

1990 ROUND ISLAND FIELD SEASON REPORT
WALRUS ISLANDS STATE GAME SANCTUARY

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1990 ROUND ISLAND REPORT

On 30 April, 1990, Hessing flew fixed-wing to the Summit Island herring camp and then flew via helicopter to Round Island. On 1 May, Sheffield joined Hessing on the island, also flying fixed-wing to Summit Island and transferring to helicopter. Our gear arrived on 1 May aboard a herring tender. The helicopter slung the 2 totes and a barrel of diesel fuel ashore from the tender to the cabin.

The cabin overwintered well, except for the the south wall which had gotten quite mildewed. The cables for the cabin outhouse pulled loose and the outhouse had blown about 150 feet, so we used the helicopter to sling it back into position. All evidence points to one or more good-sized storms over the winter. Not only had the outhouse moved, but the beaches were remarkably ivory-free for so early in the season and it seemed as though the Main Beach was steeper than usual.

VISITATION

Hessing was gone from the island for 1 month, travelling to Cape Peirce (Togiak National Wildlife Refuge) and McNeil River State Game Sanctuary. In calculating visitor days, proxies for Hessing were not counted as visitors nor were their days as official Island staff counted as visitor days. Our visitor total for this year is 168, 1 less than last year's. Compared to 1989, we had slightly more day visitors (58 vs. 46) and slightly fewer campers (110 vs. 123). The average length of stay for campers was 4.8 days. This was slightly shorter than in 1989, resulting in fewer cumulative visitor days (Appendix 1.) The first campers arrived on 26 May. The island was mostly snow-free at that time, except for the usual heavy snow load in the Luge gully above Observation Point. We detoured around this until late June.

Three professional crews visited the island this year. A film crew from Italy shot footage for a documentary on the Arctic to be shown by the British Broadcasting Corporation, the American Public Broadcasting Service and on Italian television. A second crew from Anchorage was developing a documentary for the Alaska Conservation Foundation on the leasing on Bristol Bay oil. The third group obtained acoustical recordings of walrus sounds. A member of this group is a Alaskan composer who hopes to incorporate northern noises into a musical work. Two of the groups were not well prepared for their stay on the island. They seemed poorly informed about the island and its wildlife. Perhaps more importantly, both had planned short stays without including weather days.

Seventeen photographers (15% of campers) came to the island. One of these photographers had been to the island in previous years. He remarked on the change in policy, from the former "wander at will" to our present day practice of keeping people on the trails and from directly approaching animals.

Three commercial groups came to the island. A group of three travel agents from MarkAir visited the island. They mentioned in passing that this was a reconnaissance of sorts, to investigate the possibilities for MarkAir selling roundtrip tours to the island next year. Two groups came via a new outfitting operation based out of Dillingham which arranges transportation and supplies equipment for its clients. This outfitting company was the only one which was briefed pre-season as to the necessity of good raingear, tents, and rubber boots. Yet, the first clients they sent us were not totally mobile; one of them walked with a cane and we ended up hauling their gear to and from Boat Cove. The third tour group was a Nature Conservancy tour whose logistics were supplied by Wilderness Birding Adventures and which had a 1:1 client:guide ratio.

We observed boats operating within the 3 mile closed area (Appendix 3). Most (75%) were fishing boats in passage. Herring fisherman were not all properly informed on how to obtain permits for day trips to the island. Several were told by the ADF&G in Dillingham that they could pick up a permit any time on Summit Island. Hessing went to Summit Island for 2 days in mid-May, but by this time boats were leaving the area and less than 50 permits were issued. A tender which came to the island in late May was incorrectly told by ADF&G in Dillingham it did not need to contact staff on the island ahead of time and that Boat Cove was a safe anchorage.

There were 2 visitors from the Regional Office in 1990. Nancy Tankersley, with the Non-game program, came in late June to see Round Island and to gather ideas for a Watchable Wildlife program in Alaska. Rick Sinnott, also with the Regional Office, came to the island at the same time. Sinnott will be working with area staff this winter to develop a management plan for the Sanctuary. He spent 2 weeks on Round Island, one of which was to fill in for Hessing, who travelled to Cape Peirce for a week. While on the island, Sinnott administered a test questionnaire to measure the economic value of Round Island to its visitors. During the summer, copies of the survey were given to visitors, and respondents were also asked for their opinions and thoughts on the questions asked. Hopefully, with this information an adequate vehicle for surveying visitors' opinions on Round Island and its worth to them will be designed and given to visitors during the 1991 field season. Appendix 2 outlines the results of the test questionnaire.

The new area biologist, Larry Van Daele, came to the island at the end of May with his family. He returned again for a week during July while Hessing was at McNeil River. Randy Kacyon, Bethel's new area biologist, also came to the island to fill in for Hessing for 2 weeks. We felt that it was valuable to have these divisional employees on the island in an official capacity. Trading ideas about management and administrative problems was constructive and instructive for all of us.

There were several small problems regarding general operations and the issuance of permits in 1990. To begin with, as of mid-April, funding for fiscal year 1991 had not been legislatively approved. Hessing and Sheffield returned to the island on speculation, as it were, and prospective visitors were warned that their permits might be invalid if the program weren't funded. However, in large part thanks to letters from the Alaska Outdoors Council, Greenpeace, the Eskimo Walrus Commission and the National Wildlife Foundation, the State Legislature approved funding for FY91 by mid-May. Another permitting problem, which seemed extreme this year, was the practice of people obtaining permits and then not using them--in some cases without cancelling them through the office. One party was issued 6 permits and only used 1 of them. Not only did we have a waiting list during some permit periods when few visitors actually materialized, but it made business difficult and unpredictable for Don Winkelman. However, given the fact that we were without a biologist and clerical staff in the Dillingham Wildlife Conservation office for some of the winter, we think that planning and permits for the 1990 season went fairly well.

Don Winkelman made fewer total trips to the island this season than last year, coming out approximately every 3 days, compared to 2 out of 3 days last year. He continued to try to minimize disturbances of walruses when he arrived at Boat Cove. Because our Zodiac was out of commission for the last 3 trips of the season, Winkelman brought his boat right to shore which gave us wet but convenient landings.

Visitor safety was more an of issue this year than other years. The combination of conditions on the island and the degree of preparedness of visitors often gave us cause for pause. The most serious incident was the fall of an 80-year old woman into Boat Cove as she and her group were passing their gear into the cove. Her lightness, her heavy raingear, and an extraordinary amount of serendipity are the probable explanations for her minimal injuries. Randy Kacyon, from the Bethel area office, banged his knee during a fall above First Beach. One photographer twisted his ankle but was still able to hobble. There were at least 2 groups of visitors that we urged to NOT go to Main Beach, as we felt the conditions were beyond the capabilities of the people involved.

WILDLIFE AND RESEARCH

WALRUS

Census results: Counts of walrus hauls on the beaches were conducted in the morning, as they were last season. Each evening, we exchanged information with US Fish and Wildlife Service (FWS) personnel at Cape Peirce on the daily counts of walrus. Walrus numbers on the island were similar to what they were last year. The high count of 6891 occurred on 16 July (Appendix 4). Use of the east side beaches did not start until June and continued through the season. We had several reports of walrus hauls on some of the other islands in the sanctuary over the course of the summer. A herring pilot spotted some walrus on Crooked Island in mid-May. Don Winkelman reported seeing animals hauls on the southwest side of Crooked Island at least 3 different times mid-summer. During a trip on the Puffin in late July Sheffield observed approximately 60 walrus on the north end of the north Twin. We are unable to say whether these numbers are status quo, as we rarely get reports of walrus using the other islands.

Mortality:

One walrus died on Second Beach when the snowbank under which it hauls collapsed. Another died when it became wedged in the rocks below the campground where a walrus died last year. There were at least 16 other dead walrus seen on the beaches, but although some of these were fresh, we weren't able to determine the cause of death for any of them.

Interactions with other marine mammals:

Orcas were seen interacting with walrus once this year. On 2 June, Sheffield observed a pod of 6 swimming abreast along Main Beach, about 200 m offshore. One of the whales swam away from the pod to a lone walrus floating away from shore. The orca bumped the walrus without seeming to harm it. The orca rejoined the pod briefly before again swimming to another walrus floating in the water and bumping it with similar results. The pod then swam along the east side of the island and presumably left the area, as we didn't see them again.

Unusual observations:

Visitors saw a three-tusked walrus when one hauls out just below the campground in late June. Possibly one of its tusks had received some damage at the gum level and this had resulted in a two-pronged tusk.

Research activities:

For this field season, we entered into a cooperative research agreement with FWS and groundtruthed some of Sue Hills' telemetry work. Hills deployed 9 satellite transmitters and a total of 15 VHF transmitters in the Bristol Bay area. In order to minimize the likelihood of disturbance to animals at Round Island, Hills tried to deploy all the radios at Cape Seniavin, on the Alaska Peninsula. However, the low numbers of walruses there and the topography of the area stymied her efforts. We decided to deploy some radios at Round Island, conditional upon minimizing disturbances to the animals there.

On 20 May, Sue Hills and Lauri Jemison, also of FWS, arrived on the island. We banded a total of 6 walruses on the island. Three of the animals were "double-radioed" and given both a VHF and a satellite radio. There were no observed mortalities and although walruses were moved off the beach, there were no stampedes. This cooperative tagging went very smoothly. In the past, the Department has discouraged intrusive research because of our high profile with the visitors and of course because of the welfare of the animals involved. Following our experience this summer, we would suggest repeating the work if the conditions of minimizing disturbances and optimizing our care of handled animals could be repeated.

Etorphine (M-99) was used for immobilization, with Diprenorphine (M-50/50) and Naloxone as antagonists. Dopram was used to stimulate respirations but it did not seem to have a noticeable effect. With the animal tranquilized, we filed notches in the tusks to seat the bands of the radios better. After the bands were attached and tightened, epoxy was applied. Several of the animals received spray-painted markings as well, in an attempt to give observers more visual clues. However, no visual markings were resighted. Two of the satellite and two VHF radios were shed over the course of the season, but we heard at least eight radios deployed in May and June late in the season.

