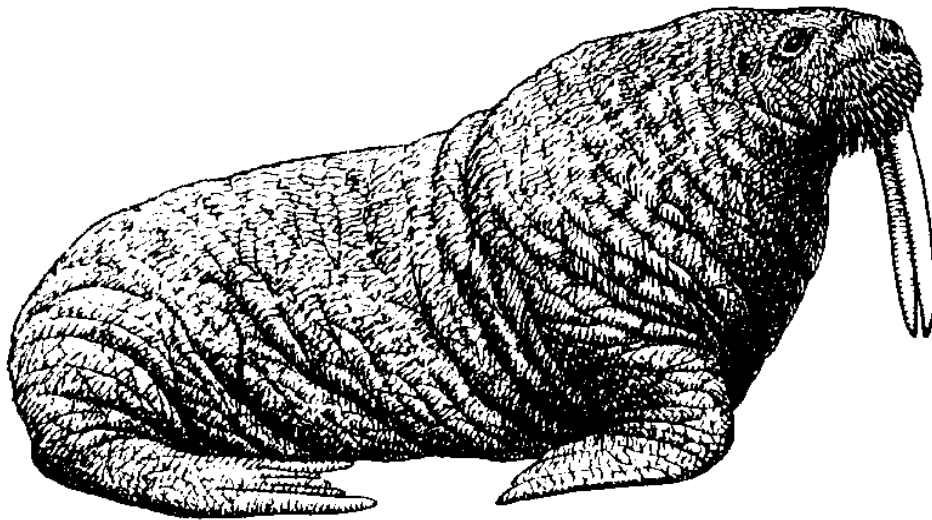


2003 Walrus Harvest Monitor Project Annual Summary



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August 2004

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ABSTRACT

The Walrus Harvest Monitor Project (WHMP) is a cooperative observer based harvest data and sample collection project supported by the U.S. Fish and Wildlife Service, the Eskimo Walrus Commission and Native subsistence hunters. In 2003 the WHMP was conducted in the villages of Diomedes, Gambell, Savoonga, Shishmaref and Wales. The total WHMP reported spring harvest in these five communities was 1,170 walrus. Walrus hunting trip success was 46.5%. The male/female sex ratio adult/subadult walrus harvested favored males at 1.1:1. Tooth samples were donated from 471 walrus and female reproductive tracts from 46 walrus were donated by hunters. A modified WHMP pilot project was conducted in Nome in conjunction with King Island and Nome Eskimo Communities. The total WHMP reported spring harvest in these two communities was 41 walrus.

INTRODUCTION

For thousands of years the Pacific walrus (*Odobenus rosmarus divergens*) has been an important component of the subsistence lifestyle of many Native communities located along the Bering, Chukchi, and Beaufort Sea coasts (Ray 1975; Silook 1976; Slooko-Carius 1979). Today, the walrus remains an essential cultural and subsistence resource for the Alaskan coastal Yupik and Inupiat Natives. Walrus hunting provides these small and remote villages with a primary source of food, raw materials, and revenue from Native handicrafts (Fay 1982).

The Pacific walrus population is shared between the USA and Russia, with both countries participating in a subsistence harvest. The Marine Mammal Protection Act (MMPA) of 1972 set a moratorium on the taking (harassing, hunting, capturing, or killing) of marine mammals in U.S. waters. However, Alaskan Natives were granted an exemption, permitting them to take marine mammals in a non-wasteful manner for subsistence and handicraft purposes. The Native harvest provides an opportunity for the collection of biological information and specimens from the Pacific walrus. Monitoring of the Pacific walrus subsistence harvest and associated biological specimen collection has been conducted by the U.S. Fish and Wildlife Service (Service) since 1980, when management responsibility was transferred from the State of Alaska.

The Service and the Eskimo Walrus Commission (EWC) jointly conduct the Walrus Harvest Monitor Project (WHMP) to assess the structure of the walrus harvest, population dynamics, and life history. The WHMP is a cooperative effort between Native hunters, the EWC, and the Service. In 2003, the EWC funded approximately 95% of the total cost of the WHMP, using MMPA Section 119 Co-Management funds allocated. The Service funded the remainder.

The Service also conducts the MTRP, which is a regulatory program authorized under the Marine Mammal Protection Act and initiated in 1988. The MTRP requires Native

hunters to report the harvest of walrus, sea otter, and polar bears to a Service representative within 30 days of harvest. The program also requires that specified parts (walrus ivory, sea otter and polar bear hides and skulls) be tagged at the time the harvest is reported. The Service employs village residents (taggers) to collect harvest information and tag the specified parts. This statewide program provides the Service with valuable harvest data.

The spring walrus hunt in the Bering Strait region generally occurs from mid-April through June as walrus migrate north to the Chukchi Sea. Hunters are most successful at this time due to large concentrations of migrating walrus, coinciding with favorable weather, ice, and boating conditions. While some walrus hunting occurs during the fall and winter, it is sporadic therefore the bulk of the harvest occurs during the spring.

The WHMP was conducted during the spring of 2003, in six Native Alaskan villages: Little Diomedede (located on Little Diomedede Island hereafter referred to as Diomedede), Gambell (located on St. Lawrence Island), Savoonga, (located on St. Lawrence Island), Shishmaref (located on the Seward Peninsula), and Wales (located on the Seward Peninsula). During 1988 - 2003, approximately 84% of the total reported Alaskan walrus harvest occurred in these villages (Service MTRP, July 2003). A modified WHMP pilot project was started in Nome (located on the Seward Peninsula), working with the King Island and Nome Eskimo Communities (Figure 1) and these data will be reported separately.

The objectives of the WHMP at Diomedede, Gambell, Savoonga, Shishmaref, and Wales are:

- 1) Accurately and completely document the entire walrus harvest during the monitoring season.
- 2) Collect walrus teeth, reproductive tracts, and other biological specimens.

The sampling program provides information on the age/sex composition of

the harvest, animal health and condition, and environmental contaminants.

- 3) Collect harvest information for comparison with the Marking, Tagging, and Reporting Program (MTRP) as a cross check on reporting compliance and to develop a correction factor to account for harvested animals which are not reported through the MTRP.
- 4) Continue to promote a co-management approach toward walrus conservation within the Native hunting community.
- 5) Present walrus conservation and management information at the local level.

The objectives of the modified WHMP pilot project at Nome with both King Island and Nome Eskimo Communities are:

- 1) Determine walrus hunter compliance with the MTRP in Nome and work to increase compliance if necessary.
- 2) Accurately document the age and sex structure of the spring walrus harvest in the Nome area.
- 3) Continue to develop the co-management approach toward walrus conservation and management.
- 4) Provide walrus conservation information and education at the local level.
- 5) Support existing and future sample collection efforts.

The WHMP and MTRP overlap in areas to provide a comparison of walrus harvest estimates and MTRP tagging compliance rates (Burn 1998). This comparison of WHMP and MTRP data allow the service to develop a correction factor to estimate of the number of walrus which are harvested but not reported and tagged through the MTRP. The Service can then use this correction factor to obtain a more accurate state wide harvest estimate. MTRP compliance rates and correction factors are not addressed in this report. For more information on MTRP compliance rates, contact the Marine Mammals Management Office, Anchorage, Ak at (907) 786-3800. For a more detailed explanation

of how the correction factor is calculated see Burn 1998, available upon request from the Marine Mammals Management Office.

METHODS

The following methods were used by the WHMP to collect data during the 2003 spring walrus harvest in the seven monitored communities.

Diomedes, Gambell, Savoonga, Shishmaref, and Wales

Contracts and program administration for the villages of Diomedes, Gambell, Savoonga, and Wales were overseen by the Service. Contracts and program administration for Shishmaref was overseen by the EWC. Technical assistance and training for all villages was provided by the Service.

Table 1 presents the numbers of Service staff and local village residents employed as harvest monitors in each village during the 2003 WHMP.

In early April, Service monitors attended two days of training in Anchorage. Training included information on monitor duties and responsibilities, the Marine Mammal Management (MMM) mission, MMPA, MTRP, walrus management history, walrus life history, WHMP protocols, field report writing, collection and preservation of biological samples, cooperation with Law Enforcement, field safety, cross cultural training, village protocol, safety, and administrative procedures. Training sessions for village monitors were conducted by Service monitors in the five villages with an emphasis on WHMP data and sample collection protocols.

Public meetings were held in each village prior to the spring hunting season to present the WHMP program objectives and to solicit assistance from the hunters. In most instances the Service WHMP coordinator, the EWC Director, a Service Law Enforcement Agent,

the communities EWC representative, and one or more of the village monitors attended each meeting. At these meetings, results from the 2002 WHMP were presented, sampling procedures were explained, support was voiced for the monitoring effort by the EWC and hunter's questions and concerns were addressed. Some hunters were unable to attend these meetings; therefore, boat captains were also visited individually prior to the monitoring period. During these visits the program was explained, cooperation was solicited, and sampling kits were provided.

Walrus sampling kits consisted of three to five sets of temporary pre-numbered tusk labels (left and right), each in a small re-sealable plastic bag, bearing the label number. Two or three of the tusk label bags were affixed to large pre-labeled white fiber (tissue sample) bags. A sample collection instruction sheet was also included. All sampling supplies were contained in a two-gallon re-sealable plastic bag and replenished on an as needed basis. Hunters were asked to put tusk labels on the tusks, place teeth in the re-sealable plastic bags which contained the tusk labels, place tissue samples in the fiber bags, and return the sample bag to the monitors.

If the tusks projected more than 2 inches (5 cm) beyond the gum, a temporary plastic label was affixed to each tusk with a stout rubber band. These temporary plastic labels assigned a tusk identification number to each adult/subadult animal which was used as a sample identification number for all samples collected from that animal. Monitors were instructed to write the kill date on the back of each label as well as the abbreviation "W/C" (with calf) if the animal was a female with a dependent calf and the calf was harvested. This was done to assist the hunters in complying with the 30 day MTRP tagging deadline and to help assure that accurate kill dates and calf harvests are reported through the MTRP.

Hunters were asked to collect the two lower canine teeth which are preferred for age determination. Teeth were cleaned of blood and connective tissue and placed in labeled

manila envelopes. Hunters were also asked to collect female reproductive tracts (i.e. uterus with ovaries attached) for life history analysis. Reproductive tracts were trimmed at the base of the cervix, labeled, sealed in large plastic bags, and frozen. Hunters were also asked to provide tissue samples from any abnormal or unhealthy walrus. These tissues were sub-sampled, labeled, and preserved in 10% buffered formalin for histological study. All biological samples were field-processed and shipped to the MMM office in Anchorage.

Harvest monitors conduct on-site beach interviews with Native boat captains immediately upon their return from walrus hunting. A specific set of questions is asked of each boat captain and biological samples are collected.

The trip information collected by the monitors included the following:

1. Village name
2. Monitors initials
3. Trip identification number
4. Name of boat captain
5. Date and time of departure and return
6. Crew size
7. Boat type (skin, aluminum, or wood)
8. Trip type (walrus or other)
9. Trip comments

A "walrus" hunting trip was defined as a single departure and return during which harvesting walrus was the primary objective. If walrus were harvested opportunistically on a trip where the primary objective was to harvest whales, seals, or birds, these trips, these were recorded as "other" hunting trips.

For each animal retrieved the following information was collected:

1. Species
2. Retrieval code (retrieved, lost, or floater)
3. Sex (male, female, or unknown)
4. Estimated age class (adult, subadult, yearling, calf, or unknown) as determined by tusk morphology criteria selected by the MTRP
5. Female reproductive status (barren, with yearling, with calf, with fetus, or unknown)
6. Substrate (ice, land, or water) on which the animal was harvested
7. Tusk identification number
8. Sample identification number
9. Types of samples donated
10. Animal comments of a biological nature

Interview data and sample information were recorded at the boat landing sites in field notebooks, and then entered into a Paradox database. See Appendix A, for a copy of the data collection sheet.

