

**Proceedings of the Arctic Pinniped Disease Investigation Workshop
Alaska Marine Science Symposium
Wednesday, Jan 18th**

Proceedings editor Carrie Goertz

Abstract: In January 18, 2012, a disease workshop was convened to share and discuss preliminary findings of the 2011 Northern Pinniped and Pacific Walrus UME disease investigation. Veterinarians, laboratory scientists, wildlife biologists, hunters and marine mammal co-management commissioners, academic researchers, several federal and state agency personnel were attending.

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Introduction/overview/goals and objectives of meeting: Kathy Burek, AVPS

Participants were greeted and thanked for attending this workshop. The goals of the workshop are to:

1. Bring everyone up to date on what has been done and determined up to this point.
2. Introduce all participating individuals and organizations to one another.
3. Come up with a plan for what we need to do in moving forward with this investigation.
4. Produce a written document in a reasonable period of time from this workshop, with specific goals and plans for the ongoing investigation.

This document and the associated materials are the result of the workshop.

UME short overview: Teri Rowles, NOAA

The UME program is an official effort to determine causes of unusual marine mammal mortality events, whether the event affects the population, and whether there are contributing factors such as physical, biological, or chemical. The working group is established by statute and consists of 12 expert advisors, including international participants. Given some of the unique aspects of this event, the group may need to be modified to include a hunter/subsistence expert. The group works with local representatives and experts and helps to determine the course of the investigation. The working group appoints investigative teams to plan and determine the bounds of the investigation. Additionally, the working group determines the end of 'event' although the investigation may continue; two possible outcomes are when there are no new causes or when there is nothing new to investigate. Additionally, there is a national contingency plan that outlines how to manage events such as these and provides guidance on laboratory testing. There will be more discussion about the contingency planning later.

Investigative Team

Onsite Coordinator- Raphaela Stimmelmayer

Offsite Coordinators: Joel Garlich Miller (USFWS) and Aleria Jensen (NOAA/NMFS)

UME Working Group Liaison: Steven Raverty

Lead Pathologist: Kathy Burek-Huntington (AVPS)

Field response and findings: North Slope Borough Surveys, Raphaela Stimmelmayer

Historically, over almost three decades, The Alaska Marine Stranding Network has reported 240 pinniped strandings in the Arctic and Western Arctic. Sixty-three percent (152/240) of these were carcasses. It is important to point out that carcass counts are highly opportunistic and most likely underestimate overall mortality. In 2011, there were over 100 seal stranding reports, the majority of which were live or moribund, but about 40% were carcasses. During this event, dedicated beach surveys were performed by NSB two to three times per week. Carcasses were measured and tagged if left on the beach to avoid double counting. Cases were distributed across the North Slope Borough. Initial cases were reported in June with peak observations occurring during August-September, and numbers quickly tapering off thereafter. All age classes were represented. The sex ratio was roughly equal. Major findings included lethargy (~30% of assessed seals), approachability/lack of flight response, and respiratory distress in some animals. Variable skin lesions were

present in over two thirds of animals and included alopecia, ulcers from pinpoint to extensive, flipper lesions, erosions, bleeding, sloughing, and some lesions that were subtle with barely visible but palpable nodules on flipper webbing. The UME consultation application package was submitted in late November. Since then whaling captains have observed many bearded and ringed seals that appeared healthy and exhibited normal behavior. About 30 adult ringed seals have been harvested from the ice during the winter hunt and no hair-loss or sores were reported. In January, the NSB DWM has examined three subsistence-harvested ringed seals. These animals were in good body condition (fatness) with normal hair coats, although there were a few small nodules present in the hind flipper webbing consistent (which may be related to lesions observed during last fall). These lesions were so few and small that in other years they would have been most likely considered unremarkable or missed all together. Communities have expressed multiple concerns about the subsistence use of seals; in light of the event this year, some do not want to hunt seals and would not eat them if sick. Others have been continuing their traditional practices and may not use a seal at all if it shows sign of illness (different seal parts are used for food and traditional handicrafts). Harvest is expected to continue through March and NSB-DWM will continue to examine most subsistence harvested seals. It was noted that lots of folks were and continue to be involved from the field to the lab (i.e.: hunters, community members, biologists and other field staff).

Field response and findings: North Slope Borough Seal Tagging Project, Jason Herreman

This tagging project was set up prior to this event with the goal of investigating seal movement. Tags included SPOT flipper tags (report every 4 days) and SPLASH head mounted tags (report every day). The first captured animal was a 'normal' hairless seal and it was just flipper tagged. Thirty-three tags were deployed on 24 different animals. Tag retention was fairly short, about 50% lost communication within two months, and 5 of 14 head mounts and 3 of 16 SPOT tags are still transmitting. Seals with skin lesions were tagged with targeting of animals that still retained some flight behavior and had some potential of survival; moribund seals were not tagged. Lost communication does not equal death, but could mean the tag fell off or it stopped transmitting for other reasons. Occurrence of diseased seals over time followed the movement pattern of tagged seals. Haulout patterns of affected seals appeared clustered by Barrow. Twelve affected seals were tagged, with one tag still reporting. Tag analysis may suggest high rate of mortality in affected animals but tags may go offline for many reasons other than death. One tagged animal was monitored for a few hours, tag attachment was checked and it peeled right off leaving a bald spot underneath; it appeared that the animal had not properly molted and had an 'old' coat. Some tagging data is available from previous years but no comparative analysis has been done and may not be truly comparable due to the large number of variables involved. A small amount of blood serum (2 ml) was obtained but because it is so limited and there has not been a specific etiology to investigate, these samples have not been sent out for testing yet.

