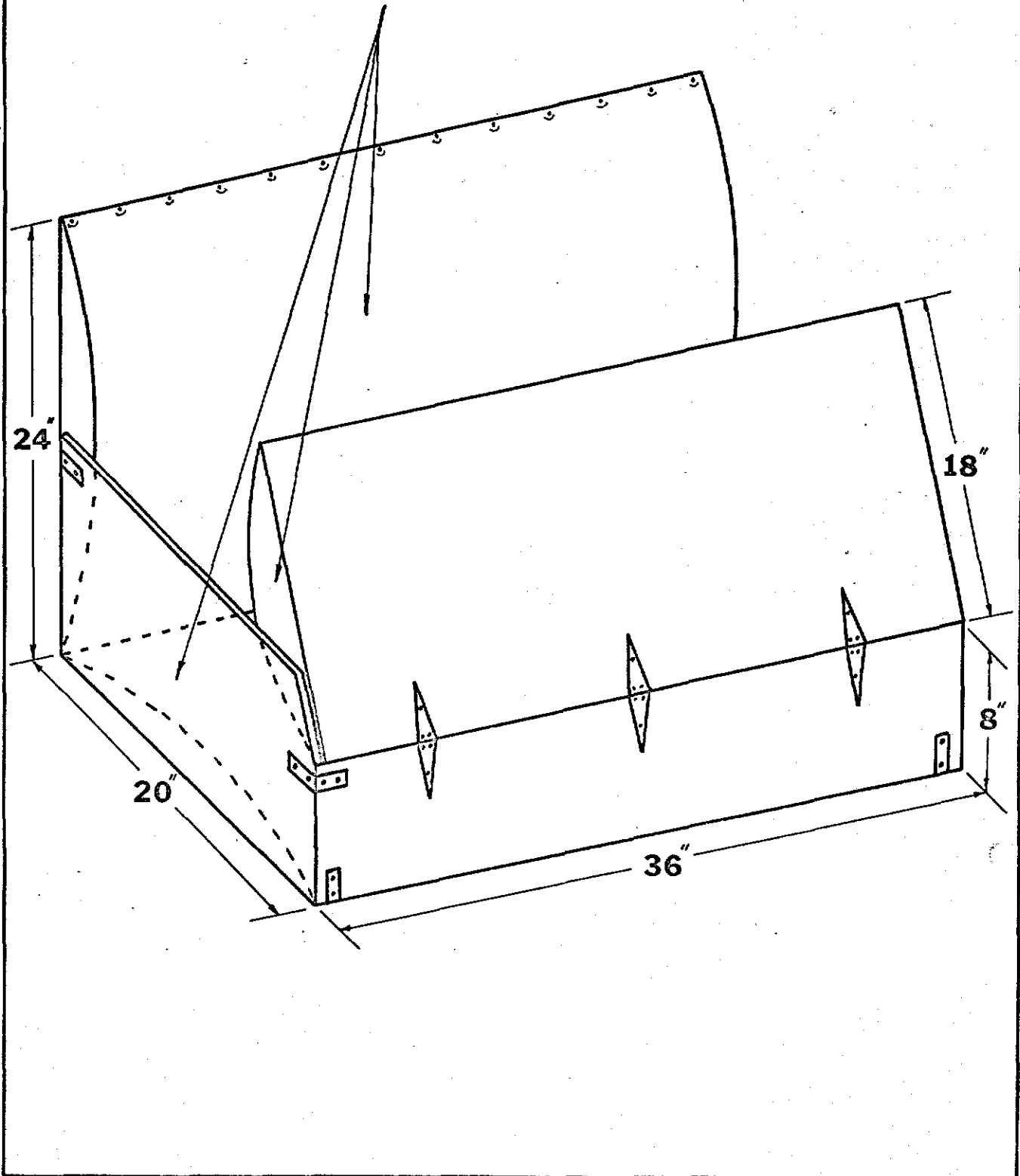


Figure II. Squeeze Box Used in 1966 Alaska Sea Otter Transplant

containers, was added after the aircraft was airborne. To prevent shifting of the load during takeoff and while in flight, the cages were lashed to the floor of the aircraft.

The otters were liberated at the release sites by setting the cages in the water and allowing the animals to swim free.

