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Thank you for agreeing to participate in this Delphi process to optimize and standardize the bald eagle monitoring programs in Southwest Alaska National Parks. Your opinions and insights will be extremely helpful in identifying an optimal sampling regime. Please note that your participation in any/all parts of this process is voluntary and you may discontinue participation at any point during the process.

Specifically, we need your help to identify the most useful information in better understanding bald eagle populations and trends, such as the metrics that will be most useful in identifying long-term trends in bald eagle populations, how to identify significant population changes, and key uncertainties of current monitoring objectives.

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Please do not hesitate to contact me with any questions, comments, or concerns. Thank you once again for your participation in this process.

Sincerely,

1a. What are some of the most prominent management issues in your management area? Do any of these management issues relate to bald eagles/bald eagle populations? In what seasons are these management decisions most important?

- Management of Visitors in *high use* areas
 - Bear viewers
 - Fishing
- Bear/human interactions

Management issues do not pertain to or are informed by bald eagle monitoring. Any management action regarding eagle conservation action would require a strong causal link. For example, regulating lead ammunition would require a strong link between bald eagle population declines and lead poisoning. Similarly regulating visitor access/movements would require a strong causal link. Do we collect the data to establish such a link? I don't think we do.

1b. How important is a long-term bald eagle monitoring program to your overall program mission? Please rate your response and provide any explanation you feel necessary.

Not at all important *Slightly important* *Important* *Fairly Important* **Very important**

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Importance depends on how eagles are doing. When they are doing well, *the management area* does not consider bald eagles in management decisions, but that would change quickly if the population started to decline sharply.

2. Please describe various factors (environmental, anthropogenic, etc.) that affect bald eagle populations in your management area. What types of influences affect bald eagle populations?

Stressors that are slow:

- Climate change
- Contaminants
 - Mercury (natural source?)
 - Lead
 - PCB’s not likely
- Visitation
 - *The management area* doesn’t have a ton of visitors
 - Some nests have quite a bit of disturbance from aircraft that doesn’t seem to affect occupancy.
- Food availability
 - How much do eagles “depend” on salmon? If salmon declines, will eagles just shift to a different source.

Stressors that are fast/catastrophic

- Oil spills
- Exotic diseases like West Nile and Avian Influenza
 - Does FWS collect dead birds and test them for this?

3. The IUCN Red List defines a species as vulnerable if there is “an observed, estimated, inferred, or suspected reduction of at least 20% over the last 10 years,” and this is the current standard for monitoring detection of bald eagle population changes in SWAN parks.

Is this an appropriate standard to apply to bald eagles in SWAN parks? What should be the threshold to trigger conservation action for bald eagles in SWAN parks?

The red list is fine, but maybe a different time step is more biologically appropriate. However we should be collecting data that would pinpoint the cause of any potential declines. Does FWS collect any data for disease and contaminants profiles on dead birds? We should probably start collecting data on visitor impacts.

4. Are bald eagle populations more likely to change slowly or catastrophically in response to stressors (including those that you listed in Question 2)? How quickly do you want to know that

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populations are changing? Is 10 years, as outlined in the IUCN standards, an adequate amount of time to detect management issues that may arise on NPS lands?

It depends on the stressor. Some will cause, slow gradual changes

- Climate change
- Visitors
- Environmental contaminants from afar

Others will be quicker and more catastrophic

- Oil/chemical spills
- Disease
- Point sources of contamination

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Effects of warming climate on wildlife.

Eagle disturbance permitting under the Bald and Golden Eagle Protection Act.

- Involves issuing permits for take of Bald Eagle nesting attempts. In the Eagle Act, take has a long definition but for permits means to disturb the birds enough to cause a failed nesting attempt.
- In Alaska, this is a concern during the breeding season when eagle nesting coincides with times when development activities are likely to disturb nesting birds.
- The issue for us is to understand the Bald Eagle population size and distribution in Alaska, and how individual birds and the population will react to permitting take.

1b. How important is a long-term bald eagle monitoring program to your overall program mission? Please rate your response and provide any explanation you feel necessary.

Not at all important *Slightly important* *Important* **Fairly Important** *Very important*

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FWS monitoring of the state-wide Bald Eagle population on a 5 year basis falls short due to various logistical constraints (not the least of which is funding).