Prior to the beginning of the monitoring season, the EWC announced a Biological Sample and Participation Incentive Program. Boat Captains were awarded raffle tickets for completing a post trip interview and for each specific tooth sample and reproductive tract contributed. Winning tickets were drawn in each village at the end of the monitoring season and numerous prizes were awarded. The Biological Sample Incentive and Participation Program is solely controlled and funded by the EWC.

King Island and Nome Eskimo Communities

In 2003, the EWC and the Service implemented a modified WHMP pilot project in Nome in cooperation with the King Island and Nome Eskimo communities. The project was administered by the EWC with the Service providing technical support and training.

Objectives for the modified Nome WHMP pilot project:

1. Determine walrus hunter compliance with the MTRP and work to increase compliance if necessary.
2. Accurately document the age and sex structure of the spring walrus harvest in the Nome area.
3. Continue to develop the co-management approach toward walrus conservation and management.
4. Provide walrus conservation information and education at the village level.
5. Support existing and future sample collection efforts.

Numerous meetings were held with hunters and tribal representatives from each community prior to the spring walrus hunt to present the WHMP program and to solicit assistance and cooperation. The Service WHMP Coordinator and the EWC director attended all preseason meetings. Only after support was received from tribal organizations was the modified WHMP implemented.

A member of the King Island community was hired as a monitor prior to the start of the spring hunting season. A training session was held with the monitor, the Service WHMP coordinator and the EWC Director in Late April. WHMP and MTRP data collection protocols and data collection sheets were explained to the monitor and project goals were outlined.

Due to the fact that the Nome Eskimo monitor was already familiar with the WHMP and has been a MTRP tagger for several years, a formal training session was not held. The monitor reviewed the project manual, objectives, goals and data collection sheets and commenced collecting harvest data.

Goals for the modified Nome WHMP pilot project:

- 1) To achieve 100% preseason contact with all walrus hunters in Nome to explain the project and seek support.
- 2) To meet a minimum of 50% of the walrus hunters at the beach for collection of harvest information and completion of MTRP protocols (tusk tagging).
- 3) To make contact with the boat captain within 48 hours of the end of the hunt if they were not met at the beach, for data collection and tusk tagging.

Information collected for each walrus hunting trip included:

- 1) Community the boat Captain is affiliated with
- 2) Monitors name
- 3) Name of boat captain
- 4) Date of hunting trip
- 5) Trip comments

For each walrus retrieved the following information was collected:

- 1) Sex (male, female, or unknown)
- 2) Estimated age class (adult, subadult, calf, or unknown) as determined by tusk morphology criteria selected by the MTRP
- 3) If tusks were MTRP tagged by the WHMP monitor on the beach or not. If tusks were not tagged on the beach, the time and date of a scheduled tagging appointment was recorded.
- 4) Comments

Interview data was recorded on data collection sheets and sent to the EWC at the end of the monitoring season. See Appendix B, for a copy of the data collection sheet.

Prior to the start of the spring hunting season the EWC announced a Participation Incentive Program for the King Island and Nome Eskimo communities. To encourage

participation in the project, boat captains were awarded one raffle ticket for each trip interview they completed. Winning tickets were drawn for each community at the end of the monitoring season and numerous prizes were awarded. The Participation Incentive Program is solely controlled and funded by the EWC.

RESULTS

2003 Spring Hunting Conditions

Summaries of the 2003 spring hunting conditions are available for the villages of Diomedede, Gambell, Savoonga, Shishmaref, and Wales, but not for King Island and Nome Eskimo communities. Detailed accounts of hunting conditions are available from the Marine Mammals Management Office.

Diomedede - Monitoring began on May 1. “The monitored period was plagued by a rapid retreat of the pack ice resulting in rough seas, fog, and poor hunting conditions.” “Hunters commented that the animal movements through the region were about three weeks early”. “Walrus were first reported in the area May 2nd but were inaccessible to hunters due to rubble ice surrounding the island.” “Pack ice to the south of the village broke off May 6th.” “Ice to the north and south of the village broke off May 9th leaving only the ice sheet between the islands until it was washed out on the 13th.” Hunting continued on and off on suitable weather days through June 13. The monitoring project ended on June 18 when Gay Sheffield left the island (Sheffield 2003).

Gambell - The monitoring season began on April 22 when monitors, Calvin Akeya and Brad Benter arrived in Gambell. On April 27 walrus hunting began and continued through June 2 when weather and ice conditions permitted. On June 4, the program was closed down for the season (Benter and Akeya 2003)

Savoonga - The monitoring season began on April 15. Although hunting priorities for mid-April focused on bowhead whales (*Balaena mysticetus*), walrus were taken opportunistically. During this time most hunters resided on the south side of the island at Powoiliak (whaling camp). From April 15 to April 24, heavy pack ice and unfavorable weather prevented hunters from accessing open water near the village. The morning of April 24 revealed a large expanse of open water. Walrus hunting began in earnest and continued through May 31 on days when weather and ice conditions permitted. The program was closed on June 1 due to lack of ice and walrus (Proffitt 2003).

Shishmaref - Monitoring began on May 2. Walrus hunting began on May 6 and continued through June 15 when weather and ice conditions permitted (Sockpick 2003).

Wales - The WHMP was activated on May 8. Walrus hunting began on May 13 and continued through June 22 on days when weather and ice conditions permitted. The WHMP was concluded on June 25 (Snyder and Mazonna 2003).

2003 Spring Harvest Summary

The following is a combined harvest summary of data collected in the five primary villages of Diomede, Gambell, Savoonga, Shishmaref, and Wales. King Island and Nome Eskimo Community data are addressed separately.

Diomede, Gambell, Savoonga, Shishmaref, and Wales Data Combined - Savoonga was the first of the five primary villages to begin walrus hunting on April 22, followed by Gambell on April 27, Shishmaref on May 6, Diomede on May 10, and Wales on May 13 (Figures 2 & 3).

WHMP monitors in the five primary villages recorded a total of 842 hunting trips on 47 days. Of these 842 trips, 790 (93.8%) were recorded as “walrus” hunting trips and 52 (6.2%) were recorded as “other” hunting trips. Of the 790 walrus hunting trips, 369

(46.7%) retrieved one or more walrus (including floaters) (Table 2). One (1.9%) of the other hunting trips opportunistically retrieved one or more walrus (including floaters).

The number of walrus hunting trips varied from one to 63 per day. During the 2003 monitoring season, hunters reported retrieving a total of 1170 walrus. Both St. Lawrence Island villages reported retrieving a total of 1047 walrus (89.5% of the total reported harvest). Savoonga hunters reported retrieving 532 walrus (45.5% of the total reported harvest); while Gambell hunters reported retrieving 515 (44.0% of the total reported harvest). Diomedede hunters reported retrieving 84 walrus (7.2% of the total reported harvest). Shishmaref hunters reported retrieving 37 (3.2% of the total reported harvest) walrus, and Wales hunters reported retrieving two (0.1% of the total reported harvest) during the monitoring period (Table 3) (Benter and Akeya 2003, Sheffield, 2003, Snyder and Mazonna 2003, Sockpick 2003, and Proffitt 2003).

Adult walrus were harvested more frequently than other age classes in the five primary villages. A total of 830 adults (70.9%) were reported as harvested, along with 74 subadults (6.3%), 10 yearlings (0.9%), and 256 calves (21.9%) (Benter and Akeya 2003, Sheffield, 2003, Snyder and Mazonna 2003, Sockpick 2003, and Proffitt 2003).

Harvest monitors in the five primary villages recorded a total of 516 females (44.1%), 558 males (47.7%), and 96 walrus of unknown sex (8.2%) (Table 3) (Benter and Akeya 2003, Sheffield 2003, Snyder and Mazonna 2003, Sockpick 2003, and Proffitt 2003).

A total of 471 tooth samples (51.5%) were collected from the adult/subadult walrus in Diomedede, Gambell, Savoonga, and Shishmaref (Table 4). Hunters in Diomedede, Gambell, and Savoonga also donated a total of 46 reproductive tracts (10.7%) from adult/subadult female walrus. No teeth were collected at Wales, and no female reproductive tracts were collected at Shishmaref (Table 4). Wales's hunters were not asked to collect female

reproductive tracts. (Benter and Akeya 2003, Sheffield, 2003, Snyder and Mazonna 2003, Sockpick 2003, and Proffitt 2003).

A total of 468 seals were reported as harvested during the 2003 WHMP in the five primary villages. Harvested seal species included, bearded (*Erignathus barbatus*) (302), ribbon (*Phoca fasciata*) (36) ringed, (*Phoca hispida*) (32), and spotted (*Phoca largha*) (98) (Benter and Akeya 2003, Sheffield, 2003, Snyder and Mazonna 2003, Sockpick 2003, and Proffitt 2003) (Table 5).

The following are individual 2003 spring harvest summaries for each village.

Diomede - Monitoring took place from May 1 through June 18. The Diomede monitor reported 91 hunting trips on 19 days (Service WHMP 2003, Sheffield 2003). Of these 91 hunting trips, 79 (86.8%) were recorded as “walrus” trips and 12 (13.2%) were recorded as “other” trips. The number of walrus hunting trips per hunting day varied from one to eleven (Service WHMP 2003) (Figure 4). Of the 79 walrus hunting trips, 25 (31.6%) retrieved one or more walrus (including floaters) (Table 2). None of the other hunting trips retrieved walrus (Service WHMP 2003, Sheffield 2003). During the monitoring period, 84 walrus were reported as harvested (Table 3) (Sheffield 2003). The number of walrus reported as harvested per day varied from zero to 17 (Figure 2). The reported harvest consisted of 29 females (34.5%) and 49 males (58.3%), and six animals of unknown sex (7.1%). Seventy three (86.9%) of the harvested walrus were adults, One (1.2%) was a subadult, and 10 (11.9%) were calves (Table 3) (Sheffield 2003).

Hunters donated teeth from 68 (92.1%) non-calf walrus and female reproductive tracts from 11 (45.8%) adult/subadult female walrus (Table 4). Forty four tissue samples were collected for the U.S. Geological Survey, Biological Research Division (USGS-BRD) for a population genetics study. Eight liver samples and five kidney samples were collected

for the Arctic Marine Mammal Tissue Archival Program, and one tongue was collected for trichinosis testing (Sheffield, 2003).

Other marine mammals reported as harvested during the monitoring period included bearded seals (39), ribbon seals (36), ringed seals (22), and spotted seals (29) (Table 5) (Sheffield 2003).

Gambell - Monitoring took place from April 22 through June 3, 2003. During this time, Gambell monitors recorded 396 hunting trips on 23 days. Of these 396 trips, 392 (99.0%) were recorded as “walrus” hunting trips and four (1.0%) were recorded as “other” hunting trips. Of the 392 walrus hunting trips, 161 (41.1%), retrieved one or more walrus (including floaters) (Table 2). None of the other trips retrieved any walrus (including floaters). The number of walrus hunting trips per day varied from one to 38 (Figure 5). During the 2003 harvest monitoring period, 503 walrus were reported as harvested and 12 were reported as being found as floaters for a total of 515 walrus (Table 3). The number of walrus reported as harvested per day varied from zero to 117 (Figure 3). The harvest included 251 (48.7%) females, 244 (47.4%) males, and 20 (3.9%) walrus of unknown sex. Of the 515 harvested walrus, 362 (70.3%) were adults, 14 (2.7%) were subadults, four (0.8%) were yearlings, and 135 (26.2%) were newborn calves (Table 3) (Benter & Akeya 2003).

