



# KODIAK/ALEUTIANS SUBSISTENCE REGIONAL ADVISORY COUNCIL

*February 10-11, 2015  
Kodiak, Alaska*



# What's Inside

Page

1	Agenda
4	Roster
5	Fall 2014 Meeting Minutes
13	Call for Federal Hunting and Trapping Proposals
14	Draft Charter with Revisions
18	Annual Report Briefing
20	Kagalaska Caribou Environmental Assessment
65	Activity Report for Kodiak NWR 2015
77	Karluk Lake Nutrient Enrichment Q&A
81	Izembek National Wildlife Refuge Report
89	Spring 2014 Emperor Goose Survey Report
105	Pacific Flyway Management Plan for Emperor Goose
149	Fall 2015 Council Meeting Calendar
150	Federal Subsistence Board Regional Advisory Council Correspondence Policy

***On the cover...***

A lone brown bear takes a moment to check its surroundings.



USFWS

**KODIAK/ALEUTIANS SUBSISTENCE REGIONAL ADVISORY COUNCIL**

11:00 a.m. on Feb. 10, 9:00 a.m. on Feb. 11

February 10-11, 2015

Kodiak Best Western Hotel

Kodiak, Alaska

**TELECONFERENCE:** call the toll free number: 1-866-560-5984, then when prompted enter the passcode:12960066

**PUBLIC COMMENTS:** Public comments are welcome for each agenda item and for regional concerns not included on the agenda. The Council appreciates hearing your concerns and knowledge. Please fill out a comment form to be recognized by the Council chair. Time limits may be set to provide opportunity for all to testify and keep the meeting on schedule.

**PLEASE NOTE:** These are estimated times and the agenda is subject to change. Contact staff for the current schedule. Evening sessions are at the call of the chair.

**AGENDA**

\*Asterisk identifies action item.

- 1. **Roll Call and Establish Quorum** (*Secretary*)
- 2. **Invocation**
- 3. **Call to Order** (*Chair*)
- 4. **Welcome and Introductions** (*Chair*)
- 5. **Review and Adopt Agenda\*** (*Chair*) ..... 1
- 6. **Election of Officers\***
  - Chair (*DFO*)
  - Vice-Chair (*New Chair*)
  - Secretary (*New Chair*)
- 7. **Review and Approve Previous Meeting Minutes\*** (*Chair*) ..... 5
- 8. **Reports**
  - Council Member Reports
  - Chair’s Report
- 9. **Public and Tribal Comment on Non-Agenda Items** (available each morning)

**10. Old Business (Chair)**

- a. Rural Determination Process Review – Secretarial Proposed Rule\* (*Anthropology*) ..... Supplement
- b. Customary & Traditional Use Determination – Southeast Council Proposal  
(*Anthropology*) ..... Supplement
- c. Winter 2016 All-Council Meeting Update (*Meeting Committee*)

**11. New Business (Chair)**

- a. Call for Federal Hunting and Trapping Regulatory Proposals\*(*Tom Evans*)..... 13
- b. Funding Opportunity – Fisheries Resource Monitoring Program
- c. Review and Approve FY2014 Annual Report\* (*Carl Johnson*) ..... 18
- d. Charter Revisions\* (*Carl Johnson*) ..... 14

**12. Agency Reports**

(Time limit of 15 minutes unless approved in advance)

- a. Tribal Governments
- b. Native Organizations
- c. USFWS

Alaska Maritime National Wildlife Refuge (*Steve Delahanty*)

- Kagalaska Caribou ..... 20
- Non-Resident Cattle

Kodiak National Wildlife Refuge

- Activity Report for Kodiak National Wildlife Refuge ..... 65
- Karluk Lake Nutrient Enrichment Q&A..... 77
- Izembek National Wildlife Refuge ..... 81
- Migratory Birds Program – Emperor Geese Update ..... 89

- d. ADF&G

Buskin River Sockeye Project Update (*Tyler Polum*) ..... Supplement

- e. OSM

**13. Future Meeting Dates\***

Confirm date and location of fall 2015 meeting ..... 149

**14. Closing Comments**

**15. Adjourn (Chair)**

**To teleconference** into the meeting, call the toll free number: 1-866-560-5984, then when prompted enter the passcode: 12960066

The Federal Subsistence Board is committed to providing access to this meeting for all participants. Please direct all requests for sign language interpreting services, closed captioning, or other accommodation needs to Carl Johnson, 907-786-3676, [carl.johnson@fws.gov](mailto:carl.johnson@fws.gov), or 800-877-8339 (TTY), prior to close of business on January 30, 2015.

If you have any questions regarding this agenda or need additional information, please contact Carl Johnson, Council Coordination Division Chief, as noted above, or contact the Office of Subsistence Management at 1-800-478-1456 for general inquiries.

DRAFT

<b>REGION 3</b>		
<b>Kodiak/Aleutians Subsistence Regional Advisory Council</b>		
<b>Seat</b>	<b>Year Apptd Term Expires</b>	<b>Member Name and Community</b>
<b>1</b>	2010 <b>2016</b>	<b>Antone Shelikoff</b> Akutan
<b>2</b>	2001 <b>2016</b>	<b>Patrick Holmes</b> Kodiak
<b>3</b>	2008 <b>2016</b>	<b>Richard Kosko</b> Adak
<b>4</b>	2004 <b>2016</b>	<b>Samuel Rohrer</b> Kodiak
<b>5</b>	2011 <b>2017</b>	<b>Thomas Schwantes</b> Kodiak
<b>6</b>	2014 <b>2017</b>	<b>Coral Chernoff</b> Kodiak
<b>7</b>	2014 <b>2017</b>	<b>Rebecca Skinner</b> Kodiak
<b>8</b>	2009 <b>2015</b>	<b>Della Trumble</b> King Cove
<b>9</b>	2000 <b>2015</b>	<b>Speridon Mitch Simeonoff, Sr.</b> <b>Chair</b> Akhiok
<b>10</b>	2012 <b>2015</b>	<b>Melissa Berns</b> Old Harbor

KODIAK/ALEUTIANS SUBSISTENCE REGIONAL ADVISORY COUNCIL

Visitor Center  
King Cove, Alaska  
September 11, 2014  
Meeting Minutes

**Roll Call**

Present in person or by teleconference were Speridon Simeonoff, Patrick Holmes, Rick Koso, Thomas Schwantes, Antone Shelikoff, Peter Squartsoff, Della Trumble, Vincent Tutiakoff. Quorum established. Sam Rohrer was absent (with hunting clients) as was Melissa Berns (emailed to inform she was ill).

**Welcome and Introductions**

Chris McKee, OSM  
Trent Liebich, OSM  
Doug Danberg, Izembek NWR  
Stacey Lowe, Izembek NWR  
Glenn Chen, BIA  
Amberly Weiss, Agdaagux Tribal member  
Bonita Severian, Agdaagux Tribe  
Liza Mack, King Cove resident

Agenda adopted with additions – Council Coordinator Administrative items (after chair's report), discussion on harvest of cod on halibut long lines (after FP15-01), discussion on sea ducks and emperor geese (after rural under Old Business).

Review and approval of previous meeting minutes with no corrections or additions.

**Council Reports**

Vincent Tutiakoff – Concerned about the direction the RAC has been going, started out about subsistence issues that affect villages, but has been increasingly working toward getting in line with State policies. Would like to see the Council work on getting aware of what is going on with the caribou out on Adak. Lot of hunters coming in and taking caribou that the locals need.

Antone Shelikoff – Noted not much was going on. Observed that sand from sand dunes had migrated over into a salmon stream on Akun.

Rick Koso – Vince covered a lot of the issues, mostly concerned about caribou. High hunting pressures on caribou is creating concerns, need an updated survey. Need an updated count on Emperor Geese, the numbers look good enough, we should be able to have a subsistence hunt. Everyone is doing well with the subsistence fisheries.

Patrick Holmes – Asked Koso about timing of Emperor Geese survey. Discussed his observations from attending the Federal Subsistence Board meeting in April.

Pete Squartsoff – Agreed with a lot of what Vince was saying, spending a lot of time with RAC meetings on things that do not matter to subsistence.

Della Trumble – Glad to have the meeting in King Cove. A lot of issues continuing to work on with Izembek NWR, had a talk with Doug about how subsistence users are treated when they go to Cold Bay. The issue of the road between the two communities is an issue of continuing concern. [Refer to transcripts for other information] Caribou drawing, shows a high need for people to get caribou. Had a culture camp this last year, coordinated with USFWS and the State. Agree with Koso on the migratory bird issues, the 80,000 number for Emperor Geese never gets met, but if you lowered it to 70,000 it could provide opportunity. The numbers have been stable. Also agrees with concerns about Adak caribou.

Tom Schwantes – Deer population on Kodiak has been unstable, some areas need to be addressed. The Emperor Geese issue is something the Council has been talking about for years. No reason why Feds can't follow the Audubon Society model for volunteer bird counts. The number of geese has been close to the 80,000 threshold, there is no reason to not have a subsistence hunt. Expressed concerns about poor working relationship between State and USFWS over counting Unimak Caribou herd.

Mitch Simeonoff – In Akhiok, right in the middle of an area with a low deer population. Only 460 deer in an area from Cape Ikolik to Kaguyak. Charter boats coming into Alitak Bay and taking a lot of does and fawns. Talked about a Kids Camp where kids learn about harvesting and arts and crafts. With Emperor Geese, the people have been subsisting for thousands of years and the resources have not been depleted; the people can regulate themselves. Strong advocate for teaching kids about the way of life and how to use resources, we need to make things better for the younger generations.

Carl Johnson provided a recap on the 805(c) report. No questions on the report.

#### Annual report reply

Patrick Holmes discussed the annual report reply, noting that the Council's intentions sometimes get lost through the drafting and approval process. Discussion continued on how to move forward on Emperor Geese discussions with migratory birds council. Trumble suggested the Council should adopt a resolution to request lowering the 80,000 threshold. Koso suggested someone go out and do a better count, noting that no one is out counting geese on the Aleutians. Schwantes suggested that the Feds could ask communities to do their own counts at the same time the Feds do their count, then add up the numbers. Trumble again noted that it is the process of making the change that they are up against, that the Council needs to look at the short term and the long term, need to determine how to be effective. Squartsoff suggested that the 80,000 threshold is actually for everyone (sport and subsistence), and that we need a lower threshold for just subsistence users. Koso noted that we should also work on requesting a caribou survey for Adak, needs to be one every 5 years. Holmes suggested that there be a working group formed to create the early draft of the annual report prior to annual report.

## **Public Comment on Non-Agenda Items**

Liza Mack – Thanked the RAC for coming here. No reason to have data gaps in bird counting, that the people in the region have traditional knowledge about the birds and populations, and that bird counts should rely on local people to get more accurate counts. People live in the area 100% of the time and could be relied upon to fill data gaps.

Trumble added information about a tribal wildlife grant to rely on fishermen to obtain population count information. Holmes provided additional suggestions on how to utilize local residents to conduct bird counts.

Amberly Weiss – Talked about setting up the wildlife grant for the tribe and different programs being set up regarding various wildlife populations. She then discussed timely completion of caribou surveys to ensure proper management, so that future generations can have the resource. Thanked the Izembek NWR staff for their presentation at the school, that her daughter now wants to be a wildlife biologist. Schwantes asked where the wildlife information was being stored, and Weiss noted it was going on a website, [beringwatch.net](http://beringwatch.net). Trumble provided additional information on the Bering Watch program, utilizing various Sentinels at different locations, such as Akutan, False Pass, King Cove and working on getting one in Sand Point.

Discussion about development of tribal wildlife management plans.

Council discussed methods to enhance public participation in the meeting, including possible evening session for non-agenda comments. It was discussed that a lot of people in the community are out of town on other business.

## **Old Business**

### Customary and Traditional Use Determination Update

Pipper Kenner, OSM, gave a presentation on the history and status of the C&T determination review. She also provided an overview of the new Southeast RAC C&T proposal.

### Rural Determination Review

Carl Johnson provided an overview on the status of the rural determination review. Holmes discussed his attending the April FSB meeting and some missing pieces from the Sun'aq Tribe's briefing to the FSB.

### Sea Ducks and Emperor Geese

Discussion led by Holmes, who referenced a document with Emperor Geese surveys on page 84 of the book and Maleck & Dowell 2011. Noted the discrepancies between spring and fall surveys, and wondered if this reflected a sampling error. Wondered how the 80,000 number was determined. And how good is that threshold if the samplings of the surveys are subject to significant sampling error. Need to send a letter to the FSB, AMBCC, Tribes and interested parties regarding revision of the threshold. Trumble asked questions about when surveys are conducted, and noted potential for coordinating information with the Sentinels. Discussion with Lowe and Danberg on how to coordinate surveys, as well as how surveys are conducted (which

was a limited discussion as Migratory Birds would have that knowledge). It was noted that it would be helpful to get the word out to the communities as to the timing of the surveys. Trumble asked to make a motion to adjust the agenda to add discussion of a resolution to lower the threshold on Emperor Geese and add additional tools to conducting surveys.

## **New Business**

### Priority Information Needs for FRMP

Trent Liebich, OSM, gave a presentation on the FRMP project funding process and highlighted regional projects funded by the FRMP. Trumble noted that it is not clear to a lot of people why residents of King Cove cannot harvest as much in the same location as residents of Cold Bay. Koso noted that when he called Feds to get his permit that the agency was very helpful. Holmes noted to call Jeff Wildley, regional manager in Kodiak. Liza Mack asked about Tribal input into the process, and Pippa Kenner, OSM, answered the question and provided information about opportunity for community and Tribal input. Holmes asked about continuing funding for Afognak and Buskin projects and expressed support for the Cold Bay, King Cove and Sand Point priority information need. Bill Pile, Kodiak NWR, mentioned that the Refuge supported collaborating on the proposals for Olga and Akalura Lakes on Kodiak.

### FP15-01

Trent Liebich, OSM, presented the proposal analysis. Holmes asked if OSM would support North Slope RAC modification, and Liebich indicated OSM likely would. State noted it supported the proposal, noting existing state definitions for barbed and barbless hooks. Written public comment by Ahtna summarized for the record. Council moved to adopt as modified by the NSRAC. Motion carried with one abstention (Anton).

### Cod on Halibut Long Line

Holmes provided background history as to a former Council member who was told by law enforcement that he could not retain cod caught on a longline under a SHARC card, and years were spent examining the issue between various agencies. He then referred to an email noting that it was now concluded that cod can be retained on a longline, but not salmon, lingcod or rockfish.

### Emperor Geese Resolution.

Della outlined the main points on the resolution as follows:

- The Council has advocated for past decade to provide for Emperor Geese subsistence hunts
- The Council has followed protocol to no avail to address this issue
- KARAC has questioned the process utilized for conducting surveys
- KARAC has question the validity of the 80,000 threshold
- KARAC would like to enhance ability and opportunity for areas to be surveyed by involving local fishermen
- Now be it resolved that the threshold be lowered to allow for a subsistence hunt on Emperor Geese – any year that the spring survey exceeds 70,000, a subsistence harvest should be allowed

- Now be it further resolved that collaboration be made with all stakeholders involved to perform more accurate surveys.

Discussion centered around two separate issues – sending a letter to Migratory Birds to provide input on how to improve survey methodology and submitting the resolution to other stakeholders to get their support of the resolution. Other stakeholders would be Aleut Corporation, AFN, YKDRAC, BBRAC, regional migratory bird councils. Holmes said he would be willing to engage the Kodiak Migratory Birds Council. Tutiakoff noted that for years the Council has questioned the threshold limit, and that for hundreds of years the people in the region have hunted the geese. The Council moved to support the resolution.

Partners for Fisheries Monitoring Strategic Plan. Palma Ingles, OSM, provided an overview of the Partners program.

#### Annual Report

Start out with a thank you to the agencies that offer assistance: thanks for staff support at Izembek NWR and OSM. Express support and thanks for Partners program.

Emperor geese survey and thresholds

Caribou assessments

Population dynamics

Schwantes asked to hold discussion on annual reports until after agency reports. Council approved a motion to that effect.

#### Nominations

Carl Johnson, OSM, gave the presentation. Trumble noted that there used to be alternates on the Councils, and she did not see a problem with that. She also noted that AFN had a Youth Council, and wondered if those representatives could be engaged with the RACs. Holmes noted that carry-over terms were a really good idea, and he would support the 4-year annual process. He also noted that it would be helpful to send announcements to the local schools about the meetings. He noted that the vetting and appointment process can be confusing. Koso also spoke in support of 4-year term and carry-over terms. Squartsoff noted support of youth involvement in the Council process. Holmes also discussed several options and issues related to a youth seat on the Council. Koso and Schwantes noted the approach needs to be focused on the local communities.

Koso moved, Schwantes seconded, to accept the 4-year terms and carryover terms. Holmes expressed concern that alternates also be included. Trumble agreed with the appointment of alternates. Koso rescinded his motion with the approval of the second, and moved to include all three options, with Schwantes' second. Motion approved unanimously.

#### All-Council Meeting

Carl Johnson provided an overview of what the meeting would be like. The Council expressed interest in the notion. Chair Simeonoff asked if we would need to appoint members of the agenda committee now, and it was noted that would happen later. Holmes was strongly interested in

being able to hear voices from other regions. Schwantes also supported the idea of both the training and meeting with other Council members from other regions.

#### All-Chairs Meeting

Carl Johnson presented the issue of having one, and the Council did not see a reason for having one.

#### **Agency Reports**

##### OSM

Chris McKee presented a staffing overview. Patrick Holmes asked to receive an email with a staff listing once all new positions are filled. He also noted that the new website is not user-friendly. Holmes noted that for new council coordinator position, he would like to see someone with cultural ties to the region and an ability to navigate the bureaucratic process.

##### USFWS

*Izembek NWR* manager Doug Danberg and biologist Stacie Lowe provided a report. Lowe covered the contents found in the written report in the meeting book. Trumble thanked them for the visit to the school and for the opportunity to discuss issues with them the previous evening, starting a productive dialogue on education and communication. She also asked about expanding the Brandt population counts, whether people in False Pass are aware of the Sea Lion study on Unimak Island, and about the caribou nutrition study. Koso expressed surprise that *Izembek NWR* was engaging in a Sea Lion study on its own, and it was noted that the area being studied was not part of the critical habitat listing. Schwantes expressed concerns about the long time it has been since a brown bear survey for Unimak Island has been completed, that updated surveys were needed to determine how many bears can be taken to relieve pressure on the caribou population. Holmes briefly touched on the issue of predator control and asked why the survey cannot be done when there is no snow, as it would be safer, or maybe doing it around the calving period like the other refuges. He asked a few questions based on the written report and complimented the staff on their outreach in King Cove. Lowe noted that Unimak Caribou do not aggregate like they do in other areas, and it was not possible to survey the calving grounds this year due to volcanic eruption. Amberly Weiss of King Cove complimented the staff for the school presentation and expressed hope for a continued good relationship with *Izembek NWR* staff. She also asked a question about a swan survey conducted over in Cold Bay. Squartsoff asked about why some areas have swan seasons and others don't, and Danberg responded to the question. Simeonoff noted that this was the "longest comfortable dialogue we have had with *Izembek*" and thanked them for the report.

*Kodiak NWR* manager Anne Marie Larosa provided a report, along with Mcrea Cobb, Tonya Lee and Bill Pile. Manager Larosa provided a staffing update. Bill Pile provided a fisheries update. Mcrea Cobb provided a wildlife report, referring to the written report in the meeting book. Tonya Lee provided information on subsistence surveys and outreach, and interaction with communities. Holmes complimented staff and made comments on the reports. Squartsoff expressed concern about low deer populations on east Kodiak Island, and outside hunters coming in and taking does and fawns, and asking if any thought has been given to closing the hunts to non-Federally qualified subsistence users. Larosa noted it could be possible but has not been

considered at this time. Holmes asked about an evaluation of the Harlequin population in Larsen Bay. Larosa noted that the last survey in that area was in 2013, so the data should be available.

Trumble asked if there were any updates on the Alaska Maritime NWR non-resident cattle public process, and requested an update on that status.

### ADF&G

Tyler Polum provided a summary of the 2014 season (through end of August) on the Buskin River, noted subsistence use interviews that were conducted. Lem Butler provided a report on the status of the Southern Alaska Peninsula Herd (SAPH) and Unimak Caribou herd. Things are going well for the SAPH herd following three years of wolf predator control. Did a calf survival study on Unimak Island this year, but sample was too small and we need to go back one more time. Early calf survival is good, but later calf survival is not quite where we would like it to be, probably about 200 caribou on the island. Still seeing low pregnancy rates, and there is a protracted calving period. Population very dispersed. Koso and Holmes complimented the report, noting that it was good news. Squartsoff asked about the cow/calf ratio, and Butler noted it was 19/100 on Unimak and 40/100 on SAPH. Trumble also thanked for the reports and noted it was encouraging. Schwantes also thanked Butler for the report, and asked about the summer calf survey. Butler noted they followed 16 calves, and that it was a really small sample size. Koso asked about a survey on the Adak herd, particularly if there was a 2010 survey. Butler noted it was Alaska Maritime NWR that conducted the survey.

### Tribal Governments/Native Organizations

Liza Mack provided a report on her dissertation work on her Ph.D. in Indigenous Studies at UAF, which relates to policy issues in Alaska Native leadership. She is also examining how regulations on fishing and hunting affect the ability of people to pass on cultural knowledge. She is currently doing work pursuant to a National Science Foundation grant. Council members congratulated her on her work and her project. Trumble noted that she was particularly proud of Mack's work and how far she has come.

### **Future Meeting Dates**

Winter 2015 – February 10-11 in Old Harbor

Fall 2015 – Primary preference is Adak on September 25-26, fall back location Cold Bay on September 29-30.

### Resumption of Annual Report discussion. Items to include:

- Emperor Geese – resolution and survey technique/threshold
- Caribou and wolves
- Deer on Kodiak NWR – send a letter of concern to NWR and ADF&G regarding the east side, noting action needs to be taken to preserve subsistence priority, perhaps mention that the Council is considering recommending a range of actions from limiting harvest to closure to non-Federally qualified subsistence users
- Increased cooperation between ADF&G and Izembek NWR, would like to continue to see that effort with regard to Unimak Island caribou

- Continued concern about sea duck population in Uyak and desire for harvest data – Koniag has a research biologist and it could be possible to ask Koniag to do a program that could gather harvest information in Larsen Bay
- Woman’s Bay subsistence crab, people feel the population is declining, big problem is ghost pots – send a letter to NOAA, USFWS and ADF&G requesting information or management options when ice may occur or submitting a Federal proposal closing during the icy period.

The Council also discussed the possibility of submitting a special action request for deer on eastern Kodiak, as well as a regulatory proposal in the next wildlife cycle.

### **Closing Comments**

Council members noted it was a positive, productive meeting, and expressed gratitude for the positive interaction with Izembek NWR staff.

I hereby certify that, to the best of my knowledge, the foregoing minutes are accurate and complete.

September 11, 2014

---

*Carl Johnson*, DFO  
USFWS Office of Subsistence Management

---

*Speridon Simeonoff*, Chair  
Kodiak/Aleutians Subsistence Regional Advisory Council

These minutes will be formally considered by the Kodiak/Aleutians Subsistence Regional Advisory Council at its next meeting, and any corrections or notations will be incorporated in the minutes of that meeting.

We are currently excepting proposals for:  
**Federal Subsistence Hunting and Trapping Regulations**

Ending Date: March 25, 2015

**How to Prepare Your Proposal**

When preparing your proposal, it is important that you include the following information:

- Name
- Organization
- Contact information (Address, Phone, Fax or Email)

Your proposal must include the following information:

1. What regulations do you wish to change? Include management unit number and species. Quote the current regulation if known. If you are proposing a new regulation, please state “new regulation.”
2. How should the new regulation read? Write the regulation the way you would like to see it written in the regulations.
3. Why should this regulation change be made?

You should also provide any additional information that you believe will help the Board in evaluating the proposed change.

**How to Submit a Proposal**

**By mail or hand delivery:**

Federal Subsistence Board  
Office of Subsistence Management  
Attn: Theo Matuskowitz  
1011 E. Tudor Rd., MS-121  
Anchorage, AK 99503

**In person at any Federal Subsistence  
Regional Advisory Council meeting:**

[www.doi.gov/subsistence/calendars/index.cfm](http://www.doi.gov/subsistence/calendars/index.cfm)

**On the Web:**

Go to the Federal eRulemaking Portal:  
[www.regulations.gov](http://www.regulations.gov) and search for FWS-R7-  
SM-2014-0062, which is the docket number for  
this rulemaking.

**Questions?** Call (800) 478-1456 or (907) 786-3888

All proposals and comments, including personal information provided, are posted on the Web at  
[www.regulations.gov](http://www.regulations.gov).

**Department of the Interior  
U. S. Fish and Wildlife Service**

**Kodiak/Aleutians Subsistence Regional Advisory Council**

**Charter**

1. **Committee's Official Designation.** The Council's official designation is the Kodiak/Aleutians Subsistence Regional Advisory Council (Council).
2. **Authority.** The Council is reestablished by virtue of the authority set out in the Alaska National Interest Lands Conservation Act (16 U.S.C. 3115 (1988)) Title VIII, and under the authority of the Secretary of the Interior, in furtherance of 16 U.S.C. 410hh-2. The Council is established in accordance with the provisions of the Federal Advisory Committee Act (FACA), as amended, 5 U.S.C., Appendix 2.
3. **Objectives and Scope of Activities.** The objective of the Council is to provide a forum for the residents of the region with personal knowledge of local conditions and resource requirements to have a meaningful role in the subsistence management of fish and wildlife on Federal lands and waters in the region.
4. **Description of Duties.** The Council possesses the authority to perform the following duties:
  - a. Recommend the initiation of, review, and evaluate proposals for regulations, policies, management plans, and other matters relating to subsistence uses of fish and wildlife on public lands within the region.
  - b. Provide a forum for the expression of opinions and recommendations by persons interested in any matter related to the subsistence uses of fish and wildlife on public lands within the region.
  - c. Encourage local and regional participation in the decision making process affecting the taking of fish and wildlife on the public lands within the region for subsistence uses.
  - d. Prepare an annual report to the Secretary containing the following:
    - (1) An identification of current and anticipated subsistence uses of fish and wildlife populations within the region.
    - (2) An evaluation of current and anticipated subsistence needs for fish and wildlife populations within the region.

- (3) A recommended strategy for the management of fish and wildlife populations within the region to accommodate such subsistence uses and needs.
        - (4) Recommendations concerning policies, standards, guidelines and regulations to implement the strategy.
      - e. Make recommendations on determinations of customary and traditional use of subsistence resources.
      - f. Make recommendations on determinations of rural status.
      - g. Provide recommendations on the establishment and membership of Federal local advisory committees.
5. **Agency or Official to Whom the Council Reports.** The Council reports to the Federal Subsistence Board Chair, who is appointed by the Secretary of the Interior with the concurrence of the Secretary of Agriculture.
6. **Support.** The U.S. Fish and Wildlife Service will provide administrative support for the activities of the Council through the Office of Subsistence Management.
7. **Estimated Annual Operating Costs and Staff Years.** The annual operating costs associated with supporting the Council's functions are estimated to be \$150,000, including all direct and indirect expenses and 1.0 staff years.
8. **Designated Federal Officer.** The DFO is the Subsistence Council Coordinator for the region or such other Federal employee as may be designated by the Assistant Regional Director – Subsistence, Region 7, U.S. Fish and Wildlife Service. The DFO is a full-time Federal employee appointed in accordance with Agency procedures. The DFO will:
  - Approve or call all of the advisory committee's and subcommittees' meetings,
  - Prepare and approve all meeting agendas,
  - Attend all committee and subcommittee meetings,
  - Adjourn any meeting when the DFO determines adjournment to be in the public interest, and
  - Chair meetings when directed to do so by the official to whom the advisory committee reports.
9. **Estimated Number and Frequency of Meetings.** The Council will meet 1-2 times per year, and at such times as designated by the Federal Subsistence Board Chair or the DFO.

10. **Duration.** Continuing.
11. **Termination.** The Council will terminate 2 years from the date the Charter is filed, unless, prior to that date, it is renewed in accordance with the provisions of Section 14 of the FACA. The Council will not meet or take any action without a valid current charter.
12. **Membership and Designation.** The Council's membership is composed of representative members as follows:

Ten members who are knowledgeable and experienced in matters relating to subsistence uses of fish and wildlife and who are residents of the region represented by the Council. To ensure that each Council represents a diversity of interests, the Federal Subsistence Board in their nomination recommendations to the Secretary will strive to ensure that seven of the members (70 percent) represent subsistence interests within the region and three of the members (30 percent) represent commercial and sport interests within the region. The portion of membership representing commercial and sport interests must include, where possible, at least one representative from the sport community and one representative from the commercial community.

For geographic membership balance, it is the goal to seat four members that reside on the Kodiak Archipelago and three members that reside on the Alaska Peninsula and three on the Aleutian and Pribilof Islands.

The Secretary of the Interior will appoint members based on the recommendations from the Federal Subsistence Board and with the concurrence of the Secretary of Agriculture.

Members will be appointed for 4-year terms. If no successor is appointed on or prior to the expiration of a member's term, then the incumbent members may continue to serve until the new appointment is made or 120 days past the expiration of term, whichever is sooner. A vacancy on the Council will be filled by an appointed alternate, if available, or in the same manner in which the original appointment was made. Members serve at the discretion of the Secretary.

Council members will elect a Chair, a Vice-Chair, and a Secretary for a 1-year term.

Members of the Council will serve without compensation. However, while away from their homes or regular places of business, Council and subcommittee members engaged in Council, or subcommittee business, approved by the DFO, may be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in Government service under Section 5703 of Title 5 of the United States Code.

13. **Ethics Responsibilities of Members.** No Council or subcommittee member may participate in any specific party matter in which the member has a direct financial interest in a lease, license, permit, contract, claim, agreement, or related litigation with the Department.
14. **Subcommittees.** Subject to the DFO's approval, subcommittees may be formed for the purposes of compiling information or conducting research. However, such subcommittees must act only under the direction of the DFO and must report their recommendations to the full Council for consideration. Subcommittee members must not provide advice or work products directly to the Agency. The Council Chair, with the approval of the DFO, will appoint subcommittee members. Subcommittees will meet as necessary to accomplish their assignments, subject to the approval of the DFO and the availability of resources.
15. **Recordkeeping.** Records of the Council, and formally and informally established subcommittees or other subgroups of the Council, must be handled in accordance with General Records Schedule 26, Item 2, or other approved Agency records disposition schedule. These records shall be available for public inspection and copying, subject to the Freedom of Information Act, 5 U.S.C. 552.

---

Secretary of the Interior

---

Date Signed

---

Date Filed

## ANNUAL REPORTS

### **Background**

ANILCA established the Annual Reports as the way to bring regional subsistence uses and needs to the Secretaries' attention. The Secretaries delegated this responsibility to the Board. Section 805(c) deference includes matters brought forward in the Annual Report.

The Annual Report provides the Councils an opportunity to address the directors of each of the four Department of Interior agencies and the Department of Agriculture Forest Service in their capacity as members of the Federal Subsistence Board. The Board is required to discuss and reply to each issue in every Annual Report and to take action when within the Board's authority. In many cases, if the issue is outside of the Board's authority, the Board will provide information to the Council on how to contact personnel at the correct agency. As agency directors, the Board members have authority to implement most of the actions which would effect the changes recommended by the Councils, even those not covered in Section 805(c). The Councils are strongly encouraged to take advantage of this opportunity.

### **Report Content**

Both Title VIII Section 805 and 50 CFR §100.11 (Subpart B of the regulations) describe what may be contained in an Annual Report from the councils to the Board. This description includes issues that are not generally addressed by the normal regulatory process:

- an identification of current and anticipated subsistence uses of fish and wildlife populations within the region;
- an evaluation of current and anticipated subsistence needs for fish and wildlife populations from the public lands within the region;
- a recommended strategy for the management of fish and wildlife populations within the region to accommodate such subsistence uses and needs related to the public lands; and
- recommendations concerning policies, standards, guidelines, and regulations to implement the strategy.

Please avoid filler or fluff language that does not specifically raise an issue of concern or information to the Board.

### **Report Clarity**

In order for the Board to adequately respond to each Council's annual report, it is important for the annual report itself to state issues clearly.

- If addressing an existing Board policy, Councils should please state whether there is something unclear about the policy, if there is uncertainty about the reason for the policy, or if the Council needs information on how the policy is applied.
- Council members should discuss in detail at Council meetings the issues for the annual report and assist the Council Coordinator in understanding and stating the issues clearly.

- Council Coordinators and OSM staff should assist the Council members during the meeting in ensuring that the issue is stated clearly.

Thus, if the Councils can be clear about their issues of concern and ensure that the Council Coordinator is relaying them sufficiently, then the Board and OSM staff will endeavor to provide as concise and responsive of a reply as is possible.

### **Report Format**

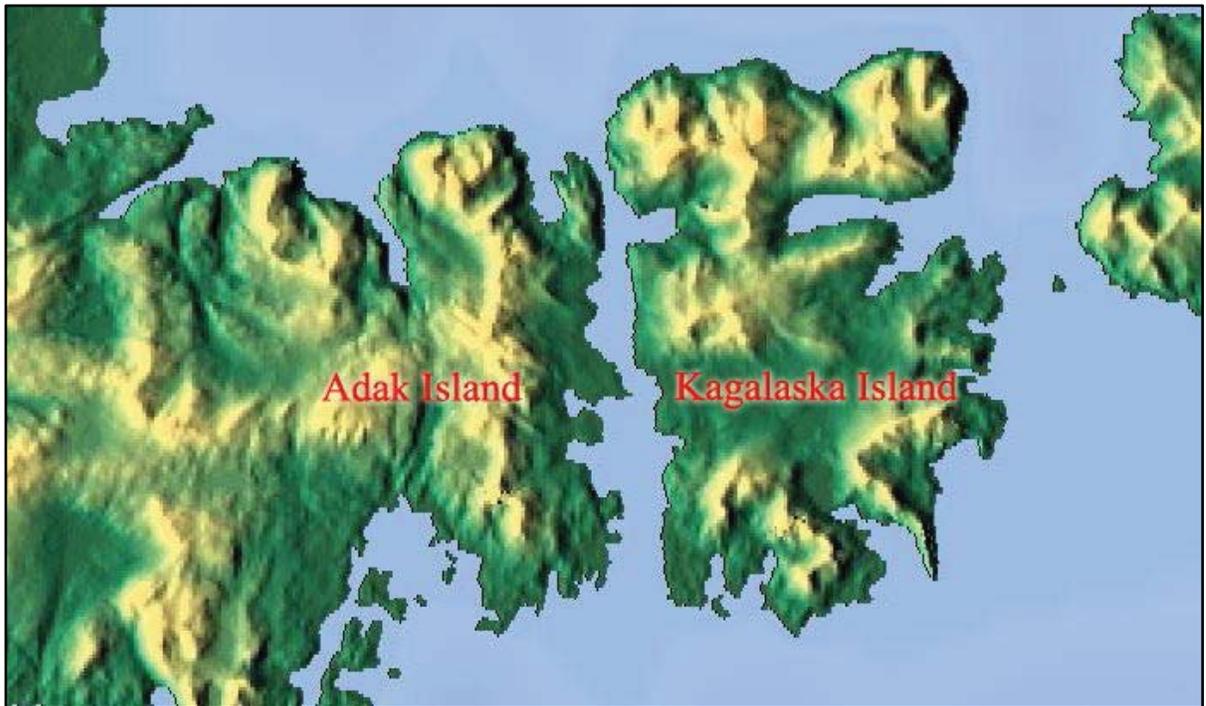
While no particular format is necessary for the Annual Reports, the report must clearly state the following for each item the Council wants the Board to address:

1. Numbering of the issues,
2. A description of each issue,
3. Whether the Council seeks Board action on the matter and, if so, what action the Council recommends, and
4. As much evidence or explanation as necessary to support the Council's request or statements relating to the item of interest.

# Draft Environmental Assessment of Caribou Control on Kagalaska Island, Alaska Maritime National Wildlife Refuge

Central Aleutian Islands, Alaska

September 2014



U.S. Fish and Wildlife Service  
Alaska Maritime National Wildlife Refuge  
95 Sterling Highway #1  
Homer, Alaska 99603  
907-235-6546

## **Environmental Assessment for Caribou Control on Kagalaska Island, Alaska Maritime National Wildlife Refuge**

### **SUMMARY**

The U.S. Fish and Wildlife Service (FWS) is proposing to initiate a caribou control project on Kagalaska Island consisting of re-occurring, refuge-coordinated, walk-in caribou control efforts beginning in 2015. These re-occurring efforts will eliminate caribou found on the island, prevent establishment of a resident caribou population, and provide information about the rate of incursion and demography of caribou dispersing to the island to improve subsequent control efforts. Additionally, caribou control on Kagalaska will alleviate risk of dispersal to other refuge islands east of Kagalaska. Information gained from re-occurring control will also be useful to evaluate the frequency of control needed to manage the threat of caribou invading Kagalaska Island. In May and June 2012, five caribou were shot on Kagalaska Island and four other caribou were observed. Current caribou numbers on Kagalaska are likely between 0 and 15 animals with ongoing bouts of immigration from Adak occurring at unknown frequency.

## **1. PURPOSE AND NEED FOR ACTION**

### **1.1 Introduction**

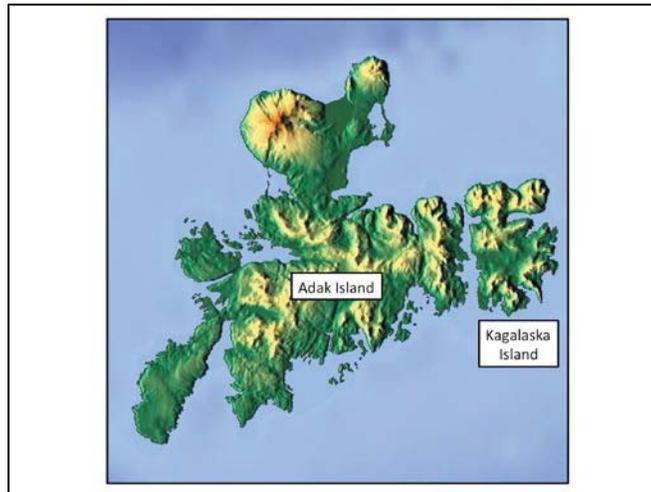
Alaska Maritime National Wildlife Refuge includes over 2,500 islands and headlands across much of coastal Alaska, including the Aleutian Islands. Kagalaska Island, in the central Aleutians, is experiencing an invasion by small numbers of caribou from an introduced population on nearby Adak Island. Caribou are not native to the central Aleutians and their presence will harm native species and wilderness character on Kagalaska. The FWS is considering an action to control caribou on Kagalaska Island to prevent them from establishing a resident breeding population on the island.