FINDINGS

During the period August 17 - September 2, forty-three sea otters were captured with gillnets in the Port Chalmers-Green Island area of Prince William Sound. Of these, 7 males and 13 females were released in the area of Klag Bay, Chichagof Island and 6 males and 4 females were released in Yakutat Bay (Figure 1). Of the remaining 13 otters, 4 were released at the capture site. Four drowned in the nets and 5 died shortly after being released in the enclosure.

As a result of observations made during the 1965 transplant, various techniques and pieces of equipment were modified. To prevent injury to the nose and mouth of those animals which chewed on the wire fencing material which surrounded the enclosure and cages, it was replaced with small mesh nylon webbing. The material proved to be satisfactory on the enclosure, but did not work out very well in the cages. Because of the stretching characteristics of the webbing, an otter pushing against the side of the cage could bow the material out considerably. In the crowded conditions of the aircraft a biting otter made the job of caring for the animals a rather hazardous occupation. After two attendants were bitten, a number of the cages which held the large and more aggressive otters were again modified and the nylon webbing was replaced with hardware cloth.

The squeeze box used to restrain the animals in order to administer an injection of tranquilizer proved to be a valuable aid. Once in the box, an animal could be held securely and the tranquilizer administered very quickly, with no apparent injury to the animal.

The amount of tranquilizer administered to each otter during the 1966 transplant was considerably less than was used in 1965. Observations made of the animals while in the enclosure indicated that the problems of stress and adjustment to captivity were not as critical as first thought. The animals are very gregarious by nature and adjust very quickly to captivity. Animals which were not given an injection of tranquilizer prior to being released in the enclosure began to feed as quickly as those given an injection. After several days in the enclosure they did not exhibit any more or less fear than tranquilized otters.

A more important consideration was the ability of some of the animals to shake off whatever ill effects they had suffered from being captured in the gill nets. A number of animals showed signs of being wet to the skin which caused considerable distress to them. Normally, the skin of the animal does

not become wet: the fine and densely packed hairs trap a body of air which prevents water from reaching the body surface. Unless an otter is able to restore the insulation qualities of his fur to a normal state within a short period of time, it will die. Otters which were under the influence of the tranquilizer drug were not as active and did not spend as much time cleaning and rubbing their fur as otters which had not received an injection of tranquilizer. As a result, their chances for survival may have been less. More observations will have to be made to substantiate this.

While being held in the enclosure, the otters were normally fed live Dungeness crab. Generally, a feeding schedule of four feedings a day with each otter receiving from 2 to 3 crab per meal (average weight of a Dungeness crab was 3 lb) was followed. On one occasion, when 5 days of bad weather prevented replenishing the crab supply, it became necessary to feed the otters chum salmon (Oncorhynchus keta) and pink salmon (Oncorhynchus gorbuscha) taken from a nearby stream. The fish were fed to the otters, both whole and in pieces. It was interesting to note that the otters (there were nine in the enclosure at the time) refused to eat the fish for a period of 24 hours. During this time they were considerably more nervous and exhibited more hostility towards one another. The grunts, groans and squeaks emanating from the animals also increased greatly in occurrence and intensity.

Four hours after the otters ate the salmon, a supply of Dungeness crab arrived and was made available to them. They immediately began to feed and judging by the sounds they made and manner they ate the crab, they were enjoying their meal. Salmon apparently is very low on the sea otter's food preference list and crab ranks very high.

As was stated earlier, 9 otters died as a result of being captured in a gillnet. Four were found dead in the net, having drowned, and 5 died within a day or two after being released in the enclosure. Four of the latter animals appeared to have died of exposure as a result of their fur becoming soaked. The fifth otter died of internal wounds incurred while in the gillnet. Another otter entangled in the net had apparently bit the animal in the abdominal region, causing internal bleeding.

No mortalities occurred while the animals were in transit to the release site in 1966, whereas in 1965, 12 animals died while aboard the aircraft. The modification made to the cages whereby the animals were allowed to lie in several inches of water is responsible for the difference. It is now obvious that overheating was the major contributing cause of the mortalities in 1965.

Sightings of Otter Transplanted in 1965

A number of sightings of sea otter transplanted in 1965 were made by Department personnel and private citizens prior to the 1966 release. Most of the sightings were made in the release area, but two have occurred as far as 100 miles away. No females with pups have been observed, however, the people in this area are not familiar with sea otters and a pup could be easily overlooked.

