

“How to mitigate the potential impacts of human-caused removals”

The Alaska Forum on the Environment

Dena'ina Conference Center

February 8, 2:00 pm – 6:00 pm

Meeting Goal

With conservation partners, develop site-specific management actions necessary to achieve the Conservation/Recovery Plan's objectives for mitigating the effects of human-caused removals of polar bears.

Meeting Objectives

1. Refine our collective understanding of the threat to polar bears from human removals
2. Develop a list of potential site-specific actions to mitigate those threats
3. Estimate anticipated duration of the actions and potential partners for implementation

Introductions

Geoff Haskett, Regional Director, Region 7 welcomed participants. He encouraged participants to work together to find solutions to the issues facing polar bears. Residents and industry in the Far North have a long history of working with the Service. The Service's objectives today are to get input, and recommendations for actions to conserve polar bear into the future.

Colleen Matt described the workshop format. We will consider two topics: (1) harvest; and (2) defense of life and other removals. Presentations on the topics will be given first; then participants will discuss recommendations for strategies to address the threats facing polar bears.

Several people listened into the conference via audio-conferencing: Geoff York (World Wildlife Fund), Karyn Rode (FWS), and Marci Johnson (National Park Service).

Current understanding of harvest

Terry DeBruyn, FWS Polar Bear Project Leader - Legal framework background:

Terry introduced the Service's Polar Bear Team. Staff members from FWS that are familiar with the issues were stationed at each table.

There are a number of laws for management of polar bears that transcend international boundaries.

1973 Intl Agreement on Conservation of Polar Bears allows for traditional harvest, allows countries to consult on polar bears; requests prohibitions on taking females or females with cubs, killing bears in dens; not self-enacting—doesn't provide for conservation program in itself. Each country implements as best sees fit; U.S. implements through MMPA.

The Service has important cooperators, including State of Alaska. We work in 3 areas w/State: 1) polar bear interactions and human safety; 2) outreach and education; and 3) research and monitoring.

The U.S. has an MOU w/Canada that builds on existing agreements. This MOU established a bilateral oversight group. They met in Inuvik in NWT where they focused on need to leverage existing polar bear coordination between countries. The bilateral oversight group considered the existing system capable of overseeing current polar bear issues, decreasing populations and harvest issues.

Alaska polar bear Harvest –

Prior to '73, sport hunting allowed in Alaska. The harvest was likely unsustainable

In 1972, the MMPA was enacted. It made UFWFS responsible for polar bears in Alaska. The Act prohibits hunting except by Alaska Natives that dwell on the coast, and only for subsistence use, handicrafts and articles of clothing.

Prior to '73, the U.S. had unlimited harvest.

In 1988, the Inupiat/Inuvialuit (I-I Agreement) established sustainable harvest quotas for the Southern Beaufort Sea (SBS) subpopulation shared between the U.S. and Canada and serves as model for other agreements.

- The U.S. quota in SBS was substantially reduced in recognition of population decline from ~1800 to ~1525.
- The I/I Agreement sets up tech advisory group and this group informs the commission which sets harvest levels.
- The I-I Agreement has no formal status in law, but the North Slope Borough (NSB) adheres to this agreement. Since its inception, the agreement has been effective at keeping quota in sustainable levels.
- Under the FWS Marking, Tagging, and Reporting Program, polar bear monitoring includes hides and skulls tagging; must register bears within 30 days; collect teeth and samples for monitoring;
- Last year the total harvest was 34 bears; 18 in Chukchi, and 16 in the SBS. Overall harvest has dwindled in the past decade.

The U.S./Russia Bilateral Agreement addressed the shared polar bear population in Chukchi/Bering seas. The agreement was signed in 2000. The 1st meeting in 2009 took place in Moscow, Russia, where they established scientific working group (SWG). The SWG was told to report back within a year on sustainable harvest for this subpopulation.

- In 2010, the SWG reported back with alternatives, and the commissioners established a quota of 58 bears shared equally with two countries, and 2:1 sex ratio.