We monitored all 15 of the VHF radios each day during daily counts. We listened from Observation Point as well as near the cabin. In order to groundtruth the satellite data and as a check of saltwater switch operation, on days when walruses with satellite radios were present on the island, we attempted to get a sighting on those animals during the time that 1 of 2 NOAA satellites was passing over Round Island. We were successful getting visuals on approximately 50 percent of our attempts. We noted the position of the animal on the beach, its activity, and what sort of condition the radio and antenna were in.

The FWS research also involved installing and maintaining an automated data collection system (ATS) for the VHF radios. Unfortunately, our success with this was minimal. In May, we used a helicopter to carry 3 batteries, a cooler and an antenna pole to the north ridge of the island. When Hills and Jemison

came to the island for banding in May, we attempted to load the system's "black box", but ended up having to send it back to the manufacturer. The 3 12-volt batteries which powered the system were sent back to Dillingham because they didn't hold a charge. By 1 August, the ATS system seemed to be on line. However, the island was subsequently hit by several rounds of terrible weather, one of which pushed the antenna over. It remains to be seen what sort of data the ATS collected while on Round Island.

Human disturbances:

This season we attempted to collect disturbance data beyond our usual opportunistic observations. Unfortunately, our effort was minimal because of other responsibilities. Consequently, this year's work may best be seen as a field test. We recorded 2 types of information, beach watches and scans. Beach watches were observations of the herd and its reactions to disturbances. These entailed using a spotting scope to watch the walruses hauled out along Main Beach. Measureable disturbances which resulted in some degree of synchronous behavior among the animals hauled on the beach were identified as to type and distance to the animals. The reaction of the walruses was noted, as well as a description of the severity of the reaction. Scans of individual animals were also conducted to investigate how their haulout time was spent. We selected 5 individual walruses and monitored them at 10 minute intervals over a time span ranging from 2 to 4 hours. Behaviors were coded into unambiguous categories (e.g., Rest, Awake, etc.) and weather and any other possible disturbance factors were also recorded.

Near the end of our season, Dana Seagers of FWS flew 2 aerial censuses of Round Island which were coordinated with ground observations by Round Island staff. He flew over the beaches as low and as closely as he could without causing severe disturbances in an attempt to count animals on the beaches as well as take photographs from which he could do comparative counts. Ideally, this might have resulted in a correction factor to apply to the daily counts we take of the east side of the island. The weather did not cooperate. Results of the aerial counts are not known as of the writing of this report.

NORTHERN SEA LION

We counted sea lions each day from the peninsula north of East Cape. More sea lions used the rocks east of our counting point than last year and though we did not include them in our counts this year, we will standardize sea lion counts by counting from 2 locations next season. Overall, sea lion numbers were lower than last year. Counts remained below 100 for approximately half of the season (Appendix 7).

As we've seen other years, a sea lion was observed with part of a net around its neck. Also, an evidently sick or wounded sea lion

hauled out in Boat Cove for several days in late June. Sheffield observed a pair of sea lions copulating on Third Beach. Perhaps the most interesting sighting of the season was when Sheffield, investigating a dead sea lion on Third Beach, found what appeared to be 3 sea lion pup carcasses on the beach on 18 June. Causes and dates of death were not discernible. The carcasses were putrid and were not collected.

The National Marine Fisheries Service listed the northern sea lion as a threatened species in July of 1990. Policies and plans for its recovery are now being established. Although the sea lion observation points on Round Island appear to be at a distance sufficient to prevent disturbances of the sea lions by visitors, we may be required to supply greater protection. A brief synthesis of sea lion data collected over the years on Round Island might reveal trends as well as ideas for ways for us to more accurately assess the use of Round Island by sea lions.

HARBOR SEAL

A single young harbor seal was seen hauled out in Boat Cove on 21 May. Another one swam past the cove in late July. The few times when Don Winkelman passed Black Rock at close range, he reported seeing harbor seals hauled out there. He reported seeing pups present consistently and estimated that 10 to 20 seals used this area.

WHALES

The gray whales passed the island during the herring season as usual. We saw no unusual sightings although we saw 1 dead male floating west past the island. It had lost most of its skin and had probably been dead for several months at least. At season's end this year, Sheffield took a piece of the baleen from the dead whale we found on the island during the 1989 season to Kathy Frost in the Region III (Fairbanks) office. She identified it as a gray whale, rather than the Minke whale we thought it was.

As mentioned in the walrus report, we saw orcas 1 time this season, when Sheffield observed a pod of 6 passing Main Beach. One of them left the pod twice to swim to 2 lone walruses, bump them and then rejoin the pod. No injuries seemed to have been sustained by the walruses.

RED FOX

Again because of the extent of our other duties and because of Hessing's absence from the island, we did not keep as close a watch on the fox dens as we generally do. In late May and early June, West Plate, North Ridge, Pinnacles, East Cape and the Cabin

dens were all used. The South Bench den was not in use and the Sea Lion den was not checked this year. Overall den productivity seemed low, but this is based on general observations of fox numbers and not specific den watches.

The East Cape den was the only den where pups were seen from late June through August, although the den was near to the trail and received a lot of human traffic. Early in the season the Cabin den was active; we observed adults carrying birds to the den several times. However, in mid-June a wildlife photographer followed a fox to the Cabin den. He later told us that he actually stepped into a den entrance, caught a glimpse of a kit's face and backed off. We told people about the den's location and that it was off limits after this. We never saw kits from this den and although the den was used through the season, we believe the kits were either killed or moved.

An unusual addition to the island's fauna this year was a white fox. Although at first we thought it might be an albino, in mid-June it appeared to be shedding to a darker coat. It seems likely that this was an arctic fox. We never saw this fox close and did not see it after the middle of June. Presumably it reached the island over the ice which gives credence to the stories of red foxes colonizing the island from the mainland.

OTHER MAMMALS

Rick Sinnott, from ADF&G, trapped small mammals from 18 June to 29 June, for a total of over 1500 trap hours. He caught three tundra voles (Microtus oeconomus) and two Siberian lemmings (Lemmus sibericus). Two shrews were found along a trail and were sent via Bill Taylor in the Anchorage ADFG office to Cincinnati, Ohio for identification by Woodrow Goodpaster. This year Dr. Goodpaster also identified a shrew from Round Island sent to him in 1988 as a dusky shrew (Sorex obscurus)

BIRDS

A bird species arrival list for the island is shown in Appendix 8. We had 1 new sighting this year, a western meadowlark. This bird will be reported to Dan Gibson at the University of Alaska, since it is a new record for this part of the state.

The Observation Point raven nest was in use again this year and produced 3 fledglings. We suspected the existence of a second near Cormorant Plot #1, east of the cabin. We never found its exact location, but 4 young ravens fledged in this area.

We monitored seabird productivity this year, watching 19 cormorant and 110 black-legged kittiwake nests (Appendix 9). However, few observations were made and the black-legged kittiwake data reflect hatching success but not total

productivity. Chick survivorship in kittiwakes seemed higher than last year and a higher percentage laid 2 eggs. Several strong storm systems moved through Bristol Bay in August; while walking along Main Beach after 1 of these storms, we found dozens of dead kittiwake and murre chicks on the beach. The

cormorant plot which was monitored in 1988 and 1989 was not used by cormorants for nesting this year. We established a secondary cormorant productivity plot on the pinnacles of First Prime Beach.

While Hessing was visiting FWS staff at Cape Peirce, she spoke to them about ideas for monitoring the seabirds which use Round Island, given the fact that our duties on the island preclude time-intensive observations. The manner in which we monitor the seabird plots at the present time does not give us adequate information on total seabird numbers for the island. These plots are not time-intensive, except for the start of the nesting season. It is probably valuable to continue doing them because this will give us some between-year comparisons for these same plots. The crew at Cape Peirce suggested setting up repeatable census plots, pointing out that counting the birds present on the productivity plots would at least give us a repeatable count that could be readily done. We agreed that the most useful seabird information we could collect would be to attempt regular island counts. They could be at 2 year intervals or 5 year intervals. The important factor would be repeating them on a regular basis. The rookeries in the sanctuary have been counted one time, in the late 1970s during OCSEAP programs. However, should drilling for oil ever go forward, or should there be a catastrophic boat collision and resultant oil spill, we should plan on having reliable baseline information available.

DISTURBANCES

We used the same means of measuring disturbances that we have in other years, including the indices of disturbance which are described in detail in the 1989 annual report. There were a total of 5 disturbances over the course of the summer which had an index of 500 or more (Appendix 5). Four of these were caused by research-related activities, either tagging or aerial censusing. The fifth large disturbance was caused by an 80-foot boat which came in one-half mile off Main Beach. Two local boats cruised the beach this summer and several fishing vessels came inside the 3-mile limit as well.

As mentioned in the walrus section of this report, we tried several methods of documenting disturbances to walruses. The moratorium on trawling for yellow-fin sole near the island may end in 1991. We have not been able to prove that this fishery disturbs walruses enough to keep them from using the island, although count and distribution data may indicate that it does. It would be useful to have a plan for assessing disturbances should the trawl fishery begin again. The observations which we collected this summer would likely be a poor reflection of the sort of disturbances which would keep animals off the island. However, with further refinement, this summer's methodology may serve to measure point-source disturbances affecting animals already on the beach.