Table 1

Tag Numbers and Other Data on the 1966 Sea Otter Transplant in Alaska

Sea Otter Transplanted Tag Number	Date Captured	Date Released	Lbs. Weight	Sex	Area Released
3 A	8/20/66	8/27/66	67	♂	Klag Bay
4 A	8/20/66	8/27/66	70	♀	Klag Bay
6 A	8/20/66	8/27/66	72	♂	Klag Bay
7 A	8/20/66	8/27/66	40	♀	Klag Bay
12 A	8/25/66	8/27/66	61	♀	Klag Bay
13 A	8/25/66	8/27/66	73	♂	Klag Bay
14 A	8/25/66	8/27/66	48	♀	Klag Bay
15 A	8/25/66	8/27/66	51	♀	Klag Bay
No Tag	8/19/66	8/27/66	68	♂	Klag Bay
No Tag	8/25/66	8/27/66	42	♀	Klag Bay
17 A	8/28/66	9/ 2/66	60	♀	Klag Bay
18 A	8/26/66	9/ 2/66	69	♀	Klag Bay
19 A	8/26/66	9/ 2/66	65	♀	Klag Bay
20 A	8/26/66	9/ 2/66	57	♂	Klag Bay
21 A	8/26/66	9/ 2/66	46	♀	Klag Bay
23 A	8/28/66	9/ 2/66	33	♀	Klag Bay
26 A	8/29/66	9/ 2/66	44	♀	Klag Bay
27 A	8/30/66	9/ 2/66	26	♂	Klag Bay
28 A	8/31/66	9/ 2/66	78	♂	Klag Bay
31 A	9/ 1/66	9/ 2/66	58	♀	Klag Bay
9 A	8/22/66	9/ 3/66	70	♂	Yakutat Bay
22 A	8/27/66	9/ 3/66	59	♂	Yakutat Bay
30 A	8/31/66	9/ 3/66	61	♀	Yakutat Bay
32 A	9/ 2/66	9/ 3/66	83	♂	Yakutat Bay
33 A	9/ 2/66	9/ 3/66	73	♂	Yakutat Bay
34 A	9/ 2/66	9/ 3/66	28	♂	Yakutat Bay
35 A	9/ 2/66	9/ 3/66	58	♀	Yakutat Bay
36 A	9/ 2/66	9/ 3/66	50	♀	Yakutat Bay
38 A	9/ 2/66	9/ 3/66	80	♂	Yakutat Bay
40 A	9/ 2/66	9/ 3/66	30	♀	Yakutat Bay

A thorough search of the release site area is planned for the spring of 1967 to determine if the transplant has been successful.

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WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO.: W-14-R-1 and 2 TITLE: Marine Mammal Investigations

WORK PLAN: G TITLE: Sea Lions, Sea Otters, Hair Seals
and Beluga Whales

JOB: 3 TITLE: Hair Seals

PERIOD COVERED: January 1, 1966 to December 31, 1966

OBJECTIVES

To obtain information on the timing of the molt and hide quality.

To determine patterns of dispersal and obtain known age specimens.

To determine the current abundance and location of major pupping areas.

To monitor commercial operations engaged in the harvesting of seals on selected pupping rookeries.

To maintain current information on the response of hair seal populations to harvesting.

TECHNIQUES

Sixty-five pelage specimens from adult seals were collected at two-week intervals from January 1 to December 31, 1966 at a local seal processing plant. Specimens measuring approximately 1 x 3 inches were pinned to a wax block and preserved in 10 percent formalin for 5 days. Median sections, .5 mm thick, were cut with a razor blade and examined under a 30X binocular microscope.

Seal pups were tagged on Tugidak Island by slowly approaching herds that had hauled-out on the beach and then rushing in and catching the animals before they entered the water. A colored nylon tag was attached to the right hind flipper.

Aerial surveys were conducted on Tugidak Island and in the Port Heiden - Port Moller areas of the Alaska Peninsula (Figure I). A Supercub PA-18 and a Cessna 180, both on floats, were used at Tugidak Island and a wheel equipped 180 was utilized on the Alaska Peninsula. All surveys were flown at an altitude of 200 to 300 feet and as near to the time of low tide as possible.

Harvest operations were monitored on Tugidak Island and on the Alaska Peninsula. A Toca-Gote motor scooter was used to travel to camps where hunters were interviewed at least every three days. Hunters at Port Moller were contacted at the completion of each aerial survey of the area.

Information on the total harvest of harbor seals was obtained from bounty records submitted by hunters for payment.