Bering Sea Communities, Gay Sheffield

Marine mammals are a key subsistence resource, an essential food item for people. Additionally, seals are an important source for handicrafts which are both culturally and

economically important. The pelts should be at peak condition in the fall; however, this year, many had no new hair growth and some were in mid-molt. Historically, the Bering Strait region has seen occasionally hair-loss cases which have included ringed, bearded, and spotted seals. As the current situation was evolving, information flyers were produced and distributed by the EWC and the Marine Advisory Program to Bering Sea community members. Information was gathered on 61 'events' which may have included more than one seal. Animals were scored in three categories: approachable, no new hair growth, or having lesions. Approachable animals started showing up in May. One event in July involved 10 dead seals on one beach. There were a few cases of carcasses washing up on shore, though several reports were received of weak/approachable sub-adult seals. Many reports of sick animals were from the hunting community as the unusual condition of the seal was first noticeable after it was harvested and retrieved. Multiple species were involved. *Most, 57% (35), were ringed seals, both sexes, found in all summer months; 57% had hair-loss, 11% were approachable, 6% had lesions, and 26% had a combination of signs. Animals with skin lesions may be under reported since signs can be subtle. Reports of ringed seals were based on harvested animals (68%), live observations (26%), and one that washed up dead (6%). Spotted seals, 18% (11), showed up in July, August, and October; most had hair-loss and were not as approachable. Bearded seals, 11% (7), showed up later in October and November. All had hair-loss and were not as approachable; presence of lesions is unknown.* [Caution for the previous paragraph in italics) – these were events, not individuals and some additional cases for 2011 will need to be added as some back tracking of reports in ongoing.] Reports decreased in November but this is probably more because of decreased hunting effort due to severe weather and therefore a decrease of observers in the field. The communities along the northern and western coast have many concerns about food security and zoonotic diseases; there have been repeated calls to the Marine Advisory Program Office in Nome for the latest news. There is a greater need for Public Service Announcements and frequent, relevant information going back to the communities. In addition to the loss of food, the diseased seals also represent a loss of pelts for handicrafts.

Canadian Perspective, Ole Nielsen, Department of Fisheries & Oceans Canada

In 2010 there were numerous ringed seals that were stranded and scavenged in western Hudson Bay. Typically they do not come ashore in that area because of high predation risk by polar bears. During this event, there were reports of polar bears grabbing seals out of the water or herding them to shore, even very young, naive polar bears. Polar Bears were getting more than they needed and were caching carcasses. Over the past decade there have been numerous inquiries about skin abnormalities in seals. Testing for distemper and influenza A were negative. There was one walrus, observed by a tagging project, which had odd skin lesions, and was approachable but went back into water and was not sampled. Dr. Nielsen recommended that there be a case definition developed for both seals and walrus.

Seal reports continued in 2011 and included new communities. No human illness was reported. Hunters from most communities report seeing fewer seals. In Eastern Canada, there is speculation by communities that abnormal molting may be due to contaminants, but cause is unknown. Harp seal populations are increasing, yet ice for pupping is decreasing. Harp seals are increasing (possibly replacing ringed seals?) and are found in more areas, including pupping in Maine. There had been unexplained die-offs of harp seals

which have not been well investigated/sampled, and there are continuing disease problems in NE Atlantic (distemper, influenza A). The role of migrating seals in disease transmission is unclear. Climate change concerns include shrinking ice and increased 'stress' which may lead to emergence of 'new' diseases and increased severity of 'existing' diseases. Hunters are concerned about the skin problems which seem to be getting more severe and prevalent. Unclear if abnormalities in the skin and mortalities of Hudson Bay ringed seals and Labrador harp seals are somehow related to events in Alaska and if perhaps problems have been smoldering for a while.

Walrus, Joel Garlich Miller (USFWS)

Walrus habitat use has changed with sea ice distribution. There is an increased use of coastal haulouts, including 'super-haulouts', historically a Russian problem but there is an increased emergence of coastal haulouts in Alaska, in particular, Point Lay (4-8 weeks, 10-30,000 animals). These haulouts create many conservation concerns including increased interactions with humans and polar bears and increased disturbance related mortalities which affect small, young animals the most. Additionally, there are concerns about stress, increased disease risk, poor nutrition, poor body conditions, increased abortions due to use of suboptimal habitat, increased transmission between animals, all of which may contribute to a high level of mortality. Current management response includes outreach, community stewardship, and restricting flights near haulouts. A 2011 tagging project noted several animals with atypical skin lesions from tusk rake marks. A multi-agency carcass survey enumerated carcasses and collected basic morphometric and demographic data and a few bio-samples (nasal, rectal, and ulcers swabs plus some tissues). One walrus with lesions was observed ante mortem, euthanized, and extensively sampled and several other animals with lesions dead on the beach were also sampled. Out of more than 20,000 animals at the site there were only 28 carcasses (68% calves and yearlings) most of which had signs of trauma/trampling but also ulcerations of unknown origin. The prevalence of lesions in several hundred live animals was examined through high powered binoculars; approximately 6% had lesions, most were sub-adults and were otherwise healthy in behavior and appearance. Russia has seen similar lesions for the past decade, typically low numbers, younger animals (dependent calves); they speculated the causes may include biting flies and/or tusk trauma. There have been no reports of widespread illness or mortality in walruses. Walrus were included in the UME declaration because of the concern of the possibility of a common agent affecting multiple species in the region. Questions include: what is the cause in walrus; is it contagious within or between species; how prevalent is it; what are the consequences to animal health/mortality/recruitment; and what is the appropriate management response? There have been no reports from the Bering Strait region or Bristol Bay consistent with the skin lesions observed further north, and high definition photos from Round Island have been reviewed.