The Alaska Nanuuq Commission (ANC) and the Service are working on a U.S. harvest management Plan. Late this year they should have a management plan in place for this population.

Taqulik Hepa, Director, North Slope Borough (NSB) Dept of Wildlife Management - Inupiat/Inuvialuit Agreement quota history

Taqulik is the Director of the Dept of Wildlife Management in NSB.

The I-I Agreement addresses the management of SBS stock of polar bears. It was established in 1988 under leadership of Andy Carpenter and Benjamin Nageak.

The parties involved in the agreement are:

Inuvialuit Game Council of NWT on behalf of the Inuvialuit of the Inuvialuit settlement region of Canada

NSB Fish and Game Commission on behalf of the NSB Inupiat of Alaska

The Agreement is a Native user-to-user agreement wherein both parties commit to setting annual quotas based on best scientific information. The objective of the agreement is to protect females and cubs, and denning bears. They have annual meetings to share information on research, management and local observations. They also participate in harvest monitoring program.

Joint I-I commissioners are appointed by each party, while the technical advisors are polar bear experts. The commission has convened 19 times between 1988 and 2010. The next meeting will be hosted by Inupiat of Alaska in July 2011.

Successful results include the following:

- Recent harvest levels have averaged 37 bears...62 bears average in both countries.
- Adopted new shared harvest quota of 70 bears, reduced from 80, based on population estimate reduction from 1800 to 1526.

The decision to move the eastern SBS boundary is pending. The decision has gone back to Inuvialuit communities for review and approval. The change will not change the U.S. portion of the quota. NSB will support Inuvialuit decision.

The I-I agreement undergoing a 10 year review by both parties

The I-I Agreement is an effective tool, wherein subsistence users manage the resource. They promote good conservation, respectful hunting. Because of this kind of management, harvest was not a major factor in ESA listing

Harvest is important for cultural and nutritional needs of the Inupiat, and should be guided by Native knowledge and concerns.

Jack Omelak, Deputy Director, Alaska Nanuuq Commission (ANC) - U.S./Bilateral Bilateral Agreement Implementation

The ANC advocates for rights of subsistence users to harvest polar bear. They have working relationships with FWS, NPS, NSB, and WWF. They have Native to Native agreement with Native groups in Chukotka.

The Bilateral group met in June, and commissioners deliberated and agreed to implement co-management plan for the Alaska side of population. The ANC worked intensively with villagers, soliciting input for management plan because it needs local involvement to be successful.

A couple of issues that we're dealing with:

How are we going to distribute quota numbers village to village and how transfer them from one village to another?

The management plan is dependent on acquiring real-time on-the-ground data and they need to keep accurate counts on when and where bears are taken.

The Native group's willingness to adopt the management plan reflects a long history of self-management and traditional management methods employed for thousands of years. The ANC has recently hired an anthropologist from Nome. The FWS has dedicated resources to support a position to add information into management plan.

When we talk about polar bear conservation, we're really talking about relationships with other human beings, because that's what it will take to make this plan successful.

Eric Regehr, FWS - Harvest management and conservation for the Alaska-Chukotka polar bear population

Dr. Regehr focused on the Alaska-Chukotka population (CS), though much of his information may be applicable to other populations. In June, 2010, the commissioners under the Bilateral Agreement agreed to a harvest quota of 19 females and 39 male polar bear per year (total 58). This places upper limit on harvest for first time and allows legal subsistence harvest in Russia for Natives for first time since 1956

The agreement represents conservation through co- management between government and Native stakeholders and is consistent with U.S. legislation and management of other marine mammal populations. The cooperation of regional governments, community orgs and Native hunters is the only way to manage human-caused mortality and implement on the ground conservation

Summary of the biological status of population:

- accurate information is currently lacking
- Habitat is suffering: sea ice loss due to climatic warm a major concern in region
- CS has exhibited fastest rates of loss of polar bear habitat in last 20 years, among highest in Arctic
- sea ice loss projected to continue and the duration of ice-free period expected to increase by several months