Hunters donated teeth from 112 (29.5%) non-calf walrus, and female reproductive tracts from 22 (11.3%) adult/subadult female walrus harvested during the monitoring period. In addition, four pathology samples (two bearded seal liver samples and two walrus tumor samples) were donated and sent to the Armed Forces Institute of Pathology. Also collected were 41 genetic samples for the USGS-BRD, 75 tissue samples for the University Of Alaska Frozen Tissue Collection, and five skin and blubber samples for a researcher at the University of Alaska, Anchorage. Seal samples for Gay Sheffield (ADF&G) were also collected. These included spotted seal samples (mandible and

stomach), bearded seal samples (liver, kidney, and stomach) and ringed seal samples (liver, kidney, and stomach) (Benter & Akeya 2003).

Other marine mammals reported as harvested during the monitoring period included bearded seals (172), ringed seals (7), spotted seals (27) (Table 5). Murres (*Uria spp.*), eiders (*Somateria spp.*), and auklets (*Aethia spp.*) were also harvested (Benter & Akeya 2003).

King Island Community - Monitoring took place from the first week of April through the last week of June. King Island hunters reported a total of 11 walrus harvested during the spring hunting season. All walrus reported as harvested were males (100%). Nine (81.8%) of the walrus reported as harvested were adults, the other two (18.2%) were subadults (Table 6) (Pikonganna 2003).

Nome Eskimo Community - All data collection was completed post-season. Twenty four (68.6%) of all Nome Eskimo Community hunters were contacted in connection with the 2003 WHMP. Nineteen of the 24 individuals contacted, reported serving as boat captains during the 2003 hunting season. All boat captains contacted voluntarily participated in the project. Participating boat captains reported a total of 30 walrus harvested during the spring hunting season. These included 16 females (53.4 %), 13 males (43.3%), and one (3.3%) walrus of unknown sex. Of the 30 walrus reported as harvested 17 (56.7%) were adults, 11 (36.7%) were subadults and two (6.7%) were calves (Table 6) (Ahmasuk 2003).

Savoonga - Monitoring took place from April 14 through June 1. During this time, Savoonga monitors reported 296 hunting trips on 23 days. Of these 296 hunting trips, 276 (93.2%) were recorded as “walrus” hunting trips and 20 (6.8%) were recorded as “other” trips. Of the 276 walrus hunting trips, 161 (58.3%) retrieved one or more walrus (including floaters) (Table 2). Only one (5.0%) of the other trips retrieved one or more walrus (including floaters). The number of walrus hunting trips per hunting day varied

from one to 29 (Figure 5). During the 2003 harvest monitoring period, a total of 511 walrus were reported as harvested and 21 were reported as being found as floaters for a total of 532 walrus (Table 3). The number of walrus reported as harvested per day varied from zero to 126 (Figure 3). The harvest included 223 females (41.9%), 240 males (45.1%), and 69 (13.0%) walrus of unknown sex. Three hundred sixty nine (69.4 %) of the harvested walrus were adults, 48 (9.0%) were subadults, five (0.9%) were yearlings, and 110 (20.7%) were newborn calves (Table 3) (Proffitt 2003 and Service WHMP 2003).

Hunters donated teeth from 274 (64.1%) non-calf walrus and reproductive tracts from 13 (6.5%) adult/subadult female walrus during the monitoring period. In addition, five skin and blubber samples for the University of Alaska, Anchorage and five seal samples for Gay Sheffield (ADF&G) were collected (Proffitt 2003).

Other marine mammals reported as harvested during the monitoring period included bearded seals (84), ringed seals (2), and spotted seals (39) (Proffitt 2003) (Table 5).

Shishmaref - Shishmaref monitors recorded a total of 30 hunting trips on 18 days. Of these 30 trips, 29 (96.7%) were recorded as “walrus” hunting trips, and one (3.3%) was recorded as an “other” trip. Of the 29 walrus hunting trips, 21 (72.4%) retrieved one or more walrus (including floaters) (Table 2). None of the other trips retrieved any walrus (including floaters). The number of walrus hunting trips varied from one to four each hunting day (Figure 4). During the 2003 harvest monitoring period in Shishmaref, a total of 28 walrus were reported as harvested and nine were reported as being found as floaters for a total of 37 walrus (Table 3). The number of walrus reported as harvested per day varied from zero to six (Figure 2). The harvest included 12 females (33.3%), 24 males (63.9%), and one walrus of unknown sex (2.7%). Twenty five walrus were adults (64.3%) and 10 were subadults (35.7%). No yearlings or calves were reported (Sockpick 2003).

Hunters donated teeth from 22 non-calf walrus (61.1%) (Table 4) (Sockpick 2003). No female reproductive tracts were donated. No sick animals were reported; therefore no anomalous tissue samples were donated for histological analysis (Sockpick 2003).

Other marine animals reported as harvested during the monitoring period include bearded seals (1) (Sockpick 2003) (Table 5).

Wales - Monitoring took place from May 9 through June 25, 2003. During this time, the Wales monitor reported 29 hunting trips. Of these 29 trips, 14 (48.3%) were recorded as “walrus” hunting trips and 15 (51.7%) were recorded as “other” hunting trips. Of the 14 walrus trips, one (7.1%) retrieved one or more walrus (including floaters) (Table 2). None of the other trips retrieved any walrus (including floaters). The number of walrus hunting trips per hunting day varied from one to five (Figure 4). During the 2003 harvest monitoring period, a total of two walrus were reported as harvested. The number of walrus reported as harvested per day varied from zero to two (Figure 2). The harvest included one female (50.0%) and one male (50.0%). One (50.0%) of the harvested walrus was a yearling and one (50.0%) was a newborn calf (Table 3) (Snyder and Mazonna 2003).

Other marine mammals reported as harvested during the monitoring period included bearded seals (6), ringed seals (1), and spotted seals (3) (Table 5) (Snyder and Mazonna 2003).

DISCUSSION

Conditions

Walrus hunting conditions and opportunities varied considerably among the monitored villages throughout the 2003 spring hunting season. A combination of changing environmental factors greatly influences the number of days walrus can be hunted and

subsequent harvest success. Hunters require access to large leads or open water through shore and pack ice, low to moderate wind conditions permitting safe boating, and ice conditions which are attractive to walrus. When favorable hunting conditions coincide with walrus availability, hunters are generally successful.

During the spring of 2003, environmental conditions favored walrus hunters in Savoonga resulting in a spring harvest exceeding the ten year mean. Gambell's spring harvest was slightly below the ten year mean, while the Diomedes and Wales harvest was well below the ten year mean. The Shishmaref harvest was well below the three year mean (WHMP data collection began in 2000).

Harvest by Community

The 2003 total reported walrus harvest in the five primary villages of Diomedes, Gambell, Savoonga, Shishmaref, and Wales (1,170) was only one animal larger than the 1,169 walrus reported as harvested in 2002 (Figure 6) (Snyder 2002, Benter and Akeya 2003, Proffitt 2003, Sheffield 2003, Snyder and Mazonna 2003, and Sockpick 2003), and slightly less than the three year mean (2000 – 2002) of 1,230 (Shishmaref WHMP data collection began in 2000) (Service WHMP 2003).

The 84 walrus reported as harvested during the 2003 spring walrus harvest at Diomedes, was less than the 2002 reported harvest of 105 (Sheffield 2002, Sheffield 2003). It was also less than the five year mean (1998 - 2002) of 99 and the historical mean (1980 - 2002) WHMP harvest of 382 (Figure 7) (Service WHMP 2003).

The 515 walrus reported as harvested at Gambell during the 2003 spring walrus harvest (Benter and Akeya 2003), was smaller than the 2002 harvest of 631 (Proffitt and Barnum 2002), the five-year mean (1998 – 2002) of 712, and the historical mean WHMP harvest (1980 - 2002) of 720 (Figure 8) (Service WHMP 2003).

The 532 walrus reported as harvested at Savoonga during the 2003 spring walrus harvest was larger than the 2002 harvest of 209 (Figure 8) (Akeya and Snyder 2002 and Proffitt 2003), the five year mean (1998 - 2002) of 437, and the historical mean WHMP harvest (1980 - 2002) of 413 (Figure 8) (Service WHMP 2003).

The 37 walrus reported as harvested during the 2003 spring walrus harvest at Shishmaref, was smaller than the 2002 reported harvest of 190 (Figure 7) (Sockpick 2002, Sockpick 2003). The WHMP is a voluntary program which strives to capture data from all harvested walrus. For various reasons not all Shishmaref boat captains were willing to provide harvest data to the village monitors in 2003. The number of walrus reported as harvested is therefore believed to be underestimated. Although not all boat captains were willing to participate, several individuals who refused to participate in 2002, had a change of heart and decided to volunteer harvest information and donate teeth in 2003. We attribute this increased participation to the EWC sponsored incentive program.

The two walrus reported as harvested at Wales in 2003 was less than the 2002 reported harvest of 34 (Snyder and Mazonna 2002), the five year mean harvest (1998 - 2002) of 25, and the historical mean WHMP harvest (1980 – 2002) of 80 (Service WHMP 2003) (Figure 7).

Although the main objective of the WHMP is to completely document the walrus harvest throughout the entire monitoring season, it is difficult to determine if this has been accomplished or not. If walrus are harvested during boating trips which originate outside the village, or for any reason the monitors are unaware that a boating trip has taken place this segment of the harvest will not be captured unless voluntarily reported by the boat captains.

Hunting Trips

Walrus hunters in Diomedes, Gambell, Savoonga, Shishmaref and Wales reported making 790 walrus hunting trips in 2003 which is 110 more trips than made in 2002, (Snyder 2002, Benter and Akeya 2003, Proffitt 2003, Sheffield 2003, Snyder and Mazonna 2003, and Sockpick 2003) and 231 more than the three year mean (2000 - 2002) of 559 trips per year (Service WHMP 2003). Walrus hunters from these communities reported that they hunted walrus on 44 days which is the same number of walrus hunting days reported in 2002 and comparable to the three year mean (1999 - 2002) (Shishmaref data collection began in 2000) of 41 walrus hunting days per year (Service WHMP 2003).

Sheffield (2003) reported Diomedes hunters making 79 walrus hunting trips which is 26 more than made in 2002, and 33 more than the five year mean (1998 - 2002) of 46 trips per year (Sheffield 2003 and Service WHMP 2003). Sheffield (2003) reported Diomedes hunters hunting walrus on 18 days compared with 12 hunting days reported in 2002, and the five year mean (1998 - 2002) of 12 hunting days per year (Sheffield 2002 and Service WHMP 2003). Although Diomedes hunters made 26 more walrus hunting trips in 2003 than in 2002, and hunted on six additional days, they harvested fewer walrus than in 2002.

Benter and Akeya (2003) reported Gambell hunters making 392 walrus hunting trips, which is 72 more trips than made in 2002, (Proffitt and Barnum 2002) and 92 more than the five year mean (1998 - 2002) of 300 trips per year (Service WHMP 2003). Benter and Akeya (2003) reported Gambell walrus hunters hunting on 23 days compared to the 26 walrus hunting days reported in 2002 (Proffitt and Barnum 2002) and the five year mean (1998 - 2002) of 20 hunting days (Service WHMP 2003). Gambell hunters hunted on fewer days in 2003 than in 2002, and made more hunting trips, but harvested fewer walrus.

