

The Subsistence Harvest of Subadult Northern Fur Seals on St. Paul Island, Alaska in 2012

November 2012

by

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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 and Marine Mammal Protection Act. 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 1984 when the commercial harvest for seal pelts ceased. Regulations allow subadult male fur seals (2-4 years old) to be taken for food during the subsistence harvest season. The harvest has occurred annually since 1984 and fur seal meat continues to be an important traditional food for Unangan (Aleuts) of St. Paul Island.

The regulations do not accommodate the customary practices of hunting fur seals and the community's changing subsistence needs. Unangan are striving to reintroduce traditional hunting and management methods through modifications of the current harvest regulations. Regulation changes will need to balance the community's subsistence needs and the National Marine Fisheries Service's (NMFS) responsibility for protecting marine mammals and the Alaska Native exception for subsistence. 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. Harvest regulations require NMFS to publish a summary of the harvests every three years and a discussion on the number of seals expected to be harvested annually over the next three years to satisfy the subsistence requirements of St. Paul Island. Since 2001 the Aleut Community of St. Paul Island has compiled and prepared harvest summary reports for NMFS, an important element of the co-management agreement. 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 2012.

METHODS

The subsistence harvest method involves organized herding of subadult male northern fur seals. Male fur seals are 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. The seals are then skinned and butchered for human consumption. For a more detailed description of the procedures of the harvest, see Humane Observer Report: Stoskopf 1984; Letcher 1985; Dorsey 1986; Zimmerman and Letcher 1986; Spraker 1987-2005.

In recent years harvests have been scheduled to occur on a weekly basis during the 23 June to 08 August season, and daily near the end of the season. The Aleut Community of St. Paul Island Tribal Government receives requests for seals prior to a scheduled harvest and works with the harvest foreman and volunteer sealers to fulfill the community's subsistence needs. The Ecosystem Conservation Office (ECO) monitored and performed the humane observer functions in partnership with Dr. Terry Spraker for the 2012 subsistence fur seal harvest for the Aleut Community of St. Paul Island in accordance with their respective co-management agreement with NMFS. The ECO Manager and Tanam Amgignaan (Island Sentinels) assessed, monitored and recorded the following factors during the 2012 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) occurrence of male fur seals greater than 124.5 cm in length, 6) occurrence of flipper-tagged fur seals, 7) number of fur seals entangled in marine debris and the number of seals disentangled, 8) health status of fur seals and oil contamination of pelts, 9) incidence of by-products and waste during the harvest process, and 10) research conducted during the harvest and visitors requesting to view the harvest.

RESULTS

Number of Fur Seals Harvested

The subsistence harvest of northern fur seals occurred during six harvests beginning on 13 July 2012 and ending on 07 August 2012. A total of 383 subadult male fur seals were harvested this season on St. Paul Island from five different haulout areas. No female fur seals were struck or killed, and no other mortality occurred during this year's harvest season (Table 1).

Table 1.--Date, location, and number of northern fur seals killed during the subsistence harvest on St. Paul Island, Alaska in 2012.

| Date | Location | Number Males Killed | Number Females Killed |
|-----------|---------------|---------------------|-----------------------|
| 13 July | Polovina | 49 | 0 |
| 20 July | Morjovi | 54 | 0 |
| 27 July | Zapadni Sands | 72 | 0 |
| 03 August | Lukanin | 83 | 0 |
| 06 August | Polovina | 44 | 0 |
| 07 August | Reef | 81 | 0 |
| Total | | 383 | 0 |

Gathering and Herding of Fur Seals and Harvest Period

Five to ten volunteer sealers would go to a specific haulout area and quickly form a line along the shore to prevent fur seals access to the ocean. The seals were then gathered into one or two groups and herded to the killing field. Gathering of fur seals started between 08:30 and 09:00 at each harvest this season. The fur seals were usually rested during and immediately after herding. Drive durations ranged from 7 to 15 minutes with an average duration of 10.5 minutes (see Appendix 1). The terrain type and degree of wetness of the grass was estimated and recorded, since wet grass is believed to be an important cooling factor for fur seals. The grass was wet during five of the harvests and damp during one harvest (Table 2). The rest durations (after herding) ranged from 5 to 15 minutes with an average duration of 9.6 minutes.

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 2012.

| Date | Location | Terrain Type; Wetness of Grass |
|-----------|---------------|--|
| 13 July | Polovina | Up hill sandy/dirt, flat grass; Wet |
| 20 July | Morjovi | Flat sandy, flat grass; Damp |
| 27 July | Zapadni Sands | Flat sandy, flat grass, up hill grass, flat grass; Wet |
| 03 August | Lukanin | Up hill sandy/dirt, flat grass; Wet |
| 06 August | Polovina | Up hill sandy/dirt, flat grass; Wet |
| 07 August | Reef | Uphill sandy/dirt, down hill grass, flat grass; Wet |

Environmental Conditions

The following environmental conditions were monitored during each harvest: air temperature, wind speed and wind direction, and weather conditions. Air temperature was taken before the herding of fur seals began and ranged from 38.0° F to 45.8° F, with an overall average temperature of 43.7° F. A breeze was present at all harvests except for the first harvest on 13 July 2012. The wind speed varied from <1 mph to 13-18 mph with an overall average wind speed of 6-9 mph. Weather conditions were mostly ideal for fur seals, with the exception of the lack of wind on 13 July 2012 (Table 3). The environmental conditions were similar to previous years (Zavadil et al. 2011).

Table 3.--Date, location, and summary of environmental conditions during the northern fur seal subsistence harvest on St. Paul Island, Alaska in 2012.

| Date | Location | Air Temp. (F°) | Wind Speed/ Direction | Weather Conditions |
|-----------|---------------|----------------|-----------------------|--------------------|
| 13 July | Polovina | 38.0 | <1 mph/ Variable | Fog/mist |
| 20 July | Morjovi | 44.2 | 4-7 mph/ N | Fog/mist |
| 27 July | Zapadni Sands | 44.7 | 4-7 mph/ SW | Fog/mist |
| 03 August | Lukanin | 44.3 | 13-18 mph/ SSW | Overcast; Fog/mist |
| 06 August | Polovina | 45.8 | 8-12 mph/ SW | Fog/mist |
| 07 August | Reef | 45.0 | 4-7 mph/ SW | Fog/mist |

Deep Body Core Temperature and Hyperthermia

Deep body core temperatures were measured for approximately 26-34 percent of harvested fur seals during each harvest. The time the temperature was taken was recorded in the field. Temperatures were grouped by time into beginning, middle, and end of the harvest and averaged. The average body temperatures are presented in Table 4. Individual fur seals temperatures ranged from 95.9° F to 105.5° F with an overall average temperature of 100.0° F (see Appendix 2). No cases of mortality due to hyperthermia 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 having too much activity or moving around in the large holding group. Another predisposing factor is the amount of rest a fur seal has had before being herded. For example, a fur seal that has 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 completely rested animal.

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) then 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.