FINDINGS

Molt and Hide Quality

Preliminary results indicate the molt of seals in the Southcentral area of the State (Game Management Units 6-16) commences in late summer and is completed in late October. No specimens from the January to July period exhibited molting activity, i.e. the absence of melanocytes or pigment in the hair roots, which indicates new hair growth.

The timing and degree of hair wear has a great effect on the quality of adult seal pelts. Specimens collected and pelts examined at a local processing plant indicated that the incidence of broken tips and short hair progressively increases after April and continues until the completion of the molt.

Collection of pelage samples and examination of hides will be continued on a larger scale to better determine when molt begins and ends, and the degree of hair wear as related to seasons of the year.

Tagging

Three hundred seal pups were tagged on Tugidak Island from June 1 to July 17. The animals were marked by using a Jumbo Rototag (Oberarch Patents, Ltd., London, England) made of brightly-colored red and yellow nylon. Dimensions of the two-piece tags were 2 1/4 x 3/4 inches. Tags were applied to the rear margin of the right hind flipper. Observations made several weeks after tagging indicated that tag loss was not occurring and wear and abrasion of the flipper was non-existent.

Commercial hunters on the island recovered 45 tagged pups from June 3 to June 30. Most were harvested within a mile or two of where they were tagged. However, it was interesting to note that some pups travel back and forth over fairly long distances along the beach. Two pups (#2022, #2060) were tagged in Areas 7 and 8 on June 24 and 26 respectively, and recovered by hunters one week later in Area 37. This would require a trip of nearly 20 miles. Another (#2091) was tagged in Area 11 and killed 12 hours later, 7 miles away, in Area 4.

No tagged seals have been recovered from June 30 to December 31, 1966. Tagging will be continued in 1967 on Tugidak Island and an experimental tagging program will be initiated in the Port Heiden area.

Population Numbers

Aerial surveys were conducted on Tugidak Island (Figure I) between May 28 and July 19, 1966. Results of these surveys are presented in Table 1.

