

The Subsistence Harvest of Subadult Northern Fur Seals on St. Paul Island, Alaska in 2015

November 2015

by

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This document should be cited as follows:

Lestenkof, P.M., P.I. Melovidov, and A.P. Lestenkof. 2015. The subsistence harvest of subadult northern fur seals on St. Paul Island, Alaska in 2015. Aleut Community of St. Paul Island, Tribal Government, Ecosystem Conservation Office. St. Paul Island, Pribilof Islands, Alaska.

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INTRODUCTION

The subsistence harvest of northern fur seals on the Pribilof Islands (St. Paul and St. George), Alaska is ruled by regulations (50 CFR 216.71-.74) established under the Fur Seal Act (FSA) and Marine Mammal Protection Act (MMPA). The regulations impose a number of restrictions on the harvest of fur seals and were developed to transition from a commercial harvest to a subsistence harvest. On St. Paul Island the subsistence harvest for fur seal meat began in 1985 when the commercial harvest for seal pelts ceased (50 FR 27914, July 8, 1985). Regulations allow subadult male fur seals (2-4 years old) to be taken for food during the subsistence harvest season, 23 June to 08 August. The harvest has occurred annually since 1985 and fur seal meat continues to be an important traditional food for Unangan (Aleuts) of St. Paul Island.

Regulations governing the subsistence taking of northern fur seals on the Pribilof Islands under the FSA limit Unangan customary practices of hunting fur seals and access to traditional foods. These limitations directly impact the health of our families and community. Unangan have traditionally and historically engaged in subsistence hunting in the spring and fall for fur seal, and subsistence hunting of laaqudaḡ (fur seal pups) in the fall. Hunting of juvenile male fur seals and laaqudaḡ have been historically allowed by the National Marine Fisheries Service (NMFS), even though it is inconsistent with 50 CFR 216.71-.74. In 2007 the Aleut Community of St. Paul Island Tribal Government petitioned NMFS to begin the process immediately for changing 50 CFR 216.71-.74 to allow for the legal take of historically allowed fur seal harvest/ hunts, the flexibility to adapt to the subsistence needs of the members of the Aleut Community of St. Paul Island, and full implementation of co-management of the subsistence takes of all northern fur seals on St. Paul Island.

To safeguard the existence of the northern fur seal, the Aleut Community of St. Paul Island (a federally recognized tribe) and NMFS entered into a co-management agreement in June 2000, and have since been working together to establish a process of shared local responsibilities regarding the management and research of fur seals. Since 2001 the Aleut Community of St. Paul Island has compiled and prepared harvest reports (Melovidov et al., 2014; Lestenkof et al., 2014; Lestenkof et al., 2012; Lestenkof et al., 2011; Zavadil et al., 2011; Zavadil, 2010; Zavadil, 2008; Lestenkof and Zavadil, 2007; Lestenkof and Zavadil, 2006; Lestenkof et al., 2006;

Malavansky et al., 2004; Zavadil and Lestenkof, 2003; Lestenkof and Zavadil, 2002; and Lestenkof and Zavadil, 2001) for NMFS, an important element of the co-management agreement. Subsistence harvest reports can be found online at <https://alaskafisheries.noaa.gov/protectedresources/seals/fur.htm>. In this report the Aleut Community of St. Paul Island describes the subsistence harvest of subadult northern fur seals on St. Paul Island, Alaska in 2015.

METHODS

The subsistence harvest method involves organized herding of subadult male northern fur seals. At a specific haulout area, five to ten volunteers quickly formed a line along the shore to prevent fur seal access to the ocean. Male fur seals are then gathered by driving them from their haulout areas to a specific killing field where they are held in a large group. Five to ten seals are then separated from this large group and driven to a group of three to four men who stun the seals by hitting them on the skull or upper neck with a solid wooden club. The seals are dragged a short distance away from the killing area where the chest and heart are cut open, completing the process of humane killing. The seals are then skinned and butchered for human consumption. For a more detailed description of the harvest procedure, see the following humane observer reports: Stoskopf, 1984; Letcher, 1985; Dorsey, 1986; Zimmerman and Letcher, 1986; and Spraker, 1987-2010.