We have the following information necessary to estimate sustainable harvest

- population size was last estimated to be 2,000 to 5,000 (1992)
- The figure 2,000 came from polar bear SWG expert opinion in 2005 and is not based on new data but extrapolated from earlier work
- The maximum population growth rate (r maximum) is unknown
- We have sex, age, reproductive status of the harvested animals in Alaska, but no information from Russia

We know that management actions are urgently needed in the CS. It is estimated that between 70 and 300 bears were killed each year in Chukotka from 1990s to 2005, based on expert opinion and anecdotal info. By comparison approximately 43 bears /year were legally harvest in Alaska 2000-2008. Together these levels of removal are not sustainable and represent immediate threat to the viability of population.

If humans are removing 76 females per year, the population necessary to sustain this level of harvest would be >6,500 polar bears

It is apparent that there are 2 management options:

1. moratorium on harvest in U.S. and Russia...most conservative...significant problems with enforcement
2. legal and regulated harvest in U.S. and Russia...likely to be supported by user groups

The harvest quota method adopted by scientific working group is more conservative than other models used in other areas of the Arctic. To estimate a sustainable harvest, we used a simple well-established harvest model that was more flexible than other methods used for polar bear. We identified biological harvest levels using a 2:1 male to female sex ratio, and explicitly incorporated biological uncertainty. We put wide brackets on harvest estimates.

The SWG, using this model, suggested an annual harvest limit of 15 females and 30 males. However, the commission adjusted that number and identified subsistence harvest limit of 58 polar bears per year. Their decision demonstrated willingness of Alaska Natives to adopt more restrictive measures to promote long-term viability of polar bear population. The Bilateral Agreement is strongly supported by user groups in Russia, creating opportunity to monitor and enforce harvest limits in Russia

The subsistence harvest of 58 polar bear/year is likely sustainable in the short term and represents a significant reduction from current human caused removal. It also promotes:

- collection of biological information
- collection and transmittal of traditional ecological knowledge

If sea ice loss continues, the CS population will face severe declines in next 50 to 100 years. It is important to control human-caused mortality, implement on the ground cons programs and polar bear protections, and collect biological information

Since the harvest limit includes all human-caused mortalities, it is important to address all lethal removals. One of the important pieces of background information that we don't know is the reason for illegal kills in Russia. Why are they being killed? food? gall bladders? Also, the Russians

may be less apt to pass up females and shoot males. We don't really know, but the illegal harvest is probably a combination of profit and subsistence.

Questions:

John Shoen, Audubon Alaska

The process you went through makes sense, but how are we going to enforce this harvest quota on the Russian side? There is a huge area to cover. Do you have any confidence we can enforce this?

Response: We're doing the best we can. They've given us a good response, we had a harvest workshop, etc. We have a wide variety of Russian stakeholders. The strong majority view in Russia is that a legal and regulated harvest and co-management is the only way we can address the issue. To rely on federal management is not possible and hasn't worked. Russians believe this is the best way forward. The Russian government has committed to allocating additional resources.

Brendan Cummings, Center for Biological Diversity

Does your modeling assume that Russian hunting depresses population, but does not include sea ice loss?

Response: Yes and no. The model assumes that historic levels of high harvest have resulted in fewer bears. But when it came to choosing a maximum population growth rate of 6 %, we choose a lower rate of 4%, thereby assuming that this population cannot reproduce as quickly as elsewhere in Arctic due to sea ice loss. The FWS' opinion is that the population is declining, even though they think that the Chukchi habitat is more productive. They are currently doing research to test their assumptions.

Karen Cameron

Have you modeled populations for different levels of sea ice, increased shipping, PCBs, increased tourism, etc. How are those factored assessed? In other words, what are the cumulative effects?

Response: We assumed that carrying capacity is declining by 2% per year. However, there are definitely other factors that will affect polar bear. In modeling the SBS population, we built more detailed projections that showed strong probability of significant declines in next 50 to 100 years. We didn't add this complexity to our modeling of the CS subpopulation.