Necropsy response and diagnostic findings from Alaska seals and walrus: Kathy Burek, AVPS

Findings are currently available from the 24 seal necropsies and 7 seal biopsies, and a few walrus (2 necropsied, 4 sampled). The team members involved include people from native communities, diagnostic laboratories, AVPS technicians, and many state, federal, and private organizations. Hunter killed animals often yielded the best samples because those

animals had not yet succumbed to secondary problems which can obscure the primary problems. The animals that were found dead tended to get terminal sepsis/bacteremia, had abnormal bleeding from skin lesions and out nose/mouth, and retention of old/yellowed hair plus alopecia. Walrus were less affected. Only approximately 6% in herd hauled out had diffusely scattered skin ulcers, most looked healthy. There were relatively low numbers of carcasses on the beach, ones that were present were primarily pups and juveniles.

The “new” cases that we are seeing this year have been described in Raphaela, Jason, Gay’s presentations. These animals had skin ulcers that sometimes would bleed, abnormal hair loss, retention of old hair, sometimes oral ulcers. Typical internal findings on necropsy included organ congestion, discolored/soft liver, and abnormal lymph nodes. Subtle skin lesions often had extensive, deep, and significant changes underneath. Seals with hair-loss (or bald seals) have been observed sporadically over many years with an apparent increased incidence this year; hunters have historically consumed/used seals with only this condition. I did examine a few of these animals and except for the hair loss, were in good body condition, and did not have the skin ulcers or nodules or changes in the liver and lymph nodes.

Histopathological findings in the systemically ill animals include the following:

- Skin and mucous membranes: dermal vasculitis (inconsistently found), ulcers, erosions, edema, some with intracytoplasmic or intranuclear inclusion bodies suggestive of virus or degenerative proteins but negative on EM for viral particles. Some have heavy fungal and bacterial colonization which is probably secondary to the ulcerative process
- Hair follicles: degeneration suggesting that hair will not be replaced with new hair. Some had heavy growth of organisms on the shaft of the hair. Additionally, all cases had mostly inactive follicles where there should be a mix of active and inactive – this kind of change is typically associated with endocrine problems
- Lung: extremely congested to hemorrhagic
- Heart: some had myocardial degeneration or lymphocytic myocarditis - suggestive of possible viral cause or etiology.
- Liver: hepatitis in different patterns, some of which suggested viral etiologies. This varied from a multifocal random lymphocytic, neutrophilic, or necrotizing hepatitis to lymphocytic periportal hepatitis. Some animals were also icteric
- Urogenital: Some animals had a pigmentary nephrosis due to draining of hemoglobin into kidneys (suggestive of hemolysis). One had a urogenital tumor.
- Lymphoid pathology: hemorrhage and erythrophagocytosis, lymphoid depletion, remarkable thymic atrophy in pups and YOY. A few animals had syncytial cells in the LN cortex, suggestive of virus but subsequent testing did not support this (IHC for Morbillivirus was negative).

Additional Testing

- Serology: a few positives but consistent with normal background levels (Positive rates by serology: morbillivirus 0/4, leptospira 1/4, herpes 3/4, brucella 1/2, calicivirus was negative)

- Bacteriology: cultured multiple pathogens but nothing consistent, PCR/Discovery testing, mostly negative (mycobacteria, rickettsia, erysipelothrix), some positives (mollicutes, bartonella, hemotropic mycoplasma in seals, bartonella in one walrus)
- Virology: All techniques are complementary, positive findings using multiple techniques are required to confirm a disease process is due to a virus.
 - PCR negative for all diseases tested, some of which were known to cause skin diseases (Calicivirus, Morbillivirus, Pan-Picornavirus, Herpesvirus, Papillomavirus, Poxvirus, Parapoxvirus, Vesicular Stomatitis Virus, Foot and Mouth Disease) as well as other viruses (Circovirus, Influenza A/B, Arterivirus, Adenovirus, Coronavirus, Enterovirus, Flavivirus, Orbivirus, Orthohepadnavirus, Paramyxovirus, Rhabdovirus, and Papovavirus).
 - Viral cultures produced an isolate from 1 of 4 walrus samples and 3 of 11 seal samples, ID still pending, but may not be significant.
 - Gene arrays negative
 - 4-5-4 pathogen discovery in progress (Columbia University) which produces a lot of data that must be reviewed.
 - Work on detecting Reverse Transcription Activity Assay has yielded some positives from both diseased and healthy seals as well as some of the lesional walrus but further work is necessary to determine significance. These results so far indicate a possible beta retrovirus with closest relationship to SIV viruses. The correlation with sick versus healthy seal tissues/ sera needs to be determined since there are both endogenous and exogenous retroviruses widely distributed in nature.
- Toxicology: samples taken for testing for heavy metals, radionuclides, HABS (DA and PSP negatives, possible to send for 'discovery' testing but unlikely cause), persistent organic pollutants, all results pending

Summary: Despite extensive testing, no significant pathogens detected and this is most likely a complex multifactorial process. Ongoing testing with results pending includes pathogen discovery techniques, significance of hemotrophic mycoplasmas, retroviruses characterization, and biotoxins/contaminants. Climate change factors should be considered. A normal molting process is initiated by basking on sea ice and therefore may be affected by decreased suitable ice for hauling out. The normal molt process actually involves approximately 6 months of orderly endocrine changes, so factors that might affect the endocrine system could be having the result of abnormal molt; these abnormalities in molt need to be worked up further, which may require live captures, examination of clinical chemistries, endocrine hormones including thyroid, corticosteroids, and sex hormones. Perhaps the new disease is related to the abnormalities in molt and due to decreased ability of the skin to counter the normal pathogens in the environment. It is also possible various contaminants might be playing a factor and they will be investigated thoroughly.