In late June there was an opening for a quota of 25 tons of yellowfin sole in waters near the Nushagak Peninsula. This fishery caused no discernible effects on the walruses or other wildlife using the island. However, boats were audible and visible from the island and on 28 June, 2 trawlers ran into each other and 1 (Shin-Yan-Ho) sank. An estimated 55,000 gallons of diesel were aboard the vessel and approximately 15% was removed from the boat. Some oil sheen was reported near the site of the accident. We observed no delayed effects on the island from this accident to date, except for the disturbance by the salvage vessels Golden Bear and Lauri Anne noted in Appendix 5. The Shin-Yan-Ho was blown up in mid-September and we do not know how the detonation affected Round Island. No immediate walrus mortality was seen by FWS personnel, who were monitoring the explosion from a plane.

Disturbances of wildlife on the island by visitors continues to be at a low level. Launching the Zodiac, whether to pursue vessels inside the boundary or to meet Winkelman's boat, is a source of disturbance which we continue to try to minimize. The disturbances from this year's research activities were expected and we were pleased that they were limited. We continue to believe that the best way we can deal with potential disturbances from visitors is through education--not only when they arrive on the island but also throughout their stay. We cannot effectively police everyone and therefore we must depend to a certain extent on the ethics of a given visitor. We caught people in restricted areas this year and generally it seemed as though embarrassment was enough of a punishment. The photographer who stepped into the Cabin fox den and was probably responsible for the abandonment of that den did not know enough about the animals which he was photographing. In the future we will give specific limits for approaching dens.

IVORY

We collected 15 single tusks, 3 noseplates and 2 skulls from the island this year. This inventory, along with several unsealed tusks from other years, is listed in Appendix 4. Beginning next season we will use a collection form so that we can track the ivory better from the island to the place where it finally is sold.

In March of 1990 we were able to sell some of the ivory which had been collected from Round Island over the past few years. The Alaska Eskimo Walrus Commission set the price at \$25 per pound and took care of the advertising. Approximately \$3,000 worth was sold at that time with about twice that amount being left in storage at present. Some of the ivory had been in storage for so long that it had dried and was checked severely, making it less

than ideal for working. The sale did not receive widespread publicity and was poorly attended. Also, some buyers were limited by the cash-only policy of the sale. In two subsequent sales, one in Anchorage and one in Dillingham, we were able to move out much of our inventory. These sales coincided with the annual Alaska Federation of Natives sale and Beaver Round-up, respectively, and were better advertised and attended than the first sale.

OVERTIME

Because of a change in overtime policy for the Division, the staff on the island was authorized for a limited amount of paid overtime. This helped keep morale up as well as helped standardize the payment policy for technicians within the department. If the staff on the island only met and oriented visitors, maintained the facilities and did minimal trailwork, they might be able to keep their hours to 37.5 per week. However, we would have no information about the animals on the island this way. Staff on the island have generally tried to collect at least daily count information. Other work has been done opportunistically. In past years, the visitor load was lower, and hasn't presented as much of a conflict with other duties as it has in recent years.

MAINTENANCE

1. Trail system: The stepping-stone system was continued from the camper's outhouse to the cabin. With the wear of recent years, even this well-drained portion of the trail was slick and muddy in wet weather. Hopefully, next year we can continue this trail beyond the cabin. Work on the trail into the campground continued and some stones were laid on the slick path into the largest campsite. Throughout the season, we continued to stake off trails to re-direct traffic. As always, the opportunities for trailwork were endless and time available to do the work was limited.
2. Cable and pulley system: We stored the cable in the boatbox in the cove and this saved us time and effort for the installation of the system. Another bolt sheared mid-season from the southern anchor, leaving two questionable bolts intact. We changed over to the anchor plate which John Matthews made. The plate is anchored by four bolts and the cable runs from a single point. This simplifies the system and more effectively equalizes the load on the anchor. As we have the past 2 years, we greased the cable before and after the season and used a minus tide for installation and dismantling.
3. Boat and motor: For convenience, we stored the boat in the icehouse last winter. It didn't appreciably affect the

condition of the boat and simplified camp breakdown and set-up. The Zodiac nearly made it through the season in passable condition. There was less tackiness and wear evident on the upper tubes than in other years. In August, a large storm system which pushed an already high tide even higher moved the boat 20 feet across the rocks, shredding its bottom. Although the oars were washed away, we were able to recover them. During the storm, the motor was slammed into the rocks several times and part of the swivel bracket sheared. The damage to the swivel seems moderate. However, the motor needs work to correct throttle and shift problems. Also, a compression check shows that the motor is likely losing some power and optimally should be rebuilt.

4. Building maintenance: All structures on the island received a paint job this summer. The catwalk leading to the cabin was only partially painted. The outside of the cabin looks excellent, but should be weatherproofed every year until its next paint job. The deck and catwalk of the cabin should be painted with appropriate deck paint, as should the hot tub deck. The kitchen floor of the cabin should be painted with floor paint next season, and the back room floor should be recoated with floor hardener. The interior walls are good for another several years.

The wick for the diesel heating stove fell apart in May. We were unable to locate the company which originally sold us the stove, so we bought a new stove for the island. However, in the meantime, we used a piece of fiberglass for the wick and the Hi-Seas continued to work through the summer. The new stove is on the island waiting for installation. Because it is a larger stove with larger pipe and will take up quite a bit more room, we might want to consider investing in another boat stove.

Although we heavily tarred the seams in the roof last year, there again was leakage between the front and back rooms of the cabin. The clerestory has several serious cracks in it; we caulked these as well as the skylight and will see how it all weathers this winter. The WNW corner of the cabin floor, where the batteries sit, broke through this year. The batteries used to sit directly on the floor and perhaps some acid spilled there in the past. We patched the hole by constructing a small platform over the hole which is nailed into the bottom plate of the walls.

As there has been in the past, this spring there was leakage from the outside of the cabin through the seams between the floors and walls of the back room. Next season we must exhume the back of the cabin to see whether and how seriously the plastic barrier has been breached. As the back of the cabin is nearly 5 feet into the ground, we will have to wait for the thaw before we do this.

RECOMMENDATIONS

Visitors: Some of the suggestions we have made in the past have been formulated into proposals which will be considered by the Board of Game during its fall meeting this year. The total number of people overnighiting on the island, exclusive of administrative people, will remain at 15. The area biologist will have the power to assign 3 scientific/educational permits per time period. Aircraft access to the island will be prohibited without permission of the area biologist. Permits will be invalid if the permittee does not contact Round Island staff or the Dillingham office before 0900 on the morning the permittee is scheduled to arrive on the island.

The most significant proposed change is for us to begin charging for permits, effective 1991. We have suggested \$50 per person for a 5 day permit, with \$10 per person for day visitors. With the current trend toward making users pay for the services they receive, we expect proposal to be implemented. We will have to establish an expedient method for day-users to pay, since many of the people who are issued day use permits at the present time end up not using them, due to the unpredictable nature of the fisheries in Bristol Bay.

We plan to keep the status quo with the way in which we orient visitors. By updating the visitor information packet, hopefully we will be able to convince potential visitors of the truly rugged and remote aspects of the island, as well as inform them about the area's inhabitants and its ecology. We will draft a Standard Operating Procedure for response to accidents on the island. In addition, we plan to have a liability release statement drafted to protect the staff and the State from liability as well as to underscore the dangers of visiting Round Island.

With visitor use holding steadily over the past few years, there is no regeneration of vegetation in the most heavily used areas of the island. The campsites continue to deteriorate, and some of the walrus overlooks, such as First Beach and the Campground, are becoming quite beaten down. Continuing the trail work is slow and time-intensive but laying large rocks in the trails is probably the best method for slowing deterioration in most places. Catwalks or boardwalks in several marshy areas might be better, but lacking funds at this time, we plan to continue with rocks. We think that construction of at least a single tent platform as a test is a must for the 1991 season. A basic 8- to 10-foot square built of plywood over a 2x6 frame would probably work well.

Wildlife: We will continue with our daily counts for both walruses and sea lions. At this time, we do not know whether the FWS is planning further research during the next several years which might involve Round Island or its personnel. We hope the cooperative spirit of this season will continue, since the

experience benefitted the staff as well as hopefully resulted in information of long-term use for management of the walruses which use Round Island.

Because sea lions have been listed as threatened, we need to watch the hauling area at East Cape more extensively early in the season to see whether it is used for pupping. Staff plans to talk to sea lion managers and researchers during the winter in order to assess the need for changes in the information we collect and in the latitude we give the visitors as far as observing sea lions.

Because the bird productivity information is readily collected, we plan to continue with our 3 established productivity plots. We will use these plots for count plots too, with the understanding that information collected from these plots do not necessarily reflect total-island trends. We would like to establish a means of getting more population counts for the island as baseline information. We will talk to seabird researchers this winter for ideas on establishing plots where we can repeat the counts in a manner which is consistent, yet not time-intensive.

We plan to consolidate the plant list and the bird list so that they are available for visitors' use. The bird list is compiled, but needs editing. The plant list needs to be translated into common names and organized for easier use.

Maintenance: The porch and catwalk of the cabin need to be painted with a good deck-quality paint. The hot tub platform should be repainted if possible. All the buildings which were painted this season will need to be weatherproofed annually until their next paint job. The inside floors of the cabin will need to be coated, the front with floor paint and the back with floor hardener. The boat box needs to be painted and caulked as well. A better system for mounting the solar panel should be designed; perhaps a hole-and-dowel system might work.

In addition to looking at the walls and floor of the cabin for woodrot, we also need to look closely at the plastic of the clerestory, which gets a few more cracks each season. The roof of the cabin will probably hold up for a little while longer, especially if we continue to tar it annually, paying special attention to the join between the clerestory and the back room.

We expect to excavate two new outhouse holes next season. We hope to move the camper's outhouse closer to the campground, but in the past it's been difficult to find bedrock-free soil on the east side of the ridge.

Disturbances: We will continue our opportunistic observations of disturbances although we are not certain whether we will have the time to continue the other disturbance observations which we attempted this season. We hope to continue our coordination with

other agencies concerning monitoring the various wildlife on the island and reporting on our findings. We will check over the course of the winter to see whether the Coast Pilot, NOAA charts and flight maps all show the water and air restrictions which are now in effect on approaching the island.