Discussion of Potential Action re: Harvest

Participants in the eight small groups were then asked to discuss and record the following:

- **What are the actions we must take to ensure that harvest does not negatively affect polar bear subpopulations?**

At the end of the discussion session, volunteers from each group shared some the actions their group discussed and recorded. A full list of current actions and new recommendations are in Appendix B of these minutes.

Current understanding of Defense-of-life and Other Removals

Dick Shideler, ADF&G - Reducing Lethal Removals

Attractant Management

When reducing defense of life removals, we must reduce attractants, and particularly the chance of direct feeding of polar bears.

- Garbage disposal – proven technologies
 - landfills
 - dumpsters
- Chemicals (POL'S, antifreeze): storage—all bears are attracted to these and they can be lethal or debilitating
- Enhanced natural foods—attracting bears
 - e.g., soap berries in Rocky Mountains
 - e.g., whale carcasses near villages
- Bottom-founded structure in moving ice create a lead system downstream that attracts seals, and attracts polar bear which, in turn, can create a problem with polar bear/human interactions

Options for MANAGEMENT

- Remove attractant or prevent access
 - Barriers to access (e.g., fence landfills)
 - Physically remove attractant (e.g., herbicides)
 - Move attractant out of conflict (e.g., carcass redistribution or diversionary feeding)
- Remove bear
- “Train” bear at location
- Lethal removal

Diversionsary feeding

- No anthropogenic foods
- Effectiveness depends on timing and duration
- Case studies for success:
 - Rocky Mountain Front, Montana- biologists collect livestock carcasses and move them into foothills and away from calving/lambing areas
 - Canadian Rockies (Banff/Jasper) – biologists collect winter kills and place them in foothills where bears can find them when they emerge from dens. This action holds bears away from roads and trails.
- Effect on demographics has not been investigated. Diversionary feeding reduces mortality but we don't know if augments reproduction

Moving Bears

- Translocation: moving bear out of its presumed home range
 - Intent is permanent removal
 - Little data on effect on resident population
 - Some success with long-distance movements
 - Most likely to be successful with subadults
 - Used for re-establishing populations
- Relocation: moving bear to another location within its presumed home range
 - short term solution for a seasonal conflict
 - no effect on resident population
 - all age classes, effective in short-term
- Case histories:
 - Canadian Rockies
 - Churchill – polar bears are moved 40 miles or so, successful in short-term
 - Churchill “jail”: a special case

On-Site Treatments

- Hazing – application of aversive agents to move a bear away or prevent bear from entering a conflict solution
 - Intent to prevent or halt immediate conflict
 - May not change long-term behavior
 - Often unmarked bear with long-term outcome unknown
 - May include capture and release with aversive treatment at release (on-site or hard release)
- Aversive conditioning -- application of aversive to train bear to permanently avoid a conflict situation
 - Removal of aversive agent is the reward
 - Requires identifiable individuals
 - Repeated application with occasional “boosters”
 - Manpower intensive
 - Not all bears are suitable candidates

We have a new technique to help us determine a bear’s conflict history. Knowing the history helps us decide if bear needs to be removed from population. Body size and stable isotope signatures can be used to identify food conditioned bears. Stable isotopes can be gotten within 24 hours. It can detect long-term diet changes, and it may tell us that we probably won’t be successful at applying aversive conditioning. If a bear weighs too much as a result of food conditioning, it physiologically may not be able to make it on natural foods. Young bears, and bears that are not food conditioned are the best candidates for aversive conditioning, provided they move away from areas of human conflict.

Questions and Comments:

Brendan Cummings, CBD

On the PowerPoint slide showing stable isotope analysis of potential garbage bears, are they under current management?

Response: Yes, but data only extended to 2004, and all but two bears are now dead. We have hair samples from previously food conditioned bears, and we will examine those to see if those bears moved back into non-food-conditioned state.