Public health and food security perspective: Louisa Castrodale, AK Health & Social Services

There are three groups involved from State agencies. The Division of Environmental Health has provided laboratory space, diagnostic testing, communications with USDA, and

consultation and facilitation. The Division of Public Health has consulted with NOAA and Health Canada to provide recommendations regarding public health to Environmental Health offices, Public Health Nurses, and other partner agencies. Standard recommendations, guidance provided to hunters regarding any animal include: neither eating animals that appear sick or diseased nor those that wash up but report sightings; safe food handling recommendations (butcher/handle with gloves, wash hands and equipment, cook meat); do not feed affected pieces to other animals; seek medical attention if sick. Marine mammals are known to carry other zoonotic diseases (rabies, trichinella, mycoplasma, brucella, pox) and working with marine mammals involves known hazards so there have always been concerns about possible disease transmission from marine mammals for both subsistence users and biologists. Questions include: what to recommend with limited information for different groups, when/how/what route to relay recommend changes, will there be changes to subsistence patterns.

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Conservation
Division of Environmental
Health
Office of the State Veterinarian
Bob Gerlach

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Division of Wildlife
Conservation
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Dept of Health & Social
Services
Division of Public Health
Section of Epidemiology
Louisa Castrodale

Traditional knowledge perspective: Ice Seal Committee and Eskimo Walrus Commission representatives

Mike Pederson introduced Ice Seal Committee/hunter/community representatives present, John Goodwin (Kotzebue), Vera Metcalf (Nome), and Harry Brower (Barrow), who bring hunter perspectives and traditional knowledge information; emphasized the need to keep Native communities informed.

There is a large interest in figuring out what the problem is and a large desire for more frequent communication/feedback. Communications are hampered by infrequent exchanges as well as the different 'language' that hunters and scientists use. Ice seals are very important in terms of subsistence and culture. Native traditional subsistence hunters have a unique perspective and traditional knowledge that will assist in understanding health problems. There are concerns in the community about zoonotic potential and possible contaminants. Communication is important to relay back to communities when sick animals are in the area, with information on how observers can identify a sick animal. Current observations peaked over the summer months so could this be related to warmer weather? Many wonder if this situation is going to repeat in 2012. The previous hairless seals seemed otherwise healthy and were readily consumed but folks are increasingly concerned and wary about the hairless seals with ulcers which tend to have easily identified differences with internal organs. Communities are looking to the biologists for answers but understand and have heard that nothing has been concluded; however, they still need to hear what is/is not learned. Traditional practice is to relieve obviously suffering animals from their misery but also to not handle them. Abnormal carcasses are left in the field or returned to the ocean so as not to transmit diseases, but wonder now what should be done with carcasses and those found dead. The impression is that the majority of sick animals are dying and not recovering, including the tagged animals.

Previously observed walrus flippers with irregular skin may be due to being in the water too long and not hauling/drying out. Hunting knowledge of animal behavior may assist with success of projects, such as tagging - for example, some seals may use their head to help break ice so tag placement on top of their head may be problematic. Ringed seals tend to break the surface in a vertical position and then sink almost straight down, whereas bearded seals tend to break the surface at an angle, swim a short distance, and arch before diving. The Walrus Commission works with communities and USFWS to monitor populations. Communities are concerned about human health as well as harvest guidelines and salvage requirements, namely the significance and misinterpretation of not harvesting enough from hunted animals that on closer examination have visible changes of concern (the risk of citation for wasteful/wanton hunting). Communities need to be involved and need follow-up communications. St Lawrence Island hunting starts in March. Care needs to be taken to avoid alarmist recommendations/language/suggestions such as recommending using gloves. In later session additional concerns that were mentioned included effects of the Japanese earthquake and tsunami, and the effect of increased ship traffic and release of ballast water. Marine mammals are not only an important food source but are also economically important as handicraft materials.

The workshop broke up into three working groups whose discussions are summarized below. Longer notes about their discussions are attached.

Teri Rowles ended with a brief discussion about the need to develop a generalized contingency plan for addressing multiple types of arctic marine mammal events and issues. Such a plan would include obtaining baseline data, performing recurring surveillance, and responding to discrete events. The hope is that the infrastructure being developed to address the current UME can be used as the basis for an Alaskan Marine Mammal Contingency Plan.

Because time ran out, an update about the Pinniped Unusual Mortality Event in the Northeast was not presented.

Working Group 1: Laboratory Analyses, Stephen Raverty and Kathy Burek
Participants: Carlos Romero, Cadhla Firth, Terri Rowles, Tracey Spoon, Ole Nielsen, Pam Tuomi, Mandy Keogh

DRAFT CASE DEFINITION: The presentations of the disease are different enough between ice seals and walrus to have separate case definitions.