### **1.2 Background**

Barren-ground caribou (hereafter “caribou”) calves from the Nelchina herd were captured, held in captivity and released on Adak Island (180,940 acres) (Fig. 1) in 1958 and 1959. At that time, Adak Island and its neighbor to the east, Kagalaska Island (29,355 acres) were within the Aleutian Island Reserve, a wildlife refuge designation. The Alaska National Interest Lands Conservation Act (ANILCA) had not yet passed to create what is now called Alaska Maritime National Wildlife Refuge.

Adak Island was home to a major naval base, with a large community associated with that base. The caribou were released at least in part to provide recreational hunting opportunities for military personnel stationed on Adak. Adak is 500 miles outside the native range of caribou, but the introduction was successful and the herd quickly became established on the island. During the

early years, when Adak Island had an Army Base and Naval Operating Base with between 1000 and 6000 people, sport hunting kept the herd to 200-400 animals. Since the closure of island's military base in 1997, sport hunting has not limited the herd. Ricca, et al. (2012b) estimated between 2512 and 2880 caribou on Adak Island in 2012. Table 1 lists Adak Island caribou population estimates based on surveys in recent years.



**Fig. 1.** Adak and Kagalaska Islands is in the central Aleutian Islands.

Year	# Caribou
1993	750
1994	975
1995	1268
1996	1648
1997	2142
1998	900
2005	2751
2012	2696

**Table 1.** Recent estimates of caribou numbers on Adak Island, by year, based on surveys.

Currently, a portion of Adak Island is conveyed to the Aleut Corporation and the remainder is a part of Alaska Maritime National Wildlife Refuge. Kagalaska Island (29,355 acres) is entirely within the refuge.

Caribou are not native to the central Aleutian Island and Kagalaska Island but are able to swim across the narrow strait between Adak and Kagalaska Islands. The distance across the 8-mile-long channel between Adak and Kagalaska Island ranges from a few hundred yards to less than 2 miles. Refuge staff and others reported caribou sign (e.g. shed antlers, feces, beds, tracks, trails) on Kagalaska beginning in the late 1990's.

### 1.3 Purpose and Need for Action

The purpose of this EA is to evaluate options for the management of caribou expanding their range onto Kagalaska Island.

Section 303(1)(b) of ANILCA describes the first major purpose for which Alaska Maritime Refuge was established and shall be managed “to conserve fish and wildlife populations and habitats in their natural diversity. . .”. (See Section 1.4 for additional authorities). The need for action is to assure that the natural integrity of Kagalaska Island is maintained.

Caribou grazing has adverse impact on native plant communities and natural integrity on Adak Island, especially depletion of lichens. Management action is necessary to slow the rate of range expansion to Kagalaska Island and prevent invasive caribou from becoming established and expanding their use across Kagalaska Island. Kagalaska Island is also designated wilderness and a new population of a non-native species will harm the wilderness character of the island.

Non-native caribou or reindeer populations on islands can increase to a level when forage, mainly reindeer lichen during winter, becomes limiting (see Section 4.2. Terrestrial Vegetation). Lichens then decline along with the biological communities that depend on them, and may take a long time to recover after depletion caused by caribou or reindeer grazing (Klein 1968, 1987; Pegau 1968). Similar to Adak Island caribou, introduced reindeer have had adverse impacts on natural biodiversity on some refuge islands.

Remote Alaska islands compete unfavorably as a hunter destination compared to mainland opportunities, and typically demand is inadequate to be used to regulate herd population. Sport hunting regulations limit the timing and take of caribou on Adak Island – only two bulls total may be taken per hunter per regulatory year and no bulls may be taken January 1- August 9. Presently there is no season and no bag limit on Kagalaska Island, but few, if any, hunters know caribou exist there. The island is only accessible by boat, limiting the level of sport hunting. Sport harvest on Adak or Kagalaska Island is not sufficient to prevent a new breeding population of caribou on Kagalaska Island.

One FWS employee and several U.S.D.A. Wildlife Services employees surveyed parts of Kagalaska Island for four days in late May and early June 2012 (Stevens and Smith 2012). Five caribou (one bull, four cows) were shot on Kagalaska Island during the survey to prevent establishment of a new island population. No other caribou were seen, although caribou tracks, feces and hair were relatively abundant on the south side of the island.

A caribou survey of Adak and Kagalaska Islands was conducted on 18 and 25 June 2012 using a helicopter (Ricca, et al. 2012). During the survey, a single group of 3 adults and 1 calf (< 3 weeks old) was observed on June 18. The calf represents the first known caribou reproduction on Kagalaska Island. No caribou were detected on the June 25 Kagalaska Island survey.

It is unclear how often caribou swim over to Kagalaska Island from Adak Island, how long they stay, and how often cows are calving there. For example, in 2003, no caribou were observed on Kagalaska Island during aerial surveys (Williams and Tutiakoff 2005), but caribou and caribou sign was frequently spotted from the ground during 2011 (Ricca, et al. 2012). These parameters should be characterized to help improve and refine caribou control efforts over the long-term.

Caribou are finding their way to Kagalaska Island. The presence of caribou on the island damages native plant communities and ecosystems and diminishes wilderness character. If allowed to continue, the caribou population is likely to grow on Kagalaska Island, causing further harm. To fulfill the FWS legal mandate set by ANILCA to preserve natural diversity, and to maintain wilderness character as required under the Wilderness Act, we need to consider the action of caribou control on Kagalaska Island.

## **1.4 Authority**

The primary authorities for this action are ANILCA, the Wilderness Act, and the National Wildlife Refuge Administration Act as amended by the National Wildlife Refuge Improvement Act. Under ANILCA, refuge managers are instructed to “conserve fish and wildlife populations and habitats in their natural diversity - - -”. Another purpose under ANILCA is to “fulfill international treaty obligations ---” which includes the Migratory Bird Treaty Act. The presence of caribou on Kagalaska Island would potentially diminish migratory bird use of the island by certain species due to changes in plant communities and vegetation structure. Kagalaska Island is designated as wilderness. The Wilderness Act requires federal wilderness stewards to not only generally avoid certain activities (commercial enterprise, motorized vehicles, and more) but also requires managers to consider and maintain the wilderness character of wilderness units. Wilderness character includes several qualities, one of which is naturalness. The naturalness of the wilderness is diminished by the presence of non-native caribou on the island. The National Wildlife Refuge System Administration Act, as amended by the Refuge Improvement Act directs wildlife refuge managers to manage for the biological integrity, diversity, and health of refuge units. All three laws give authority for the action and guide refuge decisions on the issue.

These laws and other regulations and policies listed below limit, to some degree, FWS decision-making discretion if the proposed action is implemented.

### **Executive Order**

EO 13112 on Invasive Species (February 3, 1999)

### **Federal Law**

National Invasive Species Act of 1996 (16 U.S.C. 4701)

### **Federal Regulations**

Title 50 CFR Part 31, Section 14 – Official animal control operations.

### **FWS Policy**

601 FW 3 Biological integrity and diversity and environmental health (2001)

701 FW 5 Collections, Donations and Disposals, 5.8 Donation and Disposal Procedures

### **Refuge Manual**

7 RM 14 Pest Control

## 2 PROPOSED ACTION AND ALTERNATIVES

NEPA requires the consideration of alternatives. This section outlines two alternatives to manage caribou populations on the Kagalaska Island.

### 2.1 No Action Alternative

Under this alternative, no management action will happen regarding the control of caribou on Kagalaska Island. It is highly likely that the caribou population would become permanently established on the island and would increase to densities similar to what now exist on adjacent Adak Island. Plant communities would become significantly altered. The FWS would consider opportunities for monitoring of both caribou and other plant and animal species and communities but the work would be done opportunistically. We would also search for caribou and caribou sign on islands east of Kagalaska Island, such as Little Tanaga and Great Sitkin under the expectation that caribou may move to additional islands in stepping-stone fashion as the population increased on Kagalaska Island. Subsistence hunting would be unlikely to occur at a meaningful level due to the abundant caribou adjacent to a human population on Adak. Sport hunting as regulated by the Alaska Department of Fish and Game would theoretically be a caribou management tool. However, while there could be some low level of sport hunting on Kagalaska Island it is unlikely to occur at a high level as there are no communities, airports, roads, lodging, or other infrastructure available whereas nearby Adak Island does in addition to relatively more abundant caribou. Sport hunting on the much more accessible Adak Island is not sufficient to suppress the caribou population to low levels.

### 2.2 Caribou Control On Kagalaska Island (Proposed Action)

The purposes of the proposed action alternative are to:

Repeatedly reduce or eliminate caribou on Kagalaska Island using Refuge staff, Refuge volunteers, Refuge contractors or other personnel acting on behalf of the Refuge.  
Monitor the incursion of caribou to Kagalaska Island and gather information on timing, numbers, age and gender of caribou on Kagalaska Island to inform managers and allow continued refinement of optimal control strategies such as frequency and timing.

Beginning in the summer of 2015, and continuing into the future, the Refuge proposes to implement caribou control on Kagalaska Island in compliance with ANILCA, Wilderness Act, and Administration Act mandates. One or more trained staff/volunteers/contractors will be taken ashore (landing below mean high tide and outside refuge and Wilderness boundary) reusing motorized inflatable skiff or other suitable watercraft and use center-fire rifles adequate to kill caribou. Shooters will carry a two-way hand held radio, a GPS unit, and spare clothing appropriate for weather. Depending on the number of animals expected and personnel availability, they may camp on the island in some years. The refuge research vessel Tiglax, charter vessel, or other means, may support them.

No motorized vehicles or mechanized transport (both generally prohibited by the Wilderness Act) would be used on the island (e.g., within Wilderness boundaries). Motorized skiff access

would take place below tide line, which is outside Refuge and Wilderness boundaries. Firearms are not motorized equipment. Refuge staff have conducted a Minimum Requirements Analysis in compliance with agency policies associated with the Wilderness Act.

Meat salvage will be handled in accordance with Fish and Wildlife Service policy (701 FW 5. Collections, Donations, and Disposals) Key sections of that policy include:

**A. Donations.** As a general rule, the recipients of donations should arrange to pick up and be responsible for transporting the donated items from the refuge. Recipients may be charged, as appropriate, for capture and delivery.

**C. Disposal of Products of Animal Control Activities or Accidental Death** may occur in accordance with 50 CFR 12.33.

**(1)** Animal products resulting from control activities, confiscation, or accidental death, which meet requirements of health and sanitation, may be disposed of in accordance with guidelines of paragraph 5.8D below as appropriate. Permits and authorizations must be obtained no matter what the circumstance of acquisition of material. Public relations or health considerations may require, however, that animal remains be burned or buried. This would be particularly true if evidence of disease were present.

**(2)** The facility manager may require that carcasses of accidentally or intentionally killed animals (of wildlife control activities) be left or distributed where they can be utilized by scavenger species such as eagles or vultures.

Each animal killed will be examined briefly with the sex, estimated age, location, date, and any notable features recorded. Over time, this information will help us better understand the rate of immigration, preferred areas of use, timing of immigration, and age/sex of immigrating animals. Also, we will, over time, be able to refine our control strategies related to control frequency, duration, season, and possibly other factors. The effect of control is not likely to be self-sustaining because of conditions (presence of caribou on Adak Island) outside the treatment area (Kagalaska Island).

## 2.3 Other Alternatives Not Considered Further

**Preventing dispersal to Kagalaska Island with fencing.** There is no caribou fencing on either Adak or Kagalaska Island. To approach effectiveness, an eight-mile (at least) caribou-proof fence would have to be constructed on either Kagalaska or Adak islands. Besides the high cost of initial construction on either remote island, it would be necessary to regularly inspect and repair the fence to maintain effectiveness. Besides the logistical problems, the fence alternative also requires preventing caribou from swimming around the fence and designing a barrier that would not allow caribou to go over the fence in areas where snow drifting occurs. The relevant portions of both Adak and Kagalaska Islands are federally designated wilderness, which would generally preclude construction of a fence even if it were feasible to construct and maintain. A minimum requirements assessment is necessary to determine if the FWS could construct inside either Wilderness Area. Because of logistical constraints, Wilderness concerns, and unlikely efficacy at keeping caribou off of Kagalaska Island, the action of constructing and maintaining a caribou

fence to prevent caribou from accessing Kagalaska Island will not be considered further.

**Trapping, netting or other capture methods to remove caribou from Kagalaska Island and transporting live to Adak Island.** This alternative requires greater expense and effort than using lethal control as proposed in the Proposed Action. The work would likely be done in the summer months and could be complicated by the presence of calves. Trapping, netting, or other capture methods would require getting physically closer to the caribou than would the proposed action. The effort required to get physically adjacent to each individual animal would increase the cost and decrease the probability of success. Capture and transport would cause animal stress and may result in death and injury of caribou. Transport to Adak may not result in a net loss of caribou on Kagalaska Island because individuals transported may return to Kagalaska Island. Animals tranquilized and released are not fit for human consumption for a period of time. The length of time varies with the dose of the drug and the drug used. Sport and subsistence hunting in the area of release on Adak would need to be suspended, or else animals captured must be marked clearly, so hunters could avoid them. Trapping, netting, or other capture methods plus transportation of live animals would require motorized vehicles such as helicopters for approaching the animals and/or vehicles with trailers for transporting live animals. A minimum requirements assessment is necessary to determine if the FWS could use motorized vehicles inside either Wilderness Area. This alternative will not be considered further.

**Hazing.** Visual and auditory frightening devices are temporary and largely ineffective in deterring deer (Belant et al. 1996, Belant et al. 1998, Curtis et al. 1997, Gilsdorf et al. 2003, Gilsdorf et al. 2004a, Koehler et al. 1990, Roper and Hill 1985). Deterring caribou inland and away from the east Adak Island coastline, or turning caribou back from Kagalaska Island using motion-activated propane cannons, inflatable scarecrows, other devices, or repellents is not practical considering the long coastal pathway of invasion, the inclement Aleutian weather, and other factors. A minimum requirements assessment is necessary to determine if the FWS could use these devices inside the Wilderness Area. Hazing caribou will not be considered further.

**Eliminating the source population on Adak Island.** Eliminating or greatly reducing the caribou population on Adak Island would likely slow the rate of range expansion to Kagalaska Island and would lessen impacts of caribou on both islands. A previous EA, not finalized, proposed removing caribou from Adak Island (EA for Removal of Introduced Caribou, Adak, Alaska 1994). Currently Adak Island has mixed land ownership, with large portions of the island owned and managed by the Aleut Corporation and not under refuge administration. There is also an established tradition of caribou hunting under state regulations on Adak Island as well as the existence of the town of Adak itself, many of whose residents use Adak caribou as a meat supply. Elimination of all caribou on Adak or greatly reducing the number of caribou on Adak Island is beyond the scope of this assessment. This alternative will not be considered further in this document.

**Biological control such as introducing caribou diseases or large predators to Kagalaska Island.** There is not enough information about Kagalaska Island caribou to determine if introducing a non-native predator or biological agent (e.g. chronic wasting disease, brucellosis, tuberculosis, rabies) onto Kagalaska Island would be effective, but it is highly unlikely. Examples of similar control strategies being successful at controlling ungulate invasive species are rare or poorly documented. Biological agents pose a risk of unintentionally spreading to Adak and affecting that herd too. Introducing a non-native predator to the island would be counter to refuge mandates as defined by ANILCA and the Refuge Administration Act. A minimum

requirements assessment is necessary to determine if the FWS could use motorized vehicles inside the Wilderness Area. This alternative will not be considered further.

**Interference of reproduction using sterilants or reproductive inhibitors.** There are no chemosterilants registered for use on caribou or reindeer. The only registered chemosterilant for deer must be manually injected. On Kagalaska Island, this would require capturing the caribou using traps, nets or chemical immobilization at least twice so it can be manually injected with the active ingredient. Use of the sterilants would require getting physically adjacent to each live animal on the island such as with a helicopter. A minimum requirements assessment is necessary to determine if the FWS could use motorized vehicles inside the Wilderness Area. Also, live caribou would continue to cause damage to native species even after being treated, if such treatment were possible. This alternative will not be considered further.

## 2.4 Decision To Be Made

Based on the analysis documented in this Environmental Assessment and supporting documents, the Regional Chief of Refuges for the FWS Alaska Region will determine whether or not to initiate lethal caribou control on Kagalaska Island within Alaska Maritime National Wildlife Refuge, and whether or not preparation of an Environmental Impact Statement (EIS) is necessary. If the Regional Chief determines that an EIS is not necessary, a Finding of No Significant Impact (FONSI) would be prepared, which would highlight the alternative selected for implementation.

## 3 AFFECTED ENVIRONMENT

### 3.1 History And Description Of Island

Kagalaska Island (29,355 acres and 62.1 miles of coastline) is located in the central Aleutian Islands, in the Andreanof Group. It is a glaciated mountainous island with an extinct volcano.

The island is between Adak Island to the west and Little Tanaga Island to the east. Kagalaska Island is separated from nearby Adak by a distance varying from a few hundred yards to 2 miles across 8 miles of coastline. Kagalaska Island is uninhabited by humans and provides breeding habitat for seabirds, waterfowl, land birds, salmon and other wildlife.

Native people, known today as Aleut or Unungan, occupied the central Aleutian Islands, including Kagalaska Island prior to Russian contact, but the island had no permanent settlements at the time of the Alaska Purchase in 1867. Kagalaska Island was included in the Aleutian Island Reserve established in 1913 during Alaska territorial days. Kagalaska Island was incorporated into Alaska Maritime National Wildlife Refuge in 1980 by ANILCA with five purposes, including “to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to marine mammals, marine birds and other migratory birds, the marine resources upon which they rely, bears, caribou and other mammals”. The island was designated as wilderness at the same time.

No native terrestrial mammals were known to inhabit any of the Aleutian Islands west of Umnak prior to Russian contact. After Russian contact, red foxes, arctic foxes, Norway rats, roof rats, mice and several kinds of livestock, including reindeer and caribou were introduced to many islands and persist there today. Non-native arctic foxes were eradicated from Kagalaska Island in 1997 (Ebbert 1999).

Caribou occur naturally on some small mainland portions of the refuge in the Chukchi Sea and Bering Sea Units. There is also a resident caribou herd on Unimak Island. Caribou were introduced to Adak in 1958 and 1959 when 23 calves were transplanted from the Alaska mainland (from the Nelchina herd) at the request of the military, which had a base on Adak Island (Jones 1966). The goal was to establish a controlled breeding population of caribou on Adak Island for recreational hunting by base residents. Early Adak Island caribou management objectives were to maintain the herd at a post-season population level of 200-250 animals. Prior to the closure of the Adak military base, the annual caribou harvest was more than 130 animals. Some military personnel were transported to recreational cabins and camps around the island by marine vessel and picked up at the end of a hunt. Prior to base closure, caribou mostly ranged the southern and western part of the island. Hunting them required planning, transportation by boat, or long pack trips from the limited road system. Today hunters on Adak cruise coastal areas in boats to spot caribou, or use ATVs or trucks on established roads or trails to places where they hike to hunt. A recent survey counted between 2,512 and 2,880 caribou on Adak Island (Ricca, et al. 2012). In recent times, caribou are more commonly found near Adak town than in the past.

### **3.2 Climate**

Kagalaska Island climate is maritime and subject to frequent, violent storms with high winds that can make boating dangerous. Summer storms can be milder, but dense fog is common and can obscure views, making traveling on and around the island confusing. Rain and fog can make visibility poor enough to prevent reliable detection of quietly grazing caribou. Annual precipitation can exceed 70 inches.

### **3.3 Terrestrial Vegetation**

Kagalaska Island is treeless and vegetation is classified as maritime tundra (Amundsen 1977). The high uplands and mountain slopes support a variety of lichens, mosses, and low-growing alpine plants. The lowlands are covered with tall herbaceous meadows. Kelp grows offshore and algae covers rocky intertidal areas. Succulent herbs grow just above mean high tide on beaches to a typical grass hummock zone, which continues inland as elevation increases. Lichen community is found in lowland patches, along streams, and on thinner soils of steeper slopes and often interspersed with crowberry.

### **3.4 Freshwater Resources**

Freshwater lakes, potholes, and streams occur on Kagalaska Island, especially in the glaciated valleys near the coast. There are four pink salmon streams and two sockeye streams identified on Kagalaska Island. Streams supporting both sockeye runs and the largest pink salmon run on the island flow to Quail Bay. Bergsland (1959) reported the Native name of another stream on the

West side of the island translated as “has red salmon”, and his informant said seals go up hear to the lake in the middle of the island.

### 3.5 Terrestrial mammals - Caribou

Caribou are one of Alaska’s most abundant and widely distributed big game animals. In modern times, caribou became absent in the Eastern Aleutian Islands except on Unimak Island or where their domestic variety, reindeer, were stocked. Mainland caribou are an important subsistence resource and also provide recreational hunting opportunity. The Adak caribou population size appears to be independent of harvest.

On the mainland, caribou are typically migratory, commonly traveling miles between summer range and winter range. Mainland caribou herds move almost continuously, reducing the duration of grazing pressure on local forage and likelihood of overgrazing (Skoog 1968). Seasonal caribou movements on Adak are not well understood. Adak Island has supported a breeding population of caribou since the 1960’s after the first caribou were introduced in 1959. No caribou or reindeer were ever stocked on Kagalaska Island.

As the Adak Island herd increases so will the incursion of caribou onto Kagalaska Island. Some habitat on Adak is marginal wintering habitat for caribou, and may motivate caribou to swim the channel in search of higher quality forage. Bull caribou are more likely to wander and swim the channel from Adak initially, but with increased grazing pressure on Adak, cows cross also. Eventually, a new caribou herd will become established on the smaller island and expand rapidly in the absence of predators such as bears or wolves, or increased harvest by hunters. Kagalaska Island herd will increase and eventually impact of winter forage, especially lichens.

Caribou are primarily grazers, with the majority of their diet comprised of sedges, horsetail, cranberry, blueberry, arctic willow, cottonsedge, Labrador tea, bog birch and leatherleaf. Caribou are largely dependent upon lichens (especially *Cladonia spp*) to survive during winter throughout most of their range, but can subsist on a diet without lichens if other plants, such as trees and shrubs, are available. Free ranging caribou on the mainland choose winter range mainly based on the availability of lichen forage. Caribou need water during summer and eat snow in the winter. A critical time for caribou is when open water is frozen and before the early snows. Lichens are necessary and important then because of their greater moisture-retaining ability compared to other plants. Caribou seek lichens as long as snow covers the ground, but are less essential during late spring when herbaceous green vegetation is present.

### 3.6 Marine Mammals and Endangered Species

All marine mammals in the United States are protected under the Marine Mammal Protection Act (MMPA), and some species receive additional protection under the Endangered Species Act (ESA). Marine mammals commonly found in the waters immediately surrounding Kagalaska Island include sea otters, harbor seals, and Steller sea lions. Whales and porpoises also occur offshore Kagalaska Island, but environmental consequences to these species are outside the scope of this assessment because they have an extreme low probability of being present near the island or effected by the proposed action.

Endangered or threatened species using marine waters adjacent to the island include Steller sea lions and sea otters. The marine environment surrounding Kagalaska Island is in the southwest Alaska Distinct Population Segment (DPS) of the northern sea otter (*Enhydra lutris kenyoni*). The DPS is listed as threatened under the Endangered Species Act (ESA).

Steller sea lions aggregate during summer on the northern shore of Kagalaska Island, at the base of steep cliffs. National Oceanic and Atmospheric Administration conducts ship aerial and ship-based surveys of Steller sea lions in Alaska (Fritz, et al. 2013). On June 21, 2008, NOAA counted 42 adults and juveniles (non-pups) on Kagalaska Island, 52 on June 25, 2009, and 0 on July 11, 2011.

### 3.7 Birds

There are 155 species of birds, including 34 species that are primarily Asiatic, which have been recorded on adjacent Adak Island. Bald eagles are abundant throughout the Aleutians. Rock ptarmigan, various waterfowl species, and many passerines also nest on Adak Island. Kagalaska Island avifauna is likely very similar to that on Adak. While no nesting records exist for Kittlitz's murrelets on Kagalaska Island, it likely provides breeding habitat and Kittlitz's murrelets are known to nest on adjacent Adak Island. The Aleutian Islands have been identified as a Globally Important Bird Area (American Bird Conservancy and Audubon).

### 3.8 Cultural Resources

Cultural resources on the Refuge are archaeological artifacts associated with seasonal Aleut encampments and food processing sites, village sites and midden sites. Cultural resources also include locations with significant historical events and may have associated artifacts. A third type of cultural resource on the Refuge is designated Wilderness. Cultural resource protection is required on all refuges.

#### 3.8.1 Prehistoric

Little is known about Kagalaska Island, either archaeologically, or through historical documentation (Stein 1977). Archaeological sites occur on all of the larger Aleutian Islands, though no specific recent archeological work has been conducted on Kagalaska Island, and a complete survey of archaeological sites on the island was not found at the time of this analysis. Bank (1971 in Stein 1977) reported only five sites on Kagalaska Island. These sites may have been associated with more apparent extensive use of nearby Adak Island by Native people. The proposed action will not degrade or damage archeological sites.

#### 3.8.2 Historic

There was some use of Kagalaska Island by American troops during WWII and relics of that time

occur on the island. No damage or disruption of historic features will occur if the proposed action is implemented.

### **3.8.3 Wilderness**

Wilderness is defined by the Wilderness Act of 1964 as “an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. . . Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.”

Wilderness areas are managed to preserve wilderness character, including prevention of degradation of naturalness by a human-caused introduction of a species far outside its natural range. In some cases, there is a need for agency action that may impair wilderness character. The Wilderness Act actions that impair one or more qualities of wilderness character may be allowed under certain circumstances. FWS policy requires the evaluation of proposed actions within wilderness to, in the extent possible, the action has the least impact as measured against the benchmark of conditions generally prevailing at the time of congressional designation. The FWS has prepared a minimum requirements analysis evaluating wilderness implications of both no action and the proposed action. Neither the proposed action nor the no action alternatives involve any activities generally prohibited under the Act. However, the action must still be analyzed to weigh both benefits and negative impacts to wilderness character. Agency policy directs wilderness managers to conduct a minimum requirements analysis which considers not just generally prohibited activities but also impacts to wilderness character which can include things such as a unit’s untrammelled qualities, its naturalness, and its opportunities for providing primitive and unconfined recreation.

## **4 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES**

### **4.1 Issues Identified**

Issues that were identified by the FWS as important in the decision making process regarding caribou control on Kagalaska Island are: 1) which alternative would best meet refuge mandates under ANILCA, particularly the mandate to conserve fish and wildlife populations and their habitats in their natural diversity; 2) which alternative would best meet wilderness stewardship mandates; and 3) which alternative would best maintain the biological integrity, diversity, and health of the refuge as directed by the Refuge Administration Act. No impacts of caribou control activities, as proposed, would be expected on physical resources such as soil, water and air. This chapter analyzes and compares the effects anticipated under each alternative.

## 4.2 No Action Alternative

Under the No Action alternative, caribou on Kagalaska Island have potential to increase either through immigration or by reproduction. A Kagalaska Island herd is unlikely to decrease through emigration since caribou forage resources are presently superior on Kagalaska Island compared to Adak Island. Caribou have little incentive to emigrate from habitat safe from exposure to human hunters and disturbance back to areas with a higher caribou density, greater competition for food and mates, and greater human disturbance. Caribou would continue to use the relatively undisturbed Kagalaska Island, perhaps occasionally leaving the island to search for potential mates on adjoining islands

Under the No Action alternative, the ANILCA purpose for the refuge to conserve fish and wildlife purposes in their natural diversity would be harmed. Caribou would continue to be present on Kagalaska Island and the population would almost certainly increase. Native plant communities would be altered and there would likely be some changes in bird use or abundance. While the No Action alternative would not involve activities normally prohibited by the Wilderness Act, wilderness character, particularly the element involving naturalness, would be harmed by the continued and increasing presence of caribou. The Refuge Administration Act's direction to protect biological integrity, diversity, and health is closely related the Refuge's establishing purpose under ANILCA. The No Action alternative would tend to diminish the refuge's biological integrity as a non-native species would be allowed to remain and indeed would increase in population and ecosystem influence over time.

**Terrestrial Vegetation:** The No Action alternative would lead to significant damage to terrestrial vegetation. In particular, lichen beds would be impacted and eventually would be either eliminated or greatly reduced on the island. Grazing ungulates tend to prefer certain species and certain habitat types for foraging and these preferred habitats would be the most severely damaged by the presence of caribou. On Hagemester Island, a range survey by the Soil Conservation Service in 1987 found that grazing by introduced reindeer had caused severe lichen depletion and poor range conditions (Swanson and La Plant 1987). On St. Paul Island in the Pribilof Islands (Bering Sea), 26 reindeer were stocked by 1911. At the time, the island had abundant lichen beds. There were no reindeer predators and hunting was not allowed. By 1935 the herd numbered 2,000 and by 1950 the herd crashed to 8 reindeer before beginning to grow again. On St. Matthew Island, in the Bering Sea, Klein (1968) documented the buildup and crash of reindeer on that island. These are published examples of damage caused by feral reindeer (same species as caribou) or population boom followed by a population crash on remote Alaskan islands. Similar habitat damage caused by high populations and subsequent population crashes of caribou following massive vegetation changes could occur on Kagalaska Island and other refuge islands should a caribou population become established.

**Fresh Water:** There may be some degradation of fresh water resources under the No Action alternative as caribou populations build over time. Trampling, erosion, nutrient disruption, and other negative impacts to fresh water resources can occur if caribou population increases on Kagalaska as observed on other islands.

**Terrestrial Mammals:** Caribou and Norway rats are the only terrestrial mammals on the island and neither is native. Under the No Action alternative, caribou populations would continue to

increase with the potential for catastrophic die-offs in severe winters due to starvation on depleted habitat.

**Marine Mammals:** The No Action alternative is not likely to significantly affect marine mammals using island beaches and adjacent waters. There could be some minor disturbance caused by an increased caribou population.

**Birds:** Some ground nesting birds (Lapland longspurs, rock sandpipers) could have nests crushed by grazing caribou in areas heavily used by caribou and as caribou numbers increase on the island. Changes to the plant communities would likely lead to changes in bird use and productivity, but the magnitude is unknown.

**Cultural Resources:** Under the No Action alternative, there would be disturbance and erosion related to caribou use and vegetation changes that could damage cultural resources.

**Prehistoric Resources:** The No Action alternative would lead to disturbance and erosion related to caribou use and vegetation changes that could damage prehistoric resources.

**Historic Resources:** The No Action alternative is not likely to significantly affect historic resources on the island.

**Wilderness:** Wilderness impacts are addressed separately in a minimum requirements analysis. The No Action alternative would lead to a degradation of wilderness character as non-native caribou maintained their presence on the island and increased their population.

**Endangered Species:** The No Action alternative is not likely to affect the listed species known to use the island area since both are marine mammals with terrestrial use limited to beaches and other areas immediately adjacent to the ocean.

### **4.3 Caribou Control on Kagalaska Island (Proposed Action)**

**Terrestrial Vegetation:** Under the Proposed Alternative, there would be either no damage or very limited damage to terrestrial vegetation as caribou would not be allowed to become permanently established on Kagalaska Island and would not be able to use Kagalaska Island as a stepping stone to other nearby islands. Lichen beds would remain intact. Plant communities would remain intact. The natural diversity and biological integrity of the island would remain intact.

**Fresh Water:** Caribou control could impose minor physical alterations to wetland plant communities through human trampling of aquatic vegetation and disturbance to saturated soils while humans are traveling on the island. With the very low density of caribou shooters in the action alternative, impacts associated with either trampling or disturbance would likely be inconsequential and would reduce the future trampling by caribou.

**Terrestrial Mammals:** Under the Proposed Action alternative, caribou would be periodically controlled after they emigrated from Adak Island. At any given moment the caribou on Kagalaska Island would likely range from zero animals to ten, with no opportunity for herd

increase. Caribou control is not expected to impact Kagalaska Island's other non-native terrestrial mammal - Norway rats.

**Marine Mammals:** Steller sea lions and sea otters are not expected to interact significantly with caribou on Kagalaska Island. While traversing sea otter habitat in small watercraft as when going or coming from shore during the Proposed Action, the watercraft operator will conform to the procedures described in the "Boat Operation Guidance to Avoid Disturbing Sea Otters". Participants will be reminded not to harass sea otters at any time. None of the activities of the Proposed Action is likely to effect sea otters (see Appendix A). Firing rifles upon caribou on Kagalaska Island and watercraft vessel noise are not expected to result in Level A or Level B harassment of any marine mammals as defined by the Marine Mammal Protection Act (MMPA).

Steller sea lions aggregate on the beach at the base of steep cliffs on a northern shore of Kagalaska Island, easily avoidable and inaccessible by foot. There is no chance of localized disturbance to marine mammals under the Proposed Action alternative from the occasional human activity of hiking across the island and discharging a firearm. Since most of the island and most of the caribou habitat is not along the shoreline, Steller sea lions, if present on the island during control operations will be easily avoided. Staff will be directed to avoid disturbance to hauled-out marine mammals and to avoid discharging a firearm in a way that could cause marine mammal disturbance. Firing of rifles or watercraft noise is not likely to effect Endangered Species Act (ESA) listed Steller sea lions. Caribou control will have no effect on Steller sea lion critical habitats.

**Birds:** There would no effect on birds under the Proposed Action alternative. Kagalaska Island would continue to provide healthy bird habitat and the action would avoid degradation caused by an increased presence of caribou.

**Cultural Resources:** Under the Proposed Action alternative, there would be no effect on cultural resources, including both prehistoric and historic resources. Grazing-induced accelerated erosion threatening cultural resources would not occur.

**Prehistoric Resources:** Under the Proposed Action alternative, there would be no effect on cultural resources, including both prehistoric and historic resources.

**Historic Resources:** Under the Proposed Action alternative, there would be no effect on cultural resources, including both prehistoric and historic resources.

**Wilderness:** Wilderness impacts are addressed separately through a minimum requirements analysis. Controlling a non-native species (caribou) in wilderness areas to reduce impact on native species is consistent with preservation of wilderness character, particularly by maintaining the natural qualities of the island. Some negative impacts to wilderness character may occur because of the control action (presence of people, discharge of firearms) but they are offset by the positive impacts of maintaining healthy and natural ecosystems. Prevention of the establishment of a new breeding population is often the best way to protect wilderness from invasive species.

**Endangered Species:** The Proposed Action alternative is not likely to have any effect on endangered species. There would be a slight chance of localized disturbance to listed sea otters or

sea lions under the Proposed Action alternative from the occasional human activity of hiking across the island and discharging a firearm. The disturbance is likely to be absent or very limited since most of the island and most of the caribou habitat is not along the shoreline. The sound of a center-fire rifle could conceivably produce a local and minor disturbance to marine mammals nearby but this is unlikely as most shots are likely to be at least 100 meters inland and the direction of the discharge is most likely to be inland in near-shore situations. Staff will be directed to avoid disturbance to hauled-out marine mammals and to avoid discharging a firearm in a way as to cause marine mammal disturbance.

#### **4.4 Subsistence (ANILCA Section 810 Evaluation)**

ANILCA (Section 810) requires federal land managers to identify whether a proposed land management action has potential to significantly restrict subsistence uses and consult with local subsistence users to minimize such restrictions. If the proposed action is not likely to result in significant restrictions on subsistence uses, no further activities are required for compliance with this section. Caribou control on Kagalaska (Proposed Action) does not restrict subsistence uses on Kagalaska Island. See the Appendix B: ANILCA Section 810 Evaluation.

### **5 CUMULATIVE EFFECTS**

The Refuge drafted an Environmental Assessment to remove caribou from Adak Island in 1995. The EA draft was presented to the public and agencies, and comments were considered. A draft Finding of No Significant Impact was drafted but never signed by the Regional Director. No alternative presented in the EA was taken by the FWS because the land status of Adak Island and Adak community was uncertain.

The FWS is currently developing two separate NEPA compliant documents regarding the cattle management or removal on two other refuge islands. These Environmental Impact Statements are scheduled to be available in draft form to the public in the fall 2014.

### **6 LIST OF PREPARERS**

Steve Ebbert, Wildlife Biologist, Alaska Maritime National Wildlife Refuge is responsible for writing the draft EA and preparing it for distribution.

Steve Delehanty, Refuge Manager, Alaska Maritime National Wildlife Refuge is responsible for editing and agency distribution the draft EA.

Marianne Aplin, Visitor Center Manager, Alaska Maritime National Wildlife Refuge is responsible for editing, public involvement and public distribution of draft EA.

Heather Renner, Supervisory Wildlife Biologist, Alaska Maritime National Wildlife Refuge is responsible for editing the draft EA.

## 7 ACRONYMS AND ABBREVIATIONS

ANILCA: Alaska National Interest Lands Conservation Act  
CCP: Comprehensive Conservation Plan for Alaska Maritime National Wildlife Refuge  
EA: Environmental Assessment  
EIS: Environmental Impact Statement  
FWS: United States Fish and Wildlife Service  
FONSI: Finding of No Significant Impact  
NEPA: National Environmental Policy Act  
Refuge: Alaska Maritime National Wildlife Refuge  
Refuge Improvement Act: National Wildlife Refuge Improvement Act

## 8 COORDINATION, CONSULTATION, AND COMPLIANCE

As a Federal agency, the FWS must comply with provisions of the National Environmental Policy Act (NEPA). An environmental assessment is required under NEPA to evaluate reasonable alternatives that would meet stated objectives and to assess the possible impacts to the human environment. The environmental assessment serves as the basis for determining whether implementation of the proposed action would constitute a major Federal action significantly affecting the quality of the human environment.

The planning process has been conducted in accordance with National Environmental Policy Act Implementing Procedures, Department of Interior and FWS procedures, and has been performed in coordination with the affected public. A 30-day public review and comment period for the Draft Environmental Assessment was open from October 1-31, 2014. Press releases announcing the availability of the plan were sent to local media outlets. The EA was posted on the Refuge's website for the duration of the public comment period. Paper copies were made available at the refuge office during the public comment period. Notice of the availability of the plan was sent to The Aleut Corporation, the City of Adak, Atka Village, and to the Alaska Department of Fish and Game.

## 9 LIST OF AGENCIES CONTACTED

The following agencies were contacted during preparation of the EA:  
Alaska Department of Fish and Game  
The Aleut Corporation  
City of Adak Alaska

## 10 LITERATURE CITED

Bank, T. P. 1953. Ecology of prehistoric Aleutian village sites. *Ecology* 34(2):246-264.