Jason Herreman, NSB - Human-Polar Bear Interactions in Northern Alaska

Human-polar bear conflicts will likely be increasing due to the following factors:

- Human populations on North Slope are increasing; as oil and gas increase human population is increasing
- Climate change causing bears to spend more time on shore
- Increasing tourism to see bears

Strategies for minimizing human-polar bear conflicts

- NSB Deterrence Programs
 - The North Slope Borough Dept. of Wildlife Management maintains a polar bear hazing program in Barrow and surrounding villages to protect residents
 - “On-call” patrol 24 hrs a day, 365 days a year in Barrow; as needed in other villages
 - High costs to operate
 - Staff, vehicles, fuel, deterrents
 - Previously funded by NSB, received grant from USFWS
 - Collaborative effort NSB Departments and the Native Village of Barrow and Kaktovik
 - Receive Letter of Authorization from the US Fish & Wildlife Service to haze bears

- Oil and gas operators also are required to have staff with deterrence training
- The primary objectives of deterrence:
 - Deter bear from town without endangering the bear or the public
 - Provide opportunity for exhausted polar bears to rest. Use noise, cracker shells, vehicles, to direct bears away from town or people
- Deterrence methods
 - Noise (e.g., horn from a car)
 - Cracker shells (pyrotechnics)
 - In some cases, bean-bag shot or rubber bullets
 - Use of vehicles (truck/snowmachine) to direct bear away from town and/or people
 - Removal of bowhead whale bones during fall whaling near Barrow. After butchering, the carcass is removed out to point 7 to 10 miles outside of town, where it draws bears away from community
- Community outreach and education
 - Regularly update community on polar bear issues through radio, mail flyers and local meetings
 - involve young people
 - educate visitors to community as well. At Kaktovik, we educate people as they come in at airport, and would to do so at Barrow

In summary, Alaska has a good track record of minimizing interacts with people and polar bears, though conditions are changing and must address these changes. We also need funding and ways to address attractants in communities.

[No Questions]

Craig Perham, FWS - Successful strategies to deter polar bears

Deterrence is not just using a 12-gauge shotgun with nonlethal rounds. Our program is more complex with more nuanced objectives. The FWS's Intentional Take (deterrence) program is authorized in sections of MMPA, and addresses potential injury and potential disturbance. We have many stakeholders –

- Local communities
- Oil and gas industry
- Military
- Mining industry
- Academic researchers

Intentional take is planned, purposeful and directed. Successful Deterrent Strategy must include attention to factors such as the season, time of day, attractants, physical condition and behavior of the bear. Our strategy include education pre-planning, detection, avoidance, and deterrents

Our current strategies include the following:

- Polar bear interaction plan: General polar bear awareness and safety training, Specialized training for polar bear monitors, What to do when bear is sighted.
 - Waste management
 - Snow management – blocking of a visual corridor
 - Lighting
 - Training requirements – awareness and safety
 - Monitoring requirements – specialized training for bear monitors, systematic or opportunistic program?

- Polar bear safety and awareness training. 200 - 300 people a year are exposed to some form of FWS polar bear training.
- Facility site visits, i.e., “bear audits” to look for weaknesses and strengths in system
- Deterrence training – anything that does not injure a bear can be used.

Polar bear deterrence training

Bear Monitors

Projectiles: cracker shells, bean bags, rubber bullets, scare cartridges, screamers (mostly noise-making)

Air horns

Vehicles

Electric fences

Acoustic recordings

Successful deterrence techniques include airhorns, acoustic recordings, bear monitors, dogs, vehicles, electric fences, as long as don't injure bear. Forms used on North Slope include yelling, lights, vehicles, horns, and deterrence rounds (mostly cracker shells).

The deterrence guidelines, which took effect November 5, 2010, are voluntary and are intended to reduce occurrences of interactions between bears and humans in manners safe for both. They provide clear guidance for minimizing incidental encounters with polar bears, but will not change the legal status quo for any activities in Alaska. The deterrence guidelines include 2 levels:

- 1 *Passive deterrence measures* – these are measures intended to prevent polar bears from gaining access to property or people. They include:
 - i Rigid fencing and other fixed barriers such as gates and fence skirting.
 - ii Bear exclusion cages, which provide a protective shelter for people.
 - iii Bear-proof garbage containers to exclude bears from accessing garbage as a food.