Proffitt (2003) reported Savoonga hunters making 276 walrus hunting trips which is 51 more than in 2002, (Akeya and Snyder 2002) and 97 more than the five year mean (1997 - 2001) of 179 trips per year (Service WHMP 2003). Proffitt (2003) reported Savoonga walrus hunters hunting on 21 days, the same number of hunting days as reported in 2002 (Akeya and Snyder 2002) and comparable to the five year mean (1997 - 2001) of 19 (Service WHMP 2003). Savoonga hunters made more hunting trips in 2003 than in 2002 and harvested more walrus.

Sockpick (2003) reported Shishmaref hunters making 29 walrus hunting trips which is 21 less trips than reported in 2002 (Sockpick 2002). Sockpick (2003) reported Shishmaref walrus hunters hunting on 18 days compared to the 17 walrus hunting days reported in 2002 (Sockpick 2001). Shishmaref hunters made fewer hunting trips, hunted on fewer days, and harvested fewer walrus than in 2002.

Snyder and Mazonna (2003) reported Wales hunters making 14 walrus hunting trips which is 18 less than reported in 2002 (Snyder and Mazonna 2002). Snyder and Mazonna (2003) reported Wales walrus hunters hunting on five days compared to the 15 walrus hunting days reported in 2002 (Snyder and Mazonna 2002). Wale's hunters hunted on fewer days, made fewer hunting trips, and harvested fewer than in 2002.

Success Rates

Walrus hunting success varied considerably among the five primary villages of Diomede, Gambell, Savoonga, Shishmaref, and Wales. Trip success rate is defined as the percentage of walrus hunting trips which retrieved one or more walrus (including floaters). In 2003 Diomede, Gambell, and Savoonga had a combined success rate of 46.5% compared to the 2002 trip success rate of 44.8% (Snyder 2002, Benter and Akeya 2003, Sheffield 2003, and Proffitt 2003) (Table 7). Walrus hunters in the monitored villages generally have good success on days when migrating walrus are available due to favorable access, weather, ice and open water conditions. On several hunting days, St.

Lawrence Island walrus hunters were able to make multiple hunting trips during one 24 hour period, as walrus herds were near the villages.

Shishmaref had the highest reported success rate at 72.4% (Sockpick 2003) compared to 64% as reported by Sockpick in 2002. It came to light at the fall Shishmaref hunter meeting, that at least one captain was not clear on the fact that a harvest interview should be completed even if no walrus were retrieved. Apparently some unsuccessful trips were not recorded; therefore the trip success rate may be over estimated.

Savoonga reported the second highest trip success rate at 58.3% (Proffitt 2003) compared to 38.2% as reported by Akeya and Snyder in 2002. The five year mean (1997 - 2001) trip success rate is 57.1% (Service WHMP 2003) (Table 7). It is unclear why Savoonga's 2003 trip success rate was slightly increased over the 2002 rate or why it was considerably higher than Gambell's.

Gambell had the third highest reported success rate at 41.1% (Benter and Akeya 2003) compared to 50.0% as reported by Benter and Akeya in 2002. The five year mean (1998 - 2002) trip success rate is 65.1% (Service WHMP 2003) (Table 7). It is unclear why the 2003 trip success rate for Gambell was considerably lower than for Savoonga with the two villages' only being 36 miles apart.

Diomedes reported a success rate of 31.6% (Sheffield 2003) compared to 41.5% as reported by Sheffield in 2002. The five year mean (1998 - 2002) trip success rate is 48.2% (Service WHMP 2003) (Table 7).

Wales had the lowest reported success rate of 7.1 % (Snyder and Mazonna 2003) as compared to 28.1% reported by Snyder and Mazonna in 2002 (Table 7).

It is interesting to note that while hunting effort in Diomedes, Gambell, and Savoonga increased in 2003, the success rate and harvest decreased for Diomedes and Gambell, but

increased for Savoonga. Possible explanations could in part be due to walrus availability related to ice and weather conditions. Shishmaref hunters attributed the decrease in hunting effort and the harvest in 2003 to poor weather and ice conditions. The decrease in hunting effort, trip success, and the harvest in Wales may have also been caused by poor weather and ice conditions.

Sex Ratio

The combined male/female sex ratio of adult/subadult walrus in Diomede, Gambell, Savoonga, Shishmaref, and Wales harvest favored males at 1.1:1 (1.1 males harvested for every one female). In the years, 1996, 1997, 1999, 2000, 2001, and 2002 the harvest was dominated by females (Service WHMP 2003).

The male/female sex ratio of adult/subadult walrus in the Diomede harvest favored males at 1.7:1 (1.7 males harvested for every one female). In the years, 1995 through 1997, 1999, 2000, and 2002 the harvest was dominated by females (Service WHMP 2003).

The female/male sex ratio of adult/subadult walrus in the Gambell harvest favored females at 1.03:1 (1.03 females harvested for every one male). In the years, 1996 through 2002 Gambell's harvest was also dominated by females (Service WHMP 2003).

The male/female sex ratio of adult/subadult walrus in the Savoonga harvest favored males 1.08:1 (1.08 males harvested for every one female). The 2002 sex ratio also favored males at 4.9:1 (Akeya and Snyder 2002). In previous years, sex ratios have shown considerable variation. Savoonga's harvest in 1996, 1999, 2000, and 2001 favored females (Service WHMP 2003).

The male/female sex ratio of adult/subadult walrus in the Shishmaref harvest favored males at 2:1 (2 males harvested for every one female). The 2002 Sex ratio favored females at 4.1:1. In 2000 and 2001 no females were harvested (Service WHMP 2003).

In 2003 Wales did not harvest any adult or subadult animals. The 2002 sex ratio of harvested adult/subadult walrus was 1:1 (one male harvested for every 1 female).

It is unclear whether the unequal sex ratios and the annual variation in the spring harvest represent hunter selection biases, seasonal sex-linked distribution patterns, unequal sex ratios in the population, or a combination of these factors. It is possible that the composition of the harvest is mostly influenced by the timing of good hunting weather relative to sex-linked segregation and migration of walrus herds. The slow reproductive rate and mating strategy of the pacific walrus, define adult females as the most important cohort in the population. With the overall harvest ratio favoring females for six out of the last seven years, the Service has been encouraging hunters to limit their harvest of females.

Sample Donation Rates

The combined 2003 tooth sample donation rate of 52.1% for Diomedede, Gambell, Savoonga, and Shishmaref reflects an increase of 4.0% over 2002 (Snyder 2002, Benter and Akeya 2003, Proffitt 2003, Sheffield 2003, Snyder and Mazonna 2003, and Sockpick 2003).

The 2003 Diomedede, tooth sample donation rate of 91.9% (Sheffield 2003) reflects an increase of 16.9% over 2002 (Sheffield 2002), and an increase of 11.1% over the five year mean (1998 – 2002) (Service WHMP 2003).

The 2003 Gambell tooth sample donation rate of 29.2% (Benter and Akeya 2003) reflects a decrease of 12.0% over 2002 (Proffitt and Barnum) and a decrease of 5.3% from the five year mean (1998 - 2002) (Service WHMP 2003).

The 2003 Savoonga tooth sample donation rate of 64.0% (Proffitt 2003) reflects a decrease of 5.5% from 2002 (Akeya and Snyder 2002) but an increase of 2.7% over the five year mean (1998 - 2002) (Service WHMP 2003).

The Shishmaref 2003 tooth sample donation rate of 59.5% (Sockpick 2003) reflects an increase of 39.4% over 2002 (Sockpick 2002). Two thousand and two was the first year of tooth sample collection in Shishmaref.

The combined 2003 female reproductive tract sample donation rate of 10.7% for Diomedes, Gambell, and Savoonga reflects a decrease of 14.7% over 2002 and a decrease of 18.2% over the five year mean (1998 – 2002) (Snyder 2002, Benter and Akeya 2003, Proffitt 2003, Service 2003, Sheffield 2003, Snyder and Mazonna 2003, and Sockpick 2003,).

The 2003 Diomedes, female reproductive tract sample donation rate of 45.8% (Sheffield 2003) reflects a decrease of 8.3% from 2002 (Sheffield 2002), and a decrease of 15.9% from the five year mean (1998 – 2002) (Service WHMP 2003).

The 2003 Gambell, female reproductive tract sample donation rate of 11.3% (Benter and Akeya 2003) reflects a decrease from 14.1% from 2002, and a decrease of 10.0% from the five year mean (1998 - 2002) (Barnum & Proffitt 2002 and Service WHMP 2003).

The 2003 Savoonga, female reproductive tract sample donation rate of 6.5% (Proffitt 2003) reflects a decrease of 23.1% from 2002 (Akeya and Snyder 2002), and a decrease of 10.2% from the five year mean (1998 - 2002) (Service WHMP 2003).

Female reproductive tract collection was initiated in Shishmaref in 2003, however no samples were donated. Although color photographs of reproductive tracts were distributed to boat captains, some hunters may have been unclear of exactly what was

being asked for. Due to the harvest in Wales consisting of one yearling and one calf, no biological samples were donated.

It is difficult to determine why tooth sample donation rates vary so much from year to year and village to village. It is possible that changes in WHMP personnel may affect donation rates. It has also been suggested that increases in sample donation rates could be attributed to the EWC sponsored sample incentive program.

It is also difficult to determine why female reproductive tract sample donation rates dropped in all villages in 2003 while tooth sample donation rates increased in Diomedea and Shishmaref. Several monitors have reported that some hunters do not like to collect reproductive tracts, as they take time to retrieve, are too large and heavy and take up too much space and weight in the boat. Some hunters have stated they are often too tired, cold, or wet to collect biological samples. A few hunters have stated that they will not donate samples until they are individually compensated for their time and effort.

The WHMP was just recently reintroduced to the Communities of King Island and Nome Eskimo after a hiatus of eighteen years. Vince Pikonganna was chosen to lead the King Island Community project and did an excellent job. Due to a prior commitment with the King Island dance group, Vince was absent from Nome for a one week period which coincided with all the known King Island walrus hunting trips launched from the Nome area. As an alternate monitor was not found, no King Island boats which launched from the Nome area were met at the beach. Upon Vince's return to Nome, each King Island boat captain was contacted, harvest data was collected and several tusks were MTRP tagged. Vince spent some time at Cape Woolley at the tail end of the season while numerous hunters were there. Due to unfavorable weather and rough seas, no walrus were reported as harvested from Cape Woolley. Vince reported full cooperation from all King Island boat captains and hunters.

The WHMP expansion project for Nome Eskimo Community got off to a rocky start but finished with pleasing results. There was some difficulty in finding a monitor and unfortunately no one was hired until after the hunting season had ended. Austin Ahmausk did a great job of pulling things together. He completed a post season harvest data survey, and reported excellent cooperation from boat captains and hunters. All Nome Eskimo harvest data was collected after the hunting season had ended.

Although the project goal of meeting boats at the beach from a minimum of 50% of the walrus hunts for each community was not achieved, we consider the Nome WHMP pilot project to be a success due to the high degree of cooperation received from boat captains and hunters

King Island and Nome Eskimo Community hunters reported a poor walrus hunting season due to sea ice retreating at a fast pace and seas being too rough for boating activities. We do not have any recent WHMP harvest data from either Community to compare with this first year.

The WHMP provides essential information in helping to define the status of the walrus population. The 1998 Service Stock Assessment for Pacific walrus highlighted the need for harvest monitoring projects to be continued or expanded to accurately assess the impact of subsistence hunting on the population (Service 1998).