Management plan: Over the course of the winter, area staff plan to draft a management plan with the help and guidance of the Regional office. We hope that the management plan will not only prioritize the uses of the island, but will also address potential resource conflicts. We need not manage perpetually with hindsight and we hope that this plan will help us look ahead.

APPENDIX 1. 1990 VISITOR USE OF ROUND ISLAND

Date	Party size	Cum. vis.	Days stay	Vis. days	Cum. days	Via	From
MAY							
1	5	5	1	5	5	Westling	WN
12	3	8	1	3	8	Vulcan	WN
12	2	10	1	2	10	Loon Pt	WN
13	2	12	1	2	12	Zero	Dlg.
13	4	16	1	1	16	Am.Marie	Dlg.
13	3	19	1	3	19	SeaHawk	Cordova
14	2	21	1	2	21	Saxon	WN
14	5	26	1	5	26	Shodan	Togiak
14	5	31	1	5	31	Skaggerak	Dlg.
18	3	34	1	3	34	BayQueen	Anch.
19	4	38	1	4	38	FairIsle	Kodiak
20	2	40	7	14	52	Puffin	USFWS
22	4	44	1	4	56	QuinDelta	WI
26	2	46	4	8	64	Puffin	Anch.
27	2	48	3	6	70	Puffin	Dlg.
29	2	50	1	2	72	Dancer	Sitka
JUNE							
2	1	51	4	4	76	Puffin	PA
6	2	53	3	6	82	"	Dlg.
8	1	54	7	7	89	"	CANADA
8	2	56	7	14	103	"	Anch.
8	1	57	5	5	108	"	Anch.
14	1	58	6	6	114	"	Anch.
15	2	60	5	10	124	"	Anch.
15	2	62	5	10	134	"	Dlg.
17	2	64	5	10	144	"	WN
19	1	65	4	4	148	"	ADFG/Anch.
21	1	66	8	8	156	"	" "
22	1	67	6	6	162	"	EagleRiver
22	1	68	6	6	168	"	Soldotna
29	2	70	4	8	176	"	Anch.
29	4	74	5	20	196	"	Fairbanks
29	1	75	5	5	201	"	Anch.
JULY							
2	2	77	3	6	207	"	ITALY
5	1	78	9	9	216	Puffin	WY
5	2	80	2	4	220	Yute Air	Anch.
6	2	82	8	16	236	Puffin	MA
6	2	84	4	8	244	"	WGERMANY
7	2	86	5	10	254	"	Girdwood
7	2	88	3	6	260	"	SWEDEN
11	2	90	3	6	266	"	Dlg.
13	5	95	5	25	291	"	Anch.
13	3	98	3	9	300	Puffin	Anch.

APPENDIX 1, continued. 1990 VISITOR USE OF ROUND ISLAND

JULY, cont.

17	2	100	3	6	306	Puffin	OR
17	1	101	4	4	310	"	Anch.
20	7	108	5	35	345	"	NConserv.
20	1	109	9	9	354	"	Anch/Cons.
20	2	111	5	10	364	Puffin	Dlg.
21	6	117	1	6	370	chopper	Icicle,
						Dlg.	
21	2	119	4	8	378	Puffin	CA,MA
21	1	120	8	8	386	Puffin	Anch.
21	2	122	4	8	394	"	Bethel
28	2	124	9	18	412	"	Anch.
28	1	125	7	7	419	"	Anch.
28	4	129	2	8	427	"	Fairbanks
28	2	131	2	4	431	"	PA
29	6	137	6	36	467	"	Fbx,AUSTRAL
29	1	*	5	5	472	Puffin	USFWS,Dlg.

AUGUST

2	8	145	1	8	480	ArcTern	Dlg.
3	1	146	3	3	483	Puffin	Dlg.
3	2	148	3	6	489	Puffin	Dlg.
3	2	150	7	14	503	"	NY
3	3	153	7	21	524	"	Anch.
4	3	156	3	9	533	"	Dlg.
5	2	158	3	6	539	"	Dlg.
13	2	160	6	12	551	"	Dlg.
13	2	162	6	12	563	"	FRANCE
20	4	166	4	16	579	"	Dlg.
20	1	167	4	4	583	"	WN
23	1	168	5	5	588	Puffin	AUSTRAL

Total day visitors = 58 (42% during herring season)

Total campers = 110

Total visitors = 168

* = return visitor, not counted again as camper, but days stay added to totals

MEMORANDUM

State of Alaska

TO: John Trent
Management Coordinator
Region II(S)
Anchorage

DATE: October 11, 1990

FILE NO.:

THRU:

TELEPHONE NO.: 267-2185

SUBJECT: Round Island Survey

FROM: Rick Sinnott ^{RS}
Wildlife Biologist
Anchorage

We talked about using some of the information I gathered in my summer 1990 pre-survey of visitors to Round Island to support our Board of Game proposals for further limiting numbers of visitors/day. I have summarized responses to pertinent questions.

As you know, this year's questionnaire was a pre-survey. It was only intended to test Round Island visitors' response to the questions themselves so that the questions could be refined for a full-blown survey next summer. However, 37 people completed the questionnaires in June and July. Thus, Polly and Gay sampled a substantial proportion of the 110 campers this summer. Many of the questions need to be refined for next year's survey. However, I believe the figures summarized below are very valuable indicators of visitor expenses and attitudes.

Travel Costs

The average cost for transportation to Round Island was \$682. Costs ranged from \$260 to \$1,250. Total cost for the 31 visitors that completed this question was \$21,140. Estimated total cost for all 110 campers is \$75,020, most of which was spent in Anchorage, Dillingham, and/or Togiak for air fare and boat charters.

Equipment Costs

Spotting scopes, binoculars, and photographic and camping equipment purchased primarily for the trip to Round Island averaged \$157/person. Campers reported that these costs ranged from 0 to \$1,000. The estimated total cost for all 110 campers is \$19,250. Once purchased, of course, most of this equipment can be used for other activities.

Consumer Surplus

Consumer surplus is the difference between the maximum amount that an individual is willing to pay for an activity and the actual amount paid. One way to measure consumer surplus is to set up a hypothetical situation that the respondent can identify with, and ask them how much they would be willing to pay to either help or

prevent the situation from occurring. The pre-survey included three such hypothetical situations. Two seem relevant to this issue:

- o If transportation, lodging, currency exchange rates, or other costs had risen while you were making arrangements to come, how much more would you have been willing to pay to visit Round Island before the cost was too high?

The average answer among the 26 respondents to this question was \$405. The responses ranged from \$50 to \$1,500.

- o If funding for Round Island is not approved each year by the Legislature, we would have to close the sanctuary to visitors. Assuming that while you were making arrangements to come you had heard a special fund was established to pay for staff and maintenance, how much money would you have been willing to contribute to guarantee the opportunity to visit Round Island?

This question has direct bearing on our plan to ask for user fees to help run the visitor program. I tried to avoid using terms such as "permits" and "user fees" in the pre-survey, because I thought it might somehow bias responses. Unfortunately, many found this question confusing. In the real survey, I will probably simplify it by asking visitors how much a permit should cost.

Among the 33 who responded, the average amount they were willing to pay for a "user fee" was \$88. Values ranged from \$25 to \$200.

When laymen are introduced to the willingness-to-pay concept, their first concern is whether it is valid in the real world. Research has shown that willingness-to-pay figures are not necessarily grossly inflated. If the hypothetical situations could become real, respondents seem to give realistic estimates. I believe the estimates provided in the pre-survey are realistic.

Crowding

Round Island will never be crowded in the sense that Coney Island is. Nevertheless, visitor perceptions and the quality of the experience are important considerations in managing a remote site primarily for wildlife viewing. A reduction in the maximum number of visitors/day is one of our chief proposals to the Board.

Visitors were asked how crowded the island was during their visit, on a scale from 1 (not at all crowded) to 9 (extremely crowded). All 37 responded to this question, with an average value of 2.9 (slightly crowded). Values ranged from 1 to 8.

During one period a group of 8 coincided with several smaller groups, resulting in the maximum of 15 visitors on the island at the same time. Comparing visitor perceptions during this period with other periods was of particular interest. Before and after the large group, the average response was 1.9 (not at all crowded). While the large group was on the island, the average response of visitors in this and other groups was 4.4 (slightly to moderately crowded). Clearly, allowing a maximum of 15 campers on the island at any one time begins to exceed the tolerance level of visitors.

Visitors were asked to suggest the greatest number of visitors that could be allowed on the island at any one time without it becoming too crowded. The average response was 13 (58% of the campers suggested 12 or less). Responses ranged from 6 to 20.

Visitor Facilities

Part of the island's attraction is its wilderness character. To maintain this, visitor facilities must be limited. However, there may be a few additional facilities that could improve the visitor experience and minimize future habitat or wildlife disturbances.

Visitors were asked if facilities on the island were adequate. One-third felt they were not. They most frequently suggested a cook shack and level tent sites or platforms.

Summary

Visitors to Round Island would support a reduction in the maximum number of visitors/day. Our proposal to limit the number of overnight permits available to the public to 12 is supported by a majority of visitors.

