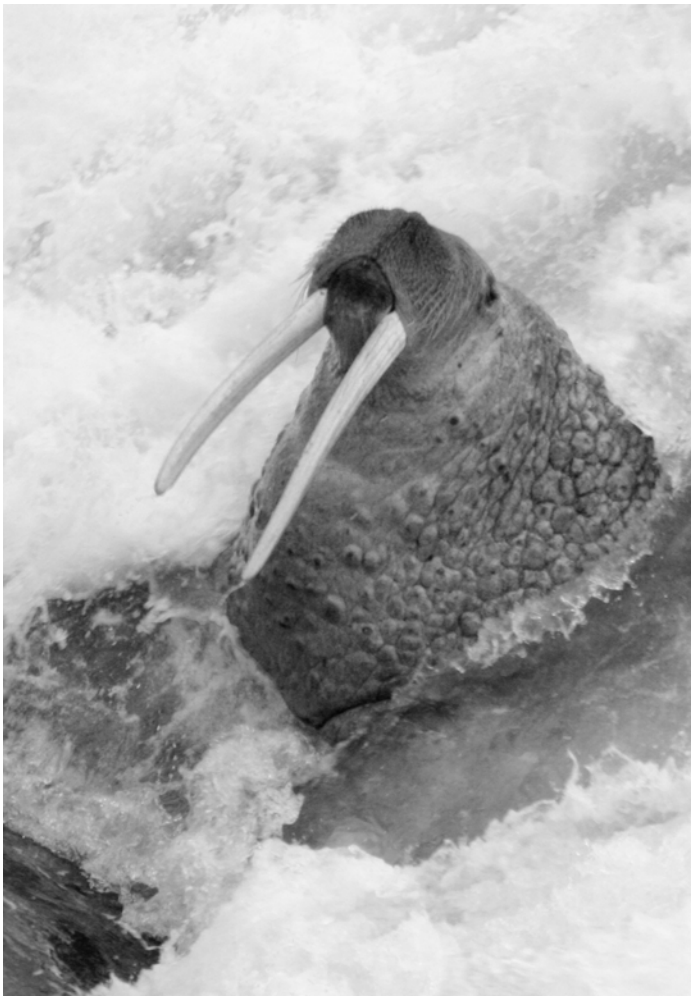
Walrus Islands
State Game Sanctuary

Annual Report 2006



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EXECUTIVE SUMMARY

The Walrus Islands State Game Sanctuary protects one of the largest terrestrial haulout sites in North America for Pacific walrus (*Odobenus rosmarus divergens*). The sanctuary also protects important habitats for several species of seabirds, Steller sea lions (*Eumetopias jubatus*) and other marine and terrestrial birds and mammals. The Alaska Department of Fish and Game (ADF&G) manages the sanctuary primarily to protect these important habitats and wildlife species, and secondarily to provide for public use and enjoyment of these resources.

The ADF&G staffs Round Island through the summer months to protect and monitor walruses and other wildlife, and to operate a visitor use program. Walrus counts for the 2006 field season were conducted from May 2 to August 14. The maximum walrus count was 2,716 on May 26 which represents a 7% decrease from 2005. The mean daily count was 897 which represents a 42% increase from 2005.

Sanctuary staff monitored populations and productivity of several nesting seabird species and provided these data to the U.S. Fish and Wildlife Service and U.S. Geological Survey for use in their statewide seabird monitoring programs. Steller sea lions were also monitored at their Round Island haulout site. These data along with brand and flipper tag resightings were provided to the ADF&G Marine Mammal Program for use in their statewide monitoring program.

There were 54 visitors to Round Island in 2006, which is approximately 56% of the mean annual number visitors from the preceding ten-year period (93 visitors) but a 24% increase from 2005. Of these, 27 were day visitors and 25 were multi-day visitors (campers).

There were eight violations of sanctuary regulations during the 2006 field season including two vessels, two aircraft and four incidents where visitors on the island went off the trail system.

Special projects completed in 2006 included replacing the back half of the cabin, constructing a storage shed, and operating a remote video camera that broadcast live images via satellite to the Internet.

INTRODUCTION

The Walrus Islands State Game Sanctuary was created in 1960 by the Alaska State Legislature. The sanctuary protects a group of seven small islands and their adjacent waters in northern Bristol Bay, approximately 65 miles southwest of Dillingham (Fig 1). The primary purpose of the sanctuary at the time of its creation was to protect the last remaining terrestrial haulout for Pacific walruses (*Odobenus rosmarus divergens*) in North America (Alaska Statute 16.20.090). All other haulouts had been abandoned due to anthropogenic disturbances, mostly related to commercial hunting.

Today, the sanctuary continues to provide important habitat for walruses and comprises one of four primary active haulout sites in Bristol Bay. The sanctuary also protects important habitats for many species of seabirds, Steller sea lions (*Eumetopias jubatus*), and other marine mammals as well as marine and terrestrial birds.

The Alaska Department of Fish and Game (ADF&G) manages the sanctuary primarily to protect these habitats and wildlife species, and secondarily to provide for public use and enjoyment of these resources including the opportunity for scientific and educational study, viewing, and photography. Since 1985, all access to Round Island and its surrounding waters requires an access permit and restrictions have been placed on visitor numbers and their activities (Alaska Administrative Code 5 AAC 92.066).

Through a Cooperative Agreement, initiated in 1993, the ADF&G and the U.S. Fish and Wildlife Service (FWS; who has primary management jurisdiction over walruses) staffed Round Island through the summer months to protect and monitor walruses and other wildlife and to operate the visitor use program. However, during the summers of 2005 and 2006 the FWS was not able to provide staff due to limited funding and in 2006, ADF&G staffed Round Island with two wildlife technicians. Their duties consisted primarily of protecting the sanctuary resources; enforcing sanctuary laws, regulations and policies; monitoring sanctuary wildlife including walruses, seabirds, Steller sea lions and other species; managing the visitor use and access permit program; and organizing major construction improvements and maintaining trails and facilities used by staff and visitors.

METHODS AND MATERIALS

STAFFING

Sanctuary manager Diane Okonek (ADF&G) and wildlife technician, Brian Okonek (ADF&G) arrived on Round Island by helicopter on May 2. The F/V, Kona Kai, transported approximately six tons of gear to the island from Homer. Efforts were coordinated between parties to transfer 20 loads of gear, slung by the helicopter, from the boat deck to the island.

Throughout the summer, volunteers including Darryl Fish, Art Mannix, Chris Mannix, Jim McCain, Jacob Soni, and Laura Wright were tasked with rebuilding the back portion of the cabin as well as building a storage shed.

VISITOR PROGRAM

Campers arrived on Round Island after obtaining a permit from the ADF&G, Dillingham office. Day visitors were issued permits upon arrival on the island after obtaining access authorization from staff through morning radio contact.

One of the primary goals of the sanctuary staff was to manage a visitor use program and to balance the quality of the experience for the visitors while protecting wildlife and other resources. Educating the visitors was one of the ways to achieve this goal. When visitors arrived on Round Island, they were briefed on the rules and regulations of the island, given a brief history of the Sanctuary, and given guidelines to approaching walrus beach viewpoints with minimal disturbance to the animals. All visitors were required to remain on established trails with the exception of going to the summit from the East Cape. To minimize disturbance, visitors were not permitted on the beaches except for island arrivals and departures from Boat Cove or an alternate site at Campground Beach. Other duties involved with the visitor program included monitoring the marine radio, authorizing access to sanctuary waters, issuing permits, collecting user fees, reviewing sanctuary rules and safety procedures, answering visitor questions, and improving and maintaining visitor facilities. For the safety of the visitors, the precipitous and slippery nature of the trails was described and recommendations for their use were explained. All visitors provided their emergency contacts and signed assumption of risk forms.

ACCESS VIOLATION

To protect sanctuary wildlife and other resources, access to Round Island and the waters within three nautical miles of the island were restricted to those possessing permits from ADF&G. Boats were allowed to access the island by utilizing a designated corridor on the northeast side of the island. Since low-flying aircraft can cause major disturbances at walrus haulouts (Fay 1982), aircraft access to the island was discouraged and ADF&G requested all pilots to avoid flights below 5,000 ft Above Ground Level (AGL) within three nautical miles of the island. Boats or planes that were observed within the restricted areas were hailed

through VHF marine radio and told of the restrictions or advisories. Although ADF&G does not have the authority to regulate airspace, pilots who harass walruses can be prosecuted by the FWS under the Marine Mammals Protection Act (MMPA).

WALRUS DISTURBANCE

Sanctuary staff documented all access violations and initiated an immediate response when appropriate. The assistance of the Alaska State Troopers, FWS Law Enforcement, and the Federal Aviation Administration (FAA) were requested as needed.

Staff monitored and documented the response of walrus to both authorized and unauthorized access and other activities. When walruses were in site of observers, the number of affected animals and the degree of their response were recorded using three distinct behaviors (head raising, reorienting, and dispersing) as measures of quantifying increasing levels of disturbance (Salter 1979).

WILDLIFE SURVEYS AND MONITORING

WALRUS SURVEYS

Established Round Island protocols were followed when collecting daily weather and other information. Before beginning the walrus counts, wind speed and direction, percent cloud cover, and amount and type of precipitation were recorded at the cabin. Maximum and minimum daily temperatures were recorded at 2000 hrs and the barometric pressure was recorded daily at 0800 and 2000 hrs. At the beginning of each beach count the Beaufort Sea state, start and end time, method, beach condition and tide were recorded. For more detailed information on the Round Island protocols see the Round Island Annual Report for 2005 (Okonek and Snively 2005)

Established Round Island protocols were followed when collecting daily walrus counts. On the East side of the Island, nine beaches were counted beginning with Second Prime (SP), Second Beach (S), First Prime (FP), First Beach (FB), Campground (CG), Boat Cove (BC), Flat Rock (FR), North Boat Cove (NBC), and ending with Main Beach (MB; Fig 2). The West side of the Island includes West Main Beach (WMB) and West Main Beach South (WMBS). During the 2006 field season, a late snow pack and limited staff numbers allowed for only 26 WMB counts. WMBS was not counted during the 2006 field season. This is a small beach and missing it does not significantly alter the total walrus counts for Round Island (Cody 2003).

SEA LION SURVEY

A Steller sea lion haulout located at East Cape was monitored at five-day intervals and opportunistically from three different observation points. Branded animals and those possessing flipper tags were documented and digital photographs were taken. Injuries, entanglements, suckling behavior, and any unusual conditions were noted.

SEABIRD MONITORING

Three species of colonial nesting seabirds were monitored throughout the summer at several sites on Round Island. Nesting chronology and nest productivity data were collected for the following species of seabirds; pelagic cormorants (*Phalacrocorax pelagic*; PECO), black-legged kittiwakes (*Rissa tridactyla*; BLKI), and common murres (*Uria aalge*; COMU). The surveys began between late May and mid-June and terminated at the end of the season. PECO plots were established at S Beach and COMU and BLKI plots were established on MB near Observation Point (OP). Photographs were taken of the plots and nests from each plot were randomly selected for monitoring. Four plots were monitored every second or third day and the number of adults, eggs, and chicks were recorded. These data were provided to the FWS Migratory Bird Management office and the U.S. Geological Survey for inclusion in their statewide seabird-monitoring program.

Population counts of five species; PECO, BLKI, COMU, and tufted (*Fratercula cirrhata*; TUPU) and horned (*Fratercula corniculata*; HOPU) puffins; began at the observation of the first egg. This occurred every third day for ten days totaling ten counts on Main Beach near Observation Point. One chick count was conducted for PECO, BLKI, and COMU at the same location on August 2.

OTHER OBSERVATIONS/ACTIVITIES

General and unusual observations were recorded in the daily log and included first wildlife and blooming plant sightings, the presence of beach cast-marine mammals, and general environmental conditions (App. A). Walrus mortalities were documented, as were the amounts and locations of ivory collected. Ivory from beach-cast walrus carcasses was collected to discourage unauthorized off-season access to the island. The collected ivory was donated to the Eskimo Walrus Commission (EWC) and then sold to Alaskan native carvers. The proceeds from the sales were deposited into the Pacific Walrus Conservation Fund, which supports walrus conservation efforts in the form of educational, research, and management projects.

OTHER ACTIVITIES

A technician with SeeMore Wildlife Systems, Inc., came to Round Island in June. He reoriented the Satellite dish, replaced one of the cameras, and performed system maintenance for online performance.

National Geographic Magazine and the National Park Service (NPS) each sent a person to Round Island in July to review the camera project for a possible partnership.

Port Defiance Zoo sent two people (including their senior staff biologist) to participate in walrus counts and to observe walruses in the wild. They remained on the island for approximately two weeks.

ADF&G in cooperation with FWS performed a seabird survey, which included the seven islands of the Walrus Islands State Game Sanctuary, the mainland coasts of northwestern Bristol and southeastern Kuskokwim Bays, and all the associated islands. The six-member team went to Round Island six days during July. Three of the days were spent doing boat counts and no one landed on the island, the other three days crew landed on the island for picking up and dropping off gear. The details and results of the survey will be included in a separate report.

CABIN IMPROVEMENTS

Camp improvements for 2006 include replacing the back half of the cabin and building a storage shed.

SUBSISTENCE HUNT

Starting on September 9 through September 23, ADF&G and Bristol Bay Native Association (BBNA) staffed the island to monitor part of the 2006 Round Island subsistence walrus hunt. During this time walrus and sea lion counts were conducted and walrus hunt data collected. The results and details of the subsistence hunt can be found in the 2006 Fall Monitoring and Walrus Hunt Report for Round (Qayassiq) Island (Snyder *et al*. 2006; App. B).

RESULTS AND DISCUSSION

STAFFING

The 2006 Round Island field season had a successful volunteer program. Six volunteers spent a total of 89 days on the island and contributed 712 hours of work. Their contributions included cabin and storage additions and improvements.

VISITOR PROGRAM

Fifty-four people visited Round Island in 2006. Of these, 29 were day-visitors and 25 were campers. There was a 23% increase in camper numbers from the 2005 field season (increase from 21 to 25 campers) and a 35% increase in day-visitors (increase 19 to 29 day visitors). There were 135 visitor-days during the summer of 2006. Sixteen of the 25 campers were Alaskans. Of the day visitors (excluding the guides) 6 were from Alaska. The day visitors were from the following states in the U.S.: Arkansas, Colorado, Michigan, Minnesota, Montana, New York, North Carolina, Pennsylvania, Washington; and countries: Australia and Canada (Table 1).

Annual visitor numbers at Round Island have decreased from a high of 303 in 1977 to a 2005 low of 40. The visitor numbers increased only slightly in 2006 to 54 (Fig. 3). The high visitation of 1977 was due to the approximately 250 day visitors that were ferried to the island from a small cruise ship. In the 1980's and early 90's, many members of the herring fishing fleet visited Round Island. After the decline of this fishery in Bristol Bay, a drop in visitation was observed. The mean number of independent day-visitors from 1980-1993 was

96, this number decreased to 23 during the years spanning 1994-2006. In 2006 there were 14 independent day visitors.

There were 131 campers in 1987, which represents the highest count recorded. The number of campers to the island remained high during the late 1980's and early 1990's. During this time, there was national and international publicity of the sanctuary through television programs and magazine articles (Rice 2002). Yearly fluctuations may also be attributed to the availability of transporters to the island, national and international economic conditions, and funding availability for staffing the island (Koenen and Rice 1996).

In 2006, Paul Markoff, boat operator of the 22' *Lindsey Mary*, began transporting visitors from Togiak to Round Island. Terry Johnson, boat operator and owner of the *Inconnu* transported visitors from Eagle Lake to Round Island between June 24 and July 6. From July 7 to July 24 the *Inconnu* was contracted by ADF&G for logistical support of the Bristol Bay Seabird survey. The *Lindsey Mary* completed 21 trips and the *Inconnu* completed 13 trips to Round Island during the 2006 season.

ACCESS VIOLATIONS

The guides, staff, and visitors used boat cove during arrivals and departures except for times when walruses were present or weather impeded this access, at such times an alternate route, CG Beach, was used. For the most part boat operators, guides, and visitors followed regulations and staff suggestions to keep wildlife disturbances to a minimum. Boat operators made a practice of approaching the island slowly, to minimize noise impact, and to anchor well offshore when walruses were present on the adjacent beaches.

Although all visitors are notified of the island rules immediately upon their arrival, some of them still ventured off the trail system on four different occasions in 2006. There was no observed reaction from the walruses during these violations. The errant visitors were given verbal warnings.