- Belant, J. L., T. W. Seamans and C. P. Dwyer. 1996. Evaluation of propane exploders as white-tailed deer deterrents. *Crop Protection* 15:575–578.
- Belant, J. L., T. W. Seamans and L. A. Tyson. 1998. Evaluation of electronic frightening devices as white-tailed deer deterrents. *Proceedings of the Vertebrate Pest Conference* 18:107–110.
- Bergsland, K. 1959. Aleut dialects of Atka and Attu. *Transactions of the American Philosophical Society* 1-128.
- Curtis, P. D., C. Fitzgerald and M. E. Richmond. 1997. Evaluation of the Yard Gard ultrasonic yard protector for repelling white-tailed deer. *Proceedings of the Eastern Wildlife Damage Control Conference* 7:172–176.
- Fritz, L., K. Sweeney, D. Johnson, M. Lynn, T. Gelatt, and J. Gilpatrick. 2013. Aerial and Ship-Based Surveys of Steller Sea Lions (*Eumetopias jubatus*) Conducted in Alaska in June-July 2008 Through 2012, and an Update on the Status and Trend of the Western Distinct Population Segment in Alaska. NOAA Technical Memorandum NMFS-AFSC-251. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center. 7600 Sand Point Way NE, Seattle, Wash. 98115. 101pp.
- Gilsford, J. M., S. E. Hygenstrom and K. C. Vercauteren. 2003. Use of frightening devices in wildlife damage management. *Integrated Pest Management Reviews* 7:29–45.
- Gilsford, J. M., S. E. Hygenstrom, K. C. Vercauteren, E. E. Blankenship, and R. M. Engemann. 2004. Propane exploders and electronic guards were ineffective at reducing deer damage in cornfields. *Wildlife Society Bulletin* 32:524–531.
- Jones, R. D. 1966. Raising caribou for an Aleutian introduction. *Journal of Wildlife Management* 30:453-460.
- Koehler, A. E., R. E. Marsh and T. P. Salmon. 1990. Frightening methods and devices/stimuli to prevent mammal damage – a review. *Proceedings of the Vertebrate Pest Conference* 14: 168–173.
- Klein, D. R. 1959. Saint Matthew Island reindeer-range studies. U.S. Fish and Wildlife Service, Federal Aid in Wildlife Restoration. Rep., Proj. W-3-R, W-3-R-12, Work Plan B. 48pp.
- Klein, D. R. 1968. The introduction, increase, and crash of reindeer on St. Matthew Island. *J. Wildlife Management*. 32:350-366.
- Klein, D. R. 1987. Vegetation recovery patterns following overgrazing by reindeer on St. Matthew Island. *Journal of Range Management* 40(4):336-338.

- Meehan, J. P. 1993. Aerial survey of barren-ground caribou at Adak Island, Alaska in 1993.
- Pegau, Robert E. 1970. Effect of reindeer trampling and grazing on lichens. *Journal of range Management* 23(2):95-97.
- Ricca, M. A., F. W. Weckerly, and A. Duarte. 2012. Range expansion of nonindigenous caribou in the Aleutian archipelago of Alaska. *Biological Invasions*.
- Ricca M. A., J. C. Williams, F. W. Weckerly, V. T. Tutiakoff Jr. 2012. Aerial survey of barren ground caribou at Adak and Kagalaska Islands, Alaska in 2012. Data Summary: USGS-Western Ecological Research Center & U.S. Fish and Wildlife Service Rep AMNWR 2012/03. Davis CA and Homer AK, 15 pp.
- Roper, R. B., and E. P. Hill. 1985. An evaluation of visual and auditory electronic devices to repel deer. *Proceedings of the Eastern Wildlife Damage Control Conference* 2:186–191.
- Skoog, R. O. 1968. Ecology of the caribou (*Rangifer tarandus granti*) in Alaska. Berkeley, CA: University of California, Berkeley. 699 p. Dissertation.
- Stevens, M. S. and T. L. Smith. 2012. Invasive Species Eradications in the Alaska Maritime National Wildlife Refuge. USDA/APHIS/WS report to USFWS. 20pp.
- Williams, J. C. and V. Tutiakoff. 2005. Aerial survey of barren-ground caribou at Adak Island, Alaska in 2005. U.S. Fish and Wildlife Service Report. AMNWR 05/14. Homer, AK. 10pp.
- Wright, J. M. 1978. Reindeer grazing in relation to bird nesting in the northern Seward Peninsula. Unpublished report. U.S. Fish and Wildlife Service, Fairbanks, Alaska. 81 pp.

## 11 Appendix A: Endangered Species Section 7 Consultation (Sea otters)

### Intra-Service Section 7 Biological Evaluation Form - Region 7

Originating Person: Steve Ebbert, Wildlife Biologist

Date Submitted: 27 Aug 2014

Telephone Number: 907-235-6546

- I. **Service Program and Geographic Area or Station Name:**  
Alaska Maritime National Wildlife Refuge
- II. **Flexible Funding Program** (e.g. Joint Venture, etc) if applicable:  
N/A
- III. **Location:** Location of the project:  
Kagalaska Island, Central Aleutian Islands (approx. 51° 47' 35" N, 176° 20' 39" W).
- IV. **Species/Critical Habitat:** List federally endangered, threatened, proposed, and candidate species or designated or proposed critical habitat that may occur within the action area.

Endangered and threatened species using marine waters adjacent to Kagalaska Island include Steller sea lions and sea otters. This consultation is specific to sea otters.

The marine environment surrounding Kagalaska Island is in the southwest Alaska Distinct Population Segment (DPS) of the northern sea otter (*Enhydra lutris kenyoni*). The DPS is listed as threatened under the Endangered Species Act (ESA), and the listed population and all other sea otter populations are protected under the Marine Mammal Protection Act (MMPA).

- V. **Project Description:** Describe proposed project or action or, if referencing other documents, prepare an executive summary (attach additional pages as needed):

See attached Draft Environmental Assessment of Caribou Control on Kagalaska Island, Alaska Maritime National Wildlife Refuge.

Beginning in the summer of 2015, and continuing into the future, the Refuge proposes to implement caribou control on Kagalaska Island in compliance with ANILCA, Wilderness Act, and Administration Act mandates. One or more trained staff/volunteers/contractors will be taken ashore (landing below mean high tide and outside refuge and Wilderness boundary) by motorized inflatable skiff or other suitable watercraft and use center-fire rifles adequate to kill caribou. Shooters will carry a two-way hand held radio, a GPS unit, and spare clothing appropriate for weather. Depending on the number of animals expected and personnel availability, they may camp on the island in some years. The refuge research vessel Tiglax, charter vessel, or other means, may support them.

No motorized vehicles or mechanized transport (both generally prohibited by the Wilderness Act) would be used on the island (e.g., within Wilderness boundaries). Motorized skiff access would take place below tide line, which is outside Refuge and Wilderness boundaries. Firearms are not motorized equipment. Refuge staff have conducted a Minimum Requirements Analysis in compliance with agency policies associated with the Wilderness Act.

VI. **Determination of Effects:**

**(A) Description of Effects:** Describe the action(s) that may affect the species and critical habitats listed in item IV.

Sea otters are not expected to interact significantly with caribou on Kagalaska Island. The presence of caribou in low numbers, as presently occurs, or the complete absence of caribou on the island, which has certainly been the case prior to caribou introduction on Adak Island in 1959, has no known impact on sea otters.

While traversing sea otter habitat in small watercraft as when going or coming from shore during the Proposed Action, the watercraft operator will conform to the procedures described in the "Boat Operation Guidance to Avoid Disturbing Sea Otters". Participants will be reminded not to harass sea otters at any time.

None of the activities of the Proposed Action is likely to impact sea otters.

VI. **Determination of Effects (continued):**

**(B) Determination:** Determine the anticipated effects of the proposed project on species and critical habitats listed in item IV. Check all applicable boxes and list the species (or attach a list) associated with each determination.

**Determination**

*No Effect:* This determination is appropriate when the proposed project will not directly or indirectly affect (neither negatively nor beneficially) individuals of listed/proposed/candidate species or designated/proposed critical habitat of such species. **No concurrence from ESFO required.**

\_\_\_\_\_ X \_\_\_\_\_

*May Affect but Not Likely to Adversely Affect:* This determination is appropriate when the proposed project is likely to cause insignificant, discountable, or wholly beneficial effects to individuals of listed species and/or designated critical habitat. **Concurrence from ESFO required.**

\_\_\_\_\_

*May Affect and Likely to Adversely Affect:* This determination is appropriate when the proposed project is likely to adversely impact individuals of listed species and/or designated critical habitat. **Formal consultation with ESFO required.**

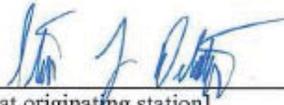
\_\_\_\_\_

*May affect but Not Likely to Jeopardize candidate or proposed species/critical habitat:* This determination is appropriate when the proposed project may affect, but is not expected to jeopardize the continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. **Concurrence from ESFO optional.**

\_\_\_\_\_

*Likely to Jeopardize candidate or proposed species/critical habitat:* This determination is appropriate when the proposed project is reasonably expected to jeopardize the continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. **Conference with ESFO required.**

\_\_\_\_\_

Signature  \_\_\_\_\_  
[Supervisor at originating station]

Date 26 August 2017

**Reviewing Ecological Services Office Evaluation (check all that apply):**

A. Concurrence  X  Nonconcurrency \_\_\_\_\_

Explanation for nonconcurrency (if applicable):

B. Formal consultation required \_\_\_\_\_  
List species or critical habitat unit

C. Conference required \_\_\_\_\_  
List species or critical habitat unit

D. Notes: No effects to sea otters are expected when boat operator prevention protocols are observed.

Name of Reviewing ES Office  Anchorage Fish and Wildlife Field Office

Signature   \_\_\_\_\_  Date  September 2, 2014

Revised 4/2013

Page 4 of 4

## 13 Appendix B: ANILCA Section 810 Evaluation

### Alaska Maritime National Wildlife Refuge Evaluation of the Effects on Subsistence Uses and Needs (ANILCA Section 810 Evaluation)

#### Caribou Control on Kagalaska Island

The U.S. Fish and Wildlife Service, acting for the Secretary, is required by Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA) to evaluate the effects on subsistence uses and needs in determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands on national wildlife refuges in Alaska. The evaluation of effects of this proposed action or use on subsistence uses and needs is documented below. If this evaluation concludes a finding that the proposed action would result in significant restriction to subsistence uses, and we wish to proceed, we must initiate further procedural requirements of Section 810.

#### Proposed Action/Use:

The Service is proposing to initiate a caribou control project on Kagalaska Island consisting of regular, refuge-coordinated, walk-in caribou control efforts beginning in 2014 on Kagalaska Island. These re-occurring efforts will eliminate caribou found on the island, prevent establishment of a resident caribou population, and provide information about the rate of incursion and demography of caribou dispersing to the island to improve subsequent control efforts. Additionally, caribou control on Kagalaska will alleviate risk of dispersal to other refuge islands east of Kagalaska. Information gained from annual control will also be useful to evaluate the relative priority of Kagalaska caribou and other proposed invasive species control projects. There were four caribou on Kagalaska Island observed during a survey in 2012. Current caribou numbers on Kagalaska are likely between 0 and 15 animals with ongoing bouts of immigration from Adak occurring at unknown frequency.

#### Evaluation:

##### 1. Subsistence Resources, Uses and Needs in the Affected Area:

In the Aleutians, residents have traditionally used the following types of resources: marine resources, including fish, (salmon, halibut, cod, etc.); marine mammals (Stellar sea lions, sea otters, harbor seals); intertidal resources such as sea urchins, razor clams, butter clams, cockles, mussels, and chitons, crab and shrimp. Plants harvested include berries (blueberries, salmonberries, mossberries, strawberries, and lingonberries), wild celery (petrusky), wild rice (*Fritillaria camschatcensis*) giant kelp, and fiddlehead ferns. Birds are harvested, including ducks, geese, or ptarmigan. Eggs are collected primarily from gull colonies. On Adak, introduced caribou also are harvested by local residents. Adak is considered rural by the Federal Subsistence Board for subsistence purposes. There is no known subsistence hunting on Kagalaska Island.

**2. Effect of Proposed Action or Use on Subsistence Uses and Needs.**

Is there likely to be a reduction in subsistence uses due to:

- Direct impacts on the resource, habitat, or increased competition for resources?  
No
- Changes in availability of the resource caused by alteration in their distribution, migration, or location?  
No
- Limitations on access to harvestable resources, such as by physical or legal barriers?  
No

**3. Availability of other lands for the purpose sought to be achieved.**

Are there other lands that have a reasonable geographic and resource based relationship for the purpose to be achieved by the proposed action, are available within the proposed time frame, are in appropriate ownership in Alaska and are not designated for land uses which would preclude the proposed action?

No

**4. Alternatives which would reduce or eliminate the proposed action from lands needed for subsistence purposes.**

Are there other ways to accommodate the proposed action (not other sites) that are reasonable, physically & technically possible, economically feasible, and capable of reducing or eliminating the proposed action from lands needed for subsistence purposes?

No

(If any of the questions are yes, explain.)

**Finding:**

Based on review and evaluation of information indicated above and in the supporting references indicated below, I have determined that the proposed use (action) will not result in a significant restriction of subsistence uses.

**Agency Decision:**

A finding of no significant restriction in subsistence uses complete the Section 810 requirements. The proposed action or use may be authorized.

**Supporting References:**

*Fall, James A. Amy Paige, Vicki Vanek, and Louis Brown. 1998. Subsistence harvests and uses of birds and eggs in four communities of the Aleutian Islands area; Akutan, False Pass, Nelson Lagoon, and Nikolski. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 243. Juneau.*

*Veltre, Douglas W. and Mary J. Veltre. 1981. Resource Utilization in Unalaska, Aleutian Islands, Alaska. Alaska Department of Fish and Game, Division of Subsistence. Technical Paper Number 58. Contract 82-0790.*

*Veltre, Douglas W. and Mary J. Veltre. 1983. Resource utilization in Atka, Aleutian Islands, Alaska. Alaska Department of Fish and Game, Division of Subsistence. Technical Paper Number 88. Contract 83-0496.*

*Wolfe, Robert J. and Amy W. Paige, Cheryl I. Scott. 1990. The subsistence harvest of migratory birds in Alaska. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 197. Juneau.*

*Alaska Policy Manual, U.S. Fish and Wildlife Service*

*Alaska Maritime National Wildlife Refuge, Final Comprehensive Conservation Plan, Environmental Impact Statement, Wilderness Review. Record of Decision signed August 26, 1988.*

*Alaska National Interest Lands Conservation Act (ANILCA), 1980.*

*Service Manual - Region 7, U.S. Fish and Wildlife Service*

*Subsistence Management for Federal Public Lands in Alaska, Final, 1992*

*Alaska Policy Manual, U.S. Fish and Wildlife Service*

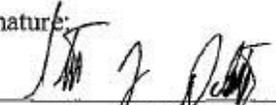
*Alaska Maritime National Wildlife Refuge, Final Comprehensive Conservation Plan, Environmental Impact Statement, Wilderness Review. Record of Decision signed August 26, 1988.*

*Alaska National Interest Lands Conservation Act (ANILCA), 1980.*

*Service Manual - Region 7, U.S. Fish and Wildlife Service*

*Subsistence Management for Federal Public Lands in Alaska, Final, 1992*

Signature:

  
\_\_\_\_\_  
Refuge Manager

8-28-14  
Date

## 14 Appendix C: Minimum Requirement Decision Guide (MRDG)



ARTHUR CARHART NATIONAL WILDERNESS TRAINING CENTER

# MINIMUM REQUIREMENTS DECISION GUIDE WORKBOOK

"...except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act..."

– The Wilderness Act of 1964

**Project Title:** Caribou Control on Kagalaska Island, Alaska Maritime NWR

### MRDG STEP 1

*Determine if Administrative Action is Necessary*

#### Description of the Situation

*What is the situation that may prompt administrative action?*

Recent visits since 2010 have confirmed the presence of caribou on Kagalaska Island. In 2012, refuge staff and their contractors discovered 5 caribou (one bull, four cows) on the island and shot them. Days later, 4 more caribou were spotted on the island (3 cows, one calf) but not taken.

The Service is proposing to initiate a caribou control project on Kagalaska Island consisting of regular, refuge-coordinated, walk-in caribou control efforts beginning in spring of 2014 on Kagalaska Island. These re-occurring efforts will provide information about rate of incursion and demography of caribou dispersing to the island to efficiently improve subsequent control efforts. Additionally, caribou control on Kagalaska will alleviate risk of dispersal to other refuge islands east of Kagalaska. Information gained from annual control will also be useful to evaluate the relative priority of Kagalaska caribou and other proposed invasive species control projects.

The purpose of the action is to eliminate non-native caribou on Kagalaska Island, keep them from spreading to other nearby islands, and collect information about the rate of incursion of caribou on Kagalaska. Controlling caribou on Kagalaska relieves one environmental threat and protects the natural biodiversity of the island. The action helps to "preserve wilderness character" - a primary mandate in the Wilderness Act. Collecting information about the demography of caribou invading Kagalaska, and the rate invasion occurs, will help us develop a strategy to minimize the impact on Wilderness character and refuge resources.

#### Options Outside of Wilderness

---

ARTHUR CARHART NATIONAL WILDERNESS TRAINING CENTER

# MINIMUM REQUIREMENTS DECISION GUIDE

## WORKBOOK

*"...except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act. ..."*

-- The Wilderness Act of 1964

Project Title: {Caribou Control on Kagalaska Island, Alaska Maritime NWR

### *MRDG STEP 1*

*Determine if Administrative Action is Necessary*

*Description of the Situation*

*What is the situation that may prompt administrative action ?*

Recent visits since 2010 have confirmed the presence of caribou on Kagalaska Island. In 2012, refuge staff and their contractors discovered 5 caribou (one bull, four cows) on the island and shot them. Days later, 4 more caribou were spotted on the island (3 cows, one calf) but not taken.

The Service is proposing to initiate a caribou control project on Kagalaska Island consisting of regular, refuge-coordinated, walk-in caribou control efforts beginning in spring of 2014 on Kagalaska Island. These re-occurring efforts will provide information about rate of incursion and demography of caribou dispersing to the island to efficiently improve subsequent control efforts. Additionally, caribou control on Kagalaska will alleviate risk of dispersal to other refuge islands east of Kagalaska. Information gained from annual control will also be useful to evaluate the relative priority of Kagalaska caribou and other proposed invasive species control projects.

The purpose of the action is to eliminate non-native caribou on Kagalaska Island, keep them from spreading to other nearby islands, and collect information about the rate of incursion of caribou on Kagalaska. Controlling caribou on Kagalaska relieves one environmental threat and protects the natural biodiversity of the island. The action helps to "preserve wilderness character" - a primary mandate in the Wilderness Act. Collecting information about the demography of caribou invading Kagalaska, and the rate invasion occurs, will help us develop a strategy to minimize the impact on Wilderness character and refuge resources.

### **Options Outside of Wilderness**

Can action be taken outside of wilderness that adequately addresses the situation?

YES

NO

**EXPLAIN & COMPLETE STEP 1 OF THE MRDG**

Explain:

Eliminating or greatly reducing the caribou population on Adak Island would likely slow the rate of range expansion to Kagalaska Island and would lessen impacts of caribou on both islands. However, much of the preferred habitat for caribou on Adak Island where other action would be needed is also wilderness. A previous EA, not finalized, proposed removing caribou from Adak Island (EA for Removal of Introduced Caribou, Adak, Alaska 1994). Currently Adak Island has mixed land ownership, with large portions of the island owned and managed by the Aleut Corporation and not under refuge administration. There is also an established tradition of caribou hunting under state regulations on Adak Island as well as the existence of the town of Adak itself, many of whose residents use Adak caribou as a meat supply. Elimination of all caribou on Adak or greatly reducing the number of caribou on Adak Island is beyond the scope of this assessment.

**Criteria for Determining Necessity**  
*Is action necessary to meet any of the criteria below?*

**A. Valid Existing Rights or Special Provisions of Wilderness Legislation**

*Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that **requires** action? Cite law and section.*

YES

NO

Explain:

[Empty text box for explanation]

*[Can action be taken outside of wilderness that adequately addresses the situation?*

Elves

**Explain:**

**EXPLAIN 8: COMPLETE STEP 1 OF THE MRDG**

Eliminating or greatly reducing the caribou population on Adak Island would likely slow the rate of range expansion to Kagalaska Island and would lessen impacts of caribou on both islands. However, much of the preferred habitat for caribou on Adak Island where other action would be needed is also wilderness. A previous EA, not finalized, proposed removing caribou from Adak Island (EA for Removal of Introduced Caribou, Adak, Alaska 1994). Currently Adak Island has mixed land ownership, with large portions of the island owned and managed by the Aleut Corporation and not under refuge administration. There is also an established tradition of caribou hunting under state regulations on Adak Island as well as the existence of the twin of Adak itself, many of whose residents use Adak caribou as a meat supply. Elimination of all caribou on Adak or greatly reducing the number of caribou on Adak Island is beyond the scope of this assessment.

**Criteria for Determining Necessity**

**Is action necessary to meet any of the criteria below?**

**A. Valid Existing Rights or Special Provisions of Wilderness Legislation**

*Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that requires action? Cite law and section.*

EI YES

Explain:

EINo

MRDG Workbook: STEP 1

Page 2 of 6

**B. Requirements of Other Legislation**

Is action necessary to meet the requirements of other federal laws? Cite law and section.

YES

NO

Explain:

The Executive Order 13112 of February 3, 1999 titled *Invasive Species* Section 2 (2) directs Federal agencies to prevent the introduction, detect and respond rapidly to, and control populations the of invasive species in any work they authorize, fund, or carry out.

Section 303(1)(b) of ANILCA describes the first major purpose for which Alaska Maritime Refuge was established and shall be managed "to conserve fish and wildlife populations and habitats in their natural diversity. . ." (See Section 1.4 for additional authorities). The need for action is to assure that the natural integrity of Kagalaska Island is maintained.

National Invasive Species Act of 1996 (16 U.S.C. 4701)

Title 50 CFR Part 31, Section 14 – Official animal control operations.

601 FW 3 Biological integrity and diversity and environmental health (2001)

**C. Wilderness Character**

Is action necessary to preserve one or more of the qualities of wilderness character including: *Untrammeled, Undeveloped, Natural, Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation, or Other Features of Value?*

UNTRAMMELED

YES

NO

Explain:

*Is action necessary to meet the requirements of other federal laws ? Cite law and section.*

Explain:

The Executive Order 13112 of February 3, 1999, titled Invasive Species Section 2 (2) directs Federal agencies to prevent the introduction, detect and respond rapidly to, and control populations of invasive species in any work they authorize, fund, or carry out.

Section 303(1)(b-) of ANILCA describes the first major purpose for which Alaska Maritime Refuge was established and shall be managed "to conserve fish and wildlife populations and habitats in their natural diversity. . .". (See Section 1.4 for additional authorities). The need for action is to assure that the natural integrity of Kagalaska island is maintained.

National Invasive Species Act of 1996 (16 U.S.C. 4701)

Title 50 CFR Part 31, Section 14 - Official animal control operations.

601 FW 3 Biological integrity and diversity and environmental health (2001)

### *C. Wilderness Character*

*is action necessary to preserve one or more of the qualities of wilderness character including: Untrammeled, Undeveloped, Natural, Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation, or Other Features of Value?*

**UNTRAMMELED**

III YES E] NO

Explain:

MRDG Workbook: STEP 1 Page 3 of 6

UNDEVELOPED

YES

NO

Explain:

NATURAL

YES

NO

Explain:

A wilderness area should be managed as to preserve its natural conditions, including prevention of degradation of naturalness by a human-caused introduction far outside its natural range. Preserving this quality ensures that indigenous species, patterns, and ecological processes are protected.

---

UNDEVELOPED

protected.

A wilderness area should be managed as to preserve its natural conditions, including prevention of degradation of naturalness by a human-caused introduction far outside its natural range.

Preserving this quality ensures that indigenous species, patterns, and ecological processes are

MRDG Workbook: STEP 1

Page 4 of 6

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

YES

NO

Explain:

[Empty text box for explanation]

OTHER FEATURES OF VALUE

YES

NO

Explain:

[Empty text box for explanation]

---

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

[1 YES E] NO

Explain:

OTHER FEATURES OF VALUE

EI 'YES E] NO

Explain:

MRDG Workbook: STEP 1

Page 5 of 6

**Step 1 Decision**  
 Is administrative action necessary in wilderness?

Decision Criteria

- A. Existing Rights or Special Provisions
- B. Requirements of Other Legislation
- C. Wilderness Character
  - Untrammeled
  - Undeveloped
  - Natural
  - Outstanding Opportunities
  - Other Features of Value

Summary Responses

- Action IS NOT necessary to meet this criterion.
- Action IS necessary to meet this criterion.
- Action IS NOT necessary to meet this criterion.
- Action IS NOT necessary to meet this criterion.
- Action IS necessary to meet this criterion.
- Action IS NOT necessary to meet this criterion.
- Action IS NOT necessary to meet this criterion.

Is administrative action necessary in wilderness?

YES

**EXPLAIN & PROCEED TO STEP 2 OF THE MRDG**

NO

Explain:

Caribou grazing has adverse impact on native plant communities and natural integrity on Adak Island, especially depletion of lichens. Management action is necessary to prevent invasive caribou from becoming established and expanding their use across Kagalaska Island. If unchecked, caribou on Kagalaska will increase to a level that threatens the island's natural biodiversity. Naturalness, a character of Wilderness established by the Wilderness Act (1967), will degrade as Kagalaska caribou increase because caribou, and effects on the environment, are not natural to the island. Caribou on Kagalaska represent "trammeling" by humans because humans stocked caribou on Adak as an exotic game animal, but caribou did not occur on Kagalaska when that island was designated wilderness in 1980.

Non-native caribou or reindeer populations on islands can increase to the level when forage, mainly reindeer lichen during winter, becomes limiting. Lichens then decline along with the biological communities that depend on them, and may take a long time to recover after depletion caused by caribou or reindeer grazing. Similar to Adak caribou, introduced reindeer have had adverse impacts on natural biodiversity on some refuge islands. Remote Alaska islands compete unfavorably as a hunter destination compared to mainland opportunities, and typically demand is inadequate to be used to regulate herd population.

*is administrative action necessary in wilderness?*

Decision Criteria Summary Responses

A. Existing Rights or Special Provisions Action IS NOT necessary to meet this criterion.

B. Requirements of Other Legislation Action IS necessary to meet this criterion.

C. Wilderness Character

Untrammeled Action IS NOT necessary to meet this criterion. Undeveloped Action IS NOT necessary to meet this criterion. Natural Action IS necessary to meet this criterion. Outstanding Opportunities Action IS NOT necessary to meet this criterion. Other Features of Value Action IS NOT necessary to meet this criterion.

Is administrative action necessary in wilderness?

## **E YES EXPLAIN & PROCEED TO STEP 2 OF THE MRDG**

EING'

Explain:

Caribou grazing has adverse impact on native plant communities and natural integrity on Adak island. especially depletion of lichens. Management action is necessary to prevent invasive caribou from becoming established and expanding their use across Kaga'la'ska Island. If unchecked, caribou on Kagalaska will increase to a level that threatens the island's natural biodiversity. Naturalness, a character of Wilderness established by the Wilderness Act (1967), will degrade as K'agalaska caribou increase because caribou, and effects on the environment, are not natural to the island. Caribou on Kagalaska represent "trammeling" by humans because humans stocked caribou on Adak as an exotic game animal, but caribou did not occur on Kagalaska when that island was designated wilderness in 1980.

Non-native caribou or reindeer populations on islands-can increase to the level when forage, mainly reindeer lichen during winter, becomes limiting. Lichens then decline along with the biological communities that depend on them, 'and may take a long time to recover after depletion caused by caribou or reindeer grazing. Similar to Adak caribou, introduced reindeer have had adverse impacts on natural biodiversity on some refuge islands. Remote Alaska islands compete unfavorably as a hunter destination compared to mainland opportunities, and typically demand is inadequate to be used to regulate herd population.

MRDG Workbook: STEP 1 Page 6 of 6

**Project Title:** Caribou Control on Kagalaska Island, Alaska Maritime NWR

**MRDG STEP 2**

Determine the Minimum Activity

**Other Direction**  
*Is there "special provisions" language in legislation (or other Congressional direction) that explicitly **allows** consideration of a use otherwise prohibited by Section 4(c)?*

**AND/OR**  
*Has the issue been addressed in agency policy, management plans, species recovery plans, or agreements with other agencies or partners?*

YES

**DESCRIBE DOCUMENTS & DIRECTION BELOW**

NO

Describe Documents & Direction:

FWS Wilderness Stewardship Policy - 610 FW 2  
2.16 How does the Service conserve wildlife and habitat in wilderness?  
B. Major ecosystem processes including wildfire, drought, flooding, windstorms, pest and disease outbreaks, and predator/prey fluctuations may be natural ecological and evolutionary processes.  
(1) We will not interfere with these processes or the wilderness ecosystem's response to such natural events unless necessary to accomplish refuge purposes, including Wilderness Act purposes, or in cases where these processes become unnatural. Examples of unnatural conditions are:  
(d) The spread of alien species.  
(2) In such cases, we encourage the restoration and maintenance of biological integrity and wilderness character.  
(3) All decisions and actions to modify ecosystems, species population levels, or natural processes must be:  
(a) Required to respond to a human emergency, or  
(b) The minimum requirement for administering the area as wilderness and necessary to accomplish the purposes of the refuge, including Wilderness Act purposes. In addition, such decisions and actions must:  
(i) Maintain or restore the biological integrity, diversity, or environmental health of the wilderness area;  
2.19 May the Service control invasive species, pests, and diseases in wilderness?  
A. We may control invasive species, pests, or diseases when:  
(1) We have demonstrated that they have degraded or there is a high probability they will degrade the biological integrity, diversity, environmental health, or wilderness character of a wilderness area;  
(3) We have demonstrated that they pose a significant threat to the health of fish, wildlife, plants, or their habitats.

---

Project Title: Caribou Control on Kagalaska Island, Alaska Maritime NWR

## MRDG STEP 2

### Determine the Minimum Activity

#### Other Direction

is there "special provisions" language in legislation (or other Congressional direction) that explicitly allows consideration of-a use otherwise prohibited by Section 4(0)?

#### AND/OR

Has the issue been addressed in agency policy, management plans, species recovery plans, or agreements with other agencies or partners?

#### E] YES DESCRIBE DOCUMENTS & DIRECTION BELOW

##### EINO

Describe Documents & Direction:

FWS Wilderness Stewardship Policy - 610 FW 2

2.16 How does the Service conserve wildlife and habitat in wilderness?

B. Major ecosystem processes including wildfire, drought, flooding, windstorms, pest and disease outbreaks, and predator/prey fluctuations may be natural ecological and evolutionary processes.

(1) We will not interfere with these processes or the wilderness ecosystem's response to such natural events unless necessary to accomplish refuge purposes, including Wilderness Act purposes} or in cases where these processes become unnatural. Examples of unnatural conditions are:

(d) The spread of alien species.

(2) In such cases, we encourage the restoration and maintenance of biological integrity and wilderness character.

decisions. and actions to modify ecosystems, species population levels, or natural processes must be:

(a) Required to respond to a human emergency...Or

(b) The minimum requirement for administering the. area as wilderness and necessary to accomplish the purposes of the refuge, including Wilderness Act purposes. In addition, such decisions and actions must:

(i) Maintain or restore the biological integrity, diversity, or environmental health of the wilderness area;

2.19 May the Service control invasive species, pests, and diseases in wilderness?

A. We may control invasive species, pests, or diseases when:

(1) We have demonstrated that they have degraded Or there is a high probability they will degrade the biological integrity, diversity, environmental health, or wilderness character of a wilderness area; (3) We have demonstrated that they pose a significant threat to the health of

fish, wildlife, plants, or their habitats.

<b>Components of the Action</b>	
<i>What are the discrete components or phases of the action?</i>	
Component X	<i>Example: Transportation of personnel to the project site</i>
Component 1	Transportation of personnel to the project site
Component 2	Transportation of equipment and material to site
Component 3	Tools used at project site
Component 4	Condition of site after project
Component 5	
Component 6	
Component 7	
Component 8	
Component 9	

**Proceed to the alternatives.**

Refer to the [MRDG Instructions](#) regarding alternatives and the effects to each of the comparison criteria.

## *Components of the Action*

*What are the discrete components or phases of the action ?*

Component X

*Example: Transportation of personnel to the project site*

Component 1

Transportation of personnel to the project site

Component 2

Transportation of equipment and material to site

Component 3

Tools used at project site

Component 4

Condition of site after project

**Component 5**

Component 6

Component 7

**Component 8**

Component 9

Proceed to the alternatives.

Refer to the MRDG Instructions regarding alternatives and the effects to each of the comparison criteria.

MRDG Workbook: STEP 2

Project Title: Caribou Control on Kagalaska Island, Alaska Maritime NWR

**MRDG Step 2: Alternatives**

Alternative 1: No Action

**Description of the Alternative**  
*What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?*

Under this alternative, no management action will happen regarding the control of caribou on Kagalaska Island.

Under the No Action Alternative, caribou on Kagalaska has the potential to increase either through immigration or by reproduction. A Kagalaska herd is unlikely to decrease through emigration since caribou forage resources is presently superior on Kagalaska compared to Adak Island. Caribou have little incentive to emigrate from habitat safe from exposure to human hunters and disturbance back to areas with a higher caribou density, greater competition for food and mates, greater human disturbance. Caribou would continue to use the relatively undisturbed Kagalaska Island, perhaps occasionally leaving the island to search for potential mates on adjoining islands.

---

Project Title: Caribou Control on Kagalaska Island, Alaska Maritime NWR

**MRDG Step 2: Alternatives**

**Alternative 1: [No Action**

**Description of the Alternative**

**What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?**

Under this alternative, no management action will happen regarding the control of caribou on Kagalaska Island. I

Under the No Action Alternative, caribou on Kagalaska has the potential to increase either through immigration or by reproduction;-A j j

Kagalaska herd is unlikely to decrease through emigration since caribou forage resources is presently superior on Kagalaska compared to Adak island. Caribou have little incentive to emigrate from habitat safe from exposure to human hunters and disturbance back to areas with a higher caribou density, greater competition for food and mates, greater human disturbance. Caribou would continue to use the, '9 relatively undisturbed Kagalaska Island, perhaps

occasionally leaving the island to search for potential mates on adjoining islands.

<b>Component Activities</b>	
<i>How will each of the components of the action be performed under this alternative?</i>	
Component of the Action	Activity for this Alternative
X <i>Example: Transportation of personnel to the project site</i>	<i>Example: Personnel will travel by horseback</i>
1 Transportation of personnel to the project site	No transportation of personnel to the project site.
2 Transportation of equipment and material to site	No transportation of equipment or material to the project site.
3 Tools used at project site	No tools used at the site.
4 Condition of site after project	Caribou may continue to spread uncontrolled within the wilderness.
5	
6	
7	
8	
9	

**Component Activities**

*How will each of the components of the action be performed under this alternative?*

*Component of the Action Activity for this Alternative*

*X Example: Transportation of personnel to the project site Example: Personnel will travel by horseback*

*1 Transportation of personnel to the project site No transportation of personnel to the project site.*

*NO transportation of equipment or material to the*

*. - I I Ilul IDI 2 Transportation of equipmnet and materlal to Slte project Site*

*3 Tools'used at project site No tools used at the site.*

*Caribou may continue to spread uncontrolled within*



## United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE  
 Kodiak National Wildlife Refuge  
 1390 Buskin River Road  
 Kodiak, Alaska 99615-0323  
 (907) 487-2600



### Federal Subsistence Activity Report Kodiak National Wildlife Refuge September 2014 – December 2014

#### Subsistence Permit Summary

Federal Subsistence regulations allow for customary and traditional harvest of Roosevelt elk, Sitka black-tailed deer and brown bear on Kodiak Refuge lands. Rural residents qualify for federal elk and deer hunts, and a small number of brown bear permits are issued to village residents (Table 1). Federal designated deer hunter and subsistence elk permits can be obtained at the Kodiak Refuge headquarters and at some villages. Permittees are required to carry their Federal subsistence permits, and current state licenses and harvest tickets while hunting.

**Table 1. Federal subsistence permits issued and estimated number of animals harvested based on harvest reports, Unit 8, 2008-2015.**

Species	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Deer*	81(74)	56(38)	67(42)	70(52)	20(11)	46(21)	45(**)
Bear	6(1)	6(1)	7(1)	5(2)	2(0)	4(0)	3(**)
Elk	3(0)	5(0)	8(1)	6(0)	2(0)	5(2)	6(1)

\*Multiple deer eligible to be harvested per permit

\*\*Incomplete reporting. Season ongoing

#### Brown Bears

##### Population Assessment

*Intensive Aerial Survey:* The Refuge, in cooperation with ADF&G, attempts to conduct annual intensive aerial surveys to assess trends in bear population size and composition in important areas across Kodiak Island. During 2014, we intended to survey two areas: one centered on the area encompassed by Fraser and Red Lakes and another encompassing the Sturgeon River drainage. Early leaf out from the warm and mild spring prevented sighting bears from the air, so we were unable to carry out this survey in 2014. We will attempt the survey again in late-May 2015.

*Brown Bear Stream Surveys:* Following established protocol, the Refuge surveys brown bear use of a network of streams in southwest Kodiak Island. The purpose of the survey is to monitor bear attendance along streams and to gather composition data of the population. From 12 July to 9 September 2014, we conducted 16 surveys. We counted substantially fewer bears (15 bears/survey average) in 2014 compared to the annual average during the 1985-2005 period (85 bears/survey). Research of bear habitat use in the same area indicated that bear use of streams was limited after berries (i.e., salmonberry and elderberry) ripened in mid to late July. The early and highly productive berry crop this year likely contributed to this unusual pattern. Elderberry, in contrast to other berry species, has relatively high protein content. Indeed, based on research conducted at Washington State University the protein content of elderberry based on dry matter digestibility falls within the “sweet spot” of 17-23% for brown bears. Single bears represented a slightly lower proportion of the population than the long-term average (43% versus the long-term average of 47%). Maternal bears comprised 20% of bears in 2014, compared to the long-term average of 17%. Cubs of the year (COY) made up 13% of all bears observed, while older cubs comprised 24%, versus the long-term averages of 11% and 24%, respectively. Family groups made up 57% of all bear groups recorded, versus the long-term average of 53%. This favorable proportion of family groups may represent improved cub production and survival reflecting increased sockeye runs in 2012 and 2013.

*Bear Harvest (data from ADF&G):* Brown bear harvest documented within the Refuge boundary during July 1, 2013 through June 30, 2014 was 104 bears. Sport harvest accounted for 101 bears, which included 79 males (78%) and 22 females (22%). Three bears were killed in defend of life and property (DLP). Sport harvest within the Refuge accounted for 62% of the total sport harvest on the Archipelago.