Preventive deterrence measures – these are measures intended to dissuade a polar bear from initiating an interaction with property or people. These include:

- iv Acoustic devices that create an auditory disturbance.
- v Vehicle or boat deterrence, e.g. patrolling the periphery of an area.

With current information we will be developing a polar bear deterrence manual. In the future, we predict that, with environmental changes, bears will interact more with people in the terrestrial environments. We will maintain an active deterrence program in order to limit bear/human interactions and thus potential removals (i.e., lethal take).

Questions:

John Shoen, Audubon

How do FWS and NSB Wildlife Dept coordinate on this?

NSB is one of best cooperators. I have a good working relationship with Jason and Mike, from my point of view.

Taqulik Hepa, NSB

On behalf of the NSB, I would like to commend the FWS on this program, we've had a long working relationship, developing plans, training our staff and helping our staff to find funding, and helping us to determine how we can do better.

John Trent, FWS

Can you quantify interactions with polar bear on annual basis? How well do polar bear respond to electric fences as opposed to grizzlies?

Response: We looked at interactions from last 4 years of data, with over an average of 300 bear sightings per year for last 4 years (just for industry). These were not all deterrence events, just observations, and included bears sighted a long way away as well as hazing and deterrence events. We found that the percentage of hazing was 20%.

Our Canadian counterparts have more experience with electric fences. I have seen videos where polar bears touch an electric fence and run.

Response from Dick Shideler, Alaska DF&G: Electric fences work, as long as they are installed correctly and are properly grounded. In winter they get drifted in, and in wet habitat they work. Electric fences are also a good option for kayakers or backpackers.

Response from Jason Herreman, NSB: Even if you get a good backpacking-type fence, you have to make sure it's tall enough, because polar bears jump. You'll need a 4.5 foot fence.

Discussion of Potential Action re: Defense-of-Life and other Removals

Participants in the eight small groups were then asked to discuss and record the following:

- **What are the actions we must take to ensure that defense of life and other human-caused removals do not negatively affect polar bear subpopulations?**

At the end of the discussion session, volunteers from each group shared some the actions their group discussed and recorded. A full list of current actions and new recommendations are in Appendix B of these minutes.

Closing comments

Jason Herreman, NSB: What about planning for oil spills?

Jim Wilder: This has been an active topic of discussion and planning in various other workshops that FWS and our conservation partners have recently been involved in. We take this concern seriously, and are willing to consider holding additional workshops to address this topic specifically, if our partners think it is necessary.

Taqulik Hepa: Today's conversation needs to include more subsistence hunters from the villages in polar bear country. In order to get their input and their buy-in, we need to have a meeting similar to this one in Barrow.

Rosa Meehan: We are planning several smaller meetings with key stakeholders and partners, including one in Barrow.

Appendix A: Action Recommendations

Polar Bear Recovery Plan Public Workshop, 2/8/11

Topic #1: Harvest

- Obtain timely, accurate information regarding Russian harvest
- Identify a monitoring protocol with a Native-to-Native component that promotes ownership by local people
- Collect data on Russian and American harvest
- Determine level of harvest in Russia
- Increase the boroughs' resources need to assess and monitor
- Support Native-to-Native Russian-American Collaboration
- Look for partners and funding/relationships
- Local ownership polar bear conservation issues by villages
- Model polar bear hunting management after the bowhead quota system
- Need polar bear/marine mammal hunting association
- Continue evaluating Russian and American harvested animal data collection (e.g. sex, teeth for age, nutritional status)
- Build a data clearinghouse so that information is shared across the entire range of polar bears, not just locally
- Instigate a raffle system to encourage reporting of harvest
- Improve the accuracy of methods that determine whether a bear comes from the CS or the SBS subpopulation.
- Accurately quantify all forms of removals in Russia
 - Work with marine mammal hunter groups for monitoring
- Unify the enforcement system under our Native harvest agreements (e.g., bowhead system)
- Use local knowledge to gain insight for all species
- Develop village harvest monitoring plan
 - Increase local engagement
- Support (offer help and advice) for local education and law enforcement
- Support Russian education and enforcement
- Improve FWS/USGS public relations about polar bear issues to the public.
 - Cooperate with Native community to deliver public relations messages
- Educate local residents about harvest programs
- Improve communication between villages using a system that offers "taking" information in real-time
- Give EPA the regulatory tools to control GHG
- Provide sufficient funding for outreach through co-management
- Coordinate outreach on all resources used for subsistence
 - Focus on meeting local needs
 - Competition from non-locals for other subsistence resources
- Coordinate various subsistence management regimes – both federal and state
- Obtain better CS population estimate through international cooperation
- Monitor harvest to understand the effects
- Develop a co-management system that works in absence of data
- Improve management measures in Russia to counter illegal harvest
- Use non-linear models to weave in other assumptions
- Investigate what's driving the illegal harvest in Russia in order to improve conservation