There were two vessels that violated the three-mile buffer around the island. One vessel that strayed in the waters immediately altered its course after being contacted by island staff. The other vessel was heading to Round Island and came within a quarter mile of the island before being hailed by staff. This vessel also immediately altered its course and left the sanctuary waters. The second incident was investigated and Alaska State Troopers issued a verbal warning.

There were also two air traffic violations. One was from an air cargo company and the second was not identified. Staff was not observing the walruses at the time of the violations; therefore, it is not known whether these activities caused a disturbance. The air cargo company was later called and issued a verbal warning.

WALRUS DISTURBANCES

Forty-two anthropogenic activities were observed and recorded during the summer season of 2006 (App. C). Thirty-eight of the activities, mostly boats, were in support of the monitoring, visitor, or seabird survey programs at Round Island. Ten of 42 activities were associated with known reactions from walrus, no reaction was observed during 25 activities, two activities had no walrus present on associated beaches and walrus behavior was unknown during five of the activities (Table 2). Most of the activities, 39/42 were in the form of boat traffic and were relatively minor. Two of the boating activities caused head raises as the most severe disturbance behavior, eight caused dispersing behavior, and 25 caused no discernible changes in behavior. The effects of two of the boating activities were unknown and two other boating activities occurred when there were no walruses on the associated beaches. Staff was not near the beaches during the air traffic activities so they could not document whether walruses were disturbed.

Walruses left the beaches at least twice during the summer from unknown causes. Killer whales (*Orcinus orca*) harassed a group of walruses near the island on at least two different occasions during the summer of 2006.

WILDLIFE SURVEYS AND MONITORING

WALRUS SURVEYS

Walrus counts for the 2006 field season were conducted from May 2 to August 14. All beaches along the east side of Round Island were counted 95 out of the total 105 days, 10 of these counts were opportunistic estimates. The maximum count of 2,716 occurred on May 26, which represents a 7% decrease from 2005 (WMB not included; Fig. 4). There were no animals on the East side beaches on June 10 (WMB not included). On WMB the maximum count of 613 occurred on June 13. On eleven out of the 26 days that WMB was surveyed, no animals were present (App D). Due to limited staff and the absence of a skiff during July there were no water counts done during the 2006 field season.

The daily mean count for 2006 was 897 animals which represents a 42% increase from the mean count of 630 from 2005 (Okonek and Snively 2005). The annual peak count of walruses at Round Island varies significantly between years with the highest number documented estimated at 15,000 during a 1978 aerial survey. The lowest annual peak count was 1,746 in 1998 (Raymond 1998). The maximum counts vary considerably between years and is attributed to the movement of walruses between several Bristol Bay haulouts and not necessarily to population fluctuations. During the mid-1900's, with the exception of Round Island, all terrestrial haulouts were abandoned. This abandonment was presumably caused by commercial hunting pressure as well as other disturbances (Fay 1982). It is possible that as walruses reestablished use of their traditional haulouts, fewer animals used Round Island at any one time. This may be evidenced by the general decline in peak walrus numbers at Round Island over the past three decades.

Cape Seniavin, a walrus haulout site on the Alaska Peninsula, has been monitored by FWS and Bristol Bay Native Association (BBNA) opportunistically since 1998. FWS staff monitored this haulout in July of 1998, 1999, 2001, and BBNA and FWS monitored it in 2003. The peak walrus numbers increased at this haulout with a high count of 1,785 in 1998 (Kruse and Jack 1999), and a high count of 3,127 in 2003 (Snively 2003). The shift in walrus distribution away from haulout sites in northern Bristol Bay may be food related and it is unknown whether it reflects a short or long-term shift in distribution.

Sea Lion Survey

Round Island Steller sea lions typically haulout at East Cape, located on the eastern tip of the island. Twenty-four combined water and land counts were conducted from three vantage points at East Cape during the summer of 2006. The maximum count of 387 sea lions occurred on May 8 and the minimum count of 32 occurred on June 27. Thirty-seven brands were seen at Round Island in 2006 including the Russian brand M618. A sea lion with an unusual brand, V16, was observed and photographed. This animal was branded on Graves Rock, Southeast Alaska in 2002.

A newborn sea lion carcass was observed and photographed at East Cape. Suckling behavior was observed multiple times from young sea lions. All sea lion data were given to ADF&G Marine Mammal Division for their annual sea lion monitoring program (App E).

Seabird Monitoring

Pelagic cormorant productivity monitoring for the 2006 field season was conducted from May 25 through August 8. A 26-nest plot was established at S beach. On the first observation day, 15 birds were incubating eggs. On May 30 a raven took all but five eggs. All the birds re-nested except for two pairs, which abandoned the colony immediately after the predation. The first chick was observed on June 23 and the maximum chick count on August 2 was 45 (Table 3; App F). Productivity was 1.73 chicks/nest, with a total of 55 chicks hatched. Staff left Round Island before all chicks fledged. The productivity figure was completed by assuming that the 45 chicks that remained survived to fledge. Pelagic cormorant chicks fledge between 47-49 days after hatching. The chicks ranged in age from 15 to 32 days old at the last observation day; therefore the productivity number reflects a maximum number of chicks that could have fledged (Table 4).

Black-legged kittiwake productivity monitoring for the 2006 field season was conducted from June 2 through July 29. Two plots (OP 2 and OP 3) each with 25 nests were established at Observation Point. On the first observation day, four eggs were counted at OP 2 and one egg at OP 3. The first chicks were observed on July 8 at OP 2, 13 days later than in 2005. The maximum chick counts at OP 2 and OP 3 were two and three respectively. Staff recorded only three surviving chicks during the season's last count on August 13: one seven-day-old chick in OP 2 and two chicks in OP 3 (Tables 3; App F). Productivity was 0.08

chicks/nest with a total of four chicks hatched. The chicks ranged in age from eight to 33 days old at the last observation day; therefore the productivity number reflects a maximum number of chicks that could have fledged (Table 4).

Common murre productivity monitoring for the 2006 field season was conducted from June 17 through August 8. Snow Two plots each containing 25 nests were established at OP: OP 2 and OP 4. On June 17, OP 2 had ten birds in incubating posture and four eggs were observed. At OP 4 seven birds were in incubating posture and two eggs were observed. Since it is difficult to see actual chicks, brooding posture suggested that first chicks arrived on July 26 and the maximum chick count was 11 at OP 2 (assuming brooding posture is counted as one chick/brooding adult; Tables 3; App F). Productivity was 0.48 chicks/nest with a total of 23 chicks hatched. The chicks ranged in age from four to 16 days old at the last observation day; therefore the productivity number reflects a maximum number of chicks that could have fledged (Table 4).

There was more snow on the island than past years and may be a reason for the late nesting. A raven's nest, containing two adults and one chick, was located near the study plots. Staff observed the ravens taking seabird chicks throughout the summer and may have contributed to the low seabird chick survival rates.

Ten population counts of the five plots from OP were conducted for five seabird species. The focal species included; PECO, BLKI, COMU, HOPU and TUPU. The population counts began at the observation of the first egg (mid-June) and counts were duplicated every third day for a month (APP G).

One chick count was conducted for PECO, BLKI, and COMU at the same location on August 2. There were a total of 13 PECO chicks, eight BLKI chicks, and 294 COMU chicks (average of two counts; Table 5) on the five plots at OP. Chick counts are not completed for HOPU or TUPU because they nest in burrows and chicks are not visible to observers.

The seabird population and productivity monitoring data were given to FWS Migratory Bird Management and USGS for inclusion in their statewide seabird-monitoring program.

OTHER OBSERVATIONS/PROJECTS

CAMERA

A remote video camera system was installed on First Beach and at Observation Point in 2005 and broadcast live images of walruses and other wildlife via satellite for public viewing on the Internet and at the Alaska SeaLife Center in Seward, Alaska. The system was deactivated but left in place at the end of the 2005 season. In May 2006, the system was repaired and reactivated; however, due to equipment and software challenges images were not viewable until August. Because of the delay in reliable video transmission, the video

feed was not routed to a public outlet in 2006. The video feed was monitored from the Anchorage office through the fall.

CABIN IMPROVEMENTS

In May of 2006 the back half (back room) of the cabin was dismantled. On the first of June, upon the arrival of the first of the volunteer crew, construction of the back room began. To avoid any additional disturbance to the archaeological zone the new room was constructed using the old room's 8 x 14 ft. footprint. Leaving the newer part of the cabin (front room) intact while replacing the back room gave the staff an area to be used as quarters and workspace. When funding allows the front room will be replaced.

The entire cabin was fully functional by July 20 when the roofing, insulation, interior paneling, and most of the painting were completed. The back room now consists of a loft for much needed sleeping/storage space.

STORAGE SHED

An 8' x 12' storage shed was built to replace a large Weatherport tent. This permanent structure, painted a rust color, lessens the visual impact of the camp compared to the white weatherport. The shed was built on the muskeg south of the cabin, outside the mapped archaeological zone.

POWER SYSTEM

The power system was upgraded with a solar controller and new batteries were installed. Diodes in one of the solar panels were replaced due to severe corrosion.

OTHER OBSERVATIONS

On May 12 staff observed killer whales pursuing approximately 40 walruses to Round Island. This activity was documented through the use of a video and a digital camera. The whales returned the next day and were again pursuing a group of approximately eight walruses and, later that day, sea lions. The sea lion pursuit was too far offshore to document. Staff could not determine whether a kill was made during these occurrences.

On May 25 staff observed three gray whales (*Eschrichtius robustus*) and a group of Steller sea lions interacting with each other from approximately one half mile off the east side of the island. The gray whales splashed and dove in the water while the sea lions jumped and rolled off the backs of the whales. Although video footage was taken the distance was too great to document any of the details.

On July 3 staff observed a gray whale, entangled in netting, swim between CG and MB. The sighting was reported to the Marine Mammal Entanglement Division of the National Oceanic and Atmospheric Administration (NOAA).

INVASIVE PLANT SPECIES

Dandelions were first documented on Round Island during the summer field season of 2004 along the trail leading to Traverse Trail (personal obs. Snively). Mary Cody of the FWS had not seen dandelions on the island during the previous five summers that she was a monitor. When the dandelions were observed in 2004, staff personnel dug them out and burned them in a burn barrel located near camp. Although as much of the root system as possible was taken, and the dandelions were destroyed by fire before going to seed, they were once again recorded on Round Island during 2005. During the 2006 field season dandelions were again documented. Photos were taken and a sample was collected and sent to the herbarium at the University of Alaska's museum. It was identified as the non-invasive *Taraxacum ceratophorum* (personal comm. Carolyn Parker). Although this species is native to Alaska it is not believed to be indigenous to Round Island. An extensive plant inventory was conducted on Round Island during the summer of 1995 and there is no record of *Taraxacum spp* in the field report (Hasselbach and Neitlich 1996).

IVORY COLLECTION

Due to minimal staff personnel and the unavailability of the skiff (used to access MB) only a single tusk was collected during the summer of 2006. The seabird survey team used the skiff for most of the month of July. The tusk was stored at the ADF&G office in Dillingham until it could be donated to the Eskimo Walrus Commission.

RECOMMENDATIONS

The following are recommended projects for the summer of 2007:

- Replace the front half of the cabin.
- Replace the deck and board walk in front of the cabin
- Change the visitor permit to include a disclaimer and emergency information
- Check solar panel diodes for corrosion and replace as needed
- Update the Round Island bird list

ACKNOWLEDGEMENTS

Many thanks to the volunteers who generously dedicated hundreds of hours towards major improvements to the Round Island campsite. Eunice Dyasuk, Joe Meehan, Jim Woolington, and other ADF&G staff are acknowledged for their logistical support during the field season. Thanks to Pete Abraham of FWS whose continued hospitality helps to make volunteers and staff feel welcome at the bunkhouse in Togiak. Funding for this project was made possible by the State Wildlife Grant administered by the FWS. Judy Alderson with the National Park Service is recognized for her continued interest and support in the management of the Walrus Islands.

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FIGURES

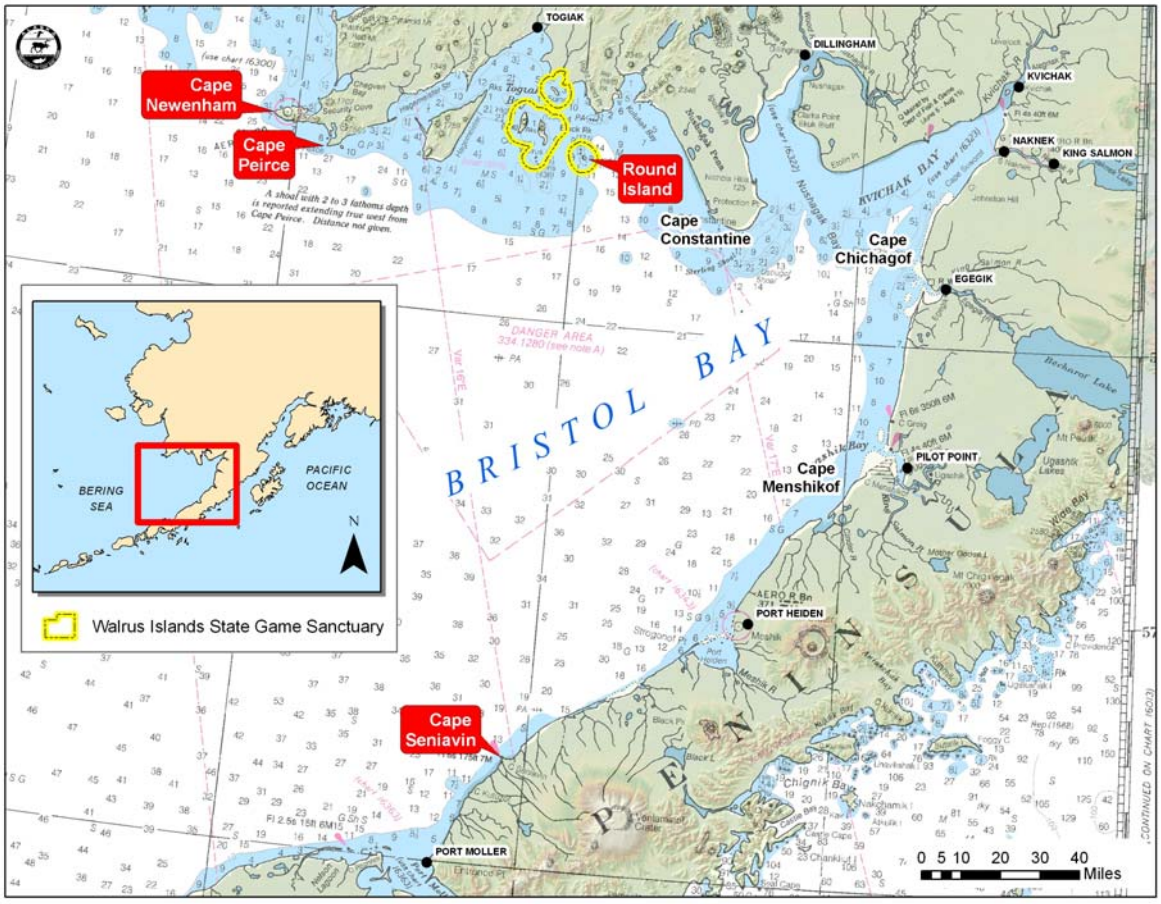

Figure 1. Map of northern Bristol Bay showing the location of Round Island and the Walrus Islands State Game Sanctuary.