FWS manages issuance of Bald Eagle take permits based on estimates of the Bald Eagle population size.

2. Please describe various factors (environmental, anthropogenic, etc.) that affect bald eagle populations in your management area. What types of influences affect bald eagle populations?

Nesting habitat:

- in forested areas, suitably-sized trees to support nests;
- in non-forested areas, locations with suitable protected ground sites (safe from predators).

Food

Anthropogenic disturbance

- For wilderness populations, may be very disturbance prone;
- For urban / suburban populations, less so.

Loss of habitat due to development.

Contaminants.

3. The IUCN Red List defines a species as vulnerable if there is "an observed, estimated, inferred, or suspected reduction of at least 20% over the last 10 years," and this is the current standard for monitoring detection of bald eagle population changes in SWAN parks.

Is this an appropriate standard to apply to bald eagles in SWAN parks? What should be the threshold to trigger conservation action for bald eagles in SWAN parks?

I think this is a suitable standard for the SWAN parks.

4. Are bald eagle populations more likely to change slowly or catastrophically in response to stressors (including those that you listed in Question 2)? How quickly do you want to know that populations are changing? Is 10 years, as outlined in the IUCN standards, an adequate amount of time to detect management issues that may arise on NPS lands?

I think that eagle populations would change slowly based on existing environmental conditions. Unless exposed to some widespread contaminant (e.g., DDT in the 1900s) or some catastrophic loss of food (e.g., loss of anadromous fish stocks due to extreme changes in ocean conditions). Even with such threats, I think it would be years to affect the population. So I think 10 years is adequate time to detect management issues.

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Sincerely,

1a. What are some of the most prominent management issues in your management area? Do any of these management issues relate to bald eagles/bald eagle populations? In what seasons are these management decisions most important?

For our *management area* there is not a current critical management issue with regard to BAEA at this time. We are monitoring BAEA as a representative top level predator in *the management area*. *The potential for a possible oil spill could be a resource issue for the management area.*

1b. How important is a long-term bald eagle monitoring program to your overall program mission? Please rate your response and provide any explanation you feel necessary.

Not at all important *Slightly important* *Important* **Fairly Important** *Very important*

For the *management unit* BAEA monitoring is quite important relative to the structure of the whole program. The goal is to monitor so that we can detect change across latitudes as well as trophic levels in the *management unit*. As such the BAEA is the only top level terrestrial predator monitored in the *management unit*.

2. Please describe various factors (environmental, anthropogenic, etc.) that affect bald eagle populations in your management area. What types of influences affect bald eagle populations?

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The migratory nature of *BAEA (Bald Eagles)* means that there are many factors that can affect birds when they are not in the park (many other months of the year). I think the factors affecting the birds in *the management area* are the same ones as for *other parts of Alaska*. Wind-generated power in the western U.S. is a significant mortality factor for *Golden Eagles* and I would assume this is the case for *BAEA* as well. Within the park, I would expect concern regarding contamination from air-borne pollutants like mercury. Given that some of the highest concentrations in NPS waters come from the *management unit*, it seems that could be a concern for *BAEA* nesting there.

3. The IUCN Red List defines a species as vulnerable if there is “an observed, estimated, inferred, or suspected reduction of at least 20% over the last 10 years,” and this is the current standard for monitoring detection of bald eagle population changes in SWAN parks.

Is this an appropriate standard to apply to bald eagles in SWAN parks? What should be the threshold to trigger conservation action for bald eagles in SWAN parks?

Not to be difficult, but I think it could be an appropriate standard if the parks will stand by that standard. My opinion is that from an ecological perspective it seems like too large of a reduction over too long of a time scale. However, if that’s the best interval the network can handle due to the cost/logistical restrictions, then it may be the only realistic option. Perhaps the difficult discussion to be had is that when push comes to shove, the parks are not willing to invest the money required for reliable information in this species as opposed to other species. If that’s the case, the network’s job is to fully document the discussion and decision so that when park staff and/or network staff change, they can understand the rationale for the state of the monitoring program.