- Collect more accurate data on populations for better decision making
- Identify resources needed in villages for co-management of harvest, including education, monitoring, and enforcement
- Develop a method to sustainably finance long-term community polar bear conflict reduction and patrol work
 - Possibly share with Russia
 - Perhaps Alaska Nanuuq Commission would become operator
- Work with Range States to create a more uniform recording and reporting system for legal harvest and trade data (We will have very specific recommendations once we finalize our PB trade report). To better fend off or support future CITES recommendations; a unified system among the Range States would provide much better data than is currently available.
- Work with appropriate entities (RU, Interpol, TRAFFIC, Various national LE) to eradicate/minimize existing known illegal trade markets (primarily within RU and the Ukraine) while setting up/strengthening systems to prevent it from ever growing elsewhere. Get ahead and stay ahead of the curve with lessons learned from other species involved in illegal trade.
- Continue to strengthen and formalize co-management agreements using lessons learned from AK and CA models. Highlight successful programs to other RS countries.
 - As above, work towards a uniform reporting system across the Range states.
- Work towards a uniform, or at least a minimum level of harvest monitoring to maximize the data from such removals across Range States (standard measures, samples, etc.)
- Ensure harvest is within sustainable levels where data is suitable for such a determination

Topic #2: Defense of Life and Other Removals

- Continue and improve formal cooperation between FWS and NSB:
 - use cooperative extension model to develop a consistent monitoring and management program across polar bear range
- Form partnerships in other countries, i.e. Canada, to improve deterrence programs
- Improve containers & storage for native food containers
- Initiate a study to investigate and monitor the effects of deterrence (e.g., the possibility of cumulative effects on same individuals.)
- Provide electric fences for use in problem areas.
- Establish a deterrence/education program for the Chukchi Sea
- Fund efforts to improve disposal – electric fencing
- Secure funding for deterrence programs – high priority
- Increase funding to continue polar bear patrol work at same or increased level.
- Identify hotspots/focal points of bear-human interaction and prioritize these areas for management.
- Monitor changes in the bear-human interactions hotspots/focal points.
 - Track changes in summer distribution.
- Address ethical, social, and behavioral questions regarding bear/human interactions and bear management.
- Address polar bear mortality and injury due to oil spills (under umbrella of human-caused mortalities)
- Improve outreach for safety reasons
- Provide training and information prior to arrival (on planes); information programs
 - Continue education efforts: know your audience, use the best language, target tourists

- Develop translations of educational materials
- Expand education/training on deterrence to decrease mortality in southern parts of range.
- Promote ongoing education programs in communities.
- Expand community program that was developed in Kaktovik to other villages.
- Be proactive to identify areas in future which may have B/H interactions in future
- Evaluate possible increases in the number of vulnerable bears (e.g., females/cubs) that may use villages as refuges from males, In addition, if bears realize they won't be shot in towns, they may become bolder and problematic.
- Plan for the possibility of a catastrophic event that would result in a lot of bears coming on shore
 - Develop procedures for discouraging bears and protecting communities.
- Develop best management practices for tours and activities.
- If tourism is increasing, regulate viewing to prevent interactions
- Continue training
- Use mentorships to bring younger people along and pass along bear patrol expertise.