Visitors are also likely to support a user fee of \$50/person. There seems to be a large consumer surplus, as costs could rise approximately 60% before visitors would choose not to come. None of the visitors seemed to be against paying a justifiable user fee, and \$50 is little more than half of what the average visitor said they would pay. Compared to the high transportation costs, a \$50 fee appears nearly inconsequential if it will help preserve the visitor program on Round Island.

cc: John Westlund
Larry Van Daele
Polly Helsing
Nancy Tankersley

APPENDIX 3. 1990 BOAT CONTACT MADE

5/01	unidentified tender
5/10	Clyde (came in without permits)
5/18	Miss Melanie*
5/18	Sea Hawk (departing visitors)
5/26	Baranof--tender
6/23	Polar Star--tug*
7/01	Irene's Way*
7/03	JUNO--tender*
7/07	local skiff*
7/18	local aluminum skiff*
8/07	Golden Bear & Lauri Anne--salvage boats

* Indicates a boat slow to respond to our requests and/or exhibiting suspicious behavior

APPENDIX 4. 1990 ROUND ISLAND DAILY WALRUS COUNTS

Date	W. Main	W. S.	W. Main	N. Main	Boat	Boat	First	Prime	Second	Prime	E. Side Total	Boat East	Boat Island
4/30	N/C		N/C	220	0	0	N/C	N/C	N/C	N/C	220	N/C	N/C
5/01	"		"	720	0	0	0	0	0	0	720	"	"
5/02	"		"	870	0	0	0	0	0	0	870	"	"
5/03	"		"	387	0	0	0	0	0	0	387	"	"
5/04	"		"	196	0	0	0	0	0	0	196	"	"
5/05	"		"	219	0	0	0	0	0	0	219	"	"
5/06	"		"	150	0	0	0	0	0	0	150	"	"
5/07	0		250	406	0	0	0	0	0	0	406	845+	1195
5/08	N/C		N/C	980	0	2	0	0	0	0	982	N/C	N/C
5/09	"		"	1421	8	21	0	0	0	0	1540	"	"
5/10	"		"	1380	3	13	0	0	0	0	1396	"	"
5/11	"		"	1192	7	16	0	0	0	0	1215	"	"
5/12	"		"	786	5	11	0	0	0	0	802	"	"
5/13	N/C		N/C	851	0	2	0	0	0	0	853	N/C	N/C
5/14	400		375	730	0	1	0	0	0	0	731	1474	2249**
5/15	N/C		N/C	227	0	0	0	0	0	0	227	N/C	N/C
5/16	N/C		N/C	236	0	0	0	0	0	0	236	N/C	N/C
5/17	N/C		N/C	221	0	0	0	0	0	0	221	N/C	N/C
5/18	N/C		N/C	172	0	0	0	0	0	0	172	N/C	N/C
5/19	"		"	415	0	0	0	0	0	0	415	"	"
5/20	"		"	690	0	0	0	0	0	0	690	"	"
5/21	"		"	550	0	0	0	0	0	0	550	"	"
5/22	"		"	676	0	0	0	0	0	0	676	"	"
5/23	"		"	342	0	0	0	0	0	0	342	"	"
5/24	"		"	571	0	6	0	0	0	0	577	N/C	N/C
5/25	"		300	228	0	1	0	0	0	0	229	N/C	N/C
5/26	"		N/C	251	0	0	0	0	0	0	251	"	"
5/27	"		300	411	0	2	0	0	0	0	413	"	"
5/28	"		150	21	0	0	0	0	0	0	21	"	"
5/29	"		N/C	200	0	0	0	0	0	0	200	"	"
5/30	"		N/C	275	0	1	0	0	0	0	276	"	"
5/31	N/C		N/C	371	0	0	0	0	0	0	371	"	"
6/01	N/C		(300)	705	0	2	0	0	0	0	707	N/C	N/C
6/02	344		900	825	0	39	113	0	0	0	977	1002	2246
6/03	N/C		130	950	0	18	165	0	3	2	1138	N/C	N/C
6/04	"		N/C	1000*	0	32	170	0	0	0	1202	"	"
6/05	"		"	800*	0	19	195	0	125	5	1144	"	"
6/06	"		"	750	0	0	148	0	160	0	1058	"	"
6/07	"		"	695	0	0	100	0	123	0	918	"	"
6/08	N/C		N/C	500	0	0	43	0	119	0	662	N/C	N/C
6/09	435		105	630	0	9	63	0	124	1	827	851	1391
6/10	N/C		N/C	238	0	0	14	0	7	0	259	N/C	N/C
6/11	"		"	623	0	19	82	0	4	0	728	"	"
6/12	"		"	1028	1	14	128	0	6	1	1178	"	"
6/13	"		"	775	5	19	90	0	32	4	925	"	"
6/14	"		"	623	0	20	136	0	97	11	887	"	"
6/15	"		"	1660	0	19	122	25	160	23	2009	"	"

1990 Daily Walrus Count (Con't.)

Date	W. Main	W. S.	W. Main	N. Main	Boat	Boat	First	First Prime	Second	Second Prime	E. Side Total	Boat East	Boat Island
6/16	N/C		N/C	730	0	3	57	14	80	0	884	"	"
6/17	185		225	1225	0	36	180	17	160	0	1628	2485	2905
6/18	N/C		N/C	2005	78	81	186	88	320	20	2778	N/C	N/C
6/19	"		"	2252	50	50	185	60	340	35	2972	"	"
6/20	"		"	1411	58	28	208	74	255	18	2052	"	"
6/21	"		"	467	15	4	150	35	176	40	887	"	"
6/22	"		"	690	19	4	149	70	145	0	1077	"	"
6/23	"		"	365	0	0	105	28	44	0	542	"	"
6/24	"		"	863	11	31	235	70	67	2	1379	"	"
6/25	N/C		N/C	580	22	30	186	39	21	0	888	N/C	N/C
6/26	435		518	1079	68	59	231	117	77	6	1637	3421	4374
6/27	N/C		N/C	1705	123	120	216	133	279	9	2585	N/C	N/C
6/28	"		"	1740	101	138	339	176	587	152	3233	"	"
6/29	"		"	840	61	50	192	97	325	84	1649	"	"
6/30	"		"	791	21	10	42	0	36	4	804	"	"
7/01	N/C		N/C	600	0	7	13	0	1	0	621	N/C	N/C
7/02	"		"	1000	0	16	7	0	1	2	1026	"	"
7/03	0		545	977	13	20	4	14	75	2	1105	"	"
7/04	N/C		N/C	1125	0	16	101	12	174	7	1435	"	"
7/05	"		"	2325	25	36	211	8	230	4	2840	"	"
7/06	"		"	2027	138	27	271	95	310	100	2869	"	"
7/07	"		"	2005	137	28	275	100	326	151	3022	"	"
7/08	"		"	1261	111	79	210	124	297	265	2347	"	"
7/09	"		"	362	0	0	43	13	4	65	487	"	"
7/10	"		"	400	0	3	139	55	1	78	677	"	"
7/11	N/C		N/C	650	0	4	112	35	1	95	897	"	"
7/12	0		90	367	0	7	69	16	0	34	493	918	1008
7/13	N/C		N/C	600	0	14	113	0	0	5	732	N/C	N/C
7/14	N/C		N/C	509	0	5	88	0	1	3	606	N/C	N/C
7/15	220		600	1223	5	71	103	6	26	9	1443	2558	3378
7/16	350		1340	2226	205	163	316	100	238	112	3248	5201	6891
7/17	650		1400	2350	234	235	300	162	360	331	3972	4800	6850
7/18	660		1300	2300	181	115	293	128	341	294	3662	4115	6075
7/19	N/C		N/C	1590	140	35	245	91	219	175	2485	N/C	N/C
7/20	"		"	1295	106	35	177	103	114	135	1936	"	"
7/21	"		"	390	0	0	95	0	5	1	491	"	"
7/22	"		"	235	0	0	20	0	0	0	255	"	"
7/23	"		"	250	0	0	0	0	0	0	250	"	"
7/24	"		"	271	1	0	0	0	0	0	272	"	"
7/25	"		"	678	0	22	100	0	1	0	801	"	"
7/26	"		"	715	27	27	4	157	0	43	946	"	"
7/27	"		"	531	18	0	74	0	41	0	664	"	"
7/28	"		"	1005	50	13	127	0	99	4	1298	"	"
7/29	"		"	1500	95	23	200	0	192	7	2017	"	"
7/30	"		"	3060	156	25	178	12	370	84	3885	"	"
7/31	N/C		N/C	1090	9	7	44	0	1	0	1152	N/C	N/C
8/01	N/C		N/C	693	0	5	9	0	0	0	707	N/C	N/C

1990 Daily Walrus Count (Con't.)

Date	W. Main	W. S.	W. Main	N. Main	Boat	Boat	First	First Prime	Second	Second Prime	E. Side Total	Boat East	Boat Island
8/02	"	"	"	775	0	3	4	0	0	0	782	"	"
8/03	"	"	"	1300	0	14	0	0	0	44	1358	"	"
8/04	"	"	"	1046	2	13	116	9	24	46	1256	"	"
8/05	"	"	"	527	0	0	115	0	1	0	643	"	"
8/06	"	"	"	1725	35	17	176	0	18	4	1975	"	"
8/07	"	"	"	1497	150	23	190	0	17	0	1877	"	"
8/08	N/C	N/C	N/C	1155	120	11	150	20	17	0	1473	N/C	N/C
8/09	2	1100	1970	120	40	190	190	75	0	6	2401	3662	4764
8/10	N/C	N/C	N/C	1230	103	20	173	62	35	4	1627	N/C	N/C
8/11	N/C	N/C	N/C	809	18	4	64	4	25	0	924	N/C	N/C
8/12	"	"	"	666	0	0	6	0	0	0	672	"	"
8/13	"	"	"	1142	0	9	0	0	0	0	1151	N/C	N/C
8/14	"	"	"	950	0	22	0	1	0	0	973	"	"
8/15	"	"	"	1425	12	28	170	0	0	0	1635	"	"
8/16	"	"	"	350	0	0	23	0	0	0	373	"	"
8/17	"	"	"	78	0	0	20	0	0	0	98	"	"
8/18	"	"	"	366	0	9	25	0	0	0	400	"	"
8/19	"	"	"	495	0	25	210	3	16	1	750	"	"
8/20	"	"	"	1582	83	133	312	78	160	2	2350	"	"
8/21	"	"	"	1580	125	99	235	85	206	0	2330	"	"
8/22	"	"	"	932	57	25	30	6	6	0	1056	"	"
8/23	"	"	"	1780	125	59	134	3	13	0	2114	"	"
8/24	"	"	"	2310	150	31	190	8	95	0	2784	"	"
8/25	"	"	"	1220	60	7	112	0	85	0	1484	"	"
8/26	"	"	"	272	0	0	0	0	2	0	274	"	"
8/27	N/C	N/C	N/C	350	0	0	0	0	0	0	350	N/C	N/C