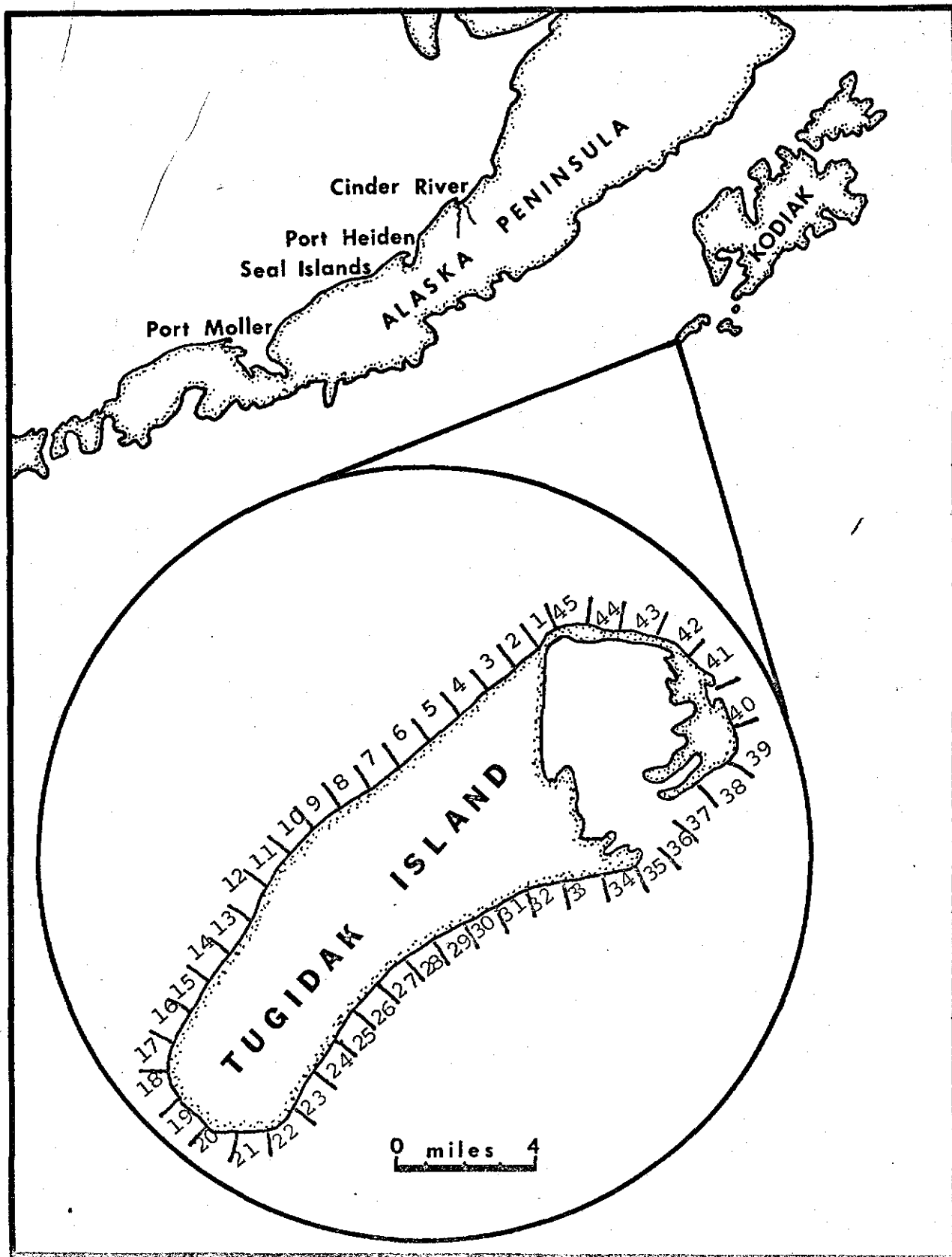


Figure 1 - Tugidak Island and one-mile survey reference areas.

Based on ground observations and reports from hunters, the Tugidak Island seal population probably approached 1,500 animals from June 1 to June 15. On the morning of June 15, large numbers of seal appeared on the beach in Areas 7 to 15. By late afternoon there were 2,500 to 3,000 on the island. It is not known why the animals appeared in such a short time or where they came from. Perhaps tagging will answer some of these questions.

Incorporated into the aerial surveys of Tugidak Island were two flights to Sitkinak Island. On June 26, 500 seals were observed on the island and on July 9, 700 were seen. These counts compare closely with surveys conducted in 1965.

Table No. 1

Tugidak Island Seal Surveys, 1966

Date	No. of Seal	Remarks
May 28	500	In areas 13 and 17
June 15	2,500-3,000	Ground observations
June 17	100	All in water, areas 1-16
June 21	1,100	1,000 of total in areas 35-43
June 26	1,300	800 of total in areas 35 and 36
June 30	season closed	
July 9	3,400	Animals scattered throughout all areas*
July 19	1,400	1,000 of total in areas 35-44

* Areas 20 to 33 are unsuitable habitat and are not used by seals.

The number of seals counted on aerial surveys show considerable variation. This variation is caused by one or more of the following:

1. Stage of the tide - Most hauling-out activities commence at receding tides and reach a peak at low ebb.
2. Hunter activity - During periods of low tide, hunter activity was greatest. This caused seals to leave the beach and move offshore.
3. Seals in the water - Once seals enter the water they scatter along the shore and up to several miles to seaward and cannot be counted accurately. Since flights are restricted to shore areas many swimming animals may be entirely missed during aerial counts.
4. Weather - Flights cannot be made during bad weather. It is not known if weather conditions have an effect on the number of seal that will haul out. On clear days sun glare makes counting difficult.

5. Flight altitude - Low level flights (200-300 feet) are necessary to facilitate counting. Estimates must be made on the first pass as seals will enter the water at the approach of an aircraft.

Aerial surveys were flown on the Alaska Peninsula from Cinder River to Port Moller (Figure I). Results of these surveys are presented in Table 2.

Table 2

Aerial Surveys of Seals on the North Side of the Alaska Peninsula, 1966

Date	Port Heiden	Port Moller	Seal Islands	Cinder River
May 31	850	150	-	-
June 7	800	200	1,000	-
June 13	-	1,600	1,000	1,500
June 24	1,500	1,000	500	1,000
June 30	2,500	1,000	1,100	-
July 4	1,600	-	400	-
July 6	2,500	5,000	700	950
July 17	1,200	400	-	-
July 22	650	450	150	-
August 2	750	-	250	2,000
August 5	-	-	-	2,000

The previously mentioned variables also apply to aerial counts made on the Alaska Peninsula. An additional factor at Port Heiden and Port Moller was the presence of outboard and inboard boat activity.

Commercial Harvest

Thirteen individuals were engaged in harvesting seal pups on Tugidak Island in 1966. Harvest operations began on May 28 and ended on June 30 when the island was closed by emergency regulation. During this period 2,200 pups were harvested.