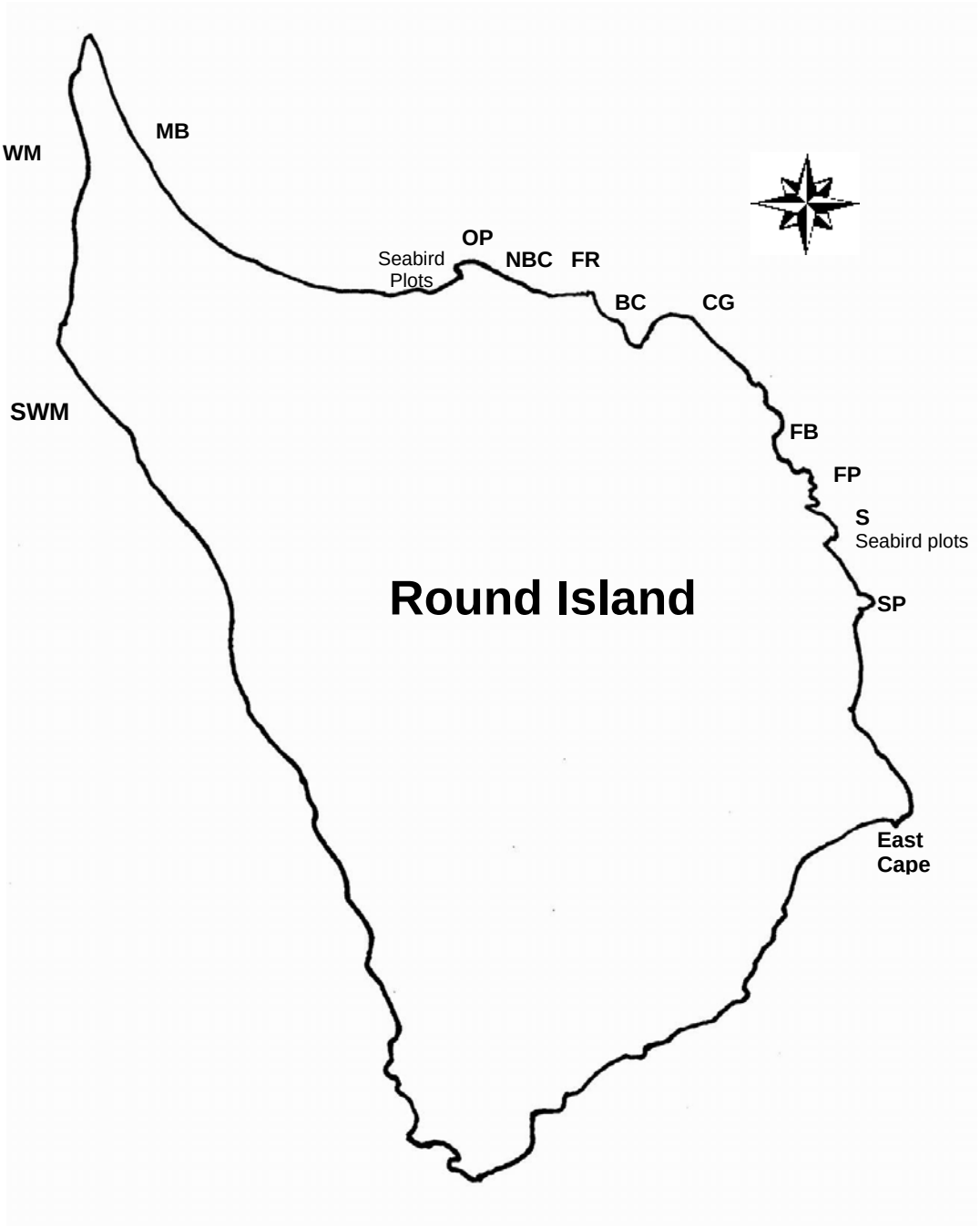

Figure 2. Map of Round Island with locations of walrus haulout beaches, bird plots and sea lion site; East Cape (sea lion haulout), SP (Second Prime), SB (Second Beach), FP (First Prime), FB (First Beach), CG (Camp Ground), BC (Boat Cove), NBC (North Boat Cove), OP (Observation Point, MB (Main Beach), and WM (West Main Beach), SWM (South West Main).

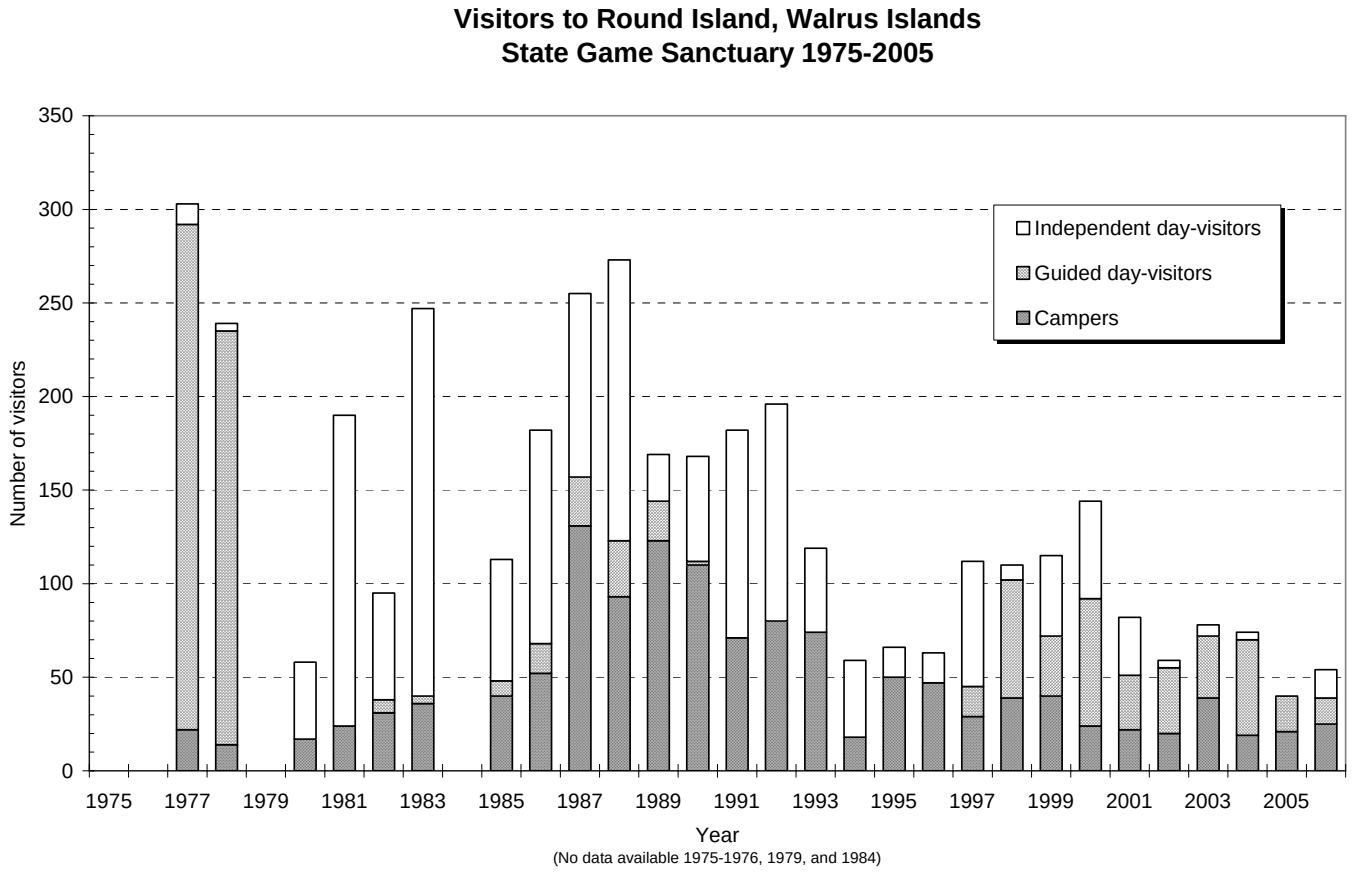

Figure 3. Visitor numbers, Round Island 1977-2005.

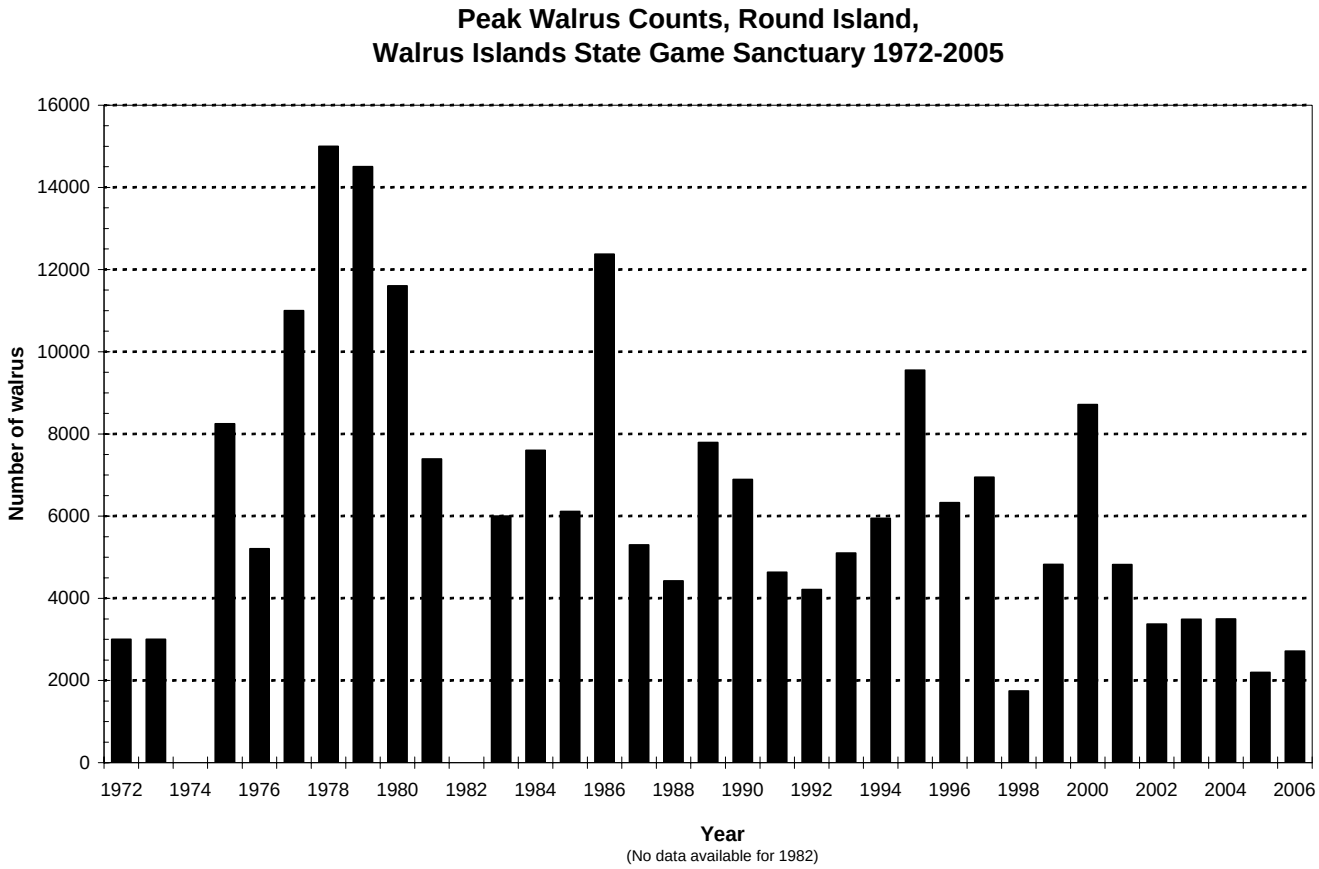

Figure 4. Walrus peak numbers Round Island.

TABLES

Table 1. Country/state of origin of visitors, Round Island 2006.

Origin	Campers	Non-guided day-visitors	Guided day-visitors
United States			
Alaska	**16**	**6**	
Anchorage	(5)		
Dillingham		(2)	
Eagle River	(4)		
Fairbanks	(2)		
Juneau	(2)		
Talkeetna	(2)		
Wasilla	(1)	(4)	
Arkansas			**4**
California	**2**		
Colorado	**1**	**3**	
Loisiana	**1**		
Michigan			**1**
Minnesota			**2**
Montana		**1**	
North Carolina		**1**	
New York			**2**
Pennsylvania	**2**		**1**
Virginia	**1**		
Washington		**3**	**2**
Australia			**2**
Canada			**1**
France	**2**		
Total	**25**	**14**	**15**

Table 2. Walrus response to anthropogenic and natural stimuli, Round Island 2006.

Walrus Response	Anthropogenic Stimulus	Natural Stimulus
Head Raises	2 (boat)	
Reorienting		
Dispersal	8 (boat)	
Total response in relation to stimulus	**10 (boat)**	
No Reaction	25 (boat), 2 (aircraft), 4 (visitors)	1 (gray whale)
Walrus not observed	2 (boat)	3 (killer whale)
No walrus present	2 (boat)	

Table 3. Productivity of three indicator seabird species; pelagic cormorant, black-legged kittiwakes, and common murres; Round Island 2006.

Species	Plot	# of nests	*Date of first egg	Date of first chick	Max. chick count	Date of max. chick count
PECO	SB	26	5/25/06	6/23/06	45	8/2/06
BLKI	OP2	25	6/2/06	8/6/06	1	8/6/06
BLKI	OP3	25	6/8/06	7/8/06	3	7/15/06
COMU	OP2	25	6/17/06	8/1/06	7	8/1/06
COMU	OP4	25	6/17/06	7/26/06	10	8/8/06

**This was the first observation date in each plot, not necessarily the date of the first egg.*

Table 4. Seabird productivity summary for Round Island, 2006.

	PECO	BLKI	COMU
	N	**N**	**N**
Nests or pairs	26	50	43
Eggs laid	64	29	27
Chicks hatched	55	4	*23
Chicks fledged	**45	**3	**21
Productivity (chicks/nest)	1.73	0.08	0.48
	%	**%**	**%**
Laying success	85	46	63
Hatching success	86	14	85
Reproductive success	70	10	78
Nesting success	85	6	n/a

**brooding behavior = chick*

***Staff left before chicks fledged; the results are based on the assumption that the remaining chicks survived to fledge.*

Definitions:

Productivity: chicks fledged per pair or nest structure.
Laying success: pairs or nest structures where 1+ egg is laid per total pairs or nest structures.
Hatching success: eggs that hatched per total eggs laid.
Reproductive success: chicks that fledged per total eggs laid.
Nesting success: nests where 1+ chicks fledged per total nest structures.

Table 5. Chick count for three seabird species; pelagic cormorant, black-legged kittiwake, and common murre; conducted on August 8 at Observation Point, Round Island 2006.

Species	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
PECO	0	2	11	0	0
BLKI	0	1	6	0	1
COMU	31	53	7	43	160

APPENDICES

Appendix A. Daily log noting observations of first plant and animal sightings, rare occurrences, and general weather description.

Date	Round Island Daily Observations
5/2/2006	*Comments* : Crew arrived on island by helicopter at 9:25 p.m. The island was covered with snow.
5/3/2006	*Birds* : common murres, pigeon guillemont, black-legged kittiwakes, glaucous-winged gulls, bald eagle, common raven, pelagic cormorant, sandhill crane, tundra swan, Bonaparte's gull, geese (brants ?), *Mammals:* A red fox and many Gray Whales *Comments:* Many murres on snowy ledges and frozen waterfalls.
5/4/2006	*Birds* :Gray-crowned rosey finches, American tree sparrow, common red polls *Mammals* : Gray whales *Comments* : Whales seen throughout the day
5/5/2006	*Birds* : Dark-eyed junco, tree swallow
5/6/2006	*Comments:* Strong west wind (20-45 km/hr) and snowy
5/7/2006	*Birds* : Rock sandpiper, king eider, glaucous gull, horned grebe
5/8/2006	*Birds* : Lapland longspur, long-tailed ducks *Plants:* First green grass shoots *Comments:* The first day of snow melt
5/9/2006	*Birds* : Savannah sparrow, tufted puffin, parakeet auklet, short-eared owl, American pipit, northern harrier, varied thrush
5/11/2006	*Plants:* Willow blooms *Comments:* The island is app. 50% covered with snow
5/12/2006	*Birds* : Semipalmated plover *Mammals* : App. 12 Orcas hunt walruses off first beach
5/13/2006	*Birds* : Horned puffins *Mammals:* Orcas return to hunt sea lions, app. 12 gray whales within 150 m of shore between East cape and campground
5/14/2006	*Birds* : Hermit thrush, ruddy turnstone *Comments* : 3 in. of new snow on the ground
5/15/2006	*Birds* : Golden-crowned sparrow, white-crowned sparrow *Mammals* : 3 gray whales rolling on the gravel at the end of the spit off main beach
5/16/2006	*Birds* : Black turnstones, king eider, harlequin ducks *Mammals* : Newly born steller sea lion pup, gray whales
5/17/2006	*Birds* : Seventy five parakeet auklets at second prime beach *Mammals* : Five gray whales close to shore *Comments* : Snow covers app. 25% of the island
5/19/2006	*Comments* : Unidentified group of ducks in boat cove
5/20/2006	*Birds* : Ten white-fronted geese, yellow-rumped warbler *Mammals* : 352 steller sea lions
5/21/2006	*Birds* : Marbeled murrelet
5/22/2006	*Birds* : Western sandpipers, dunlins, merlin *Comments* : Herring fisheries finishing up.
5/23/2006	*Birds* : Green-winged teal, hoary redpoll *Comments:* Snow has melted off the cabin and boardwalk
5/24/2006	*Birds* : Fox sparrow, spotted sandpiper *Mammals* : 5 whales seen at east cape. Fox activity has decreased. *Comments* : First day that crew can sit on the deck comfortably.
5/25/2006	*Birds* : Wilson's warbler, unidentified thrush, northern pintail, peregrin falcon *Mammals* : 3 gray whales and 12 steller sea lion roll around together 300 yards off first beach. Whales stay in area for about four hours. *Plants* : Louseworts, Labrador tea, coltsfoot. *Comments:* Gullies of the island are still filled with snow and are able to melt water for drinking.
5/26/2006	*Birds* : Two crested auklets, common raven's nest seen at north boat cove and second prime beach *Comments* : Water cistern melts out of the snow pack
5/27/2006	*Mammals* : Several gray whales in front of the cabin.
5/28/2006	*Birds* : Horned lark near the summit *Mammals:* Injured walrus at second beach with a puncture wound above the right eye and the right tusk displaced to the right *Plants* : Lousewort in bloom *Comments:* First visit to the summit for 2006, raven observed stealing an eg, no murres on cliffs at observation point and low nest building activities of kittiwakes.
5/29/2006	*Birds:* Two white-winged crossbills seen at cabin *Plants* : First hint of green on hillside as willows, crowberry, and dwarf birch start to green up *Comments* : 34 parakeet auklets observe on waterat first beach and 50 in front of the cabin, 10 crested auklets at north boat cove
6/1/2006	*Mammals* : Sea lions were observed feeding on flounders *Comments* : Hot and calm day. Five big fishing boats were observed working to the east for the last three days.
6/2/2006	*Mammals* : Two gray whales *Plants* : Narcissus and Animone in bloom *Comments* : No murres were at observation point
6/4/2006	*Plants* : Alaska violet, bog rosemary, and pixie-eyed primrose in bloom *Comments* : Three pair crested auklets observed mating
6/5/2006	*Comments* : Fox was observed bringing a seabird to its den near the cabin
6/6/2006	*Plants* : Cordyalis, purple oxytrope, yellow anemone, pussy toes, cardamine are all in bloom
6/7/2006	*Birds* : Unusually white gull was observed *Mammals* : Minke whale observed in front of cabin, whales at the end of main beach spit observed near gravel bar *Comments* : murres not observed at observation point plots, first kittiwake egg was observed at this location

Appendix A. Continued.