### Research

In cooperation with the U.S. Geological Survey’s Alaska Science Center and the University of Montana-Flathead Lake Biological Station, the Refuge continued research initiated in 2012. Goals of the project, entitled *Kodiak Brown Bear-Sockeye Salmon Foraging Ecology in Southwest Kodiak Island, Alaska*, include: (1) characterizing the spatial and temporal variation of salmon runs in 11 spawning streams using a novel time-lapse camera system; (2) determining how salmon abundance, run timing, and energy levels affect overall exploitation of salmon by Kodiak bears; (3) quantifying the physical and biological characteristics of salmon runs that trigger bears to travel among streams; and (4) quantifying the physical characteristics of preferred salmon foraging sites. In 2014, we monitored salmon abundance and bear density at 11 streams using time-lapse camera monitoring systems between late-May and late-September (Figure 1). We calculated total escapement using previously developed calibrations that relate time-lapse counts of salmon to spawning escapement. We estimated total escapement in the 11 streams was 457,918 salmon. Morphology of focal streams was measured, including stream widths, depths, and substrate sizes. Sixteen female bears were captured, fitted with GPS collars, and tracked during the season (Figure 2).

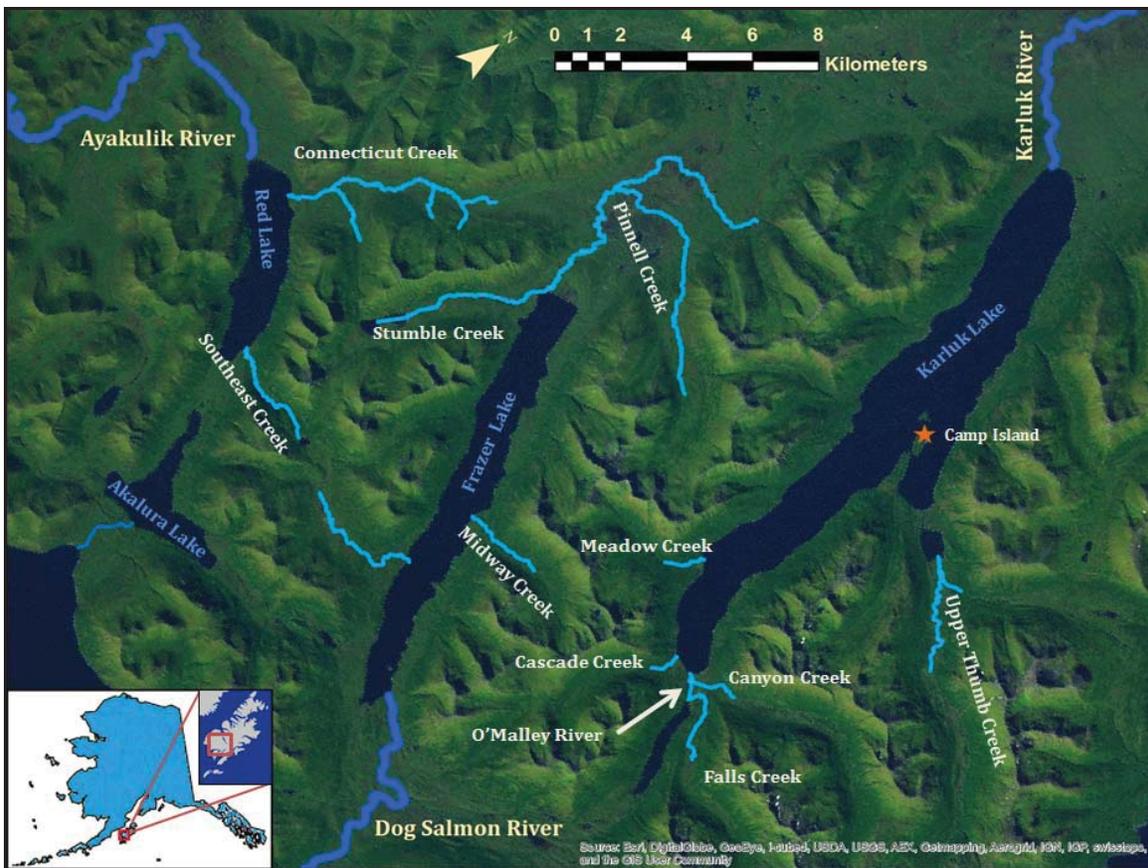


Figure 1. Study streams for bear-salmon research, southwest Kodiak Island.

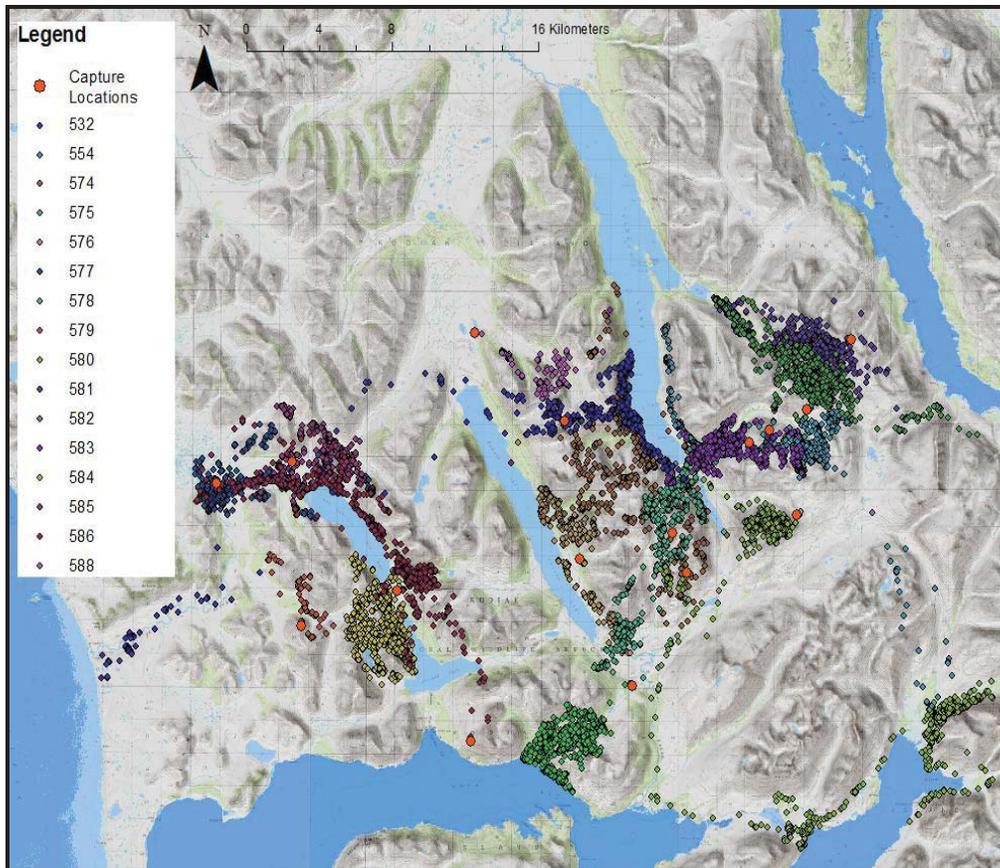


Figure 2. GPS-collared bear locations, June through August 2014, southwest Kodiak Island.

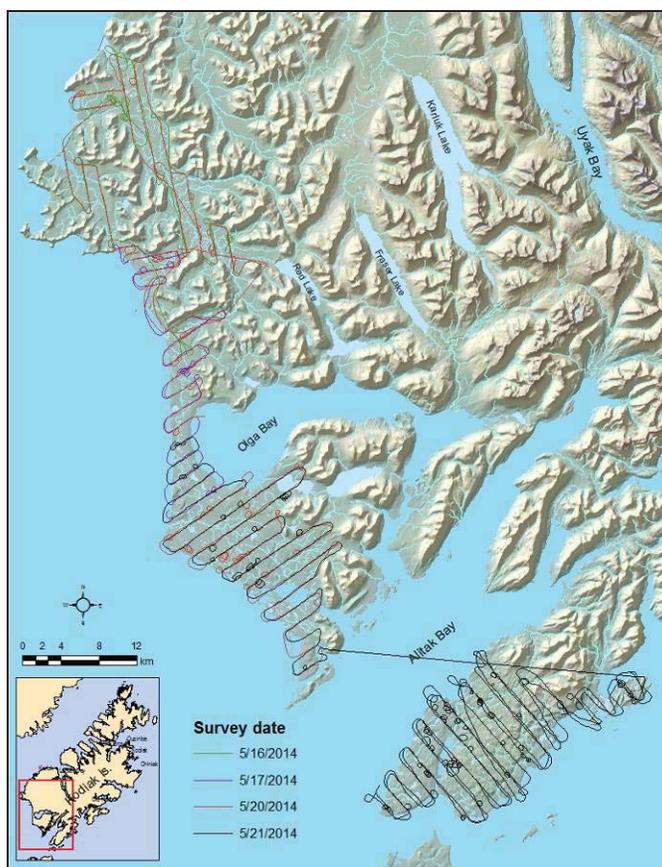
### Sitka Black-tailed Deer

In May 2014, Refuge biologists expanded upon a new approach to aerially survey Sitka black-tailed deer in non-forested habitats on Kodiak. We found that deer population densities increased approximately 62% within the Aliulik Peninsula survey area between 2012 ( $0.20 \pm 0.06$  deer/mile<sup>2</sup>) and 2014 ( $0.33 \pm 0.12$  deer/mile<sup>2</sup>). This May, we plan to further refine the survey method to include mountainous terrain. The long-term goal is to provide wildlife managers with an index of annual changes in deer abundances, which will allow for improved harvest management.

Since 2011, deer harvest results on the Kodiak Archipelago, including subsistence and recreational sport hunter efforts, are assessed annually by the ADF&G via a required online hunter reporting system. Because this new system is used state-wide, as opposed the previous paper-based questionnaire that was specific to Kodiak, we have been unable to include Kodiak-specific questions, such as whether deer were harvested on Refuge. Refuge staff continue to work with ADF&G to address this information gap and we are striving to develop a new approach to generating Refuge-specific harvest data for deer.

To date, subsistence users have reported lower hunter effort in 2014 compared to the 2013-14 season, which is likely a result of a growing deer population. ADF&G documented 2,469 deer

that were legally harvested during the 2013-14 deer season under sport and subsistence regulations. Forty-five federal subsistence designated deer harvest permits have been allocated for the 2014-15 season, compared with 46 permits during the 2013-14 season.



**Figure 3. Track lines recorded by GPS during Sitka black-tailed deer aerial line-transect surveys, Kodiak Island, 2013.**

## Elk

Radio-collared elk provide a basis for ADF&G's efforts to track herd locations and estimate herd composition, population size and harvest quotas. ADF&G's fall 2014 elk survey indicated that the population size was approximately 885 elk, which was higher than the estimated population of 765 elk in 2013. A total of 64 elk were harvested under state regulations during the 2014 season, of which 26 were males. The Waterfall herd, which summers in the vicinity of Refuge lands on Afognak Island, increased from 60 to 80 elk between 2013 and 2014. Three elk (one male and two female) were harvested from the Waterfall herd. One of these, a male elk, was harvested under federal subsistence regulations.

## Sea Otters

### Population Monitoring

In the Kodiak region, monitoring results provide information on the general health, size, and distribution of a substantial portion of a federally threatened sea otter stock. With funding from the FWS Inventory and Monitoring Program, we surveyed sea otters in Kodiak Archipelago waters (excluding waters surrounding Tugidak and Sitkinak Islands) in July 2014 using a standardized aerial survey method that has been applied throughout Alaska. A randomly selected subsample of sea otter groups are intensively counted to develop a survey-specific sightability correction, which allows for a population estimate with statistical confidence (Figure 4). Based on the results of two survey replicates, we estimated  $13,274 \pm 3,694$  otters inhabited Kodiak Archipelago waters. Previous population estimates using the same method resulted in an estimate of  $11,005 \pm 4,190$  otters in 2004 and  $13,526 \pm 4,606$  otters in 1989. A report detailing these results is in progress and will be available in fall 2015. The Refuge and USGS biologists are working towards determining the required survey frequency and extent needed to identify notable changes in the sea otter population size and distribution over time.

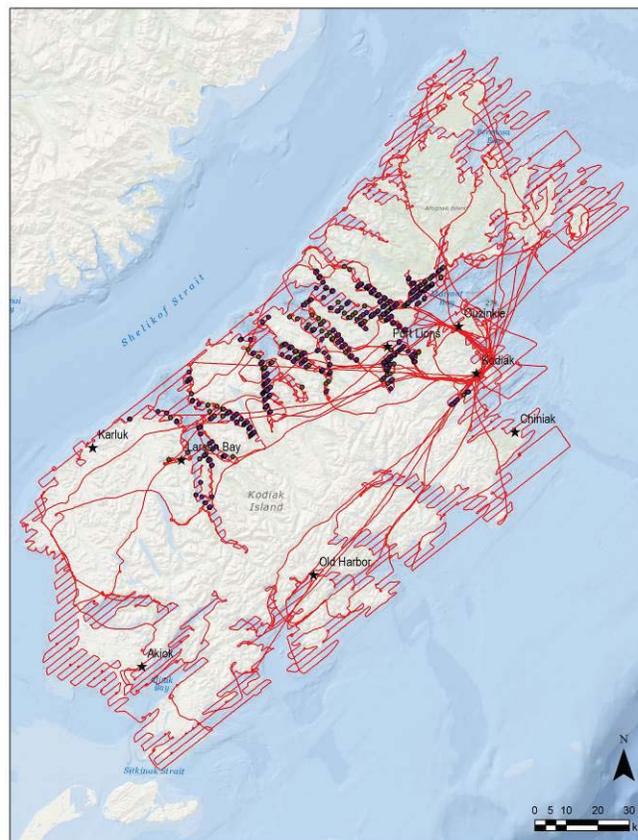


Figure 4. Track lines recorded by GPS and sea otter point locations, July 2014, Kodiak Archipelago.

### Causes of Mortality

Dead sea otters reported by the public, and collected by Kodiak Refuge subsistence staff, are sent to MMM for detailed necropsies to determine their causes of death. No dead sea otters were reported to Refuge staff during this reporting period.

### Marine Mammal Marking and Tagging Update (MMMTP)

Under the 1972 Marine Mammal Protection Act, qualified Alaskan coastal natives may harvest sea otters and use the pelts for handicrafts. Legally harvested sea otter hides and skulls must be officially tagged by a USFWS-approved representative (“tagger”). Currently, there are 15 taggers distributed in the villages of Kodiak Island. During this reporting period, Refuge headquarters staff tagged 20 sea otters and four sets of walrus tusks.

## **Migratory Birds**

### Coastal Waterbird Surveys

In summer 2014, the Refuge continued a survey initiated in 2011 focusing on marine nearshore birds in the intertidal zone and shallow inshore waters. We conducted surveys in June and August, when the majority of resident breeding birds had established nests and populations were relatively stable. August surveys allowed us to estimate productivity of species with distinctive juvenile plumages, including marbled murrelets and pigeon guillemots. Surveys were conducted from small skiffs using the Refuge research boat, the *M/V Ursa Major II*, as a mobile home base. Refuge staff surveyed the east side of Kodiak Island from Chiniak Bay southwest to Alitak and Olga Bays, completing 102 transects along approximately 1,600 km of shoreline. This region was last surveyed in June and August 2011. The most commonly encountered species included: black-legged kittiwakes, glaucous-winged and mew gulls, tufted and horned puffins, common murrelets, marbled murrelets, pigeon guillemots, and harlequin ducks. Table 2 compares productivity indices for both breeding seasons and Table 2 lists preliminary population estimates from 2011 and 2014.

**Table 2. Productivity as measured by the ratio of hatch year to adult birds for select marine bird species surveyed in August 2011 and 2014 by Kodiak Refuge on the east side of Kodiak Island from Chiniak Bay southwest to Alitak and Olga Bays.**

	August 2011			August 2014		
	Number-Hatch Year	Number-Adult	Hatch Year:Adult Ratio	Number-Hatch Year	Number-Adult	Hatch Year:Adult Ratio
Bald Eagle	5	168	0.030	21	166	0.127
Mew Gull*				91	1511	0.060
Glaucous-winged Gull*				641	5210	0.123
Black-legged Kittiwake*				448	11991	0.037
Kittlitz's Murrelet**	6	3	2.000	1	13	0.077
Marbled Murrelet	59	1395	0.042	40	783	0.051
Pigeon Guillemot	73	1208	0.060	116	1060	0.109

\*Age data for gulls not collected in 2011

\*\*Includes observations of Kittlitz's Murrelets both on and off transect

**Table 3. Preliminary population estimates for select marine bird and mammal species surveyed in June and August, 2011 and 2014 by Kodiak Refuge on the east side of Kodiak Island from Chiniak Bay southwest to Alitak and Olga Bays.**

	June 2011 Population Estimate (SE)	June 2014 Population Estimate (SE)	August 2011 Population Estimate (SE)	August 2014 Population Estimate (SE)
<b>Nearshore Transects</b>				
Harlequin Duck	5,148 (1,446)	5,386 (1,295)	8,215 (2,123)	6,326 (1,233)
Barrow's Goldeneye	101 (67)	89 (75)	813 (476)	1,143 (604)
Common Merganser	762 (492)	908 (523)	1,820 (1,468)	2,692 (1,228)
Red-breasted Merganser	474 (158)	302 (107)	364 (217)	79 (70)
Bald Eagle (Adult)	1,358 (391)	773 (119)	681 (116)	646 (71)
Bald Eagle (Subadult)	247(193)	187 94)	70 (30)	143 (33)
Black Oystercatcher	311 (137)	1,247 (749)	2,446 (1,488)	2,631 (1,565)
<b>Nearshore &amp; Offshore Transects</b>				
Pelagic Cormorant	1,680 (578)	3,462 (726)	3,430 (1,180)	6,404 (2,705)
Red-faced Cormorant	2,471 (1,270)	286 (124)	4,127 (1,969)	83 (45)
Mew Gull	2,098 (603)	2,512 (730)	19,281 (6,783)	19,560 (4,986)
Glaucous-winged Gull	39,672 (14,022)	44,189 (15,307)	84,318 (24,847)	89,428 (29,826)
Black-legged Kittiwake	144,940 (53,002)	179,783 (63,579)	276,205 (66,497)	182,199 (53,896)
Arctic Tern	1,963 (509)	3,150 (1,065)	1,684 (626)	875 (367)
Aleutian Tern	1,464 (432)	1,591 (671)	382 (228)	70 (44)
Common Murre	32,074 (12,137)	6,799 (3,258)	23,887 (5,517)	9,065 (2,411)
Pigeon Guillemot	16,940 (2,567)	16,459 (2,429)	18,995 (3,096)	13,379 (1,779)
Kittlitz's Murrelet	11 (13)	85 (40)	88 (43)	97 (43)
Marbled Murrelet	10,860 (1,861)	6,853 (1,310)	20,046 (4,328)	8,555 (1,880)
Tufted Puffin	27,465 (20,038)	57,144 (37,070)	25,964 (5,978)	33,931 (14,123)
Horned Puffin	4,520 (1,505)	5,603 (1,335)	25,508 (8,668)	11,295 (2,710)
<b>Marine Mammals</b>				
Sea Otter	423 (227)	2,546 (1,250)	2,649 (2,417)	1,356 (409)
Harbor Seal	2,322 (1,299)	4,277 (1,608)	11,611 (9,931)	5,437 (2,052)

### Kittlitz's Murrelet Nesting Ecology Study

In October 2014, FWS biologists, along with several cooperators, published an article in the Journal of Wildlife Diseases titled “Fatal Paralytic Shellfish Poisoning in Kittlitz’s Murrelet (*Brachyramphus brevirostris*) Nestlings, Alaska, USA”. The article focuses on an interesting finding from a long-term nesting ecology project on Kittlitz’s Murrelet on southwest Kodiak Island. The study has been on-going since 2008, and in 2011 and 2012 eleven nestlings died unexpectedly before fledging. Eight of the dead nestlings were salvaged and initial pathology investigations at the National Wildlife Health Center in Madison, WI, indicated the nestlings were in good physical condition and tested negative for a variety of viral and bacterial infections. Samples from the dead nestlings were then analyzed for saxitoxin, one of the neurotoxins responsible for paralytic shellfish poisoning (PSP), and seven of eight chicks tested positive; three at high enough levels to have caused death. Mortality in wild birds due to saxitoxin exposure has rarely been documented, but the majority of bird deaths attributed to PSP resulted from accumulation of toxins in filter-feeding fishes, especially sand lance and herring. In the Kodiak study, digital cameras placed at the nest site indicated sand lance were being fed to the nestlings within hours of their deaths, and sand lance from ingested samples from the dead

nestlings also tested positive for saxitoxin at high levels. A copy of the publication is available to the public from Robin Corcoran (486-0229) at Refuge Headquarters.

For more information see:

Shearn-Bochsler, V., E.W. Lance, R. Corcoran, J. Piatt, B. Bodenstein, E. Frame, and J. Lawonn. 2014. Fatal paralytic shellfish poisoning in Kittlitz's murrelet (*Brachyramphus brevirostris*) nestlings, Alaska, USA. *Journal of Wildlife Diseases* 50(4): 933-937.

Or visit:

<http://www.adn.com/article/20141011/paralytic-shellfish-poisoning-could-be-underreported-cause-death-marine-birds>

## **Fisheries**

*Please note that results of salmon counts presented below were provided by the Alaska Department of Fish and Game (ADF&G).*

### Western Area

The early run sockeye salmon returning to the Karluk River met escapement goals (110,000 to 250,000 fish) for the third consecutive year. The Karluk River late-run also had satisfactory salmon returns: escapement was the largest since 2005. Residents of Karluk and Larsen Bay who participated in subsistence fishing reported good catch-per-unit-effort for sockeye and were able to meet their subsistence harvest needs in 2014.

In contrast, Chinook salmon escapements for the Karluk River and Ayakulik River did not meet their respective lower escapement goals. The 2014 Karluk River Chinook salmon escapement (1,182 fish) was the second lowest return in the past 10 years. Escapement observed in the Ayakulik River (789 fish) was the lowest observed since monitoring was initiated in 1972. To facilitate conservation of these stocks, ADF&G issued emergency orders closing all fishing activity between June 20 and August 18, 2014.

### Northern Area

The northern areas of the Kodiak Archipelago open for subsistence fishing under federal regulations experienced solid returns of sockeye salmon in 2014. Federal marine waters near Afognak River (Litnik) and Buskin River were popular fishing location for subsistence users from Port Lions and Ouzinkie, and Kodiak residents, respectively. The 2014 Litnik sockeye salmon escapement count (36,345 fish) was lower than 2013 (42,153 fish), but was well within the escapement goal. The 2014 Buskin River sockeye salmon escapement (13,976 fish) marked the fourth year of escapement goal exceedance. In response, ADF&G issued emergency orders expanding fishing areas for both systems. Residents of Port Lions, Ouzinkie and Kodiak reported high catch-per-unit-efforts.

### Preliminary Environmental Assessment of the Karluk Lake Nutrient Enrichment project

The Environmental Assessment (EA) for Karluk Lake Fertilization proposal, submitted by Kodiak Regional Aquaculture Association (KRAA), will be open for public comment in January 2015. The EA responds to the KRAA's application for a special use permit to conduct a nutrient

enrichment project on Karluk Lake within the Kodiak Refuge to increase lake productivity and, ultimately, sockeye salmon populations. The FWS welcomes comments on the EA from members of the public during a 60-day comment period. In particular, the FWS is looking for any other information available to inform the decision and any additional alternatives that should be considered. In an effort to provide additional information pertaining to Kodiak Archipelago fisheries, a poster board titled “Challenges of Salmon Management for Kodiak Westside Fishery” will be available at the public meeting on 13 January, 2015, from 4-6 pm, at the Kodiak Refuge Visitor Center. Refuge representatives will be available at the meeting to discuss the project and get additional information from the public to help inform the decision. More information, including a copy of the EA, is available at <http://www.fws.gov/nwrs/threecolumn.aspx?id=2147562300>.

## **Education and Outreach**

### Proposed Changes to Harvest Regulations on Refuge Lands

We conducted outreach with Native tribes on Kodiak Island regarding possible regulatory changes for harvesting under state regulations on federal lands in Alaska, including Kodiak Refuge. Possible changes include:

- Prohibiting taking brown bear cubs or sows with cubs (currently prohibited on Kodiak);
- Prohibiting use of bait, traps or snares to harvest brown bears (currently prohibited on Kodiak)
- Prohibiting the taking of wildlife from an aircraft or on the same day air travel has occurred (currently authorized only for deer on Kodiak)
- Control of predators to increase other game populations for human harvest
- Authorizing noncommercial gathering of natural resources, such as plants, berries and firewood to recreational users (currently legal only to local rural residents)
- Prohibiting the use of bait, traps or snares to harvest brown bears (currently prohibited on Kodiak)

Following a comment period for Alaska native organizations on the above proposed regulatory changes, there will be an opportunity for public comment beginning in January 2015.

### Hunter Outreach

Refuge staff has continued hunter outreach efforts in village communities focused on federally-managed subsistence designated deer hunting opportunities, federal subsistence bear hunting and federal subsistence elk hunting on Afognak Island. One of our primary goals was make it more convenient to register for federal subsistence hunts by establishing a representative in villages who is able to fill permits locally. Additionally, we sought to provide information on new and existing hunt opportunities on Refuge lands, such as recent changes to the mountain goat sport hunting regulations in ADF&G hunt area 480. During visits, we also distribute informational handouts on regulations for sea otter hunting and definitions of “significantly altered” handicraft, as requested by the Council.

### Education

*Critter Cams:* Refuge and ADF&G staff delivered a workshop called Project Wild, which focused on using trail cameras to increase student interest in, and understand of, local wildlife populations. In addition to instructing educators on the overall Project Wild curriculum, the workshop provided educators with instructions on camera use in the field and associated lesson plans. To support this effort, the refuge recently acquired three ReConyx trail cameras that are now freely available to rural teachers for educational purposes. The kit containing the cameras is currently being circulated throughout Kodiak villages and appears to be popular.

*Rural School Outreach:* During Fall 2014, Refuge staff visited Old Harbor, Akhiok and Peterson schools. The goals of the visits included instruction focusing on land mammals of Kodiak, bird lifecycle and habitat, cultural harvests of salmon to accompany a 4<sup>th</sup> grade Salmon Unit, and a presentation by Law Enforcement agents Kurt Rees and Bill Raften that involved Alutiiq elders Mary Haakanson and Florence Pestrikof. The Law Enforcement presentation also included a special USFWS coin gift to the students.

### Kodiak Subsistence Salmon Project

ADF&G's Division of Subsistence, in cooperation with the Refuge and local researchers, began a project in 2012 that seeks to understand the factors that have shaped the Kodiak subsistence salmon fishery over time. This project responds to Priority Information Needs identified by the Council and Office of Subsistence Management by investigating the environmental, demographic, regulatory, cultural and socioeconomic factors affecting harvest levels of salmon for subsistence use in the Kodiak Area. Specifically, the study uses household surveys and key respondent interviews to document the status and trend in salmon harvest, harvest practices, and processing methods in the Old Harbor, Larsen Bay, and selected areas of the Kodiak road system. We are currently in the final stages of the project and hope to have a report available to the Council during the fall meeting. Stay tuned for more information and community outreach presentations soon.

### **Other Noteworthy Activity**

#### Strategic Plan for Network-based Monitoring of Water Temperature

In November 2014, with support from a grant from the Western Alaska Landscape Conservation Cooperative (LCC), the Refuge completed a strategic plan for monitoring the water temperature of salmon habitat. The focus on monitoring water temperature of salmon habitat reflects recognition of its prominent influence on salmon at all life cycle stages, the importance of salmon to the economy and ecosystem of the archipelago and the need to provide reliable time-series data to support development of proactive approaches to management of salmon in response to climate change. Primary collaborators on plan development included the ADF&G, the Kodiak Regional Aquaculture Association (KRAA) and the Sun'aq Tribe of Kodiak.

Accomplishing the goals and objectives described in the plan will require data collection consistent with established protocol and minimum standards that ensure the accuracy, quality, reliability and utility of data. We will collect continuous temperature data with electronic,

programmable data loggers. Presently, collection of such continuous data is limited to three stream sites and eight lake sites in the archipelago. Pending approval by the LCC, we plan to expand data collect to 27 stream sites and 25 lake sites in Kodiak. Of these 52 sites, 21 will be designated as long-term reference sites, and 8 of 25 lake sites will be designated as year-round, multi-depth, monitoring stations. Data will be available to the public.

#### Invasive Plant Management

Since 2003, the Refuge has consistently operated an integrated pest management (IPM) program to address the threat that highly invasive plants pose to native habitat resources. In 2014, we applied IPM methods in partnership with landowners and the Kodiak Soil and Water Conservation District to control highly invasive plants in eight areas (Akalura Cannery, Alitak Cannery, Buskin River, Camp Island vicinity, Garden Island, Harvester Island vicinity, Refuge properties in Kodiak, and Uganik Cannery). We conducted surveys and/or outreach in three areas (Terror Lake access road, western Moser Bay, and northern Deadman Bay). We also updated our IPM strategy in accordance with NEPA procedures. A summary of the updated strategy may be accessed at:

[http://www.fws.gov/refuge/Kodiak/what\\_we\\_do/resource\\_management.html](http://www.fws.gov/refuge/Kodiak/what_we_do/resource_management.html).

**1. What is the purpose of this Environmental Assessment?**

The Environmental Assessment (EA) evaluates the environmental and management consequences as well the effects on subsistence uses of the Kodiak Regional Aquaculture Association's (KRAA) proposed nutrient enrichment in Karluk Lake. The preliminary EA contains four alternatives: Alternative A: No Action; Alternative B: Proposed Action - KRAA proposal to apply an aqueous solution of phosphorus and nitrogen to the surface of Karluk Lake over the period of five years to increase lake productivity; Alternative C: the stocking of fry in Karluk Lake over the same five year time period; Alternative D: a combination of stocking and fertilization.

**2. Why conduct an Environmental Assessment?**

The KRAA has applied for a special use permit from the Kodiak National Wildlife Refuge in order to conduct their proposed action, which is within the boundaries of the Refuge. Under the National Environmental Policy Act, the Refuge must assess the potential impacts of the proposed action and alternatives on the human and natural environment. The resulting preliminary EA informs the decision whether to permit the activity in accordance with federal laws and management policy.

**3. What is the purpose of this proposal?**

Karluk Lake is the largest lake in the Kodiak Archipelago and its watershed supports all five species of Pacific Salmon. Karluk Lake has historically been the largest producer of sockeye salmon on Kodiak Island. Concerns surfaced after 2008 when the early run of Karluk Lake sockeye failed to meet the Alaska Department of Fish and Game's minimum escapement goals for several years. In 2012, KRAA submitted an application to the Refuge for a special use permit to fertilize Karluk Lake to increase primary productivity in the lake. The project hopes to thereby increase smolt size, survival, and ultimately adult sockeye salmon harvest.

**4. What do we know about Karluk sockeye escapement?**

We don't have any return records before 1921, when the first weir was installed on the Karluk River to count returning salmon. Using nitrogen isotopes from lake sediment samples, researchers have reconstructed an estimate of historical salmon escapement into Karluk Lake over the past 2000 years, showing large cycles between 300,000 and 1.3 million sockeye before commercial fishing began in the late 1800s. Total returns vary over time due to many environmental factors, including lake, river and marine habitat, as well as human factors such as harvest. Weir data shows a peak in escapement in the 1920s, with subsequent escapement fluctuating between 200,000 and around 1.5 million fish.

**5. What do we think caused the decreased run during 2008-2011?**

The Alaska Department of Fish and Game (ADF&G) attributes the decreased runs to over-escapement between 1985-2007, which resulted in large numbers of juveniles that overgrazed and reduced the food available for future runs. Since 2012 the sockeye salmon returns to Karluk Lake have trended upwards, exceeding the minimum escapement goal; in 2014, returns exceeded the maximum escapement goal.

**6. What area would the proposed project affect?**

The KRAA proposal would apply fertilizer to the surface water of all of the main Karluk Lake basin, as well as Thumb and O'Malley Lake Basins. Stocking fry would occur in Upper Thumb River and Lake. All five species of Pacific salmon depend on different areas within the Karluk watershed and may be affected; therefore the project area is defined as the entire Karluk River drainage.

**7. What is the project duration?**

The project period includes two years of pre-project monitoring, two years of post-project monitoring, and five years of enhancement activity.

**8. What is the estimated cost?**

The cost to Kodiak Regional Aquaculture Association is estimated at \$250,000 annually to fertilize the lake. The cost for stocking fry is estimated at \$250,000-\$300,000 annually. The combination of fertilization and stocking is approximately \$500,000-\$550,000.

**9. What is the importance of Karluk Lake for sockeye salmon?**

Unlike other species of Pacific salmon, sockeye salmon take advantage of lakes for spawning their eggs and rearing juvenile salmon. Once they hatch, juvenile sockeye generally stay in Karluk Lake for 2-3 years, and a variety of factors determine their growth, including environmental conditions, food, and space availability. Juvenile sockeye salmon in Karluk Lake feed mostly on small animals (zooplankton) in the lake, such as copepods.

**10. What is the history of fertilization and stocking at Karluk Lake?**

The ADF&G stocked Karluk Lake with sockeye salmon fry from 1978-86 and fertilized the lake from 1986-90. There have been no other enhancement projects since 1990.

**11. What was the effect of the previous fertilization on Lake productivity?**

Applying fertilizer generally results in an increase in microscopic plant material (phytoplankton). In Karluk Lake, primary productivity (measured by chlorophyll a), increased during fertilization but returned to pre-fertilization levels following enrichment.

**12. What about when the lake was stocked?**

Stocking added between 1-8.5 million juveniles annually to the Karluk system, but no data were collected to evaluate the impact of the added stock on the resulting adult runs.

**13. Didn't salmon returns increase after enhancement?**

Karluk runs have historically been cyclical. There was insufficient monitoring data collected to determine past enhancement project effects on sockeye returns. Total Karluk sockeye returns began to rise in 1982, peaked in 1991, and have continued to fluctuate with another peak in 2003. We can use current research on productivity and returns to better understand the context of this system. Researchers in 1998 concluded that salmon carcass deposition was the most important driver of lake productivity for the increased return that began in 1982, prior to the fertilization project. In addition, the cyclical variation in salmon returns in the

Karluk was similar to other non-enriched systems between 1981 and 1997.

**14. What are the potential effects of sockeye stocking on other salmon stocks?**

The Karluk watershed supports a diverse population of fish species. Increasing adult sockeye returns through stocking could change the proportion of adults harvested, cause overharvest of wild sockeye stocks that have lower egg to fry survival, and result in a long-term decline of wild stocks, reducing genetic diversity. In addition, an enhanced sockeye return could increase incidental catch of other Pacific salmon species, including Karluk River Chinook, which are currently listed as a “stock of management concern.”

**15. What is the importance of the Salmon Portfolio Effect and genetic variety?**

Protecting the genetic variety of sockeye salmon stocks in the Karluk watershed provides for a fishery that is more resilient to changes in the environment and a more reliable long-term future food source for people and wildlife. The “Salmon Portfolio Effect” describes the recent analysis of over 50 years of data from Bristol Bay’s many different genetic stocks of sockeye salmon, comparing the overall resilience of the system to a financial best practice of diversified portfolio investments. In general, greater biological diversity tends to result in ecosystems with long-term resilience and requires less intensive management. Bristol Bay salmon returns demonstrate the benefits of a healthy portfolio by improving run stability and decreasing the frequency of fishing closures.

**16. What guides Kodiak Refuge management policy?**

Like most Alaskans, we value healthy, wild salmon and salmon habitat, and recognize how important they are to the surrounding communities and to other critical wildlife in the area. Our key legislation is the 1997 Refuge Improvement Act, which requires that we maintain the biological integrity, diversity, and environmental health of the National Wildlife Refuge System. Under ANILCA, we have also developed a Comprehensive Conservation Plan (2008 updated), that sets an overall direction and provides goals and management guidelines for Kodiak Refuge.

**17. Does the Fish and Wildlife Service have a preferred alternative at this time?**

No. The Service is in the process of evaluating the proposal through the environmental assessment process and will make a decision once the EA is final.

**18. What are the expected effects of these alternatives?**

Table 10 in Section 4 of the EA summarizes the anticipated effects of the alternatives. Please look at this table for details, which range from no impact to moderate impact. Under the preliminary assessment, no significant impacts are expected from any of the alternatives.

**19. What are the decisions to be made at the end of the review period?**

The outcome of the preliminary EA process is a decision document signed by the appropriate responsible official (RO) for the Service. In the document, the RO will determine the following:

- Whether any of the anticipated impacts from the considered alternatives are likely to be significant;

- Whether the analysis contained in this EA is adequate for the purposes of reaching an informed decision regarding KRAA's proposal;
- Whether to approve the Proposed Action or deny KRAA's request for a permit
- Whether the Proposed Action and other action alternatives conform with the purposes of Kodiak Refuge and mission of the NWRS; and
- Appropriate terms and conditions as necessary if the project is approved.

**21. How can I participate in this process?**

This preliminary EA provides an opportunity for public comment. The comment period will be open for 60 days following the release of the preliminary EA. Please submit comments by email to [fw7\\_kodiak\\_planning@fws.gov](mailto:fw7_kodiak_planning@fws.gov) or by mail to Pete Wikoff, U.S. Fish and Wildlife Service, 1101 E. Tudor Road, Anchorage, Alaska 99503. We also invite you to attend on Open House at the Kodiak NWR Visitor Center on January 13 from 4 to 8 p.m.

**22. What does the Service want to know?**

We value your input! We want to know if there is any additional information or are there other alternatives we should consider in the preliminary EA?



# United States Department of the Interior



U.S. Fish and Wildlife Service  
Izembek National Wildlife Refuge  
P.O. Box 127  
Cold Bay, Alaska 99571  
<http://www.fws.gov/refuge/izembek/>

Izembek National Wildlife Refuge Report for the  
Kodiak/Aleutians Federal Subsistence Regional Advisory Council  
Spring Meeting – February 2015  
(Compiled in December 2014)



## INVENTORY AND MONITORING STUDIES

### Caribou

#### Unit 9D (Southern Alaska Peninsula)

In 2014-15 the State and Federal subsistence hunts were opened for Unit 9D with a total harvest goal of 40 caribou. For the Federal subsistence hunt, 20 permits were allocated to five communities (4 permits each; Cold Bay, King Cove, Sand Point, False Pass, and Nelson Lagoon). The Federal hunt is a split season open from August 10 to September 20, 2014 and November 15, 2014 to March 31, 2015. To date, no caribou have been reported as harvested for the Federal subsistence hunt.