ICE SEALS: For Ice seals, there seem to be two related but different disease processes, so we would like to split these into two separate but related case definitions:

- Case/Type 1: Alopecia alone is present. These cases are of less concern, but samples are still needed to help understand differences from other case types and possible causes. Will need a few whole animals from a couple of regions, nominally 10 but the number of animals needed will be determined as part of the epidemiology plan to be developed by the WG and the Investigative Team. Presumed healthy/normal animals could potentially be taken as directed research takes under the national MMHSP permit to avoid requiring hunters to give up animals that they would normally use. Authorization under the permit requires consultation with permit office but is relatively quick, most straight forward for animals with early lesions but also probably for animals without apparent signs and presumably normal/healthy.
- Case/Type 2: Those with significant signs such as the following. Would like to examine as many as feasible but epidemiologic plan will help guide needs and logistics may limit it to a maximum per day. Will need to develop communication strategy to quickly relay new needs and when carcasses are no longer needed.
 - Externally obvious signs
 - Prolonged molt with retention of old or senescent hair
 - Alopecia with or without sores/cutaneous ulceration, sometimes open or bloody
 - Blepharitis
 - Rhinitis with or without additional clinical signs including respiratory distress
 - Lack of fear/response to humans, approachable, lethargy
 - Necropsy findings of
 - Retention of senescent hair, alopecia, ulcerative dermatitis
 - Thymic atrophy
 - Lymphadenopathy
 - Marked pulmonary and generalized congestion with or without additional lesions
- A field case definition checklist for seals could look like:

Lack of hair or presence of old hair	<input type="checkbox"/> Yes <input type="checkbox"/> No
Unafraid of people and approachable	<input type="checkbox"/> Yes <input type="checkbox"/> No
Bumps present on:	
Flippers	<input type="checkbox"/> Yes <input type="checkbox"/> No
Face	<input type="checkbox"/> Yes <input type="checkbox"/> No
Eyes	<input type="checkbox"/> Yes <input type="checkbox"/> No
Lips	<input type="checkbox"/> Yes <input type="checkbox"/> No
Armpits	<input type="checkbox"/> Yes <input type="checkbox"/> No
Sores (sometimes open or bloody) present on:	

Flippers	<input type="checkbox"/> Yes <input type="checkbox"/> No
Face	<input type="checkbox"/> Yes <input type="checkbox"/> No
Eyes	<input type="checkbox"/> Yes <input type="checkbox"/> No
Lips	<input type="checkbox"/> Yes <input type="checkbox"/> No
Armpits	<input type="checkbox"/> Yes <input type="checkbox"/> No

It would be helpful to include photos of the lesions and an outline of a seal on the checklist

- **WALRUS:** Pacific walruses have very sparse pelage and hair density is highly variable among individuals. Therefore it is hard to define unusual cases of Alopecia. The primary findings on the affected walrus were Multifocal open or bloody sores /ulcers often in otherwise healthy appearing and acting animals. In more advanced cases, there may also be poor body condition, lethargy, lack of flight response, respiratory distress.
- A simple field case definition check list for walrus could include the following:

Bumps or sharply delineated sores across the body	<input type="checkbox"/> Yes <input type="checkbox"/> No
+/- Blood coming from nose/mouth	<input type="checkbox"/> Yes <input type="checkbox"/> No
Lethargy	<input type="checkbox"/> Yes <input type="checkbox"/> No
Body condition	<input type="checkbox"/> fat <input type="checkbox"/> average <input type="checkbox"/> skinny <input type="checkbox"/> Don't know

It would be helpful to include photos of the lesions and an outline of a walrus on the checklist.

DIFFERENTIALS FOR THE CAUSE: Differentials for the cause of this / these disease / diseases include most likely **MULTIFACTORIAL FACTORS** which may include the following:

- Infectious disease – Virus
- Contaminants / toxins
- Environmental factors (climate change, salinity, acidity)
- Endocrine function
- Immune function
- Nutrition factors.

PLAN FOR ONGOING SAMPLING AND INVESTIGATION: We talked about the need for a plan for future case work-ups:

- **SEALS** - We would like to examine both the hunter killed animals of both types as well as beach cast carcasses. Whole carcasses should be submitted to a veterinary pathologist or veterinarian trained in the protocols for detailed necropsy.
- **WALRUS** : For walrus, we will either need to have a veterinarian or pathologist go to the carcass, or have individuals on site send chilled, fresh subsamples of lesions and organs to a laboratory for subsampling.
- **In All CASES:** We will need to maximize the chances of a diagnosis by examining optimal case materials which includes\
 - Cases that are fresh when obtained,
 - Can be shipped quickly to maintain freshness,

- And are never frozen, and are therefore worth the cost of shipping, sampling, and testing.
- Carcass submission is currently very low now but it may pick up in the summer. NOTE: AK Division of Wildlife Conservation has a program to examine subsistence carcasses brought to their laboratory if the hunter has a concern and the NSB also has a program to check subsistence seals; both efforts are independent of this UME but can aid the investigation.
- We still need a proper case definition and information materials to send to field to obtain data but also guide hunters and field observers as to which animals would be good to send in for further workup. Developed DRAFT checklist of symptoms and different parameters for seals and walrus. Pictures will enhance understanding of lesions. Need to keep short and simple to maximize compliance/effectiveness. May need to develop questions to assess level of effort in order to determine prevalence and incidence. Recognize that many carcasses may not be submitted because of not being suitable, shipment not being possible, or the hunter needs/wants to hold onto the carcass. Even if carcasses are not shipped for sampling, the data and pictures of the carcass are still valuable. Field guide/checklist will need editing and need follow up, but the draft is the first attempt at collecting surveillance data.