Date	Round Island Daily Observations
6/8/2006	*Comments*: First wall of the new cabin goes up
6/12/2006	*Plants*: Forget-me-nots are in bloom *Comments*: App. 25% of murres observed at the observation point plots
6/13/2006	*Comments*: Cabin loft floor in place
6/14/2006	*Birds*: Bank swallow *Mammals*: Walrus observed at first and second beaches in large numbers for the first time this season
6/15/2006	*Plants*: Bog rosemary, Alaska poppy and yellow violets in bloom *Comments*: Gable ende of cabin go up
6/16/2006	*Comments*: Single sandhill crane circles above first beach
6/17/2006	*Plants*: Chocolate lillies and star flower bloom *Comments*: Cabin rafters are up
6/18/2006	*Comments*: Common murre productivity monitoring and counts begin at observation point. The cabin roof is now weather tight.
6/19/2006	*Plants*: Dogwood in bloom *Comments*: 70 pelagic cormorants roosting at flat rock
6/20/2006	*Plants*: Cloud berry and nagoon berry in bloom
6/21/2006	*Comments*: Traverse to west main beach is now free of snow
6/23/2006	*Comments*: A technician for Seemore gets the web cam up and running and the cabin now has internet service
6/24/2006	*Comments*: The Inconnu makes its first trip of the season and drops off two visitors as well as equipment for the upcoming Bristol Bay seabird study.
6/25/2006	*Birds*: Rough-legged hawk *Plants*: Wild geraniums and capitate lousewort in bloom *Comments*: Visitors hike to the summit
6/29/2006	*Comments*: First golden-crowned sparrow fledgling observed
7/1/2006	*Comments*: First Savanah sparrow fledgling observed. A walrus named rock-head (due to an embedded rock) was seen for the third year in 2006.
7/2/2006	*Plants*: Spirea, lupine and dandelions in bloom *Comments*: Raven chicks were observed: three at second prime and one at north boat cove.
7/4/2006	*Mammals*: Six orcas seen feeding a half mile off-shore.
7/8/2006	*Comments*: Raven chick fledged at north boat cove, first kittiwake chicks hatched: one at observation point and one at west main beach.
7/10/2006	*Plants*: Irises in bloom *Comments*: Observed many songbird fledglings on the trails, mostly golden-crowned, savannah sparrows and hermit thrushes.
7/13/2006	*Plants*: Arctic daisy in bloom
7/18/2006	*Birds*: Pectoral sandpiper *Plants*: Grass has gone to seed *Comments*: Murre chick heard at observation point
7/22/2006	*Mammals*: Three young fox pups were seen at the den site above the cabin, they were still gray in color.
7/31/2006	*Comments*: Two murre chicks seen at observation point, plot two.
8/4/2006	*Mammals*: Two badly scarred walruses were observed: one with half his mustachio pad gone and the other with a verticcal scare from his eye through his lip.
8/5/2006	*Mammals*: A den and two fox pups were seen at west main beach near the view point.
8/8/2006	*Mammals*: A dead vole was seen at boat cove and when inspected was found to have a tick.
8/10/2006	*Comments*: Golden-crowned sparrows have migrated out.
8/12/2006	*Mammals*: Six fox pups were seen at the den above the cabin. *Comments*: First murre chicks were heard and seen on the water. Various shorebirds are seen on the trails daily.
8/13/2006	*Comments*: Four murre chicks and one juvenile were seen on the water. AT observation point, all the pelagic cormorants have chicks that have fledged. At second beach the chicks are beginning to fledge.

Appendix B. Hunt monitoring report, Round Island, Fall 2006.

2006 Fall Monitoring and Walrus Hunt Report for Round (Qayassiq) Island

November, 2006

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Appendix B. Continued.

Summary

In 2006, the Round Island (Qayassiq) fall hunt dates began September 10 and ended October 20. Monitors arrived on Round Island on September 9 and left on September 23. Daily walrus (*Odobenus rosmarus*) counts were conducted by an ADF&G biologist and a BBNA volunteer and a BBNA intern for the duration of the monitoring program. The average number of walruses on Round Island during this period was 77, with a high count of 444 on September 12. Steller sea lions (*Eumetopias jubatus*) were counted on seven days with a high count of 102 animals at East Cape. Although no hunt activities occurred while monitors were present on the island, two hunts occurred before the end of the hunting season. The community of Togiak harvested four young walruses and Twin Hills with invited crewmembers from Togiak harvested a single walrus. The hunting parties collected measurement data from both hunts and Twin Hills collected tissue samples to be stored by the Alaska mammal tissue archive program.

Cover Photo by Marian Snively: Michelle Ilutsik-Snyder, an intern hired by BBNA, performing walrus counts on Round Island, Fall 2006.

Appendix B. Continued.

BACKGROUND AND HISTORY

Historically, the Pacific walrus (*Odobenus rosmarus divergens*) has thrived in the Bering and Chukchi seas (Fay 1982). In the 17th century there was an increased demand for walrus ivory, oil, and hides, which corresponded to the arrival of the Europeans. Walruses were hunted extensively until the end of the 19th century when only a fraction of the population remained (Fay 1957).

Round (Qayassiq) Island was a traditional walrus hunting ground for Alaskan Natives. The island is located in Bristol Bay, approximately 30 miles southwest of the village of Togiak (Fig 1). Because of the historic over-harvesting of walruses and its subsequent dwindling population, the State of Alaska created the Walrus Island State Game Sanctuary in 1960 and prohibited all hunting on Round Island.

In the early 1990's hunters, mainly from the village of Togiak, petitioned the Alaska Board of Game (BOG) for access to the sanctuary for subsistence hunting on Round Island. This resulted in the formation of the Qayassiq Walrus Commission (QWC) in 1995, which helped to reestablish the Round Island subsistence hunt. The participating villages include Aleknagik, Clarks Point, Dillingham, Ekuk, Ekwok, Manokotak, New Stuyahok, Togiak, and Twin Hills (By-laws of the QWC Article II). The BOG agreed to allow island access between October 1 and 31 for the hunt. The harvest limit set at 10 (including struck and lost animals) by the Cooperative Agreement (ADF&G, EWC, QWC, and USF&WS). Later, the QWC petitioned the BOG for an extended hunting period. They also petitioned the Cooperative Agreement for a larger harvest limit. In 1997 the extended hunt dates were set between September 20 and October 20 and the harvest limit increased to 20. In 2003, because of the logistical difficulties of the Round Island hunt, the QWC again petitioned to extend island access time for the hunt (Cody 2003). The dates were extended and are now set from September 10 through October 20 with the hunting limit still 20 (Subsistence Walrus Hunting on Round Island, Bristol Bay, Alaska Cooperative Agreement).

Due to the increased duration of the hunt and the earlier hunt dates the BOG directed hunt managers to increase efforts for monitoring walrus disturbance during the hunt events. To achieve this goal the managing agencies agreed to provide two monitors on Round Island during the earlier hunt period starting in the fall of 2003 through the fall of 2006. The primary goals of the monitors are to conduct daily walrus counts and to monitor disturbances. Monitors also photograph the hunts, are available to tag ivory as it is collected, and relay weather and walrus count information through VHF radio.

Appendix B. Continued.

METHODS

WALRUS COUNTS

The 2006 monitors included an ADF&G Biologist, and a BBNA volunteer and a BBNA intern. Round Island was monitored from September 9 through September 23. Included in the counts were West Main Beach (WMB), Main Beach (MB), Flat Rock (FR), Campground (CG), First Beach (FB), First Prime (FP), Second Beach (S), and Second Prime (SP; Fig. 2). All beaches were counted daily with the exception of WMB. Due to its precipitous nature and in the interest of safety WMB was not counted during periods of inclement weather. Weather data and other count data were collected by following established protocols (see last year's Walrus Islands State Game Sanctuary Annual Report for further detail on weather and walrus count data collection; Okonek and Snively 2005).

STELLER SEA LION COUNTS

The sea lion colony at East Cape was counted opportunistically as time allowed. Brand numbers were transcribed in write in rain books only when monitors were sure of the number.

SEABIRD MONITORING

Round Island has established seabird plots that are monitored throughout the summer months. The plots were monitored during the fall by noting absence or presence of pelagic cormorants (*Phalacrocorax pelagicus;* PECO), Common Murres (*Uria aalge*; COMU), and Black-legged Kittiwakes (*Rissa tridactyla*; BLKI).

WALRUS HUNT MONITORING

A VHF radio was monitored between 8:00 and 9:00 mornings and evenings to relay weather conditions and walrus numbers to the hunters.

ACCESS VIOLATIONS

During access violations, monitors attempted to identify and photograph the offending craft. If the offender was a vessel the monitors attempted to make radio contact with the boat operator. When contacted, the operator is advised of the violation and directed to leave the waters immediately. Any contact information was also documented so that the incident could be investigated by the Alaska state troopers.

When possible the monitors documented changes in walrus behavior during the access violations to document any disturbance to the animals. Walrus counts were made during and after the disturbance events and also documented.

RESULTS AND DISCUSSION

WALRUS COUNTS

There was a maximum of 444 walrus on September 12 and a minimum of 0 on September 19 and 20 (the September 20 count did not include WMB; Fig. 3). The daily average count from September 9 through September 23 was 77 (Table 1). The majority of walruses were observed on MB throughout the monitoring period (Figure 4). WMB was counted nine out of the fifteen days and no walruses were present during these counts.

STELLER SEA LION COUNTS

Steller sea lions were counted seven times during the monitoring period. There was a maximum of 102 sea lions on September 9 and a minimum of 48 on September 19 and September 22 (Fig. 4). The following sea lion brands were positively identified from East Cape: September 9; A234, A278, A286, and September 17; A430.

SEABIRD MONITORING

Common murres were not seen in the plots for the duration of the monitoring period. Black-legged kittiwakes were present on the first day monitors were present (September 9) in the summer study plots but were not seen after this. There were few PECOs on the productivity plots through September 14. A single COMU was seen flying over NBC during the hunt monitoring period.

When monitors first arrived on the island they observed at least four carcasses of PECOs strewn around the vicinity of the cabin. The monitors noted two-three more carcasses as the weeks progressed and later saw an adult red fox (*Vulpes vulpes*) carrying a freshly killed PECO carcass to its young. Although the monitors did not see the fox killing the bird it is likely that foxes are killing cormorants to feed their young. There were seven foxes seen at one time near the cabin, most were kits.

WALRUS HUNT MONITORING/POST-OBSERVER HUNTING ACTIVITY

No hunting occurred during the two-week monitoring period on Round Island, likely due to inclement weather and a time conflict with mainland moose hunting.

On September 29, between the hours of 1100 and 1600, the Togiak hunt captain and his crew of 18, arrived to Round Island on six small boats. Prior to shooting, the crew observed seven walruses between North Boat Cove and Campground Beach. The hunt took place on Main Beach where the group harvested four young walruses. The hunters were able to get as close

as five feet from the animals before shooting. There were three to four shots fired per walrus with a total of 12 shots being fired. A single animal remained on the beach when the crew left the island; the hunt captain said that this animal appeared to be sick.

On October 12, the Twin Hills hunt captain and an invited six-person crew from Togiak arrived to Round Island on three small boats. Prior to shooting, the crew observed a single walrus on Main Beach. The hunters approached the animal by foot and fired two shots. The crew departed after butchering took place at 1700 hours. The captain from the hunt was also the monitor and collected the skin, muscle, kidney, tissue as well as the tooth from the walrus. The samples were collected for the Alaska Marine Mammal Tissue Archival Project, a joint effort conducted by the U.S. Geological Survey, Biological Resources Division, the National Marine Fisheries Service, and the National Institute of Standards and Technology. The samples will be stored under suitable conditions to allow for future analyses involving potential environmental contaminants.

No animals were struck and lost during the two hunts. Both hunt parties took measurements of the girth size, length of animal, tusk length and circumference of the harvested animals (Table 2).

The BBNA intern fulfilled all her obligations. She entered data accurately, wrote in her journal daily, read walrus literature, performed walrus and sea lion counts, and performed camp chores. When the intern returned from the field her main duty was to help write the hunt monitoring report.

ACCESS VIOLATIONS

There was one access violation observed during the hunt monitoring period. A large vessel sought shelter from a storm and anchored approximately a quarter mile from West Main Beach. The vessel captain was contacted and was informed that a permit is needed to enter the Round Island three-mile buffer. Due to the nature of the access violation, only a verbal warning was given.

There were only three walruses on Round Island before the access violation and all remained after the end of the activity. The high seas and windy weather are likely factors contributing to the low counts for the day.

Appendix B. Continued

ACKNOWLEDGEMENTS

We thank the Bristol Bay Native Association, Eskimo Walrus Commission, and the Qayassiq Walrus Commission for funding this project. The ADF&G is acknowledged for their staff support and the USF&WS for their logistical support. The ADF&G Dillingham staff, especially Jim Woolington and Eunice Dyasik, are greatly appreciated for their continued and exceptional support. Finally, we express our gratitude to Kiana Puttman, for her hard work, logistical knowledge, dedication to the project, and her skills in popcorn and chocolate cake making.