4. Are bald eagle populations more likely to change slowly or catastrophically in response to stressors (including those that you listed in Question 2)? How quickly do you want to know that populations are changing? Is 10 years, as outlined in the IUCN standards, an adequate amount of time to detect management issues that may arise on NPS lands?

I could likely write for hours on this question. My cynical view is that “we” want to know how quickly populations on a short time scale when it’s the crisis of the day and when “we” don’t perceive a threat to the population “we” are fine with a much longer time scale (5 or more yrs). The answer depends on which person is at the table expressing the park view at that particular time. My opinion is that for the purposes of continuing a long-term program we could sustain and be happy with results from a 2-3 yr sampling interval. From an ecological/biological perspective for these species 10 yrs is too long.

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I think the above list is inclusive and represents some of the best knowledge there is on *BAEA* in Alaska.

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Please do not hesitate to contact me with any questions, comments, or concerns. Thank you once again for your participation in this process.

Sincerely,

1a. What are some of the most prominent management issues in your management area? Do any of these management issues relate to bald eagles/bald eagle populations? In what seasons are these management decisions most important?

Potential of large scale mining adjacent to *the management area*. Potentially affecting water quality and quantity and ultimately negatively affecting fish populations.

The possibility of oil spills that would impact our area. This winter a small spill occurred in an aging pipeline. This *type of event* would affect all marine species and those dependent on resources that use that environment.

Climatic changes are affecting seabirds and fish species in North Pacific waters. Causing die-offs and altering distributions of species. Some of these are prey species for BAEA in some seasons.

None of these management issues related directly to BAEA, but would have the potential to have large impacts on BAEA populations in the region.

1b. How important is a long-term bald eagle monitoring program to your overall program mission? Please rate your response and provide any explanation you feel necessary.

Not at all important *Slightly important* *Important* *Fairly Important* **Very important**

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The reason BAEA monitoring is very important to *the management area* is that bald eagles are one of the species specifically mentioned in the parks enabling legislation. It is therefore of great importance to ensure we monitor their population status.

2. Please describe various factors (environmental, anthropogenic, etc.) that affect bald eagle populations in your management area. What types of influences affect bald eagle populations?

Currently we have little data to determine what affects the variation in nest occupancy and success among years. There may be some evidence of weather, possibly spring precipitation, affecting nest initiation, occupancy, and success. Other than that no other factors have been investigated in *the management area*.

Since our population has fluctuated, without a prolonged negative trend, little effort has been made to get at the cause of these poor years. We do know that some of our long lived fish species in our lakes are high in mercury, but have not assessed BAEA as a potential bio-accumulator of that mercury. In our somewhat undisturbed system, variable weather and environmental factors are likely the big drivers of population change in our system.

3. The IUCN Red List defines a species as vulnerable if there is “an observed, estimated, inferred, or suspected reduction of at least 20% over the last 10 years,” and this is the current standard for monitoring detection of bald eagle population changes in SWAN parks.

Is this an appropriate standard to apply to bald eagles in SWAN parks? What should be the threshold to trigger conservation action for bald eagles in SWAN parks?

I do not have any reason to set a standard that is different from what is used for the IUCN Red List. It seems appropriate as a threshold for beginning conservation action for BAEA in SWAN parks.

4. Are bald eagle populations more likely to change slowly or catastrophically in response to stressors (including those that you listed in Question 2)? How quickly do you want to know that populations are changing? Is 10 years, as outlined in the IUCN standards, an adequate amount of time to detect management issues that may arise on NPS lands?

In response to most of the stressors listed, the response will likely be slow which makes the IUCN standard adequate for detecting management issues.

I think for catastrophic events like an oil spill or a water quality issue related to mining, the effect could be quick and dramatic. I think given the known effects of those types of stressors on wildlife populations, a response would occur regardless of the IUCN standard or SWAN standard.

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I do not have any other individuals I believe need to be added.

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1a. What are some of the most prominent management issues in your management area? Do any of these management issues relate to bald eagles/bald eagle populations? In what seasons are these management decisions most important?

Management issues that relate to BAEA populations include issues that impact BAEA food sources such as climate change; subsistence, commercial, and sport harvest; environmental toxins; and disturbance of nesting birds.