Harvest methods were the same as in previous years. All hunters were equipped with motor scooters for transportation and killing was done by clubbing. Because of high hunter mobility, and easy access to all hauling out areas, seals were chased off the beach at least once a day. The animals became extremely wary and consequently were difficult to catch.

Two hunting parties operated at Port Heiden and two at Port Moller, with some incidental hunting at Cinder River and Seal Islands. The harvest began on May 1 and closed July 7 by emergency regulation in the Port Heiden area.

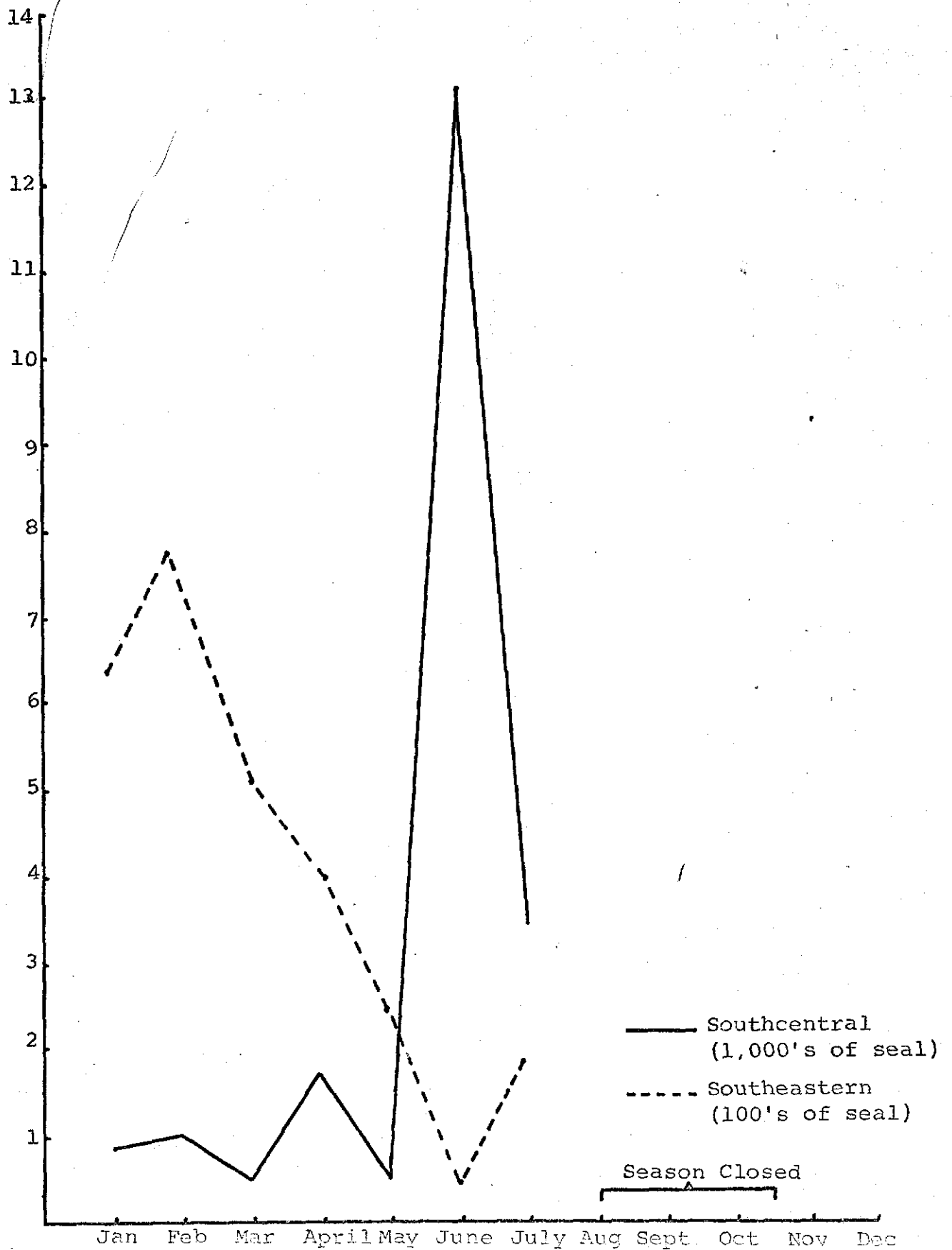


Figure 2. Chronology of the 1966 Seal Harvest in Southeastern and Southcentral Alaska

During this period 3,100 pups were harvested. At Port Moller, 2,300 pups were taken from May 1 to July 31.