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FIGURES

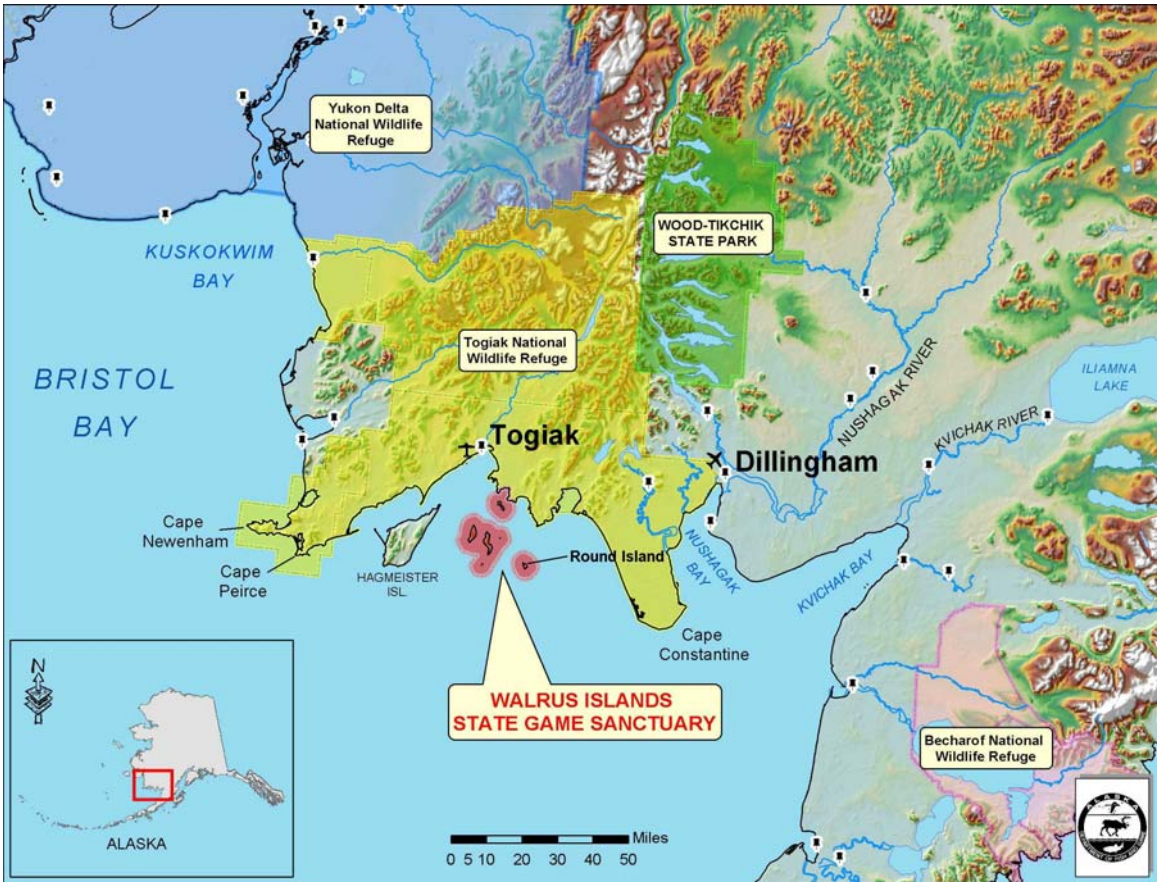

Figure 1. Location of Round Island of the Walrus Islands State Game Sanctuary.

Appendix B. Continued

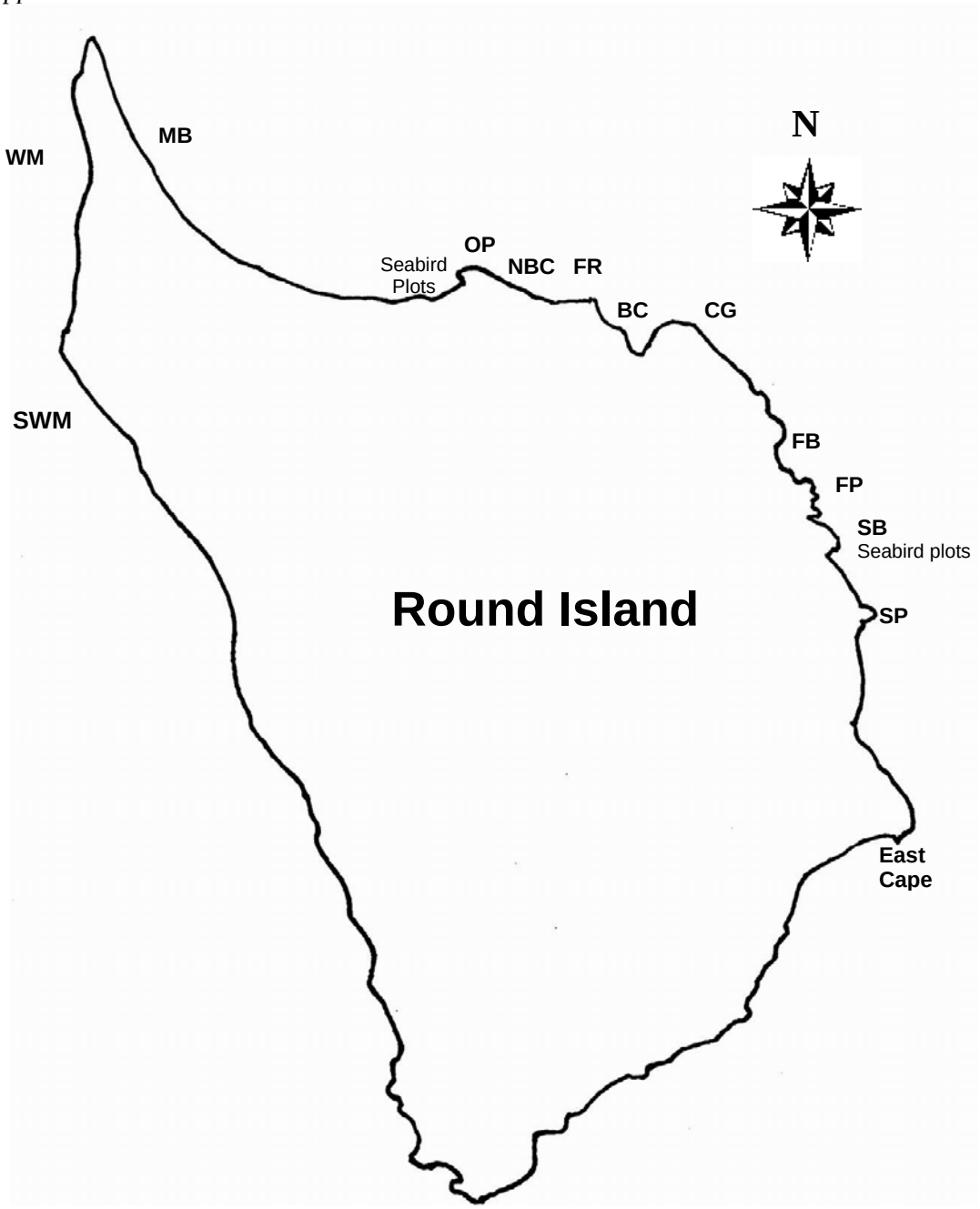

Figure 2. Map of Round Island with locations of walrus haulout beaches, bird plots and sea lion site; East Cape (sea lion haulout), SP (Second Prime), S (Second Beach), FP (First Prime), FB (First Beach), CG (Camp Ground), BC (Boat Cove), NBC (North Boat Cove), OP (Observation Point, MB (Main Beach), and WM (West Main Beach), South West Main, (SWM).

Appendix B. Continued

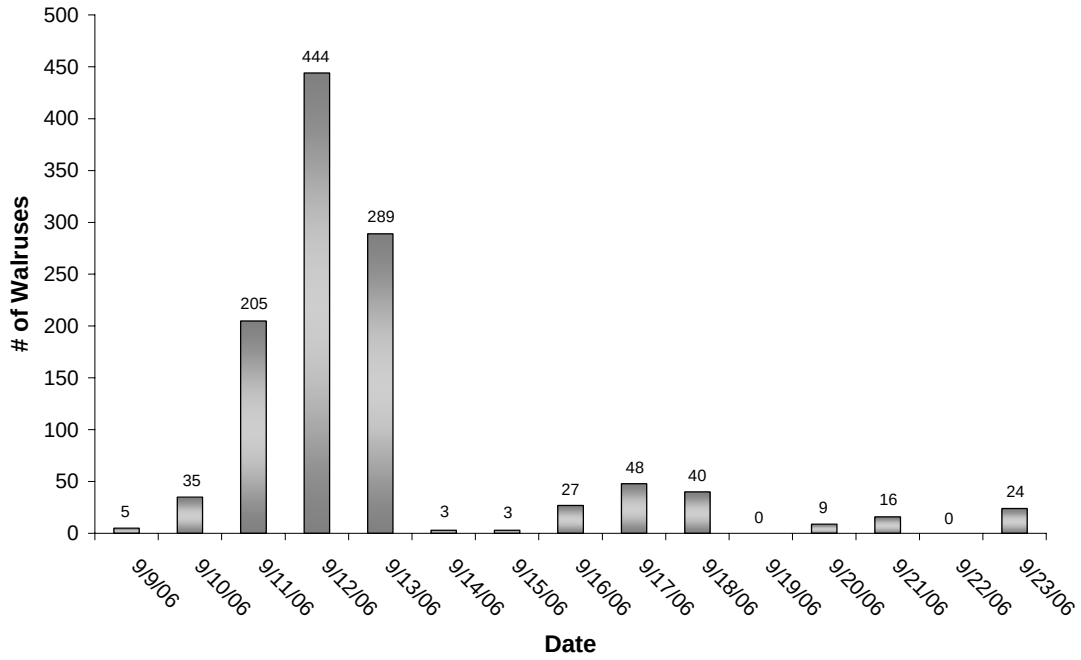

Figure 3. Walrus numbers during the RI walrus hunt monitoring, fall 2006.

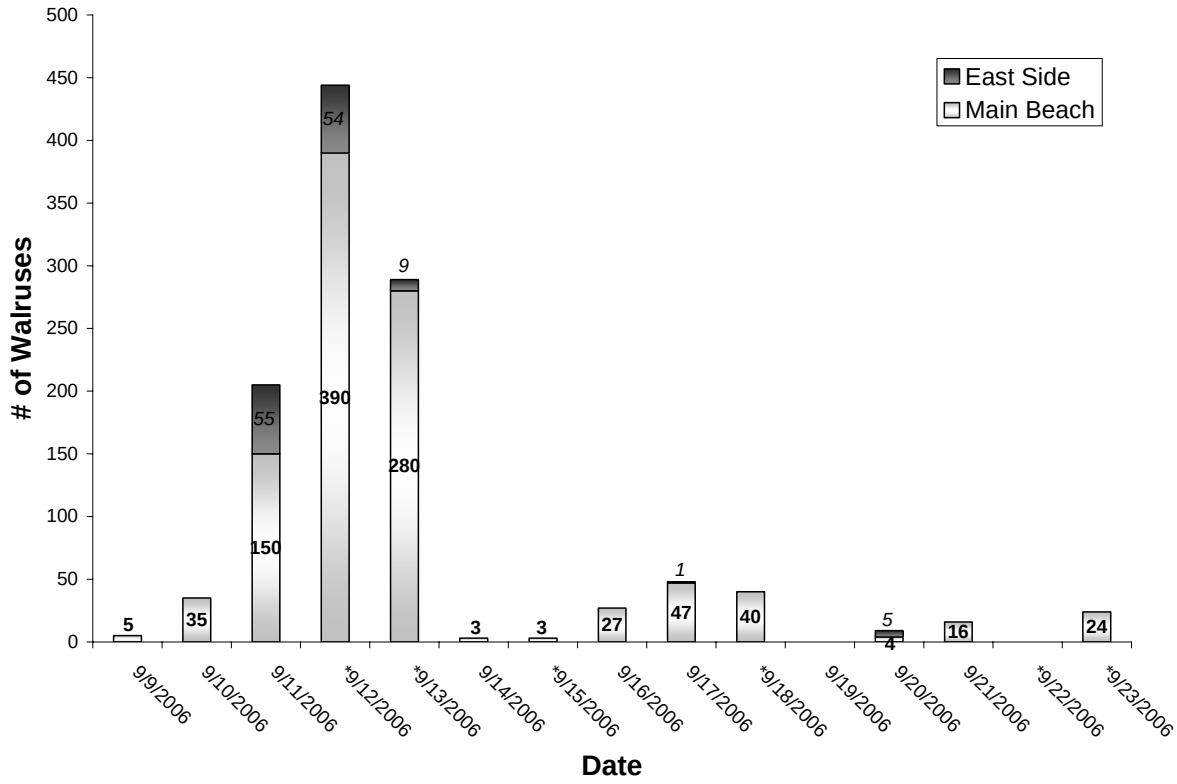

Figure 4. Walrus numbers during the RI walrus hunt monitoring showing both east side beaches and Main Beach counts, fall 2006.

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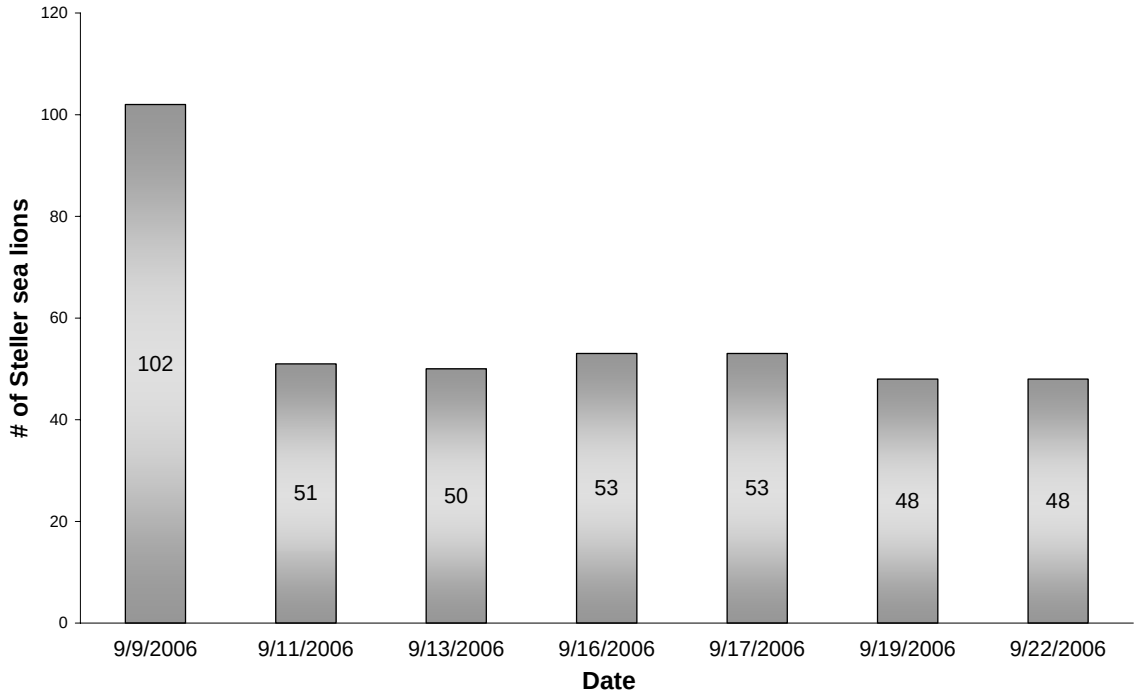

Figure 5. Steller Sea Lion numbers during the RI walrus hunt monitoring, fall 2006.

TABLES

Table 1. Walrus count numbers at Round Island, Alaska, September 9-22.

Date	East Side	Main Beach	West Main Beach	Total
9/9/2006	0	5	0	5
9/10/2006	0	35	0	35
9/11/2006	55	150	0	205
9/12/2006	54	390	no count	444
9/13/2006	9	280	no count	289
9/14/2006	0	3	0	3
9/15/2006	0	3	no count	3
9/16/2006	0	27	0	27
9/17/2006	1	47	0	48
9/18/2006	0	40	no count	40
9/19/2006	0	0	0	0
9/20/2006	5	4	0	9
9/21/2006	0	16	0	16
9/22/2006	0	0	no count	0
9/23/2006	0	24	no count	24
			Average	**77**

Appendix B. Continued.

Table 2. Walrus measurements from five harvested walruses during the Round Island fall hunt, 2006.

Walrus	Village	Date	Girth (ft)	Length (ft)	R Tusk Length (in)	R Tusk Circumference (in)	L Tusk Length (in)	L Tusk Circumference (in)
*1	Togiak	9/29/2006	6.8	12	11.5	7	12	7.0
*2	Togiak	9/29/2006	5.5	10	11	6	11	6.0
*3	Togiak	9/29/2006	5.5	10	9	6	7.5	6.5
*4	Togiak	9/29/2006	4.5	8	6	4	5.5	4.5
5	Twin Hills	10/12/2006	9.25	9	22	9.25	22	9.0

* Estimate of measurements using a 7.5 ft ore for comparison.

Appendix C. Anthropogenic activities and natural occurrences, Round Island 2006.