Season in which these are important varies by location, life history stage, and resource of concern. So, nesting disturbance is obviously a concern during nesting season, toxins are year-round but sublethal effects on adults may be manifest during nesting (e.g., reduced hatch rate), effects on salmon populations would be manifest during salmon migration for interior eagle populations, for example.

1b. How important is a long-term bald eagle monitoring program to your overall program mission? Please rate your response and provide any explanation you feel necessary.

Not at all important Slightly important Important Fairly Important Very important

Fairly important. Bald eagles are a sentinel for environmental conditions. They are also legally protected (Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act), have spiritual value for many, and park visitors enjoy seeing eagles.

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2. Please describe various factors (environmental, anthropogenic, etc.) that affect bald eagle populations in your management area. What types of influences affect bald eagle populations?

Please refer to my answer for 1a, above.

3. The IUCN Red List defines a species as vulnerable if there is “an observed, estimated, inferred, or suspected reduction of at least 20% over the last 10 years,” and this is the current standard for monitoring detection of bald eagle population changes in SWAN parks.

Is this an appropriate standard to apply to bald eagles in SWAN parks? What should be the threshold to trigger conservation action for bald eagles in SWAN parks?

I think using the IUCN red list threshold is a reasonable starting point. We need to determine how available resources and constraints such as weather will affect our power to detect change. Can we reasonably detect, with acceptable precision and accuracy, a 20% decline in nesting eagle pairs, for instance?

As for a population metric, I suggest number of occupied nests during laying and incubation.

4. Are bald eagle populations more likely to change slowly or catastrophically in response to stressors (including those that you listed in Question 2)? How quickly do you want to know that populations are changing? Is 10 years, as outlined in the IUCN standards, an adequate amount of time to detect management issues that may arise on NPS lands?

It depends on the stressor, but bald eagles being large-bodied, long-lived birds and many of the stressors being sublethal and having their primary effect on reproductive success, I believe gradual change would be most likely (except in extreme cases like poisonings due to spills or other accidents, and those effects would be more localized).

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I suggest XXX

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Sincerely,

1a. What are some of the most prominent management issues in your management area? Do any of these management issues relate to bald eagles/bald eagle populations? In what seasons are these management decisions most important?

For the management area, contaminants and recreational disturbance are increasing management issues that have the potential to impact bald eagle populations in the park. Climate change and PDO impacts to fish and seabirds (prey populations) also have the potential to affect bald eagles, especially breeding potential.

1b. How important is a long-term bald eagle monitoring program to your overall program mission? Please rate your response and provide any explanation you feel necessary.

Not at all important Slightly important Important Fairly Important Very important

The management area was established to protect marine and other birds. Bald eagles have been shown to reflect changes in ecosystem processes as well as environmental contaminants and should be a good indicator of the health of the marine environment.

2. Please describe various factors (environmental, anthropogenic, etc.) that affect bald eagle populations in your management area. What types of influences affect bald eagle populations?

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Breeding success appears to depend on weather conditions in *the management area* in the spring. Other influences have not been well defined for the study area; however, recreational disturbance as well as other forms of disturbance have been shown to impact breeding bald eagles. As visitor use increases in certain areas of the *management area*, there is additional potential for negative impacts to nesting bald eagles. Bald eagle productivity may be impacted by contaminants. Some limited research showed that bald eagles carry mercury loads that are on average under current toxicity thresholds; however, some individuals did have feather mercury levels above threshold values.

3. The IUCN Red List defines a species as vulnerable if there is “an observed, estimated, inferred, or suspected reduction of at least 20% over the last 10 years,” and this is the current standard for monitoring detection of bald eagle population changes in SWAN parks.

Is this an appropriate standard to apply to bald eagles in SWAN parks? What should be the threshold to trigger conservation action for bald eagles in SWAN parks?

Seems like an appropriate standard to aim for as part of the SWAN monitoring program. Individual parks may want to take conservation action sooner if other negative impacts are observed on a smaller scale such as poaching, contaminants, recreational disturbance around individual nests, etc. Conservation action should be triggered whenever the park observes a need to protect resources. The monitoring program should try to be able to detect trends in occupancy and productivity at the above standard to assist parks in monitoring the health of the resource – not necessarily to trigger conservation action.