DISCUSSION REGARDING SUBSISTENCE IMPACTS/REPERCUSSIONS

It is important to relay to communities and hunters the need to sample healthy animals to understand the disease and that sampling animals in no way implies that the animal is otherwise acceptable for consumption or other uses. While it is not possible to provide definitive, prospective advice as to suitability of the use of individual affected or unaffected carcasses, there has been NO evidence of the transmission of disease to people or pets. Therefore, there are NO recommendations to change traditional hunting practices which have historically worked well for subsistence communities and hunters are advised to use their best judgment. The information gathered from hunters is especially important because of the increased likelihood of them encountering animals early in the course of the disease and therefore can provide information that will be helpful to identify causes and contributing factors to the condition and the spatial and temporal trajectory of the problem.

DISCUSSION REGARDING LONGTERM IMPLICATIONS

In other situations UME's become recognized cyclic problems/disease outbreaks with various drivers, some of which are anthropogenic. As such they may become the 'new normal.' Increased surveillance is needed to understand the changes and trends, for understanding implications to population biology, food safety, and cultural use of marine mammals. Additionally, good communication plans are required to relay the latest findings/understanding.

IMPORTANT LAB SAMPLING/STORAGE REQUIREMENTS

This discussion has implications primarily for the laboratory based samplers. Triplicate samples of everything are important, especially viral culture samples, RNA later, and tissues. Some samples should be held back and archived in case there is a concern about

sample contamination at reference laboratories. It was discussed whether there should be laboratories specified for every type of sample submission. The answer was YES but needs to be determined through working group recommendations.

- Pathogen discovery lab needs (Cadhla Firth – Columbia University):
 - Pathogen discovery: liver, fecal swabs or fecal samples, serum
 - Maintaining a consistently cold temperature chain for collected samples is extremely important. Samples should be collected as soon as possible. Less than 5 hrs is ideal but less than 24 hrs is okay.
 - Columbia can send out aliquots of Easy Mag or RNALater.
 - Serum, feces and liver store in -80 freezer
 - 454- Larger 'reads' avg of 500 bp, so more of the reads will be from the hosts
 - Illumina- smaller reads avg of 100 bp, bioinformatics needed to assemble small reads together

Other Diagnostic laboratory needs/recommendations

- Ultracold frozen tissues work well for virology (Carlos Romero, Ole Nielsen)
- Bacterial isolates (Athens): characterization beyond Strep- should be easily done.
- Virology (Saliki, Nielsen, and Romero): despite negative results to date, it is hard to discount a viral disease. Diagnostic samples from animals with very early symptoms are important and are requested (Buffy coat from sick seals frozen in VTM would be a good new thing to try)
- Animals with early nodules / ulcers, before secondary process develop and obscure the primary problem, are wanted for viral and bacterial isolates- for many tests
- Samples are still available from existing cases. Kathy can produce a spreadsheet with the samples on hand with brief clinical history and analysis done or pending.
- Immune function tests would be a good thing to incorporate (T. Spoon – Mystic). In live capture cases, the following samples could and should be collected: Buffy coats – for lymphocyte function tests, virus isolation and PBMC proliferation. Serum and plasma would be needed for Cytokines.
- Determining the involvement some of the differentials will require live captures to obtain fresh/viable samples for the following tests.
- General health parameters: CBCs, clinical chemistries,
- Nasal and mucosal swabs, fecal matter and swabs
- Hormones: thyroid, sex, cortisol, TSH (stabilizers), possibly thymosin (stabilizers)

Working Group 2: Field plans and necropsy protocols for next season – Raphaela Stimmelmayer

Discussed live captures (risks, benefits, and costs), harvest monitoring plan, overview of sampling opportunities for 2012.

Identified groups doing research, data gathering, or sampling that could be 'platforms of opportunity' for obtaining samples for further investigation of this event. More information is in the detailed notes from this group.

- North Slope Borough
 - Tagging ringed (~24) and bearded (~5) seals,
 - Beach surveys 2x/week during open water period (Barrow, Wainwright, and Pt Hope)
 - Possible walrus carcass survey in Pt Lay
 - Harvest monitoring and sampling ringed, bearded, and walrus
- Peter Boveng has historic telemetry and archived tissue/serum, no vessel/sampling for 2011 or 2012, collaborates with Russian scientists, also works with harbor seals, since not tagging this year, may have 'extra' tags to share
- Terry Spraker posted 3 PVs on the Pribilofs which had not been seen there before, emphasized that the cause of the current disease is probably multi-factorial
- Joel Garlich-Miller: Russians will be here in March, also have program to provide free histopathology of samples when hunters provide diseased tissues to USFWS or ADFG, could possibly get heli-time
- USGS is continuing to collect biopsies
- USFWS Marking Tagging and Reporting program (Statewide harvest program for walrus (B. Benter, J. Trent)
- Lori Quakenbush, plans to spend more time this year at Pt Lay, possibly able to sample more carcasses
- Kimberlee Beckmen: carcasses are sometimes sent to ADFG or Kathy Burek for examination; has 4000 serum samples.
- Lori Polasek: has photo-monitoring (not real time but hi-def photos) project, may be able to retrospectively examine images from camera monitoring program to evaluate spread of lesions in walrus haulouts in northern sites and sites in Bristol Bay
- Barrow hunter sampling, hunters call NSB Wildlife Department who goes to carcass to get data and/or samples, blood/serum difficult because time lapse between death and sampling (options include the 'chicken fat clot' in major vessels, Nobuto strips, filter paper, note do not want to send sample collection tools in the field with hunters)
- St Lawrence Island has spring harvest on ice, animals harvested long distance from communities & animal not brought back whole, walrus monitoring project is long-standing in some areas, can add to sampling protocols, Lori Quakenbush working with Jonathan Snyder on list; bearded seals sometime available
- Free histopathology of diseased tissues is a service provided to hunters by USFWS and ADFG
- Need to be aware of impact of extensive sampling such as increased time on the ice under potentially dangerous weather and ice current conditions; increased fuel cost; not appropriate to have hunters use formalin on the ice; suggestion to take vets and or

trained biologists to field at the start of intensive harvest periods to get some initial samples; try and make more use of blood/spot cards.

- Note samples can be taken under the national permit for outbreak investigations; Craig George is a Co-PI.

Bringing live animals to ASLC is a theoretical possibility but would need to be carefully considered and addressed on a case by case basis. Initially ASLC could only manage 2 ringed seals or 1 young walrus in an isolation pool room. With time and money, if determined to be a priority, it may be possible to increase holding capacity with modifications to the facility. Ice seals and dependent walrus calves brought to ASLC from the North Slope would not be released, and if recovering would be placed in a permanent captive facility. An alternative could be to set up a remote care facility where the animals are found.

Working Group 3: Communication issues – Gay Sheffield, Mike Pederson, Vera Metcalf, Aleria Jensen, Julie Speegle, Katrina Mueller

Discussed effective information exchange and dialogue with Alaska Native communities and international community, roles, responsibilities and methods; results reporting and interpretation. Communication needs to be frequent, relevant, consistent, and regionally appropriate. Need to avoid allowing the press to fill in information voids. Joint press releases are better than separate ones for walrus and seals. Need to be mindful of raising expectations and be wary of the implication of different words/phrases to different people. Add groups from the YK Delta, Bristol Bay, the Alaska Peninsula, and UAF. Include members of the Ice Seal and Walrus Commissions who will help disseminate information via tribal councils to get it to the communities. Quarterly or periodic mailings are needed to reach groups with poor internet connectivity. Develop FAQs for the general and rural communities. Previously missed modes of communication include: PROMED, radio shows, and community events. Katrina and Julie should prepare press release about this workshop, should identify regional contacts to determine regional information needs. Updates may not need press releases. Current plan is to relay results to Raphaela Stimmelmayer, the Onsite Coordinator, who will coordinate with others and determine how to best disseminate new information. Recommend starting with bi-weekly updates, even if just negative results or no new information. **Vera Metcalf** listed basic aspects of what we know: samples have been provided, things moving along, progress being made, no answers yet but still working on. The Walrus Commission represents 19 communities in 5 regions and communicates with neighboring non-member regions; it is important to address community and suggests workshops with local experts.

Arctic Pinniped Disease Workshop –January 18th, 2012 (Anchorage) – Group III: COMMUNICATION SUMMARY

Main group participants: Cyd Hanns (NSB-DWM) Gay Sheffield (UAF-MAP), Joel Garlich-Miller (USFWS); Mike Miller (IPCOM), Vera Metcalf (EWC), Katrina Mueller (USFWS), Lara Horstmann-Dehn (UAF-SFOS), Mike Brubaker (ANTHC), Julie Speegle (NOAA), Aleria Jensen (NMFS), Mike Pederson (NSB-DWM/ISC), Harry Brower (NSB-DWM), Teri Rowles (NMFS), Caroline Beha (ICC)

OBJECTIVE:

- Provide information that will help provide answers to the UME event
- Provide information to serve the northern and western coastal subsistence communities

Goals:

- Frequent, relevant, consistent communications regarding UME Investigation
- Proactive communications re: Results, reporting, education, contacts, safety
- Regionally appropriate communications are essential
- Explore/develop new venues of communication/outreach
- Expand regional outreach – Y/K Delta, Bristol Bay, Eastern Russia, etc.

Reminders:

- Coastal communities are members of the UME Investigative Team
- Without two-way communication – no one “team member” will hear the other
- This UME is first that involves essential Alaskan subsistence species
- Be mindful of the communication expectations / tone one may set
 - Food security issues
 - Public health issues
 - Economic (handicraft) issue
- Reiterate results
- Without consistent information, media will “fill in the gaps” – often sensationalizing the “story”

To date:

- Communications were ramped up over a month+ period while we all were trying to understand the scope and details of this event
- Overall system is good – can improve/expand on regional efforts to include Universities, school districts, coastal observer groups, environmental groups, ICC, tanneries

Room for Improvement:

- Getting information exchange to a wide culturally diverse geographic area
- Understanding different regional traditional subsistence practices, timing, uses

- Communication – regional points of two-way contact with agencies/regional groups (see last page)

Types of communication needed:

- **Immediate:** USFWS/NMFS joint press release – NOT separate – **DUE FEB 7th**
 - Report overall number of cases; species involved – beyond UME (ex: spotted, bearded, ringed, walruses)
 - Geographic range of cases
 - Locations of cases/events
 - Timing
 - What is it – and/or what can be/ has been ruled out
 - Analysis done to date – sample sizes, species involved, locations
 - Human health advice/updates
 - Regional contact information
 - What to look for (ex: symptoms, behaviors, etc.)
 - What can one do to help (ex: where/what to report)
 - UME status / workshop results
- **Bi-weekly:** Investigative updates provided to regional points of contact for regional edits and distribution
 - Numbers of cases
 - Locations of ongoing cases; new cases
 - Testing results
 - What can be/ has been ruled out
 - Human health advice/updates
 - Regional contact information
- **Quarterly:** Update reports – mailed out (Funding USFWS-sponsored)
 - Summary of biweekly reports