This year harvests were scheduled to occur twice a week during the 23 June to 08 August season. The Ecosystem Conservation Office (ECO) of the Aleut Community of St. Paul Island Tribal Government takes requests for seals on the day of the scheduled harvest (before the roundup of subadult males from the haulout) and works with the harvest foreman and volunteer sealers to fulfill the community's subsistence needs. ECO monitored and performed the humane observer functions for the subsistence fur seal harvest for the Aleut Community of St. Paul Island in accordance with the co-management agreement with NMFS. ECO personnel monitored and recorded the following factors during the 2015 harvest season: 1) number and sex of fur seals harvested, 2) methods of gathering and herding of fur seals and harvesting period, 3) environmental conditions, 4) deep body core temperatures of fur seals and cases of hyperthermia,

5) morphometric measurements and biological sample collections, 6) occurrence of entangled and flipper-tagged fur seals, 7) health status of fur seals and oil contamination of pelts, 8) incidence of by-products and waste during the harvest process, and 9) external research and harvest viewing permits issued during the harvest. In 2015 the subsistence harvest of northern fur seals occurred during eleven harvest events beginning on 07 July 2015 and ending on 07 August 2015.

RESULTS

Number and Sex of Fur Seals Harvested

A total of 312 subadult male fur seals were harvested on St. Paul Island from six different haulout areas. Two female fur seals were accidentally struck and killed this season. No other mortality occurred during this year's harvest season (Table 1).

Table 1.--Date, location, and number of male and female northern fur seals killed during the subsistence harvest on St. Paul Island, Alaska in 2015.

Date	Location	Number Males Killed	Number Females Killed
07 July	Polovina	19	0
09 July	Zapadni Reef	26	0
10 July	Big Zapadni Sands	23	0
16 July	Polovina	35	0
17 July	Big Zapadni Sands	18	0
23 July	Polovina	31	0
24 July	Lukanin	36	0
30 July	Big Zapadni Sands	36	0
31 July	Gorbatch	27	0
06 August	Polovina	5	0
07 August	Morjovi	56	2
Total		312	2

Gathering and Herding of Fur Seals and Harvest Period

Fur seals were gathered between 08:17 and 8:43 during each harvest this season. Fur

seals were usually rested during and immediately after herding. Drive durations ranged from 8 to 31 minutes with an average duration of 15 minutes (Appendix 1). Terrain type and degree of wetness of the grass at each harvest area was estimated and recorded; wet grass is believed to be an important cooling factor for fur seals. The grass was either damp or wet at each of the killing fields (Table 2). Rest durations (after herding) ranged from 6 to 17 minutes with an average duration of 10 minutes (Appendix 1).

Table 2.--Date, location, terrain type and wetness of grass during the drive of northern fur seals to the killing field during the subsistence harvest on St. Paul Island, Alaska in 2015.

Date	Location	Terrain Type	Wetness of Grass
07 July	Polovina	Up hill sandy/dirt, flat grass	Damp
09 July	Zapadni Reef	Flat sandy, flat grass, up hill grass, flat grass	Wet
10 July	Big Zapadni Sands	Flat sandy, flat grass, up hill grass, flat grass	Wet
16 July	Polovina	Up hill sandy/dirt, flat grass	Damp
17 July	Big Zapadni Sands	Flat sandy, flat grass, up hill grass, flat grass	Damp
23 July	Polovina	Up hill sandy/dirt, flat grass	Wet
24 July	Lukanin	Up hill sandy/dirt, flat grass	Wet
30 July	Big Zapadni Sands	Flat sandy, flat grass, up hill grass, flat grass	Damp
31 July	Gorbatch	Up hill sandy/dirt, down hill grass	Damp
06 August	Polovina	Up hill sandy/dirt, flat grass	Damp
07 August	Morjovi	Flat with clumps of grass, flat grass	Wet

Environmental Conditions

The following environmental conditions were monitored during each harvest event: air temperature, wind speed and wind direction, and weather conditions. Air temperatures were measured before fur seals were herded and ranged from 46.0° F to 51.0° F, with an overall average temperature of 48.0° F. Wind speed varied from 1-3 mph to 13-19 mph with an overall average wind speed of 6-10 mph. Weather conditions were mostly ideal for fur seals with the exception of high air temperatures and low wind speed on 24 July and 31 July (Table 3; Appendix 1).