Table 4.--Date, location, summary of the deep body core temperatures, and number of seals dying from hyperthermia during the northern fur seal subsistence harvest on St. Paul Island, Alaska in 2012.

| Date | Location | Average deep body core temperature (°F) | | | Number of hyperthermic animals |
|-----------|---------------|---|-------------------|----------------|--------------------------------|
| | | Beginning of harvest | Middle of harvest | End of harvest | |
| 13 July | Polovina | 98.8 | 99.3 | 99.1 | 0 |
| 20 July | Morjovi | 100.7 | 98.5 | 101.7 | 0 |
| 27 July | Zapadni Sands | 99.7 | 100.1 | 102.5 | 0 |
| 03 August | Lukanin | 99.3 | 100.9 | 101.4 | 0 |
| 06 August | Polovina | 98.3 | 98.0 | 99.8 | 0 |
| 07 August | Reef | 99.0 | 99.7 | 99.9 | 0 |

Male Fur Seals Greater Than 124.5 cm in Length

Regulations require that only subadult male fur seals 124.5 cm or less in length may be harvested. This length has been associated with fur seals 4-years old and younger. During each harvest the ECO Manager and Tanam Amgignaa I measured a proportion of fur seals to the nearest 0.5-centimeter, from the tip of the nose to the tip of the tail, as an estimate of fur seal length. A total of 244 fur seals were measured (64 percent of total harvested) during this year’s harvest season. Nine fur seals greater than 124.5 cm in length were harvested, with lengths ranging from 125.0 cm to 137.5 cm.

Flipper-Tagged Fur Seals

A 3-year old subadult male with flipper tags H759 was harvested from Lukanin on 03 August 2012. A 2-year old with flipper tags G655 (right flipper) and G656 (left flipper) was observed during the roundup at Polovina and released. No other tagged fur seals were observed during this year’s harvest.

Fur Seal Entanglement and Disentanglement

Three entangled subadult male fur seals were observed during the 2012 subsistence fur seal harvest. All three fur seals were disentangled and released. Level A forms were completed for these three animals and submitted to the NMFS Alaska Region Representative.

Health Status and Oil Contamination

The health status of fur seals was evaluated by examining viscera and carcasses throughout each harvest by Dr. Terry Spraker. One 3-year old subadult male harvested from Lukanin on 03 August 2012 was found with spots of oil on its pelt. Dr. Spraker collected the oil for possible identification and is awaiting designation of personnel for making the identification.

By-products and Waste

Some community members prefer the “butterfly” cut of fur seal meat, which can be considered more wasteful than the usual way sealers butcher the meat. Due to the apparent wastefulness of this cut of meat, the Tanam Amgignaa II had to discontinue the butterfly cut from this year’s harvest. ECO will also ensure that the butterfly cut will not be allowed in future harvests. Some fur seal pelts and whiskers 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.

Research

Several research projects were conducted in conjunction with the 2012 subsistence fur seal harvest on St. Paul Island. The ECO collected snouts from the 244 fur seals that were measured, and extracted the upper canine teeth for the National Marine Mammal Lab (NMML) in Seattle, WA. NMML processes the canine teeth for estimating the age composition of the harvest. The age data will be linked to the body length measurements collected to get length-at-age for each of the 244 fur seals that were sampled. The ECO Manager and Tanam Amgignaan will age the teeth independently in St. Paul first, and then ship to NMML for validation in mid-January 2013. Length-at-age data will be appended to this report when the ages have been estimated. The overall fur seal length statistics were as follows: the minimum length was 92.0 cm, the maximum length was 137.5 cm, and the average length was 111.0 cm.

A Memorandum of Agreement was entered into with Dr. Terry R. Spraker with Colorado State University for two different projects: 1) to collect fur seal samples (stomachs and small intestines) to compare the number of gastrointestinal parasites in the stomach to the number of tapeworms in the ileum/caecum, and 2) to collect fur seal samples (blubber) for the prevalence of hookworms in sub adult males (see attached MOA2012-01). A Memorandum of Agreement

(MOA) was entered into with Dr. Bobette Dickerson with NMML to collect fur seal samples (whiskers, feces, blood for serum, nasal swabs and liver) for prevalence of potentially reproductively harmful diseases and isotope analysis during this year's harvest (see attached MOA2012-02).

Per the MOAs with Dr. Spraker and Dr. Dickerson, both will provide an annual report to the Aleut Community of St. Paul Island Tribal Government of the results of the analysis of the tissues (see attached annual reports for Spraker and Dickerson for samples collected in 2011). The annual report will describe the study, analysis of samples, the results of analysis, progress of study, and any forecasted activities. Also included in the MOA is a statement that the researcher shall not interfere with the subsistence harvest process while collecting samples, and is subject to oversight by the Harvest Foreman and enforcement actions of the Tribal Enforcement Officers, which may include suspension of the collection of samples. Any questions regarding the above mentioned research projects and/or results can be addressed to Dr. Spraker (Terry.Spraker@colostate.edu) and Dr. Dickerson (Bobette.Dickerson@noaa.gov).

DISCUSSION AND CONSIDERATIONS

In summary, six harvests were conducted from 13 July through 07 August 2012 with a total of 383 subadult male fur seals harvested. No females were struck or killed, no cases of mortality due to hyperthermia were found, and no inhumane acts were observed this season. The continued success of harvesting subadult males and preventing mortality due to hyperthermia during harvest activities 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).

These points will continue to be monitored by the ECO Manager and Tanam Amgignaan 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

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Northern Fur Seal Harvest Monitoring Log, St. Paul Island, Alaska

Harvest Conditions

| Harvest ID Number | Harvest Date | Harvest Location | Harvest Start/End | Time (min) | Drive (min) | Temp. (F) | Wind Direction | Wind Speed | Weather Conditions | Grass Condition | Observer Initials |
|-------------------|--------------|-------------------|-------------------|------------|-------------|-----------|----------------|------------|--------------------|-----------------|-------------------|
| SNPNFSHV12-1 | 13-Jul-12 | Polovina | 8:41-10:50 | 129 | 10 | 38 | VAR | <1mph | fog/mist | Wet | PIM |
| SNPNFSHV12-2 | 20-Jul-12 | Morjovi | 8:47-11:10 | 143 | 11 | 44.2 | N | 4-7mph | fog/mist | Damp | PIM |
| SNPNFSHV12-3 | 27-Jul-12 | Big Zapadni Sands | 8:38-11:09 | 151 | 15 | 44.7 | SW | 4-7mph | fog/mist | Wet | PIM |
| SNPNFSHV12-4 | 03-Aug-12 | Lukanin | 8:23-11:09 | 166 | 13 | 44.3 | SSW | 8-12mph | fog/mist | Wet | PIM |
| SNPNFSHV12-5 | 06-Aug-12 | Polovina | 8:35-10:35 | 120 | 7 | 45.8 | SW | 8-12mph | fog/mist | Wet | PIM |
| SNPNFSHV12-6 | 07-Aug-12 | Reef | 8:26-11:28 | 182 | 7 | 45 | SW | 4-7mph | fog/mist | Wet | PIM |

Harvest Counts

| Harvest ID Number | Seals Harvested | SAMs Released | Adult Males Released | Adult Males Stunned | Adult Males Killed | Females Stunned | Females Killed | Heat Strokes | High Seal Temp. (F) | High Air Temp. (F) | Oiled SAMs |
|-------------------|-----------------|---------------|----------------------|---------------------|--------------------|-----------------|----------------|--------------|---------------------|--------------------|------------|
| SNPNFSHV12-1 | 49 | 187 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 |
| SNPNFSHV12-2 | 54 | 213 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 |
| SNPNFSHV12-3 | 72 | 158 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 |
| SNPNFSHV12-4 | 83 | 255 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 |
| SNPNFSHV12-5 | 44 | 185 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 |
| SNPNFSHV12-6 | 81 | 149 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 |
| Total | 383 | 1147 | 0 | 0 | 0 | 0 | 0 | 0 | (Avg.) | (Avg.) | 0 |