4. Are bald eagle populations more likely to change slowly or catastrophically in response to stressors (including those that you listed in Question 2)? How quickly do you want to know that populations are changing? Is 10 years, as outlined in the IUCN standards, an adequate amount of time to detect management issues that may arise on NPS lands?

Either is possible. 10 years may be too long if eagles are being impacted by a contaminant threat but probably reasonable amount of time for most potential changes from environmental stressors.

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Private lands within park/preserve boundary. *5% of the management area* is in private ownership

Climate change – thawing permafrost, retreating glaciers (among many others)

Forest health (spruce bark beetle)

Fire regime changes

Non-native plant and insect infestations

Harvest of fish, wildlife and vegetation

Salmon – commercial harvest, recreational harvest, subsistence harvest, climate change, invasive species, oil development, and construction and presence of pipelines.

Resident Fish and toxic contaminants (mercury and pesticides)

Off-road vehicle (ORV) use

Backcountry /wilderness planning management

Increased visitation

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Mining claims

Specific stressors to bald eagle populations in *the management area* would include development and timber harvest on private lands along rivers, lakes, and coastal areas; potential increases in commercial and recreational fishing on the Copper River and its tributaries; toxic contamination in resident fish; camping or other recreational or subsistence access/use activities (including use of OHVs, jet boats, and low flying aircraft) in sensitive breeding areas; environmental contamination; and the effects of climate change (forest health, fire, permafrost thawing, hydrology). *A Pipeline and a highway, transportation routes for petroleum products, cross the area bald eagles are monitored.* Should oil leaks occur at these sites, there is a potential for contamination and bioaccumulation of toxins in fish consumed by eagles.

1b. How important is a long-term bald eagle monitoring program to your overall program mission? Please rate your response and provide any explanation you feel necessary.

Not at all important Slightly important Important Fairly Important Very important

Fairly important. They are an important indicator of current conditions and effects of stressors in and around the park.

2. Please describe various factors (environmental, anthropogenic, etc.) that affect bald eagle populations in your management area. What types of influences affect bald eagle populations?

We have documented loss of nests to wildfire and landslides. We also lose nests/nest trees to environmental events such as wind and *flooding*. During high water nest trees can get swept down river. If we get more flooding events due to climate change, this could affect the number of large trees suitable for nests. These currently do not seem to have any effect on a population level. We have yet to analyze long term eagle data with climate data, salmon escapement, etc.. I suspect that the availability of salmon/fish may have the greatest effect on eagle populations.

3. The IUCN Red List defines a species as vulnerable if there is “an observed, estimated, inferred, or suspected reduction of at least 20% over the last 10 years,” and this is the current standard for monitoring detection of bald eagle population changes in SWAN parks.

Is this an appropriate standard to apply to bald eagles in SWAN parks? What should be the threshold to trigger conservation action for bald eagles in SWAN parks?

This seems to be appropriate. In my experience, it seems that bald eagle nest success and productivity go up and down, roughly year to year. A ten year time frame may give a long term indication of the resilience of the population. As a group, the SWAN and others, could decide that a trigger such as ‘if nest success and productivity decline by X% for X years in a row, the population may be in trouble’ could be put in place.

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4. Are bald eagle populations more likely to change slowly or catastrophically in response to stressors (including those that you listed in Question 2)? How quickly do you want to know that populations are changing? Is 10 years, as outlined in the IUCN standards, an adequate amount of time to detect management issues that may arise on NPS lands?

Probably more likely to change slowly, unless there is a catastrophic decline in salmon or an oil spill. For slow, climate change related stressors, a question to ask is whether changes will continue to be slow, or will the changes that have slowly occurred over time (premafrost melting, for example) suddenly or more quickly cause catastrophic results such as landslides? Another example would be spruce bark beetle. Over time, large areas of spruce forests have been affected by the spruce beetle and may cause a more catastrophic fire than would normally have occurred. This goes back to within a ten year time frame the SWAN and others, could decide that a trigger such as ‘if nest success and productivity decline by X% for X years in a row, the population may be in trouble’ could be put in place.