Date	Start time	End time	Disturbance Type	Closest Approach	# Walruses	# Walruses react	Walrus response
5/2/2006	21:25	23:15	None observed	~1/2 mi.	350	Unknown	unknown
5/10/2006	15:05	19:45	AV	~200 m./calm	4 – FR	1	1 - HR
5/12/2006	9:30	955	Orcas	N/A	N/A	Unknown	
5/13/2006	6:30	8:05	Orcas	N/A	N/A	Unknown	
5/23/2006	15:15	15:45	Ship	~2 miles		Unknown	
6/1/2006	10:30	11:00	Boat - A	Rocks at CG	5	1 – CG	1 -= DS
6/12/2006	21:15	22:00	Boat - A	Rocks at CG	12 - FR	0	
6/13/2006	11:15	12:00	Boat - A	Rocks at CG	7 – CG	0	
					5 – BC		
					14 - FR		
6/18	8:45	8:55	Boat - A	Boat Cove	2 - FR	0	
6/20/2006	1320	13:42	Boat - A	Rocks at CG	15- FR	0	
6/22/2006	13:10	13:26	Boat – A	Boat Cove	15-FR	0	
					3-BC		
					3-CG		
6/24/2006	8:50	11:00	Boat- A	Rocks at CG	11-FR	0	
					3-BC		
				Boat Cove			
	14:00	17:10	Boat- A		11-FR	0	
					3-BC	1 left beach	
6/26/2006	13:19	17:20	Boat-A	Boat Cove	10-FR	0	
6/27/2006	18:55	20:03	Boat- A	Boat Cove	5-FR	0	
6/28/2006			People	First Beach			
6/29/2006	13:00		Boat-A	Boat Cove	10-FR	0	
					6-CG	0	
		16:45	“	“	3-FR	0	
					4-CG	0	
6/30/2006	8:35	9:05	Boat-A	Boat Cove	1-FR	0	
					25 in water		
6/30/2006	12:28	19:00	Boat-A	Boat Cove	6-FR, 9 water arriving	0	
					3-FR departing	0	
7/1/2006	11:40	11:48	Boat-A	CG alternative	14-FR, 5 in water	0	
					2-BC	0	
					1-CG	0	
						1	Leaves shallows
				Boat Cove	12-FR		8 HR and reorientation, 3 leave
	13:37	14:00			2-BC	11	
						0	

Appendix C. Continued.

Date	Start time	End time	Disturbance Type	Closest Approach	# Walruses	# Walruses react	Walrus response
7/2/2006	9:50	11:20	Boat – A	Boat Cove	1 – FR	0	ND
	12:40	13:15	Boat - no walrus on beaches	Boat Cove	0	0	ND
7/3/2006	8:40	10:30	Gray whale	CG to MB			
	8:45	9:00	Boat – A/V	CG	1 – FR 1 – BC	0	ND
	11:30	17:30	Boat – A/V	Boat Cove	10 – FR 1 – BC	1 FR	DS
7/4/2006	6:45	10:00	Orcas	FB – Campground	None	None	
7/4 cont.				CG			
	14:45	16:15	Boat		12 – FR 2 – CG 3 - BC	2 – BC	DS
7/5/2006	14:15	14:40	Boat	CG	14 – FR 4 - BC 1 – CG	0	ND
7/6/2006	10:30	16:30	Boat A/V	Boat Cove	8 – FR	0	ND
	12:15	12:30	Boat A/V	Boat Cove	8 – FR	0	ND
7/7/2006	10:41	11:10	Boat Visitor on beach without staff	CG	4 – FR	0	ND
			Visitors go off trail	SB	195 FR	?	?
7/9/2006	9:30	21:30	Boat A/V	BC	5 FR	0	ND
	17:15	17:20	Unknown natural cause	MB	280 MB	40	DS
7/12/2006	9:15	12:10	Boat A/V	BC	11 FR 5 CG	0 5	ND DS
7/14/2006	10:30	17:30	Boat A/V	BC		2 FB	DS
7/19/2006	14:08	14:10	Plane over island	West to east	?	?	?
7/20/2006	1445	20:30	Boat A/V	BC	14 FR	0	ND
	18:30	2100	Boat A/V	S & E side of island and BC	0	0	ND
7/21/2006	16:20		Plane circles island				Unknown
7/24/2006	10:15	10:45	Boat	BC	None	None	ND
7/25/2006	10:45		Boat A/V	BC	9 FR	None	ND
	20:00				8 FR,.1 BC	None	

Appendix D. Daily walrus counts on Round Island 2006.

Date	East Side Total	West Side Total	Total # walrus	Method
5/2/2006	350	no count	350	fly by
5/3/2006	1026	no count	1026	scheduled
5/4/2006	5	no count	5	scheduled
5/6/2006	50	no count	50	scheduled
5/7/2006	40	no count	40	scheduled
5/8/2006	318	no count	318	scheduled
5/9/2006	500	no count	500	opportunistic
5/10/2006	1372	no count	1372	scheduled
5/11/2006	1200	no count	1200	scheduled
5/12/2006	730	no count	730	scheduled
5/13/2006	0	no count	0	no count
5/14/2006	920	no count	920	scheduled
5/15/2006	1754	no count	1754	scheduled
5/16/2006	1903	no count	1903	scheduled
5/17/2006	1108	no count	1108	opportunistic
5/18/2006	1677	no count	1677	scheduled
5/19/2006	600	no count	600	scheduled
5/20/2006	469	no count	469	scheduled
5/21/2006	no count	no count	no count	no count
5/22/2006	536	no count	536	scheduled
5/23/2006	1116	no count	1116	scheduled
5/24/2006	1912	no count	1912	scheduled
5/25/2006	1980	no count	1980	opportunistic
5/26/2006	2716	no count	2716	scheduled
5/27/2006	1859	no count	1859	scheduled
5/28/2006	968	no count	968	opportunistic
5/29/2006	968	no count	968	scheduled
5/30/2006	299	no count	299	scheduled
5/31/2006	860	no count	860	scheduled
6/1/2006	1660	no count	1660	scheduled
6/2/2006	460	126	**586**	opportunistic
6/3/2006	1876	250	**2126**	opportunistic
6/4/2006	830	508	**1338**	scheduled
6/5/2006	740	535	**1275**	scheduled
6/6/2006	1097	470	**1567**	scheduled
6/7/2006	no count	no count	no count	no count
6/8/2006	102	no count	102	no count
6/9/2006	0	207	**207**	scheduled
6/10/2006	0	no count, too windy	0	scheduled
6/11/2006	6	no count, too windy	6	shedulede
6/12/2006	452	too foggy to count	452	scheduled
6/13/2006	2257	613	**2928**	scheduled
6/14/2006	2310	371	**2681**	scheduled
6/15/2006	1817	190	**2007**	scheduled
6/16/2006	451	37	**488**	scheduled
6/17/2006	150	no count	150	opportunistic
6/18/2006	no count	no count	no count	no count
6/19/2006	377	220	**597**	scheduled
6/20/2006	915	no count	915	opportunistic
6/21/2006	955	200	**1155**	scheduled
6/22/2006	955	249	**1204**	scheduled
6/23/2006	652	no count	652	opportunistic
6/24/2006	1201	no count	1201	scheduled
6/25/2006	590	0	**590**	scheduled
6/26/2006	472	no count	472	scheduled
6/27/2006	361	no count	361	opportunistic
6/28/2006	no count	no count	no count	no count
6/29/2006	797	fog, no count	797	opportunistic
6/30/2006	746	0	**746**	scheduled

Appendix D. Continued

Date	East Side Total	West Side Total	Total # walrus	Method
7/1/2006	925	0	**925**	scheduled
7/2/2006	571	0	**571**	scheduled
7/3/2006	900	wind, no count	900	scheduled
7/4/2006	1580	alone, nc	1580	scheduled
7/5/2006	1431	0	**1431**	scheduled
7/6/2006	no count	no count	no count	no count
7/7/2006	1108	no count	1108	scheduled
7/8/2006	245	0	**245**	scheduled
7/9/2006	512	0	**512**	scheduled
7/10/2006	404	wind, no count	404	scheduled
7/11/2006	no count	no count	no count	no count
7/12/2006	1478	no count	1478	scheduled
7/13/2006	715	no count	715	scheduled
7/14/2006	359	0	**359**	scheduled
7/15/2006	843	no count	843	scheduled
7/16/2006	800	no count	800	opportunistic
7/17/2006	800	no count	800	opportunistic
7/18/2006	491	no count	491	scheduled
7/19/2006	155	no count	155	scheduled
7/20/2006	no count	no count	no count	no count
7/21/2006	2671	no count	2671	scheduled
7/22/2006	862	376	**1238**	scheduled
7/23/2006	227	no count	227	scheduled
7/24/2006	no count	no count	no count	no count
7/25/2006	395	no count	396	scheduled
7/26/2006	486	no count	486	scheduled
7/27/2006	no count	no count	no count	no count
7/28/2006	800	0	**800**	opportunistic
7/29/2006	427	no count	427	scheduled
7/30/2006	460	no count	460	scheduled
7/31/2006	486	no count	486	scheduled
8/1/2006	575	no count	575	opportunistic
8/2/2006	1223	0	**1223**	scheduled
8/3/2006	1638	no count	1638	scheduled
8/4/2006	1566	no count	1566	scheduled
8/5/2006	400	0	**400**	opportunistic
8/6/2006	580	no count	580	scheduled
8/7/2006	402	no count	402	opportunistic
8/8/2006	620	2	**622**	scheduled
8/9/2006	1429	no count	1429	scheduled
8/10/2006	490	no couny	490	opportunistic
8/11/2006	1048	no count	1048	scheduled
8/12/2006	429	no count	429	scheduled
8/13/2006	217	no count	217	scheduled
8/14/2006	335	no count	335	opportunistic

Appendix E. Steller sea lion counts, identifications, and comments. Round Island 2006.

Date	Time Begin/End	Land Count	Water Count	Total	Brands/Tags
5/3/06	10:00-10:30	165	35	200	none
5/8/06	10:00-10:30	354	33	387	none
5/13/06	10:30-11:15	128	30	158	A444 – yearling/nursing A110 A?
5/15/06	8:20	204	10	214	X3 A253 A263
5/16/06	10:00	289	2	291	X133 A195 A280 A64 A59 A444 A322
5/18/06	17:05	349	3	352	X3 A280 A281 A118 A444
5/23/06	10:00	217	71	288	A263 A43 A196 A223 A64 A253 X133 A281
5/25/06	18:30	262	15	277	A230 A444 F1124 A11? A263
5/31/06	10:30	64	7	71	None
6/1/06	16:00	No count			A256
6/3/06	15:45	88	9	97	A291 Y16 A79 A280 A196
6/7/06	17:30	110	0	110	A321 A196
6/9/06	17:00	No Count			Y16
6/13/06	14:30	81	29	110	A281 A310 A196 A79, A263
6/17/06	8:30	60	27	87	A196
6/22/06	8:15	75	7	82	A281 A47 A196 A230

Appendix E. Continued

Date	Time Begin/End	Land Count	Water Count	Total	Brands/Tags
6/27/06	10:11	31	1	32	A223
7/2/06	14:30	83	11	94	None
7/7/06	7:35	212	10	222	A252
					A79
					AODO
					A256
					A64
7/8/06					Y16
					A223
					A284
					AODO
7/14/06	8:00	176	9	185	None
7/19/06	900	238	11	249	X168
					A230
					A64
					A278
7/21/06	15:30	190	22	212	A223
7/26/06	1400	68	4	72	A256
					A278
					M618
7/29/06	1550	93	0	93	M618
					A256
					A222
8/2/06	1200				A222
					A430
					A225
					A230
8/4/06	1948	86	6	92	None
8/9/06	1130	78	15	93	A291
					A234
					A451

Appendix F. Productivity data from three species of seabirds on Round Island; pelagic cormorant (PECO), black-legged kittiwake (BLKI), and common murre (COMU). a=adult, st=standing, e=egg, in=Incubating, c=chick.

2006 PECO PRODUCTIVITY-SECOND BEACH

#	5/25/06	5/27/06	5/29/06	5/31/06	6/2/06	6/4/06	6/6/06	6/8/06	6/13/06	6/15/06	6/17/06	6/19/06	6/21/06	6/23/06	6/25/06	6/27/06	6/30/06
1	1ast0e	1ast1e	1ain2e	1ast0e	1ast0e	1ast0e	1acop0e	1ain?e	1ain3e	1ain1e	1ain2e	1ain3e	1ain2e	1ain1e	1ain1e	1ain3e	1ain1e
2	1ain?e	1ain1e	1ain1e	1ain0e	2ast0e	1ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast2e	1ain?e	2ain1e	1ain?e	2ain?e
3	1ain?e	1ain1e	1ain?e	1ast0e	2ast0e	1ast0e	2ast0e	1ast0e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e
4	1ain?e	1ain1e	1ain?e	1ast0e	1ast0e	2ast0e	2ast0e	2ast0e	1ast0e	1ain2e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e
5	1ain1e	1ain1e	1ain2e	1ast0e	1anb0e	1ast0e	2ast0e	2ast0e	1ast0e	1ast1e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e+	1ain2e+	1ain1e
6	1ain?e	1ain1e	1ain1e	2acop	1ast0e	2ast0e	1ast0e	1ast0e	2ast0e	2ast0e	1ast0e	1ast0e	2ast0e	1ast0e	2ast0e	1ain1+	1ain1e
7	1ain?e	1ain?e	1ain?e	1ast0e	0a0e	0a0e	oa0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ain?e	1ain?e	1ain?e	1ain3e	1ain?e
8	1ain?e	1ain1e	1ain1e	1ast0e	2ain?e	2ast0e	1ast0e	2anb0e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1ain1e	1ain1e	1ain1e	1ain?e
9	1ain?e	1ain?e	1ain1e	2ast0e	1ast0e	2ast0e	2anb0e	2ast0e	1ain?e	1ain2e	2ain1e	1ain2e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e
10	1ain?e	1ain1e	1ain1e	1ain0e	1ast0e	2ast0e	2anb0e	1ast0e	2ain?e	1ain2e	1ain?e	1ain3e	1ain?e	1ain?e	1ain?e	1ain1e	1ain2e
11	1ain?e	1ain?e	1ain1e	1ain0e	1ast0e	1ast0e	2acop0e	1anb0e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	2ain1e	1ain?e	1ain?e	1ain2e
12	2ast0e	1ast0e	1ast0e	2ain0e	2ain?e	1ain?e	2ain?e	2ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e
13	1ast0e	2ast0e	1ast0e	1ast0e	1anb0e	1ast0e	1ast0e	1ain?e	1ain1e	1ain3e	1ain2e	1ain3e	1ain?e	1ain?e	2ain3e	1ain1e+	1ain2e
14	1astoe	1ast0e	1ast0e	1ast0e	2ast0e	1ain?e	2ain?e	2ain?e	1ain?e	2ain?e	1ain?e	2ain?e	1ain1e+	2ain?e	1ain?e	1ain1e+	1ain1e
15	1ast0e	1ast0e	1ain1e	1ast0e	2ain0e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1ain?e	1ain1e	1ain?e	1ain1e	1ain?e	1ain1e+	1ain1e
16	2ain?e	1ast1e	1ain2e	2ast0e	2anb0e	1ast0e	2anb0e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1ain?e	1ain?e	1ain2e	1ain?e	1ain?e
1/17	1ast0e	1ain1e	1ast1e	1ast0e	2anb0e	1ast0e	2ain?e	2ain?e	1ain?e	1ain?e	2ain1e	1ain1e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e
18	1ast0e	1ain1e	1ast1e	1ast0e	1ast0e	1ast0e	2anb0e	2ast0e	1ain1e	1ain1e+	2ain1e	1ain2e	1ain2e	2ain?e	1ain?e	1ain?e	1ain?e
19	1ain1e	2ain3e	1ain3e	1ain2e	1ain2e	1ain2e	1ain?e	1ain2e	1ain1e+	1ain3e	1ain2e	1ain2e	***1abr?c**	1ain1e1c	1ain1e2c	1abr2c	1abr2c
20	2ast0e	2ain0e	1ain?e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e
21	1ast0e	2ast0e	2ast0e	1ast0e	2ast0e	1ain2e	1ain1e	1ain1e	1ain1e+	1ain3e	1ain1e+	1ain3e	1ain?e	1ain?e	1ain3e	1ain?e	1ain3e
22	1ast0e	2ain1e	1ain1e	1ast0e	2ast0e	1ast0e	2ast0e	1ain0e	1ain?e	1ain1e+	1ain?e	1ain?e	1anb?e	1ain?e	1ain1e+	1ain1e+	1ain1e
23	1ain1e	1ain2e	1ain1e	2ast0e	1ast0e	1ast0e	1ast0e	1ain?e	1ain?e	2ain1e	1ain2e	1ain1e	1ain?e	1ain1e	1ain?e	1ain2e	1ain?e
24	1ain1e	1ain1e	1ain2e	2ain?e	2ain2e	1ain?e	1ain?e	1ain?e	1ain2e	1ain2e	1ain?e	1ain1e	1ain?e	1abr1c	1ain?e	1abr1c+	1abr1c
25	2ain1e	1ain?e	1ain1e	2ain?e	2ain0e	1ain?e	1ain?e	1ain1e	1ain?e	1ain1e	1ain?e	1ain?e	1ain?e	2abr1c	1ain?e	1abr2c	1abr1c
26		1ain1e	1ain1e	2acop	2ast0e	2ast0e	2ast0e	1ast0e	1ain1e	1ain1e	1ain?e	1ain1e	1ain?e	1ain2e	1ain2e	1ain2e	1ain?e