In collaboration with the Alaska Department of Fish and Game, the caribou herd composition survey was conducted in October 2014. A total of 884 caribou were surveyed. The survey yielded an increase in the calf per 100 cow ratio (45 calves per 100 cows) from 40 per 100 cows in 2013 (Figure 1). The bull ratio declined slightly to 45 per 100 cows from 50 per 100 cows. However, the bull ratio still remains above the management objective of 35 per 100 cows.



Figure 1. Southern Alaska Peninsula (SAP) caribou herd fall composition surveys conducted by Alaska Department of Fish and Game from 2004 to 2014. Number of fall calves and bulls per 100 cow caribou in the SAP herd located in Unit 9D.

#### Unit 10 (Unimak Island)

In collaboration with the Alaska Department of Fish and Game, the Unimak Island caribou herd composition survey was conducted in October 2014. A total of 127 caribou were surveyed. The survey yielded an increase in the calf per 100 cow ratio (22 calves per 100 cows) from 19 per 100 cows in 2013 (Figure 2). The bull ratio also increased to 15 per 100 cows from 10 per 100 cows in 2013.

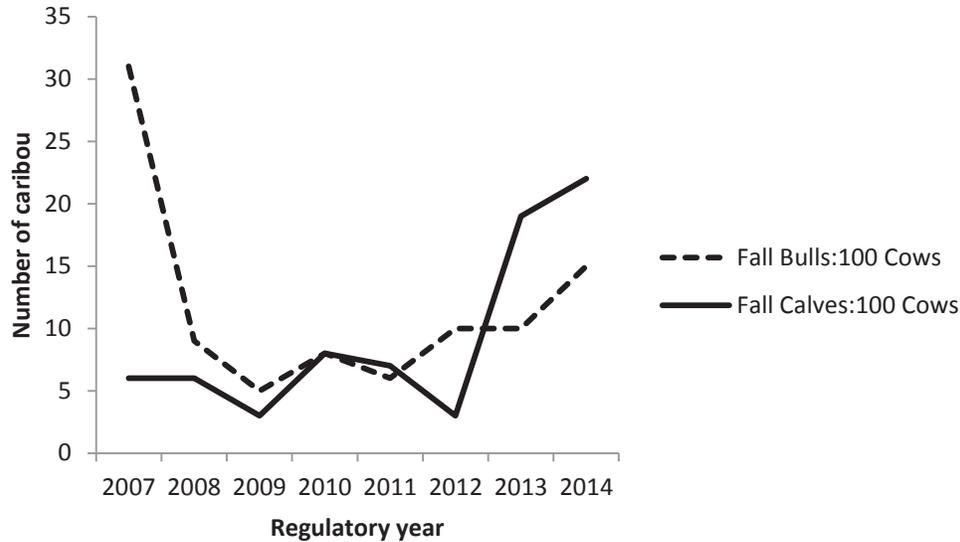


Figure 2. Unimak Caribou Herd (UCH) fall composition surveys conducted by Alaska Department of Fish and Game from 2004 to 2014. Number of fall calves and bulls per 100 cow caribou in the UCH herd located in Unit 10.

**WATERFOWL**

**Pacific Brant**

An index of productivity for the entire Pacific population of brant is generated from ground-based counts conducted in Izembek Lagoon and adjacent areas each fall when the birds are staging for migration. Brant productivity data have been collected at Izembek National Wildlife Refuge for over 50 consecutive years. Brant production counts were conducted this fall between 4 September and 26 October 2014 at observation points throughout Izembek Lagoon including: Grant’s Point, Round Island/Outer Marker, Operl Island mud flats, and the areas between Neuman Island and Blaine Point. Counts were also conducted in southwestern areas of Izembek Lagoon inside Norma Bay, from the south shoreline of Norma Bay, and from the shoreline in the south central area of the lagoon between Norma Bay and Applegate Cove. A total of 49,978 brant were classified this year (adult or juvenile). The brant population sampled contained 16.9% juveniles. In 2013, the sampled population contained 17.9% juveniles. The long term average (1963-2013) of juveniles in this population is 22.2% (Figure 3).

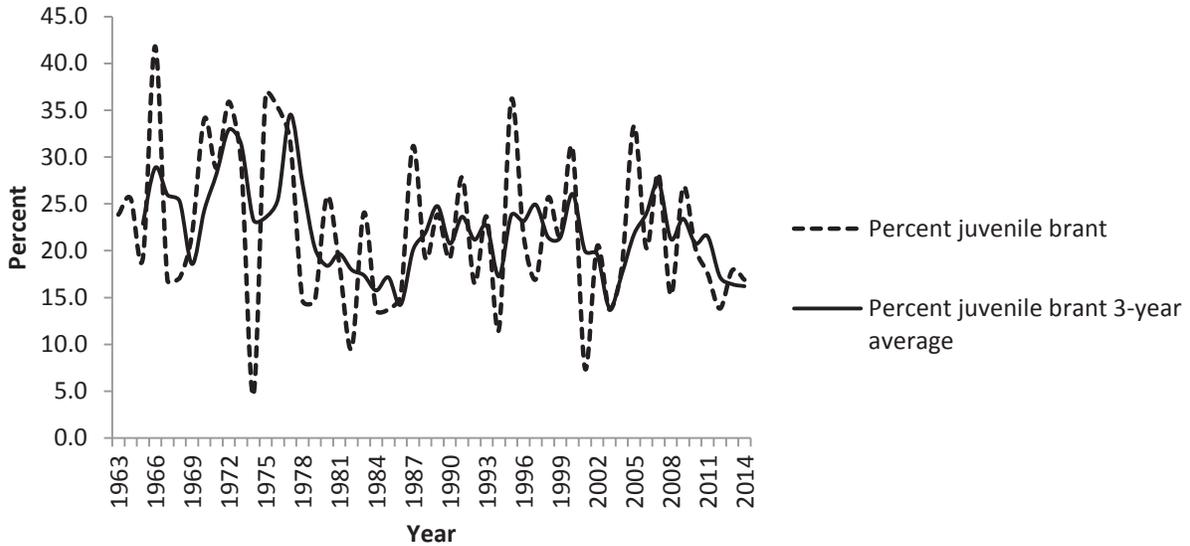


Figure 3. Pacific brant fall productivity index (percent juvenile brant in the population) 1963-2014, Izembek National Wildlife Refuge, southwest Alaska.

### Emperor Goose

The fall productivity counts for Emperor geese were conducted between 4 September and 26 October 2014. The ground based counts are conducted by Izembek Refuge staff. The counts were conducted at Outermarker, Grant Point, Birdsall Island, Mortensen's Lagoon, Trout Creek, Skunk Hollow, and the mouth of Russell Creek. A total of 1,497 geese were classified by age (adult or juvenile). The population sampled contained 24% juveniles. This is a small decrease from juveniles counted in the fall population in 2013 (27.0%). The long term average from 1966-2013 of juveniles sampled in this portion of the population is 21.6% (Figure 4).

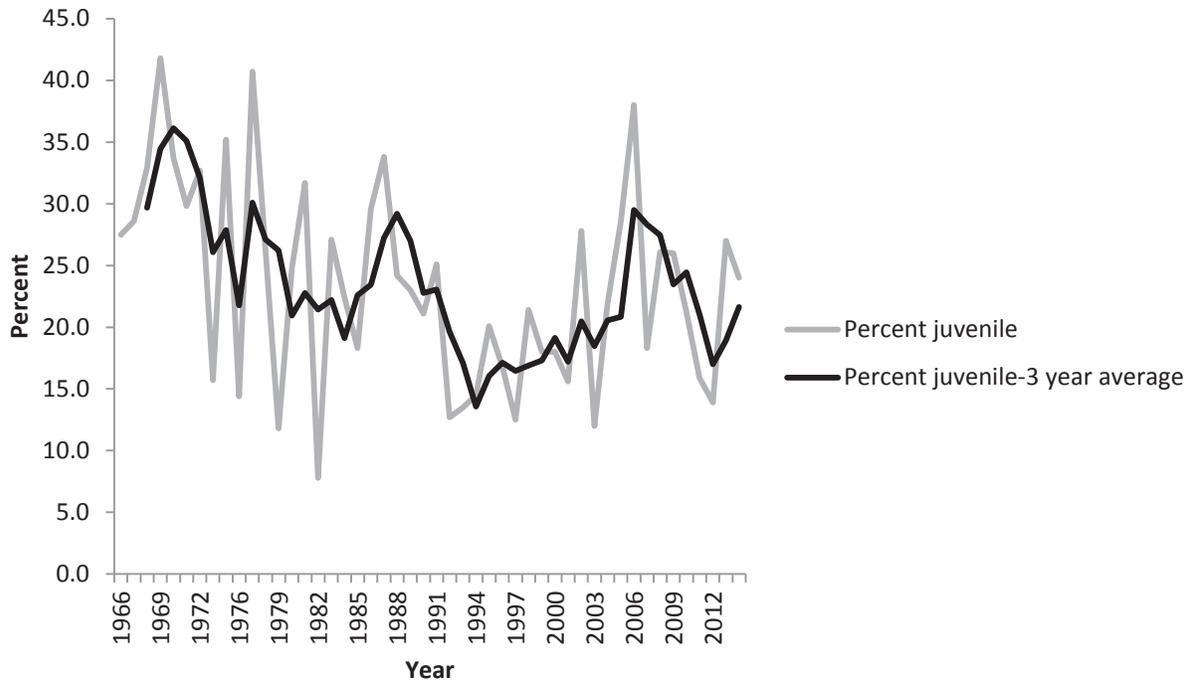


Figure 4. Emperor goose fall productivity index (percent juveniles in the population) 1966-2014, Izembek National Wildlife Refuge, southwest Alaska.

### Stream Water Temperature Monitoring

We initiated a water temperature monitoring study to obtain information on the current conditions and provide continual monitoring of water temperature in streams utilized by salmon on the refuge. In the fall of 2014, we deployed 25 water temperature sensors in streams on the refuge. The temperature sensors will collect a temperature recording once every hour for up to 5 years. Sensors will be monitored and data will be downloaded on an annual basis to maintain the stations.

### Sitka Spruce Tree Inventory

We conducted an inventory of the Sitka spruce trees located on and near the refuge during the summer and fall of 2014. We collected location data (latitude and longitude coordinates) and size measurements on each tree including DBH (diameter at breast height) and relative height estimates. In addition, we searched for and recorded signs of bird nests and other use by wildlife of the trees. This data will increase our understanding of the distribution, abundance, and potential expansion of this nonnative tree species that was introduced to the landscape by the military in approximately 1944.



Figure 5. Photo of Bald eagle using a Sitka spruce tree for a nesting site in 2014 on Izembek Refuge, Cold Bay, Alaska. Photo credit: Ron Deroche/USFWS.

### **Avian Influenza and Avian Blood Parasites**

Izembek NWR continued working in cooperation with the U.S. Geological Survey (USGS) to collect AI and blood parasite samples from hunter-harvested waterfowl in September and October 2014. This year nearly 1,000 samples were collected and will be tested this winter.

### **Origin of Juvenile Black Brant**

This fall Izembek NWR collaborated with USGS scientists to collect primary feathers from juvenile Pacific Black Brant that were harvested by hunters in Izembek Lagoon. The purpose of this research is to determine the breeding origin for juvenile brant that use Izembek Lagoon in the fall. Stable isotope techniques will be used to measure the amount of hydrogen in the feathers since this varies by geographic location. Current speculation is that a greater portion of the annual production of brant is coming from breeding areas in the Arctic rather than in western Alaska, where brant production has traditionally occurred. A total of 99 samples were collected this fall. The isotopes will be analyzed in February 2015 and results will be available in the spring of 2015. Additional samples will be collected in fall 2015.

## **EDUCATION AND OUTREACH ACTIVITIES**

### **Three New Educational Kiosks Constructed**

In the fall of 2014, three new kiosks were constructed and are on display throughout the refuge. Each kiosk features an educational display about the history and origins of Izembek Refuge and information about the wildlife and habitats found on the refuge. The new kiosks are located at the entrance of the refuge nearest to the airport, at the end of Outermarker Road overlooking Izembek Lagoon, and on Frosty Creek Road near First Bridge.



### **King Cove School Field Trip**

In September 2014, Izembek Refuge Manager Doug Damberg and Wildlife Biologist Stacey Lowe visited the King Cove School and presented a program on the biological studies that take place on the refuge. The presentation included information about the careers of a refuge manager and wildlife biologist. All of the students had the opportunity to examine several wildlife specimens (study skins and skulls) of critters commonly found on the refuge. The students were also given the opportunity to ask questions about the refuge, wildlife, and biological studies.

### **Indoor Archery Program**

This fall Kelly Modla, Refuge Law Enforcement officer from the Kenai Refuge, and Izembek Refuge staff, provided a course for students to learn the fun and primitive skill of archery. After receiving instruction and a short demonstration, the students had the opportunity to test their skills at the shooting line and join in on some fun competition. Kelly's mobile archery range and equipment provided an indoor opportunity for first timers to get their feet wet and advanced shooters to showcase their skills. All ages were involved from Kindergarten through grade 12. Kelly and Refuge staff visited the King Cove School, False Pass School, and the Cold Bay School throughout the week, ultimately reaching out to over 90 students. Although much of the focus was on having fun, students learned the fundamentals of proper shooting techniques and safety on the shooting line.

In addition, Kelly provided all schools a brief and thoughtful overview of why she loves her job as a federal wildlife law enforcement officer and the many important, challenging, and exciting opportunities this career has to offer. Primary points of the presentation stressed the major education and safety roles that wildlife law enforcement officers play for the general public, in addition to protecting our precious natural resources. A great deal of positive feedback was given to Kelly and Izembek staff by teachers and students. The archery program scored a bull's eye and was enjoyed by all!



AERIAL SURVEY OF EMPEROR GEESE AND OTHER WATERBIRDS  
IN SOUTHWESTERN ALASKA, SPRING 2014

By

Heather M. Wilson  
and  
Christian P. Dau

Key Words: Aerial survey, emperor geese, waterbirds, southwest Alaska.

June 2014

U. S. Fish and Wildlife Service  
Migratory Bird Management  
1011 E. Tudor Road  
Anchorage, Alaska 99503

## AERIAL SURVEY OF EMPEROR GEESE AND OTHER WATERBIRDS IN SOUTHWESTERN ALASKA, SPRING 2014

Heather M. Wilson, U.S. Fish and Wildlife Service, Migratory Bird Management, 1011 E. Tudor Road, Anchorage, AK, 99503

Christian P. Dau, U.S. Fish and Wildlife Service, Migratory Bird Management, 1011 E. Tudor Road, Anchorage, AK, 99503

**Abstract:** We conducted the 32<sup>nd</sup> annual spring aerial emperor goose survey (1981-2012, 2014) from 23 to 29 April 2014. The survey included coastline and estuarine habitats from Jacksmith Bay to Wide Bay, including the north and south sides of the Alaska Peninsula. We counted a total of 79,883 emperor geese, 18.2% above the 2012 count of 67,588, and 22% above the long-term average (65,486, 1981-2012). The current management index (most recent 3-year average, 2011-12, 2014) is 73,879 (7.4% above the previous 3-yr average of 68,772). Other species of emphasis included Pacific brant and Steller's eider with counts of 64,588 and 15,212, respectively.

**Key words:** Aerial survey, emperor geese, waterbirds, southwest Alaska. June 2014

---

### INTRODUCTION

Since 1981 we have conducted an annual spring emperor goose survey to monitor spring distribution, abundance, and population trends of emperor geese and other waterbirds at migratory staging areas in southwestern Alaska. The aerial survey was cancelled in 2013 due to aircraft mechanical issues. The survey focuses on coastline and estuarine habitats from southern Kuskokwim Bay south and west along the north side of the Alaska Peninsula to Bechevin Bay and includes the south side of the Alaska Peninsula east to Wide Bay. Survey coverage along the south side of the Alaska Peninsula focuses on known emperor goose use areas and omits habitats where birds have not traditionally been observed staging, based on more inclusive historical surveys. A 3-year moving average of survey totals is used as the population index for management in accordance with the Pacific Flyway Emperor Goose Management Plan (2006). These data provide long-term population trends, distribution, and habitat use for emperor geese and associated species.

### METHODS

We flew the 2014 survey between 23-29 April within the core portion of 143 shoreline/estuarine segments (Mallek and Dau 2000; Figure 1). We conducted the survey in an amphibious Cessna 206 (N9623R) flown at 45m (150 feet) above sea level and at 175km/hour (95 knots). Aircraft map displays along with 1:500,000 aeronautical and 1:63,360 topographical maps were used for navigation. Observations of habitat and survey conditions including wind, temperature, sky condition, visibility, sea and fresh-water ice conditions, and tide stage were recorded during the survey.

Survey timing targets spring staging emperor geese on the Alaska Peninsula prior to arrival on the Yukon-Kuskokwim Delta and following their departures from the eastern Aleutian Islands and Kodiak Island. Less than 100% of all emperor geese are within the survey area at the time the survey is conducted, but it is expected that the proportion present is consistent among years. Because not all emperor geese are present within the survey area, the total count is considered a population *index*, rather than a *total population estimate*.

The 2014 survey began on 23 April at Jacksmith Bay (Segment 14) and continued to Nanvak Bay (Segment 22). The portion of the survey from Egegik Bay to Moffet Point (Segments 36-59) was flown on 24 April. Moffet Bay, Izembek Lagoon and Kinzarof Lagoon (Segments 60-65, 84-85) were flown on 25 April. Segments west of Cold Bay (66-68, 80-83) were completed on 28 April along with a replicate survey of Moffet Bay and Izembek Lagoon. The south side of the Alaska Peninsula, east to Wide Bay (within Segments 88-137), was flown on 29 April. We used laptop computers and the aircraft Global Positioning System (GPS) to associate geographic coordinates with each voice-recorded observation. Record and Transcribe programs were used to collect and process data (J. Hodges, MBM-Juneau).

## SURVEY CONDITIONS

Ice and snow conditions in 2014 were indicative of the mild 2013-14 winter conditions and an early spring break-up, in comparison to the cold, delayed spring of 2012. Sea ice was absent offshore and in estuaries throughout the survey area in 2014. Only the largest lakes in northern Bristol and Kuskokwim bays (Segments 14-22) had remnant ice. Snow cover was approximately 5% from Nanvak Bay (Seg. 22) north, and was otherwise absent in coastal lowlands throughout the survey area.

April 23: Jacksmith Bay to Dillingham (Segments 14-22): Conditions were good with minimal sun glare seaward of the survey route. Winds were light and variable ( $\leq 10$  knots) and ceilings were scattered to overcast at 2,000-3,000 feet. Air temperatures ranged from 35° to 40°F.

April 24: Dillingham to Cold Bay (segments 36-59): Survey conditions were good. Light southwest winds ( $\leq 5$  knots) increased to southeast at 15 knots with ceilings of 2,500 to  $\geq 5,000$  feet scattered to overcast. Air temperatures increased from 30° to 40°F during the day.

April 25: Cold Bay and Izembek Lagoon (Segments 84-85, 60-65): Survey conditions were good with mid-level tide in Izembek Lagoon and high tide in Cold Bay. Ceiling was 2,000 feet overcast with southeast wind at 8 knots and air temperature was 40°F.

April 28: Izembek Lagoon to Bechevin Bay and the southside to Cold Bay (Segments 60-65 [Izembek replicate], 66-68, 80-85): Survey conditions were good with mid-level tide in Izembek Lagoon high tide along the Pacific side of the Alaska Peninsula. Winds were north westerly at 15-20 knots with a ceiling of 900 feet overcast and an air temperature of

45°F.

April 29: Belkofski Bay to Wide Bay (Segments within 88-137). Ceilings were greater than 1,000 feet with thin scattered to clear skies and winds were calm to southerly at  $\leq 10$  knots. Very little sun glare was encountered and the far east portion of Wide Bay had fog. Air temperature was 45°F.

## RESULTS/DISCUSSION

Totals counts in 2014 are presented by survey segment (Table 2). Most emperor geese were found in their traditional estuaries along the Bering Sea coast of the central and western Alaska Peninsula, with slightly lower than average counts (1981-2012) from Cape Newenham north (1 versus 1.9% of the total count), west of Izembek Lagoon (0 versus 0.3%), and along the south side of the Alaska Peninsula (2.6 versus 3.6%). The largest aggregations of emperor geese in 2014 were observed near Port Heiden and Nelson Lagoon. Observations at Unalaska, west of the survey area in the eastern Aleutian Islands, suggested that most emperor geese had departed by 18 April with late stragglers on 20 April (2 adults with 18 juveniles; S. Golodoff, pers. comm.). Near the town of Kodiak, departure of up to 85% of the wintering population was indicated from 13-23 April, with few remnant birds reported on 28 April (R. MacIntosh/S. Berns, pers. comm.).

### Emperor Goose

The 2014 emperor goose spring count (79,883) was 18.2% above the 2012 estimate of 67,588 (Dau and Mallek 2013 and Table 2, this report) and 22.0% above the long term average of 65,487 (1981-2012). The current management index (i.e., 3-year average, 2011-12, 2014) of 73,879 birds is 7.4% above the previous average of 68,772 (2010-2012; Table 3). Primary staging sites along the north side Alaska Peninsula held 96.3% of birds observed in 2014, versus the long-term average of 91.4% (1981-2012). Below average counts of emperor geese were made from Jacksmith Bay to Cape Pierce (Segments 14-22; n=814 birds; 1981-2012 average 1,302). No emperor geese were seen in the westernmost areas of Bechevin Bay/Morzhovoi Bay (Segments 67-68/80-81) versus the 1981-2012 average of 157. In 2014, a total of 2,058 (2.6%) were observed along the south side of the Alaska Peninsula (Segments 88-137) versus the 1981-2012 average of 2,846 (3.6%). Observations of the early departures of emperor geese from Unalaska confirm that most migrants from the eastern Aleutian Islands were likely in the survey area. Likewise, observations of migrants from Kodiak Island suggest that most emperor geese from that wintering population were likely in the survey area.

### Pacific Brant

We observed a total of 64,588 brant during the 2014 survey (Table 2) which is 9.7% below the long-term average for this spring survey (71,495, 1981-2012). We observed 40,135 brant, 62.1% of the total, in Izembek Lagoon and adjacent areas (Segments 60-68, 80-85). The long-term average for that area is 78.4% (1981-2012). Also, we observed

20,972 brant in Chagvan and Nanvak bays (Segments 20, 22), which is well above the long-term average of 12,349 brant for those segments. Based on these observations, we believe our brant count may have been low due to an accelerated, yet geographically spread migration, in response to the mild, early spring conditions. The first brant were arriving at the Tutakoke River (Yukon-Kuskokwim Delta) on approximately 23 April, as we were beginning the survey (J. Sedinger, pers. comm.), while observations from British Columbia to Oregon, and at Izembek lagoon, indicated some were still enroute from southern wintering and staging areas.

We flew a replicate survey of Izembek (Segments 60-65) and Kinzarof (Segment 85) lagoons on 28 April, during which 50,967 brant were observed. Three days earlier (25 April) our initial count of the area revealed 33,265 brant. Ground-based observations suggested brant were actively arriving to the Izembek area during this period (C. Dau, H. Wilson, and Izembek NWR staff pers. obs.).

### Steller's Eider

We observed only 15,212 Steller's eiders during the survey (Table 2). This low count may have also been due to an accelerated migration in response to the mild, early spring conditions, as we indicated with brant. However, only 209 Steller's eiders were observed from Jacksmith Bay to Nanvak Bay (Segments 14-22), indicating that most of the population had likely migrated north of the survey area prior to 23 April. The 2014 count is 68.6% below the long-term average of 48,652 (1981-2012). Distribution was similar to previous years with most Steller's eiders observed from Port Heiden to Izembek Lagoon (11,459 birds, 75.3%). Steller's eider flock composition, recorded by the right seat observer, showed that 90.2% of 41 total observations were of equal ratios (i.e., adult males versus brown-plumaged birds).

### CONCLUSIONS

Since an indicated population decline in 1981-82, the trend in the annual population index for emperor geese has remained essentially flat to slightly increasing; with an overall annual growth rate of 0.2% (1981-2012, 2014, Figure 3, Table 3). However, the growth rate since harvest closure in 1987 (1.2%) has been substantially more favorable. This slow, but steadily increasing trend, suggests that the closure to hunting in 1987 may have positively influenced conservation of the species. Overall, continued mortality pressures (anthropogenic and natural) and subdued productivity (relatively low proportion of juveniles counted in the fall) are likely precluding population growth, as indicated by the spring survey index.

Fall age ratios (% hatching-year birds) have declined at approximately 1%/year, with annual estimates around the long-term mean of 0.19 (SD: 0.06) representing a range of poor (0.1-.12) to good (0.23-0.26) years from 1985-2013 (Stehn and Wilson 2014). Six of the past 10 years (60%) and 14 of the overall 29 years (48%) have been below the long-term average juvenile age ratio (Stehn and Wilson 2014); indicating production has been less than ideal. Declining numbers of juveniles lowers potential recruitment of

breeding age adults (3<sup>+</sup> yrs). The likelihood that birds harvested in spring are breeding-age adults rather than young, is higher in years following a summer of poor production. Mortality of breeding-age adults is especially harmful to the overall emperor goose population because it lowers both current population size and potential production of future goslings. We believe low annual productivity (as indexed by fall age ratios) and a failure to increase adult survival, are the primary factors limiting recovery of the population. A better understanding of additive losses from continued hunting (intentional and unintentional take and crippling) would help quantify this impact on the population. However, this effort will first require more reliable documentation (Wolfe and Paige 2002, Naves 2011).

We believe that two realistic management options for increasing population size are 1) reducing human harvest year-round and 2) increasing nest success and lower gosling predation rates on the Yukon-Kuskokwim Delta. Gosling survival is estimated to be low due to high predation rates, primarily by gulls (Bowman et al. 1997). Gosling growth and survival rates also appear to be negatively influenced by grazing pressure and competition for preferred habitats (Schmutz and Laing 2002). Additional, uncontrollable, negative factors during nesting and brood rearing include storm surge flooding, increased pond salinity and sedimentation, and erosion of nesting habitat. However, emperor geese exhibit high rates of egg production and nest success through late incubation in most years (Fischer and Stehn 2012), which indicates good potential for gosling production.

The following are our views of problems limiting recovery of the emperor goose population and potential management options to address them:

- 1) **Problem:** Illegal hunting in spring, summer, fall and winter. Comprehensive harvest surveys are needed in Alaska and Russia to assess temporal and spatial distribution and age composition within the harvest.  
**Management option:** Increase compliance with regulations through outreach and enforcement to reduce take. Expand and provide analytical support for harvest surveys to better assess take.
- 2) **Problem:** Predation on goslings is high (Bowman et al. 1997), productivity is relatively low, and survival of juveniles is chronically low from pre-fledging through winter (Schmutz et al. 1997).  
**Management option:** Predator management options on the YKD should be evaluated for local and area-wide effectiveness in increasing productivity and gosling survival (Bowman et al. 1997). Monitoring of age and season specific survival rates should be continued. Increase monitoring of climate-change impacts on quantity and quality of nesting and brood rearing habitats.
- 3) **Problem:** Wintering ecology and survival of emperor geese is poorly understood and very low juvenile survival is indicated.  
**Management option:** Quantify mortality factors during winter and

determine if management options exist to reduce them. Marking and satellite tracking studies of emperor geese have helped locate possible study sites (Hupp et al. 2007, 2008a,b).

The spring emperor goose survey continues to provide an index to population size and trend as required by the Pacific Flyway management plan (Pacific Flyway Council 2006 and Alaska Migratory Bird Co-management Council (AMBCC) Technical Subcommittee - Emperor Goose). We believe this survey would benefit from complete or partial replicate counts at high density staging sites (e.g. Port Heiden, Nelson Lagoon, and Izembek). Replicate counts could 1) help qualify the accuracy of the population index and 2) provide useful measures of timing and duration of use of most important sites.

*The findings and conclusions in this article are those of the author(s) and do not necessarily represent the views of the U.S. Fish and Wildlife Service.*

## ACKNOWLEDGMENTS

We appreciate the continued lodging, vehicle, hangar, and fuel support provided by Alaska Peninsula/Becharof and Izembek NWR's. We also extend extra thanks to the following individuals: Jim Wittkop for continued AK Peninsula pre-planning help, Allen and Vera Gilliland (Katmai National Park) for logistical assistance getting fuel to Port Heiden, Mike Hink for last minute lodging and dinner in Dillingham, Guy Morgan (Grant Aviation) for mechanical assistance in Cold Bay, and Bob Platte (MBM-R7) for preparing map presentations for Figures 1 and 2.

## REFERENCES

- Bowman, T.D., R.A. Stehn, and K.T. Scribner. 1997. Glaucous gull predation of goslings on the Yukon-Kuskokwim Delta, Alaska. Unpubl. Rept. USFWS, MBM, Anchorage, AK. 59 pp.
- Dau, C.P. and E.J. Mallek. 2012. Aerial survey of emperor geese and other waterbirds in southwestern Alaska, spring 2011. Unpubl. Rept. USFWS, MBM, Anchorage, AK. 20 pp.
- Fischer, J.B. and R.A. Stehn. 2012. Nest population size and potential production of geese and spectacled eiders on the Yukon-Kuskokwim Delta, Alaska, 1985-2011. Unpubl. Rept. USFWS, MBM, Anchorage, AK. 46 pp.
- Hupp, J. W., J. A. Schmutz, C. R. Ely, E. E. Syroechkovskiy, Jr., A. V. Kondratyev, W. E. Eldridge, and E. Lappo. 2007. The moult migration of Emperor Geese *Chen canagica* between Alaska and Russia. *Journal of Avian Biology* 38:462-470.
- Hupp, J. W., J. A. Schmutz, and C. R. Ely. 2008a. Seasonal survival of radio-marked emperor geese in western Alaska. *Journal of Wildlife Management* 72:1584-1595.

- Hupp, J. W., J. A. Schmutz, and C. R. Ely. 2008b. The annual migration cycle of Emperor Geese in western Alaska. *Arctic* 61:23-34.
- Mallek, E.J. and C.P. Dau. 2000. Aerial survey of emperor geese and other waterbirds in southwestern Alaska, fall 1999. Unpubl. Rept., USFWS, MBM, Fairbanks. 19 pp.
- Naves, L.C. 2014. Alaska Migratory Bird Subsistence Harvest Estimates, 2011. Tech. Paper No. 395. Alaska Migratory Bird Co-Management Council/Alaska Dept. Fish and Game. Unpubl. Rept.
- Pacific Flyway Council. 2006. Pacific Flyway Management Plan for Emperor Geese. Emperor Goose Subcommittee, Pacific Flyway Subcommittee [c/o USFWS], Portland, OR. Unpubl. Rept. 24 pp + appendices.
- Platte, R.M. 2012. Conversion of spring and fall emperor goose surveys on the coastal Alaska Peninsula to ArcMap file geodatabase. Unpubl. Rept., USFWS, Anchorage. 6p.
- Schmutz, J.A., R.F. Rockwell and M.R. Petersen. 1997. Relative effects of survival and reproduction on the population dynamics of emperor geese. *J. Wildl. Manage.* 61(1): 191-201.
- Schmutz, J.A., and K.K. Laing. 2002. Variation in foraging behavior and body mass in broods of emperor geese (*Chen canagica*): evidence for interspecific density dependence. *Auk* 119:996-1009.
- Stehn, R.A., and H.M. Wilson. 2014. Monitoring Emperor Geese by age ratio and survey counts, 1985-2013. Unpubl. Rept., USFWS, MBM, Anchorage, 12 pp.
- Wolfe, R.J. and A.W. Paige. 2002. The subsistence harvest of black brant, emperor geese and eider ducks in Alaska. Alaska Dept. of Fish and Game, Div. of Subsistence, Tech. Paper No.234. Juneau. 112 pp.

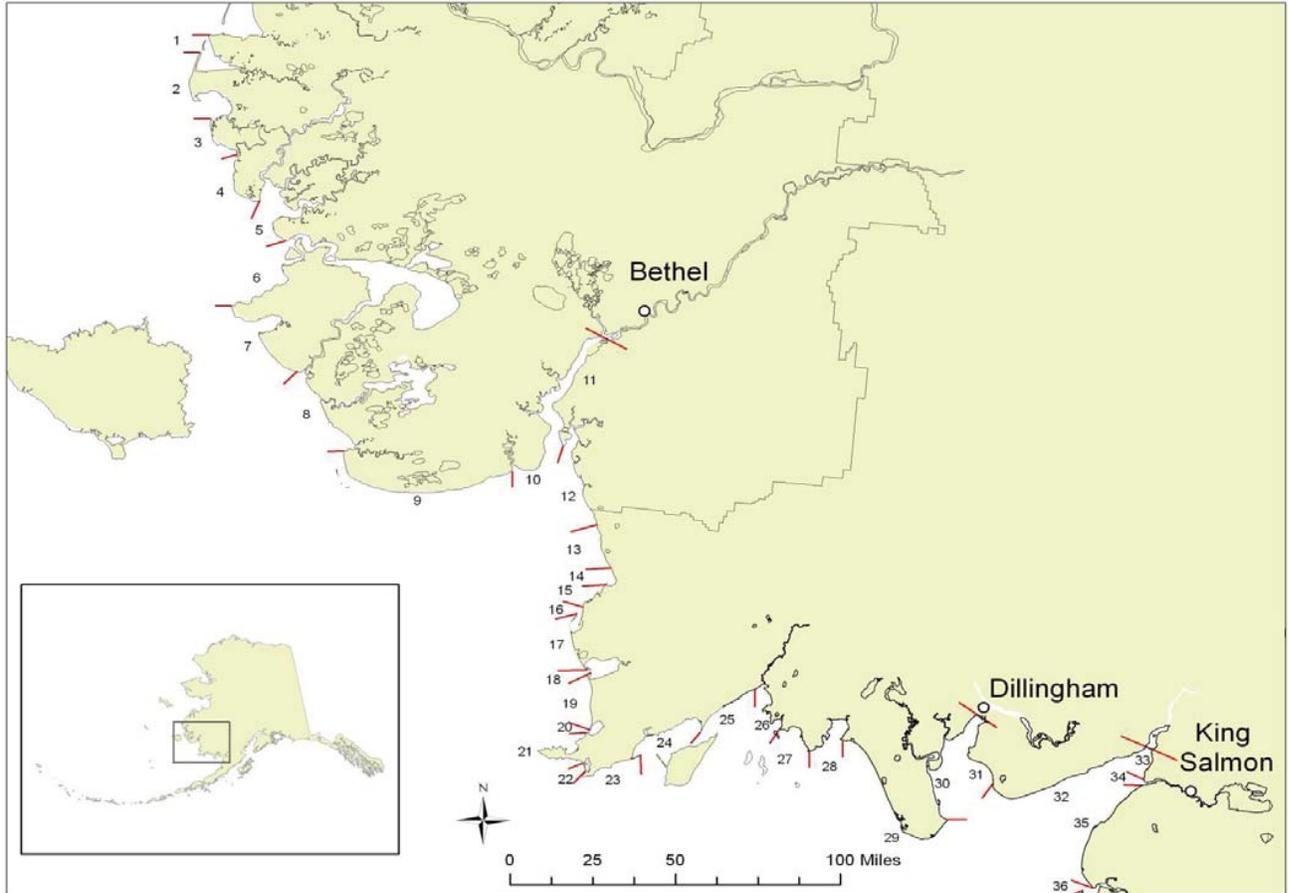


Figure 1. Emperor goose aerial survey segments 1-35, southwest Alaska.

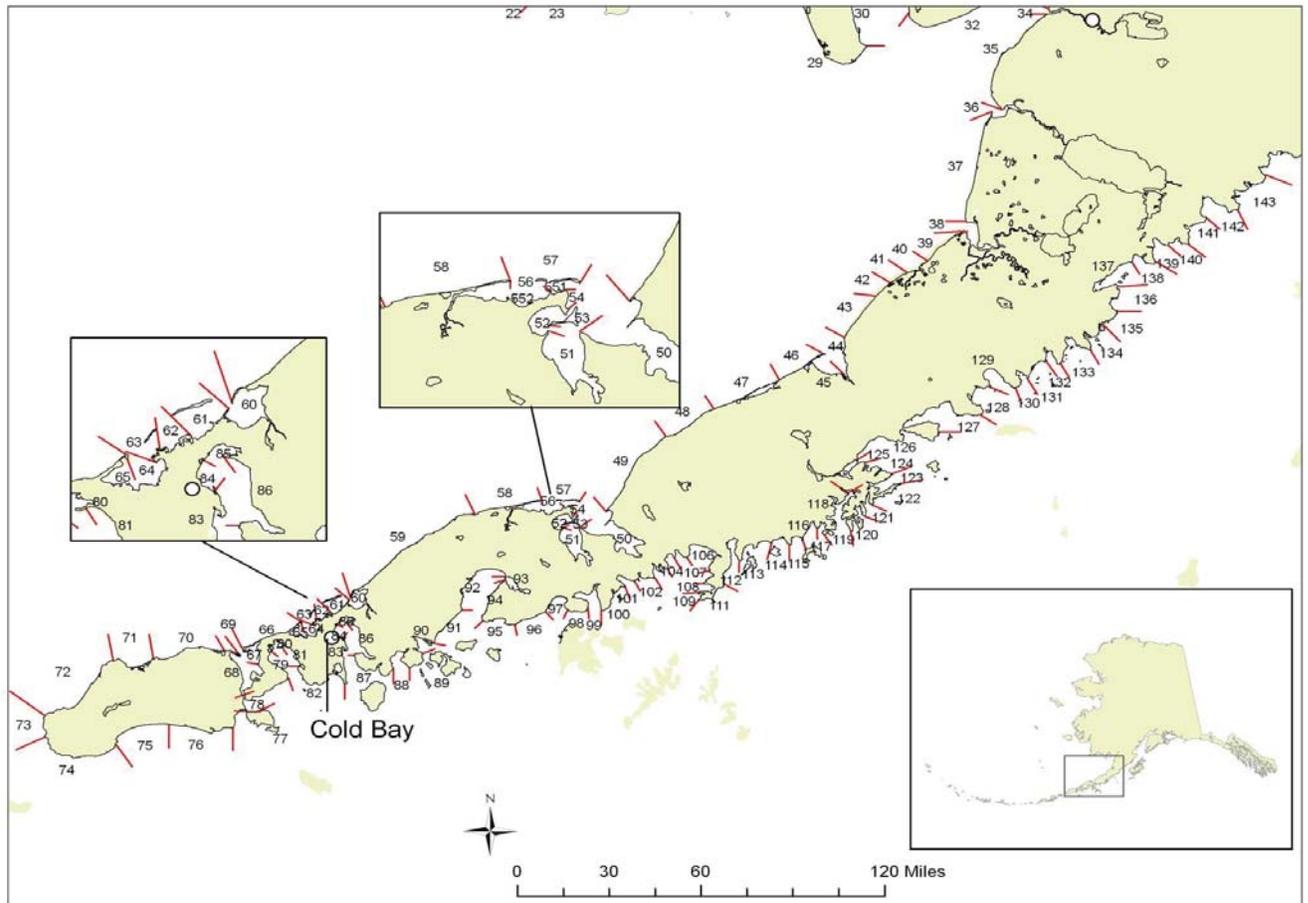


Figure 2. Emperor goose aerial survey segments 35-143, southwest Alaska.