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XXX

Xxx,

I just had another thought. We don't really know at what point nests fail, which may help to determine what stressors have the most effect. It might be impractical, but it would be interesting to follow a subset of nests to determine that

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Specifically, we need your help to identify the most useful information in better understanding bald eagle populations and trends, such as the metrics that will be most useful in identifying long-term trends in bald eagle populations, how to identify significant population changes, and key uncertainties of current monitoring objectives.

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Please do not hesitate to contact me with any questions, comments, or concerns. Thank you once again for your participation in this process.

Sincerely,

1a. What are some of the most prominent management issues in your management area? Do any of these management issues relate to bald eagles/bald eagle populations? In what seasons are these management decisions most important?

NA, as my program is to provide technical support to parks.

1b. How important is a long-term bald eagle monitoring program to your overall program mission? Please rate your response and provide any explanation you feel necessary.

Not at all important Slightly important Important Fairly Important Very important

NA, as my program is to provide technical support to parks.

2. Please describe various factors (environmental, anthropogenic, etc.) that affect bald eagle populations in your management area. What types of influences affect bald eagle populations?

Presumably predominantly environmental, barring things like oil spills, etc.

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The current criteria I’m finding lists this as ‘ $\geq 30\%$ over the last 10 years...’ (Criteria A.2, pg 21, [IUCN Criteria doc](#)).

Is this to be calculated on a park by park basis or over the whole network?

If park by park, should there be consideration of a criteria focused on regional abundance?

E.g., what is the definition of ‘species’ that SWAN is using in this application? Is it ‘all BAEA breeding in SWAN parks’? Is this a reasonable definition for the population of interest? Is it biologically based?

Worth thinking through what the interpretation and actions would be if, say, there is a decline detected at KEFJ but none at LACL or KATM/ANIA, etc.

Is abundance the most ‘responsive’ indicator of population health? Would something ‘faster’, like certain key demographic parameters, be

4. Are bald eagle populations more likely to change slowly or catastrophically in response to stressors (including those that you listed in Question 2)? How quickly do you want to know that populations are changing? Is 10 years, as outlined in the IUCN standards, an adequate amount of time to detect management issues that may arise on NPS lands?

I am not familiar enough w/ BAEA biology to answer.

IUCN states the time scale as ‘10 years or three generations, whichever is longer’. Is enough know about BAEA breeding to estimate the average age of parents of the current cohort (IUCN definition of *Generation*, pg 11, *ibid*) and thus compare ‘three generations’ to ‘10 years’ in order to then judge if both, or either or neither are acceptable time frames for triggering management concern?

Are estimates of annual variability in abundance (and/or laying, hatching, fledging, recruitment) available to get a sense of the expected time to detect trends of management relevance?

Are there perhaps different types of changes (in abundance, in breeding success, etc.) associated with different major stressors of management interest?

Clearly defining the management issues or actions that are to be informed by the BAEA monitoring program will help clarify the appropriate time scale and changes to be detected.

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Would it be useful to engage someone from the ‘East Coast’ BAEA monitoring community? (perhaps Patuxent or New England region of FWS or any of the groups that have been actively dealing with the monitoring associated w/ the de-listing process)

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Sincerely,

1a. What are some of the most prominent management issues in your management area? Do any of these management issues relate to bald eagles/bald eagle populations? In what seasons are these management decisions most important?

1b. How important is a long-term bald eagle monitoring program to your overall program mission? Please rate your response and provide any explanation you feel necessary.

Not at all important *Slightly important* *Important* *Fairly Important* **Very important**

2. Please describe various factors (environmental, anthropogenic, etc.) that affect bald eagle populations in your management area. What types of influences affect bald eagle populations?

In *the management unit*, salmon returns likely have the greatest impact on BAEA abundance and reproductive success. There is also the possibility of a catastrophic oil spill event from the pipeline.

3. The IUCN Red List defines a species as vulnerable if there is “an observed, estimated, inferred, or suspected reduction of at least 20% over the last 10 years,” and this is the current standard for monitoring detection of bald eagle population changes in SWAN parks.

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Is this an appropriate standard to apply to bald eagles in SWAN parks? What should be the threshold to trigger conservation action for bald eagles in SWAN parks?