#	7/2/06	7/4/06	7/7/06	7/9/06	7/12/06	7/15/06	7/18/06	7/21/06	7/23/06	7/26/06	7/29/06	7/31/06	8/2/06	8/4/06	8/6/06	8/8/06
1	1ain1e+	1ain2e	1ain1e1c	1abr?c	1abr1c	2abr?c	1abr2c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1ast0c	2ast0c	1ast0c	1ast0c
2	1ain1e	1ain?e	1ain3c	1ain?e	1ain?e	1ain?e	1ain2e	1abr?c	1abr1c	1abr1c	1abr?c	1abr?c	1ast2c	1ast2c	1ast1c	1ast2c
3	1ain?e	1ain?e	1ain?e	1abr1c	1abr1c	1abr?c	1abr?c	1abr?c	1abr1c	1abr1c	1abr?c	1abr1c	1ast1c	1ast2c	1ast1c	1ast2c
4	1ain?e	1ain1e	1ain?e	1ain?e	1ain?e	1ain?e	1abr?c	1abr?c	1abr?c	1abr1c	1abr?c	1abr3c	1ast2c	1ast1c	1ast1c	0a2c
5	1ain1e+	1ain1e	1ast0e	oaoe	0a0e	0a0e	1ast0e	0a0e	1ast0c	0a	0a	0a0c	1ast0c	0a0c	0a0c	1ast0c
6	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1abr?c	1abr?c	1ain?e	2abr?c	1abr?c	1abr?c	1abr?c	1abr?c	1abr1c
7	1ain?e	1ain2e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1abr?c	1abr?c	1abr1c	1abr1c	1abr?c	2ast2c	1ast2c	1ast2c	1ast2c
8	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1abr1c	1abr?c	1abr?c	1abr1c	1abr1c	1abr1c	1abr1c	1ast3c	1ast3c	0a2c	1ast3c
9	1ain?e	1ain?e	1ain?e	1ain?e	1abr1c	2abr1c	1abr1c	1abr?c	1abr1c	1abr3c	1abr1c	1abr3c	1ast3c	1ast2c	1ast1c	2ast2c
10	1ain?e	1ain2e	1ain?e	1ain2e	1ain?e	1ain1c	1ain?e	1abr?c	1abr1c	1abr1c	1abr1c	1abr1c	1ast1c	1ast1c	1ast1c	1ast2c
11	1ain?e	1ain2e	1ain?e	1ain?e	1abr?c	1abr1c	1abr1c	1abr?c	1abr1c	1abr2c	1abr1c	1abr1c	1ast2c	1ast2c	1ast2c	1ast2c
12	1ain?e	1ain?e	1abr1c	1ain?e	1abr1c	1abr2c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	1ast3c	1ast3c	1ast3c	1ast3c
13	1ain1e+	1ain2e	1ain2e	1abr2c	1abr1c	1abr1c	1abr3c	1abr2c	1abr2c	1abr2c	1abr2c	1abr2c	1ast2c	1ast2c	1ast2c	1ast2c
14	1ain?e	1ain1e+	1abr1c	1abr1c	1abr1c	1abr1c	2abr1c	2abr1c	1abr2c	1abr1c	1abr2c	1abr2c	1ast1c	1ast1c	1ast1c	1ast1c
15	1ain?e	1ain1e+	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr2c	1abr1c	1abr2c	1abr2c	1abr2c	1ast2c	1ast2c	1ast2c	1ast2c
16	1ain1e+	1ain2e	1ain1e+	1abr1c	1abr1c	1abr1c	1abr1c	1abr2c	1abr1c	1abr2c	1abr2c	1abr2c	0a2c	1ast2c	1ast2c	1ast2c
17	1ain1e+	1abr?c	1ain?e	1ain2e	1abr1c	1abr?c	1abr1c	1abr2c	1abr1c	1abr2c	1abr1c	1abe2	1ast2c	2ast2c	1ast2c	1ast2c
18	1ain?e	1ain1e+	1abr?c	1ain2e	1abr1c	1abr1c	1ain?e	1abr3c	1abr1c	1abr2c	1abr2c	1abr2c	1ast3c	1ast3c	1ast3c	1ast3c
19	1abr1c	1abr1c	2abr1c	1abr2c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1ast1c	1ast1c	0a1dead	1a1deadc
20	0a0e	0a0e	0a0e	0a0e	oaoe	0a0c	oaoe	0a0e	0a0e	1abr2c	0a	0a0c	0a0c	0a0c	0a0c	0a0c
21	1abr2c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr2c	1abr2c	1ast?c	1abr2c	1abr2c	1ast2c	1ast2c	0a2c	1ast2c
22	0a0c	1ain?e	1ain?e	1abr1c	1ain?e	1ain?e	1abr1c	1abr?c	1abr?c	1abr1c	0a	0a0c	0a0c	0a0c	0a0c	0a0c
23	1ain1e	1ain?c	1ain1e	1ain?e	1ain?e	1ain?e	1ain?e	1abr?c	1abr?c	1abr3c	1abr1c	1abr1c	1ast2c	1ast2c	0a2c	1ast1c
24	1abr1c	1abr1c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	0a3c	0a3c	0a3c	1ast2c
25	1abr2c	1abr2c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	1abr3c	1ast3c	1ast3c	1ast3c	1ast3c
26	1ain2e	1ain?e	1ain1e	1ain2e	1abr1c	1abr3c	1abr1c	1abr1c	1abr?c	1abr2c	1abr2c	1abr2c	1ast2c	1ast2c	1ast3c	1ast3c

*first chick observed

Appendix F. Continued

2006 BLKI PRODUCTIVITY - PLOT 2 - MAIN BEACH - FROM OBSERVATION POINT

#	6/2/06	6/5/06	6/7/06	6/8/06	6/12/06	6/14/06	6/17/06	6/19/06	6/21/06	6/23/06	6/25/06	6/27/06	6/29/06	7/1/06
1	1ast0e	1AST	1AST?E	1ast0e	1ast0e	0a0e	0a0e	0a0e	0a0e	0a0e	1ast0e	0a0e	1astoe	1ast0e
2	1ast0e	GONE	3AIN?E	1ast0e	1ain?e	1ast0e	0a0e	0a0e	0a0e	1ast0e	0a0e	0a0e	2ast0e	1ast0e
3	1ain1e	1AIN?E	1AST0E	oaoe	2ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1astoe	1ast0e
4	1ast0e	1AST	1AST0E	1ast0e	0a0e	0a0e	1ast0e	0a0e	0a0e	0a0e	0a0e	0a0e	1astoe	1ast0e
5	1ast0e	1AIN2E	1AIN?E	1ast0e	1ast0e	0a0e	0a0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	2ast0e	1ast0e
6	1ast0e	1AIN?E	1AIN2E	1ast0e	1ast0e	1ain0e	1ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	2ast0e	1ast0e
7	1ast0e	1AST0E	1AST0E	1ast0e	1astoe	1ast0e	0a0e	2ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
8	1ast0e	1AST0E	1AST0E	1ast0e	1ast0e	0a0e	0a0e	2ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ain?e	2ast0e
9	1ast0e	1AIN?E	1AIN1E	1ast0e	1ast0e	1ast0e	1ast0e	1ain0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
10	1ast0e	1AIN2E	1AST0E	1ast0e	1ast0e	1ast0e	1ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
11	1ast0e	1AST0E	1AST0E	1ain?e	1ast1e	1ain?e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	2ast0e	1ast0e
12	1ast0e	1AIN?E	1AIN0E	1ast0e	1ast1e	1ast1e	2astoe	1ast1e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
13	1ast0e	2AIN?E	2AST0E	1ast?e	2ast1e	2ast1e	1ain1e	1ain2e	1ain?e	1ain?e	1ast0e	1ain1e	1ain?e	1ain1e
14	1ain1e	1AIN?E	1AIN1E	1ast0e	1ast0e	1ast0e	1astoe	0a0e	2ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e
15	1ast0e	1AIN?E	2AIN1E	1ain1e	0a2e	0a0e	1ast2e	2ast1e	1ast0e	0a0e	2ast0e	1ast0e	1ast0e	1ast0e
16	1ast0e	1AIN?E	1AIN?E	1ain?e	1ain?e	1ain?e	1ain?e	0a0e	1ast0e	0a0e	0a0e	1ast0e	1ast0e	1ast0e
17	1ast0e	1AIN?E	1AIN0E	1ain?e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
18	1ast0e	1AIN?E	1AIN1E	0a0e	0a0e	2ast0e	1ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
19	1ast0e	1AIN?E	1AIN1+E	1ast0e	1ast1e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e
20	1ast0e	2AST0E	1AIN?E	1ain?e	2ast0e	1ast0e	1ast0e	1ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
21	1ast0e	1AIN?E	1AIN2E	1ain?e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e
22	1ain1e	2acop	2AIN1E	1ast0e	2ast2e	1ast2e	1ain2e	1ain?e	1ain?e	2ast1e	1ast0e	1ain1e	1ain1e	1ast0e
23	1ast0e	1AST0E	1AST0E	1ain?e	1ain?e	1ain?e	1ast1e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e
24	1ast0e	1AIN?E	1AIN?E	2ast0e	1ast0e	1ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	2ast0e	1ast0e
25	1ain1e	1AIN?E	1AIN2E	1ast0e	1ain?e	1ain?e	1ast0e	2ast0e	0a0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e

#	7/3/06	7/5/06	7/8/06	7/12/06	7/15/06	7/17/06	7/19/06	7/21/06	7/23/06	7/26/06	7/29/06	8/6/06	8/13/06
1	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	0a0e	1ast0e	2ast0e	1ast0e	1ast0e	0a	0a	0a
2	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	2ast0e	0a0e	0a	0a	0a	0a
3	1ast0e	1ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	2ast0e	1ast0e	1ast0e	1ast0e	0a	0a
4	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a	0a	0a	0a
5	1ast0e	1ain?e	1ast0e	1ast0e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain1e	***1abr1c**	1abr1c
6	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	2ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e
7	1ast0e	1ast0e	1ast0e	1asit0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a	0a	0a	0a
8	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	2ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
9	1ast0e	1ain?e	1ast0e	1asit0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
10	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
11	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
12	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a	0a	0a
13	1ain?e	1ast0e	0a0e	0a0e	2ast0e	0a0e	0a0e	2ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
14	2ast0e	0a0e	1ast0e	1asit0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e
15	2ast0e	1ast0e	1ast0e	1asit0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
16	1ast0e	1ast0e	0a0e	0a0e	2ast0e	0a0e	0a0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
17	1ast0e	1ast0e	1ast0e	1asit0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a	0a	0a	0a
18	1ast0e	1ast0e	1ast0e	1asit0e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ast0e	1ast0e	1ast0e
19	1ast0e	1ast0e	0a0e	1ast0e	2ast0e	1ast0e	1ast0e	1ast0e	2ast0e	0a	1ast0e	1ast0e	1ast0e
20	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	2ast0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
21	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	0a0e	1ast0e	1ast0e	0a0e	0a	0a	0a	0a
22	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1ain?e	1ast0e	1ast0e	0a	0a	0a	0a
23	2ast0e	1ast0e	1ast0e	0a0e	1ast0e	2ast0e	1ast0e	1ast0e	0a0e	0a	1ast0e	1ast0e	1ast0e
24	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	0a	1abr?e	1abr?e	1abr?e
25	0a0e	1ast0e	1ast0e	0a0e	1ast0e	0a0e	0a0e	0a0e	0a0e	0a	oa	oa	oa

** first chick*

Appendix F. Continued

2006 BLKI PRODUCTIVITY - PLOT 3 - MAIN BEACH - FROM OBSERVATION POINT

nest #	6/8/06	6/12/06	6/14/06	6/17/06	6/19/06	6/21/06	6/23/06	6/25/06	6/27/06	6/29/06	7/1/06	7/3/06
1	1ast0e	1st0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	2ast0e	1ast0e
2	1ain?e	1ast0e	2ast0e	1ast0e	2ast?e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	2ast0e	1ast0e
3	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
4	1ast0e	nest gone	1ain?e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
5	1ast0e	nest gone	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
6	1ain?e	1ain2e	1ast1e	1ain1e	1ain1e	1ain?e	1ain?e	1ain/e	1ain?e	1ain?e	1ain1e	1ain?e
7	1ain?e	2ast1e	1ain2e	1ain?e	1ain?e	1ain?e	1ain1e	2ast0e	0a0e	1ast0e	1ast0e	0a0e
8	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	2ast)e	1ast0e	0a0e	1ast0e	2acop0e	2acop0e
9	1ast0e	1ast0e	1ain1e	1ain?e	1ain1e	1ain1e	1ain1e	1ain1e	1ain?e	1ain1e	1ain?e	1ain?e
10	1ain?e	1ain?e	1ain1e	1ain?e	1ain1e	1ain1e	1ain1e	1ain1e	1ain?e	1ain1e	1ain?e	1ast?e
11	1ast0e	1ast0e	1ain1e	1ain?e	1ain1e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1ain?e
12	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e
13	1ain?e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
14	1ain?e	1ast0e	nest gone	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e
15	1ast0e	1ast0e	nest gone	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	0a0e	1ast0e	2ast0e
16	1ast0e	1ast0e	nest gone	1ast0e	1ast0e	1ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
17	oaoe	1ast0e	2ain1e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
18	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
19	1ast0e	1ain?e	1ain1e	0a0e	1ast0e	0a0e	0a0e	0a0e	1ast0e	1ast0e	2ast0e	1ast0e
20	1ain1e	1ain?e	1ain?e	1ain?e	1ain?e	1ain2e	1ain?e	1ast0e	1ast0e	2ast0e	1ast0e	1ast0e
21	1ain?e	1ain?e	1ain?e	1ast0e	1ast0e	1ast0e	2ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e
22	1ast0e	1ast0e	1ast0e	1ain?e	1ast0e	1ast0e	1ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e
23	1ain?e	0a1e	1ain?e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	2ast0e	1ast0e	1ast0e
24	1ast0e	1ast0e	1ain?e	1ast0e	0a0e	0a0e	0a0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e
25	1ast0e	1ast0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e

nest #	7/5/06	7/8/06	7/12/06	7/15/06	7/17/06	7/19/06	7/21/06	7/23/05	7/26/06	7/29/06	8/7/06	8/13/06
1	1ast0e	1ast0e	1asit0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
2	2ast0e	1ast0e	1asit0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
3	1ast0e	1ast0e	1asit0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	0a	1ast0e	1ast0e	1ast0e
4	1ast0e	1ast0e	0a0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
5	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
6	1ain1e	1ain1e	0a0e	1ast0e	1ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
7	2ast0e	1ast0e	0a0e	1ast0e	0a0e	0a0e	0a0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
8	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	0a0e	1ast0e	0a0e	0a	0a	0a	0a
9	1ain?e	1ain1e	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c
10	2ast?e	***1abr1c**	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1a 0c	0a
11	1ain?e	1ain?e	1ain?e	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c	1abr1c
12	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a	0a	0a	0a
13	1ast0e	1ast0e	1ast0e	0a0e	0a0e	0a0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
14	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	0a0e	0a	0a	0a	0a
15	0a0e	1ast0e	0a0e	0a0e	0a0e	0a0e	1ast0e	0a0e	0a	1ast0e	1ast0e	1ast0e
16	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
17	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	0a	0a	0a	0a
18	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	2ast0e	0a0e	0a	1ast0e	1ast0e	1ast0e
19	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	2ast0e	0a0e	0a	1ast0e	1ast0e	1ast0e
20	1ast0e	1ast0e	1asit0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
21	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
22	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
23	1ast0e	1ast0e	0a0e	1ast0e	0a0e	1ast0e	1ast0e	0a0e	0a	1ast0e	1ast0e	1ast0e
24	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e
25	0a0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a	1ast0e	1ast0e	1ast0e

** first chick*

Appendix F. Continued.