Entanglement Counts

| Harvest ID Number | SAMs Entangled | SAMs Disentangled | SAMs Scarred | Adult Males Entangled | Adult Males Disentangled | Adult Males Scarred | SAMs Sampled | Adult Males Sampled | SAM Rate of Entanglement | Adult Rate of Entanglement |
|-------------------|----------------|-------------------|--------------|-----------------------|--------------------------|---------------------|--------------|---------------------|--------------------------|----------------------------|
| SNPNFSHV12-1 | 1 | 1 | 0 | 0 | 0 | 0 | 237 | 0 | | |
| SNPNFSHV12-2 | 0 | 0 | 0 | 0 | 0 | 0 | 267 | 0 | | |
| SNPNFSHV12-3 | 1 | 1 | 0 | 0 | 0 | 0 | 230 | 0 | | |
| SNPNFSHV12-4 | 1 | 1 | 0 | 0 | 0 | 0 | 338 | 0 | | |
| SNPNFSHV12-5 | 0 | 0 | 0 | 0 | 0 | 0 | 229 | 0 | | |
| SNPNFSHV12-6 | 0 | 0 | 0 | 0 | 0 | 0 | 230 | 0 | | |

Northern Fur Seal Harvest Monitoring Log, St. Paul Island, Alaska

| | | | | | | | | | | |
|--------------|---|---|---|---|---|---|------|---|-------|-------|
| Total | 3 | 3 | 0 | 0 | 0 | 0 | 1531 | 0 | 0.196 | #Num! |
|--------------|---|---|---|---|---|---|------|---|-------|-------|

Fur Seal Harvest Data Report:

10/1/2012 4:09 AM

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| | | | | | |
|-----------------|-----|----------------|---|----------|----------|
| Nfs Harvest UID | 185 | Nfs Harvest ID | 1 | Location | Polovina |
|-----------------|-----|----------------|---|----------|----------|

| | | | | | | | | | | |
|-----------------|----------------------|---------------|-----------------------|----------|-----|-----|------|--|--|--|
| Start Date/Time | 7/13/2012 8:41:06 AM | End Date/Time | 7/13/2012 10:50:17 AM | Initials | PIM | PML | MRJR | | | |
|-----------------|----------------------|---------------|-----------------------|----------|-----|-----|------|--|--|--|

| | | | | | |
|----------|-------|--------|-----------|------|--------------|
| Weather | Wind | Sea | Wind Dir. | Tide | Temp. Deg. F |
| fog/mist | <1mph | 1/2ft. | VAR | M | 38 |

| | | | |
|----------|--|-----------|--|
| Comments | | Data Note | |
|----------|--|-----------|--|

Pod Information

| Pod # | Start Kill | End Kill | HighTemp | AirTemp | # Harvested | Sam Rel. | Ad. Male Rel. | SAM Ent. | SAM Disent. | Ad. Male Ent. | Ad. Male Disent. |
|-------|------------|----------|----------|---------|-------------|----------|---------------|----------|-------------|---------------|------------------|
| 1 | 8:57 | 9:00 | | | 11 | 23 | 0 | 0 | 0 | 0 | 0 |
| 2 | 9:25 | 9:35 | | | 21 | 68 | 0 | 0 | 0 | 0 | 0 |
| 3 | 10:00 | 10:14 | | | 17 | 96 | 0 | 1 | 1 | 0 | 0 |

| Pod # | Ad. Male Stunned | Ad. Male Killed | Fem. Stunned | Fem. Killed | Heat Strokes | Other | Notes |
|-------|------------------|-----------------|--------------|-------------|--------------|-------|-------|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | |

Fur Seal Harvest Data Report:

10/1/2012 4:09 AM

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| | | | | | |
|-----------------|-----|----------------|---|----------|---------|
| Nfs Harvest UID | 186 | Nfs Harvest ID | 2 | Location | Morjovi |
|-----------------|-----|----------------|---|----------|---------|

| | | | | | | | | | | |
|-----------------|----------------------|---------------|-----------------------|----------|-----|------|-----|--|--|--|
| Start Date/Time | 7/20/2012 8:47:58 AM | End Date/Time | 7/20/2012 11:10:07 AM | Initials | PIM | MRJR | PML | | | |
|-----------------|----------------------|---------------|-----------------------|----------|-----|------|-----|--|--|--|

| | | | | | |
|----------|--------|-----|-----------|------|--------------|
| Weather | Wind | Sea | Wind Dir. | Tide | Temp. Deg. F |
| fog/mist | 4-7mph | 4ft | N | H | 44.2 |

| | | | |
|----------|--|-----------|--|
| Comments | | Data Note | |
|----------|--|-----------|--|

Pod Information

| Pod # | Start Kill | End Kill | HighTemp | AirTemp | # Harvested | Sam Rel. | Ad. Male Rel. | SAM Ent. | SAM Disent. | Ad. Male Ent. | Ad. Male Disent. |
|-------|------------|----------|----------|---------|-------------|----------|---------------|----------|-------------|---------------|------------------|
| 1 | 9:14 | 9:30 | | | 10 | 6 | 0 | 0 | 0 | 0 | 0 |
| 2 | 9:32 | 9:52 | | | 14 | 29 | 0 | 0 | 0 | 0 | 0 |
| 3 | 9:58 | 10:02 | | | 11 | 32 | 0 | 0 | 0 | 0 | 0 |
| 4 | 10:17 | 10:20 | | | 9 | 41 | 0 | 0 | 0 | 0 | 0 |
| 5 | 10:32 | 10:39 | | | 10 | 105 | 0 | 0 | 0 | 0 | 0 |

| Pod # | Ad. Male Stunned | Ad. Male Killed | Fem. Stunned | Fem. Killed | Heat Strokes | Other | Notes |
|-------|------------------|-----------------|--------------|-------------|--------------|-------|----------------------------------|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | Actual pod time started on pod#3 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | |

Fur Seal Harvest Data Report:

10/1/2012 4:09 AM

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Nfs Harvest UID Nfs Harvest ID Location

Start Date/Time End Date/Time Initials PIM PML MRJR

| Weather | Wind | Sea | Wind Dir. | Tide | Temp. Deg. F |
|----------|--------|-----|-----------|------|--------------|
| fog/mist | 4-7mph | 4ft | SW | M | 44.7 |

Comments Data Note

Pod Information

| Pod # | Start Kill | End Kill | HighTemp | AirTemp | # Harvested | Sam Rel. | Ad. Male Rel. | SAM Ent. | SAM Disent. | Ad. Male Ent. | Ad. Male Disent. |
|-------|------------|----------|----------|---------|-------------|----------|---------------|----------|-------------|---------------|------------------|
| 0 | 8:39 | 8:54 | | | | | | 1 | 1 | 0 | 0 |
| 1 | 9:09 | 9:15 | | | 15 | 53 | 0 | 0 | 0 | 0 | 0 |
| 2 | 9:34 | 9:39 | | | 18 | 27 | 0 | 0 | 0 | 0 | 0 |
| 3 | 9:59 | 10:05 | | | 22 | 18 | 0 | 0 | 0 | 0 | 0 |
| 4 | 10:26 | 10:32 | | | 17 | 60 | 0 | 0 | 0 | 0 | 0 |

| Pod # | Ad. Male Stunned | Ad. Male Killed | Fem. Stunned | Fem. Killed | Heat Strokes | Other | Notes |
|-------|------------------|-----------------|--------------|-------------|--------------|-------|--|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 year SAM entangled/disentangled during round up. |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | |

Fur Seal Harvest Data Report:

10/1/2012 4:09 AM

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| | | | | | |
|-----------------|-----|----------------|---|----------|---------|
| Nfs Harvest UID | 192 | Nfs Harvest ID | 4 | Location | Lukanin |
|-----------------|-----|----------------|---|----------|---------|

| | | | | | | | | | | |
|-----------------|---------------------|---------------|----------------------|----------|-----|-----|------|--|--|--|
| Start Date/Time | 8/3/2012 8:23:34 AM | End Date/Time | 8/3/2012 11:09:09 AM | Initials | PIM | PML | MRJR | | | |
|-----------------|---------------------|---------------|----------------------|----------|-----|-----|------|--|--|--|

| Weather | | | Wind | Sea | Wind Dir. | Tide | Temp. Deg. F |
|----------|----------|--|---------|------|-----------|------|--------------|
| fog/mist | overcast | | 8-12mph | 10ft | SSW | H | 44.3 |

| | | | |
|----------|--|-----------|--|
| Comments | | Data Note | |
|----------|--|-----------|--|

Pod Information

| Pod # | Start Kill | End Kill | HighTemp | AirTemp | # Harvested | Sam Rel. | Ad. Male Rel. | SAM Ent. | SAM Disent. | Ad. Male Ent. | Ad. Male Disent. |
|-------|------------|----------|----------|---------|-------------|----------|---------------|----------|-------------|---------------|------------------|
| 0 | 8:27 | 8:40 | | | | | | 1 | 1 | 0 | 0 |
| 1 | 8:51 | 8:54 | | | 10 | 27 | 0 | 0 | 0 | 0 | 0 |
| 2 | 9:07 | 9:11 | | | 19 | 26 | 0 | 0 | 0 | 0 | 0 |
| 3 | 9:32 | 9:35 | | | 14 | 22 | 0 | 0 | 0 | 0 | 0 |
| 4 | 9:52 | 9:57 | | | 20 | 11 | 0 | 0 | 0 | 0 | 0 |
| 5 | 10:19 | 10:26 | | | 18 | 39 | 0 | 0 | 0 | 0 | 0 |
| 6 | 10:50 | 10:52 | | | 2 | 130 | 0 | 0 | 0 | 0 | 0 |

| Pod # | Ad. Male Stunned | Ad. Male Killed | Fem. Stunned | Fem. Killed | Heat Strokes | Other | Notes |
|-------|------------------|-----------------|--------------|-------------|--------------|-------|--|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 year old SAM found entangled/disentangled and relea |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | SAM 3yr old harvested with tag # H759 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | SAM 3yr old harvested with spots of oil on fur. |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 4 year old SAM partially stunned on last pod. It recover |

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| | | | | | |
|-----------------|-----|----------------|---|----------|----------|
| Nfs Harvest UID | 193 | Nfs Harvest ID | 5 | Location | Polovina |
|-----------------|-----|----------------|---|----------|----------|

| | | | | | | | | | | |
|-----------------|---------------------|---------------|----------------------|----------|-----|-----|------|--|--|--|
| Start Date/Time | 8/6/2012 8:35:09 AM | End Date/Time | 8/6/2012 10:35:54 AM | Initials | PIM | PML | MRJR | | | |
|-----------------|---------------------|---------------|----------------------|----------|-----|-----|------|--|--|--|

| | | | | | |
|----------|---------|-----|-----------|------|--------------|
| Weather | Wind | Sea | Wind Dir. | Tide | Temp. Deg. F |
| fog/mist | 8-12mph | 4ft | SW | M | 45.8 |

| | |
|----------|--|
| Comments | |
|----------|--|

| | |
|-----------|---|
| Data Note | NFS 2 yr old with tag found in roundup. Capture/released Ta Number 655(rf) G656(lf) |
|-----------|---|

Pod Information

| Pod # | Start Kill | End Kill | HighTemp | AirTemp | # Harvested | Sam Rel. | Ad. Male Rel. | SAM Ent. | SAM Disent. | Ad. Male Ent. | Ad. Male Disent. |
|-------|------------|----------|----------|---------|-------------|----------|---------------|----------|-------------|---------------|------------------|
| 1 | 8:53 | 8:57 | | | 15 | 30 | 0 | 0 | 0 | 0 | 0 |
| 2 | 9:22 | 9:28 | | | 13 | 44 | 0 | 0 | 0 | 0 | 0 |
| 3 | 9:49 | 9:56 | | | 16 | 111 | 0 | 0 | 0 | 0 | 0 |

| Pod # | Ad. Male Stunned | Ad. Male Killed | Fem. Stunned | Fem. Killed | Heat Strokes | Other | Notes |
|-------|------------------|-----------------|--------------|-------------|--------------|-------|-------|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | |

Fur Seal Harvest Data Report:

10/1/2012 4:09 AM

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| | | | | | |
|-----------------|-----|----------------|---|----------|------|
| Nfs Harvest UID | 194 | Nfs Harvest ID | 6 | Location | Reef |
|-----------------|-----|----------------|---|----------|------|

| | | | | | | | | | | |
|-----------------|---------------------|---------------|----------------------|----------|-----|-----|------|--|--|--|
| Start Date/Time | 8/7/2012 8:26:15 AM | End Date/Time | 8/7/2012 11:28:34 AM | Initials | PIM | PML | MRJR | | | |
|-----------------|---------------------|---------------|----------------------|----------|-----|-----|------|--|--|--|

| | | | | | |
|----------|--------|-----|-----------|------|--------------|
| Weather | Wind | Sea | Wind Dir. | Tide | Temp. Deg. F |
| fog/mist | 4-7mph | 4ft | SW | M | 45 |

| | | | |
|----------|--|-----------|--|
| Comments | | Data Note | |
|----------|--|-----------|--|

Pod Information

| Pod # | Start Kill | End Kill | HighTemp | AirTemp | # Harvested | Sam Rel. | Ad. Male Rel. | SAM Ent. | SAM Disent. | Ad. Male Ent. | Ad. Male Disent. |
|-------|------------|----------|----------|---------|-------------|----------|---------------|----------|-------------|---------------|------------------|
| 1 | 8:55 | 8:58 | | | 17 | 35 | 0 | 0 | 0 | 0 | 0 |
| 2 | 9:20 | 9:25 | | | 15 | 13 | 0 | 0 | 0 | 0 | 0 |
| 3 | 9:49 | 9:54 | | | 22 | 25 | 0 | 0 | 0 | 0 | 0 |
| 4 | 10:21 | 10:34 | | | 27 | 76 | 0 | 0 | 0 | 0 | 0 |

| Pod # | Ad. Male Stunned | Ad. Male Killed | Fem. Stunned | Fem. Killed | Heat Strokes | Other | Notes |
|-------|------------------|-----------------|--------------|-------------|--------------|-------|-------|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | |

Appendix 2-Northern Fur Seal Deep Body Core Temperatures 2012

| Harvest Date | Harvest Location | Time | Temp (°F) | Average | Total | | | |
|--------------|---------------------------|-------|-----------|---------|-----------|----------|----------|----------|
| | | | | Temp | Harvested | Min Temp | Max Temp | Avg Temp |
| 13-Jul-12 | Polovina | 9:00 | 96.3 | | | | | |
| 13-Jul-12 | Polovina | 9:02 | 99.3 | | | | | |
| 13-Jul-12 | Polovina | 9:05 | 100.7 | 98.8 | | | | |
| 13-Jul-12 | Polovina | 9:30 | 100.3 | | | | | |
| 13-Jul-12 | Polovina | 9:32 | 95.9 | | | | | |
| 13-Jul-12 | Polovina | 9:33 | 102.3 | | | | | |
| 13-Jul-12 | Polovina | 9:35 | 98.0 | | | | | |
| 13-Jul-12 | Polovina | 9:37 | 99.3 | | | | | |
| 13-Jul-12 | Polovina | 9:39 | 100.2 | 99.3 | | | | |
| 13-Jul-12 | Polovina | 10:06 | 99.1 | | | | | |
| 13-Jul-12 | Polovina | 10:08 | 98.2 | | | | | |
| 13-Jul-12 | Polovina | 10:09 | 100.1 | | | | | |
| 13-Jul-12 | Polovina | 10:10 | 100.2 | | | | | |
| 13-Jul-12 | Polovina | 10:10 | 100.5 | | | | | |
| 13-Jul-12 | Polovina | 10:12 | 96.4 | 99.1 | 49 | 95.9 | 102.3 | 99.1 |
| 20-Jul-12 | Morjovi | 9:19 | 98.7 | | | | | |
| 20-Jul-12 | Morjovi | 9:20 | 100.4 | | | | | |
| 20-Jul-12 | Morjovi | 9:37 | 102.0 | | | | | |
| 20-Jul-12 | Morjovi | 9:38 | 101.5 | | | | | |
| 20-Jul-12 | Morjovi | 9:40 | 101.0 | 100.7 | | | | |
| 20-Jul-12 | Morjovi | 10:03 | 97.7 | | | | | |
| 20-Jul-12 | Morjovi | 10:02 | 100.2 | | | | | |
| 20-Jul-12 | Morjovi | 10:08 | 97.7 | 98.5 | | | | |
| 20-Jul-12 | Morjovi | 10:21 | 101.8 | | | | | |
| 20-Jul-12 | Morjovi | 10:23 | 103.1 | | | | | |
| 20-Jul-12 | Morjovi | 10:38 | 98.7 | | | | | |
| 20-Jul-12 | Morjovi | 10:39 | 101.5 | | | | | |
| 20-Jul-12 | Morjovi | 10:40 | 102.4 | | | | | |
| 20-Jul-12 | Morjovi | 10:41 | 102.5 | 101.7 | 54 | 97.7 | 103.1 | 100.7 |
| 27-Jul-12 | Big Zapadni Sands Haulout | 9:14 | 97.5 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 9:17 | 101.2 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 9:18 | 99.6 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 9:39 | 98.8 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 9:39 | 97.8 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 9:41 | 100.6 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 9:41 | 102.1 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 9:42 | 100.1 | 99.7 | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 10:04 | 98.6 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 10:06 | 100.4 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 10:06 | 101.9 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 10:08 | 98.9 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 10:08 | 100.8 | 100.1 | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 10:30 | 100.5 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 10:30 | 100.5 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 10:32 | 102.7 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 10:34 | 102.0 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 10:34 | 102.8 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 10:35 | 102.2 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 10:35 | 105.5 | | | | | |
| 27-Jul-12 | Big Zapadni Sands Haulout | 10:36 | 103.5 | 102.5 | 72 | 97.5 | 105.5 | 100.9 |
| 3-Aug-12 | Lukanin | 8:55 | 98.3 | | | | | |
| 3-Aug-12 | Lukanin | 8:55 | 99.5 | | | | | |
| 3-Aug-12 | Lukanin | 8:56 | 98.7 | | | | | |
| 3-Aug-12 | Lukanin | 9:12 | 98.1 | | | | | |
| 3-Aug-12 | Lukanin | 9:14 | 102.2 | | | | | |
| 3-Aug-12 | Lukanin | 9:14 | 97.9 | | | | | |
| 3-Aug-12 | Lukanin | 9:15 | 97.8 | | | | | |
| 3-Aug-12 | Lukanin | 9:15 | 100.9 | | | | | |
| 3-Aug-12 | Lukanin | 9:16 | 100.5 | 99.3 | | | | |
| 3-Aug-12 | Lukanin | 9:36 | 99.8 | | | | | |
| 3-Aug-12 | Lukanin | 9:36 | 101.6 | | | | | |
| 3-Aug-12 | Lukanin | 9:37 | 98.6 | | | | | |
| 3-Aug-12 | Lukanin | 9:38 | 102.0 | | | | | |
| 3-Aug-12 | Lukanin | 9:39 | 99.2 | | | | | |
| 3-Aug-12 | Lukanin | 9:57 | 101.4 | | | | | |
| 3-Aug-12 | Lukanin | 9:57 | 103.2 | | | | | |
| 3-Aug-12 | Lukanin | 9:58 | 102.9 | | | | | |
| 3-Aug-12 | Lukanin | 9:59 | 101.7 | | | | | |
| 3-Aug-12 | Lukanin | 10:00 | 100.1 | | | | | |
| 3-Aug-12 | Lukanin | 10:00 | 100.2 | | | | | |
| 3-Aug-12 | Lukanin | 10:01 | 99.9 | 100.9 | | | | |
| 3-Aug-12 | Lukanin | 10:23 | 102.0 | | | | | |
| 3-Aug-12 | Lukanin | 10:24 | 102.7 | | | | | |
| 3-Aug-12 | Lukanin | 10:27 | 101.9 | | | | | |
| 3-Aug-12 | Lukanin | 10:27 | 101.2 | | | | | |

Appendix 2-Northern Fur Seal Deep Body Core Temperatures 2012

| Harvest Date | Harvest Location | Time | Temp (°F) | Average | Total | | | |
|--------------|------------------|-------|-----------|---------|-----------|----------|----------|----------|
| | | | | Temp | Harvested | Min Temp | Max Temp | Avg Temp |
| 3-Aug-12 | Lukanin | 10:28 | 101.9 | | | | | |
| 3-Aug-12 | Lukanin | 10:55 | 101.0 | | | | | |
| 3-Aug-12 | Lukanin | 10:55 | 99.2 | 101.4 | 83 | 97.8 | 103.2 | 100.5 |
| 6-Aug-12 | Polovina | 8:56 | 98.7 | | | | | |
| 6-Aug-12 | Polovina | 8:59 | 97.7 | | | | | |
| 6-Aug-12 | Polovina | 9:00 | 100.5 | | | | | |
| 6-Aug-12 | Polovina | 9:00 | 96.2 | 98.3 | | | | |
| 6-Aug-12 | Polovina | 9:28 | 98.9 | | | | | |
| 6-Aug-12 | Polovina | 9:28 | 98.3 | | | | | |
| 6-Aug-12 | Polovina | 9:31 | 96.6 | | | | | |
| 6-Aug-12 | Polovina | 9:31 | 98.3 | 98.0 | | | | |
| 6-Aug-12 | Polovina | 9:53 | 98.6 | | | | | |
| 6-Aug-12 | Polovina | 9:54 | 99.1 | | | | | |
| 6-Aug-12 | Polovina | 9:55 | 98.7 | | | | | |
| 6-Aug-12 | Polovina | 9:57 | 102.2 | | | | | |
| 6-Aug-12 | Polovina | 9:57 | 98.8 | | | | | |
| 6-Aug-12 | Polovina | 9:59 | 101.4 | 99.8 | 44 | 96.2 | 102.2 | 98.9 |
| 7-Aug-12 | Reef | 9:00 | 97.1 | | | | | |
| 7-Aug-12 | Reef | 9:00 | 98.8 | | | | | |
| 7-Aug-12 | Reef | 9:02 | 100.8 | | | | | |
| 7-Aug-12 | Reef | 9:25 | 99.5 | | | | | |
| 7-Aug-12 | Reef | 9:26 | 97.5 | | | | | |
| 7-Aug-12 | Reef | 9:27 | 99.2 | | | | | |
| 7-Aug-12 | Reef | 9:27 | 100.1 | 99.0 | | | | |
| 7-Aug-12 | Reef | 9:53 | 98.2 | | | | | |
| 7-Aug-12 | Reef | 9:53 | 102.2 | | | | | |
| 7-Aug-12 | Reef | 9:54 | 101.2 | | | | | |
| 7-Aug-12 | Reef | 9:54 | 100.0 | | | | | |
| 7-Aug-12 | Reef | 9:55 | 103.3 | | | | | |
| 7-Aug-12 | Reef | 9:56 | 96.6 | | | | | |
| 7-Aug-12 | Reef | 9:56 | 99.1 | | | | | |
| 7-Aug-12 | Reef | 9:58 | 96.8 | 99.7 | | | | |
| 7-Aug-12 | Reef | 10:26 | 100.1 | | | | | |
| 7-Aug-12 | Reef | 10:27 | 101.3 | | | | | |
| 7-Aug-12 | Reef | 10:28 | 98.8 | | | | | |
| 7-Aug-12 | Reef | 10:29 | 101.4 | | | | | |
| 7-Aug-12 | Reef | 10:31 | 98.5 | | | | | |
| 7-Aug-12 | Reef | 10:31 | 101.9 | | | | | |
| 7-Aug-12 | Reef | 10:32 | 101.4 | | | | | |
| 7-Aug-12 | Reef | 10:34 | 98.5 | | | | | |
| 7-Aug-12 | Reef | 10:36 | 97.5 | 99.9 | 81 | 96.6 | 103.3 | 99.6 |