Several harvest methods were utilized in the Port Heiden - Port Moller areas. All transportation was by outboard motor-driven skiffs. Several hunters used 9 1/2 inch stretched mesh gillnets, while others harvested by clubbing and shooting with .22 caliber rifles.

Seal Harvest

Information obtained from bounty records in calendar year 1966, indicate a kill of approximately 5,200 seals from Southeastern Alaska (Judicial District I) and 22,000 from Southcentral Alaska (Judicial District III). A downward trend in the total harvest is indicated when compared to a kill of 13,000 in Southeastern Alaska, and 28,000 in Southcentral Alaska in 1965.

The decrease in harvest, as compared to other years, may be attributed to several possible factors. Mainly, there appears to be a decrease in seal numbers, especially in areas that are easily accessible to hunters. Also, fluctuation of prices paid for skins by the fur industry has prompted hunters to pursue other ventures.

It is interesting to note that the harvest has become seasonal. In Southeastern Alaska, the greatest number of seals are taken during the winter months. In this area many hunters engage in commercial fishing during the summer and then hunt for seals in the winter. In Southcentral Alaska hunters are concentrating on pups which are available during the summer months. These pups are harvested in large numbers, over a short period of time, and thus provide a greater return than adult seals taken in winter. The kill by month, as obtained from bounty records, is depicted in Figure 2.

The number of individuals hunting and submitting bounty claims has also decreased. In 1965, claims for bounty were received from 177 people in Southeastern Alaska and 168 in Southcentral Alaska. During 1966, 70 individuals submitted claims from Southeastern and 90 from Southcentral Alaska.

The only documents available for compilation of the number of seals bountied are Code Distribution Vouchers (Form SA-49) provided by the Administrative Section when bounty payments are made. The forms state the hunter's name, address, size of payment, and when he claims he killed the seal. There is no information on the form indicating where the seal was killed or how many were shot and not retrieved. Also, many forms are buried in files and are not available for analysis. As a result, the number of seal harvested, as determined from bounty data, should be considered minimal and at best indicates only trends in the harvest.

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WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO.: W-14-R-1 and 2 TITLE: Marine Mammal Investigations

WORK PLAN: G TITLE: Sea Lions, Sea Otters, Hair Seals
and Beluga Whales

JOB: 4 TITLE: Beluga Whales

PERIOD COVERED: January 1, 1966 to December 31, 1966

OBJECTIVES

To study the reaction of belugas to various types of underwater sound transmissions. To gather basic life history data.

TECHNIQUES

Tape recorded sounds of killer whales (Orcinus orca) were transmitted underwater in the Naknek River of Bristol Bay on May 5, 6, and 7. Sound producing equipment consisted of an Amplicorp Magemite portable tape recorder, Model GI OEV, a Bogan Model RP-2 preamplifier, a McIntosh Model Mc-40 amplifier and a Hydro Products Model DEA-7 hydrophone projector. The equipment was used to project sounds within the spectrum of 20 - 20,000 cps.

A more detailed description of the equipment, its operation and past experiments conducted with it, appears in the 1965 Alaska Work Plan Segment Reports W-6-R-6 and W-14-R-1.

Department personnel during the period May 19 - June 12 collected belugas in the Kvichak River of Bristol Bay. Whales were collected by driving them into shallow water with a fast outboard motor driven skiff and harpooned with the aid of a spear gun normally used by Scuba divers. Shortly after being harpooned, the whales were dispatched with a rifle bullet placed about a foot posterior to the blowhole. Stomachs were analyzed immediately in the field, recording numbers and species ingested. Reproductive tracts and teeth were collected and preserved for future analysis. Observations of beluga movements and numbers were made.

FINDINGS

The sound producing equipment was set up on the APA cannery dock on the Naknek River approximately two miles from the entrance. The river at this location was approximately 3/4 mile wide. Tides of 25 feet flowed into the

river and greatly affected depth and water conditions. At low tide, large sand bars were evident in the river. The cannery dock was located adjacent to the main channel of the river allowing sound transmissions to be made at any stage of the tide.

The sound experiments were carried out on three successive days during the flooding stage of the tide. Only one flood tide was covered each day since the second tide occurred at night, making evaluation of results impossible. A lack of wind resulted in calm water conditions which permitted almost continuous observation of the whales once they entered the river systems.