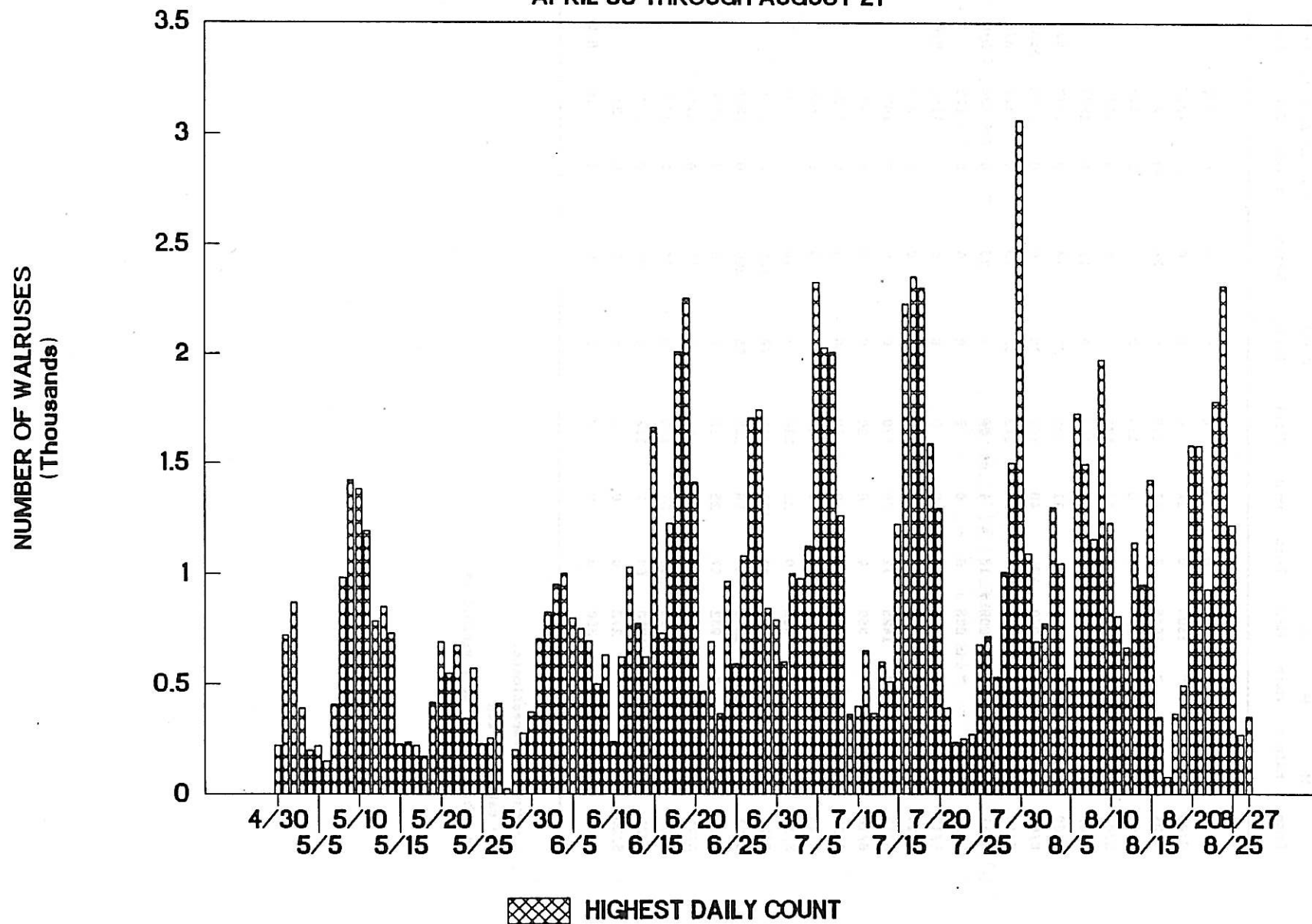
+ = May be overestimate.