AGREEMENT TYPE: Memorandum of Agreement

AGREEMENT #: 2012-01

PROJECT: 1. Compare the number of gastrointestinal parasites in the stomach to the number of tapeworms in the ileum/caecum; and 2. Prevalence of hookworm larvae in the blubber of subadult northern fur seals.

PARTNER 1: Aleut Community of St. Paul Island (ACSNP), Tribal Government

ADDRESS: 2050 Venia Minor Road
St. Paul Island, Alaska 99660

PROJECT CONTACT: Pamela Lestenkof **TEL:** 907-546-3238 **FAX:** 907-546-3254 **EMAIL:** pmlestenkof@tgspi.com

PARTNER 2: Terry R. Spraker

ADDRESS: College of Veterinary Medicine, Colorado State university, Fort Collins Colorado 80526

TEL: 970-297-4155 **FAX:** 970-297-0320 **EMAIL:** Terry.Spraker@colostate.edu

PROJECT DESCRIPTION:

- STANDARD CONDITIONS (See Attachment)** **PROJECT SCOPE AND AUTHORIZATION (See Attachment)**

PERIOD OF PERFORMANCE: 01 July 2012 to 30 June 2013

EXECUTION: Execution of this document by duly an authorized representative of the Aleut Community of St. Paul Island, Tribal Government (Partner 1) and Terry Spraker (Partner 2), including Aleut Community of St. Paul Island, Tribal Government's Standard Conditions (reverse side) and any attachments, Additional Provisions as indicated, and addenda, represents the entire Agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral in regard to this specific project.

PARTNER 1: ACSNP, Tribal Government **PARTNER 2:** Terry R. Spraker

BY: Amos T. Philemonoff, Sr. **BY:** _____

SIGNATURE: _____ **SIGNATURE:** _____

TITLE: President **TITLE:** Pathologist, project leader

DATE: _____ **DATE:** _____

STANDARD CONDITIONS

1. **EXECUTION.** This Agreement becomes effective upon signatures by authorized representatives of each party and upon receipt by both parties of a signed original or facsimile transmittal.
2. **INITIATION.** Partner 2 is authorized to proceed with services upon receipt of an executed Agreement or written Notice to Proceed.
3. **COMPLETION/TERMINATION.** This Agreement shall remain in force until completion or until terminated. This contract may be terminated for any reason at any time by either party upon 10 days written notice. Any notice under this agreement shall be in writing and delivered in person or by public or private courier service (including the U.S. Postal Service Express Mail) or certified mail with return receipt requested or by facsimile. All notices shall be addressed to the party at the above addresses or at such other addresses that the parties may, from time-to-time, direct in writing. Any notice shall be deemed to have been given on the earlier of: (a) actual delivery or refusal to accept delivery; (b) the date of mailing by certified mail; or (c) the day facsimile delivery is verified. Actual notice, however, provided to Partner 1 or Partner 2, shall always be effective.
4. **COMPLIANCE WITH LAWS.** Partner 2 shall comply with all applicable Federal, State, local, and tribal laws and ordinances in carrying out the Scope under this Agreement.
5. **DISPUTES.** Unless the parties agree otherwise, all disputes arising under this agreement shall be heard in the St. Paul Island Tribal Court. The decision of the St. Paul Island Tribal Court shall be binding.
6. **SEVERABILITY.** If the Tribal Court determines that any provision of this Agreement is invalid or unenforceable, any invalidity or unenforceability will affect only that provision and will not make any other provision of this Agreement invalid or unenforceable and shall be modified, amended or limited only to the extent necessary to render it valid and enforceable.
7. **SUCCESSORS AND ASSIGNEES.** This Agreement binds and benefits the heirs, successors and assignees of the parties.
8. **ENTIRE AGREEMENT.** This instrument, together with the Memorandum of Agreement, constitutes the entire agreement between the parties; and it shall not be amended, altered or changed except by a written agreement signed by the parties hereto. It replaces and supersedes any and all oral agreements between the parties, as well as any prior writings for this project.
9. **REPORTING OF STUDY RESULTS:** Partner 2 will provide an annual report to Partner 1 of the results of the study. At a minimum the annual report will include the results of any analysis, and a preliminary interpretation of the results. If no results are available at the end of the period, a timeline for the analysis, results and reporting must be provided to the Partner 1. Each annual report shall describe the study, analysis of samples, the results of analysis, progress of study, and any forecasted activities. Any reports or peer-reviewed journal articles that are published as a result of the samples will also be provided and acknowledged.
10. **INTERFERENCE WITH HARVEST:** Partner 2 agrees not to interfere with the subsistence harvest process including but not limited to: round up, pod cutting, stunning, exsanguination, pelt removal, cutting and bagging of meat. Partner 2, in the process of collecting samples, is subject to oversight by the Harvest Foreman and enforcement actions of the Tribal Enforcement Officers, which may include suspension of the collection of samples.
11. **OTHER TERMS AND CONDITIONS.** No other terms or conditions.

PROJECT SCOPE AND AUTHORIZATION

Partner 1 authorizes Partner 2 to collect the following samples from the 2012 subsistence fur seal harvest on St. Paul Island, Alaska:

This project involves the collection of tissues from the 2012 northern fur seal subsistence harvest. The tissues collected are all discarded tissues collected from the gut pile and will not interfere with the harvest procedures.