Table 3.--Date, location, and summary of environmental conditions during the northern fur seal subsistence harvest on St. Paul Island, Alaska in 2015.

THE SUBSISTENCE HARVEST OF NORTHERN FUR SEAL ON ST. PAUL ISLAND IN 2015

Date	Location	Air Temp. (F°)	Wind Speed/ Direction	Weather Conditions
07 July	Polovina	46.0	8-12 mph/ SE	Overcast/Fog/Mist
09 July	Zapadni Reef	48.0	4-7 mph/ SE	Fog/Mist
10 July	Big Zapadni Sands	48.0	8-12 mph/ E	Fog/Mist
16 July	Polovina	48.0	8-12 mph/ N	Fog/Mist
17 July	Big Zapadni Sands	46.0	13-19 mph/ W	Overcast/Drizzle
23 July	Polovina	47.0	13-19 mph/ SW	Overcast/Fog/Mist
24 July	Lukanin	50.0	4-7 mph/ W	Overcast
30 July	Big Zapadni Sands	49.0	1-3/ Variable	Overcast
31 July	Gorbatch	51.0	4-7/ E	Fog/Mist
06 August	Polovina	49.0	4-7/ NE	Overcast/Fog/Mist
07 August	Morjovi	49.0	4-7/ NE	Drizzle /Fog/Mist

Deep Body Core Temperature and Hyperthermia

Deep body core temperatures were measured for approximately 6-80 percent of harvested fur seals during each harvest. Individual fur seals temperatures ranged from 94.3°F to 103.9°F with an overall average temperature of 100.6°F. On 06 August the harvest was stopped after the first pod of five animals were harvested due to high body core temperatures. Fur seal body temperatures were not measured on 24 July. No cases of mortality due to hyperthermia were observed during this harvest event or the rest of the season (Table 4; Appendix 1).

Table 4.--Date, location, average deep body core temperatures, and number of seals dying from hyperthermia during the northern fur seal subsistence harvest on St. Paul Island, Alaska in 2015.

Date	Location	Average Body Temperature (°F)	Number of Hypothermic Animals
07 July	Polovina	100.5	0
09 July	Zapadni Reef	101.7	0
10 July	Big Zapadni Sands	99.5	0
16 July	Polovina	101.2	0
17 July	Big Zapadni Sands	99.4	0
23 July	Polovina	101.6	0
24 July	Lukanin	--	0
30 July	Big Zapadni Sands	99.5	0
31 July	Gorbatch	101.5	0

06 August	Polovina	102.6	0
07 August	Morjovi	99.4	0

Morphometric Measurements and Biological Sample Collections

Length-at-age data, when collected over time, provide insight into factors affecting populations, such as possible food shortage or difficulty of individuals to find sufficient food over time. Stunted growth and light body weight is expected in individuals of populations near carrying capacity. Body length measurements of a proportion of harvested fur seals were taken using a metal caliper placed over the animals from the tip of the nose to the tip of the tail, to the nearest 0.5 centimeter. The length was recorded on a numbered Ziploc bag that was inserted into the animal's mouth. Jaws were then removed and inserted into each bag. The jaws were later boiled to extract the upper and/or lower canines. Teeth were then visually inspected for growth rings to estimate the age of individual animals, and to get length-at-age for each measured fur seal. Body length measurements and teeth were collected from 243 fur seals (77 percent of total harvested) during this year's harvest season. ECO also collected teeth from an additional 16 harvested fur seals. After the teeth were aged independently in St. Paul they were shipped to the National Marine Mammal Laboratory (NMML) for validation and archival in October 2015. The overall fur seal length statistics were as follows: the minimum length was 90.5 cm, the maximum length was 123.5 cm, and the average length was 105.5 cm (Appendix 2).

Since 2014 ECO has been collecting blubber and liver samples for long term banking in the National Marine Mammal Tissue Bank through the Alaska Marine Mammal Tissue Archival Project for retrospective contaminant analysis. ECO collected 300 g samples of blubber and liver from 11 harvested fur seals (Appendix 1). Samples were processed immediately on island, packaged into Teflon jars, labeled, and stored in a -18 °C freezer on island. Samples were shipped in a dry shipper to Hollings Marine Laboratory in Charleston, S.C. for long term banking in November 2015. AMMTAP will report scientific information resulting from analysis of tissues back to ECO. In addition to blubber and liver samples, body length measurements, teeth, serum and whiskers were also collected to assess the current condition of these animals.