I’m personally opposed to using arbitrary threshold values for management decisions. We might specify a particular rate of change we are striving to detect with our monitoring program based on specific goals and objectives, but I do not think we should pick a specific threshold value that would trigger management.

We should also consider the ability to detect both long, gradual declines (e.g., climate related changes) and acute, catastrophic declines (e.g., oil spill) when designing these projects. For example, if only long slow trends over decades are of primary interest, monitoring can occur more infrequently (e.g, maybe every 3-5 years). If quantifying catastrophic declines due to a particular event are desirable, annual surveys might be most appropriate. For the sake of a starting point, defining our objective to follow the IUCN recommendations seems appropriate, as long as we also consider the catastrophic scenario as well.

3. Are bald eagle populations more likely to change slowly or catastrophically in response to stressors (including those that you listed in Question 2)? How quickly do you want to know that populations are changing? Is 10 years, as outlined in the IUCN standards, an adequate amount of time to detect management issues that may arise on NPS lands?

I would think we should attempt to address both long and short term decline scenarios. For gradual trends, 10yrs might be a reasonable goal. For catastrophic declines, the ability to detect something around a 30% decline in a single interval might be a reasonable goal.

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Sincerely,

1a. What are some of the most prominent management issues in your management area? Do any of these management issues relate to bald eagles/bald eagle populations? In what seasons are these management decisions most important?

1. Recreational use of public areas that are also important for wildlife production and protection. Potential impacts to bald eagles during both breeding and wintering seasons.
2. Lack of understanding or acknowledgement of impacts of disturbance to wildlife during sensitive periods. Potential impacts to bald eagles during both breeding and wintering seasons.
3. Continued habitat loss and degradation due to conversion for development and agriculture. Examples include grassland habitat conversion, tile drainage of wetlands, and loss of Conservation Reserve Program habitat acres. At the current levels, probably limited impacts to bald eagles, which have adapted to humanmade habitats, such as nesting in shelterbelts instead of natural forests.
4. Increased use of pesticides, including neonicotinoids. Unknown impacts to bald eagles.

1b. How important is a long-term bald eagle monitoring program to your overall program mission? Please rate your response and provide any explanation you feel necessary.

Not at all important *Slightly important* *Important* ***Fairly Important*** *Very important*

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1. Our agency has a legal mandate to manage for the needs of nongame species.
2. Our monitoring efforts provided important data related to the delisting, and we committed to continuing nest monitoring following the delisting.
3. Our agency is a signatory on a multiagency Memorandum of Understanding related to endangered species; the bald eagle is covered under this MOA, and our activities related to bald eagles will continue as long as the MOA is in place. This agreement is renewed every 5 years.
4. This species continues to generate strong support among members of the public. We are aware of that sentiment and prioritize this species for attention partly because the public expects us to.

2. Please describe various factors (environmental, anthropogenic, etc.) that affect bald eagle populations in your management area. What types of influences affect bald eagle populations?

1. Nesting site availability as influenced by clearing of isolated trees and forest degradation due to loss of natural flooding regimes along major rivers.
2. Forage fish availability.
3. Level of disturbance during nesting and at winter concentration sites.
4. Physical condition/health of individual birds, as influenced by eating lead-contaminated crippled birds and eating lead-contaminated deer and elk carcasses during the fall and winter.
5. Illegal take of feathers at nest sites, which may cause disturbance and illegal killing of bald eagles for feathers.

In my opinion, all of these factors affect bald eagle populations at various geographical scales.

3. The IUCN Red List defines a species as vulnerable if there is “an observed, estimated, inferred, or suspected reduction of at least 20% over the last 10 years,” and this is the current standard for monitoring detection of bald eagle population changes in SWAN parks.

Is this an appropriate standard to apply to bald eagles in SWAN parks? What should be the threshold to trigger conservation action for bald eagles in SWAN parks?

I’m not sure I know enough to answer this question, but I can offer some possible considerations:

1. Do you know the percentage of nonbreeders in the population?
2. Do you know if the breeding population is at carrying capacity?
3. Are other factors that may contribute to population fluctuations being monitored, such as food availability and contaminants in the foraging environment?

4. Are bald eagle populations more likely to change slowly or catastrophically in response to stressors (including those that you listed in Question 2)? How quickly do you want to know that populations are changing? Is 10 years, as outlined in the IUCN standards, an adequate amount of time to detect management issues that may arise on NPS lands?

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I don't know that I have an informed opinion on this question, but 10 years seems to be a relatively short time period for a relatively long-lived species.

For some stressors, it depends on the size of the population and the extent of the population that is concentrated in a particular geographical area or that is dependent on similar habitat conditions. It's likely that contaminant impacts for many new compounds are unknown or poorly known.

It would be helpful to know where Alaska's breeding bald eagles winter, what the threats are in those areas, and how concentrated the birds are.

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Sincerely,

1a. What are some of the most prominent management issues in your management area? Do any of these management issues relate to bald eagles/bald eagle populations? In what seasons are these management decisions most important?

-Climate change—this could both directly and indirectly affect eagles

-Ocean acidification—this could have an indirect affect on eagles

-Human impacts such as marine debris and exotic plants-- this could both directly and indirectly affect eagles

-Potentially increasing visitor use, especially in coastal areas— this could directly affect eagles from noise? If people deliberately disturb them? Probably not a large effect unless we have major increase in visitation/boat traffic.

-Tribal group relations—likely not related to eagles

-Readiness for oil spill and other man-made disasters-- this could both directly and indirectly affect eagles

1b. How important is a long-term bald eagle monitoring program to your overall program mission? Please rate your response and provide any explanation you feel necessary.

Not at all important *Slightly important* *Important* *Fairly Important* **Very important**

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The bald eagle is the only wildlife that *the management area*, is monitoring annually. No other wildlife is monitored at this higher population level. Plus, bald eagles provide the interface between marine and terrestrial environments and can inform the park on both ecosystems substantially changing.

2. Please describe various factors (environmental, anthropogenic, etc.) that affect bald eagle populations in your management area. What types of influences affect bald eagle populations?

Environmental:

- Retreat of glaciers from climate change may increase the amount of bald eagle habitat that is available in the park’s coastal areas.
- Seasonal changes for prey fish could affect bald eagle populations—could be positive or negative, depending on the change.

Anthropogenic:

- Marine debris may be increasing the amount of plastics in the env’t that would
- Ocean acidification may affect food web that will affect bald eagles, especially given their reliance on fish.
- Increased vessel traffic and visitor use could change the soundscapes for bald eagles, especially in more remote areas.
- Various contaminants could affect egg viability.
- Possible increases in use of UAS/drones could affect bald eagles, especially if these devices were used outside the park below mean-high tide.

3. The IUCN Red List defines a species as vulnerable if there is “an observed, estimated, inferred, or suspected reduction of at least 20% over the last 10 years,” and this is the current standard for monitoring detection of bald eagle population changes in SWAN parks.

Is this an appropriate standard to apply to bald eagles in SWAN parks? What should be the threshold to trigger conservation action for bald eagles in SWAN parks?

I think over 10 years for 20% is too slow and too much. This is how a vulnerable species is defined—and then it may be more difficult to return the population to previous levels. We need something finer and quicker to measure so that if we can, we can prevent that 20%, or at a very minimum collect more information to ground-truth and verify the decline.

Not sure what the best time frame would be, but maybe 3 or 5 years is more appropriate. For example, if in 3 consecutive years, there is a reduction of 15% this would trigger a response. Alternatively, in 5 consecutive years, a reduction of 20%.

I think fine-tuning and potentially collecting more data to verify accuracy will be important to do before 10 years is up. 3-5 years gives you a chance to refine the data, or decide if you need to do more surveys because there really is a problem.

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4. Are bald eagle populations more likely to change slowly or catastrophically in response to stressors (including those that you listed in Question 2)? How quickly do you want to know that populations are changing? Is 10 years, as outlined in the IUCN standards, an adequate amount of time to detect management issues that may arise on NPS lands?

No, I think a 3-5 year window is better for detecting change. It would be first initial ALERT. I think bald eagle populations could potentially change catastrophically if there is a catastrophic change in the prey base.

The reason we have tried to continue both productivity and occupancy surveys is because it was thought that productivity surveys would detect change sooner than occupancy surveys.

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