* = estimate; fog

** = big swells, poor visibility

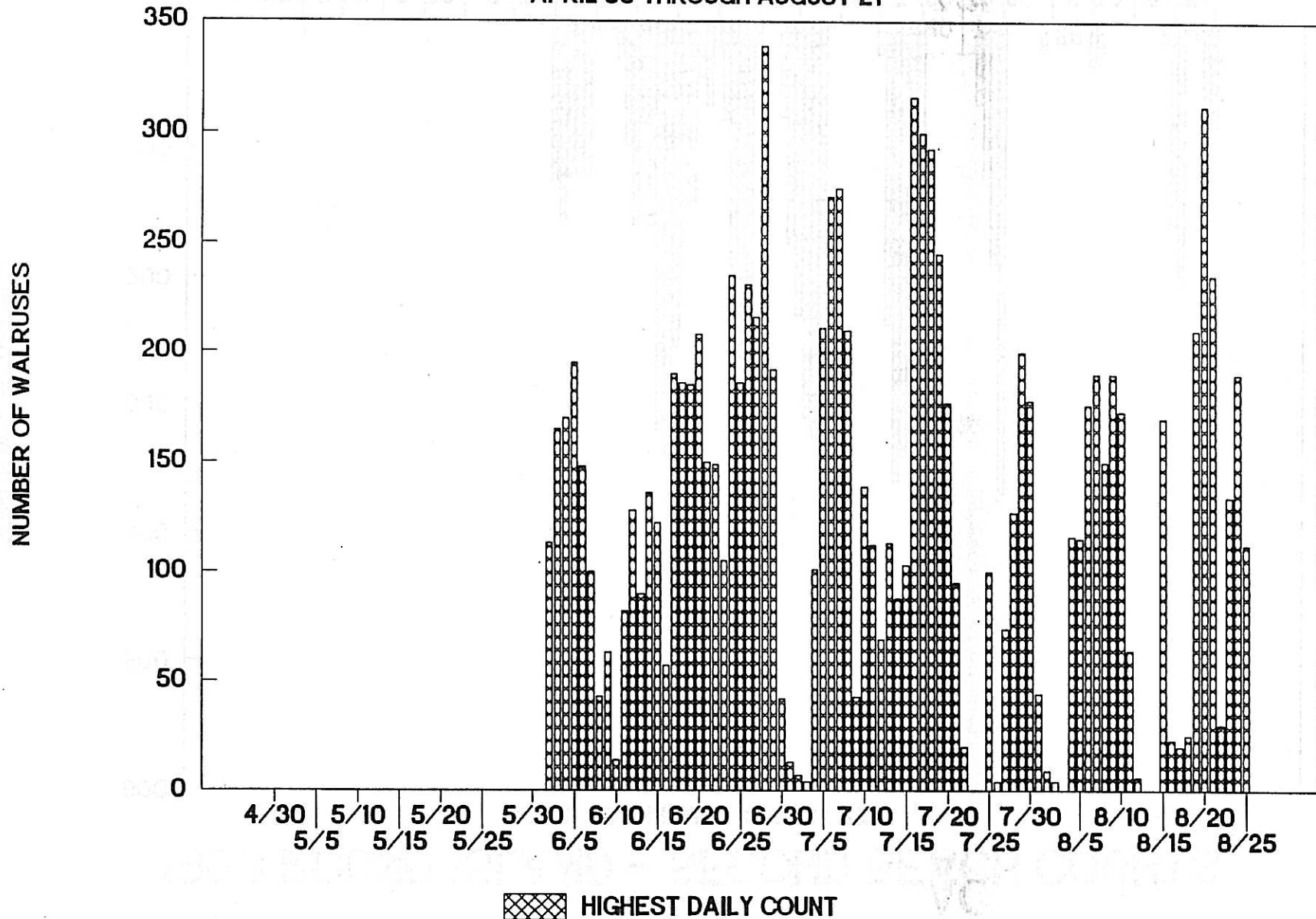
1990 ROUND ISLAND - MAIN BEACH COUNTS

APRIL 30 THROUGH AUGUST 27



1990 ROUND ISLAND - FIRST BEACH COUNTS

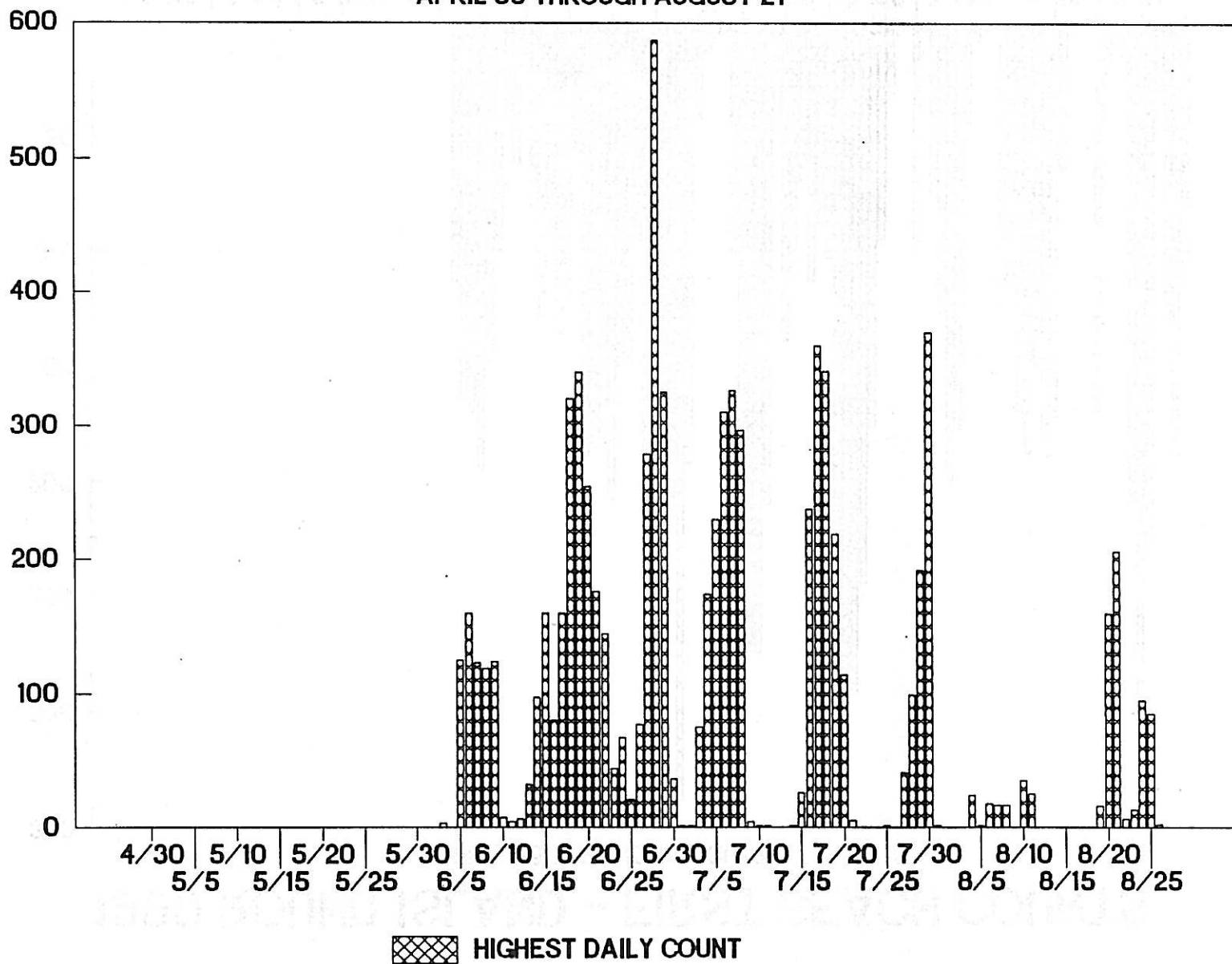
APRIL 30 THROUGH AUGUST 27



1990 ROUND ISLAND - SECOND BEACH COUNTS

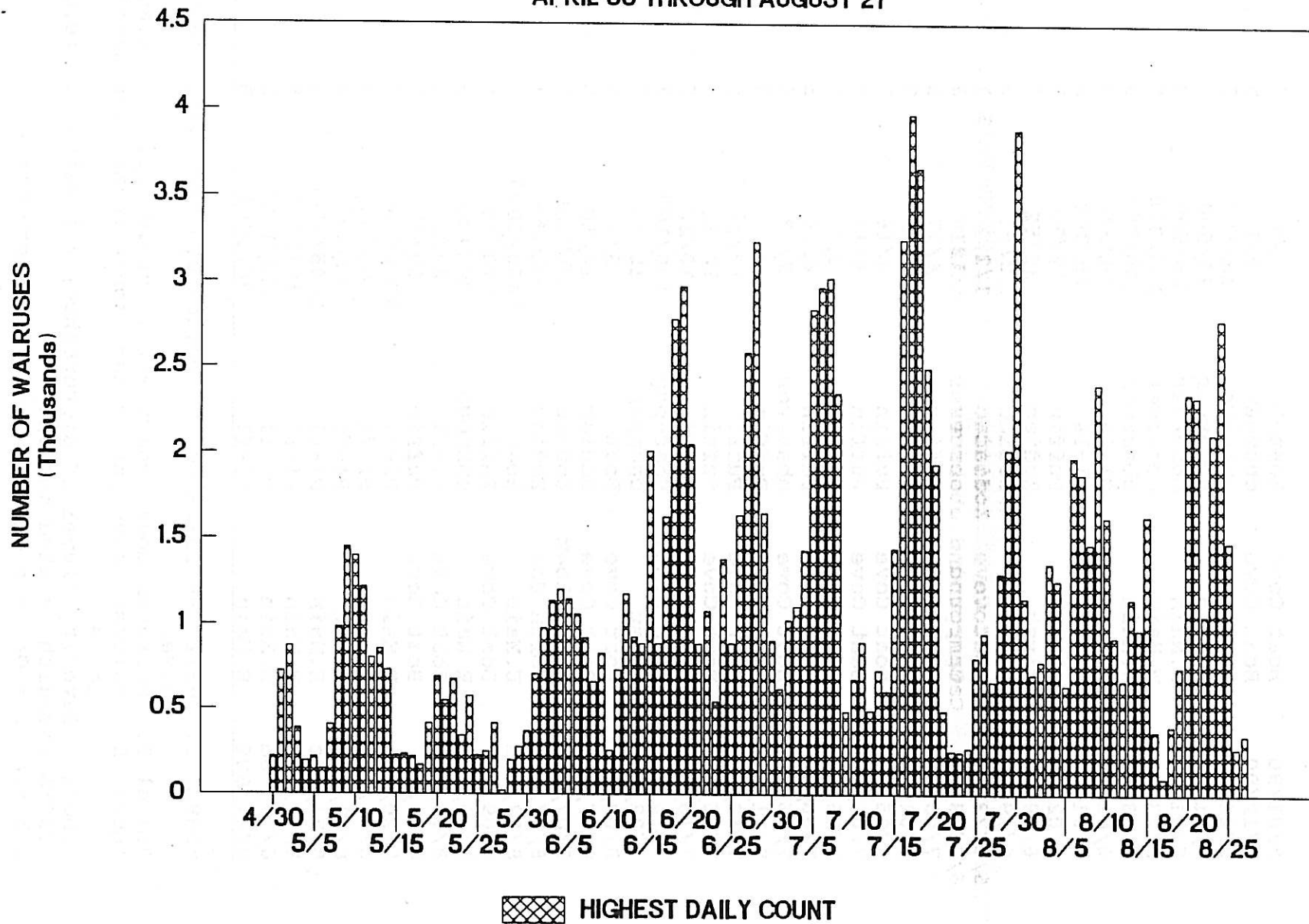
APRIL 30 THROUGH AUGUST 27

NUMBER OF WALRUSES



1990 ROUND ISLAND - EAST SIDE TOTAL

APRIL 30 THROUGH AUGUST 27



APPENDIX 5. 1990 ROUND ISLAND WALRUS DISTURBANCES

Date	Beach	Type	Dist/Total	Level*	Index^
5/01/90	Boat Cove	Boat-La	3/3	3	9
5/12/90	Boat Cove	chopper	8/8	5	40
5/21/90	E.Main	observer	18/500	5	90
5/21/90a	W.Main	observer	25/500	5	125~
5/21/90b	W.Main	observer	25/500	3	75~
5/23/90a	W.Main	observer	100/390	5	500~
5/23/90b	W.Main	observer	100/390	3	300~
6/01/90a	W.Main	Pl-la	10/300	3	30
6/01/90b	W.Main	Pl-la	20/300	5	100
6/02/90	S.Boat	Puffin	12/20	5	60
6/09/90a	First	Zodiac	30/52	1	30
6/09/90b	First	Zodiac	2/52	3	6
6/23/90	Boat Cove	Zodiac	1/2	3	3
6/28/90	Campground	observer	4/18	3	12
7/03/90	Boat Cove	Zodiac	4/17	5	20
7/04/90	Boat Cove	Puffin	4/4	3	12
7/05/90a	Boat Cove	Puffin	4/16	3	12
7/05/90b	Boat Cove	Puffin	6/16	1	6
7/05/90	Boat Cove	Zodiac	3/3	3	9
7/06/90	Boat Cove	Puffin	6/30	5	30
7/06/90	Boat Cove	observer	2/27	5	10
7/11/90	Boat Cove	Puffin	4/4	5	20
7/13/90	Boat Cove	Puffin	12/12	5	60
7/15/90	Boat Cove	Puffin	12/28	5	60
7/16/90	Boat Cove	Puffin	10/20	5	50
7/18/90	Main B.spit	Boat-psg	100/100	1	100
7/22/90	First	chopper	15/95	5	60
8/02/90	Boat Cove	Boat	3/3	5	15
8/07/90a	Boat Cove	Zodiac	10/10	5	50
8/07/90b	North Boat	Zodiac	50/150	5	250
8/07/90c	North Boat	Zodiac	80/150	1	80
8/07/90d	E.Main	Boat	1400/1800	1	1400
8/09/90	Boat Cove	Puffin	10/20	5	50
8/13/90	E.Main	unknown	50/650	3	150
8/19/90	Boat Cove	Pl-fl	20/34	5	60~
8/20/90	Boat Cove	Puffin	85/99	5	425
8/20/90	E.Main	Pl-fl	1000/1600	1	1000~
8/21/90a	First	Pl-fl	73/177	1	73~
8/21/90b	First	Pl-fl	17/177	5	85~
8/21/90c	E.Main	Pl-fl	1485/1700	1	1485~
8/21/90d	E.Main	Pl-fl	15/1700	5	75~
8/21/90e	E.Main	Pl-fl	400/1685	1	400~
8/21/90f	E.Main	Pl-fl	20/1685	5	100~

*Level 1. Walruses raise heads, bodies synchronously, seen as wave.

*Level 3. Walruses move toward water, usu.stopping on beach.

*Level 5. Walruses move into water, don't rehaul for several hours.