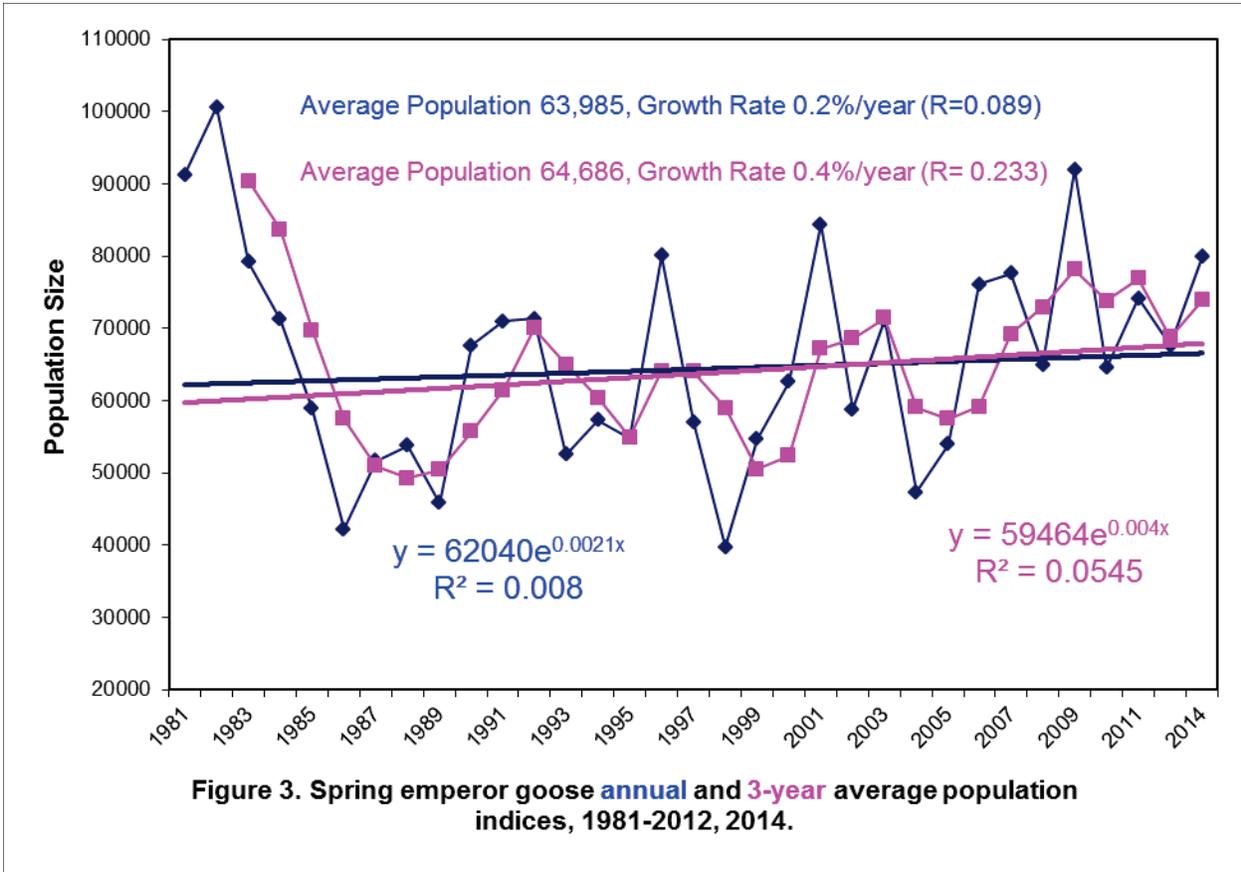


Table 1. Snow and ice conditions during spring emperor goose survey in southwest Alaska, 23 April 2014.

AREA	SNOW COVER <sup>1</sup>	MARINE ICE COVER <sup>2</sup>
Kokechik Bay	NS	NS
Hooper Bay	NS	NS
Hazen Bay	NS	NS
Carter Bay	<5	0
Goodnews Bay	<5	0
Chagvan Bay	<5	0
Nanvak Bay	<5	0
<b>Relative Phenology<sup>3</sup></b>	<b>Very Early</b>	<b>Very Early</b>

<sup>1</sup> Percent snow cover on near-shore freshwater marshes. NS= Not Surveyed.

<sup>2</sup> Percent of marine ice cover in estuary.

<sup>3</sup> Subjective habitat conditions (early, average, late) based on ice and snow cover.

Species	14	15	16	17	18	19	20	22	36	37	38	39	40	41	42	43
Bald Eagle (Ad)									2		1					
Beluga																
Black Brant							18422	2550			50					
Black-legged Kittiwake							2									
Black Scoter		2				20	8		53	332	12	289				
Canada Goose							250									
Common Eider											11					
Common Merganser		4														
Emperor Goose		20		6			778	10	2767	1	4966					
Greater Scaup	3	3	5		27		10	30	240	22	18					
Gray Whale										1		1				
Harlequin Duck												10				
King Eider						4			2	8						
Large Gull	132	32	268	42	181	76	692	633	436	340	850	32				
Long-tailed Duck	2	2	361	1		33	35			192		50				
Mallard									4	2	21					
Mew Gull	6	2	7	2	1	2			306	97	182	180				
Northern Pintail		10							26		20					
Pacific Loon										2						
Pelagic Cormorant					23											
Pigeon Guillemot																
Red-breasted Merganser			74	29	86	7	121	74	2	38	70	8				
Red-throated Loon				2		2			4	44	6					
Sea Otter									3	1	2					
Small Shorebird									500		1200					
Steller's Eider		79	80	50	316		3173	10								
Surf Scoter												2				
White-fronted Goose												10				
White-winged Scoter				1		128			17	112	2	21				

Table 2 (continued). Waterbird and mammal observations by segment, southwest Alaska, 23-29 April 2014.

Species	44	45	46	47	48	49	50	51	52	53	551	552	56	57	58	59
Arctic Tern												1	1			
Bald Eagle (Ad)	1					1	2	2			1		1			
Bald Eagle (Juv)			1							1	1		4			
Black Brant				50												
Black Scoter	214	1	637	190	15	2075			1			65	7001	2592	2804	239
Common Eider	10	350	6	2								3	90			
Common Raven				1	1											
Common Goldeneye													1			
Emperor Goose	4427	29851	8	14090						20	1739	4491	1175	1410		
Greater Scaup	115					10		15								
Gray Whale					2	5										1
Harbor Seal		930		480		121							280	1	60	
King Eider	80					61										
Large Gull	440	196	237	2152	777	651	274	4	431	312	496	900	45	344	993	37
Long-tailed Duck				2		400							1500		240	
Mew Gull	453	70	176	700	1270	670	500	1040		6	700				40	30
Northern Pintail	600	460		530					75							
Red-breasted Merganser	6		5			15						110		6	1	
Red-throated Loon			1													
Sea Otter		75					6	28		1			418	130	1	
Small Shorebird	500			1030			220				2000	40				
Steller's Eider	5			1600									810	125		
Steller's Sealion						2										
Walrus						1										
White-winged Scoter						559						34	815	1	47	

Table 2 (continued). Waterbird and mammal observations by segment, southwest Alaska, 23-29 April 2014.

Species	60	61	62	63	64	65	66	67	68	80	81	82	83	84	85
Bald Eagle (Ad)			1								1				
Bald Eagle (Juv)				1											
Black Brant	2207	3777	3225	311	17750	5995	304	2700	967	3152	1	30	50		
Black-legged Kittiwake								7							
Black Scoter	236		10				124	2	10	10	53	40	4		
Brown Bear								1	1						
Common Eider									19						3
Common Loon											1	2			
Common Raven													2		
Emperor Goose	1317			45									10		
Greater Scaup	1459		8							15					
Harlequin Duck					5		51	8	30		2		5	7	65
Harbor Seal		60		5					2		2				4
Large Gull	205	78	54	46	3	1000	181	234	366	668	7	113	38	6	223
Long-tailed Duck									1						
Mallard	20	1	104							17					
Mew Gull		43	2			500		9	75	52			5	1	63
Northern Pintail		122	2												
Pelagic Cormorant							1							1	
Red-breasted Merganser	47	27							2	141					75
Sea Otter	194	137	70	11		40	2	88	228		20		1		6
Small Shorebird	2615		225										90		
Steller's Eider	3271	5528	65	60						6					
Tundra Swan			3												
White-winged Scoter	3						25		3				1	2	

Table 2 (continued). Waterbird and mammal observations by segment, southwest Alaska, 23-29 April 2014.

Species	88	90	91	92	93	97	99	101	102	103	104	105	106	107	112	113	114	115
Bald Eagle (Ad)	3		1	1		1	4		1			1	1			1		
Bald Eagle (Juv)								1								3	1	
Black Brant	4	733	20	66				30										
Black Scoter	18	2		7	28	6	13				65		12	10	35	26	23	30
Bufflehead	12	20					14								45			
Common Loon	3	1	3			5	20	1		1	5	1	8	9		4		
Common Raven					1													
Double-crested Cormorant					1			1				1	2			1		
Emperor Goose		15	10	149	15							15			190			
Common Goldeneye					2			2										
Greater Scaup							20							1				
Gray Whale															1			
Harlequin Duck	4	33		80	248	33	199	34	42		9	98	32	19	32		30	
Harbor Seal					21	2	6	60			2						2	1
Large Gull	33	618	16	739	394	41	3	8	41	1	2	3	5	6	65	7	10	8
Long-tailed Duck						2	1	1										
Mallard					55		2											
Mew Gull	5	2		111	56	14	14	13	4				40	27	260	42	2	14
Pelagic Cormorant			3												1	23	6	2
Pigeon Guillemot														1		3	1	
Red-breasted Merganser	80	10	32		25		148	2	4		1			8	179	16		
Lesser Sandhill Crane		2																
Sea Otter	2		13	10														
Small Shorebird				6700	400								30					
Steller's Eider		6			2		20	2										
Steller's Sealion							1								1			
Surf Scoter						20												3
White-winged Scoter	22		2				4					3	4		15			

Table 2 (continued). Waterbird and mammal observations by segment, southwest Alaska, 23-29 April 2014.

Species	116	117	118	125	126	127	128	129	130	131	132	133	134	135	136	137	Survey Total
Arctic Tern																	2
Bald Eagle (A)		1	1	1	1	3			2	1		7	1	1	3	1	53
Bald Eagle (J)				1	1	1						1				1	18
Bald Eagle (N)																	Note
Black Brant				1700	3		80	26	39			21				325	64588
Black-legged Kittiwake												200					209
Black Scoter				275	157	65	5	45				33				92	19400
Brown Bear		1						1						1			5
Bufflehead												20	2				91
Canada Goose																	250
Common Eider																2	496
Common Loon			4	2	5	1	1	3				5	2	1		4	94
Common Merganser																	4
Common Murre	2		2														4
Common Raven					2		1	21			1					1	33
Double-crested Cormorant					5		2	1	2				1				17
Emperor Goose				185	75	369	311		270	45	25	80			1160	498	79883
Common Goldeneye				8		4		7									5
Greater Scaup				4			2					30				1	2279
Gray Whale					1	1					2				1		17
Harlequin Duck				77	6	77		26	55	3		135		29	30	74	1588
Harbor Seal		30	2	7		3	100	4				25				3	3170
Humpback Whale																	1
King Eider					25												186
Large Gull	15	45	74	3203	145	531	90	48	61	3	17	355	68	83	125	393	24264
Long-tailed Duck																	3405
Mallard				1													269
Mew Gull	300		2	368	8	206	1	125	12	50		294				26	11408
Northern Pintail																	2141
Pacific Loon																	2
Pelagic Cormorant			3	2								2				1	68
Pigeon Guillemot																	5
Red-breasted Merganser				195	17	4	11	26	2	2				1		39	2199
Red-throated Loon																	61
Lesser Sandhill Crane																	2
Sea Otter					16	13		6				1				3	1526
Small shorebird (spp)						10		1							8		18259
Steller's Eider								1	3								15212
Steller's Sealion																	5
Surf Scoter					8	40									8	21	108
Tundra Swan												2					7
Walrus																	1
White-fronted Goose																	10
White-winged Scoter			1	1	20	64	10	5			1					21	1985

Table 3. Spring emperor goose survey data, southwest Alaska, 1981-2012, 2014.

YEAR	TOTAL	% CHANGE	3-YR AVG.	% CHANGE	DATES	OBSERVERS	SURVEY AREA
1981	91267				4/23-4/27	R.King/R.Gill/J.Sarvis/C. Dau	Y-K Delta to Wide Bay
1982	100643	0.093			5/2-5/4	R.King/C.Dau/M.Reardon/ B. Reiswig	Kuskokwim Bay to Wide Bay
1983	79155	-0.271	90355		4/25-4/29	R.King/C.Dau/V.Berns/ J.Solberg	Kuskokwim Bay to Wide Bay
1984	71217	-0.111	83672	-0.074	4/26-5/4	R.King/C.Dau/V.Berns/ R.Arment	Kuskokwim Bay to Cape Douglas
1985	58833	-0.210	69735	-0.167	5/12-5/16	R.King/C.Dau	Kuskokwim Bay to Cape Chiniak
1986	42231	-0.393	57427	-0.176	5/4-5/7	"	Nelson Island to Cape Atushagvik
1987	51633	0.182	50899	-0.114	4/30-5/4	"	Hooper Bay to Puale Bay
1988	53784	0.040	49216	-0.033	5/2-5/6	"	Hooper Bay to Cape Chiniak
1989	45800	-0.174	50406	0.024	5/3-5/6	"	Hooper Bay to Portage Bay
1990	67581	0.322	55722	0.105	4/28-5/4	"	Hooper Bay to Portage Bay
1991	70972	0.048	61451	0.103	5/2-5/7	"	Hooper Bay to Puale Bay
1992	71319	0.005	69957	0.138	4/30-5/5	"	Hooper Bay to Cape Kubugakli
1993	52546	-0.357	64946	-0.072	4/30-5/5	"	Hooper Bay to Wide Bay
1994	57267	0.082	60377	-0.070	4/29, 5/2-6	"	Hooper Bay to Wide Bay
1995	54852	-0.044	54888	-0.091	5/3-5/6	"	Hooper Bay to Chignik Lagoon
1996	80034	0.315	64051	0.167	4/27-4/30	"	Hooper Bay to Puale Bay
1997	57059	-0.403	63982	-0.001	4/25-4/28	"	Hooper Bay to Wide Bay
1998	39749	-0.435	58947	-0.079	5/4-5/7	"	Hooper Bay to Wide Bay
1999	54600	0.272	50469	-0.144	4/27-5/1	"	Hooper Bay to Wide Bay
2000	62565	0.127	52305	0.036	4/28-5/3	E.Mallek/C.Dau	Hooper Bay to Chignik Lagoon
2001	84396	0.259	67187	0.285	4/29-5/4	"	Hooper Bay to Puale Bay
2002	58743	-0.437	68568	0.021	5/3-5/6	"	Kuskokwim Bay to Wide Bay
2003	71160	0.174	71433	0.042	4/29-5/3	"	Hooper Bay to Wide Bay
2004	47352	-0.503	59085	-0.173	4/30-5/3	"	Hooper Bay to Wide Bay
2005	53965	0.123	57492	-0.027	4/20-4/23	"	Kuskokwim Bay to Wide Bay
2006	76108	0.291	59142	0.029	4/27-5/2	"	Kuskokwim Bay to Wide Bay
		0.018	69205	0.170		"	Kuskokwim Bay to Kuiu Bay
2007	77541				4/24-4/29	"	
2008	64944	-0.194	72864	0.053	4/29-4/30	"	Naknek to Bechevin Bay
2009	91948	0.294	78144	0.072	5/1-5/3	"	Kuskokwim Bay to Wide Bay
		-0.424	73818	-0.055	4/27,5/1-5/2	"	
2010	64562					"	Kuskokwim Bay to Canoe Bay
		0.129	76892	0.042	4/27, 4/29-5/1	"	Kuskokwim Bay to Canoe Bay
2011	74166					"	
2012	67588	-0.097	68772	-0.106	4/25-4/27	"	Kuskokwim Bay to Wide Bay
2013						No Survey	
2014	79883	0.182	73879	0.074	4/23-25,4/29	H.Wilson/C.Dau	Kuskokwim Bay to Wide Bay

**Pacific Flyway Management Plan for the**

---

# **Emperor Goose**



Photograph by Mike Boylan with permission from USFWS Alaska Image Library

PACIFIC FLYWAY MANAGEMENT PLAN

FOR THE

EMPEROR GOOSE

Prepared for the:

Pacific Flyway Council  
U.S. Fish and Wildlife Service

By the

Pacific Flyway Study Committee  
Emperor Goose Subcommittee

And

Alaska Migratory Bird Co-Management Council  
Emperor Goose Subcommittee

MAY 1988

JULY 1994

JULY 2006

Approved by: \_\_\_\_\_  
Chairman, Pacific Flyway Council

\_\_\_\_\_  
Date

*Suggested Citation: Pacific Flyway Council. 2006. Pacific Flyway Management Plan for the Emperor Goose. Emperor Goose Subcommittee, Pacific Flyway Study Committee [c/o USFWS], Portland, OR. Unpub. rept. 24 pp. + appendix.*

## **ACKNOWLEDGMENTS**

The Pacific Flyway Council appreciates the work of the Emperor Goose Subcommittee to update and revise this management plan, and particularly Christian Dau of the Region 7, Migratory Bird Office in Anchorage who undertook the majority of the effort of managing reviews, re-writing and formatting several early drafts. Review and constructive comments from the Alaska Migratory Bird Co-Management Council, Emperor Goose Committee, is especially appreciated.

Pacific Flyway Study Committee, Emperor Goose Subcommittee members included:

Tom Rothe, Alaska Department of Fish and Game  
Russ Oates, USFWS Region 7

Alaska Migratory Bird Co-Management Council, Emperor Goose Subcommittee members included:

Tom Rothe, Alaska Department of Fish and Game  
Russ Oates, USFWS Region 7  
Peter Devine, Aleutian/Pribilof Islands Association  
Austin Ahmasuk, Kawerak, Inc.  
Ralph Andersen, Bristol Bay Native Association  
Tim Andrew, Association of Village Council Presidents  
Bob Leedy, USFWS Region 7  
Julian Fischer, USFWS Region 7  
Christian Dau, USFWS, Region 7

The Council offers special thanks to the staff of the Izembek National Wildlife Refuge for continuation of fall age ratio and family group size counts as long-term indices of productivity; and to Dr. Joel Schmutz for his contributions toward developing survival rates for emperor geese and for working in cooperation with Dr. Jerry Hupp (USGS-ASC) on an analysis of distribution through satellite tracking.

## TABLE OF CONTENTS

ACKNOWLEDGMENTS	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	v
LIST OF APPEDNICES	v
I. INTRODUCTION	1
II. GOALS AND OBJECTIVES	2
III. STATUS	3
A. Abundance and Trends	3
B. Breeding Areas	4
C. Fall Migration	5
D. Wintering Areas	5
E. Spring Migration	6
F. Production and Mortality	6
G. Banding	9
H. Sport Harvest	9
I. Subsistence Harvest	9
J. Nonconsumptive Use	10
IV. MANAGEMENT ISSUES	11
V. RECOMMENDED MANAGEMENT STRATEGIES	13
A. Harvest management	13
B. Management and Research	14
VI. PLAN IMPLEMENTATION AND REVIEW	17
VII. LITERATURE CITED	17
FIGURES	24
APPENDICES	25

## **LIST OF FIGURES**

- Figure 1. Seasonal distribution of emperor geese.
- Figure 2. Primary Alaska Peninsula estuaries used by migrating emperor geese.
- Figure 3. Emperor geese population estimates during spring and fall migration.
- Figure 4. Emperor goose breeding pair and total goose indices in the coastal zone of the Yukon-Kuskokwim Delta, Alaska.
- Figure 5. Emperor goose winter age ratios, Aleutian Islands.
- Figure 6. Emperor goose harvest estimates.

## **LIST OF ADDENDICES**

- Appendix 1. Descriptions of key emperor goose use areas in Alaska and the Russian Far East.
- Appendix 2. Emperor goose population estimates during spring and fall migration.
- Appendix 3. Emperor goose breeding pair and total goose indices in the coastal zone of the Yukon-Kuskokwim Delta, Alaska.
- Appendix 4. Emperor goose nesting data from random plot surveys on the Yukon-Kuskokwim Delta, Alaska.
- Appendix 5. Emperor goose fall age ratios from aerial photography, Alaska Peninsula.
- Appendix 6. Emperor goose fall age ratios, Izembek NWR.
- Appendix 7. Emperor goose fall family group counts, Izembek NWR.
- Appendix 8. Emperor goose winter age ratios, Aleutian Islands.
- Appendix 9. Reported fall harvests of emperor geese in Alaska, 1970-1985.
- Appendix 10. Emperor goose subsistence harvest estimates.

## I. INTRODUCTION

Emperor geese (*Chen canagica*) are distributed in remote maritime habitats of Alaska and the Russian Far East (Figure 1, Appendix A). Most emperor geese winter along the Alaska Peninsula and in the eastern Aleutian Islands. Spring and fall migrants use staging areas along the Alaska Peninsula (Figure 2). Emperor geese nest in western and southwestern Alaska and along the east and north coasts of Chukotka with the majority on the Yukon-Kuskokwim Delta, Alaska. The historical breeding range on the Alaska mainland extended from the north side of the Seward Peninsula to south of Kuskokwim River near Carter Bay (Gabrielson and Lincoln 1959). Nesting distribution is presently constricted as emperor geese are uncommon nesters on the Seward Peninsula (Kessel 1989) and they are no longer known to breed south of the Yukon-Kuskokwim Delta (Seppi 1997).

The earliest estimate of emperor goose population size was 139,000 observed during a late spring survey from Kuskokwim Bay to Port Moller on the Alaska Peninsula in 1964 (King 1965). Fall migration surveys in the late 1960's estimated a population size of 150,000 (King and Lensink 1971). Petersen and Gill (1982) estimated a 34% decline in population size from 1971 to 1980, which prompted the initiation of annual spring and fall migratory staging surveys (Dau and Mallek 2005, Mallek and Dau 2004). A 3-year running average of spring surveys from 1981 to 1986 indicated a further 36% decline (Dau and King 1986). The spring population index has continued to decline but at a much slower rate since 1986 and the 1981-2004 with the 3-year running estimate of population size declining at 0.4%/year (Appendix B).

Estimates of breeding success on the Yukon-Kuskokwim Delta remained relatively constant during the 1970's and early 1980's (Eisenhauer and Kirkpatrick 1977, Petersen 1987), and the annual estimate of total nests has gradually increased since 1985 (Fischer et al. 2004). Fall age ratios, collected along the Alaska Peninsula since 1985, average 18.3% juveniles (Anderson et al. 2004) and indicate an average decline of 4.3%/year. These recent data suggest that increased mortality of pre or post-fledging young may be a factor restricting population growth.

Hunting mortality and predation are manageable factors involved in the decline of emperor geese that must be decreased to restore the population. In 1985 the bag limit of emperor geese was reduced from 6 to 2 birds per day and the season was closed completely in 1986. Under the terms of the Yukon-Kuskokwim Delta Goose Management Plan (YDGMP), subsistence hunting of emperor geese also was closed in 1987; however, harvest continues to occur (Wentworth and Wong 2002, Wolfe et al. 1990, Wolfe and Paige 2002).

The historical lack of a system to regulate subsistence harvest has limited effective management of goose populations, including emperor geese, on the Yukon-Kuskokwim Delta of Alaska. In order to better manage these populations, an agreement was signed in January 1984 between Alaska Natives of the Yukon- Kuskokwim Delta (Association of Village Council Presidents), the U.S. Fish and Wildlife Service, the Alaska Department of Fish and Game, and the California Department of Fish and Game. The agreement was

renamed the Yukon-Kuskokwim Delta Goose Management Plan and has been updated and modified periodically to the present day. In 1993 the states of Oregon and Washington also became signatories to the Plan. Alaska Native government entities representing other areas of Alaska with interest in emperor goose populations and habitat have yet to become signatories to this plan.

The 1916 Convention for the Protection of Migratory Birds between the U.S. and Great Britain prohibited the harvest of geese and most other species between March 10 and September 1. In Russia, emperor geese are protected as a “Red Book” species of concern (Kolosov and Skarlato 1983) however, illegal harvest still occurs. The migratory bird treaties with Canada and Mexico were amended in 1997 to allow for regulated customary and traditional use during the previously closed period. In Alaska, the Alaska Migratory Bird Co-Management Council (AMBCC) was established in October 2000 to develop proposed regulations to manage harvests occurring from March 10 to September 1. Spring and summer subsistence harvest of migratory birds is now rules established in 50 CFR Part 92. The AMBCC established a standing Harvest Technical Committee to provide guidance on design and implementation of statewide migratory bird harvest assessments of all species open to subsistence hunting. The AMBCC Emperor Goose Subcommittee was formed to address species-specific issues.

The purpose of this plan is to update previous versions of this plan (Pacific Flyway Council 1988) and reemphasize established goals and strategies for management of emperor geese in the Pacific Flyway that facilitate meeting objectives presented herein. This plan identifies management actions, associated information needs, and agency responsibilities for implementation during 2006-2010.

## **II. GOALS AND OBJECTIVES**

The goal of this management plan is to restore the emperor goose population to historical levels and maintain it for all its values to society, including ecological, educational, recreational, and scientific uses, both consumptive and non-consumptive.

Objectives:

- A. Maintain a minimum population of 150,000 emperor geese based on spring surveys.
- B. Protect and manage nesting and brood rearing habitats in sufficient quantity and quality necessary to achieve population objectives. Emphasis should be increased on research and management activities to improve the quality of broodrearing habitat.
- C. Protect and manage migratory staging and wintering habitats in sufficient quantity and quality to achieve population objectives.
- D. Reduce harvest to achieve population objectives. Hunting will be closed when the population is below 60,000 geese based on the current 3-year running average of

spring population estimates. Hunting may be considered again when the 3-year running average reaches 80,000 geese.

- E. Achieve fall juvenile age ratios of  $\geq 20\%$ . This objective is dependent on reducing predation rates on goslings and increasing the quantity and quality of brood rearing habitat.

### III STATUS

#### Abundance and Trends

Emperor geese inhabit remote areas of western and southwestern Alaska and the Russian Far East (Palmer 1976, Bellrose 1980), areas plagued by unfavorable climate and difficult logistics making population surveys challenging. Hence, limited historical information is available on population size or distribution. Aerial surveys of southwest Alaska in the 1960's estimated spring and autumn numbers of migratory staging emperor geese at 139,000 and 150,000, respectively (King 1965, King and Lensink 1971). Eisenhower and Kirkpatrick (1977) summarized available survey data to the 1970's suggesting a fall population between 175,000 and 200,000 and estimated 140,000 - 160,000 survived to spring. The current 3-year running average of spring and fall population estimates are 57,492 and 83,175 geese, respectively (Dau and Mallek 2005, Mallek and Dau 2004) (Appendix B, Figure 3). Russian and Alaskan breeding emperor geese mix during migration and winter, based on observations of marked birds and band recoveries (Schmutz and Kondratyev (1995).

Kistchinski (1976) suggested up to 80% of emperor geese summering in Russia are molting non-breeders. Uspenskii (1984) reported as early as 1969 that the nesting population in Chukotka Peninsula was decreasing rapidly. Historic population estimates are 12,000 - 15,000 emperors breeding and molting in Chukotka, with 200 wintering in the Commander Islands (Kistchinski 1973 and 1976, A. Kistchinski pers. comm.). Estimates of numbers in Chukotka, prior to the arrival of molt migrants (Jones 1972, Eisenhower and Kirkpatrick 1977), come from late June aerial surveys in 1974 (Kistchinski 1976) and 1993-95 (Hodges and Eldridge 2001). Population estimates for generally similar areas of the north Chukotka coast from Bering Strait west to Cape Shmidt were 7950 birds in 1974 and 2952 in 1993-95 (-63%). Hodges and Eldridge (2001) estimated a total Russian summering population of emperor geese at 5,079 including 2,952 in Chukotka, 223 from the Kolyma to Indigirka river deltas and 1,904 in inland areas from the Indigirka River to the Yana River. The arrival of molt migrants from Alaska enlarges the summering population in Russia. During recent aerial surveys in 2002 of "all key coastal wetlands of eastern Chukotka" 21,500 emperor geese were counted and the total population was speculated to be 25,000-30,000 (E. Syroechkovskiy, Jr. pers. comm.) The reported two-fold increase in summering emperor geese in Chukotka from 1974 to 2002 may be related to an apparent decline in molting on St. Lawrence Island (Murie 1936, Fay 1961, King and Derksen 1986, King and Butler 1987, Hogan and Rearden 1987, Eldridge and Bollinger 1988).

The U.S. Fish and Wildlife Service began annual migration surveys of emperor geese in fall 1979, and since 1981, aerial surveys have been conducted in southwest Alaska staging areas

in spring and fall. The spring survey completed from late April to early May, is used as the management index because the population is concentrated during a shorter time period than during the more protracted fall migration completed in early October. During spring, emperor geese congregate in Bristol Bay estuaries and along the northern Alaska Peninsula where the population is estimated prior to their moving north to breeding sites (Petersen and Gill 1982, Dau and Mallek 2005) (Appendix B).

Data on distribution and abundance of emperor geese in the Aleutian Islands are primarily from incidental counts made during early spring marine mammal surveys (Kenyon 1962, Eldridge 1987, T. Evans pers. comm., J. Haddix pers. comm.). Survey design and emphasis on recording emperor geese was not consistent between years so these late winter Aleutian surveys provide only a subjective indication of population trend. Counts declined from 24,712 emperor geese in 1962 to 1,319 in 2000, however, distributions were similar with preferred use areas from Tanaga Island to the Krenitzin islands.

### **Breeding Areas**

In Alaska, most emperor geese breed in the coastal zone of the Yukon-Kuskokwim Delta (Palmer 1976, Bellrose 1980, King and Dau 1981, Petersen et al. 1994) with small numbers on the Seward Peninsula (Kessel 1989). (Figure 1, Appendix A). Fay and Cade (1959) and Fay (1961) reported 1,000 to 2,000 breeding on St. Lawrence Island while earlier reports were of breeding “in large numbers” (Friedmann 1932). Small numbers of emperor geese may currently breed on Nunivak Island (H. Ivanof pers. comm.). Emperor geese breed in coastal habitats preferring slough borders, pond shorelines, peninsulas, ericaceous tundra and pingos and small islands as nesting sites (Kistchinski 1972, Mickelson 1975, Eisenhauer and Kirkpatrick 1977, Petersen 1985). Breeding chronology varies due to timing of snow melt and the availability of nest sites. Median nest initiation dates on the Yukon-Kuskokwim Delta ranged from 20 May to 3 June (Petersen 1990, 1992a).

Broods move from nest sites to coastal salt marsh and estuarine habitats within one week of hatching, partially to find refuge from predators. Laing and Raveling (1993) found that goslings selected vegetated mudflats in coastal salt marsh and spent over 80 percent of their feeding time there. Goslings initially feed on nitrogen-rich salt marsh plants (Kistchinski 1972, Laing and Raveling 1993), and crowberries (*Empetrum nigrum*) are important during fall (Mickelson 1975).

A molt migration consisting of most sub adults and failed breeders occurs in mid-June from the Yukon-Kuskokwim Delta to St. Lawrence Island and coastal lagoons of Chukotka (Murie 1936, Fay and Cade 1959, Fay 1961, Jones 1972, Kistchinski 1973, 1988). In recent years, use of St. Lawrence Island as a molting site has declined with a corresponding 100% increase in Chukotka (King and Derksen 1986, King and Butler 1987, Hogan and Rearden 1987, Eldridge and Bollinger 1988, E. Syroechkovskiy, Jr. pers comm.).

In Russia, emperor geese breed throughout coastal Chukotka from Mallen Lagoon along the Bering Sea north and west to Cape Shmidt along the Chukchi Sea (Kistchinski 1973, Portenko 1981, Schmutz and Kondratyev 1995, Dorogoi and Beaman 1997, A. Kistchinski,

pers. comm.). Nesting in Chukotka begins in mid June (Kistchinski 1972, Krechmar and Kondratyev 1982, P. Tomkovich pers. comm.).

### **Fall Migration**

Emperor geese migrate up to 2,200 km from molting sites to staging areas in southwest Alaska (Petersen et al. 1994, Izembek NWR files) (Figure 2). Molt migrants arrive first from early to mid-August followed by successful breeders by late September. Banding and satellite telemetry data suggest most of the emperor goose population follows western Alaska migratory routes (Schmutz and Kondratyev 1995, Hupp et al. 2001, 2004). Few emperor geese are seen in fall along the Bering Sea coast of Kamchatka and wintering numbers are small there and in the Commander Islands (Kistchinski 1973, Palmer 1976, E. Lobkov pers. comm.).

Emperor geese exhibit strong fidelity of to staging lagoons within and among seasons and remain at single sites for more than one month (Schmutz 1992). Over 80 percent of the population in spring and fall stage from Cinder River Lagoon to Nelson Lagoon (Figure 2, Appendix A). Three estuaries along the south coast of the Alaska Peninsula (Ivanof Bay, Chignik Lagoon and Wide Bay), islands south of the Alaska Peninsula and Kodiak Island are important to smaller numbers of emperor geese.

Petersen (1983) observed emperor geese foraging on blue mussels (*Mytilus edulis*) and macoma clams (*Macoma* spp.) during low tide and roosting onshore at high tide. Schmutz (1994) reported that flocks with disproportionately more juveniles continued to feed during high tide due to greater nutritional demands. At Izembek Lagoon, emperor geese also feed on eelgrass (*Zostera* spp.) and crowberries (*Empetrum* spp.), roosting at high tides along beaches or adjacent uplands.

### **Wintering Areas**

By November, most emperor geese disperse from fall staging areas to wintering sites throughout the Aleutian Islands, islands south of the Alaska Peninsula and the Kodiak Archipelago. In mild winters some birds remain in Alaska Peninsula estuaries if ice free habitat exists (Palmer 1976, Hupp et al. 2001, 2004). In Russia, emperor geese winter in the Commander Islands and along the southern Kamchatka coast. Petersen et al. (1994) report accidental winter records from Hawaii, Sundai City, Japan and Wrangel Island, Russia. The occasional single or small group of emperors sighted in British Columbia, Washington, Oregon and northern California are likely the result of parasitic laying in the nests of other species of geese which winter in these areas and breed on the Yukon-Kuskokwim Delta (Lensink 1969).

In the central and western Aleutians, emperor geese arrive from October to November, although occasional sightings occur in early September. Most wintering birds arrive by mid-December and depart in spring by mid-April. Observations of marked birds suggest strong site fidelity within and between years (Byrd 1989, Byrd et al. 1992, Hupp et al. 2001, 2004, R. McIntosh pers. comm.).

Wintering emperor geese prefer shallow estuaries and shorelines for foraging and roosting. In the Aleutian Islands larger numbers use islands with extensive intertidal habitats and small numbers use conical volcanic islands with high energy beaches (J. Williams pers. comm.). The winter diet consists of *Fucus* spp., *Ulva* spp., eelgrass, kelp and various molluscs and other marine organisms associated with intertidal habitats, and vegetation including the shoots of *Elymus* spp. and rhizomes and herbaceous parts of *Equisetum* spp. (Murie 1959).

### Spring Migration

Emperor geese begin migrating from Aleutian Island wintering sites as early as March (Byrd et al. 1974, Byrd 1988) to staging areas on the Alaska Peninsula where most remain until making non-stop flights to the Yukon-Kuskokwim Delta in early May (Hupp et al. 2001, 2004) and later to more northerly breeding areas. Emperor geese arrive on the Yukon-Kuskokwim Delta in early to mid-May, with large influxes occurring two to 16 days later (Petersen 1990, 1992a). Most Russian breeders migrate along the western Alaska coastline through the Bering Strait, arriving in Chukotka in early June (Kistchinski 1972, Krechmar and Kondratyev 1982). Birds wintering in the Commander Islands and southern Kamchatka are assumed to migrate along the eastern Bering Sea coastline to Chukotka (A. Kistchinski pers. comm.).

### Production and Mortality

Prior to 1985 there were no comprehensive measures of emperor goose productivity at nesting sites. Since 1985, intensive random ground plot surveys have been conducted on the Yukon-Kuskokwim Delta (Fischer et al. 2004) in conjunction with aerial surveys (Butler and Malecki 1986, Eldridge and Hodges 2004) to provide annual estimates of population size and production. Data indicate low, positive annual growth rates of +2.4% for total birds (Appendix C, Figure 4) and +1.2% for active nests (Appendix D) while the population estimate from spring surveys indicates a very low annual decline of -0.4%/year (Figure 3).

Emperor geese initiate nests on the Yukon-Kuskokwim Delta from 20 May to 3 June (Petersen 1991, Petersen et al. 1994). In Chukotka, nests were initiated from 6 to 20 June (Kistchinski 1972, Krechmar and Kondratyev 1982). Nest initiation dates for marked individuals were similar each year (Petersen 1992a). Early nest initiation is advantageous as goslings are able to attain larger body size, which is positively correlated with survival (Schmutz 1993). In climatically late years, when nest site availability was delayed, nest initiation coincides with snow melt and runoff (Petersen 1990).

Normal clutch size is four to six eggs (average 4.9 eggs) (Petersen 1991). Kistchinski (1972) and Krechmar and Kondratyev (1982) report clutch sizes of two to nine eggs (average 4.2 eggs) in Chukotka. Climatically late springs can result in reduced clutch size and non-breeding in the Arctic (Barry 1960, 1967). On the subarctic Yukon-Kuskokwim Delta, emperor goose clutch size did not vary between early and late seasons, averaging 5.0 eggs (Fischer et al. 2004) (Appendix D). However, clutch size did decline later in the nesting season due to one or more factors including continuation of partially destroyed clutches, re-

nesting, first attempts by inexperienced individuals, and depletion of nutrient reserves during climatically late years (Petersen 1992a).

Female emperor geese often parasitically lay eggs in nests of other females and less commonly in the nests of other goose species. Petersen (1991) found over 62% of emperor goose nests were parasitized, and over 14% of goslings produced were from parasitic eggs. Costs of accepting parasitic eggs included slightly reduced hatching success of host eggs. Parasitic females were not known to incubate clutches in seasons they laid parasitically.