Entangled and Flipper-Tagged Fur Seals

Four entangled male fur seals were observed during the harvest season. Two fur seals were disentangled and released. One entangled subadult male was observed during the herding of animals, but was not part of the harvest round-up. One 6-7 year old entangled subadult was too large to capture (Appendix 1). Level A forms were completed and submitted to the NMFS Alaska Regional Stranding Coordinator and Technical Monitor for the two fur seals that were disentangled.

One subadult male with yellow flipper tags 3195E on both front flippers was sighted in a pod and released at Lukanin on 24 July 2015. No other tagged fur seals were sighted during this year's harvest (Appendix 1).

Health Status and Oil Contamination

The health status of fur seals was evaluated by examining the viscera and carcasses of harvested fur seals. All harvested fur seals appeared to be healthy, and no pelts were observed with oil contamination this harvest season.

By-products and Waste

Some fur seal pelts, esophagus, whiskers, and teeth were taken for the creation of arts and crafts on St. Paul Island during this year's harvest. No waste occurred on the harvest field under 50 CFR §216 Subpart F.

External Research and Harvest Viewing Permits

One external research project was conducted in conjunction with the harvest this season. A Memorandum of Agreement (MOA) was entered into with Dr. Bobette Dickerson with NMML for fur seal sample collection for prevalence of potentially reproductively harmful diseases, contaminants, and isotope analysis. Dickerson is characterizing the prevalence of potentially reproductively harmful diseases in the northern fur seal population on St. Paul Island.

Dickerson is using serology to test for Chlamydia, Leptospirosis, calicivirus, brucella, morbillivirus, herpes, coxiella and toxoplasmosis in the population. To continue monitoring on Morbillivirus (phocid distemper) which tends to be cyclic in nature, nasal swabs will be collected and tested for the presence of the virus. The whiskers will be used to look at variation in stable isotopes between haulouts to determine feeding location of the subadult males throughout the year and also to look at feeding locations throughout the animals lifespan, this will be compared to serum stable isotope results. Dickerson will also be collecting some muscle tissue to test for plastics contaminants. Per the MOA with Dr. Dickerson, she will provide the Aleut Community of St. Paul Island Tribal Government with an annual report of the results of the analysis of the tissues collected in 2015. Any questions regarding the above mentioned research projects and/or results should be addressed to Dr. Dickerson (Bobette.Dickerson@noaa.gov).

ECO issued a total of 15 fur seal harvest observation permits to non-tribal members this harvest season. The Aleut Community of St. Paul Island has a tribal ordinance that requires non-tribal members, except those who are legally married to a tribal member, to obtain a permit to observe the fur seal harvest.

DISCUSSION AND CONSIDERATIONS

In summary, eleven harvests were conducted this harvest season with a total of 312 subadult male fur seals harvested, and two females accidentally struck and killed. No cases of mortality due to hyperthermia were found, and no inhumane acts were observed this season.

Fur seals can die due to hyperthermia (overheating) during herding of the seals to the killing field or throughout the harvest period. The harvest method involves holding the animals in a large group approximately 10 to 20 yards from the stunning area. Predisposing factors for overheating include warm air temperatures, lack of cloud cover and/or mist, dry grass, lack of wind, fur seals being herded too quickly (especially uphill), long drives, fur seals being held too tight in the large holding group, and the harvest crew moving seals in the large holding group too frequently. Another predisposing factor is the amount of rest a fur seal has had before being herded. For example, a fur seal that had just arrived on shore from a feeding trip may not be "fully rested" and, if subjected to a herding event, may become exhausted more quickly than a

seal that had rested adequately prior to the roundup.