The need for harvest monitoring programs such as the WHMP was recognized and addressed in detail at a recent joint U.S./Russia walrus harvest monitoring workshop (Garlich-Miller and Pungowiyi 1999). In May of 1999, the first Russian harvest monitor training session took place in Gambell. Russian harvest monitor coordinators from the Chukotka and Provideniya districts were trained in WHMP protocols. Following the training, Russian harvest monitor coordinators returned and began training village monitors to collect this information in six Native villages. In the spring of 2000, 2001, 2002 and 2003, the Service and the EWC met again with Russian harvest monitor

coordinators to exchange data, discuss past programs and expand the cooperative program into two additional Russian villages. Now, 11 villages, (approximately 90% of the Russian walrus harvest) are monitored by this program. As Pacific walrus are a shared resource with Russia, we believe developing and maintaining programs which necessitate joint resource management are essential and should be continued. The importance of the relationships and exchange of information between Alaskan and Russian Native people and biologists cannot be overstated. It is through these dialogues that understanding and communications are improved, trust is increased, and co-management activities are expanded. For a detailed account of the Chukotka Walrus Harvest Monitor Project see Walrus Harvest Monitoring in Chukotka 2003, available upon request from the Marine Mammals Management Office.

ACKNOWLEDGMENTS

We sincerely appreciate the Native walrus hunters of Diomede, Gambell, King Island Community, Nome Eskimo Community, Savoonga, Shishmaref, and Wales for providing voluntary harvest information and biological samples. The Marine Mammals Management office would like to thank all harvest monitors: Gay Sheffield (ADF&G) (Diomede), Calvin Akeya, Shena Angi, Crystal Apangalook, Brad Benter (USFWS), Naomi Booshu, Casey Iyakitan, Dana James, Charla Koozaata, Stephanie Ohktokiyuk, Yvonne Slwooko, and James Walunga, (Gambell), Vince Pikonganna (King Island Community), Austin Ahamusk (Nome Eskimo Community), Mary-Jane Iworrikan, Irving Kava, Jefford Kingeekuk, Harold Kiyuklook, Martha Kiyuklook, Sherry Kulowiyi, Edward Noongwook, Sherry Nowpakahok, Freida Okoomealingok, Dominick Pelowook, Rex Pungowiyi, Melody Rookok, and Garred Smith, (Savoonga), Alice Schultze, Davis Sockpick, and Thomas Sockpick (Shishmaref), and Metrona Mazonna (Wales) who participated daily and played such a prominent role in the success of the WHMP. We thank Vera Matcalf (EWC Director), and all EWC Board Members for their cooperative and financial support of the WHMP. We thank the village corporations, IRA's, Native

stores, and individuals that provided the necessary services, assistance, and support to the monitors and the WHMP. We also appreciate MMM supervisor Rosa Meehan, Walrus Project Leader, Wells Stephensen, and expediter, Dean Cramer who provided direction, support, supplies and information from the MMM office in Anchorage. We also thank Ellen Baier, Doug Burn, and Joel Garlich-Miller of the Marine Mammals Management office and all others who provided assistance.

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Table 1. Number of Service and village monitors stationed in each village for the 2003 WHMP

Village	Service Monitors	Village Monitors	Total
Diomedede	1	0	1
Gambell	1	10	11
King Island Community	0	1	1
Nome Eskimo Community	0	1	1
Savoonga	1	13	14
Shishmaref	0	3	3
Wales	0	1	1
All Villages	3	29	32

Table 2. Summary of walrus hunting trip success¹ during the 2003 Walrus Harvest Monitor Project².

Village	Total Walrus Trips	Number of walrus retrieved per trip (n)																Success (%) ¹
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15 or more	
		Number of walrus trips that retrieved (n) number of walrus (including floaters)																
Diomedede	79	54	6	3	7	4	2	1	0	0	1	1	0	0	0	0	0	31.6%
Gambell	392	231	52	41	16	13	13	6	8	1	4	4	1	1	0	0	1	41.1%
Savoonga	276	115	48	36	13	18	13	16	8	4	2	2	0	0	1	0	0	58.3%
Shishmaref	29	8	11	6	2	2	0	0	0	0	0	0	0	0	0	0	0	72.4%
Wales	14	13	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	7.1%
All Villages	790	421	117	87	38	37	28	23	16	5	7	7	1	1	1	0	1	46.7%

¹ Success is defined as the percentage of walrus hunting trips during which one or more walrus were retrieved (including floaters).

²King Island & Nome Eskimo Communities not included due to the method in which data was collected

Table 3 Summary of age class and sex of walrus reported as harvested during the 2003 Walrus Harvest Monitor Project.

Village	Age Class	Female	Male	Unknown	Total
Diomedede	Adult	24	43	6	73
	Subadult	0	1	0	1
	Yearling	0	0	0	0
	Calf	5	5	0	10
	Subtotal	29	49	6	84
Gambell	Adult	189	173	0	362
	Subadult	6	8	0	14
	Yearling	1	1	2	4
	Calf	55	62	18	135
	Subtotal	251	244	20	515
Savoonga	Adult	182	187	0	369
	Subadult	18	28	2	48
	Yearling	2	3	0	5
	Calf	21	22	67	110
	Subtotal	223	240	69	532
Shishmaref	Adult	9	16	1	26
	Subadult	3	8	0	11
	Yearling	0	0	0	0
	Calf	0	0	0	0
	Subtotal	12	24	1	37
Wales	Adult	0	0	0	0
	Subadult	0	0	0	0
	Yearling	0	1	0	1
	Calf	1	0	0	1
	Subtotal	1	1	0	2
All Villages	Adult	404	419	7	830
	Subadult	27	45	2	74
	Yearling	3	5	2	10
	Calf	82	89	85	256
Total		516	558	96	1170

Table 4. Summary of walrus tooth and female reproductive tract samples donated during the 2003 Walrus Harvest Monitor Project¹.

Village	Non-calf walrus	Tooth samples	Percent of teeth collected (%)	Adult & subadult female walrus	Female reproductive tracts	Percent of female reproductive tracts collected (%)
Diomede	74	68	91.9%	24	11	45.8%
Gambell	380	111	29.2%	195	22	11.3%
Savoonga	422	270	64.0%	200	13	6.5%
Shishmaref	37	22	59.5%	12	0	0.0%
Wales	1	0	0.0%	0	0	0.0%
All villages	914	471	51.5%	431	46	10.7%

¹ Biological samples were not collected from King Island and Nome Eskimo community hunters

Table 5. Summary of seal species reported as harvested during the 2003 Walrus Harvest Monitor Project¹.

Village	Bearded seal	Ribbon seal	Ringed Seal	Spotted Seal
Diomedede	39	36	22	29
Gambell	172	0	7	27
Savoonga	84	0	2	39
Shishmaref	1	0	0	0
Wales	6	0	1	3
All villages	302	36	32	98

¹ Seal harvest data was not collected for King Island and Nome Eskimo communities.

Table 6. Summary of age class and sex of walrus reported as harvested during the 2003 Walrus Harvest Monitor Project for the two Nome hunting communities.

Village	Age Class	Female	Male	Unknown	Total
King Island	Adult	0	9	0	9
	Subadult	0	2	0	2
	Yearling	0	0	0	0
	Calf	0	0	0	0
	Subtotal	0	11	0	11
Nome Eskimo	Adult	10	7	0	17
	Subadult	5	6	0	11
	Yearling	0	0	0	0
	Calf	1	0	1	2
	Subtotal	16	13	1	30
	Total	16	24	1	41

Table 7. Summary of walrus hunting trip success from the Walrus Harvest Monitor Project for Diomedede, Gambell, and Savoonga from 1998 - 2003.

Village	1998	1999	2000	2001	2002	Five Year Average (1998 - 2002)	2003
% Success¹							
Diomedede	63.9%	45.5%	53.6%	35.7%	41.5%	48.0%	31.6%
Gambell	60.6%	81.6%	78.5%	54.7%	50.0%	65.1%	41.1%
Savoonga	51.2%	62.5%	64.0%	69.7%	38.2%	57.1%	58.3%
All Three Villages	59.9%	71.7%	64.6%	56.2%	44.8%	59.4%	46.5%

¹ Success is defined as the percentage of walrus hunting trips during which one or more walrus were retrieved (including floaters). King Island and Nome Eskimo Communities not included due to the method in which data was collected



Figure 1. Location of Alaskan Walrus Harvest Monitor project villages in 2004

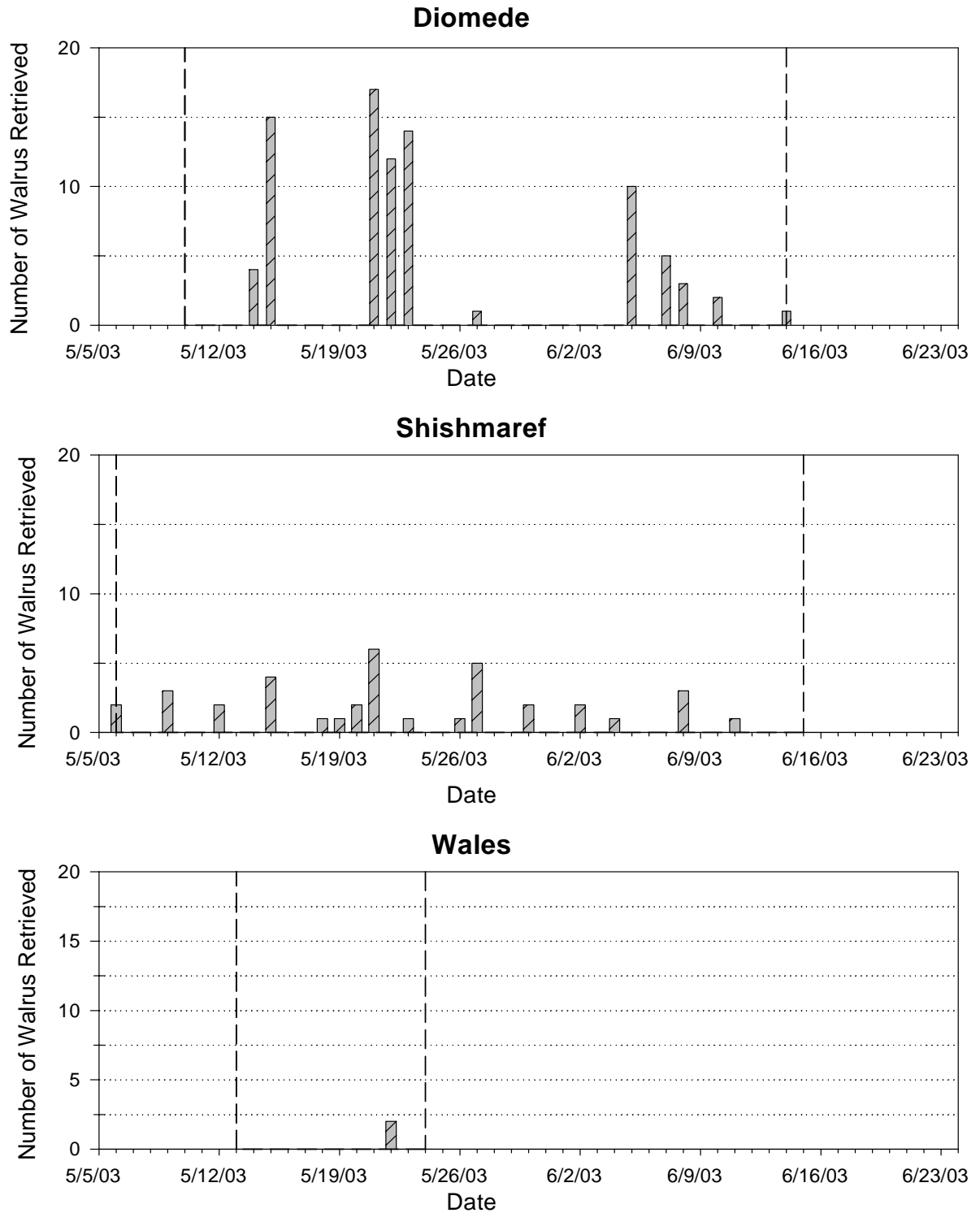


Figure 2. Number of walrus harvested by date during the course of the 2003 Walrus Harvest Monitor Project in the villages of Diomede, Shishmaref, and Wales. Vertical dashed lines represent the start and end of walrus hunting effort in each village.