Petersen (1992a) reported 43-70% of marked female emperor geese nested each year. Nesting propensity was independent of the previous year's nest fate, clutch size, nest initiation date, and arrival date, and the current year's arrival date or timing of habitat availability. Low nesting rates may be related to variability in annual adult mortality rates. The proportion of adult females that survived to the following summer was significantly higher among geese that did not nest than among geese that nested suggesting that non-nesting is a strategy used by emperor geese when nesting increases the risk of adult mortality (Petersen 1992b).

Nesting success varied from 90.6% in 1982 to 0.1% in 1986 (n=746 nests) (Petersen 1992a). Predation by arctic foxes was the primary cause of nest loss (Stickney 1989, Petersen 1992a). Stehn (1991) concluded that factors other than nest success, clutch size, nesting chronology, and egg production may be more important determinants of fall population size. Most important factors affecting population size are the number of pairs (i.e. adult survival), the proportion of breeding pairs that attempt to nest, and the survival of goslings to fledging. Glaucous gulls (*Larus hyperboreus*) are a primary factor limiting juvenile survival on the Yukon-Kuskokwim Delta consuming from 21,000 to 52,000 goslings in 1994 (Bowman et al. 1997). Predation by gulls, exclusive of other mortality factors, exceeded the estimated 16,000 goslings surviving to early August (Bowman et al. (1997).

Prior to 1985, fall age ratio counts to estimate emperor goose productivity were conducted by the Izembek NWR (Izembek NWR files). Comprehensive annual fall photographic age ratio surveys in estuaries on the north side of the Alaska Peninsula where begun in 1985 (Butler et al. 1985) providing a 20-year average of 18.3% young (Anderson et al. 2004) (Appendix E). The proportion of juveniles has declined by an average of 4.3% per year since 1985. Estimates of fall age ratio and family group size at the Izembek NWR since 1966 provide averages of 23.2% juveniles (Appendix F) and family group size of 2.8 juveniles per family (Appendix G). Juvenile age ratios at Izembek NWR have declined at 1.7% per year since 1966. Winter age ratio estimates in the Aleutian Islands (Byrd et al. 1992, Alaska Maritime NWR, files) averaged 14.5% juveniles, an average of 37.8% below corresponding fall estimates; this may provide an index of juvenile mortality (Figure 5, Appendix H). Byrd et al. (1992) suggested that there is proportionally more mortality among juveniles than adults and suggested eagle predation and oiling were among possible causes.

Seasonal and annual survival estimates of emperor geese, based on mark resightings, were found to be low compared to other goose species (Petersen et al. 1994, Schmutz et al. 1994). Adult monthly winter survival rate was 0.940, whereas monthly over-summer survival varied

among years from 0.940 to 0.980 (Schmutz et al. 1994). Estimates of monthly survival of juveniles during their first winter period averaged 0.710. Subsequent monthly survival of juveniles was 0.943, similar to adults. Annual adult survival, estimated at 0.631 after adjustment for collar loss, was similar to the 0.587 reported by Petersen (1992b). Schmutz and Morse (2000) suggest that neck collared geese have lower return rates than tarsus-banded birds, and Schmutz et al. (1997) indicate average annual survival rates just over 0.80 are more realistic.

Natural mortality among juveniles is high during brood rearing (Bowman et al. 1997) and over their first winter, with survival positively correlated with body condition during fledging (Schmutz 1993). Heavy goslings had significantly higher survival than lighter goslings between late pre-fledging and arrival on fall staging areas. Results suggest that body mass affected the ability of juveniles to depart breeding areas, and/or affected survival during the first phase of migration. Differences in body mass may be caused by variable hatch dates, growth rates and forage qualities (Schmutz 1993), or differential energetic demands. Schmutz et al. (1994) point out that lack of agricultural foods, and relatively high latitude and inclement weather of winter habitat may lead to high natural mortality for juvenile and adult emperor geese in comparison to other goose species. Bowman et al. (1997) found glaucous gull predation was higher on emperor goose goslings than on other goose species.

Emperor geese have shown a variable but slow increase in population trend on the Yukon-Kuskokwim Delta since regulations stopped sport hunting and a combination of regulations and negotiations were initiated to slow subsistence harvest (Figure 6). Sport and subsistence harvest reductions throughout the Pacific Flyway increased survival, recruitment and population sizes of both cackling Canada geese and greater white-fronted geese that also nest on the Yukon-Kuskokwim (Trost and Drut 2004). However, similar harvest restrictions on emperor geese have failed to increase population size (Figure 3). Continued population decline is precipitated by low productivity rates and continued illegal harvest, which appears to be exceeding the recruitment of breeding adults into the population.

Eliminating or reducing illegal harvest and managing predators on breeding areas are the most realistic strategies for increasing survival and recruitment of emperor geese and increasing total population size. Adequate quantitative data on size of the illegal harvest are lacking (Wolfe and Paige 2002), and harvest is likely to be completely additive to natural mortality, particularly when the proportion of juveniles is low (Schmutz et al. 1994).

Little is known about the winter ecology of emperor geese. The relationship of habitat conditions to winter survival, nutritional and energy requirements, food availability, importance of winter conditions to reproductive capabilities, effects of pollution, predation rates and disturbance all require further study. Oil-stained emperor geese have been observed in the Aleutian Islands suggesting there may be a chronic problem with oil contamination from vessel sinkings and fuel discharges. Emperor geese are susceptible because they spend approximately 5 months each year foraging and roosting in the intertidal zone where oil deposits were found (Byrd et al. 1992). Emperor geese surviving contact with oil may experience reduced fitness, either due to ingestion or loss of insulation coupled with common adverse weather conditions (Byrd et al. 1992). Due to their remote and dispersed

winter distribution and the nature of known mortality factors (e.g. eagle predation, chronic oiling, etc.), management options to improve winter survival for emperor geese are limited.

The impacts of long-term environmental changes in emperor goose habitats, while unknown, are likely negative (e.g., warming Bering Sea temperatures, reduced sea ice, increased rates and impacts of storm surges, vegetation changes) (Owen 1980, Petersen 1985, Schmutz et al. 1994). Predator populations, increasing seasonally or in the long-term, adversely impact emperor geese. Predatory gull populations on Yukon-Kuskokwim Delta are increasing at a rate of >4% per year (Platte and Stehn unpubl. data). Gulls may be benefiting from increased productivity and survival related to expanded fisheries and at-sea processing in the North Pacific and Bering Sea (Hamilton-Paterson 1992). Arctic foxes are important nest predators that may be increasing due anthropogenic factors that have increased over-winter survival and reduced harvest.

### **Banding**

Approximately 9,782 emperor geese had been banded and 145 recoveries had been reported as of August 2004 (J. Schmutz, pers. comm.). The majority of recoveries came from Alaska with a few reports from British Columbia and Washington. Limited banding of molting emperor geese in Russia has resulted in two recoveries, both in Alaska; one near Cold Bay and one on St. Lawrence Island. Two birds with Russian bands were sighted in Cold Bay in the fall of 1993 (Schmutz and Kondratyev 1995). There is one report of a young of the year bird banded on the Yukon-Kuskokwim Delta in August 1968 and recovered in July 1973 in Chukotka.

### **Sport Harvest**

Sport harvest of emperor geese was reduced from a bag limit of 6 to 2 per day in 1985 and has been completely closed since 1986. Estimates of annual sport harvest by the Alaska Department of Fish and Game from 1970-1980 (Appendix I) averaged 2,100 emperor geese (1,400-3,000) and seldom exceed two percent of the estimated total population size. Most sport harvest occurred at staging areas along the north side of the Alaska Peninsula, most notably the Izembek State Game Refuge and Izembek National Wildlife Refuge.

### **Subsistence Harvest**

In Alaska, harvest of emperor geese and their eggs is a traditional and customary use (Wolfe et al. 1990). Wolfe and Paige (2002) estimate over 4,500 birds were taken annually during the early 1990's, representing nearly 8% of the spring population index. Geographic coverage and sampling intensity suggest this estimate may be low

Subsistence harvest surveys estimate magnitude and timing of take relying on the trust and cooperation of subsistence hunters sampled anonymously (Wentworth and Wong 2001). The first study of subsistence waterfowl take on the Yukon-Kuskokwim Delta was made in 1964 (Klein 1966) and the estimated 8,200 emperor geese reported accounted for approximately 6% of the estimated spring population (King 1965). From 1985 to 2000, harvest estimates

averaged 2,119 emperor geese shot (1616-4031) and 290 eggs collected (40-518) however, these data underestimate harvest because several villages where harvest is known to occur, did not initially participate in most years (Wentworth and Wong 2001, Wentworth, unpubl. data) (Figure 6, Appendix J).

Historically, emperor geese have been taken on St. Lawrence Island by shooting during migration or driving of molting birds, a practice reported to be declining (Fay and Cade 1959, Fay 1961). Preliminary harvest surveys on St. Lawrence Island in 2002 estimated over 1,700 emperor geese were taken (A. Ahmasuk pers. comm.).

A 12-month survey in 1986-1987 at three Alaska Peninsula communities (Pilot Point, Ugashik, and Port Heiden) identified two distinct periods of waterfowl hunting. At Pilot Point, Ugashik and Port Heiden a total harvest of 205 emperors (64 in the spring and 141 in the fall) was reported (Fall and Morris 1987). Wentworth and Wong (2001) reported an average of 379 emperor geese take annually by Bristol Bay villages from 1995-2000. Fall surveys conducted in False Pass and Nelson Lagoon reported 26 and 44 emperors harvested for each respective community (Stanek 1990). The magnitude, timing, and location of the subsistence harvest needs to be more accurately documented and monitored to facilitate management efforts to restore the population.

Predation and over-winter mortality causes most of the losses in juveniles while most adult mortality is attributed to subsistence harvest during spring and summer. In Alaska an estimated 70% of the subsistence harvest of emperor geese is during spring and summer (Wentworth and Wong 2001). Low first year juvenile survival and first breeding at 3 years old, suggests recruitment rate of breeding adults is low. Current best estimates suggest spring and summer harvest exceeds recruitment of breeding adults and is therefore a factor in the continued decline in population size.

In 1997, the governments of Canada, Mexico and the United States amended the 1916 MBTA and the subsequent 1936 Mexico Convention for the Protection of Migratory Birds and Game Mammals. These amendments allowed harvests of migratory birds and their eggs during the previously closed period. The Alaska Migratory Bird Co-Management Council (AMBCC) was established in October 2000 to recommend subsistence harvest regulations to the Service and to the Flyway Councils for implantation in Alaska. The AMBCC consists of Alaska Native, Federal and State of Alaska representatives with equal voting responsibilities. Recommended regulations were expedited and the first legal season openings took place in 2003. The AMBCC followed agreements from the Yukon Delta Goose Management Plan and recommended continued closed season for emperor geese

### **Nonconsumptive Use**

The extent of nonconsumptive use of emperor geese is unknown but likely limited due to their remote distribution. Limited viewing and photographic opportunities exist near Kodiak, Cold Bay, Shemya and Adak, as well as near many villages throughout their range. A public information program on arctic nesting geese (Teach About Geese), with an emphasis on emperor geese, prepared by the Fish and Wildlife Service received limited use in schools

throughout Alaska.

#### **IV. MANAGEMENT ISSUES**

- A. Emperor goose spring survey estimates since 1981 indicate greater than a 50% decline in population size from the historic level and a long-term decline of 0.4% per year.
- B. Illegal harvest of emperor geese continues to occur in Alaska at an undetermined rate. Although the MBTA Protocol has resulted in legal spring and summer subsistence hunting of migratory birds, current regulations have kept all seasons closed. Efforts to explain the need for hunting closures and encourage compliance should be increased, particularly in emperor goose staging and wintering areas.
- C. Regional or Statewide surveys to estimate timing and magnitude of emperor goose harvest need to be fully funded and implemented. The MBTA Protocol stipulates that harvest will not increase in relation to the continental population. Comprehensive harvest surveys are necessary to assure this mandate is met.
- D. Harvest of emperor geese occurs in Russia but information on the timing and magnitude are lacking.
- E. An estimated mortality of up to 40% of goslings produced on the Yukon-Kuskokwim Delta, due to predation by an increasing numbers of glaucous gulls, is a primary factor preventing growth of the emperor goose population. A study proposed to evaluate management strategies to reduce this predation has not been implemented.
- F. Fox predation on emperor goose eggs, goslings and adults is poorly documented and may be increasing. Information on the magnitude of losses is needed to determine appropriate management strategies.
- G. The emperor goose population would face increased risks during migration and winter by proposed oil exploration and development in Bristol Bay and along the Alaska Peninsula.
- H. Cooperative management agreements, easements, land exchanges or purchases of refuge in holdings and adjacent properties are needed to insure protection of key nesting, molting and staging areas of emperor geese. Management plans are lacking for some State and Federal owned coastal habitats important to emperor geese. Land use plans and regulations are necessary to avoid impacts of habitat loss and disturbance on emperor geese.
- I. Habitat changes on the Yukon-Kuskokwim Delta may impact survival of emperor goose goslings. Historically, goose populations and productivity were higher and they maintained larger expanses of grazed habitats. Lower numbers of geese since the 1980's may have reduced the amount and quality of preferred brood rearing

- habitat by over grazing.
- J. Insufficient data on wintering ecology is hindering understanding of winter survival factors and needs for management actions.
  - K. Aerial and ground inventories of Russian breeding and molting habitats are needed to understand emperor goose ecology and monitor population trends.
  - L. Habitat losses and disturbance from human activities include commercial fishing, oil spills and chronic oil pollution, introduced animals such as foxes and rats, and disturbances from aircraft, boats, all-terrain vehicles, and commercial/industrial activities.
  - M. Band return rates of emperor geese are low. Lack of data hampers analysis of seasonal distribution of harvest and estimation of survival rates and longevity.

## V. RECOMMENDED MANAGEMENT STRATEGIES

The following management procedures are recommended and assigned a priority rating. Their implementation will be influenced by staff availability, fiscal and legislative constraints. When possible, management procedures in this plan should be coordinated and incorporated into those recommended in plans for other species and populations in the Pacific Flyway. Agencies should involve local residents in management activities, where feasible, throughout the range of the species.

### A. Harvest Management

1. Implement provisions of this plan and the Yukon-Kuskokwim Delta Goose Management Plan requiring closure of all hunting if the current 3-year running average of spring population estimates is below 60,000 birds. Resumption of harvest may be considered when the population reaches a current 3-year index of 80,000 birds.

Responsibility: USFWS, ADFG, AMBCC (AVCP-WCC)  
Priority: I  
Schedule: Continuing

2. Continue to implement and enforce federal regulations for harvest of emperor geese and their eggs.

Responsibility: USFWS, ADFG, ADPS-ABWE, AMBCC  
Priority: I  
Schedule: Continuing

3. Continue support of the Yukon-Kuskokwim Delta Goose Management Plan.

Responsibility: USFWS, USGS, AMBCC (AVCP), ADFG, CDFG, ODFW, WDFW  
Priority: I  
Schedule: Continuing

4. Conduct annual subsistence harvest surveys throughout habitats used by emperor geese to determine magnitude and timing of emperor goose subsistence harvest in Alaska and monitor trends.

Responsibility: USFWS, ADFG, AMBCC  
Priority: I  
Schedule: New Start

5. Continue education and outreach programs designed to increase awareness of emperor goose management and biology with the goal of reducing both deliberate and incidental harvest.

Responsibility: USFWS, AMBCC, ADFG  
Priority: I  
Schedule: Continuing

B. Management and Research (Incorporate Traditional Ecological Knowledge into ongoing management and research activities as appropriate.)

1. Continue annual spring aerial population survey of migratory staging areas to produce the primary population management index.

Responsibility: USFWS  
Priority: I  
Schedule: Continuing

2. Continue annual fall aerial population survey of migratory staging areas. These data are used in conjunction with photographic age ratio surveys (B.3) to estimate the proportion of juveniles in the fall population.

Responsibility: USFWS  
Priority: II  
Schedule: Continuing

3. Continue fall aerial photographic survey to determine the proportion of juveniles at staging sites. Continue ground sampling to estimate age ratios and average family group size at Izembek NWR to maintain historic database.

Responsibility: USFWS  
Priority: I  
Schedule: Continuing

4. Continue aerial breeding population survey in the coastal zone of the Yukon-Kuskokwim Delta. Use in conjunction with random nest plot survey to estimate total nests and potential production.

Responsibility: USFWS  
Priority: I  
Schedule: Continuing

5. Continue annual random nest plot survey on the Yukon-Kuskokwim Delta coastal zone to index productivity.

Responsibility: USFWS  
Priority: I  
Schedule: Continuing

6. Conduct an aerial photographic survey of brood flocks on the Yukon-Kuskokwim Delta to compare family size during late brood rearing to family group sizes during migration on the Alaska Peninsula and to assess the effects of potential predator management procedures (Procedure 7).

Responsibility: USFWS  
Priority: II  
Schedule: Intermittent

7. Initiate studies to determine the effects of predator management designed to reduce emperor goose egg and gosling mortality on the Yukon-Kuskokwim Delta. Evaluate the effectiveness of these actions by estimating juvenile survival rates in relation to other factors influencing gosling mortality. Determine the effect of increased juvenile recruitment on population size.

Responsibility: USFWS  
Priority: I  
Schedule: New start

8. Communicate with Russians to obtain breeding, molting and migrating information throughout the Russian Far East. Arrange opportunities for cooperative aerial and ground surveys.

Responsibility: USFWS, Russia  
Priority: I  
Schedule: Continuing

9. Complete population model using best available information to estimate how survival and reproduction effect population change and how manipulations might affect these changes.

Responsibility: USGS-ASC, USFWS  
Priority: I  
Schedule: Continuing

10. Initiate a study of emperor goose ecology in winter to determine habitat requirements, physiological and nutritional requirements, and mortality factors.

Responsibility: USFWS, USGS-ASC  
Priority: I  
Schedule: Undetermined

11. Support establishment of protective measures and retain existing ones to maintain adequate breeding and molting areas. Develop cooperative management agreements and public use plans with landowners to protect emperor goose habitat.

Responsibility: USFWS, ADFG, local governments, Alaska Native organizations, conservation organizations  
Priority: II  
Schedule: Ongoing

12. Support establishment of protective measures and retain existing ones to maintain adequate migratory staging and wintering areas. Develop cooperative management agreements and public use plans with landowners to protect emperor goose habitat.

Responsibility: USFWS, ADFG, local governments, Alaska Native organizations, conservation organizations  
Priority: II  
Schedule: Ongoing

13. Determine contaminant levels in emperor geese, examining both juveniles and adults, and assess potential effects on health and survival.

Responsibility: USFWS  
Priority: II  
Schedule: Undetermined

14. Continue cooperative educational and volunteer programs associated with the Yukon-Kuskokwim Delta Goose Management Plan with Alaska Native organizations. Expand education and information programs on emperor goose conservation to include villages in Bristol Bay, Alaska Peninsula, St. Lawrence Island, Seward Peninsula and Aleutian Islands.

Responsibility: USFWS, ADFG, AVCP, AMBCC  
Priority: I  
Schedule: Ongoing

## VI. PLAN IMPLEMENTATION AND REVIEW

An Emperor Goose Subcommittee of the Pacific Flyway Study Committee shall monitor the status of the population, coordinate management activities, and review progress toward achieving the goal and objectives of this plan. The subcommittee shall coordinate with the AMBCC Emperor Goose committee to revise this plan as needed and report, through the Pacific Flyway Study Committee, accomplishments and shortcomings of management efforts to the Pacific Flyway Council, state and federal agencies having relevant management responsibilities, and organizations interested in emperor goose management.

The subcommittee shall be responsible for integrating plan provisions with other plans and programs for waterfowl management. In addition, the subcommittee will ensure that emperor goose management and research guidelines complement the goals of the North American Waterfowl Management Plan.

The subcommittee shall be composed of a representative from each federal and state agency having management responsibility for this goose population. Chairmanship shall be appointed biannually and rotated among member agencies. The subcommittee will exercise its prerogative to invite participation (ex officio) at meetings by any individual, group, agency or representative whose expertise, counsel or managerial capacity is required for coordination and implementation of management programs.

Rotation of the chair shall alternate between USFWS Region 7 and ADFG. Terms begin October 1 and continue for 2 years.

## VII. LITERATURE CITED

- Anderson, P.D., W.W. Larned, E.J. Mallek, C.P. Dau and R.A. Stehn. 2002. Monitoring emperor goose populations by aerial counts and fall age ratio. Unpubl. Rept., U.S. Fish and Wildl. Serv., Migratory Bird Management, Anchorage, AK. 7pp.
- Barry, T.W. 1960. Breeding biology of the Atlantic brant (*Branta bernicla hrota*). M.Sc. thesis, Cornell Univ. 81pp.
- Barry, T.W. 1967. The geese of the Anderson River Delta, N.W.T. Completion Report, Canadian Wildlife Service. Inuvik, N.W.T. 212pp.
- Bellrose, F.C. 1980. Ducks, Geese and Swans of North America. 3<sup>rd</sup> Edition. Stackpole Books, Harrisburg, Pa. 540pp.
- Bowman, T.D., R.A. Stehn and K.T. Scribner. 1997. Glaucous gull predation of goslings on the Yukon-Kuskokwim Delta, Alaska. Unpubl. Rept., U.S. Fish and Wildl. Serv., Migratory Bird Management, Anchorage, AK. 58pp.

- Bowman, T.D. and W.W. Larned. 1999. Emperor goose production on the Yukon Delta NWR in 1999. Unpubl. Rept., U.S. Fish and Wildl. Serv., Migratory Bird Management, Anchorage, AK. 12pp.
- Butler, W.I., M.R. Petersen, J. Sarvis and C.P. Dau. 1985. Fall 1985 productivity estimates of emperor geese from aerial photographs on the Alaska Peninsula. Unpubl. Rept. U.S. Fish and Wildl. Serv., Anchorage, AK. 7pp.
- Butler, W.I. and R.A. Malecki. 1986. Development of an aerial breeding pair survey of geese nesting in the coastal zone of the Yukon-Kuskokwim Delta. Unpubl. Rept., U.S. Fish and Wildl. Serv., Migratory Bird Management, Anchorage, AK. 20pp.
- Byrd, G.V., D.D. Gibson and D.L. Johnson. 1974. The birds of Adak Island, Alaska. *Condor* 76(3): 288-300.
- Byrd, G.V. 1989. Observations of emperor geese in the Aleutian Islands October 1988-April 1989. Unpub. Rept. U.S. Fish and Wildl. Serv. Adak, AK. 13pp.
- Byrd, G.V., J.C. Williams, and A. Durand. 1992. Observations of emperor geese in the Aleutian Islands during the winter of 1991-1992. Unpub. Rept. U.S. Fish and Wildl. Serv., Adak, AK. 21pp.
- Dau, C.P. and R.J. King. 1986. Spring survey of emperor geese in southwestern Alaska, 4-7 May 1986. Unpubl. Rept., U.S. Fish and Wildl. Serv., Izembek NWR, Cold Bay, AK. 26pp.
- Dau, C.P. and E.J. Mallek. 2005. Aerial survey of emperor geese and other waterbirds in southwest Alaska, spring 2005. Unpubl. Rept., U.S. Fish and Wildl. Serv., Migratory Bird Management, Anchorage, AK.
- Dorogoi, I.V. and M. Beaman. 1997. On the increase of the breeding range of emperor goose (*Anser canagicus*). *Cazarka* 3: 382 (1997).
- Eisenhauer, D.I. and C.M. Kirkpatrick. 1977. Ecology of the emperor goose in Alaska. *Wildl. Monogr.* 57. 67pp.
- Eldridge, W.D. 1987. Aleutian Island emperor goose survey - Trip Report. U.S. Fish and Wildl. Serv., Migratory Bird Management, Anchorage, AK. 6pp.
- Eldridge, W.D. and K.S. Bollinger. 1988. Molting emperor goose survey of St. Lawrence Island, Alaska. Unpubl. Rept. U.S. Fish and Wildl. Serv., Anchorage, AK. 6pp.
- Eldridge, W.D. and J.I. Hodges. 2004. Report to the Pacific Flyway Committee on the 1985-2004 Coastal Zone Yukon-Kuskokwim Delta Goose Survey of geese, swans and sandhill cranes. Memorandum, U.S. Fish and Wildl. Serv., Migratory Bird Management, Anchorage, AK. 14pp.

- Evans, T.J., D.M. Burn and A.R. DeGange. 1997. Distribution and relative abundance of sea otters in the Aleutian Archipelago. Unpubl. Rept. U.S. Fish and Wildl. Serv., Marine Mammal Mgmt. (MMM97-5), Anchorage, AK. 29pp.
- Evans, T.J., D.M. Burn and A.R. DeGange. 1997. Distribution and relative abundance of sea otters in the Aleutian Archipelago. Unpubl. Rept. U.S. Fish and Wildl. Serv., Marine Mammal Mgmt. (MMM97-5), Anchorage, AK. 29pp.
- Fall, J.A. and J.M. Morris. 1987. Fish and wildlife harvest in Pilot Point, Ugashik, and Port Heiden, Alaska Peninsula, 1986-1987. Alaska Dept. of Fish and Game, Div. of Subsistence. Juneau, AK. Tech. Paper 158. 161pp.
- Fay, F.H. and T.J. Cade. 1959. An ecological analysis of the avifauna of St. Lawrence Island, Alaska. Univ. Calif. Publ. Zool. 63(2) :73-150.
- Fay, F.H. 1961. The distribution of waterfowl to St. Lawrence Island. Wildfowl 12: 70-80.
- Fischer, J.B., R.A. Stehn, T.D. Bowman and G. Walters. 2004. Nesting populations and potential production of geese and spectacled eiders on the Yukon-Kuskokwim Delta, Alaska in 2004. Unpubl. Rept., U.S. Fish and Wildl. Serv., Migratory Bird Management, Anchorage, AK. 25pp.
- Friedmann, H. 1932. The birds of St. Lawrence Island, Bering Sea. Proc. U.S. National Museum 80(12): 1-31.
- Gabrielson, I.N. and F.C. Lincoln. 1959. The Birds of Alaska. Stackpole Co., Harrisburg, Pa. 922pp.
- Hamilton-Paterson, J. 1992. The great deep: the sea and its thresholds. Random House, New York. 330pp.
- Hodges, J.I. and W.D. Eldridge. 2001. Aerial waterfowl surveys of eiders and other waterbirds on the eastern Arctic coast of Russia. Wildfowl 52: 127-142.
- Hogan, M.E. and M.B. Rearden. 1987. Emperor goose survey of St. Lawrence Island, Alaska, 9 June 1987. Unpubl. Rept. U.S. Fish and Wildl. Serv., Anchorage, AK. 5pp.
- Hupp, J.W., J.A. Schmutz and C.R. Ely. 2001. Migration, winter movement, and spring pre-nesting interval of emperor geese. Unpubl. Rept. U.S. Geol. Surv., Alaska Biological Science Center, Anchorage, AK. 35pp.
- Hupp, J.W., J.A. Schmutz and C.R. Ely. 2004. Migration, winter distribution and spring pre-nesting interval of emperor geese. Unpubl. Rept. U.S. Geol. Surv., Alaska Biological Science Center, Anchorage, AK. 23pp.

- Jones, N.G.B. 1972. Moulting migration of emperor geese. *Wildfowl* 23(1972):92-93.
- Kenyon, K.W. 1962. Sea Otter Studies, Population and Distribution (with notes on Steller's sea lions and emperor goose). Unpubl. Rept. U.S. Fish and Wildl. Serv., Branch of Wildl. Research, Seattle, Wa. 47pp.
- Kessel, B. 1989. Birds of the Seward Peninsula, Alaska. Univ. Alaska Press. Fairbanks, AK. 330pp
- King, J.G. 1965. Waterfowl Migration Spring 1964. Memo dated 19 January 1965 to Manager, Izembek National Wildlife Refuge. U.S. Bureau of Sport Fisheries and Wildlife. Anchorage, AK.
- King, J.G. and C.J. Lensink. 1971. An evaluation of Alaskan habitat for migratory birds. Unpub. Rept. U.S. Bureau of Sport Fisheries and Wildlife. Washington, D.C. 72pp.
- King, J.G. and C.P. Dau. 1981. Waterfowl and their habitats in the eastern Bering Sea. p 739-753 in Hood, D.W. and J.A. Calder (eds.) *The Eastern Bering Sea Shelf: Oceanography and Resources*. Univ. Washington Press, 1981, 2 Vols. 1339pp.
- King, J.G. and D.V. Derksen. 1984. Alaska goose populations: past, present and future. *Trans. N.A. Wildl. & Nat. Res. Conf.* 51: 464-479.
- King, R.J. and W.I. Butler. 1987. Emperor goose survey of St. Lawrence Island, Alaska, 28 July 1987. Unpubl. Rept. U.S. Fish and Wildl. Serv., Fairbanks, AK. 4pp.
- King, R.J. and D.V. Derksen. 1986. Waterfowl survey of St. Lawrence Island, Alaska 13 July 1984. Unpubl. Rept. U.S. Fish and Wildl. Serv., Fairbanks, AK. 4pp.
- Kistchinski, A.A. 1972. On the biology of the emperor goose. pp 149-162 in Kumari, E. (ed.) *Geese of the USSR, Proc. of Conf., Estonia, May 1970*. Tartu. 178pp.
- Kistchinski, A.A. 1973. Waterfowl in Northeast Asia. *Wildfowl* 24:88-102.
- Kistchinski, A.A. 1976. A number of waterfowl in Chukotski peninsula. *Bull. MOIP* 81:40-50 (In Russian). 24
- Kistchinski, A.A. 1988. Avifauna of Northeast Asia, history and modern state. Nauka (Moscow). 288pp. (In Russian).
- Klein, D.R. 1966. Waterfowl in the economy of the Eskimos on the Yukon-Kuskokwim Delta, Alaska. *Arctic* 19(4) :319-336.
- Kolosov, A.M. and O.A. Skarlato. 1983 (ed). Red book for the Russian Soviet Federated Socialist Republic. Academy of Sciences. Bureau of Hunting, Agriculture and Preserves. Ministry of the Russian Soviet Federated Socialist Republic. 456pp.

- Krechmar, A.V. and A.Y. Kondratyev. 1982. Nesting ecology of the emperor goose (*Philacte canagicus*) in the north of the Chukotka Peninsula. *Zool Zhurnal* 61(2):254-264. (in Russian).
- Lensink, C.J. 1969. Family bond as a factor in the migration of geese. Unpubl. Reports. U.S. Fish and Wildlife Service, Bethel, AK. (No.1, 8pp; No. 2, 6pp; No. 3, 4pp)
- Laing, K.K. and D.G. Raveling. 1993. Habitat and food selection by emperor goose goslings. *Condor* 95:979-888.
- Mallek, E.J. and C.P. Dau. 2004. Aerial survey of emperor geese and other waterbirds in southwest Alaska, fall 2004. Unpubl. Rept., U.S. Fish and Wildl. Serv., Migratory Bird Management, Anchorage, AK. 17pp.
- Mickelson, P.G. 1975. Breeding biology of cackling geese and associated species on the Yukon-Kuskokwim Delta, Alaska. *Wildl. Monogr.* 45. 35pp.
- Murie, O.J. 1936. The Birds of St. Lawrence Island, Alaska. Appendix V, pp. 359-376 in Geist, O.W. and F.G. Rainey. 1936. Archeological Excavations at Kukulik, St Lawrence Island, Alaska. Misc. Publ., Univ. of Alaska, Vol. II. Washington, D.C.
- Murie, O.J. 1959. Fauna of the Aleutian Islands and Alaska Peninsula. No. Am. Fauna 61. USDI-Fish and Wildl. Serv., Washington, D.C. 406pp.
- Owen, M. 1980. Wild geese of the world. B.T. Batesford Ltd., London. 236pp.
- Pacific Flyway Council. 1988. Pacific Flyway management plan for emperor geese. Emperor Goose Subcomm., Pacific Flyway Study Comm. [c/o USFWS], Portland, Or. Unpubl. Rept. 31pp. + appendix.
- Palmer, R.S. ed., 1976. Handbook of North American birds, Vol. 2 (Part 1). University Press, New Haven: Yale. 521pp.
- Petersen, M.R. 1983. Observations of emperor geese feeding at Nelson Lagoon, Alaska. *Condor* 85:367-368.
- Petersen, M.R. 1985. The emperor goose. Pages 453-457 in DiSilvestro, R.L. (ed.) Audubon wildlife Report. The National Audubon Society, New York.
- Petersen, M.R. 1987. Nesting ecology of emperor (*Anser canagicus*) and cackling Canada geese (*Branta canadensis minima*) at Kokechik Bay, Yukon-Kuskokwim Delta, Alaska. Unpubl. Rept. U.S. Fish and Wildl. Serv. Alaska Fish and Wildl. Research Center. Anchorage, AK.

- Petersen, M.R. 1990. Nest-site selection by emperor geese and cackling Canada geese. *Wilson Bull.* 102:413-426.
- Petersen, M.R. 1991. Reproductive ecology of emperor geese. Ph.D. thesis. Univ. of California, Davis.
- Petersen, M.R. 1992a. Reproductive ecology of emperor geese: annual and individual variation in nesting. *Condor* 94:383-397.
- Petersen, M.R. 1992b. Reproductive ecology of emperor geese: survival of adult females. *Condor* 94:398-406.
- Petersen, M.R. and R.E. Gill, Jr. 1982. Population and status of emperor geese along the north side of the Alaska Peninsula. *Wildfowl* 133:31-38.
- Petersen, M.R., J.A. Schmutz and R.F. Rockwell. 1994. Emperor goose (*Chen canagica*). *The Birds of North America*, No. 97 (A. Poole and F. Gill, eds.) .Philadelphia: The Academy of Natural Sciences, Washington D.C. 20pp.
- Platte, R.M. and R.A. Stehn. 2002. Relative abundance, trends, and distribution of waterbirds from aerial breeding pair surveys, 1988-2001, on the coastal zone of the Yukon-Kuskokwim Delta, Alaska. Unpub. Rept. U.S. Fish and Wildl. Serv., Migratory Bird Management, Anchorage, AK. 39pp.
- Portenko, L.A. 1981. Birds of the Chukchi Peninsula and Wrangel Island. Smithsonian Institution and National Science Foundation, Washington, D.C. and Amerind Publishing, New Delhi.
- Schmutz, J.A. 1992. Survival and migration ecology of emperor geese along the Alaska Peninsula. Unpubl. Rept. U.S. Fish and Wildl. Serv. Alaska Fish and Wildl. Research Center. Anchorage, AK. 17pp.
- Schmutz, J.A. 1993. Survival and pre-fledging body mass in juvenile emperor geese. *Condor* 95:222-225.
- Schmutz, J.A. 1994. Age, habitat, and tide effects on feeding activity of emperor geese during autumn migration. *Condor* 96:46-51.
- Schmutz, J.A., R.F. Rockwell, and M.R. Petersen. 1993. Progress Report 1993: Population modeling of emperor geese. Unpubl. Rept. U.S. Fish and Wildl. Serv., Alaska Fish and Wildlife Research Center, Anchorage, AK. 17pp.
- Schmutz, J.A., S.E. Cantor, and M.R. Petersen. 1994. Seasonal and annual survival of emperor geese. *J. Wildl. Manage.* 58:525-535.

- Schmutz, J.A. and A.Y. Kondratyev. 1995. Evidence of emperor geese breeding in Russian and staging in Alaska. *Auk* 112(4): 1037-1038.
- Seppi, B.E. 1997. Fall migration of shorebirds and waterfowl at Carter Spit, Alaska. BLM-Alaska Open File Rept. 65. USDI-Bureau of Land Manage., Anchorage, AK. 36pp.
- Stanek, R.T. 1990. Unpublished subsistence harvests at False Pass and Nelson Lagoon, Alaska. Unpubl. Rept., Alaska Department of Fish and Game, Div. of Subsistence, Anchorage, AK.
- Stehn, R.A. 1991. Nesting populations and production of geese on the Yukon-Kuskokwim Delta. U.S. Fish and Wildlife Service, Alaska Fish and Wildl. Research Center. Anchorage, AK. 45pp.
- Stickney, A.A. 1989. The foraging behavior, habitat use, and diet of arctic foxes (*Alopex lagopus*) in a goose nesting area near Kokechik Bay, Alaska. M.Sc. thesis. Univ. Alaska, Fairbanks.
- Trost, R.E. and M.S. Drut. 2004. 2004 Pacific Flyway Data Book. Unpubl. rept., USFWS-DMBM, Portland, Or. 60pp.
- Wentworth, C. and D. Wong. 2001. Subsistence waterfowl harvest survey Yukon-Kuskokwim Delta, 1995-1999. Unpubl. Rept. U.S. Fish and Wildl. Serv., Anchorage, AK. 125pp.
- Wolfe, R.J., A.W. Paige, and C.L. Scott. 1990. The subsistence harvest of migratory birds in Alaska. Alaska Dept. of Fish and Game, Div. of Subsistence, Juneau, AK. Tech. Paper No. 197. 183pp.
- Wolfe, R.J. and A.W. Paige. 2002. The subsistence harvest of black brant, emperor geese and eider ducks in Alaska. Alaska Dept. of Fish and Game, Div. of Subsistence, Juneau, AK. Tech. Paper No. 234. 112pp.