This project involves Drs. Gene Lyons, Tetiana Kuzmina and myself. Dr. Lyons did his PhD on St. Paul Island in the early 1960's and described the life cycle of the hookworm of which at that time was causing relatively high mortality. Dr. Kuzmina is also a parasitologist and works with gastrointestinal parasites and was also working with these parasites last summer on St Paul. Drs. Lyons and Kuzmina are both from the University of Kentucky, Lexington, Kentucky. We would like to collect from the gut pile stomach attached to small intestine from subadult male seals killed during the fur seal harvest. The purpose is to compare the number of gastrointestinal parasites in the stomach to the number of tapeworms in the ileum/caecum. There is a hypothesis that as the worm burden decreases in the stomach the burden of tapeworms increase in the ileum/caecum. There is also the hypotheses that the reason the burden of gastrointestinal parasites are declining is that there also is a decline in the small energy rich intermediate host for these parasites. All of these sets of stomach/intestine would be collected from the gut pile and cause no disturbance to the harvest. If this decline in gastrointestinal parasites continues we will try to do further work to define the intermediate hosts for these parasites.

They also would like to collect 20 to 30 grams of blubber from the discarded pelts in the field. These blubber samples will be examined for the presence of third stage hookworm larvae. This analysis will give a rough estimation of the prevalence of hookworms in subadult males. At the present time we know the prevalence of hookworms in pups is relatively low, but do not know of the prevalence of hookworms in the subadult males. Since the degree of blubber varies on each pelt we would like to collect blubber from as many pelts from the gut pile that does have blubber. As we are collecting the blubber from the pelts we would examine the underlining of the pelts for filarial parasites. We would also like to collect discarded spleens from the gut pile and examine them for microfilaria of the adult filaria found in the pelts. We expect to find more evidence of the filarial parasites by examining spleens for microfilaria than only by checking the pelts for the adults. All pelts will remain on the killing field and not harmed in any way if people want the pelts for tanning. This request is for the 2012 northern fur seal subsistence harvest on St. Paul Island Alaska. I am covered under the National Marine Mammal Laboratory, Seattle, Washington to have fur seal tissues in my possession.

AGREEMENT TYPE: Memorandum of Agreement
AGREEMENT #: 2012-02
PROJECT: Project No. 1 – Fur Seal Sample Collection for Prevalence of Potentially Reproductively Harmful Diseases, and isotope analysis
PARTENER 1: Aleut Community of St. Paul Island (ACSNP), Tribal Government
2050 Venia Minor Road
ADDRESS: St. Paul Island, Alaska 99660
PROJECT CONTACT: Pamela Lestenkof **TEL:** 907-546-3238 **FAX:** 907-546-3254 **EMAIL:** pmlestenkof@tgspi.com
PARTNER 2: Bobette Dickerson
ADDRESS: NMFS/NMML 7600 Sand Point Way NE Seattle WA 98115
TEL: 206 526 4688 **FAX:** 206 526 6615 **EMAIL:** Bobette.Dickerson@noaa.gov

PROJECT DESCRIPTION:

STANDARD CONDITIONS (See Attachment)
 PROJECT SCOPE AND AUTHORIZATION (See Attachment)

PERIOD OF PERFORMANCE: 01 July 2012 to 30 June 2013

EXECUTION: Execution of this document by duly a authorized representative of the Aleut Community of St. Paul Island, Tribal Government (Partner 1) and Bobette Dickerson (Partner 2), including Aleut Community of St. Paul Island, Tribal Government’s Standard Conditions (reverse side) and any attachments, Additional Provisions as indicated, and addenda, represents the entire Agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral in regard to this specific project.

| | | | |
|-------------------|---------------------------------|-------------------|----------------------------|
| PARTNER 1: | <u>ACSNP, Tribal Government</u> | PARTNER 2: | <u>Bobette Dickerson</u> |
| BY: | <u>Amos T. Philemonoff, Sr.</u> | BY: | <u></u> |
| SIGNATURE: | <u></u> | SIGNATURE: | <u></u> |
| TITLE: | <u>President</u> | TITLE: | <u>Fisheries Biologist</u> |
| DATE: | <u></u> | DATE: | <u></u> |

STANDARD CONDITIONS

1. **EXECUTION.** This Agreement becomes effective upon signatures by authorized representatives of each party and upon receipt by both parties of a signed original or facsimile transmittal.
2. **INITIATION.** Partner 2 is authorized to proceed with services upon receipt of an executed Agreement or written Notice to Proceed.
3. **COMPLETION/TERMINATION.** This Agreement shall remain in force until completion or until terminated. This contract may be terminated for any reason at any time by either party upon 10 days written notice. Any notice under this agreement shall be in writing and delivered in person or by public or private courier service (including the U.S. Postal Service Express Mail) or certified mail with return receipt requested or by facsimile. All notices shall be addressed to the party at the above addresses or at such other addresses that the parties may, from time-to-time, direct in writing. Any notice shall be deemed to have been given on the earlier of: (a) actual delivery or refusal to accept delivery; (b) the date of mailing by certified mail; or (c) the day facsimile delivery is verified. Actual notice, however, provided to Partner 1 or Partner 2, shall always be effective.
4. **COMPLIANCE WITH LAWS.** Partner 2 shall comply with all applicable Federal, State, local, and tribal laws and ordinances in carrying out the Scope under this Agreement.
5. **DISPUTES.** Unless the parties agree otherwise, all disputes arising under this agreement shall be heard in the St. Paul Island Tribal Court. The decision of the St. Paul Island Tribal Court shall be binding.
6. **SEVERABILITY.** If the Tribal Court determines that any provision of this Agreement is invalid or unenforceable, any invalidity or unenforceability will affect only that provision and will not make any other provision of this Agreement invalid or unenforceable and shall be modified, amended or limited only to the extent necessary to render it valid and enforceable.
7. **SUCCESSORS AND ASSIGNEES.** This Agreement binds and benefits the heirs, successors and assignees of the parties.
8. **ENTIRE AGREEMENT.** This instrument, together with the Memorandum of Agreement, constitutes the entire agreement between the parties; and it shall not be amended, altered or changed except by a written agreement signed by the parties hereto. It replaces and supersedes any and all oral agreements between the parties, as well as any prior writings for this project.
9. **REPORTING OF STUDY RESULTS:** Partner 2 will provide an annual report to Partner 1 of the results of the study. At a minimum the annual report will include the results of any analysis, and a preliminary interpretation of the results. If no results are available at the end of the period, a timeline for the analysis, results and reporting must be provided to the Partner 1. Each annual report shall describe the study, analysis of samples, the results of analysis, progress of study, and any forecasted activities. Any reports or peer-reviewed journal articles that are published as a result of the samples will also be provided and acknowledged.
10. **INTERFERENCE WITH HARVEST:** Partner 2 agrees not to interfere with the subsistence harvest process including but not limited to: round up, pod cutting, stunning, exsanguination, pelt removal, cutting and bagging of meat. Partner 2, in the process of collecting samples, is subject to oversight by the Harvest Foreman and enforcement actions of the Tribal Enforcement Officers, which may include suspension of the collection of samples.
11. **OTHER TERMS AND CONDITIONS.** No other terms or conditions.

PROJECT SCOPE AND AUTHORIZATION

Partner 2 is characterizing the prevalence of potentially reproductively harmful diseases in the northern fur seal population on St. Paul Island. Partner 2 is using a combination of serology and polymerase chain reaction (PCR) to test for Chlamydia, Leptospirosis, calicivirus, brucella, morbillivirus, herpes, coxiella and toxoplasmosis in the population. To date Partner 2 has been able to take samples from adult females in the fall. Only testing females (and only from one time of the year) would result in a biased estimate of the rates of these diseases in the population so to get a more rounded sample set she wants to take samples from the sub adult males (SAM) taken during the harvest to test for these diseases. Morbillivirus (phocid distemper) is of particular interest due to a potential impact on monk seals so to further characterize this disease in fur seals we will be attempting to culture the virus from liver samples so the nasal swabs will be tested and if positive the liver tissue will be cultured. The whiskers will be used to look at variation in stable isotopes between haulouts to determine feeding location of the SAMs throughout the year. The fecal samples will be used to look for dimoic acid prevalence.