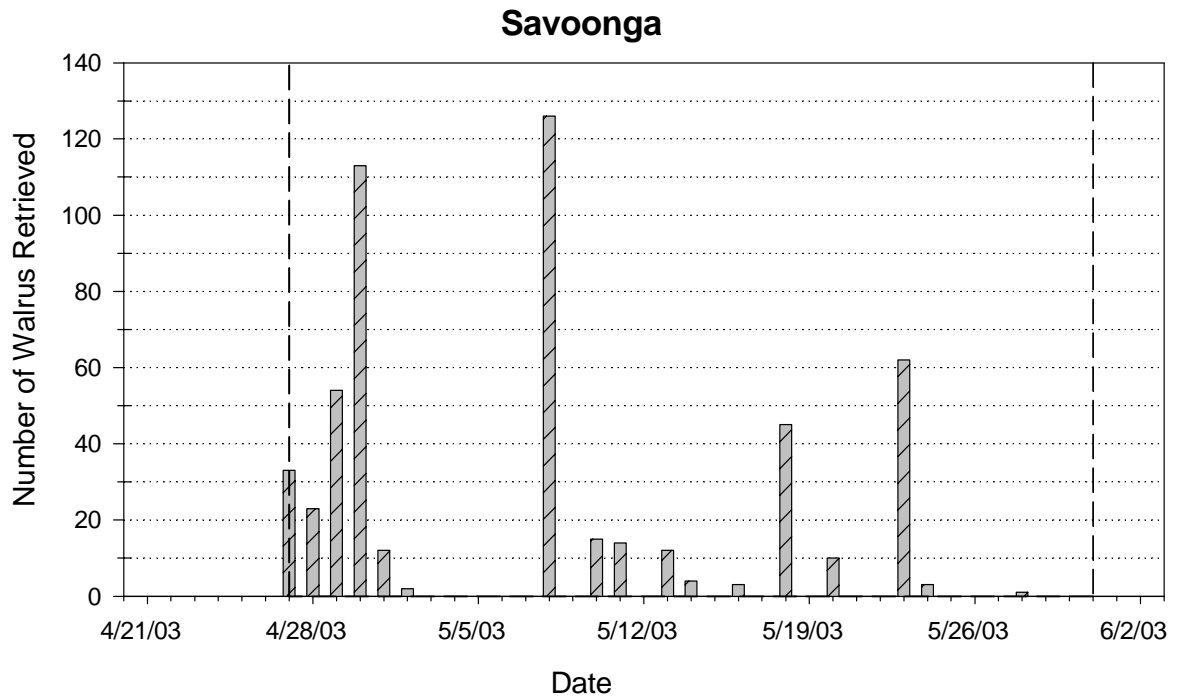
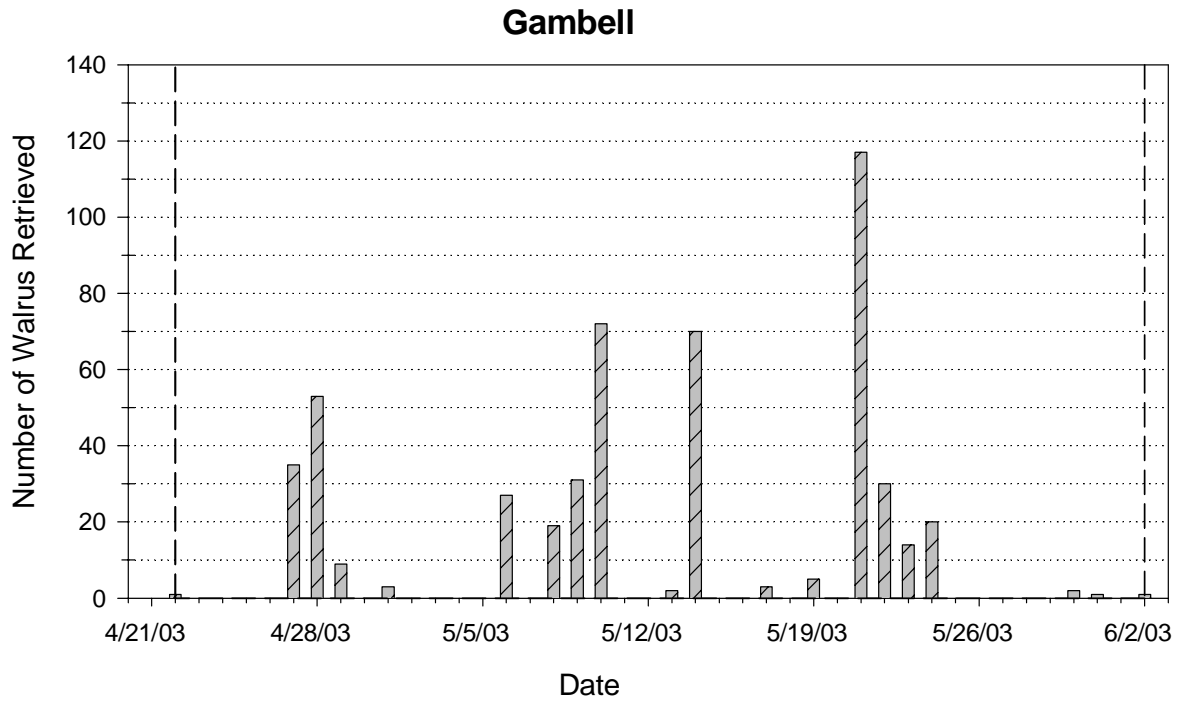


Figure 3. Number of walrus harvested by date during the course of the 2003 Walrus Harvest Monitor Project in the villages of Gambell, Savoonga. Vertical dashed lines represent the start and end of walrus hunting effort in each village.

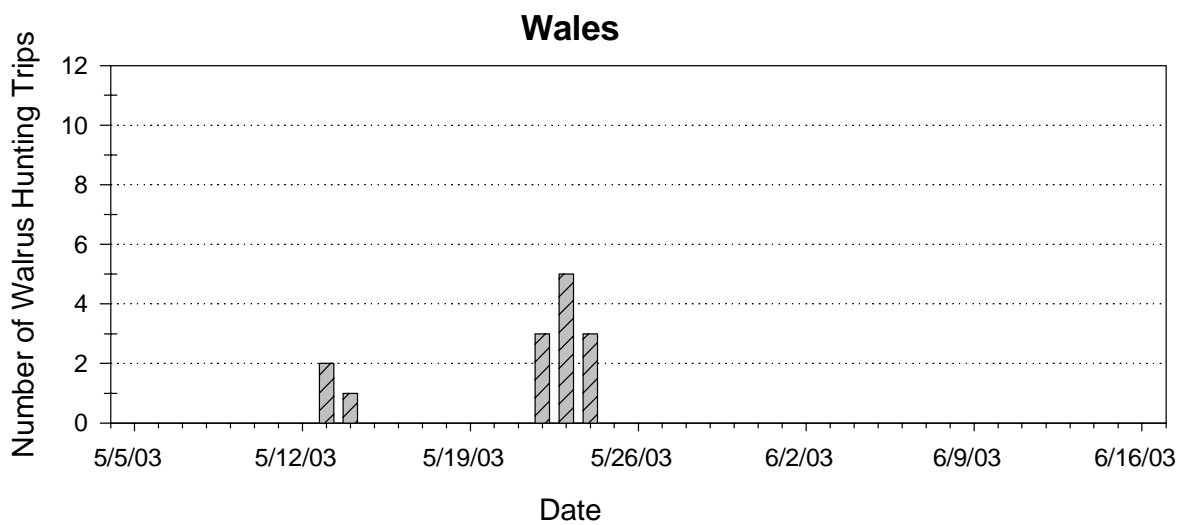
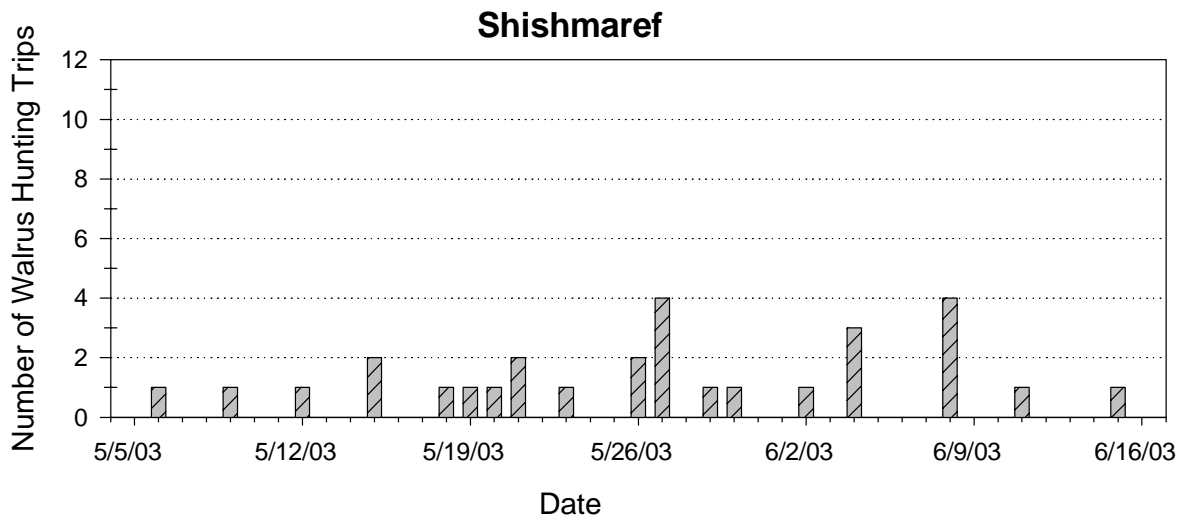
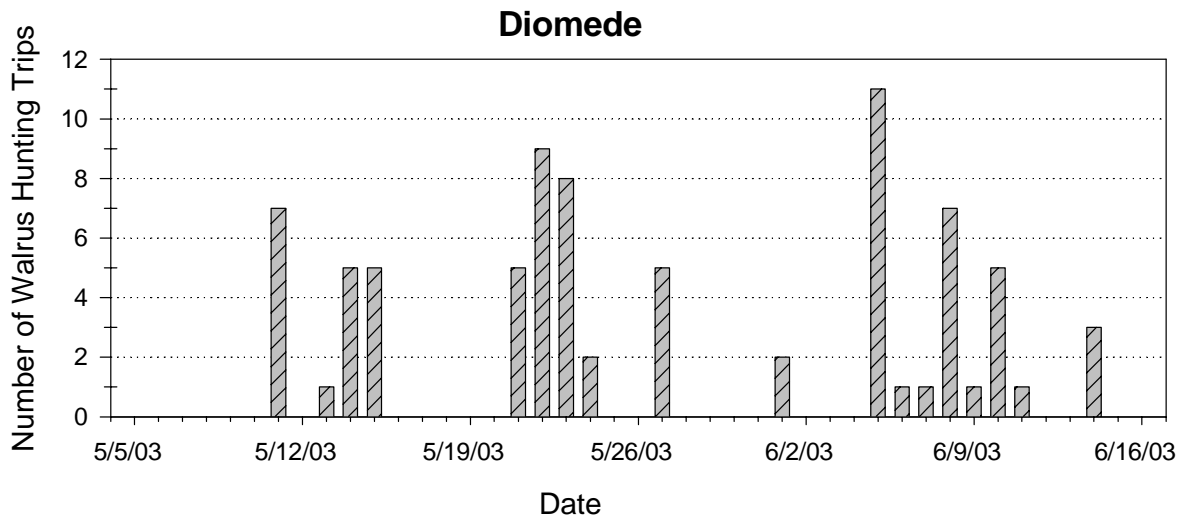


Figure 4. Number of walrus hunting trips by date during the course of the 2003 Walrus Harvest Monitor project in the Villages of Diomede, Shishmaref, & Wales.