Media/distribution available:

- Radio (regional / statewide)
 - Public service announcements
 - Call-in shows
- Phone
 - Receiving/following up reports
 - Providing individual updates to remote communities
 - Toll-free numbers when possible
- Newspaper
 - Regional: Nome Nugget, Arctic Sounder, etc.
 - Statewide: ADN, Alaska Dispatch
 - National
- Mailing lists
 - Co-management ANOs
 - IRA Tribal Councils
 - Regional Health Centers
 - University of Alaska

- Regional school districts
- Tanneries
- Regional Native Corporations
- Health/environmental Coordinators
- Tribal Coordinators
- Seafood Processors (Norton Sound on south)
- Commercial Fishermen Groups
- Tourist/tourism outlets/venues
- Internet/E-mail
 - Informative website with FAQ, contact info, status update, photos
 - List Serve
 - Facebook
- Video-conferencing
 - Vocational schools
 - University
 - Health institutions
- Meetings/Conferences
 - Regional conferences
 - AMSS
 - AFE
 - Stranding Network
 - US MM Commission
 - ANOs
 - IPCOMM

Types of info to communities/public:

- Confirmation of no new incidents, etc. Updates such as Japan seals, etc.
- What communities are seeing, local update reports
- Communication tree
- Need advice as to regional info for communication pieces
- Regional relevant newsletter/bulletins – directed at subsistence audience
- Criteria on information needed; that past/future sighting information is extremely useful
- Use regionally appropriate contacts, list regional points of contact
- Provide info on samples, collections, results
 - Get human health advice through regional health centers, ANTHC, co-management partners, hunters
- NMFS bi-weekly updates

Types of info needed to UME researchers:

- Regional harvest timelines
- Report of new cases
 - Location, Date, Species, Sex, Age, Body condition
 - Status: Live, Dead, Harvested
 - Animal behavior

- Photos
- Samples if possible/desired

To Do:

- Develop FAQ
 - Will this change the pending ESA determination for ringed/bearded seals?
 - Will this change the warranted but precluded status for walrus?
 - Will this affect harvest and/or management strategies for NMFS?
 - Will this affect harvest and/or management strategies for USFWS?
 - What to do if coming across a live/dead sick seal? Where to report?
 - What to do if harvested sick seal? Where to report?
- Create regional networks that provide relevant information both ways
- Expand information area, groups, via radio talk shows, regional updates, etc.
- Develop language for food safety/public health related aspects (NSB-DWM, EWC, ANTHC – for possible assistance)

Immediate Fact Sheet –

- **To:**
 - IRA councils, City offices,
 - Co-management organizations
 - Regional papers
 - Marine Advisory Program agents (Nome, Dillingham, Bethel, Dutch Harbor, etc.)
 - Borough Governments
 - Arctic Research Commission
 - Regional Corporations or Tribal Governments (ex: ASRC, AVCP, BBNA, BSRC, ICAS Kawerak, Maniilaq)
- **Information to include:**
 - Case summary
 - Regions involved
 - Recent workshop
 - What to look out for and what to do
 - Salvage/handling advice
 - Contact/reporting information

OTHER ISSUES:

Sampling/harvest:

- Remuneration/incentives need to be put in place
- OLE needs to be made aware of salvage and handling issues re: Diseased animals
- Personal choice/experience of hunters is key (salvage, handling, consumption decisions)

Statewide/Comprehensive:

- Agencies:

- USFWS – MMM; OLE
- NMFS – OPR; Stranding Network; OLE
- USGS
- News: Alaska Dispatch, Anchorage Daily News
- University: UAF, UAA, UAS, etc.

REGIONAL COMMUNICATION CONTACTS

North Slope:

- North Slope Borough Dept. of Wildlife Management
 - Alaska Eskimo Whaling Commission
 - Ice Seal Commission
 - ADF&G (Barrow)
- Eskimo Walrus Commission

Northwest Arctic:

- North Slope Borough Dept. of Wildlife Management
 - Alaska Eskimo Whaling Commission
 - Ice Seal Commission
- Eskimo Walrus Commission
- Northwest Arctic Borough office (?)
- Kotzebue IRA(?)
- UAF Marine Advisory Program (Nome) (?)

Bering Strait:

- Eskimo Walrus Commission
- UAF Marine Advisory Program (Nome)
 - Kawerak, Inc.
 - Bering Strait School District / Nome schools
 - Nome Nugget
 - NPS, ADF&G (Nome)
 - UAF Northwest campus; SFOS
 - Norton Sound Health Corporation
- North Slope Borough Dept. of Wildlife Management
 - Alaska Eskimo Whaling Commission
 - Ice Seal Commission

Yukon-Kuskokwim Delta:

- UAF Marine Advisory Program (Bethel)
 - National Park Service
 - Region V ADF&G (Bethel)
- Eskimo Walrus Commission
- AVCP
 - Ice Seal Commission
 - Alaska Beluga Whale Committee

Bristol Bay:

- Eskimo Walrus Commission
- Qayassiq Walrus Commission
- UAF Marine Advisory Program (Dillingham)
- Bristol Bay Native Association
 - Alaska Beluga Whale Committee
 - Ice Seal Commission

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