^Index = Severity (level of disturbance) x # walruses disturbed

~USFWS research-related activity

a,b,c,etc. = On same day, denotes same disturbance source

APPENDIX 6. 1990 IVORY COLLECTED FROM ROUND ISLAND

REGISTRATION #	ITEM	LENGTH (cm)	CIRCUM (cm)
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Registration number 189:

D318	tusk	46.0	28.3
D319	tusk	60.5	21.0
D320	tusk	60.4	20.5
D321	tusk	58.5	20.5
D322	tusk	34.0	18.6
D323	tusk	37.0	19.0
D324	tusk	58.0	23.0
D325	tusk	53.0	21.0
D326	tusk	53.0	21.0
D327	tusk	47.0	22.5
D328	tusk	38.5	21.0
D329	tusk	54.0	23.0
D330	tusk	39.0	16.5
D331	tusk	43.0	20.0
D332	tusk	33.0	19.0
D333A	plate +	55.0	23.0
D333B	2 tusks	64.0	23.0
D334A	plate +	50.5	20.0
D334B	2 tusks	54.0	18.5
D335A	plate +	55.0	20.0
D335B	2 tusks	55.0	20.0
D336A	skull +	64.5	22.0
D336B	2 tusks	56.0	21.0
D337A	skull +	63.0	23.5
D337B	2 tusks	63.0	25.0

Registration #190--collected in other years, sealed this year:

D338	tusk	70.0	18.3
D339	tusk	36.3	22.8
D340	tusk(half)	19.2	20.0
plus 31 small pieces from 3 to 10 inches in size			

APPENDIX 7. 1990 SEA LION COUNTS

Date	Time	Count
5/01	1710	370
5/02	1016	230
5/03	0935	245
5/04	0940	314
5/05	0940	338
5/06	0845	155
5/07	1021	455
5/08	0850	375
5/09	1032	344
5/10	0840	248
5/11	1036	397
5/12	0905	207
5/13	1351	469
5/14	1200	439
5/15	0935	247
5/16	0930	123
5/17	0924	230
5/18	0920	289
5/19	0941	362
5/20	0950	287
5/21	0935	488
5/22	0725	395
5/23	1030	455
5/24	0735	193
5/25	0958	184
5/26	1830	685
5/27	1621	520
5/28	0900	143
5/29	1803	538
5/30	0940	168
5/31	0944	190
6/01	1330	494
6/02	2240	335
6/03	0800	367
6/04	1903	493
6/05	1600	365
6/06	1447	381
6/07	0815	242
6/08	1652	320
6/09	1800	363
6/10	0957	136
6/11	1525	282
6/12	2200	221
6/13	0905	62
6/14	0956	193
6/15	0925	105

Sea lion Count (Con't.)

Date	Time	Count
6/16	1844	166
6/17	0905	198
6/18	1037	127
6/19	2035	150
6/20	1014	123
6/21	2225	60
6/22	1802	102
6/23	1856	106
6/24	1121	168
6/25	1603	94
6/26	2035	150
6/27	1315	158
6/28	1503	101
6/29	1900	85
6/30	2044	41
7/01	2215	105
7/02	1821	65
7/03	1006	95
7/04	2215	26
7/05	0830	140
7/06	1823	42
7/07	2155	44
7/08	2240	19
7/09	1420	19
7/10	0941	102
7/11	1350	78
7/12	0934	93
7/13	1407	51
7/14	0946	48
7/15	1406	71
7/16	1105	121
7/17	2220	25
7/18	2015	43
7/19	2315	77
7/20	2042	37
7/21	2115	16
7/22	1856	60
7/23	1611	33
7/24	2007	69
7/25	1021	64
7/26	1856	15
7/27	1033	59
7/28	1841	51
7/29	2057	39
7/30	2130	37
7/31	0958	30
8/01	0940	70

Sea lion Count (Con't.)

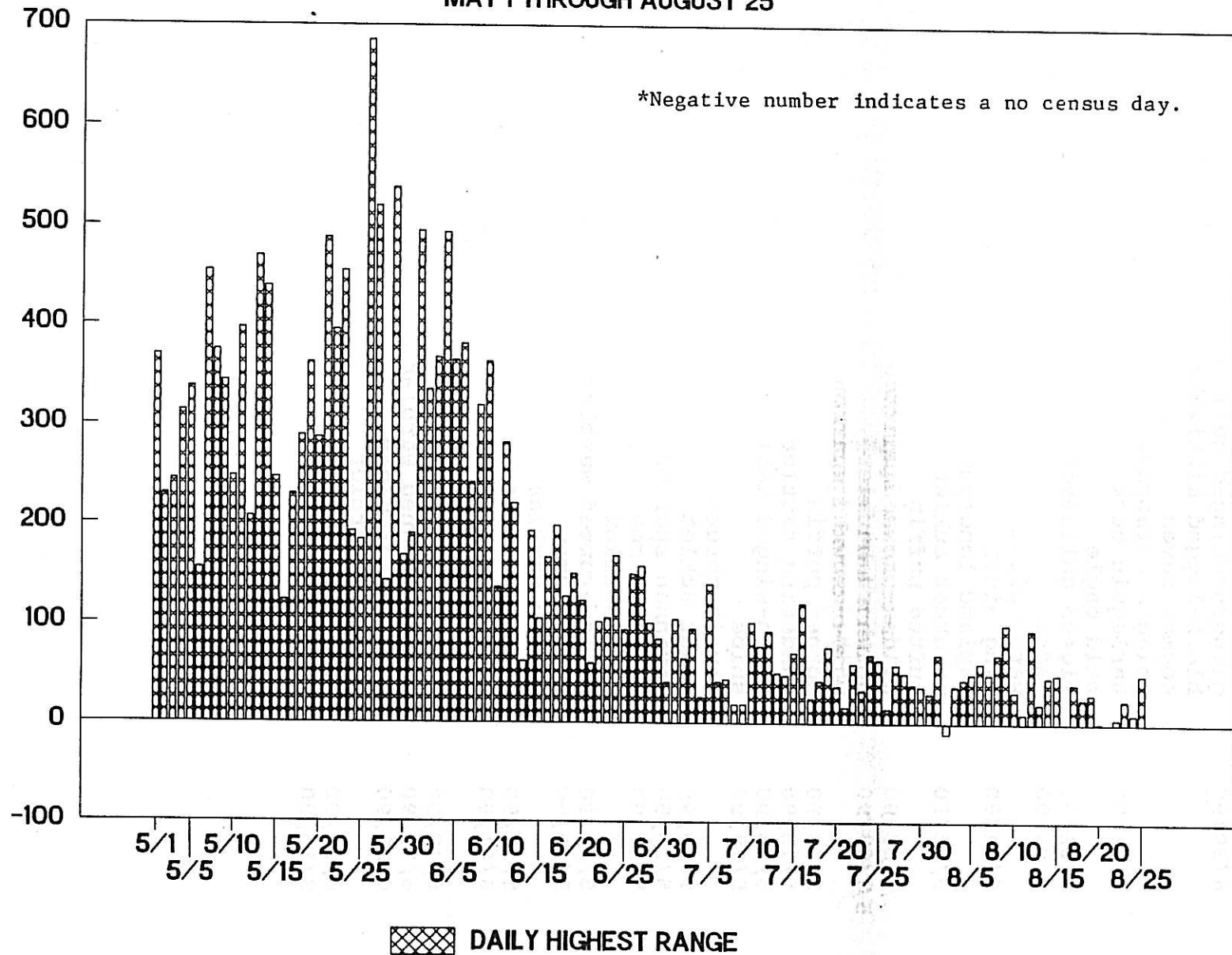
Date	Time	Count
8/02	No Count	
8/03	2049	38
8/04	1645	44
8/05	0852	50
8/06	1906	61
8/07	0900	50
8/08	1610	70
8/09	1205	100*
8/10	1030	32
8/11	0930	10
8/12	1303	95
8/13	2140	20
8/14	0943	47
8/15	0920	50
8/16	1035	70*
8/17	1045	40
8/18	1815	25
8/19	0935	30
8/20	1737	1
8/21	2030	0
8/22	0730	5
8/23	1730	24
8/24	1045	10
8/25	1025	50
8/26	1020	50*

* = boat

1990 ROUND ISLAND - SEA LION COUNT

MAY 1 THROUGH AUGUST 25

NUMBER OF SEA LIONS



APPENDIX 8. 1990 ROUND ISLAND BIRD SIGHTING LIST

4/30/90	glaucous-winged gull
	black-legged kittiwake
	common raven
	pelagic cormorant
5/01/90	harlequin duck
	bald eagle
5/02/90	pigeon guillemot
5/03/90	redpoll
	water pipit
5/04/90	king eider
	Lapland longspur
5/05/90	parakeet auklet
	tufted puffin
5/08/90	golden-crowned sparrow
5/09/90	northern harrier
	white-crowned sparrow
5/13/90	horned puffin
5/15/90	wandering tattler
5/16/90	green-winged teal
5/18/90	snipe
	hermit thrush
5/19/90	least auklet
5/26/90	savannah sparrow
5/27/90	tree sparrow
	tree swallow
5/28/90	yellow-rumped warbler
5/30/90	fox sparrow
	yellow warbler
5/31/90	sandhill crane
6/01/90	western meadowlark
	crested auklet
6/19/90	pintail
6/20/90	orange-crowned warbler
6/21/90	western sandpiper
	Wilson's warbler
8/14/90	black turnstone
8/15/90	rock sandpiper

APPENDIX 9. 1990 ROUND ISLAND SEABIRD PRODUCTIVITY

	CORMS #2	KITTIWAKES	
		OP#1	OP#2
Nest attempts	19	57	53
Nests w/eggs	19	51	51
Mean clutch size	3.4	1.5	1.2
Hatch success	0.81	.39	.45
Chicks fledged	1.90	no data	no data
Reproductive success	1.90	no data	no data
Productivity	1.90	no data	no data

Clutch size = # eggs per nest with eggs

Hatch success = eggs hatched per eggs laid

Fledge success = chicks fledged per eggs hatched

Reproductive success = chicks fledged per nest with eggs

Productivity = chicks fledged per nest attempt

(Population counts not done for the 1990 season)