Partner 1 authorizes Partner 2 and Van Helker to collect the following samples from the 2012 subsistence fur seal harvest on St. Paul Island, Alaska for the above mentioned project:

| Species | Tissue Requested | Amount of Tissue/Sample | Number of Samples/Animal | Total Number of Samples | Protocol |
|-------------------|-------------------------|--------------------------------|---------------------------------|--------------------------------|-----------------|
| Northern fur seal | Whiskers | 1 whisker | 1 | 300 | NMML |
| Northern fur seal | Feces | 3 ml | 1 | 100 | NMML |
| Northern fur seal | Blood for serum | 8 ml | 1 | 100 | NMML |
| Northern fur seal | Nasal swabs | Swab | 2 | 100 | NMML |
| Northern fur seal | Liver | 5 cm x 5cm | 1 | 100 | NMML |

Annual report Terry Spraker

Project 1

Describe the study: Dr. Wendi Roe, College of Veterinary Medicine, Massey University, North Pomer, New Zealand and I are investigating markers for degrees of hypoxia to the brain related to drowning of Southern Sea lions off the New Zealand coast. This project entails the collection of 40 subadult male heads from the gut pile following the harvest. One of the major difficulties in this project is obtaining normal tissues to study hypoxia and the effect of post mortem changes in the brain. These tissues collected from the gut pile will serve as control tissues.

Analysis of samples: Brains (n=40) were collected from the harvest. The brains were removed from 10 immediately after the seals were killed (0 hours), 10 at 12 hours, 10 at 24 hours and 10 at 48 hours following death. These brains were examined histologically with two different stains used in human medicine to determine degrees of hypoxia and ischemic necrosis.

Results: With the first histological examination no difference could be determined with the stained used.

Progress of study: The purpose of the study was to investigate if these stained used to determine hypoxic damage to the brain in humans could be used in seals.

Preliminary interpretation: These stains do not work in Northern Fur seal brains.

Publications: None

Project 2

Describe the study: The second project involves Drs. Gene Lyons, Tetiana Kuzmina and myself. Dr. Lyons did his PhD on St. Paul Island in the late 1960's and early 1970's and described the life cycle of the hookworm of which at that time was causing relatively high mortality. We would like to collect 20 to 30 grams of blubber from the discarded pelts from the gut pile. These blubber samples will be examined for the presence of third stage hookworm larvae. This analysis will give a rough estimation of the prevalence of hookworms in subadult males. At the present time we know the prevalence of hookworms in pups is relatively low, but do not know of the prevalence of hookworms in the subadult males. Since the degree of blubber varies on each pelt we collected blubber from as many pelts from the gut pile that does have blubber. This request is for the 2011 northern fur seal subsistence harvest on St. Paul Island Alaska.

Analysis of samples: Blubber was collected from the pelts of 140 subadult male fur seals killed during the harvest. These samples were minced and placed in Baermann funnels filled with warm water and allowed to settle for 6 hours. Next the material from the bottom of the tubes was examined for the presence of third stage hookworm larvae.

Results: A total of 8 third stage hookworm larvae were found in the blubber of 5 of 140 subadult males and three adult hookworms were found in the small intestine of a single subadult male fur

seal. This is the first reported finding of third stage hookworm larvae in a subadult northern fur seal.

Progress of study: NA

Preliminary interpretation: The results from this study suggest that the prevalence of third stage hookworm stored within the blubber layer in subadult fur seal males is still extremely low (3-5% from different haul-out areas).

Publications: Yes one

Lyons, Eugene T., Tetiana A. Kuzmina, Sharon C. Tolliver and Terry R. Spraker. Update on the prevalence of the hookworm, *Uncinaria lucasi*, in northern fur seals (*Callorhinus ursinus*) on St. Paul Island, Alaska, 2011. Parasitology Research Online First™, 8 March 2012

These data were presented in two scientific conferences – the Alaska Marine Science Symposium (Anchorage, 15-20 January, 2012) – three posters

And at the 11th European Multicolloquium of Parasitology (Cluj-Napoca, Romania, 28 of July – 2 of August 2012).

Project 3

Describe the study: This project involves Drs. Tetiana Kuzmina, Gene Lyons and myself. Dr. Lyons is from the University of Kentucky, Lexington, Kentucky, Dr. Kuzmina is from the Institute of Zoology NAS of Ukraine. Stomach and intestinal tracts were collected from 105 to 140 subadult male fur seals killed at the harvest. All gastrointestinal parasites were collected, enumerated and identified. Then the number of gastrointestinal parasites will be compared to previous published reports.

Analysis of samples: All gastrointestinal parasites were collected, enumerated and identified from 105 subadult males fur seals killed at the harvest.

Results: The number of gastrointestinal parasites appears to have declined as compared to data found in the 1950s and late 1980/early 1990s.

Progress of study: This study is progressing nicely. However, we need similar parasitological surveys for the next 5 years to validate that the gastrointestinal parasite burdens have in fact declined over the last 50 years. The next step in this project will be to determine if the cause in the decline of gastrointestinal parasites is actually due to a decline in the intermediate and paratenic hosts of these gastrointestinal parasites. The intermediate and paratenic hosts for these gastrointestinal parasites are the small energy rich fishes that are caught as by-catch in the fishing industry.

Preliminary interpretation: The prevalence of gastrointestinal parasite burden has continued to decline over the last 50 years

Publications: yes one

Kuzmina, T.A., O. I. Lisitsyna, E. T. Lyons, T. R. Spraker and S. C. Tolliver. Acanthocephalans in northern fur seals (*Callorhinus ursinus*) and a harbor seal (*Phoca vitulina*) on St. Paul Island, Alaska: species, prevalence, and biodiversity in four fur seal subpopulations. *Parasitology Research. Online First*TM, 15 May 2012

These data will be presented at the 11th European Multicolloquium of Parasitology (Cluj-Napoca, Romania, 28 of July – 2 of August 2012)

29 June 2012

Report on Memorandum of Agreement MOA2011-01 Project No. 1 – Fur seal sample collection for prevalence of potentially reproductively harmful diseases.

TO: Aleut Community of St Paul Island Tribal Government

From: Bobette Dickerson NMML (206) 526-4688

Over the course of the 2011 northern fur seal harvest I collected 50 nasal swabs, 30 lung, lymph node, liver, skin and testicular tissues, 20 fecal samples and 100 serum samples from SAMs to investigate the prevalence of potentially reproductively harmful diseases and to test for the prevalence of dimoic acid.

The blood samples have been tested for prevalence of coxiella with high positives (final results pending up on the upwards of 80%) as we expected since we have found high incidence of coxiella in placentas and in the dirt surrounding rookeries. This is not an indication of an active infection it is just an indication of exposure at some point in the animal's life. We will be working with the CDC throughout the next couple of years to determine actual infection rates and the pathological implications if any.. The fecal samples have been passed on to the dimoic acid lab and we should have results soon. Due to budget constraints we have been unable to run the majority of tests but the samples are safely housed at -80C and will be run soon.

I would be happy to answer any questions you may have regarding the results we have so far and the additional work we plan on doing with the samples.