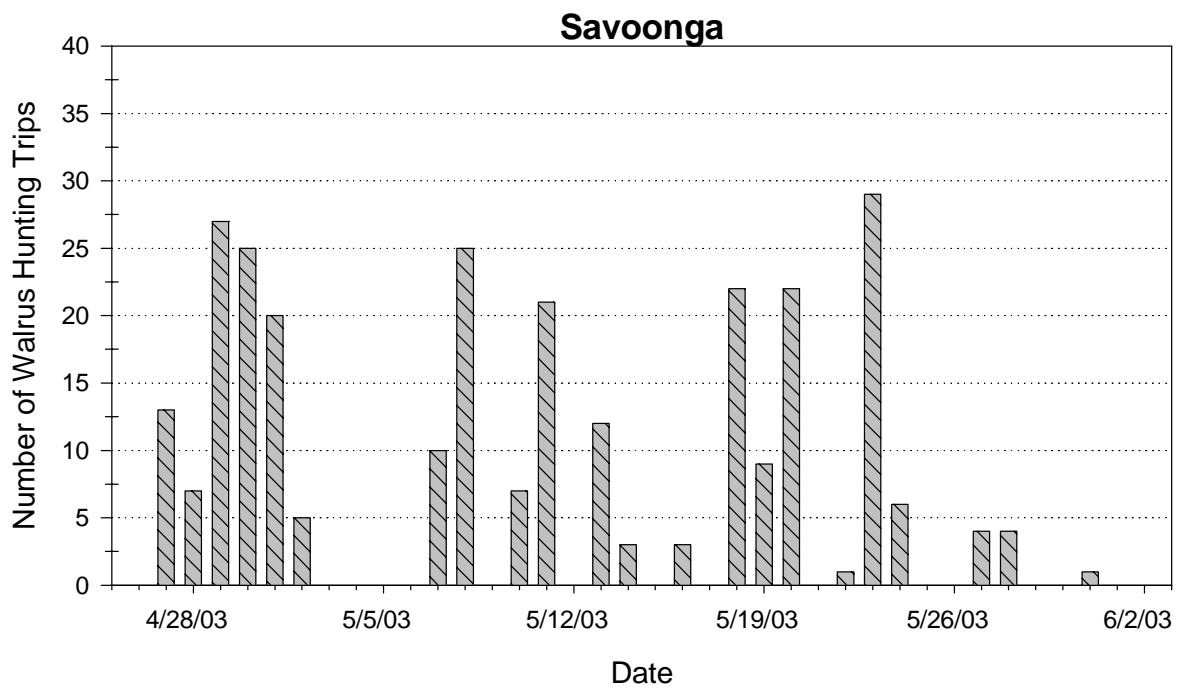
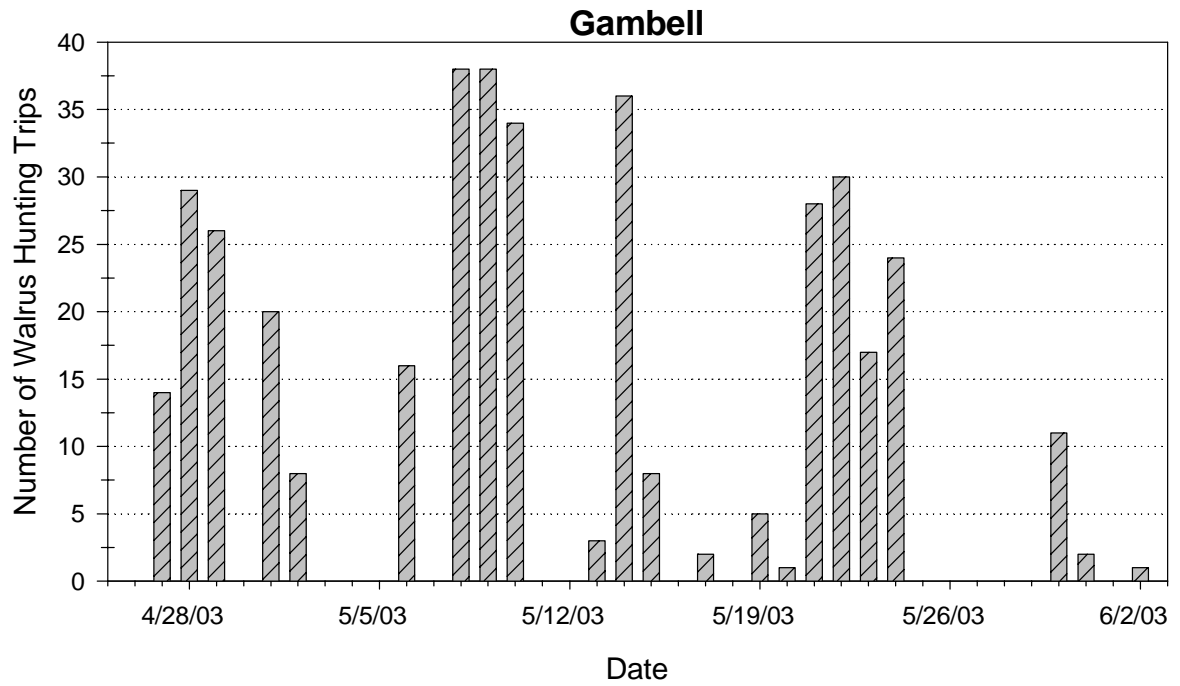


Figure 5. Number of walrus hunting trips by date during the course of the 2003 Walrus Harvest Monitor Project in the villages of Gambell & Savoonga.

All Villages

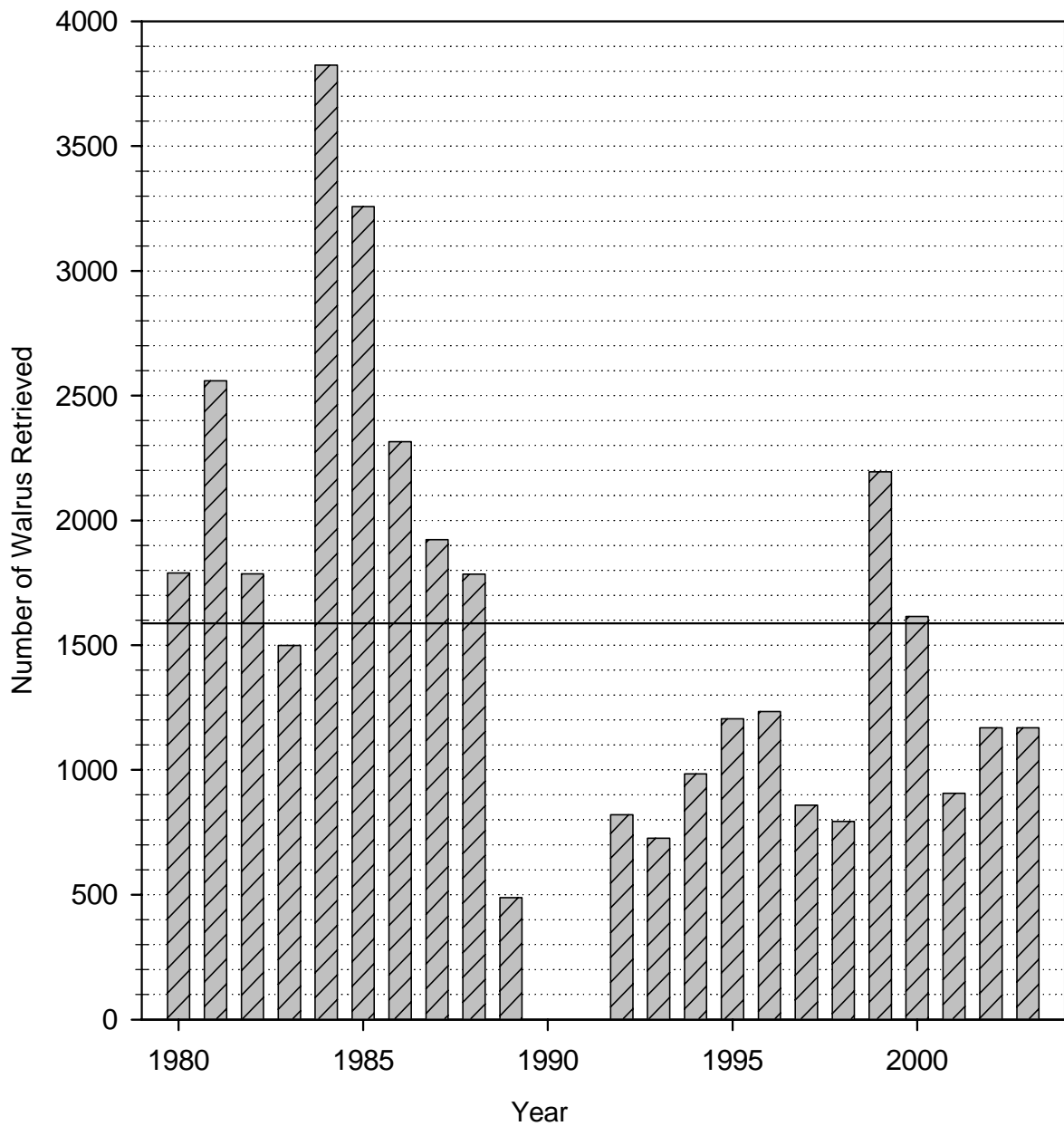


Figure 6. Total numbers of walrus harvested during the annual Spring harvest in Diomedede, Gambell, Savoonga, Shishmaref, and Wales Alaska from 1980 - 2003. Data were not collected in 1990 and 1991. Shishmaref data is only included in years 2000 and later. Solid horizontal line represents mean annual harvest.