Normally the belugas enter the river shortly after the tide began to flood. They were usually sighted after they had traveled about 1/2 to 3/4 mile up the river. Once located, their movements were followed for a short time to firmly establish their direction and pattern of movement. The sound equipment was then turned on and the reaction of the whales noted.

On five occasions, groups of belugas numbering as many as 25 animals or more entered the river and reacted in the following manner:

Immediately after the equipment was turned on, the whales dove and were not seen again for three to five minutes. When they were again sighted, they were swimming directly away from the sound source or headed for the opposite shore. When they reached the other bank, they usually milled around awhile and then headed back out to sea, swimming against the tide. On two occasions, several large white whales, after reaching the opposite bank, moved further upstream, but none were observed above the transmission site.

The movement upstream after reaching the opposite bank probably occurred as a result of the whales being able to swim behind a large sand bar which existed near the far shore. With the sand bar between the whales and the transmitting site, the signal might have been eliminated or of such low intensity that it did not disturb the animals.

After three days of transmitting, the experiments had to be terminated as poor weather conditions made observation of the whales impossible.

The experiments conducted certainly are not conclusive evidence that the sound system is going to continue to elicit, over a long period, the particular response of the belugas noted during the field trials. From the experiments, however, we know that 1) belugas hear the sounds we are transmitting and react to them in a gratifying manner, 2) the sound projector operating under 10 watts of power has an effective range of at least one mile and probably many more, and 3) that sand bars may interfere with the sound transmissions.

Experiments will be conducted in the spring of 1967 to determine if, after repeated transmissions, the whales will continue to turn away from the sound source. The present sound-producing equipment is not suited for sustained transmissions and will have to be modified. The modifications to be made will be directed toward developing a system which will operate continuously for a number of days without the aid of an attendant.

Table 1

Measurements and Stomach Contents of Belugas from Kvichak River, 1965-1966

No.	Location	Date	Sex	T L*	M G	G F	F A	F G	S F	W F	L F	F W	Stomach Contents
65-1	3 mi S of Nakeen	5/29/65	♀	105	59	66	23	27	23	6.7	11.0	7.5	336 red salmon fingerlings
65-2	3 mi N of Copenhagen Cr.	5/31/65	♀	122	68	62	30.5	33.5	28.5	8.5	12.0	8.3	196 red salmon fingerlings
65-3	Copenhagen Cr.	5/31/65	♂	105	70	67	28.5	37	25.5	8.0	11.3	7.5	316 red salmon fingerlings
65-4	Graveyard	6/11/65	♀	85	55	52	23.5	26.5	21	7.0	9.0	6.5	286 red salmon fingerlings
65-5	3 mi N of Copenhagen Cr.	6/11/65	♀	126	75	72	36	39	31	9.5	13.0	9.5	32 red salmon fingerlings
65-6	Copenhagen Cr.	6/12/65	♀	102	64	60	27	30	27	8.0	11.0	7.5	121 red salmon fingerlings and 3 shrimp
65-7	Halfmoon Bay	6/12/65	♂	103	66	64	25.5	35	26	8.0	10.7	7.5	59 red salmon fingerlings (digestion advanced)
66-1	Branch River	5/20/66	♀	100	66	59	27.0	--	25.5	7.5	13.0	8.0	121 smelt
66-2	Levelock	5/22/66	♂	83	60	55	22.0	--	20.0	7.0	5.5	7.0	57 smelt, 2 lamprey and 7 shrimp
66-3	Koggiung	5/22/66	♂	123	72	65	28.0	--	30.0	9.0	8.0	9.0	7 smelt
66-4	Copenhagen Cr.	6/11/66	♂	154	87	80	42	--	37	11.0	--	12.0	Empty except for two rocks

* All measurements in inches

T L - notch of flukes to tip of snout
 M G - girth of largest portion of body
 G F - girth posterior to flippers
 F A - notch of flukes to anal opening
 F G - notch of flukes to genital aperture

S F - span of flukes
 W F - maximum width of flukes
 L F - axillary length of flipper
 F W - maximum width of flipper

BELUGA COLLECTIONS

Four belugas were collected in the Kvichak River during the period May 20 - June 11. Measurements and stomach contents of collected specimens are presented in Table 1. Analysis of reproductive data, food habits, movements and numbers will be reported when sufficient number becomes available.

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