To avoid mortality from hyperthermia seals need to be driven slowly, given a chance to rest after the drive, and the holding groups should be kept loose so that the seals do not pile up on each other. The resting period duration should be determined based on the behavioral signs of the fur seals held in the group; once the seals do not exhibit early signs of hyperthermia (including flipper fanning, open mouth breathing, and lying down), subsequent harvest activities can commence. If a fur seal lags behind during the gathering period it should be allowed to leave the group and return to the haulout area. If harvestable-sized seals escape while attempting to release a lagging seal, the harvest crew should not attempt to re-herd them; the risk of lagging seals dying is greater than the loss of a few harvestable seals.

The continued success of harvesting subadult males, preventing mortality due to hyperthermia during harvest activities, and 100 percent harvest reporting requires following these important points:

1. Herd fur seals slowly to the killing field.
2. Do not unnecessarily harass the seals during the drive.
3. If a fur seal lags behind during the drive, leave it alone, as it is exhausted and has probably just returned from a feeding trip.
4. Try to release older fur seals and females during the drive.
5. Let fur seals rest for 10 to 15 minutes after being herded and prior to the commencement of harvest activities.
6. Drive small groups (five to seven seals) to the stunners at a time.
7. Take adequate time to isolate the preferred fur seals to be stunned from those not preferred. This will reduce the number of 5-year old seals accidentally struck and/or killed.
8. If air temperatures are between 50° F and 55° F, let the seals rest frequently during the drive and keep the holding group(s) loose. If the air temperature is 55° F or higher, cancel the harvest for that day. Furthermore, if the temperature is 50° F with no wind the harvest should be canceled for that day.
9. When fur seals in the holding group show early signs of hyperthermia (e.g. flipper fanning, open mouth breathing, and lying down) the seal(s) should be rested or the harvest should be

stopped and the seals released and allowed to depart to the water at their own pace.

10. Plans of herding should be discussed with sealers before a drive starts. If drive plans change during the drive because not enough fur seals are gathered or too many big bulls or females are in the group, the seals should be released in a safe area (e.g. not near cliffs).
11. All harvested fur seals should be sexed during the skinning and butchering process to attain 100 percent reporting of number of subadult male fur seals harvested and number of females accidentally harvested.

These points will continue to be monitored and conducted by ECO as part of their humane observer functions. The Aleut Community of St. Paul Island Tribal Government will make this harvest report available to the Tribal Council and to the community.

ACKNOWLEDGEMENTS

The Ecosystem Conservation Office wishes to thank the Aleut Community of St. Paul Island Tribal Government for its continued support. Very special thanks to the Tanadgusix Corporation and all the volunteer sealers for their assistance, cooperation, patience, and support. Thank you to Dr. Dickerson for collecting and processing whisker and serum samples for ECO. Last but not least, thank you to Trident for providing plastic bags to transport seal meat to community member's homes.

This report is a result of research funded by the NOAA Fisheries AK Region under award NA14NMF4390160 to the Aleut Community of St. Paul Island Tribal Government.

REFERENCES

- Dorsey, A.S. 1986. Humane Observer Report, Pribilof Island Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Lestenkof, A.D. and P.A. Zavadil. 2001. 2001 Subsistence Fur Seal Harvest Season Report. Aleut Community of St. Paul Island, Tribal Government, Ecosystem Conservation Office. St. Paul Island, Pribilof Islands, Alaska.
- Lestenkof, A.D. and P.A. Zavadil. 2002. The Subsistence Harvest of Northern Fur Seals on St. Paul Island in 2002, Final Report. Aleut Community of St. Paul Island, Tribal Government, Ecosystem Conservation Office. St. Paul Island, Pribilof Islands, Alaska.