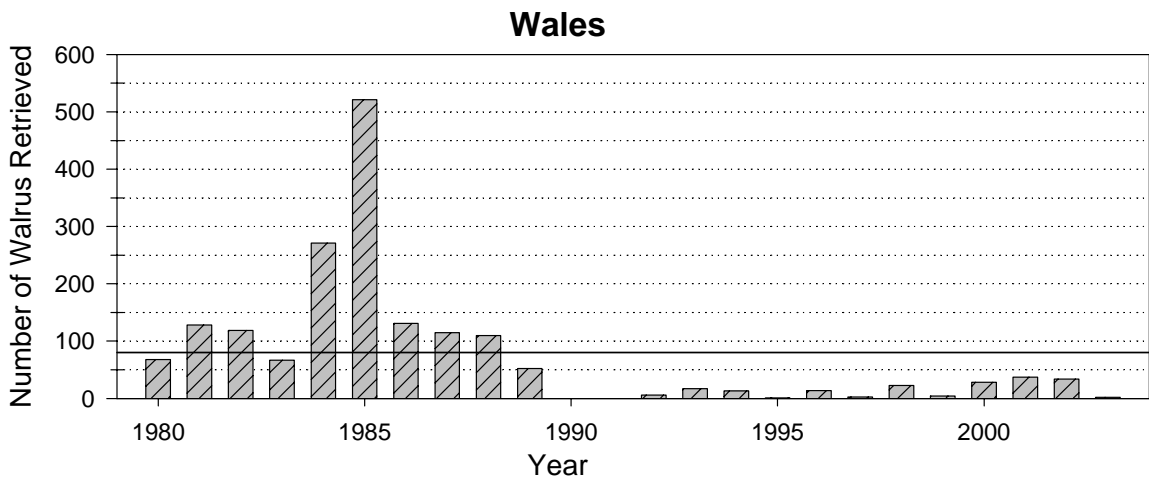
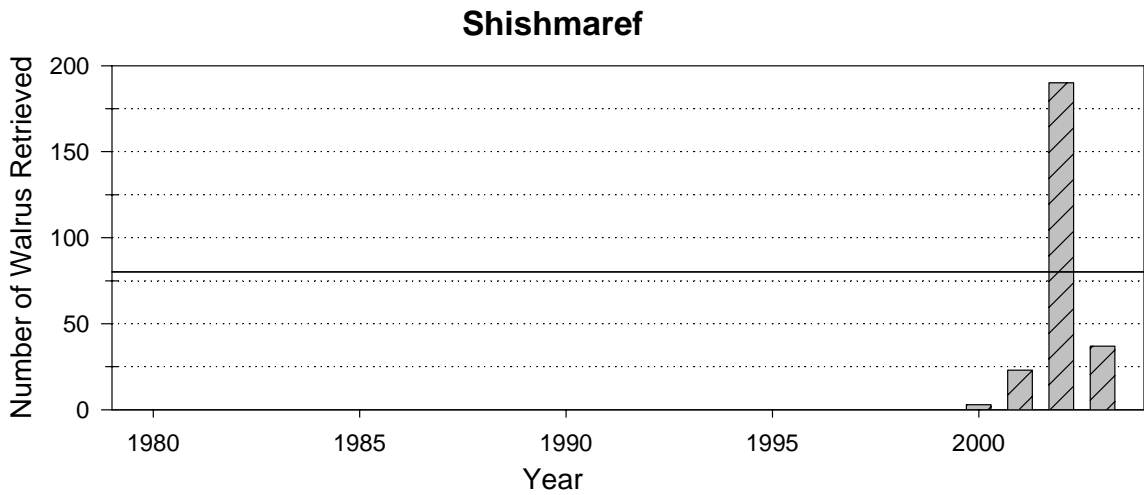
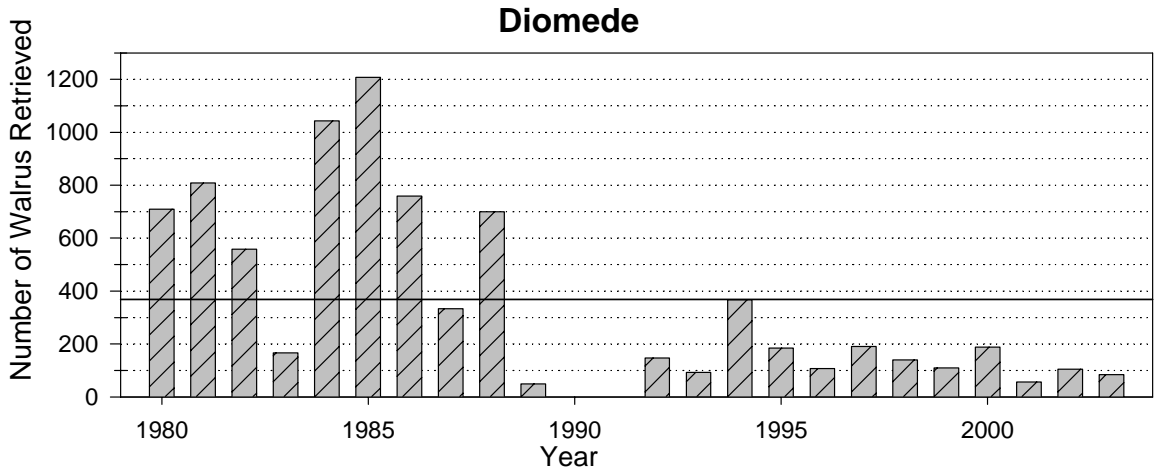


Figure 7. Total numbers of walrus harvested during the annual Spring harvest in Diomede, Shishmaref, and Wales, Alaska from 1980 - 2003. Data were not collected in any village in 1990 and 1991. Data collection did not begin in Shishmaref until 2000. Solid horizontal line represents mean annual harvest.

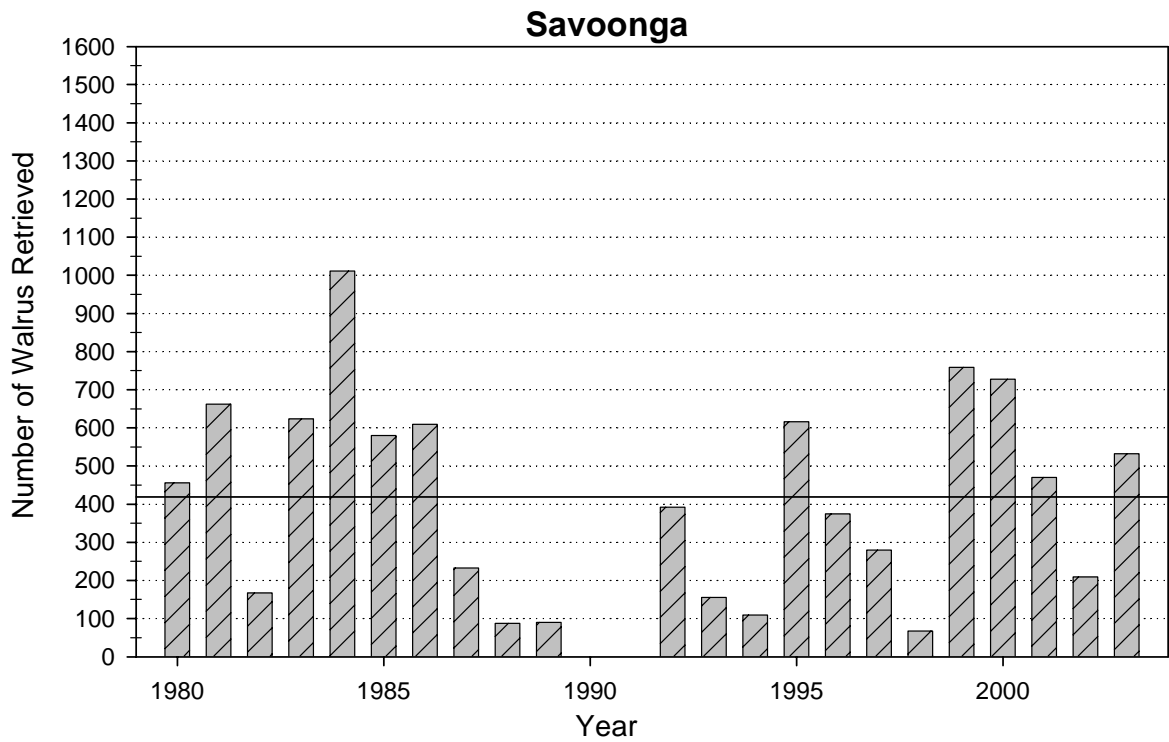
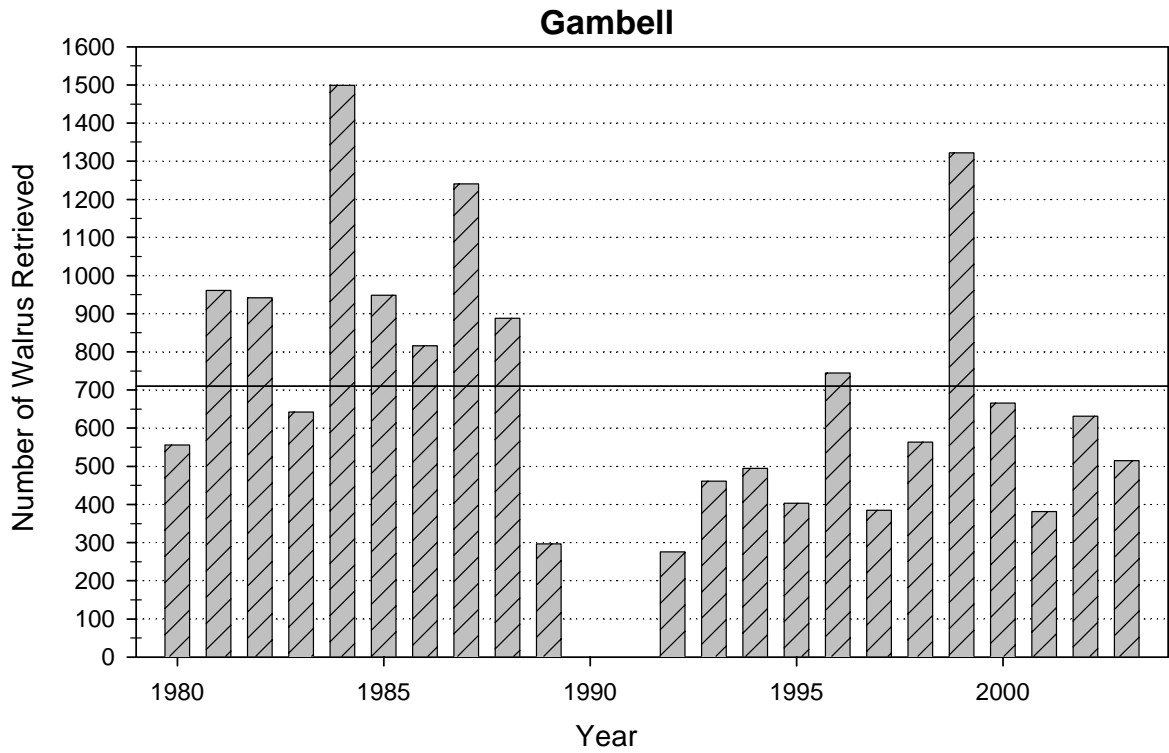


Figure 8. Total number of walrus harvested during the annual Spring walrus harvest in Gambell and Savoonga, Alaska from 1980 to 2003. Data were not collected in 1990 and 1991. Solid horizontal line represents mean annual harvest.

Appendix A

Trip Information:

Village:	Collectors:	Trip ID:
Captain:		Crew size:
Date Leave:	Time Leave:	Boat type:
Date Return:	Time Return:	Trip Type: W O
Comments:		

Animal Information:

Rec #	Species	R	Sex	Age	Fstat	Subs	N	Tusk ID#	Sample ID#	T	R	L	K
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

Animal Comments:

Additional Samples: For UAF Frozen Tissue Collection Use Only

Rec #	Additional Samples Collected	Bar code/ Sample #

Appendix B Nome Walrus Harvest Monitor Project Data Sheet

Collector's Name:	Date:
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Captains Name:	Trip ID:	Boat Met at Beach? Y N
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Males	Male Adults	Male Sub-adults	Male Calves	Male Unknown Age Class
Number of Walrus Harvested:				
Number of Walrus MTRP Tagged:				

Females	Female Adults	Female Sub-adults	Female Calves	Female Unknown Age Class
Number of Walrus Harvested:				
Number of Walrus MTRP Tagged:				

:

Unknown Sex	Unknown Sex Adults	Unknown Sex Sub-adults	Unknown Sex Calves	Unknown Sex & Age Class
Number of Walrus Harvested:				
Number of Walrus MTRP Tagged:				

Tagging Appointment Made?: Y N	Date/Time:
Location	

Comments: