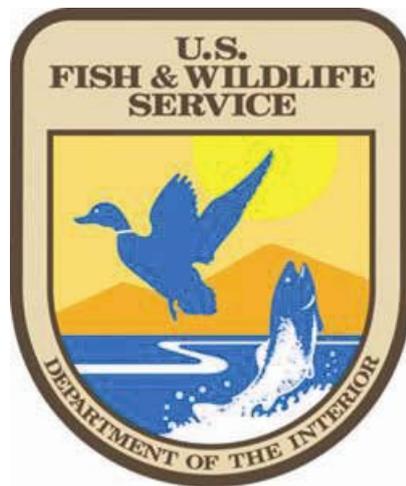


POLAR BEAR CONSERVATION/RECOVERY PLANNING MEETING

August 25-26, 2011

Egan Center, Anchorage, AK



**U.S. Fish & Wildlife Service
1011 E. Tudor Road
Anchorage, AK 99503**

Contents

AGENDA	2
DAY 1 - FACILITATOR GROUND RULES	4
DEVELOPING CRITERIA UNDER THE ENDANGERED SPECIES ACT (ESA)	5
EXAMPLE: GRIZZLY BEAR RECOVERY PLAN.....	8
EXAMPLE: SOUTHERN KILLER WHALE	11
KEY ASSUMPTIONS AND UNCERTAINTIES – POLAR BEAR POPULATIONS	14
ICE PROJECTIONS	16
ICE SEAL POPULATIONS	17
KEY ASSUMPTIONS AND UNCERTAINTIES - POLAR BEAR POPULATION RECOVERY	18
A GLOBAL PERSPECTIVE ON POLAR BEAR POPULATION RECOVERY	18
MITIGATION OF GHGS AND POLAR BEARS.....	20
DAY 1 - WRAP UP	21
DAY 2 – INTRODUCTION.....	22
DEFENDERS OF WILDLIFE	22
STATE OF ALASKA	23
NORTH SLOPE BOROUGH	25
ALASKA NANUUQ COMMISSION	29
CENTER FOR BIOLOGICAL DIVERSITY.....	36
WORLD WILDLIFE FUND	32
PUBLIC COMMENTS	33
CLOSING COMMENTS.....	33
APPENDIX A: MEETING ATTENDEES.....	41

Agenda

Polar Bear Conservation/Recovery Planning Agenda

August 25-26, 2011 8:30am-5:00pm

Egan Center, Anchorage, AK

Meeting Goal

With conservation partners, discuss how to define quantifiably when polar bears can be delisted from the Endangered Species Act (ESA). Also, discuss with conservation partners how to define quantifiably when polar bears would need to be “uplisted” from threatened to endangered.

Meeting Objectives

1. Present case studies from two other species’ recovery plans. Discuss lessons learned.
2. Present the most recent scientific assessments of the key assumptions and uncertainties related to the conservation of polar bears.
3. Gather recommendations from conservation partners that quantify the point at which polar bears could be delisted from the ESA, and conversely, when they would need to be “uplisted” to endangered.

Day 1- August 25, 2011

Time	Topic/ Event	Presenter/Participants
8:30	Road map of the polar bear conservation/recovery planning process	Rosa Meehan, Jim Wilder,
Developing a conservation strategy: the role of criteria		
8:45	Developing Criteria under the ESA	Judy Jacobs, FWS ESA
9:30	Example: Grizzly Bear Recovery Plan	Chris Servheen, FWS
	Discussion	All
10:30	BREAK	
10:45	Example: Southern Killer Whale	Lynne Barre, NMFS
	Discussion	All
11:45	LUNCH	On your own
Polar bear recovery - key assumptions and uncertainties		
1:00	Key assumptions & uncertainties - polar bear populations	Eric Regehr, FWS
	Discussion	
Key assumptions & uncertainties- habitat and prey		
1:45	Ice projections	George Durner, USGS
2:15	Ice seal populations	Brendan Kelly, NSF
2:30	Discussion	All
Key assumptions & uncertainties- polar bear population recovery		
3:00	Vision for future polar bear conservation	Lily Peacock, USGS
3:30	Mitigation of GHGs and polar bears	Dave Douglas, USGS
4:00	Discussion	
4:30	Wrap up	Colleen Matt

Day 2 – August 26, 2011

Time	Topic/ Event	Presenter/Participants
8:30	Introduction/review	Colleen Matt
Conservation partners' recovery strategies		
	<p>Highest priority Action: In the view of your organization, what is the one single action that can be taken to best ensure the persistence of healthy polar bear populations?</p> <p>Successful outcomes for polar bears in Alaska: What would your organization judge to be a successful outcome of a conservation/recovery program for polar bears in Alaska? In other words, in your view what would be an acceptable population size and trend of Alaska polar bears? <i>Please frame your answer in both temporal and spatial terms.</i> [For example, would you consider a program successful if polar bear populations in Alaska declined by 25% or 50%, but the population was projected to remain stable at that level for the next 25 years?].</p> <p>Successful outcomes for polar bears throughout their circumpolar range: When (or under what conditions) would your organization recommend removing polar bears from the ESA? What sort of evidence would you require to make this decision? <i>Please frame your answer in both temporal and spatial terms.</i> NOTE: Delisting <i>usually</i> is evaluated on the basis of an increasing or stable population, mitigation of threats, and security of the species' habitat.</p> <p>Partners' future role: What is the role of your organization in achieving 1-3, above?</p>	
<i>Note: Times below are estimations and may vary</i>		
8:45 am	Defenders of Wildlife	Karla Dutton
9:25 am	State of Alaska	Kim Titus
10:05 am	North Slope Borough	Jason Herreman
10:45 am	Break	
11:00 am	Alaska Nanuuq Commission	Jack Omelak
11:40 am	Center for Biological Diversity	Brendan Cummings
12:20 am	Lunch on your own	
1:30 am	World Wildlife Fund	Geoff York
2:10 am	Public Comments	All
Next Steps		
After discussion	Wrap-up	Jim Wilder, Colleen Matt

Day 1 - Facilitator Ground Rules

Colleen Matt, Facilitator

Opened the meeting and provided the following reminders:

- Please turn off cell phones
- Please speak up and state your name and organization for the recorder
- Please register at the front table and provide clearly written contact information

Road Map of the Polar Bear Conservation/Recovery Planning Process

Rosa Meehan, Chief, Marine Mammals Management, USFWS

Thank you all for your attendance and participation. Clearly we face challenging times and our efforts to work together to develop a plan are very important. It's been an interesting journey. There are strong opinions on polar bears, their fate and the actions we should take. Your input is valued and will help us to do a better job. We've done a lot in the past year. We are on a fast track and focused on getting a plan put together in a timely fashion because people do care and because the world is changing so quickly. We want to integrate with international efforts and look at polar bears on a comprehensive basis. We are looking forward to ongoing collaboration. We want to make our program accessible to all, especially to our partners. Welcome everyone.

Jim Wilder, USFWS

Thank you everyone for attending and for your previous participation in the planning process. Thank you to our distinguished panel of speakers that have gathered with us for the next two days. We look forward to hearing from participants during the workshop. The people in the room represent a wide spectrum of viewpoints, but we share common ground in that we all would like to see polar bears remain a functioning, resilient component of our ecosystem. Keep that in mind today and tomorrow as we enter into discussions and listen to presenters. The criteria for the plan are important: they define the research, management and conservation strategies as we move forward into the future. It is not an easy task, but it can be done.

Progress on the planning phase has included working with conservation partners to collect input on threats, actions needed to address threats, and a round of comments on the draft plan. At this time USFWS is still incorporating those comments in to the plan. Today's primary goal is to discuss demographic and habitat criteria and to 1) define the criteria needed to remove polar bears from the ESA (delisting criteria), and 2) address uplisting criteria, or the point at which polar bears need to be moved from threatened to endangered status. Criteria include goals, objectives, and on-the-ground actions.

"There are strong opinions on polar bears, their fate and the actions we take."

This species is different. It is high profile; the first species listed under ESA due to impacts from climate change. As a result this is the first recovery plan where the primary threat is global climate change. Because of this, polar bears are difficult to fit into a traditional recovery plan. Our challenges include accurately predicting and measuring the population-level impacts of climate change, and the lack of historical analog for range-wide polar bear population declines resulting from climate change and habitat loss.

There is a larger circumpolar effort occurring concurrently to Alaska's planning efforts. The Range States' first draft of a comprehensive circumpolar plan is due in October 2011. National action plans are being developed and will be rolled into the comprehensive Range States plan. Once the Range States action plans are combined into a circumpolar whole, Alaska reserves the right to adopt that in whole or in part as part of our recovery plan.

Our success depends on a landscape approach and integrating with partners. We will develop actions, related to identified threats. These actions will be site specific and fundable. Plan actions will be rolled in to a succinct prioritized table with estimated costs, established timeframes, and potential partners.

Next steps in the planning process are:

September, 2011	Complete writing 2nd draft
September 19-30, 2011	Partner review of draft Plan
October 3-7, 2011	Discuss with partners' their comments and concerns to date on draft Plan.
October 24-26, 2011	Present draft Plan at Range States' meeting.
December 2011-February 2012	Technical work group meets to develop draft criteria
April 14-28, 2012	Partner review, comment, and discussion of draft criteria

Developing Criteria under the Endangered Species Act (ESA)

Judy Jacobs, USFWS ESA

In order to discuss a recovery plan, we must first define what recovery is. Unfortunately, the ESA doesn't actually define recovery, but it does define *conserve* as "the use of all methods and procedures necessary to bring [listed] species to the point at which the measures provided by the ESA are no longer necessary (ESA Section 3). The USFWS Recovery Planning Guidelines define recovery as "the process by which the decline of an endangered or threatened species is arrested or reversed, and the threats to its survival are neutralized, so that its long term survival *in nature* can be ensured."

So how do we get to that point in a way that makes sense and is achievable? The recovery plan, according to ESA, has to have three elements:

1. A description of the site-specific management actions necessary to achieve the plan's goal for conservation of the species
2. Objective/measurable criteria that will result in a determination that the species be delisted
3. Estimates of the time required and the cost to carry out that measures necessary to achieve the plan's goal

The recovery plan includes three major parts:

1. Background (describes everything we know about the species)
2. Recovery goals, objectives and criteria and tasks (action narrative)
3. Implementation schedule

The *recovery strategy* is a key part of the plan. It provides a segue between the information we know and what we want to do. The strategy justifies the approach we intend to take. The classic view of recovery is a continuum from extinct on one end all the way to completely recovered on the other end. We want the species functional in the ecosystem. With the polar bear we have a different situation. The polar bear is not near the extinct level yet, but the information we have shows that if we don't plan for conservation the status may decline towards that end of the continuum.

Recovery goals are the rulemaking threshold.

- Reclassify (for endangered species): no longer "...in danger of extinction throughout all or a significant portion of its range..." but still "in danger of becoming endangered."
- Delist: "...measures provided pursuant to this Act are no longer necessary..."

Delisting is not always the ultimate goal of a recovery plan. In the case of polar bears, this may be relevant. If the best available information indicates we can't figure out a point where we foresee delisting, the goal could be long term stability within the threatened classification. We must justify this very clearly in the administrative record and in the recovery plan itself.

In some plans for threatened species there may be conditions for "uplisting" from threatened to endangered. These criteria are often included in plans. It is not required, but there may be situations where it is valuable to have triggers for uplisting if the trends are going down.

In order to know that goals have been met, clearly articulated objectives and measurable criteria need to be identified in the recovery plan. Objectives are discrete targets which, when taken together, comprise the conditions under which a species may be delisted. Objectives are the “what.” Criteria are the “how.” Criteria are the precise standards for measuring how we know we’ve gotten there. Objectives use qualitative terms like “protect, restore, reduce, maintain, improve, assure, etc.” Objectives and criteria can be framed in terms of demography and threats.

Demographic-based objectives link the species status to the goals that are trying to be accomplished. Representation (genetic and ecological diversity), resiliency (sufficient population size) and redundancy (sufficient number of population) are addressed in demography-based objectives. Threats-based objectives link to the priority concerns identified through the threats description and assessment in the background section of the plan.

Criteria are the essence of the plan. They must be objective and measurable and should have the following two characteristics:

1. Presentation: criteria must be presented accurately, clearly and completely. Assumptions and uncertainties that are being faced must be explicitly stated.
2. Substance: criteria must be developed in an unbiased fashion based on sound analysis of the species’ biological and threats status.

Measurability provides a standard where two biologists can identify when a criterion has been met. Demography-based criteria will often include numbers, i.e. minimum number of breeding pairs, certain growth rates, etc. Threats-based criteria should reflect the threats addressed in the 5-factor analysis in the final Rule listing the species. These five factors are:

Recovery units may be delineated for widely distributed species. They may be useful for maintaining the extent of historical distribution or if threats differ in different portions of the range. If recovery units are set, criteria must be developed for each unit.

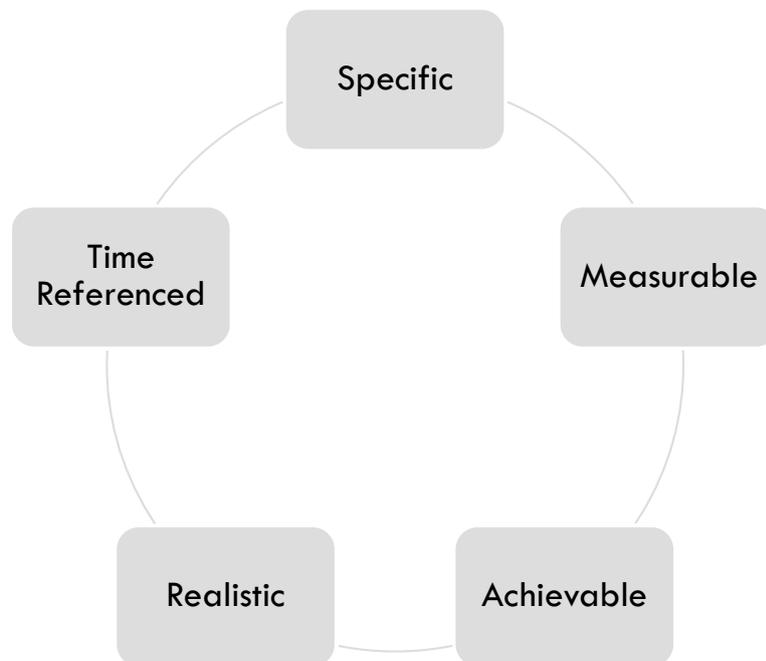
Five Factors – ESA Sec 4(a)(1)

- 1. The present or threatened destruction, modification, or curtailment of its habitat or range*
- 2. Overutilization for commercial, recreational, scientific, or educational purposes*
- 3. Disease or predation*
- 4. The inadequacy of existing regulatory mechanisms*
- 5. Other natural or manmade factors affecting its continuing existence*

Sometimes there may be a high degree of uncertainty and this could very well be relevant to the polar bear population. Uncertainty can be built in to a recovery plan by addressing confidence limits and indicating a need for further refinement. Some of the tasks developed should address actions necessary to fill the information gaps.

Interim criteria may be used when objective, measurable criteria cannot be developed. They are used rarely and must be explained in administrative record and in the plan. They must provide near-term targets that will suffice until better criteria can be developed. Interim criteria must be explained as to why the criteria cannot be determined at this time and the plan must specify the actions/tasks needed to develop objective, measurable, criteria as well as providing a timeline for completing the actions and revisiting the criteria.

‘SMART’ Objectives are:



Criteria development is an iterative process. It can and should be revised as new information becomes available. Uncertainties should be stated. Criteria should lead to identification of effective recovery actions.

DISCUSSION

Question: Shannon Torrence, USFWS: Can you address recovery units in other countries?

Answer: Judy Jacobs, USFWS: Normally recovery plans don't list foreign species because we can't tell other countries what to do with their species. However, in this case, there are the Range States plans so there is an equivalent of recovery units.

Question: Susie Miller, USFWS: In the case of the short-tailed albatross or other plans you've worked on, what is the time scale for the recovery actions? How does that tie in with re-evaluation of goals and how often is that done? Different actions have different timeframes, but is there a norm?

Answer: Judy Jacobs, USFWS: Generally the implementation schedule in the recovery plan goes out five years. As a rule, we are supposed to revise or update our recovery plans once every five years. That doesn't mean the species has to be recovered in five years. And, we don't have to wait five years, but we can.

Comment: Brendan Kelly, NSF: Your comments about handling uncertainty are helpful. It is important when we use the term "uncertainty" to define it. Having only one definition is unreliable. When we use the term, it will be helpful if we clarify the sense in which we are using it.

Question: Jason Herreman, NSB: Can you qualify the statement on recovery units in other countries?

Answer: Judy Jacobs, USFWS: This is one of the sore points I have with regard to foreign areas and listed species. The U.S. is pretty clear on the fact that we do not have jurisdiction in foreign countries, so if there is a U.S.-based corporation that is acting in another country, under the ESA we can't do anything with regards to that.

Comment: Rosa Meehan, USFWS: Let's look at what we can do, and positive ways we can take advantage of the partnerships we have. Polar bears are a circumpolar species, many live in Canada. We share an interest in addressing polar bear conservation and we may be best served if we look for ways we can take positive advantage of the general interest. The Range States' primary goal is to develop a circumpolar action plan for polar bears. There is a commitment by each jurisdiction to develop plans. It's like having all the Arctic on our team. Let's look for ways to use this. The best thing we have going for us is the general interest and broad commitment to this.

Question: Kim Titus, ADF&G: What is the relationship between ESA and MMPA? There are a number of protections for polar bears that are in place because they are a marine mammal. Can you comment on the overlap between these two?

Answer: Rosa Meehan, USFWS: A benefit we have going in to this complex issue is that they have been managed under MMPA since 1972. The MMPA has provided a lot of useful and practical management tools and those tools and programs provide a basis for us in growing our conservation efforts through the tools we have under ESA. MMPA was written prior to ESA and it was the template for the ESA. ESA is written a bit better than the MMPA. Absolutely our intention is to build upon the tools that MMPA has and enhance their use as we go through this process.

“Our intention is to build upon the tools that MMPA has and enhance their use as we go through this process ...”

Question: Brendan Cummings, Center for Biological Diversity: What is the role of USFWS in actions outside the U.S.? We should focus on recovery unit. It is narrow to say there is no jurisdiction overseas. Section 7 applies to the high seas. Polar bears spend much of their time outside the territorial seas and outside these other countries. The U.S. has much greater jurisdiction than just Alaska bears.

Comment: Judy Jacobs, USFWS: I am not familiar with the application of Section 7 to the high seas. [Follow-up: There is no specific reference to high-seas in ESA section 7. ESA section 9 (Prohibited Acts) does indicate that “it is unlawful for any person subject to the jurisdiction of the United States to... take any [endangered] species upon the high seas” but the application of this to section 7 is a topic for legal interpretation.]

Example: Grizzly Bear Recovery Plan

Chris Servheen, USFWS Montana

The U.S. grizzly bear was listed in 1975. At that time there were six recovery zones. The basic element of the recovery plan was recognizing that there was a need to change the way things were done in regards to habitat and population management. There was high level political commitment and support, cooperation among agencies for a long term effort (30 years), and depth to the political support.

The basic ways we are recovering grizzly bear populations include:

- Reduce mortality
- Relink isolated units
- Habitat security (through access management and sanitation)
- Build public support and understanding

The greatest threat for grizzly bear is human intrusion into habitat through their activities. Human actions are reducing the resiliency of wildlife populations to respond to threats. There is a need to increase the resiliency of species if they are to recover, and this involves habitat and mortality management. The public is increasingly detached from the impacts of their actions on wildlife and wildlife habitat. Leadership is needed to work with the public and political leaders to understand the ecosystem impacts of development actions and how these can be made more compatible with wildlife.

The grizzly bear population in one particular recovery zone is two to three times what it was in 1975 and increasing at a rate of 2-3% per year. The Yellowstone subpopulation is expanding at a rate of 4-7% per year. One of our challenges today is to get people to start thinking about how to live with grizzly bears, especially in private lands.

The grizzly bear was listed in 1975 due to the low numbers of bears. There were a high number of deaths during the garbage phase-out in Yellowstone. The stated reasons for the grizzly bear listing under ESA in 1975 were: reduction in range, livestock grazing, timbering and road/trail construction within the habitat, indiscriminate illegal killing, possible impacts of isolation of populations from each other, and the rapid closing of garbage dumps resulting in dispersal of grizzly bears.

The key reason for success has been the Interagency Grizzly Bear Committee which brings together agencies with different mandates. Initially it was difficult getting in the door of certain agencies; some agencies didn't want to be involved, didn't think they should be involved, etc. An MOU was signed in 1984 by the Assistant Secretaries of Interior and Agriculture and the four governors (Wyoming, Montana, Idaho and Washington), and it directed state/federal agencies to cooperatively implement the recovery plan and provide for the recovery of the grizzly bear.

The objectives of the Interagency Grizzly Bear Committee are:

1. Implement the tasks in the recovery plan
2. Conserve and recover the grizzly bear in four U.S. states
3. Work together to achieve the goals under cooperative approach emphasizing habitat and mortality management
4. Enhance communication and cooperation towards the mutual goal

The group included state Fish and Game directors, Park Service Regional Directors, the USFWS, tribal representatives, BLM directors, etc., with subcommittees convened for each of the recovery areas. This process made a difference because it committed agencies to a common objective through the signatures of high-level officials. It provided an accountability link between decision-makers and the field-level implementation of the Recovery Plan and provided a structure for interagency cooperation.

The grizzly bear population was allowed to grow and recover through a variety of activities. Mortality control was implemented and state manager began to manage mortality. Habitat management was implemented to increase habitat security and secure attractants (garbage storage and disposal, promotion of backcountry attractant storage practices by outfitter organizations, towns/counties passed ordinances). Science and monitoring was intensively applied to populations. The foundation of good science makes for good management decisions. Science and monitoring information was directly translated into management actions.

An adaptive management system was implemented and included three critical elements:

1. Conceptual and quantitative models that make explicit the current understanding of the system, the underlying hypotheses driving management and key uncertainties
2. Rigorous monitoring plans focused on reducing the most critical uncertainties
3. A scientifically defensible plan for monitoring and research including rapid action on research results and feedback from management outcomes to revise management decisions

There were challenges with the small, isolated, units of population: habitat loss, human caused mortality, habitat fragmentation, habituation and food conditioning, and slow reproduction. There were different levels of intensity within recovery units based on the size of population within the unit.

Successful bear management can be characterized by four components: 1) biological data (a science team that informs); 2) organization and people to manage (Interagency Grizzly Bear Committee); 3) political support (for grizzly bears, it was the visibility of Yellowstone), and 4) public support for the program (interagency cooperation and the same message coming from all the agencies was fundamental to public support). The ability to actually achieve recovery helped continue and maintain the political and public support.

*Overall Objective of the Grizzly Bear Recovery Plan:
Assure a healthy and secure grizzly bear population in each
ecosystem*

- Develop strong and scientifically credible population information
 - Develop strong and scientifically credible information on the status of populations
 - Use strong and scientifically credible information on how to manage mortality within sustainable limits
- Develop strong and scientifically credible habitat management
 - Develop strong and scientifically credible habitat criteria
- Develop a comprehensive and adaptive management plan (not recovery plan) that all agencies agree to implement

The keys to success are:

- Political commitment – leaders had to decide that this was something that they could support and then do so
- Science and monitoring – to tell us what was happening and highlight what needed to be done. Invest in the best science.
- Adaptive management – apply the science to management decision and change management in respond to monitoring data as necessary
- Public support – understand the interests of the public and build on them
- Emphasis successes – helps people and agencies realize that the investments of time and trouble are paying off and results in more partners

Compromise is fundamental to the process. Partnerships are essential to success. Obtaining buy-in and building success produces more support. Mortality control is dependent on public and political support. Public and political support determines the success of management. Habitat security is key. Established use is difficult to change but such changes are necessary.

“If some populations are allowed to disappear, it will not happen because we did not know what to do to help them. It will happen because the public and political pressures did not allow us as managers to do what we could have done to save them.”

DISCUSSION

Question: Craig Perham, USFWS: Can you give us some examples of the criteria being used to remove the bear from recovery to a stable population?

Answer: Chris Servheen, USFWS: Demographics are the criteria being used, i.e. numbers of unduplicated females with cubs, number of dead bears broken down by number of dead independent females, number of independent males and number of dependant young. Those are used to set limits within each recovery unit. Habitat is another criterion. The area is divided in to subunits and there are criteria such as no increase in the number of motorized routes within a subunit, or any reduction in secure habitat.

Question: Ken Titus, ADF&G: Did it matter that critical habitat was never declared?

Answer: Chris Servheen, USFWS: We did not define critical habitat for grizzly bears because we have the interagency grizzly bear guidelines that divided the habitat into areas and those areas were defined as situation 1, 2 or 3 areas. For example, within areas defined as Situation 1, conflicts were resolved for the bear.

Question: Lynn Barre, NOAA: There is grizzly bear habitat in Canada but the MOU is strictly by the United States. What kind of relationship do you have between Canada and the United States?

Answer: Chris Servheen, USFWS: There are four recovery units that are trans-boundary in nature with bears having “dual citizenship.” The MOU was not signed by Canada. The Canadians were invited and are participating on each subcommittee. We work in Canada, with the approval and agreement of the Canadians.

We cannot affect habitat or mortality management in Canada, but we have affected changes because of cooperative efforts. We did explore options for formalizing the cooperation but it became very complicated for several reasons (i.e. the involvement of the U.S. State Department and Canadian Provincial governments) so it was never institutionalized, but we work with them regularly.

Question: Matt Cronin, University of Alaska: What is the listing status of the bears now?

Answer: Chris Servheen, USFWS: Threatened. Yellowstone is recovered and delisted.

Comment: Brendan Cummings, Center for Biological Diversity: One of the issues tying up delisting is the role of how to relate recovery criteria to a shifting baseline and ecosystem due to climate change.

Comment: Chris Servheen, USFWS: One of the issues discussed with regard to grizzly bears was the decline of whitebark pine due to increasing winter temperatures (bears eat white bark pine nuts). The recovery plan addressed measuring habitat and habitat decline rather than the issue of climate change. In the delisting document, we determined that the whitebark pine decline was not critical to the grizzly bear habitat because demographic criteria (i.e. number of bears and biological issues such as fat content of the bears, etc.) continued to be met. As we measure the demographics of the population, we see the population increasing and we see they are in excellent condition despite whitebark pine decreasing. We monitor it now, and will even after delisting, so we can see if there is a change. This is part of adaptive management. You never know what will happen five or ten years from now, and you need to monitor to make changes if needed. You feed the science in to the program.

Example: Southern Killer Whale

Lynne Barre, NOAA Fisheries

The Southern Resident killer whales are a very small population, less than 90 animals, in three pods. In May through September, they range near San Juan Islands. In the winter the pods range from California to British Columbia. Their prey is salmon, but specifically focused on Chinook salmon. The whales use sound to find food and to communicate. The distinct population segment of the Southern Resident killer whale was listed as endangered in November 2005. There is a history of mortality with these animals. In the late 1990's the population experienced a 20% decline, which prompted the petition to list. The factors were: prey decline (Chinook salmon are also listed as an endangered species), pollution and contaminants (stored in blubber), vessels and sound (whale watching vessels and other sources of sound). In addition, other affecting factors include the small population size which can lead to inbreeding, and concern that every whale in the population might be in the same place at the same time putting them at risk for spills, disease, etc.

The timeline of the recovery planning process started well before listing. In May 2003, the Southern Residents were designated as depleted under MMPA and conservation planning was started. In 2003-2004, public workshops were held for each threat. In March 2005 a preliminary draft plan was available for public comment. In 2006, NOAA Fisheries designated critical habitat and the proposed ESA Recovery Plan was available for public comments. In January 2008, the final ESA Recovery Plan was released. In March 2011, a five-year review was completed under ESA with no change to endangered status.

For critical habitat designation, essential features included water quality, prey, passage to support migration and foraging.

Recovery Plan Development: The broad public interest in killer whales created some challenges. We wanted to engage everyone with a high level of interest so we did not have a recovery team, and instead had public workshops on threats. There were some uncertainty and data gaps. Recovery criteria were a big challenge. We had a lot of internal input and comments from the Marine Mammal Commission, but it was tough to develop two levels of criteria for both down-listing and delisting for each threat. The cost estimates for actions and total cost of recovery was another big challenge.

Public Workshops: We invited agency, industry and conservation groups as well as the general public. State of the science presentations were provided at the start of each workshop. There were breakout groups to identify conservation strategies. Group discussions focused on strategies for feasibility, implementing agencies,

linking to ongoing programs, and identifying immediate actions. A summary of the workshop proceedings were posted on the web.

Recovery Plan Approach: since there was no “smoking gun” threat, there was a decision to use a broad approach to address all threats. An adaptive process is used to incorporate research results as it becomes available. There was specific funding in place to get started prior to the listing and the Recovery Plan. It was focused on research, enforcement support and education. At every step of the listing process we heard how important it was to have public support and education was focused on raising awareness.

“An adaptive process is used to incorporate research results as they become available.”

Recovery Program includes management measures:

- Protection from primary threats
- Additional potential threats
- Outreach/education
- Stranded, sick and injured whales
- Coordination

There is a section on research and monitoring separate from management measures. The format and process was informed by a similar process in Canada for their killer whale populations. A lot of the elements from the research plan were incorporated in the recovery plan and they are linked as well to the management measures.

The recovery criteria are divided by biological factors and threats criteria. Under biological factors, there are criteria such as percent of growth over time, demographics (quantitative measures of population parameters), representation, resiliency and redundancy. Threats criteria were very difficult, and cover a range of types of actions. They range from management actions, oil spill response plans, other plans that are in place, regulatory actions that can be taken, indicators/data that threats are not limiting recovery or that they don't pose a threat. Long term monitoring is identified.

Some of the biological criteria included:

- 2.3% average growth for 14 years (down-listing) or over 28 years (delisting).
- Quantitative measures of population parameters
 - Representation of all three pods
 - Number of males in pods
 - Ratios of juveniles, adults, post reproductive, males and females
 - Inter-birth intervals (tracking length of time between births and reproductive-age females that are not producing)
 - No significant increases in mortality rates for age/sex class

Examples of threats criteria:

- Research is underway to increase knowledge of the foraging ecology and inform fishery management programs that determine harvest limits, hatchery practices and evaluate consistency with recovery of salmon (down-listing)
- Recovery or management plan for listed salmonids are in place to restore them to the point they are self-sustaining members of the ecosystem (down-listing)
- Reduction in impacts from commercial and recreational whale watching (delisting)
- Effective oil spill response plan in place for killer whales (delisting)

We used the Steller sea lion plan and other plan's similar biological criteria, NOAA publications, and joint recovery planning guidance for USFWS and NOAA as resources. The Marine Mammal Commission provided comments and was a good resource.

The plan has been in place for several years now. Some of the challenges included a lot of media attention, lack of funding, and creating a new Section 7 program that required us to do the following:

- Consider specific consultations when describing listing factors and developing critical habitat
- Set criteria and thresholds for impacts where possible
- Recovery criteria helpful in jeopardy analysis
- Learn from other species programs
- Update as new information as it becomes available

Section 7 Consultations

- Fishery regulations
- Hydropower actions
- Water treatment plants, sewer outfalls
- In-water construction
- Upland projects
- Habitat restoration
- Research on Southern Resident killer whales
- Navy and Coast Guard operations
- Tidal and wave energy projects, LNG terminals

One of the most successful outcomes is coordination. With a trans-boundary species, coordination is required. While there is not a formal process in place and differing laws between countries, coordination has been key. For example, the U.S. has taken a stronger role in addressing vessel impacts and Canada has addressed contaminant and sound issues. While we are working together and cooperating, we are taking leads on different portions. Other coordination includes state vessel regulation, research community, Salmon and Puget Sound Recovery programs.

The five-year ESA review was completed in March 2011. All implemented actions were reviewed and evaluated as to whether the biological and threats criteria were met. We have met some of them, but not all. It was an opportunity to re-evaluate the criteria and revise them if needed..

DISCUSSION

Question: Colleen Matt, Facilitator: Can the entire recovery plan be downloaded from the website?

Answer: Lynne Barre, NOAA: Yes.

Question: Jack Omelak, Alaska Nanuuq Commission: Were you able to quantify effects or amounts of pollutants and vessel traffic? If so, can you give examples?

Answer: Lynne Barre, NOAA: We have quantitative measures such as how close a vessel is to the whales and how a vessel impacts the whales' behavior, and a lists of effects and risk factors. Contaminant criteria were challenging. We know what levels of pollutants are in the whales and we do have comparisons from different years. We had to use proxy thresholds from harbor seals for some of our data.

Question: Brendan Kelly, NSF: Are you using public workshops in place of a recovery team?

Answer: Lynne Barre, NOAA: Yes, we went with a broad, more transparent approach.

Question: (unable to identify speaker): Chris Servheen made a compelling argument about the interagency committee being key in his recovery efforts.

Comment: Chris Servheen, USFWS: The interagency group didn't write the plan, it implemented the plan. The grizzly bear plan was developed in much the same fashion as killer whale recovery plan. Our interagency team implements the plan. It doesn't include everybody, and there is a challenge in making management decisions if there are non-managers on the team. How many people can you get together to build an effective recovery plan? There is a limit. We had a core group that developed the plan, and then

put it out for comments, but we didn't have a big group to write the document. The sheer size of the group to be inclusive of all those that wanted to be at the table and to have a 50+ recovery team membership would be difficult.

Shannon Torrence, USFWS: I'm curious about the organization of the people who are working on it. Who are the people who worked on the recovery planning and implementation as opposed to the Section 7 consultations?

Answer: Lynne Barre, NOAA: The good news/bad news is there are only three of us that do it all. On the positive side, we all know about every project, we know what's on the recovery plan and we are working on Section 7.

Key Assumptions and Uncertainties – Polar Bear Populations

Eric Regehr, USFWS

In this presentation we'll be looking at defining demographic conservation/recovery criteria for polar bears, looking at examples of realistic demographic information for actual polar bear populations within Alaska, and discussing general considerations for how we might define meaningful demographic information for polar bears.

The conservation/recovery goal is to achieve conditions where polar bears no longer require ESA listing. There were multiple objectives discussed in the ESA process, one of which was a demographic objective. The demographic objective is to establish that polar bear are not likely to face severe declines or extinction in the foreseeable future. We want to look at demographic criteria (population parameters and their values) to determine if the demographic objective has been reached.

What population parameters can we use to define demographic criteria (for a single polar bear population)?

- Population size
- Population growth rate (in general based on survival and reproduction)
- Relationship between population parameters and the environment
- The risk of future population declines (based on population parameters, their relationship to the environment, and anticipated changes to the environment)

In an ideal world, we'd have unbiased and precise knowledge of all these types of information. In the real world, these things are imperfectly estimated or even unavailable. We need to discuss how well the types of demographic information can be evaluated for this species and what alternatives exist. The focus here is on the types of information used to define criteria, not the actual values of specific parameters.

Western Hudson Bay: an accommodating system and best-studied population in the Arctic.

This group of polar bears is easy to study because it has a complete annual sea ice cycle and the bears studied are concentrated in a discrete area of land. Information was obtained from 4,723 captures using two sampling methods between 1984-2004. Population size is difficult to estimate for free ranging species. Population does appear to be declining. Survival rates (which are much better than population estimates and are less biased) were stable for prime adults but survival rates of other age classes varied over time. Breakup date of sea ice was the best predictor of survival.

Southern Beaufort Sea: A more challenging system and a well-studied population.

This area is more challenging because the region is characterized by annual formation and retreat of sea ice. Polar bear studies occur in the spring when they are dispersed over the sea ice and are not as concentrated in a discrete land area as there are in Hudson Bay. The population does not exhibit discrete seasonal boundaries and occurs in two countries. From 2001-2006 there were 1,099 captures. The historic population size was 1,800 in the 1980's and to greater than 2,000 in the 1990s. Mean population from 2004-2006 was 1,526. There is a large amount of uncertainty associated with these estimates, especially historic estimates, and changes in sampling methods prevent a determination that population size declined from the 1980s to the present. Survival and breeding were high in 2001-2003 and low in 2004 and 2005. The declining sea ice suggests declining vital rates. Confidence intervals were wide on estimates of survival and reproduction.

When looking at information about the climate in to the future, the general trend is a prediction of more “poor” ice years. Projecting population sizes forward 45 years in to the future, there is a 60% probability of a severe decline. In 90 years, there is a 90% probability of a severe decline. This means there is a high likelihood of severe decline if the data is accurate and unbiased, and if the relationship between survival and sea ice rates continues to be valid in to the future.

Chukchi Sea: a more challenging system and a less-studied population.

This area is characterized by the formation and retreat of sea ice. Polar bears are studied in the spring when dispersed on the ice with only a small area accessible due to logistical constraints. The population does not exhibit discrete seasonal boundaries and occurs in two countries, and is thus difficult to define. We really don't have much of an idea where to the west of the Chukchi Sea the population ends. From 2008-2011 there were 220 captures. Though the data collected is not likely to provide reliable estimates of population size or survival, we expect to obtain information relevant to demographic criteria from this limited data. We plan to evaluate our study design to inform future research.

General considerations for defining meaningful criteria for well studied populations include:

- Use population specific, a priori evaluations of study design to evaluate statistical ability to detect changes in population parameters
- Don't focus on population size
- Evaluate vital rates (survival and reproduction) and their relationship to environmental conditions
 - Population of interest must be defined
 - Potential bias in parameter estimates must be quantified and mitigated
 - Studies should be sufficiently long enough to incorporate natural variability in the Arctic environment
- Use population projects models to predict risks of future population decline
 - All types of uncertainty must be considered
 - Relationships between vital rates and environmental conditions in the current study must also be valid in the future

General considers for all populations, including those less-studied:

- Place emphasis on recovery and conservation criteria for specific threats, i.e. the availability of sea ice habitat
- Get away from population measures and survival rates and evaluate a broad range of indices including body condition, reproduction and health, community-based monitoring and traditional ecological knowledge
- Develop transparent and structured methods to synthesize multiple lines of evidence, which may be weak individually, but which in combination allow for stronger inference regarding population status.
- Think creatively! There are a lot of uncertainties and we'll have to find new ways to approach this.

DISCUSSION

Question: Brendan Cummings, Center for Biological Diversity: The Hudson Bay study (with data through 2004), has continued and more data has come in. When can we expect to see updates?

Answer: Eric Regehr, USFWS: With regards to Western Hudson Bay, USFWS is collaborating with Environment Canada to evaluate data through 2010. Summer 2012 is the estimate for a published manuscript.

Comment: Lily Peacock, USGS: We are currently working on reassessing survival rates and population size in the Beaufort Sea. The goal to submit a manuscript was sometime this winter but I'm not sure if that's still the plan.

Question: Shannon Torrence, USFWS: (unable to hear)

Answer: Eric Regehr, USFWS: It is not linear. In Western Hudson Bay it was more of a linear relationship primarily because you try to find a correlation between two variables and we had 20 points. Projecting further into the future will be important.

Amy Kearns, AECOM: Regarding population viability models (PVA) and relating them to the climate change models, how adaptable are the PVA as more information comes in and the climate models are refined based on new data?

Answer: Eric Regehr, USFWS: It is fairly easy to integrate new information as far as sea ice projections into the demographic modeling process. It is more difficult to integrate biological data.

Key Assumptions and Uncertainties – Habitat and Prey

Ice Projections

George Durner, USGS

There has not been a lot of additional information since 2007 on sea ice, so primarily this will be a review of information that may be familiar. A published paper in 2007 titled in part “Faster than Forecasted” by Stroeve et al. reviews observational trends between 1953 and 2006 and reveals that ice reduction is occurring at a much faster pace than projected. The trends show that even winter ice is declining. Stroeve et al. (2007) conclude that the current summer minima are 30 years ahead of model forecasts. The role of green house gases (GHG) has changed over that same period. 33-38% of observed trends were externally forced by GHGs, but in the later part of the observation period (since 1979) it has increased 47%.

Some concerns about projecting sea ice through use of general circulation models are:

1. Are the correct forcing parameters?
2. What is the temporal variability that can be expected?

The conclusions were: observed and modeled sea ice trends are forced by both natural and anthropogenic factors. Observed and modeled sea ice trends are greater than either natural variability or human forced models.

(See charts in presentation)

Take home message; you need both anthro and natural forcing parameters to project what is happening in the real world. Kay et al. (2011) concluded that 56% of sea ice variability is driven by GHGs. They examined the temporal window of trends and concluded that is an important factor because within short windows you get considerable variation.

Kay et al (2011) summarized the following conclusions:

1. Observed and modeled late 20th century sea ice loss cannot result from natural variability alone. In fact, 56% of sea ice trends were due to anthropogenic forcing;
2. Internal variability, however, exerts a strong influence on sea ice trends, and this is especially evident on time scales < 20 years.
3. As climate warms, multi-decadal negative sea ice trends increase.
4. As climate warms, trend variability on 2-10 year timeframes increases.
5. As climate warms, positive sea ice trends on 2-10 year windows occur throughout the first half of the 21st century.

Polar bears occupy a large part of the Chukchi Sea. (Reference: Douglas, D.C., 2010, Arctic sea ice decline: Projected changes in timing and extent of sea ice in the Bering and Chukchi Seas: U.S. Geological Survey Open-File Report 2010-1176, 32 p. <http://pubs.usgs.gov/of/2010/1176>)

For polar bears in the Chukchi Sea, mostly, there is not a lot of change in sea ice January through May. Once you get into summer, sea ice is largely displaced from a major portion of the sea for two months and by the end of the century it is predicted to be largely absent for five months.

Conclusions:

- Faster than forecast continues to be realized
- Faster than forecast is becoming even faster
- Eventually there will be better quantification of the forcing elements of sea ice projections and temporal variation in GCM sea ice projects
- Despite the potential of reduced uncertainty in anticipated new GCMs it is unlikely that sea ice

DISCUSSION

Question: Brendan Cummings, Center for Biological Diversity: One of the studies showed the Chukchi Sea being ice free for part of the summer by the end of the century. It seems we've already reached that point now. How will the study attempt to integrate the observed trends into the modeling?

Answer: Dave Douglas, USGS: To clarify the results of the study, the mid century and late century projections are showing an ice-free Chukchi Sea for three summer months. The projections are widening the duration of the ice-free season over the Chukchi Sea shelf. We were being very conservative since these projections were actually done for walrus.

Ice Seal Populations

Brendan Kelly, NSF

The ESA was largely in response to the increased rate of extinctions, primarily due to human-induced habitat changes. It is essential that we realize the ESA asks an evolutionary question rather than ecological one. Evolution is the change in gene frequencies within a population. We make a lot of good policy on imperfect but probable forecasts. With regards to diminishing ice habitat, is the change in habitat likely to lead to extinction or will the change lead to population reductions and therefore at an increased risk in the foreseeable future?

For ice-associated seals, sea ice loss will threaten them by the end of the current century. The forecast is that the last refuges of ice will be in Northwest Greenland. For ringed seals, there is a further threat: diminishing snow cover that protects the young from cold and predators. Adequate snow depths are predicted to occur only in isolated pockets within the Arctic Archipelago. There is very little ability to track ice seals numerically, and therefore their recovery criteria will have to depend on a degree of habitat loss or recovery.

DISCUSSION

Question: Jason Herreman, NSB: The actual formation of the sea ice and its topography and the definition of wind driven snow on the sea ice (unable to hear)

Answer: Brendan Kelly, NFS: The amount of snow you would expect on flat ice, without drifting, was looked at. Most of the snow cover in the Arctic falls in the autumn months. More precipitation will come as rain and more and more will fall in to water before ice forms. Snow will collect less and be unavailable for pupping areas. You have to have the source material to build drifts, and we don't see that happening.

Question/Comment: Jason Herreman, NSB: We need to reevaluate the models to take into account drifting and ridging affects. It makes a huge difference in snow deposition. There is a need to improve the models before drawing conclusions from them. Ice will still be formed by December, and the earliest ice retreat is forecasted to be after the pupping season is over. It may affect molts, but may not have the effects on pupping that you show.

Answer: Brendan Kelly, NSF: What I'm suggesting is that the early snow melts will be catastrophic for pups with high rates of predation and hypothermic losses.

Question: Eric Regehr, UFWFS: What is the timeframe for the ESA process for ice seals? And, did you look at the timeframe and how strong those relationships would have to be to result in declines in order to warrant listing?

Answer: Brendan Kelly, NSF: We looked at the foreseeable future as threat specific. In terms of the change in ice and snow cover, we see the projections all show increased warming and increased loss. After the mid-century you see more spread between the members of the ensemble. We have already preordained what will happen through mid century based on what has already occurred. After that it varies from model to model, but all still project more ice and snow loss by end of century. The BRT recommendations were based on how much habitat will be lost.

Question: Kim Titus, ADF&G: You implied in one way that polar bears were easy to study as compared to ice seals and, if there is a pessimistic view looking at ice seals, from a recovery/data standpoint where do you go?

Answer: Brendan Kelly, NFS: There are some that believe they will be able to count ice seals. However, I wouldn't sit around and not make policy. The agencies are obligated by law to make policy, despite whether or not the information is 'good enough.' You have to make policy based on the best information you have at the moment. You can measure habitat loss for polar bears, assessing vital rates, etc.

Key Assumptions and Uncertainties - Polar Bear Population Recovery

A Global Perspective on Polar Bear Population Recovery

Lily Peacock, USGS

This presentation will set the context for discussions with a global perspective on the conservation and monitoring of polar bears. There are five Range States: United States, Canada, Russia, Greenland and Norway. Within those, there are 19 recognized subpopulations of polar bears. International coordination began in 1965. In Fairbanks, Alaska, scientists, managers and politicians met to discuss concerns about polar bear conservation. The Governor of Alaska at that time, William Egan, gave the welcoming address and Alaska Senator Bartlett brought with him a letter from President Lyndon B. Johnson. The impetus was a common concern on the over harvest of polar bears. 300 polar bears per year were being hunted by aircraft and there were similar concerns (with respect to sport harvest and over harvest) in the other Range States. Eight years later, the five Range States, after much negotiation, wrote an international agreement on the conservation of polar bears and concluded that:

- The harvest of polar bears will be prohibited, except by local people using traditional methods
- Each party shall
 - Protect ecosystems
 - Management populations with sound conservation practices and on the best available scientific data
 - Conduct national research programs

Despite overharvest being largely addressed, the international agreement is still relevant. The main threat to polar bears now is thought to be the unidirectional decline of habitat as a result of climate warming. Other impacts are human-caused mortality, contaminants and development in the Arctic.

In Greenland there are four subpopulations of polar bears. In 1973 when the agreement was signed, Greenland limited harvesting to local people defined as aboriginal hunters who perform hunting as their primary occupation. Nonetheless, concerns about overharvesting persisted, and a quota system was begun in 2006. Because the Greenlanders had little demographic information, in 2008 they banned the distribution of polar bear parts, especially hides. Greenland uses periodic mark-recapture of polar bears, satellite telemetry and traditional ecological knowledge in collecting information.

Canada has about 65% of the world's polar bears in 13 subpopulations. Quotas were established in 1967 during the planning process that led to the 1973 international agreement. When Canada ratified the international agreement, they allowed some sport harvest. The jurisdiction for management of polar bears is at the territorial and provincial levels. They assess populations using both science and traditional knowledge. The Western Hudson Bay subpopulation has the most long-term, comprehensive data on hand of all the populations, but it is not the only subpopulation being researched. Most of the research conducted at the territorial level is about population abundance and status (assessment of reproduction and survival). Estimates are done on a cyclical basis. Most of the estimates are achieved by mark-recapture to estimate abundance.

Russia has had a hunting ban since 1957. Recently, they changed regulations, in accordance with an international agreement between the U.S. and Russia, wherein Russia recognized a subsistence hunting quota for Eastern Russian hunters. There are still concerns over illegal harvest, especially in Eastern Russia. Research in Russia includes ice modeling and community-based monitoring.

In the United States, the MMPA was signed in 1972. There is an Inuvialuit-Inupiat Agreement in 1988, the U.S. - Russia agreement in 2007, a U.S. – Canada MOU in 2008 and the EPA in 2008 listed the species as threatened. Long term research has been conducted since the 1980's.

In Norway there have been long-term studies of polar bears in the Barents Sea focusing on ecology, polar bear movements, and contaminants. There has been recent success in the Barents Sea using aerial surveys for population abundance. Norway does not harvest polar bears.

Nine of the 19 populations do not have enough information to assess the risk of future decline. The Conservation of Arctic Flora and Fauna (CAFF) group has facilitated an effort to write a circumpolar monitoring plan to reduce uncertainty in status estimation. Their goal is to develop a plan that could improve the ability to detect future trends, identify the most vulnerable subpopulations, and, with frequent analysis of the data, could guide effective harvest, habitat and disturbance management. Different than the Range States plan, the CAFF circumpolar plan focuses on metrics that are important to monitor and techniques for monitoring. It is not a management plan. The circumpolar monitoring plan identifies monitoring tiers: high intensity (high research access and good baseline data and includes one population from each of the four eco-regions), medium intensity and low intensity. The Southern Beaufort Sea was assigned high intensity and the Chukchi was assigned medium intensity. The monitoring level intensity status refers to vital rates. Monitoring habitat availability can be done through remote sensing so that should be done on a circumpolar basis and not just in high intensity areas.

The CAFF circumpolar plan includes monitoring for abundance, reproduction and survival and trends. In the high intensity areas it requires physical capture and marking of polar bears, biopsy darting or aerial surveys. The plan calls for continued monitoring of harvest, poaching and human-bear interactions. Harvest samples have been used extensively in contaminant analysis. Human-bear interactions are expected to increase and in some areas it is documented they have indeed increased.

Decline in habitat is a primary concern, as are the near-term predictions as to how polar bears might respond to changing ice conditions. In some areas, despite decline in ice habitat, there are stable populations. However monitoring of body condition and reproductive rates show some decline, and this be related to prey availability more than changing ice conditions. Habitat monitoring could be applied on a circumpolar level using imaging and remote sensing as opposed to collaring animals.

To date there has been no circumpolar standardization for measuring polar bear body condition. Body condition may be one of the first metrics to suggest nutritional distress. There may be metrics that can be developed based on samples, but these metrics will require research and development. There have been coordinated efforts on contaminants. There is a call for the documentation of traditional ecological knowledge. In Canada, traditional ecological knowledge is required to make decisions on harvest and management, habitat protection and industrial development.

Community-based monitoring will help to broaden our knowledge base. Harvest monitoring is a natural fit for community-based monitoring and can document distribution, polar bear condition, and augment mark-capture modeling.

Conservation strategies include:

- Curb greenhouse gas emissions
 - Ontario is the first jurisdiction to legislate the shutdown of coal-fired plants. By 2014, all 19 coal plants will be closed. By 2008, more than 75% of electrical generation came from emission-free sources.
- Protect denning and land habitat
- Maintain sustainable harvest (requires monitoring and estimation of population status)
- Increase efforts in deterrence including reducing human food and waste as attractants
- Prepare for extreme events (oil spill, mass stranding)

DISCUSSION

Question: Jim Lawler, NPS: I'm curious about aerial surveys for polar bears. Was that line transect or occupancy modeling?

Answer: Lily Peacock, USGS: Barents Sea and Foxe Basin was mark-recapture distance sampling from transects.

Mitigation of GHGs and Polar Bears

Dave Douglas, USGS

In a study by Steven Amstrup et al, the IPCC A1B model, also known as the "business as usual" scenario stabilizes at about 700 ppm CO₂ by the end of the century. The MIT model (mitigation model) shows 450 ppm CO₂ by the end of the century. Slides comparing the forcing scenarios to a radiative forcing model were shown indicating the two follow the same pattern, i.e. if there is an increase in greenhouse gases it will increase the radiative forcing. A comparison of forcing scenarios to global temperatures illustrates an average mean global temperature increase of up to 2.75 degrees C by the end of century. Using the mitigation model, the temperature increase is approximately 1 degree C. The final slides compared forcing scenarios to sea ice decline which show that under the IPCC A1B (business as usual) model, the Arctic will be ice free in September by mid-century.

A Bayesian network model was used forecasting the 21st century worldwide status of polar bears. The ultimate outcome classes defined in the model were a polar population that was either larger, same as now, smaller, rare or extinct. It is a synthesis of prevailing knowledge, expert opinions, etc. applied to four ecosystems: divergent ice, convergent ice, archipelago and seasonal ice.

With the Bayesian model you can prescribe the best possible management. When looking at the Bayesian Network modeling results for the last decade (2090-2099, the A1B business as usual model, even with the best possible management, there is not a qualitative change among probabilities of the population outcomes. However, looking at the MIT model, there is possibility to substantively improve the chances of persistence of polar bears throughout their range.

With the temperature rise, we would see a linear decrease in the quality of the ice habitat. The models lend evidence that there isn't a tipping point, at least within the century we looked at. If we locked in greenhouse gases at 2020 levels, the ice loss does not continue. Even after a rapid ice loss event, if the greenhouse gases were arrested, the sea ice would be respond and stabilize.

The growth rate of fossil fuel emission during the 1990's of greenhouse gases was 1% per year. In 2000-2009, it grew by 2% per year. What happened? China's coal-fired plants came on line and overtook the U.S. in carbon emissions. 92% of the worldwide growth during 2007-2009 was attributed to China and India coal emissions. Peter Sheehan's forecasted that by 2030 there would be an additional 3 gigatons of carbon above that of any IPCC AR-4 forcing scenario.

The results indicate that reducing greenhouse gases would help. Will it happen? Yes, but to what extent and on what timeframe is highly uncertain. It involves people, it is an international problem, and it involves both economics and politics.

DISCUSSION

Question: Matt Cronin, University of Alaska: The models show different probabilities of extinction. Those models projected a longer open water season, so is there a threshold length of an open water season that would precipitate extinction?. Is it possible to determine the length of the open water season that is likely to cause extinction in one of the regions or subpopulations?

Answer: Dave Douglas, USGS: It would vary by ecoregion and it is not explicitly prescribed. This information could not be teased out of the Bayesian model. The models are blended based on shelf to ice distance, shelf-ice extent change, shelf-ice-free months change, etc. Exactly where a specific ice threshold is relative to extinction is not exact. Among the outcome probabilities, there is never a 100% probability of extinction.

Question: Eric Regehr, USFWS: One of the stumbling blocks with the Bayesian models is that you put sea ice conditions and a bunch of other stuff into the model box. So, within the box, there should be some sensible or intuitive relationships between sea ice change and population changes. What were some of the relationships incorporated into the second generation models?

Answer: Dave Douglas, USGS: This model here is the original construct from the 2008 model design. For example, inside this Bayesian model, the foraging habitat quality parameter has four categories. If the change in that parameter is projected to be one of these four categories, then how does it relate to the box it is connected to? You might assign a lower weight to that probability. A lot of it is expert opinion. The weights can be changed as more information is learned.

Comment: Eric Regehr, USFWS: At some point in the model there has to be a quantitative link between sea ice and outcomes.

Question: (unable to identify speaker): Is it correct that the inputs for this modeling were not capped? We see an optimistic output, but is that based on sea ice modeling that's predicting more ice?

Answer: Dave Douglas, USGS: All the results in the Nature paper were based on the NCAR CCSM3 model touted to have the most sophisticated parameters and which produces more realistic results. It is also one of the models that has some of the most rapid ice loss events. Because we see ice decreasing faster than models have forecasted doesn't necessarily mean the model are wrong, it may mean that Mother Nature did something that was far from average. CCSM3 tracks the observed ice decline better most models, but it doesn't nail it. Is it a problem with the model, or disparity with a very atypical reality? The Arctic has lost a tremendous amount of old ice. Much of the old ice was lost as a result of a wind-driven phenomenon occurring largely during early 1990's, and then again around 2005. That was not a greenhouse gas phenomenon. Do climate models emulate those kinds of wind forcing events at exactly the right times? Should we expect them to? Observations and models show a century of depleting ice and there's nothing out there that shows ice turning around. Over the longer 20+ year timeframe, everything points to decline

Day 1 - Wrap Up

Colleen Matt

Tomorrow we will be hearing from many partners involved in polar bear conservation . We will discuss how success is defined. The plan must address both delisting and uplisting from threatened to endangered. There will be several speakers tomorrow, plus there will be time for general comments. The discussions held tomorrow will become fodder for the technical group meeting in December.

Day 2 – Introduction

Colleen Matt, Facilitator

Facilitator Colleen Matt opened the meeting with a recap of the previously day and an outline of the presentations for today. Presentations will address the following questions:

1. In the view of your organization, what is the one single action that can be taken to best ensure the persistence of healthy polar bear populations?
2. What would your organization judge to be a successful outcome of a conservation/recovery program for polar bears in Alaska? In other words, in your view what would be an acceptable population size and trend of Alaska polar bears?
3. When (or under what conditions) would your organization recommend removing polar bears from the ESA? What sort of evidence would you require to make this decision?
4. What role can your organization play in achieving 1-3 above?

Defenders of Wildlife

Karla Dutton

In preparing for this presentation, Defenders of Wildlife found questions 1 and 4 were easy to answer; questions 2 and 3 were much harder.

For question #1, the single action that can be taken to best ensure persistence of a healthy polar bear population, we feel is to conduct life history model to identify the stages of the bear's life history most likely to be sensitive to conservation efforts.

The answers to questions #2 and #3 are difficult because there is significant uncertainty about the polar bears' future. We believe two possible future scenarios exist depending on climate change impacts. First is that climate change becomes serious enough to make the polar bear a "conservation-reliant" species that requires supplemental feeding and human intervention to maintain a minimum viable population. Second is future action to halt climate change has the effect of stabilizing or reversing warming trends at some undetermined time in the future, and does so soon enough, so that the polar bear can recover and remain delisted without ongoing human intervention.

Under the first scenario, the Service would need to re-evaluate how it treats conservation-reliant species for the purposes of ESA recovery and delisting. Under the second scenario, we believe the ESA currently requires the Service to consider the polar bear recovered when it is no longer threatened. In this regard, the difficult issue is how the Service defines "foreseeable future." We believe the Service should evaluate whether it is possible to define "foreseeable future" as anything shorter than the period it takes for the climate to stabilize or cool. An inappropriate definition of "foreseeable future" would result in the premature delisting of the polar bear and thus risk the need to relist it at some future time.

"... there is significant uncertainty about the polar bears' future."

One possible recovery goal is to have enough polar bears around by the time the climate possibly stabilizes or starts to cool. The 40 or 50 year timeframe used in the polar bear listing rule seems too short for the purposes of determining whether the species has recovered, especially given that it does not appear the climate will stabilize or cool in that timeframe. Using a minimum viable population (MVP) number might be better if based on a potentially longer time scale than the 40-50 year timeframe and perhaps even a 50-100 year timeframe. We urge the Service to exercise caution in over-relying on any numerical target for U.S. bears though. We further urge the Service to regularly update population recovery targets based on newly available science, particularly projected impacts of climate change.

As for the future role of Defenders, we stand ready to help with our science, endangered species and policy capacity, and to continue to work with USFWS and other partners in Alaska on proactive and practical programs to address polar bear conservation issues.

State of Alaska

Doug Vincent Lang

The State believes the proper timeframe for planning is 10 to 20 years. We don't support the use of longer timeframe due to too much uncertainty; the shorter time period was supported. The focus should be on those areas within the United States. Within this time period there should be: attention to continued monitoring of population and regulation of harvest. The MMPA and state and federal regulations are sufficient to conserve polar bears and prey.

The long-term conservation goal is sustainability and provides usable polar bear populations for traditional uses. We believe this is currently occurring. Focus should remain on conservation planning. There are a number of successful polar bear conservation actions and plans in place.

The State does not feel polar bears are currently threatened and we don't believe a recovery plan is necessary at this time. The conservation of polar bears is important. We are continuing relationships with Alaska Natives, oil and gas, and other entities. Coastal impact concerns are being addressed. The State looks forward to continuing collaborative efforts including our participation in international forums.

Kim Titus

Conservation and recovery planning together is a perplexing approach. I suggest separating the two plans and dealing with them separately. There are many excellent conservation plans within the U.S. and internationally.

In reviewing the literature on population monitoring, there is a need within the Department of Interior to have a common vision of applied science. While this should be related to conservation and recovery needs, it does not necessarily relate to the recovery plan itself. Nowhere in the plans by federal agencies is there a vision or an information-needs document that is shared within the agencies. There is long-term work that has gone on within the Beaufort, but I have no idea if that has been vetted within the science community to determine if that information portrays the top needs. There is a need a common vision statement within the Department of Interior.

I think there is a need to describe occupied habitat relative to the Barrier Islands designated as critical habitat. Examination of use patterns by polar bears should foster adjustments to critical habitat. Science could be bolstered to understand critical habitat, especially in Bering Sea and the southern range of the species. There is a need to evaluate critical habitat in mainland areas like the five-mile inland designation. This information can better inform critical habitat decisions. There is also a need to evaluate what is meant by occupied habitat and occupied range. Tools should be explored and empirical data gathered. One suggestion is that field logistic convenience not be the sole driver on evaluating range. Beaufort Sea polar bears should be sampled for demography based on distribution across their environment, not just their juxtaposition across the Alaska coast.

While some work is ongoing on polar bear physiology and health, there is a need to explore fitness and health parameters. For demographic work, we encourage non-invasive sampling techniques. And, where culturally possible and in conjunction with the Nanuq Commission, data should be gathered from all harvested bears.

We urge and support the use and ongoing refinement of climate modeling. We need to think carefully about design functional response to habitat and vital rates of polar bears. Correlative studies are difficult, but given the high profile and understanding the relationship between those things is important.

DISCUSSION

Question: Sonja Jahrsdoerfer, USFWS: I'd like to request clarification on Kim's first issue about Barrier Islands and designations of critical versus occupied habitat.

Answer: Kim Titus, State of Alaska: Critical habitat is defined as the Barrier Islands down to Hooper Bay. There hasn't been a bear down in Hooper Bay in many, many years or decades. Their vital rate goes to zero when they're down that far south. The Service should evaluate the large expanse of critical habitat relative to the real occupied range of polar bears. In that critical habitat designation, words like "occupied" and

“occupied range” are used rather loosely and there could be a greater tie between the real spatial distribution of polar bears and critical habitat, especially in the southern range.

Question: Kassie Siegel, Center for Biological Diversity: we have virtual unanimity in the science community from the polar bear steering group, from peer reviewers, and the USFWS that the polar bears should be listed as a threatened/endangered species. The State is taking an outlying position from many of these. It sounds as if you are advocating less data, not more. What additional information is the State of Alaska looking for that might cause the state to change its mind and support protection?

Answer: Doug Vincent-Lang, State of Alaska: I don't think we are an outsider. We support long-term conservation of polar bears and feel we have a regulatory environment that has been successful in rebuilding polar bears. We should continue to monitor populations and we are contributing a large amount of money (two-thirds of a million) for monitoring. We need to determine what the responsible levels of harvest are and we've outlined three paths forward necessary for conservation.

Comment: Kim Titus, State of Alaska: There is a significant trend as relates to non-invasive sampling that it will collect more data, not less data. If you dart and get tissue samples, you radio tag, and you can get 90 other biopsy samples and tissue samples from another 100 bears efficiently, I suggest that you end up with more data, not less data. It's a tradeoff between a variety of techniques and permitting, but the fact is when you handle a lot of animals you are going to have mortalities.

Comment: Jason Herreman, North Slope Borough: The State is not alone in suggesting the polar bear should not be listed. The Borough suggested that this may not be the best direction for conservation of the species. There are other methods for conservation. Non-invasive sampling is something we'd like to see. We are not all unified on some of these topics.

Comment: Matt Cronin, University of Alaska: It is important to keep in mind science and policy are not the same. ESA is a policy decision; science is used to make it. The scientific community may not be unanimous. There is a certain amount of uncertainty in the models, but most agree sea ice is declining to some extent. You can believe the models and predictions, but they are predictions. Separating science and policy and using predictive population trajectories is a new approach for the ESA and may be premature.

Question: Amy Kearns, AECOM: What data is being collected from harvested polar bears, and is there a systemic collection of information/data/organs that may give insight into the health of polar bears?

Answer: Jason Herreman, North Slope Borough: There are a couple of programs. The Nanuuq Commission is coordinating sampling outside of the borough. They offer some funding to hunters in exchange for providing samples to the USFWS. The Borough has had some difficulties in recent years, but we are trying to collect more metrics, samples for contaminants, samples from organs and tissues. We are hoping to improve our sampling protocol in the coming year. We got all the necessary samples to determine health from the last bear that was harvested. When a bear is harvested they are often harvested away from the community, at odd hours, and the bears aren't necessarily brought back to the community for butchering, so it is difficult to get to the carcass to do complete sampling.

Question: Kassie Siegel, Center for Biological Diversity: Pardon me for asking tough questions but I want to keep challenging us to think about this process. Dr. Servheen emphasized how important it was for grizzly bears that the agencies were all on the same page and giving the same message. We are all in this room because the polar bear IS listed and the science supports this, but the State is taking a different line of thinking. Is there something in this process that informs the State differently than the rest of us? Where is the common ground and what information does the State need?

Answer: Doug Vincent Lang, State of Alaska: We will not agree with the need to list polar bears at this time. We are dedicating money to get more information and answers to look at the issue. We are spending considerable resources. Because we don't think listing is the right thing, we don't believe a recovery plan is appropriate, but we do feel conservation is important. We support , and provide efforts to support, long-term efforts to conserve polar bears.

Comment: Amy Kearns, AECOM: I have one comment about successful outcomes for acceptable population size based on some of the information presented. Maybe changing the successful outcome to survivability, as opposed to just focusing on population size, is one possibility. What is a better metric for polar bear recovery? Maybe honing in on survivability is the better metric than just population size.

Question: Jim Wilder, USFWS: Thanks Doug and Kim for presentation. Kim, you mentioned coordinated DOI research strategy and I think that may be one product out of this planning process. Essentially, the recovery planning process is threats-based, so we are trying to identify actions for threats. Plan of action and implementation schedules will be prioritized based on the ability of these actions to achieve polar bear conservation. In a sense, this process will achieve what you are looking for. Doug, to follow up on the CIAP program, it seems like that has been in the news recently that it might be going away, can you speak to that?

Answer: Doug Vincent-Lang, State of Alaska: The Alaska Coastal Zone management program has gone away, but the baseline regulations associated with the program remain in place. All the existing regulatory structure did not go away; it's just how they are now being coordinated. The CIAP program money was set out before that program sunsetted.

Comment: Lily Peacock, USGS: Regarding the call for coordinated research responses, Chris Servheen talked about the usefulness in the grizzly bear study team. There is a real need for an Alaskan interagency polar bear research team so that we can get together and write a research plan for the State of Alaska with input from members on this team from all agencies, that is separate from the recovery planning effort. For example: USGS has mandates about studying Arctic changing ecosystems and they may not be a priority in the recovery action plan. Coordinated research is necessary and mirroring the Canadian polar bear technical committee may be useful. It is evolving amongst several agencies, and I see the need for an interagency polar bear research study team to coordinate research.

North Slope Borough

Mike Pederson, Jason Herreman, Billy Adams

Mike Pederson

Thank you Jim and the USFWS for the invitation to participate in this meeting and the entire process. Because I'm on the ground and dealing with polar bears with the Polar Bear Patrol, I believe we can protect bears from coming into town and get them moved back out to the ice. As part of our polar bear outreach we have distributed posters and brochures about polar bear habitat and what bears do in the different seasons. These posters were mailed to each of communities and brochures were sent to all school-aged children. Our successful polar bear patrols are a priority for the North Slope Borough communities along the coast.. Polar Bear Patrol has been in place since the early 1990's and it works well. For the Borough, our priority and number one action is the Polar Bear Patrol to protect the bear and the community.

Jason Herreman

The highest priority action as seen by the North Slope Borough is to mitigate GHGs to stop climate change by developing alternative energy sources. We also provide systematic updates to the nation and Arctic communities about NSB GHG mitigation. This may be outside of the recovery process for polar bears, but if we are going to write a recovery plan GHGs can't be outside of the process. The Borough is approaching the issue from the standpoint of a conservation plan, rather than a recovery plan, because we didn't support the listing.

Local actions include working with local communities to establish polar bear interaction plans. This could include:

- 1) Maintain sustainable harvest
- 2) Establish resting areas for bears that do not limit access to subsistence resources for our communities
- 3) Attractant management and deterrence programs
- 4) Well regulated viewing opportunities
- 5) Outreach & education programs for young hunters on acceptable traditional harvest of bears

Some alternative actions might include using landing craft for moving game carcasses away from communities; towing floating marine mammal carcasses to shore away from communities so that bears can access them for food, and offshore floating resting platforms.

Future polar bear research:

- Establish a five-year research and management plan
- Establish minimally invasive population monitoring techniques that collect necessary management data
- Focus research on the response of individual subpopulations to climate change
- Conduct hunter surveys to better understand how polar bear condition/recruitment/survival has changed over time
- Look at prey base and its availability to bears throughout the year (this is a huge data gap for polar bears at this point)

The North Slope Borough feels the successful outcome for polar bear in Alaska would be:

- A stable population that, even if only seasonally present, could provide a subsistence harvest
- Safe interaction between communities and bears
- Establishment of plans to deal with extreme events such as oil spills and mass strandings
- Polar bears should be delisted in Alaska when it is established that a stable population exists

Successful outcome for polar bears throughout circumpolar range:

- Each of the 19 subpopulations or 4 eco regions should be evaluated independently for delisting under ESA
- Each subpopulation/eco region should be delisted when it is established that the specific population is stable or increasing
- Maintain current genetic diversity

Polar bears were listed based on sea ice models and therefore we need to:

1. Establish criteria for appropriate models (regionally specific ice models, snow cover models that include wind drift and ice structure dynamics) to use to determine when delisting is possible if we are going to rely on these models as a criteria for delisting
2. A core polar bear range should be identified based on future sea ice, prey and polar bear population model projections
3. The circumpolar population should be delisted when it is established that a stable population exists within this defined core area

Our role is to help establish recovery criteria; review all future drafts of conservation and recovery plan; work as on-the-ground conservation partners, and provide local input and perspective on how bears are responding to climate change, deterrence program, attractant management, and local outreach.

Climate change has to be addressed for polar bears. The USFWS needs to continue to involve local communities in decision making about conservation and recovery. There needs to be a unified front across all branches of USFWS in regards to issues that affect polar bears. The USFWS needs to continue to foster and acknowledge contributions of partners; and Arctic communities need to be allowed to continue to manage our own resources.

DISCUSSION:

Question: Karyn Rode, USFWS: My question is regarding the outreach and education programs for young hunters about acceptable traditional harvest of bears. That is great and we should think about having that explicit in our recovery plan. What does it entail? Is it just in Barrow or throughout the communities?

Answer: Jason Herreman, NSB: We use radio talk shows and have hunters talking to young folk while out hunting. Barrow has a young hunters program that had grant funds to work with the young hunters in the community. There has not been a large expansion to other villages yet, other than the radio talk shows. We

are hoping for continued support and funding for that program to provide one on one outreach in the communities.

Question: Colleen Matt, Facilitator: Can you expand on the core area?

Answer: Jason Herreman, NSB: There is one ecoregion in particular where bears are likely to do better in the future due to ice conditions allowing for access to prey. I'm envisioning that as a core area for bears, and it may not need to be listed but needs to be conserved for the future.

Question: Shannon Torrence, USFWS: In regards to core areas, different ecoregions and delisting, is Alaska considered a significant portion of the polar bear range? Are there other areas that are listed that are not a significant portion, and should we consider listing portions of areas in the future as opposed to all areas/ranges?

Answer: Sonja Jahrsdoerfer, USFWS: There are two considerations under ESA as regards listing: 1) distinct population segment, and 2) significant portion of the range. We didn't list any distinct population segments for polar bears. We felt there was too much mixing between the subpopulations to be discrete. Significant portion of the range depends on looking at the threats and if they are concentrated in only a portion of the range. For that you would have to make the case there were threats that are particularly concentrated in that area.

Question: Lily Peacock, USGS: In regards to the comment that perhaps the polar bears should not have been listed, let's say the polar bears hypothetically decline in abundance. What would the North Slope Borough feel would be potential management actions to uplist to endangered status?

Answer: Jason Herreman, NSB: I can't answer that from a North Slope Borough perspective. On a personal level, if the potential were to exist that the polar bear was to be gone from Alaska they should definitely be listed. If we ended up with only a seasonally present population in Alaska, I think we would need to consider uplisting them.

Comment: Sonja Jahrsdoerfer, USFWS: Regarding significant portion of the range, one important change in the policy (it is in draft at the moment), if you decide a part of the range is significant you'd still list the whole thing.

Billy Adams

Thank you to the Service for inviting us to speak. This is an important topic to me, as it is to you. I have lived in Barrow for all of my 45 years and began hunting with my father and my uncles on the ice 40 years ago and have never missed a single season of whaling or hunting on the ice. When I try to hunt on the land everybody knows me and thinks I'm lost; most of my time is on the ice. I learned about the ice, snow, animals and when they have their pups/cubs and what is important for them. We already know what is important for them: it is the snow and ice. When I observed a lot of the ice as I was growing up, and in the 1980's we had good ice. In the 1990's I began to see some changes. The bears were already being studied by the agencies and I remember the population size was good then, and still growing. Even though we have had some years of ice and weather changes, we still have a good population of bears.

"Research needs to incorporate some of our traditional knowledge."

As we listened to the grizzly bear talk yesterday he stated that if we work only with people we agree with, we might not accomplish what we need to. As Rosa stated, we are here to work together on the same goal to see the polar bears remain in the Arctic in to the future. As an Inupiat we have gained knowledge through generations about our environment. I see this as a good start; so let us work together to ensure this is going in the right direction between those who live in the Arctic and those who don't.

Research needs to incorporate some of our traditional knowledge. Yesterday I listened to some good presenters and I admire them. I have been taught from real ice experts, from the elders, about ice conditions, different types of ice and snow, and we have our own terms for those conditions including currents and winds. Yesterday I listened to those speaking about snow and ice and they may not be the real experts. We need to make projections based on some of the experts with traditional knowledge. I do not support projections going out 100 years. Where I live, I live there year round. We see scientists study animals for only a few days at a time. It doesn't seem enough.

The outreach to young hunters is important. We are taught when to hunt and when not to. We don't hunt in June, July and August when fur is out of season and bad. The only time to hunt is late winter, after mothers go into their dens. That is a real effort for conservation. We are taught through generations these kinds of things, for thousands of years, and have learned to manage our animals.

There is always going to be ice but the important time for that ice is when the cubs are being born and when there are pups of the seals being born. The most important ice for polar bears is young ice and that young ice starts to come in October. There are a lot of bears that are very healthy, but we need to make some room for improvements in studying ice. Some scientists may use just satellite images for sea ice, but we need to get out there in person.

There is a message we all want to conserve our bears and there are only a few polar bear hunters in Alaska and I'm one of those people. I care about the animals and the people, too. We have to give this message out to the real world how it is when we live in our communities. I share your concerns and think about them daily.

DISCUSSION

Question: Jim Wilder, USFWS: The North Slope Borough is an extremely critical partner in the future of polar bear conservation and we want to continue our collaboration and cooperation. You are familiar with the polar bear jail in Churchill. Is that something that you foresee in the future as useful on the North Slope, for example, for responding to possible future mass strandings of polar bears on shore or oil spills?

Answer: Mike Pederson, NSB: We don't give the bear three chances in our region and then move them out when they come in again. I don't think that's something we would consider.

Comment: Jason Herreman, NSB: We haven't seen support for that type of structure in our communities. We would rather take measures to keep bears out of the community.. Drawing bears away from communities is probably a better way, not a feeding program but a diversionary program to draw them away to areas where there will be less conflict.

Comment: Billy Adams, NSB: Polar bear patrols started when I was a teenager. There are people that volunteer. More than 25 years ago I started to do that and then, all of the sudden I'm getting paid to do it. During those times we've learned a lot, of things like putting fences around the dump, moving the dump a couple of miles further inland from town, moving beach carcasses away from town. These things made for a lot of improvement and we had fewer calls about polar bears.

Question: Tom Evans, USFWS: Do you think there will ever be a time when there will be no ice and there will be problem bears that will not leave the village. If the alternative is to shoot them, would a polar bear jail for temporary incarceration be useful? For example, if there is an oil spill and we had such a place to anesthetize them and clean them up? If there are longer periods with no summer ice and there is something like an oil spill, we might need a place like that.

Answer: Billy Adams, NSB: The Barrier Islands to the northeast might be one a good area where we could transport a bear away from town. Who would fund a jail like that? There would need to be a helicopter, a sling, a biologist, etc.

Comment: Mike Pederson, NSB: In Barrow our patrollers have a job to do and they care about their job. There are times we are called multiple times within the same night. We've dealt with the same bear throughout the night and into next morning. As part of conserving the polar bear population when we deal with problem bears we try to do it in a way that doesn't have a negative effect on the bear.

Alaska Nanuuq Commission

Jack Omelak

I had to think a long time on how to relay some of the concerns and issues of the Alaska Nanuuq Commission and how it fits into the modern, Western science strategies. What I came up with is that one of the most important things is communication and education. One of my favorite quotes is from George Bernard Shaw is “the biggest problem with communication is the illusion that it’s taken place.”

At times resource management is more about managing people than resources. How do we account for the human element in these management strategies? Humans can be unrealistic and not conform to standards and the repeated results that science demands. Our role at the Nanuuq Commission is to be a conduit between the hard science and the people that we represent.

We’ve heard a lot about management plans, adaptive management, and co-management. What exists is a chasm between the people in the field and the managers. It’s easy to meet in the room and talk about modeling and theories but how do we make it relevant, understandable and important to the resource users? How can we identify, comprehend or integrate issues of concerns brought forth by the users? The transfer is not necessarily easy. Our ideas are similar. We’ve identified the same threats, but we don’t speak a common language. Successful management plans incorporate a system, real time, accurate, on-the-ground observations, i.e. asking for local observation from those using the resources. There exists a problem in quantifying those observations into our models or management strategies. Example: Radio telemetry can tell us where they’re going but local observation can tell us what they’re doing. There needs to be a long-term commitment to establishing a communication network, not only with the villages, but with the general public and colleagues in Russia. Take a historic approach to understanding subsistence harvest in Alaska, and take in to account that 200 years ago the direct physical relationships between humans and the environment and resources they used. The tenets that founded Western science aren’t new to the users, i.e. migration, limiting takes, etc.

“... how do we make it relevant, understandable and important to the resource users?”

Both natives and non-natives alike will benefit from a communication approach. We know that Western science can benefit from taking into consideration observations from local peoples. Resource users can benefit from Western science as well. By incorporating strategies that recall, revisit or reestablish the prestige and honor previously associated with the polar bear, we can reinvigorate the status of what the polar bear used to mean. I don’t mean to imply contemporary groups don’t revere the polar bear; what I do mean is that there is a way to synthesize this primal understanding at the core of responsible resource use that also contains the same aspects of contemporary conservation efforts. W we are trying very hard to make the polar bear more of a symbol of prestige like it was in the past, through our conservation management efforts and we’ve had to create new ways to do that. We need to get the people we represent to buy into what we’re doing here and we need to get the people in here to buy into what the people are doing out there.

Center for Biological Diversity

Brendan Cummings

Thank you to the USFWS for convening this workshop and inviting me to present. As we search for common ground, the North Slope Borough presentation is similar in many ways to mine. The fundamental issue, I think, is GHGs. As we move forward with developing a recovery plan, I wanted to start off that my organization disagrees a bit with the USFWS on ESA. I will start with the assumption the agency doesn’t have authority to regulate GHGs (an assumption we do not accept), but I still believe that for the recovery plan to be a credible document, and because the law requires it, the plan has to address the fate of bears and greenhouse gases. I have given my talk this title (Recovery Plan or Obituary) because there is a danger of accepting that it is already too late to do anything about the fate of the polar bear because society won’t do anything about reducing greenhouse gases. However, even if we don’t have confidence that society will meet necessary standards of reduction in greenhouse gases to save the bear, we need to assess if we are doing what we can to address conservation of polar bears.

So long as the Earth is in an energy imbalance due to elevated greenhouse gas concentrations, the planet will continue to warm and the polar bear's sea ice will be reduced.

What is the conservation unit?

- Global species
- Alaska bears
- Divergent ice eco region
- Southern Beaufort Sea population
- Chukchi/Bering Sea population
- Significant portion of range/recovery unit

We need to be explicit during the planning process about what we are talking about. While it is the global population we are concerned with, we also need to focus on the loss of Alaska bears as being unacceptable. There is a high risk of extinction even under a mitigated greenhouse gas scenario in the divergent ice eco region. This is a hurdle we have to overcome to save bears in Alaska.

Desisting criteria should include:

- Demographic (informative and will help monitor success, but it doesn't really address the critical issue. We are unlikely to know population trends and body condition. We can't base delisting criteria purely on this)
- Sea ice (one of the most important variables but there is still a high degree of variability in the shorter term)
- Temperature
- Atmospheric CO₂ concentrations (scientifically credible, measurable, objective standard as believed by our organization)

What should the acceptable level of greenhouse gasses be set at? In the Amstrup et al. 2010 study, the "business as usual" model takes us in to the high 600's ppm; under the mitigation model it is capped at 450 ppm. Simply capping it there, we still have a 50% risk of extinction of Alaska bears. 450 ppm is not recovery. Combine it with best management practices and it reduces extinction risk only down to 25%. This is still not recovery. The current number set by J. Hansen of NASA is 350 ppm globally, but for sea ice we might need to set it lower than that.

Uplisting to endangered criteria: in 2007 the Marine Mammal Commission recommended the Southern Beaufort Sea polar bears, due to projected sea ice loss, be listed as endangered. What kind of criteria for uplisting will be in the recovery plan? In the Steller sea lions' case, an endangered population may be defined as one with a greater than 5% chance of extinction over next 100 years. For Steller eiders it is defined as "if extinction risk rises to greater than 20% over 100 years."

The path to recovery won't be easy. To reach 450 ppm, we need to get 40% below 1990's levels by 2020; 80-95% below 1990 levels by 2050. And, we need to reach zero emissions by mid century to reach 350 ppm. It is a reality and needs to be addressed to recover polar bears.

Good management matters. However, it doesn't matter if we don't address global warming. What is best management?

- *Oil spills* are a risk to bears in Alaska. An oil spill in Beaufort or Chukchi seas will be very bad for bears in Alaska, but there are plenty of bears in Canada. Section 7 looks at global bears but the recovery plan looks at Alaska bears. We need to harmonize these two things.
- *Contaminants*. Contaminants aren't what caused the bear to be delisted, but it is still one of the pieces that must be addressed.
- *Harvest*. What is a sustainable harvest of a declining population? Populations that are declining or will be declining due to global warming and how do you overlay a sustainable harvest with a population that is in decline?
- As the Arctic unravels, we need a response plan that is separate from listing/delisting criteria:

- Churchill – 3 bears shot already this year
- Starving bears
- Stranded bears
- Orphans
- Captivity – given the high extinction risk in the wild, we need to start developing contingency plans as well.