- Lestenkof, A.D., P.A. Zavadil, A. Malavansky, and M. Malavansky, Jr. 2006. The Subsistence Harvest of Northern Fur Seals on the Pribilof Islands in 2005. St. George and St. Paul Islands, Pribilof Islands, Alaska.
- Lestenkof, A.D. and P.A. Zavadil. 2006. 2006 Subsistence Fur Seal Harvest on St. Paul Island Memorandum for the Record. Aleut Community of St. Paul Island, Tribal Government, Ecosystem Conservation Office. St. Paul Island, Pribilof Islands, Alaska.
- Lestenkof, A.D. and P.A. Zavadil. 2007. 2007 Subsistence Fur Seal Harvest on St. Paul Island Memorandum for the Record. Aleut Community of St. Paul Island, Tribal Government, Ecosystem Conservation Office. St. Paul Island, Pribilof Islands, Alaska.
- Lestenkof, P.M., P.I. Melovidov, D.V. Roberts, and P.A. Zavadil. 2011. The Subsistence Harvest of Subadult Northern Fur Seals on St. Paul Island, Alaska in 2011. Aleut Community of St. Paul Island, Tribal Government, Ecosystem Conservation Office. St. Paul Island, Pribilof Islands, Alaska.
- Lestenkof, P.M., P.I. Melovidov, M. Rukovishnikoff, Sr., and P.A. Zavadil. 2012. The Subsistence Harvest of Subadult Northern fur seals on St. Paul Island, Alaska in 2012. Aleut Community of St. Paul Island, Tribal Government, Ecosystem Conservation Office. St. Paul Island, Pribilof Islands, Alaska.
- Lestenkof, P.M., P.I. Melovidov, and M. Rukovishnikoff, Sr. 2014. The subsistence harvest of subadult northern fur seals on St. Paul Island, Alaska in 2013. Aleut Community of St. Paul Island, Tribal Government, Ecosystem Conservation Office. St. Paul Island, Pribilof Islands, Alaska.
- Letcher, J.D., 1985. Humane Observer Report, Pribilof Fur Seal Harvest, National Marine Fisheries Service, Juneau, Alaska.
- Malavansky, A., M. Malavansky, Jr., P.A. Zavadil, A.D. Lestenkof, and P.G. Tetoff. 2004. The Subsistence Harvest of Northern Fur Seals on the Pribilof Islands in 2004. St. George and St. Paul Islands, Pribilof Islands, Alaska.
- Melovidov, P.I., P.M. Lestenkof, M. Rukovishnikoff, Sr., and D.V.V Roberts. 2014. The subsistence harvest of subadult northern fur seals on St. Paul Island, Alaska in 2014. Aleut Community of St. Paul Island, Tribal Government, Ecosystem Conservation Office. St. Paul Island, Pribilof Islands, Alaska.
- Spraker, T.R., 1987. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 1988. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 1989. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 1990. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 1991. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine

- Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 1992. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 1993. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 1994. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 1995. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 1996. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Services, Juneau, Alaska.
- Spraker, T.R., 1997. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 1998. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Services, Juneau, Alaska.
- Spraker, T.R., 1999. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 2000. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Services, Juneau, Alaska.
- Spraker, T.R., 2001. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 2002. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 2003. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 2004. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 2005. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 2006. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 2007. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 2008. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Spraker, T.R., 2009. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.

- Spraker, T.R., 2010. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Stoskopf, M.K., 1984. Humane Observer Report, Pribilof Fur Seal Harvest. National Marine Fisheries Service, Juneau, Alaska.
- Zavadil, P.A. and A.D. Lestenkof. 2003. The Subsistence Harvest of Northern Fur Seals on St. Paul Island in 2003. Aleut Community of St. Paul Island, Tribal Government, Ecosystem Conservation Office. St. Paul Island, Pribilof Islands, Alaska.
- Zavadil, P.A. 2008. 2008 Subsistence Fur Seal Harvest on St. Paul Island Memorandum for the Record. Aleut Community of St. Paul Island, Tribal Government, Ecosystem Conservation Office. St. Paul Island, Pribilof Islands, Alaska.
- Zavadil, P.A. 2010. 2009 Subsistence Fur Seal Harvest on St. Paul Island Memorandum for the Record. Aleut Community of St. Paul Island, Tribal Government, Ecosystem Conservation Office. St. Paul Island, Pribilof Islands, Alaska.
- Zavadil, P.A., P.M. Lestenkof, S.M. Zacharof, and P.I. Melovidov. 2011. The Subsistence Harvest of Sub-Adult Northern Fur Seals on St. Paul Island, Alaska in 2010. Aleut Community of St. Paul Island, Tribal Government, Ecosystem Conservation Office. St. Paul Island, Pribilof Islands, Alaska.
- Zimmerman, S.T. and J.D. Letcher, 1986. The 1985 Subsistence Harvest of Northern Fur Seals, *Callorhinus ursinus*, in St. Paul Island, Alaska. National Marine Fisheries Service, Juneau, Alaska.