2006 COMU PRODUCTIVITY - PLOT 2 - MAIN BEACH FROM OBSERVATION POINT

nest #	6/17/06	6/19/06	6/21/06	6/23/06	6/25/06	6/27/06	6/29/06	7/1/06	7/3/06	7/5/06
1	1ast0e	1ast0e	1ain?e	1ain?e	1ain?e	1ain1e	1ain1e	1ain?e	1ain?e	1ain?e
2	1ast0e	1ast0e	1ain1e	1ain?e	1ain1e	1ain?e	1ain1e	1ain1e	1ain?e	1ast0e
3	1ain1e	1ain1e	2ain1e	1ain?e	1ain1e	1ain1e	1ain1e	1ain1e	1ain1e	1ain1e
4	1ast0e	1ain1e	1ain1e	1ain?e	1ain1e	1ain1e	1ain1e	1ain1e	1ain1e	1ain1e
5	1ast0e	1ain1e	1ain1e	1ain?e	1ain1e	1ain1e	1ain1e	1ain1e	1ain1e	1ain1e
6	1ast0e	1ain1e	1ain1e	1ain1e	1ain1e	1ain1e	1ain1e	1ain1e	1ain?e	1ain1e
7	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ast?e	1ain?e	1ain?e	1ain?e
8	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1ain?e	1ain?e
9	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1ain?e	1ain?e
10	1ain1e	1ain?e	1ain1e	1ain1e	1ain1e	1ain1e	1ain?e	1ain?e	1ain?e	1ain1e
11	1ain1e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e
12	1ast0e	1ain?e	1ain?e	1ain?e	1ast0e	0a0e	1ast0e	1ain?e	1ain1e	1ast0e
13	1ast0e	1ain1e	1ain?e	1ain?e	1ast0e	1ast0e	2ain?e	1ain?e	1ast0e	1ain1e
14	1ain?e	1ast0e	1ain?e	1ain1e	1ast0e	1ast?e	1ain?e	1ain?e	1ain1e	1ain1e
15	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1ast?e	1ain1e	1ain?e	1ast?e	1ast0e
16	2ain1e	0a1e	1ast1e	1ast?e	1ain?e	0a0e	0a0e	2ast0e	1ast1e	1ast0e
17	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	0a0e	2ast0e	0a0e	1ast0e
18	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ain1e	0a0e	2ast0e	2ast0e	1ast0e
19	1ast0e	2ain?e	2ast0e	1ast0e	2ain?e	1ain1e	1ain?e	2ain?e	1ain1e	1ain?e
20	0a0e	1ain?e	1ain?e	1ast0e	1ast0e	0a0e	0a0e	1ast0e	1ast0e	0a0e
21	1ast0e	1ain?e	1ast0e	1ain?e	2ain?e	0a0e	0a0e	0a0e	oaoe	0a0e
22	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
23	1ast0e	1ain?e	1ast0e	1ast0e	2ast0e	0a0e	1ast0e	2ast0e	1ast0e	1ast0e
24	1ain?e	2ain?e	1ast1e	1ast0e	1ast0e	0a0e	2ast0e	2ast0e	1ast1e	1ast0e
25	1ast0e	2ain?e	2ain?e	2ain?e	2ain?e	1ain?e	1ast0e	1ast0e	0a0e	1ast?e
nest #	**7/8/06**	**7/12/06**	**7/15/06**	**7/17/06**	**7/19/06**	**7/21/06**	**7/23/06**	**7/26/06**	**8/1/06**	**8/8/06**
1	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1abr1c
2	1ast0e	0a0e	1ast0e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ast?e	1ast?c
3	1ain?e	1ain?e	2ain?e	1ain?e	1ain1e	1ain1e	1ain?e	1abr?c	1ain1c	1abr?c
4	1ain1e	1ain?e	1ain?e	1ain?e	1ain1e	1ain1e	1abr?c	1abr?c	1abr1c	1abr?c
5	1ain?e	1ain?e	1ain1e	1ain?e	1ain1e	1ain1e	1ain?e	1abr?c	1ast?c	1ast0c
6	1ain1e	1ain?e	1ain1e	1ain?e	1ain1e	1ain1e	1abr?c	1ain?e	1abr1c	1ast?c
7	1ain?e	1ain?e	1ain1e	1ain?e	1ain1e	1ain1e	1ain1e	1ain?e	1abr?c	1abr?c
8	1ain?e	1ain?e	1ain1e	1ain?e	1ain1e	1ain1e	1ain1e	1ain?e	1abr?c	1abr?c
9	1ain?e	1ain?e	1ain1e	1ain?e	1ain1e	1ain1e	1abr?c	1abr?c	1abr1c	1abr?c
10	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain1e	1abr1e	1ain?e	1abr1c	1abr1c
11	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain1e	1ain?e	1abr?c	1abr1c	1abr?c
12	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0c	1ast?c
13	1ain1e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ast0e	1ast0c	1ast?c
14	1ain?e	1ain?e	1ain?e	0a0e	1ain?e	1ain?e	1ast?e	1abr?c	***1abr1c**	1abr?c
15	1ast?e	1ast0e	1ain?e	0a0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0c	1ast0c
16	1ast0e	2ast0e	1ast0e	2ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1abr?c
17	2ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ain?e	1abr?e	1ain?e	1abr?c
18	2ast0e	2ast0e	1ast0e	2ain?e	1ast0e	1ast0e	1ain?e	1ain?e	1ain?e	1abr?c
19	1ast0e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ast0e	1ast0c
20	0a0e	0a0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	0aoe	1abr?c
21	1ast0e	1ast0e	0a0e	1ast0e	0a0e	0a0e	0a0e	1ast0e	0a0e	oaoc
22	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1asr0e	1ast0e	1ast0e	1ast0e	1ast0c
23	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0c
24	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0c
25	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1abr?c

** first chick observed*

Appendix F. Continued

2006 COMU PRODUCTIVITY - PLOT 4 - MAIN BEACH FROM OBSERVATION POINT

nest #	6/17/06	6/19/06	6/21/06	6/23/06	6/25/06	6/27/06	6/29/06	7/1/06	7/3/06	7/5/06
1	2ast0e	1ast0e	2ain?e	1ast0e	1ast0e	0a0e	2ast0e	1astoe	1ast0e	1ast0e
2	1ain?e	1ain?e	1ain?e	1ain?e	2ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e
3	2ain1e	1ain?e	1ain?e	1ain1e	1ain?e	1ain?e	1ain1e	1ain?e	1ain1e	1ain?e
4	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1ain?e	1ain1e	1ain?e
5	1ast0e	2ast0e	1ast0e	1ast0e	1ain?e	1ast1e	1ain1e	1ain?e	1ast?e	1ast?e
6	1ast0e	2ain?e	1ain?e	1ast0e	2ain?e	1ain1e	2ain?e	1ain?e	1ain?e	1ain?e
7	1ast0e	1ast0e	1ain1e	1ain?e	1ain?e	1ain1e	1ain?e	1ain?e	1ain?e	1ain?e
8	2ain?e	1ast0e	1ain?e	1ast0e	1ain?e	1ain1e	1ain?e	2ain?e	1ast?e	0a0e
9	2ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain1e	1ain1e
10	1ain1e	2ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain1e	1ain1e	1ain?e
11	2ain?e	2ain?e	1ain?e	1ain?e	2ain?e	1ain?e	2ain?e	1ain?e	2ain1e	1ain?e
12	2ast0e	1ast0e	1ast0e	1ain?e	2ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e
13	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	0a0e
14	1ast0e	1ast0e	1ain?e	1ast0e	2ain?e	1ain?e	2ain?e	1ain?e	1ain?e	1ast?e
15	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	2ain?e	1ast0e	0a0e	1ast0e	1ain?e
16	1ast0e	0a0e	1ast0e	0a0e	1ast0e	0a0e	0a0e	0a0e	0a0e	0a0e
17	1ast0e	1ast0e	1ain?e	0a0e	1ast0e	0a0e	0a0e	0a0e	1ast0e	1ast0e
18	1ast0e	0aoe	0a0e	1ast0e	0a0e	0a0e	0a0e	1ast0e	1ast0e	1ast0e
19	1ast0e	0a0e	0a0e	1ast0e	0a0e	1ast1e	0a0e	0a0e	0a0e	0a0e
20	2ast0e	0a0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	2ast0e
21	2ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e
22	2ast0e	0a0e	2ast?e	0a0e	1ast0e	0a0e	2ain?e	1ast0e	1ain?e	1ain?e
23	1ast0e	2ain?e	1ain?e	1ast0e	1ast0e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e
24	1ast0e	1ast?e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1astoe	1ast0e
25	1ast0e	1ast0e	1ast?e	1ast0e	1ast?e	0a0e	1astOe	1ast0e	1ast0e	1ain?e
nest #	**7/8/06**	**7/12/06**	**7/15/06**	**7/17/06**	**7/19/06**	**7/21/06**	**7/23/06**	**7/26/06**	**8/1/06**	**8/8/06**
1	0a0e	2ast0e	1ast0e	0a0e	0a0e	1ast0e	1ast0e	0a0e	1ast0c	1ast0c
2	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1ain?e	1ain?e	1abr?c	1abr1c	1abr?c
3	1ain?e	1ain?e	1ain?e	1ain1e	1abr?c	1abr?c	1abr?c	1abr?c	1ain?e	1ast1c
4	1ain?e	1abr?c	1abr?c	1abr?c	1abr?c	1abr?c	1abr?c	***1abr1c**	1ast?e	1ast0c
5	0a0e	1ain?e	1ast0e	1ast?e	1ain?e	1ain?e	1ast0e	1ain?e	1ast2e	1ast0c
6	1ain?e	1ain1e	1ain1e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1abr1c	1abr1c
7	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1ain1e	2ast?c	1ast2c	1abr?c
8	1ast0e	2ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0c	1ast0c
9	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1abr?c	1abr1c	1abr?c
10	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1ain?e	1ain?e	1abr?c	1abr1c	1abr?c
11	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1abr?c	1abr?c
12	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain1e	1ain?e	1abr1c	1abr?c
13	1ast?e	1ain?e	1ast0e	0a0e	0a0e	0a0e	0a0e	1ast0e	1ast0c	1ast0c
14	1ain?e	1ain?e	1ain?e	1ast?e	1ain?e	1ain?e	1ain?e	1ast0e	1ast?c	1abr?c
15	0a0e	0a0e	0a0e	0a0e	0a0e	1ast0e	0a0e	0a0e	1ast0e	1ast0c
16	0a0e	1ast0e	1ast0e	0a0e	0a0e	1ast0e	0a0e	1ast0e	1ast0e	0a0c
17	0a0e	0a0e	0a0e	0a0e	0a0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0c
18	0a0e	0a0e	0a0e	0a0e	1ast0e	0a0e	0a0e	0a0e	0a0c	0a0c
19	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0e	0a0c	1ast0c
20	0a0e	1ast0e	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	1ast0e	1ain?e	1abr?c
21	0a0e	0a0e	0a0e	1ast0e	0a0e	0a0e	0a0e	0a0e	1ast0e	1ast0c
22	1ain?e	1ain1e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ast?e	1ain?e	1ast1c
23	1ain?e	1ain?e	1ain1e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ast?e	1ast1c
24	1ast0e	1ast0e	1ast0e	0a0e	1ast0e	0a0e	0a0e	0a0e	0a0e	1ast0c
25	1ain?e	1ast0e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ain?e	1ast0e	1abr?c

** first chick observed*

Appendix G. Seabird population counts from Observation Point, Round Island 2006.

2006 POPULATION COUNT - PLOT 1- MAIN BEACH FORM OBSERVATION POINT

Date	Count Number	Start Time	Finish Time	Number of BLKI	Number of BLKI Nests	Number of PECO	Number of PECO Nests	Number of COMU	Number of HOPU	Number of TUPU
6/19/2006	1	1239		8	5	0	0	83	1	0
	2			8	5	0	0	81	1	0
6/23/2006	1	1107		18	10	0	0	88	0	0
	2		1111	18	10	0	0	91	0	0
6/26/2006	1	1028		28	15	0	0	101	0	0
	2		1034	28	15	0	0	103	0	0
6/29/2006	1	1228		16	13	0	0	91	0	0
	2		1233	16	14	0	0	100	0	0
7/3/2006	1	1-Sep		25	18	0	0	92	0	0
	2		1348	25	17	0	0	88	0	0
7/5/2006	1	1022		19	13	0	0	102	0	0
	2		1025	19	13	0	0	99	0	0
7/9/2006	1	1541		12	12	0	0	77	0	0
	2		1545	12	12	0	0	75	0	0
7/12/2006	1	1540		4	3	0	0	90	0	0
	2		1544	4	3	0	0	89	0	0
7/15/2006	1	1550		12	8	0	0	104	1	0
	2		1600	12	8	0	0	93	1	0
7/19/2006	1	1400		14	11	0	0	91	0	0
	2		1402	14	11	0	0	92	0	0

2006 POPULATION COUNT - PLOT 2 - MAIN BEACH FROM OBSERVATION POINT

Date	Count Number	Start Time	Finish Time	Number of BLKI	Number of BLKI Nests	Number of PECO	Number of PECO Nests	Number of COMU	Number of HOPU	Number of TUPU
6/19/2006	1	1226		76	42	3	3	201	0	0
	2		1231	69	52	3	3	174	0	0
6/23/2006	1	1022		67	46	4	4	88	0	0
	2		1030	72	48	4	4	91	0	0
6/26/2006	1	1047		104	53	3	3	180	0	0
	2		1102	98	54	3	3	164	0	0
6/29/2006	1	1242		95	51	6	3	164	0	0
	2		1402	92	53	6	3	179	0	0
7/3/2006	1	1309		90	48	5	3	209	0	0
	2		1338	93	52	5	3	205	0	0
7/5/2006	1	1027		103	54	5	3	193	0	0
	2		1053	106	52	5	3	220	0	0
7/9/2006	1	1537		68	46	10	3	179	0	0
	2		1549	68	48	10	3	197	0	0
7/12/2006	1	1546		35	25	6	3	239	0	0
	2		1553	32	25	6	3	271	0	0
7/15/2006	1	1601		47	37	5	2	224	0	0
	2		1608	51	40	5	2	260	0	0
19-Jul	1	1417		50	38	5	2	218	0	0
	2		1428	49	40	5	2	216	0	0

Appendix G. Continued.

2006 POPULATION COUNT - PLOT 4 - MAIN BEACH FROM OBSERVATION POINT

Date	Count Number	Start Time	Finish Time	Number of BLKI	Number of BLKI Nests	Number of PECO	Number of PECO Nests	Number of COMU	Number of HOPU	Number of TUPU
6/19/2006	1	1418		58	48	0	0	539	0	0
	2		?	52	46	0	0	599	0	0
6/23/2006	1	1033		50	37	0	0	495	0	0
	2		1149	45	41	0	0	531	0	0
6/26/2006	1	1148		114	60	0	0	553	0	0
	2		1151	112	67	0	0	600	0	0
6/29/2006	1	1422		67	49	0	0	482	0	0
	2		1444	64	49	0	0	458	0	0
7/3/2006	1	1445		118	58	0	0	517	0	0
	2		1500	116	58	0	0	561	0	0
7/5/2006	1	1114		120	66	3	0	510	0	0
	2		1137	113	66	3	0	536	0	0
7/9/2006	1	1618		90	64	4	0	427	0	0
	2		1646	87	61	4	0	486	0	0
7/12/2006	1	1617		34	23	2	0	519	0	0
	2		1633	37	26	2	0	608	0	0
7/15/2006	1	1630		57	43	1	0	502	0	0
	2		1650	61	48	1	0	515	0	0
7/19/2006	1	1510		53	37	3	0	560	0	0
	2		1527	51	40	3	0	586	0	0

2006 POPULATION COUNT - PLOT 3 - MAIN BEACH FROM OBSERVATION POINT

Date	Count Number	Start Time	Finish Time	Number of BLKI	Number of BLKI Nests	Number of PECO	Number of PECO Nests	Number of COMU	Number of HOPU	Number of TUPU
6/19/2006	1	1315		74	46	8	8	85	0	0
	2			78	50	8	8	74	0	0
6/23/2006	1	1058		70	43	7	7	59	0	0
	2		1105	75	45	7	7	57	0	0
6/26/2006	1	1103		111	43	9	9	72	0	0
	2		1114	112	45	9	9	73	0	0
6/29/2006	1	1236		54	34	8	9	60	0	0
	2		1412	52	36	8	9	60	0	0
7/3/2006	1	1316		104	51	7	9	56	0	0
	2		1332	95	53	7	9	52	0	0
7/5/2006	1	1037		95	47	10	9	69	0	0
	2		1044	90	49	10	9	66	0	0
7/9/2006	1	1549		62	43	11	5	30	0	0
	2		1604	66	44	11	5	34	0	0
7/12/2006	1	1559		32	28	8	5	65	0	0
	2		1605	33	27	8	5	71	0	0
7/15/2006	1	1610		50	37	9	5	51	0	0
	2		1625	53	41	9	5	54	0	0
7/19/2006	1	1403		50	38	14	5	68	0	0
	2		1416	48	38	14	5	61	0	0