Our role: in the ideal world, our role is taking the documents produced (a recovery plan that we believe is scientifically credible) and pushing in the Lower 48 for full funding and implementation of climate policies on a national level that are consistent with that plan.

DISCUSSION

Comment: Amy Kearns, AECOM: Compromise is important. When you come together in a collaborative effort to bring back polar bears and make sure we don't lose them in Alaska, you are in the role of being an advocate. I'm proposing that you don't limit yourself to a position that the recovery plan must be such-and-such or we won't advocate it, and we'll shop around for funding. Instead, work together even though the plan may not be 100% what you want. It is important to make sure that, even if the plan doesn't meet 100% of your needs, everyone gets some of what they want. It is important to give and take. Inviting the EPA who may have the authority to regulate GHGs may be wise to ensure we're all moving in the same direction.

Question: Matt Cronin, University of Alaska: What is the status of EPA's regulating? If GHGs are the issue as models suggest, the agency that has authority to regulate should be involved.

Answer: Amy Kearns, AECOM: I believe they have the final GHGs reporting rule and individual sectors in the industry are continuing to write those parts of the rule. EPA has a regulation in place for defining what is a major source for GHGs and what constitutes a requirement to get a permit for adding new sources of GHGs. Like many regulations, I believe it is being looked at and could possibly be in litigation.

Comment: Kassie Siegel, Center for Biological Diversity: The EPA is moving forward with rules to reduce GHGs from the transportation section (stationary and mobile sources). The Supreme Court ruled that GHGs do qualify as air pollutants. There are: a final endangerment finding for greenhouse gases; a reporting rule; GHGs standards for cars, trucks; and there is new source-review permitting. The EPA is working on nationally applicable rules for power plants and oil refineries. The EPA is doing a lot right now.

Comment: Brendan Cummings, Center for Biological Diversity: We do understand the need for compromise and don't expect the plan to be as if we've written it. We hope that the plan has enough substance that we can agree it will help recover the polar bear. You cannot compromise with the laws of physics. The statement about subsistence harvests was not to say there should be no subsistence harvest. Global warming puts us in a new world and we need to figure out how to harmonize these two things. There will be pressure and we need to get ahead of the issue.

Comment: Eric Regher, UFWFS: Regarding the harvest comment, this is a big and relevant issue. The fact is, if a population is declining for any reason other than harvest, the short version is there is no sustainable harvest at that point. What are the mechanisms for population regulation for polar bear? There is some work that needs to be done and we need to recognize that there is no sustainable harvest and we need to have frank discussions about it. Another comment is there should be caution when looking at Bayesian models; they are qualitative in nature. Also, there are diverse groups of people here but there is a lot of common ground. Conservation happens in a lot of places. A lot of it happens on the ground where polar bears are and we need to keep that in mind. Regarding outreach and younger people, and in conservation in general, we need to be frank about threats and also be positive and focus on what we can do.

Comment: Lily Peacock, USGS: As far as sustainable harvest, one way to start talking about this is really be conscious of the language we are using. We shouldn't use the term 'sustainable harvest' but instead focus on subsistence harvest or culturally important harvest or managed harvest or talk about harvest in light of human safety. It is difficult to defend 'sustainable'. One way to move forward is to use words that reflect what the harvest is about here in Alaska. In Western Hudson Bay, because of the results of science, the harvest was

reduced from 56 to 8 in one year. This was unpopular on the ground and there were more than that taken in defense. Conservation support is important on the ground, so let's start changing how we talk about harvest and the language that we use.

World Wildlife Fund

Geoff York

Our number one highest priority action is the reduction of GHGs and elimination of short-term climate drivers. There remains need to address immediate sources of risk to the polar bear, including cautionary management of key habitats.

Successful outcomes: given sea ice changes anticipated, our recommendation is that we not focus on population size. Metrics and end points should incorporate local knowledge, harvest monitoring programs, known and anticipated climate change impacts and human activity impacts. There needs to be an engagement structure with people who live and work in polar bear country. We need to build capacity in local/regional areas for participation in monitoring, research, policy, conflict management and meetings like this. USFWS, the North Slope Borough and The Nanuuq Commission have a great track record at working together.

We need to be clear on the science and complexity on a global status. 'One size fits all' solutions are likely to be unsuccessful. There are 19 subpopulations and we could see just as many different stories unfold. We need to recognize and state existing knowledge gaps. Traditional metrics for delisting would likely not work across the range. We need to work collectively to fill data gaps. Adopting and implementing a circumpolar management plan will establish a framework in revising delisting decisions. International collaboration and commitment must be done more in to the future. We support using habitat parameters as one threshold for listing/delisting.

Mitigation of human activities should include:

- Protection of habitat
- Reduction of gases
- Collaboration

The World Wildlife Fund is one of the largest conservation organizations in the world; and it is the only active organization across the Arctic and all polar bear Range States. WWF is science based and has a large member base. The organization has a global climate and energy program working internationally, nationally and regionally. We are engaging large corporations to change business practices. Across the Arctic and in Alaska we work with local partners, people that live with the bears. We support polar bear research projects in Norway, Russia, and Canada. We work with partners to develop new adaptive management tools to incorporate change in to conservation planning. Keeping people with different opinions and perspectives in the same room and working together will strengthen the outcomes. We stand ready to join conversations and offer capacity when needed.

DISCUSSION

Question: Matt Cronin, University of Alaska: Regarding not using population size or numbers as a metric, I'm not sure why one wouldn't want to use population size as a metric?

Answer: Geoff York, WWF: In my experience, and being realistic about the gaps, we're not going to ever have numbers. Given the challenges in the Chukchi Sea and vast size of the area, we'll probably never have numbers. I think we risk confusing ourselves, stakeholders and the public by using numbers as a metric when we really don't have good numbers. Where we can obtain good numbers, then, yes, we should do it and use it.

Question: Susie Miller, USFWS: Regarding your comment on working on development of an adaptive management tool? Is it something specific?

Answer: Geoff York, WWF: There is a project that is supposed to wrap up by end of 2011 that is trying to look at physical features across the Arctic that will be resilient to change across time. They are trying to

develop new management tools and paradigms that are more adaptive and open to change. The program is called RACER.

Public Comments

Question: Brendan Cummings, Center for Biological Diversity: Who is the technical work group?

Answer: Jim Wilder, USFWS: That is still being determined at this point. It will most likely include the USFWS polar bear team, USGS polar bear team, a Marine Mammal Commission member and we're still working out the particulars of the rest. There will be a meeting next week to follow up on this workshop and make some of those decisions.

Comment: Rosa Meehan, USFWS: One thing we are going to emphasize is to maintain an open, transparent process. There are opportunities for people to review and comment on the work that has been done to date. You are welcome to call and talk at any time, and we value the input and the thoughts you have. We want to maintain that open dialogue.

Comment: Jim Wilder, USFWS: The next draft will be completed in September but it won't be substantially different from April's draft. It will be a placeholder for the Range States' plan. In the draft we submit in October there won't be anything on criteria except for a place holder for that information.

Closing Comments

Rose Meehan, UWFWS

Thank you for making time in your busy schedules to come and share your thoughts with us. I cannot stress the importance of the continuing interest, thoughts and insights. We do have some common interests. We care about polar bears. We want polar bears to stay part of the environment. We recognize the desires and interests of the people that live with polar bears. We look forward to building on the shared interest; to continue looking for common ground and tangible things we can do to pursue polar bear conservation. Let's look for the positive aspects to this because there is a lot we can do together, rather than getting hung up on things we can't do. We can share our thoughts to affect changes in various areas with others. Together we can make a real difference.

Jim Wilder

From my perspective this is an extremely challenging undertaking that requires us all to work together. I've found the contributions, presentations and comments we've heard at this workshop useful and thought provoking. They will help us to develop a meaningful plan.

Appendix A: Meeting Attendees

Name	Organization	Email	Phone	Copy of Minutes
Lisanne Aerts	OASIS Enviro	l.aerts@oasisenviro.com	268.1970	Y
Hank Baij	Corps of Engineers	Harry.a.baij@usace.army.mil	753.2784	Y
Justin Blank	Weston/ConocoPhillips	justin.blank@westonsolutions.com	252.7826	Y
Karen Cameron	AK Mgt	karenc@alaska.cent	248.8421	Y
Rachel Cox	Exxon Mobil	rachel.r.cox@exxonmobil.com	564.3737	
Matt Cronin	University of Alaska	macronin@alaska.edu	227.1753	Y
Brendan Cummings	Center for Biological Diversity	bcummings@biologicaldiversity.org	760.366.2232	Y
Dave Douglas	USGS	ddouglas@usgs.gov	364.1576	
George Durner	USGS	gdurner@usgs.gov	786.7082	
Karla Dutton	Defenders of Wildlife	kdutton@defender.com	276.9420	
Jason Herreman	North Slope Borough	Jason.herreman@northslope.org	878.1881	
Grant Hilderbrand	NPS	Grant_hilderbrand@nps.gov	644.3578	
Carole Holley	Pacific Environment	cholley@pacificenvironment.org	277.1029	Y
Amy Kearns	AECOM		273.4570	Y
Brendan Kelly	NSF			
Julie Lina	Pioneer	Julie.lina@pxd.com	343.2106	Y
Ken Lord	DOI Solicitors	Ken_lord@sol.doi.gov	271.4184	
Rosa Meehan	USFWS	rosa_meehan@fws.gov	786.3800	
Mandy Migura	NMFS	mandy.migura@noaa.gov	271.1332	Y
Susi Miller	USFWS	Susanne_miller@fws.gov	786.3828	Y
Matt Moran	USAF	Matthew.moran@elmendorf.af.mil	552.0788	
Rebecca Noblin	CBD	rnoblin@biologicaldiversity.org	274.1110	Y
Lilly Peacock	USGS	lpeacock@usgs.gov	786.7068	
Craig Perham	USFWS			
Christopher	USFWS	Christopher_putnam@fws.gov	786.7844	

Putnam				
Karen Rode	USFWS	Karyn_ode@fws.gov		
Hannah Vorhees	U Penn/ANC	Hannahvsas.upenn.edu	227.0557	Y
Jeff Welker	ENRI/UAA	Afjmw1@uaa.alaska.edu	244.7785	Y
Margaret Williams	WWF	Margaret.williams@wwfus.org	279.5504	Y
Jim Winegarner	Brooks Range	winegarner@brpcak.com	865.5084	Y
Dave Yokel	BLM	dave.yokel@blm.gov	474.2314	Y
Doug Vincent-Lang	ADF&G	Douglas.vincent-lang@alaska.gov	267.2339	Y
Geoff York	WWF	gyork@wwfcanada.org	613.232.2518	Y
M. Gilbert	Pacific Environment	gtmakore@gmail.com		
Rachel Cox	Exxon Mobile	Rachel.r.cox@exxonmobile.com	564.3737	Y
Michael Pederson	NSB WWM	Mike.pederson@north-slope.org	852.0350	Y
Kevin Callahan	Exxon Mobile		250.2505	Y
Terry DeBruyn	UWFWS	Terry_debruyn@fws.gov	786.3812	
Lynne Barre	NOAA	Lynne.barre@noaa.gov	206.526.4745	Y
Mary Cody	BOEMRE	Mary.cody@boemre.gov	334-5286	Y
Melissa Snover	NPS	Melissa_snover@nps.gov	683-9542	Y
Jim Lawler	NPS	Jim_lawler@nps.gov	455.0624	Y
Tahzay Jones	NPS	Tahzay_jones@nps.gov	644.3442	Y
Kassie Siegel	Center for Biological Diversity	ksiegel@biologicaldiversity.org	760.366.2232	Y
Billy Adams	NSB	Billy.adams@north-slope.org	852.0350	Y
Sonja Jahrsdoerfer	USFWS	Sonja_jahrsdoerfer@fws.gov	786.3323	Y