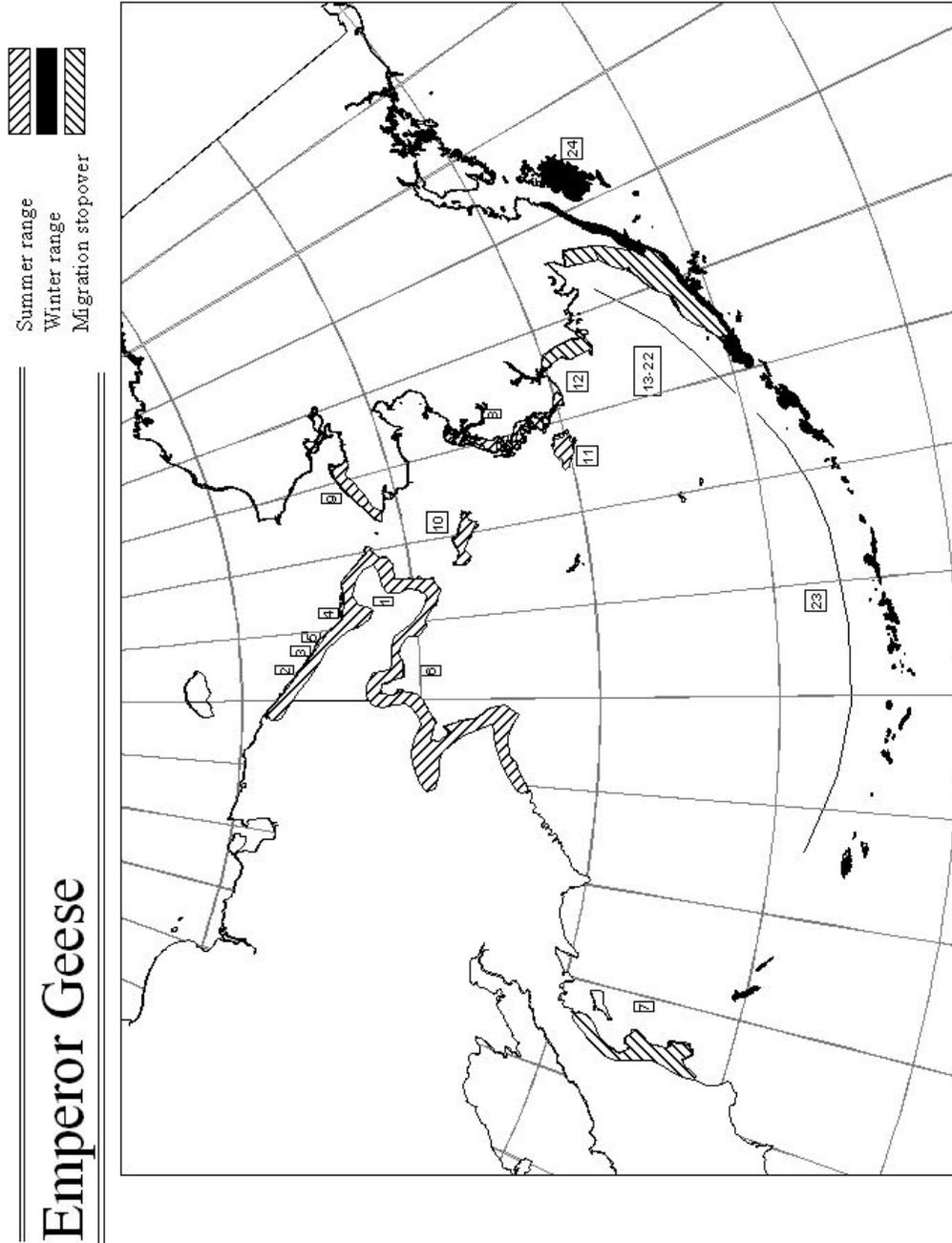


Figure 1. Range of the emperor goose (Numbers refer to Appendix A).

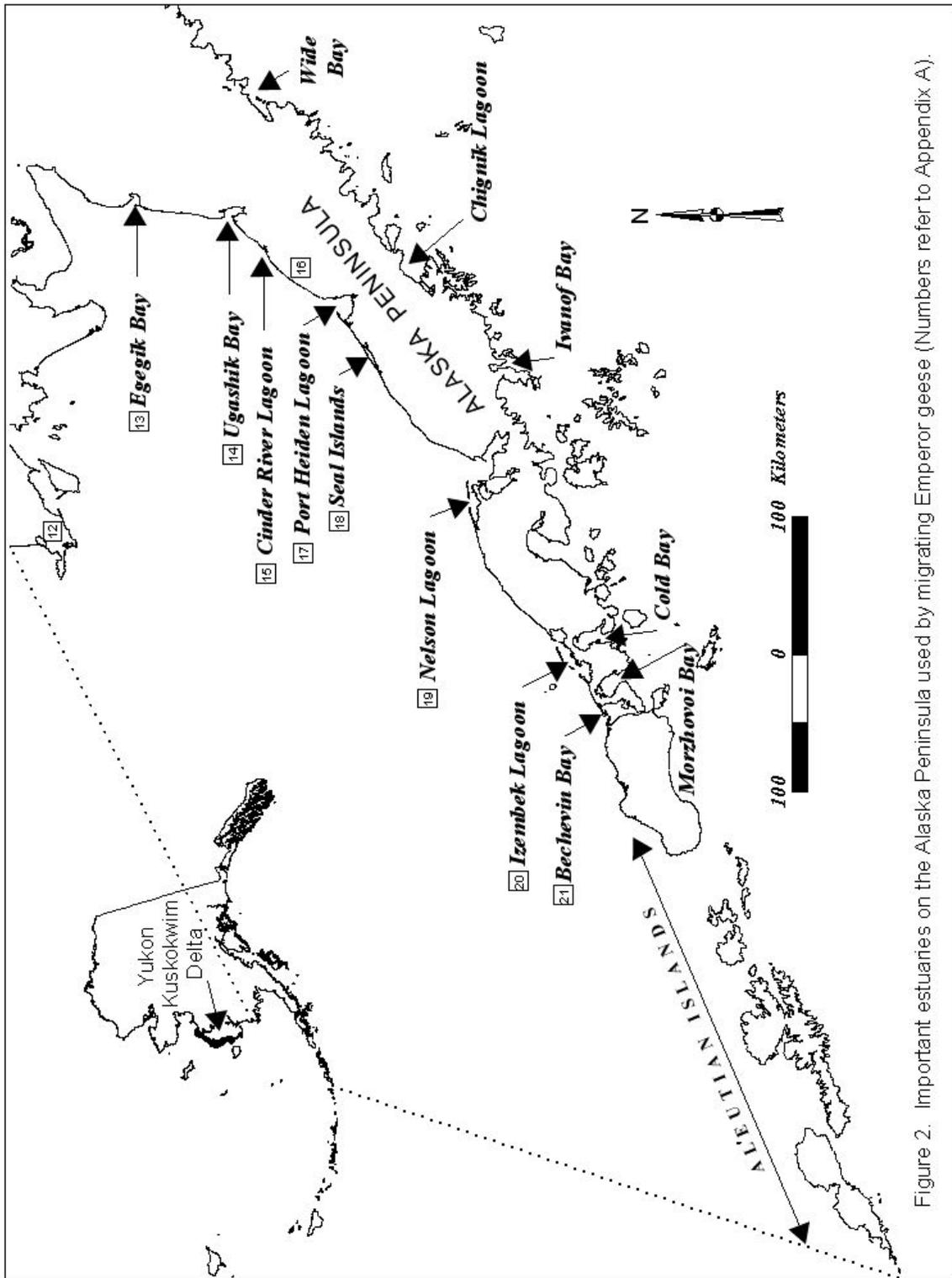


Figure 2. Important estuaries on the Alaska Peninsula used by migrating Emperor geese (Numbers refer to Appendix A).

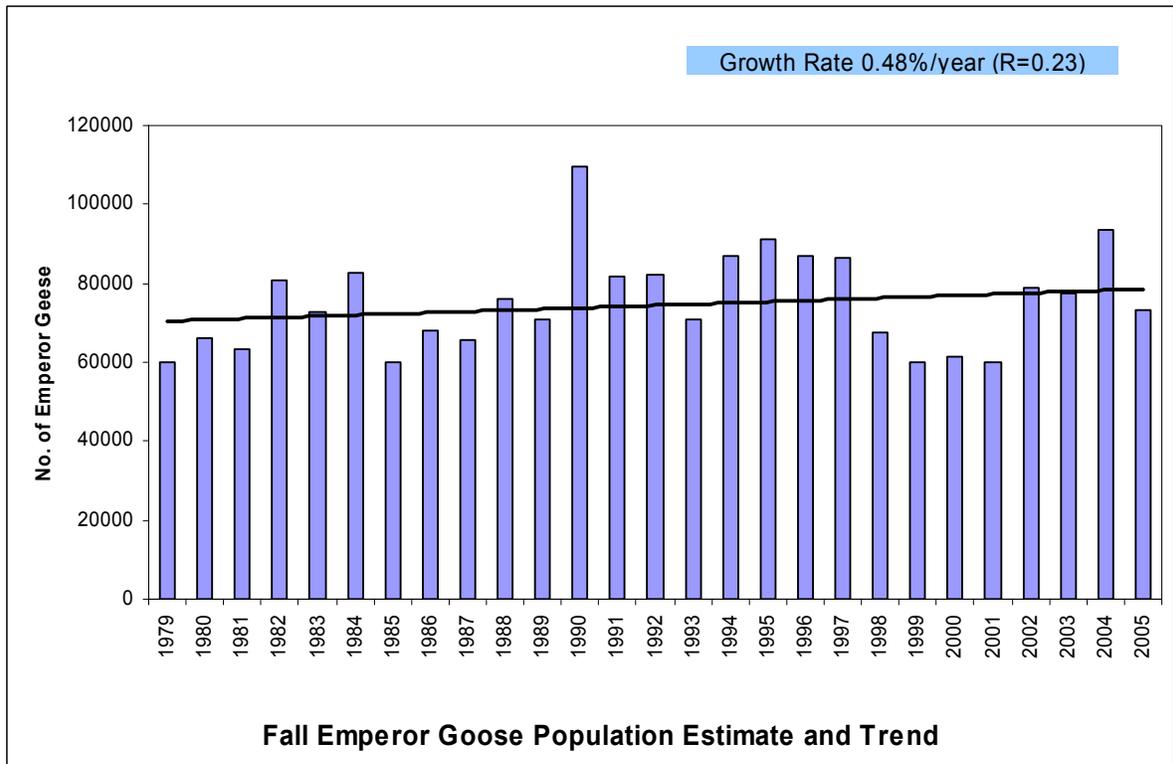
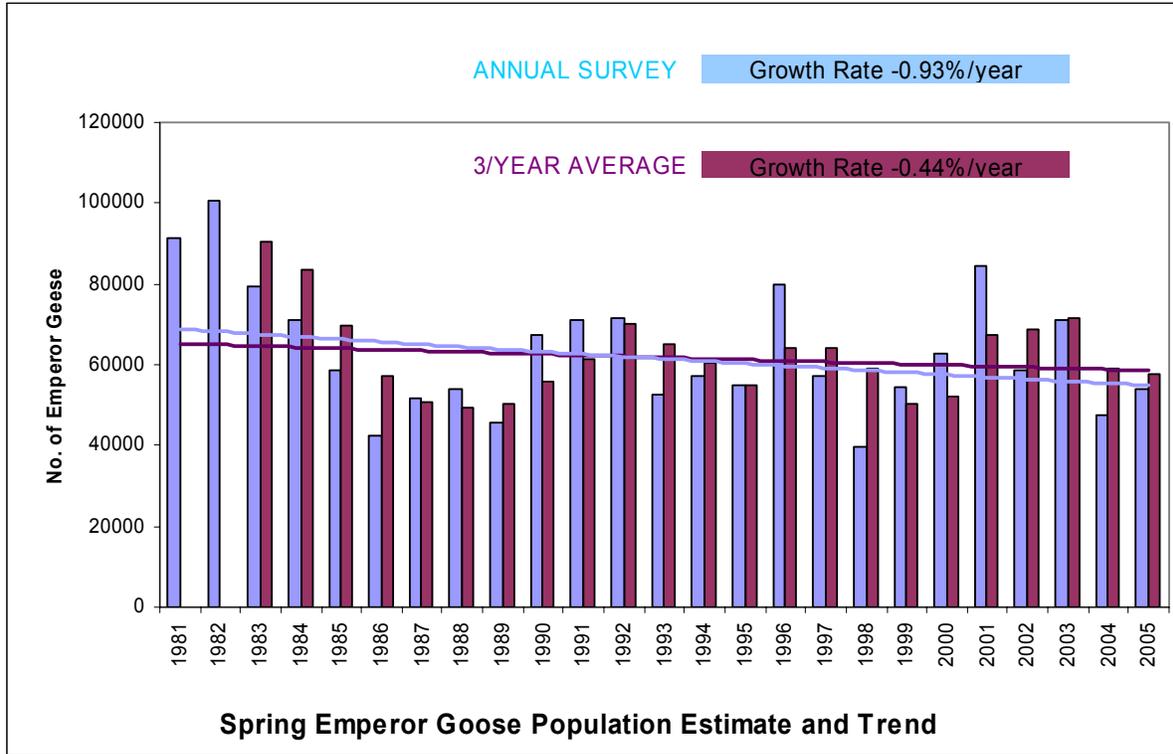
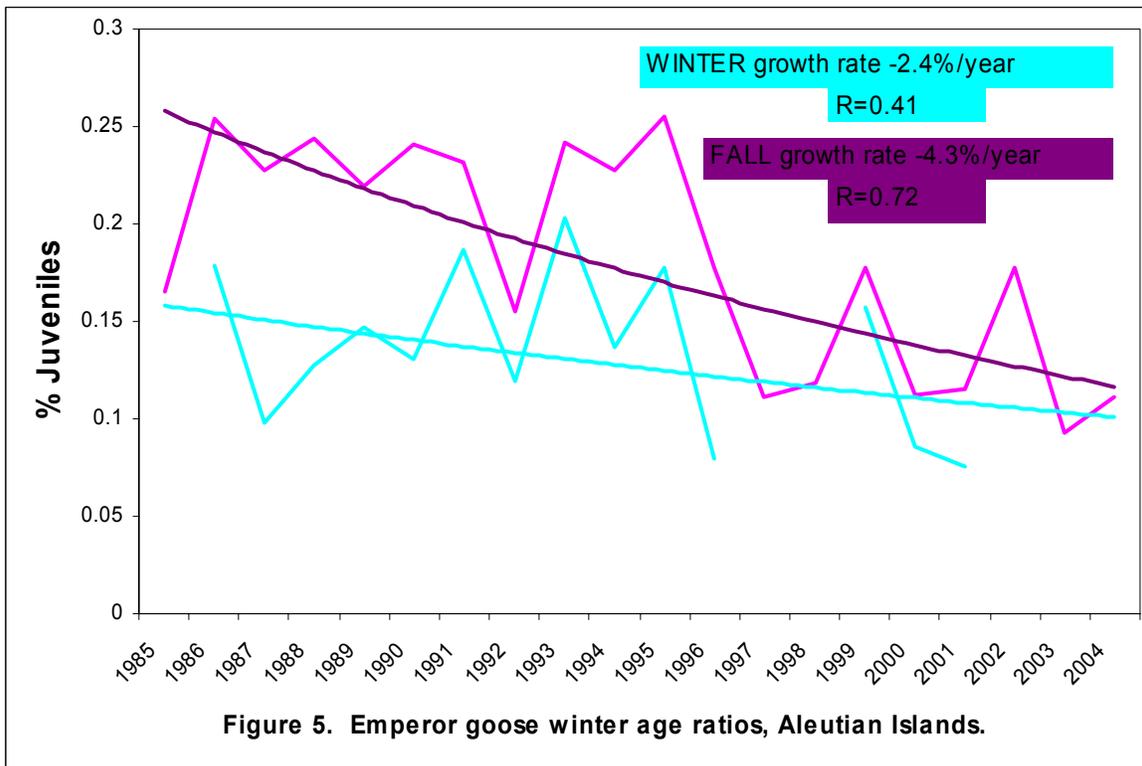
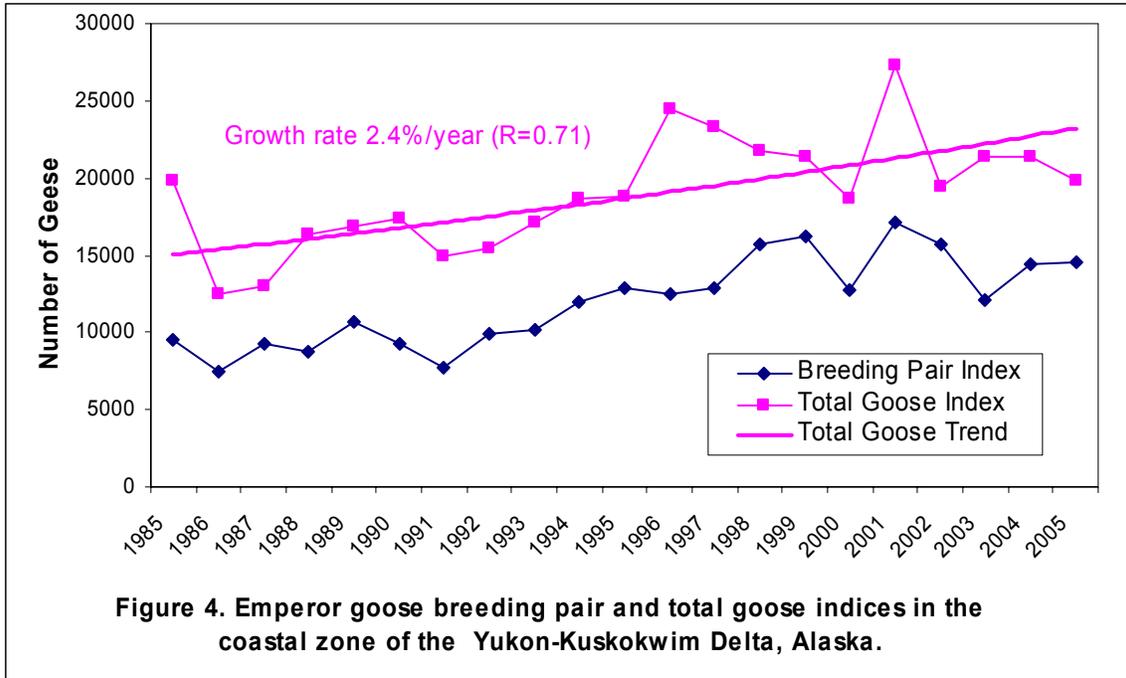


Figure 3. Emperor goose population estimates during spring and fall migration.



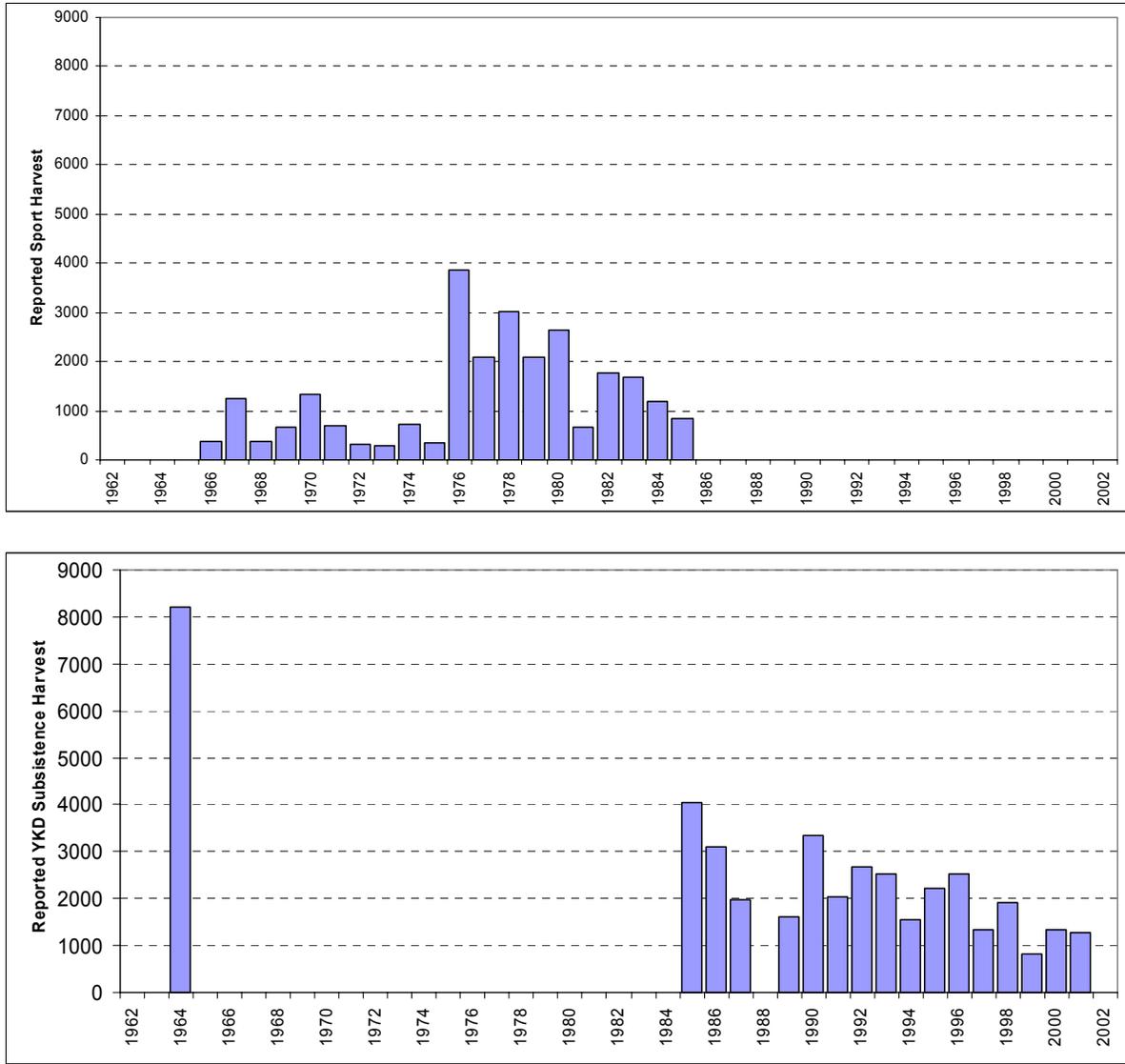


Figure 6. Emperor goose harvest estimates.

Appendix 1. Descriptions of key emperor goose use areas in Alaska and the Russian Far East.

Area	Use	Number <sup>1</sup>	Season	Ownership	Threats
<b>RUSSIA</b>					
1. Chukotsk coastal areas (Cape Schmidt to Mallen Lagoon)	Nesting	3,000-8,000	Spring-Summer		Hunting/Oil Spill/Unknown
	Molting	>21,500			
2. Tenkergynpilken Lagoon	Molting	<21,500	Summer		Hunting/Oil Spill/Unknown
3. Ukouge Lagoon	Molting	>2,000	Summer		Hunting/Oil Spill/Unknown
4. Kolyuchinskaya Bay	Nesting Molting	Unknown <21,500	Spring-Summer		Hunting/Oil Spill/Unknown
5. Vankarem Lagoon	Nesting	Unknown	Spring-Summer		Hunting/Oil Spill/Unknown
6. Kresta Bay	Nesting	Unknown	Spring-Summer		Hunting/Oil Spill/Unknown
7. Kamchatka Peninsula/ Commander Islands	Wintering	Unknown	Winter	Nature Reserves	Oil Spill/Unknown
<b>ALASKA</b>					
8. Yukon-Kuskokwim Delta	Nesting	80-90% of pop	Spring-Summer	Yukon Delta NWR, 22(g) lands	Hunting/Oil Spill/Predation
	Molting	80-90% of pop			
9. Kotzebue Sound coastal	Nesting	+1,000	Spring-Summer	50% Bering Land Bridge NP	Hunting/Oil Spill/Unknown
10. St. Lawrence Island	Nesting Molting	≤300-1,000 3,000-10,000	Spring-Summer Summer	Native owned	Hunting/Oil Spill/Unknown
11. Nunivak Island	Nesting	Unknown	Spring-Summer	Yukon Delta NWR, 22(g) lands	Hunting/Oil Spill/Unknown
	Staging	2,000/2,000	Spring/Fall	Yukon Delta NWR, 22(g) lands	Hunting/Oil Spill/Unknown
12. Chagvan Bay/Nanvak Bay	Staging	11,200/200	Spring/Fall	Togiak NWR	Hunting/Oil Spill/Unknown

## Appendix 1. Continued.

Area	Use	Number <sup>1</sup>	Season	Ownership	Threats
13. Egegik Bay	Staging	1,800/2,300	Spring/Fall	Part Egegik State CHA	Hunting/Oil Spill/Unknown
14. Ugashik Bay	Staging	4,275/2,500	Spring/Fall	Part Pilot Point State CHA	Hunting/Oil Spill/Unknown
15. Cinder River Lagoon	Staging	13,825/24,000	Spring/Fall/Winter	Cinder River State CHA	Hunting/Oil Spill/Unknown
16. Hook Lagoon	Staging	1,000/2,000	Spring/Fall/Winter	Private Lands	Hunting/Oil Spill/Unknown
17. Port Heiden	Staging	33,187/28,600	Spring/Fall/Winter	Port Heiden State CHA	Hunting/Oil Spill/Unknown
18. Seal Island	Staging	14,000/20,000	Spring/Fall/Winter	Private Lands	Hunting/Oil Spill/Unknown
19. Nelson Lagoon	Staging	60,000/39,400	Spring/Fall/Winter	Part Port Moller State CHA	Hunting/Oil Spill/Unknown
20. Izembek Lagoon	Staging	18,300/9,100	Spring/Fall/Winter	Izembek NWR/SGR, 22(g) land	Hunting/Oil Spill/Unknown
21. Unimak/False Pass	Staging	120/4,000	Spring/Fall/Winter	Izembek NWR, 22(g) land	Hunting/Oil Spill/Unknown
22. Alaska Peninsula (south side)	Staging	4,200/9,600	Spring/Fall/Winter	Alaska Peninsula, Becharof, and Izembek NWRs	Hunting/Oil Spill/Unknown
23. Aleutian Islands	Wintering	Unknown	Winter	Alaska Maritime NWR, DOD land	Hunting/Oil Spill/Unknown
24. Kodiak Island	Wintering	Unknown	Winter	Kodiak NWR, 22(g) land	Hunting/Oil Spill/Unknown

<sup>1</sup> Areas 12-22, numbers are averages for Spring/Fall emperor goose surveys.

Appendix 2. Population indices for emperor geese - spring and fall surveys, 1979-2005.

<b>Year</b>	<b>Spring Survey</b>	<b>3/Year Spring Average</b>	<b>Fall Survey</b>
1979			59808
1980			65971
1981	91267		63130
1982	100643		80708
1983	79155	90355	72551
1984	71217	83672	82842
1985	58833	69735	59790
1986	42231	57427	68116
1987	51633	50899	65663
1988	53776	49213	76165
1989	45800	50403	70729
1990	67581	55719	109531
1991	70962	61448	81782
1992	71319	69954	82295
1993	52546	64942	71051
1994	57267	60377	87086
1995	54852	54888	91009
1996	80034	64051	87018
1997	57059	63982	86669
1998	39749	58947	67744
1999	54600	50469	60226
2000	62565	52305	61626
2001	84396	67187	59987
2002	58743	68568	78692
2003	71160	71433	77290
2004	47352	59085	93544
2005	53965	57492	73212

Data provided by USFWS, Migratory Bird Management, Anchorage.

Appendix 3. Indicated total and pair indices for emperor geese from the coastal zone of the Yukon-Kuskokwim Delta, Alaska, 1985-2005.

Year	Pairs <sup>1</sup>	Indicated Total Geese	SE
1985	9,542	19,805	1,960
1986	7,413	12,430	1008
1987	9,312	13,035	1,121
1988	8,695	16,392	1,402
1989	10,737	16,855	1,220
1990	9,282	17,347	1,401
1991	7,758	14,888	1,284
1992	9,879	15,416	994
1993	10,183	17,147	1,230
1994	12,007	18,733	1,059
1995	12,892	18,764	1,072
1996	12,433	24,413	2,476
1997	12,820	23,287	1,451
1998	15,686	21,741	1,541
1999	16,208	21,406	1,591
2000	12,798	18,667	949
2001	17,112	27,297	1,473
2002	15,646	19,504	1,326
2003	12,141	21,378	1,746
2004	14,410	21,396	1,097
2005	14,490	19,798	1,190

<sup>1</sup> Indicated pairs = 2 x (singles + pairs)

Appendix 4. Population size estimates of nests and eggs on the Yukon-Kuskokwim Delta (YKD), Alaska 1985-2005. The number of nests and eggs outside the ground sampled area was calculated by multiplying the ground sampled estimate by the ratio of indicated breeding pairs outside/inside the ground sampled area, as determined by aerial surveys. Indicated breeding pairs were based on twice the number of singles plus the number of birds in pairs observed.

Year	# plots	Total		Active		Active		Clutch	
		Nests	SE	Nests	SE	Eggs	SE	Size	n
1985	48	19941	4653	9452	2967	49422	15312	5.2	113
1986	101	25432	2447	17830	1752	90482	8933	5.2	218
1987	125	24569	2491	22728	2320	114672	12048	5.1	361
1988	95	16480	2133	15033	2081	77714	11937	5.1	192
1989	89	25862	3236	23089	2816	116311	14387	5.1	292
1990	101	24239	2015	21438	1957	107902	9741	4.9	288
1991	97	33066	3232	31432	3076	155655	16039	5.0	356
1992	66	26807	2645	25548	2608	127809	13305	5.0	259
1993	99	24085	2524	22851	2428	108142	11652	4.9	285
1994	43	38294	4053	36231	3949	179393	20344	4.9	308
1995	50	31388	3431	30367	3363	147737	16140	4.9	297
1996	54	32086	3031	30264	2947	155068	15507	5.1	280
1997	75	22062	2227	21142	2184	101024	10497	4.8	230
1998	72	26890	2653	25515	2583	119215	12226	4.7	266
1999	59	31391	3087	28971	2878	128247	12718	4.5	224
2000	80	35490	3607	34982	3549	174409	17979	5.0	344
2001	81	14174	1390	10995	1207	52486	6179	4.8	127
2002	84	36062	4226	33546	3952	168609	19806	5.0	303
2003	83	24166	2784	19334	2407	92930	12085	4.8	211
2004	81	32324	3085	30866	2991	150507	14764	4.9	338
2005	83	37645	3438	35448	3228	178427	16361	5.0	380

Appendix 5. Fall age ratio estimates from aerial photographs of emperor geese on the north side of the Alaska Peninsula, 1985-2005.

<b>Year</b>	<b>Age Ratio</b>	<b>SE</b>	<b>No. Geese Classified</b>	<b>No. Photos</b>
1985	0.165	0.026	3,193	155
1986	0.254	0.051	6,830	311
1987	0.228	0.008	10,177	703
1988	0.244	0.009	11,180	483
1989	0.219	0.011	12,718	390
1990	0.241	0.009	13,541	474
1991	0.232	0.009	14,569	412
1992	0.155	0.008	14,832	403
1993	0.242	0.013	5,735	255
1994	0.228	0.01	16,881	479
1995	0.255	0.013	11,664	361
1996	0.178	0.014	10,793	182
1997	0.111	0.008	11,138	205
1998	0.118	0.007	16,544	336
1999	0.178	0.01	13,489	392
2000	0.112	0.009	7,748	263
2001	0.115	0.008	11,186	365
2002	0.178	0.01	6,458	402
2003	0.093	0.007	8,686	421
2004	0.111	0.007	6,237	370
2005	Waiting data.			

Appendix 6. Emperor goose annual production estimates, Izembek NWR, 1966-2005.

Year	Adults	Juveniles	Total Classified	% Juveniles
1966	699	265	964	27.5
1967	1,457	585	2,042	28.6
1968	1,195	585	1,780	32.9
1969	4,149	2,980	7,129	41.8
1970	9,722	4,933	14,655	33.7
1971	1,842	3,458	11,600	29.8
1972	4,680	2,270	6,950	32.7
1974	2,025	377	2,402	15.7
1975	744	405	1,149	35.2
1976	1,923	324	2,247	14.4
1977	996	683	1,679	40.7
1978	1,395	495	1,890	26.2
1979	841	113	954	11.8
1980	1,777	586	2,363	24.8
1981	1,067	495	1,562	31.7
1982	1,653	140	1,793	7.8
1983	1,058	393	1,451	27.1
1984	2,753	795	3,548	22.4
1985	2,245	503	2,748	18.3
1986	3,283	1,381	4,664	29.6
1987	2,926	1,523	4,512	33.8
1988	3,884	1,242	5,126	24.2
1989	3,811	1,136	4,947	23.0
1990	4,002	1,068	5,070	21.1
1991	8,599	2,882	11,481	25.1
1992	9,291	1,347	10,638	12.7
1993	13,976	2,176	16,152	13.5
1994	4,658	792	5,450	14.5
1995	6,434	1,618	8,052	20.1
1996	3,128	631	3,759	16.8
1997	1,345	144	1,489	10.0
1998	1,595	432	2,027	21.4
1999	2,395	527	2,922	18.0
2000	1,870	410	2,280	18.0
2001	1,232	228	1,460	15.6
2002	4,789	1,842	6,631	27.8
2003	5,744	785	6,529	12.0
2004	4,600	1,288	5,888	21.9
2005	2,844	1,139	3,983	28.6

Appendix 7. Emperor goose family group counts at the Izembek NWR, 1966-2005.

Year	Total Families	Total Juveniles	Avg. Family Group Size
1966	132	331	2.51
1967	66	215	3.26
1968	40	112	2.80
1969	161	530	3.29
1970	383	1,115	2.91
1971	484	1,318	2.72
1972	210	641	3.05
1974	50	130	2.60
1975	51	149	2.92
1976	207	567	2.74
1977	108	302	2.80
1978	62	188	3.03
1979	53	175	3.30
1980	40	93	2.33
1981	181	571	3.15
1982	32	85	2.66
1983	192	612	3.19
1984	80	230	2.88
1985	125	354	2.83
1986	266	794	2.98
1987	186	577	3.10
1988	200	616	3.08
1989	145	455	3.14
1990	97	309	3.19
1991	147	487	3.31
1992	151	451	2.99
1993	161	441	2.74
1994	301	703	2.34
1995	99	319	3.22
1996	125	330	2.64
1997	43	114	2.65
1998	97	239	2.46
1999	82	200	2.44
2000	105	229	2.18
2001	42	103	2.45
2002	260	696	2.68
2003	218	439	2.01
2004	235	568	2.42
2005	131	365	2.79

Appendix 8. Emperor goose winter productivity estimates, Aleutian Islands, Alaska<sup>1</sup>.

<b>Year</b>	<b>Estimates<sup>2</sup></b>		<b>Total</b>	<b>% Juveniles</b>
	<b>Adults</b>	<b>Juveniles</b>		
1988/89	4142	597	4739	12.6
1989/90	5249	923	6172	15
1990/91	3595	537	4132	13
1991/92	13424	2925	16349	17.9
<b>Sum</b>	26410	4982	31392	
<b>Average</b>	6603	1249	7849	15.9

<sup>1</sup> Data supplied by the Alaska Maritime NWR - Aleutians Islands Unit.

<sup>2</sup> Estimates represent cumulative totals from multiple surveys.

Appendix 9. Reported fall harvest of emperor geese in Alaska, 1970-1986.

Year	Harvest <sup>1</sup>
1970	1,400
1971	715
1972	1,840
1973	2,373
1974	2,067
1975	2,891
1976	2,592
1977	2,198
1978	2,968
1979	2,055
1980	2,306
1981	700
1982	1,770
1983	1,674
1984	1,188
1985	835
1986-Present	Closed

<sup>1</sup> Harvest information based on ADF&G mail questionnaire surveys (1970-76 and 1982-85) and USFWS harvest surveys (1977-81).

Appendix 10. Emperor goose spring population and subsistence harvest estimates, 1985-2002.

Year	Population Size	Y-K Delta		Bristol Bay		Togiak		Alaska Peninsula	
		Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)
1985	58,833	4031 (6.9)							
1986	42,231	3091 (7.3)							
1987	51,633	1352 (2.6)							
1988	53,776	No Survey							
1989	45,800	1616 (3.5)							
1990	67,581	3440 (5.1)							
1991	70,962	2394 (3.4)							
1992	71,319	2669 (3.9)							
1993	52,546	2602 (5.0)							
1994	57,267	1493 (2.6)							
1995	54,852	2041 (3.7)		123 (0.22)		187 (0.34)		144 (0.26)	
1996	80,034	2374 (3.0)		No Survey		32 (0.04)		148 (0.18)	
1997	57,059	1469 (2.6)		16 (0.03)		97 (0.17)		236 (0.41)	
1998	39,749	1899 (4.8)		No Survey		481 (1.20)		126 (0.32)	
1999	54,600	818 (1.5)		37 (0.07)		113 (0.21)		No Survey	
2000	62,565	1352 (2.2)		No Survey		59 (0.09)		249 (0.40)	
2001	84,396	1078 (1.3)		45 (0.05)		8 (0.01)		173 (0.20)	
2002	58,743	1250 (2.1)		NA		NA		NA	

# Fall 2015 Regional Advisory Council Meeting Calendar

August–November 2015

Meeting dates and locations are subject to change.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Aug. 16	Aug. 17 <b>WINDOW OPENS</b>	Aug. 18	Aug. 19	Aug. 20	Aug. 21	Aug. 22
Aug. 23	Aug. 24	Aug. 25	Aug. 26	Aug. 27	Aug. 28	Aug. 29
Aug. 30	Aug. 31	Sept. 1	Sept. 2	Sept. 3	Sept. 4	Sept. 5
Sept. 6	Sept. 7 <b>HOLIDAY</b>	Sept. 8	Sept. 9	Sept. 10	Sept. 11	Sept. 12
Sept. 13	Sept. 14	Sept. 15	Sept. 16	Sept. 17	Sept. 18	Sept. 19
Sept. 20	Sept. 21	Sept. 22	Sept. 23	Sept. 24	Sept. 25 <b>K/A—Adak</b>	Sept. 26
Sept. 27	Sept. 28	Sept. 29	Sept. 30 <i>End of Fiscal Year</i>	Oct. 1	Oct. 2	Oct. 3
Oct. 4	Oct. 5	Oct. 6 <b>NWA—Buckland (tent.)</b>	Oct. 7 <b>YKD—TBA</b>	Oct. 8	Oct. 9	Oct. 10
Oct. 11	Oct. 12	Oct. 13 <b>SE—Petersburg</b>	Oct. 14 <b>SP—Nome</b>	Oct. 15	Oct. 16	Oct. 17
Oct. 18	Oct. 19	Oct. 20 <b>SC - Seldovia</b>	Oct. 21	Oct. 22	Oct. 23	Oct. 24
Oct. 25	Oct. 26	Oct. 27 <b>BB - Dillingham</b>	Oct. 28	Oct. 29 <b>EI - Fairbanks</b>	Oct. 30	Oct. 31
Nov. 1	Nov. 2	Nov. 3 <b>WI - Kaltag</b>	Nov. 4 <b>NS—Kaktovik (tent.)</b>	Nov. 5	Nov. 6 <b>WINDOW CLOSSES</b>	Nov. 7

## Subsistence Regional Advisory Council Correspondence Policy

The Federal Subsistence Board (Board) recognizes the value of the Regional Advisory Councils' role in the Federal Subsistence Management Program. The Board realizes that the Councils must interact with fish and wildlife resource agencies, organizations, and the public as part of their official duties, and that this interaction may include correspondence. Since the beginning of the Federal Subsistence Program, Regional Advisory Councils have prepared correspondence to entities other than the Board. Informally, Councils were asked to provide drafts of correspondence to the Office of Subsistence Management (OSM) for review prior to mailing. Recently, the Board was asked to clarify its position regarding Council correspondence. This policy is intended to formalize guidance from the Board to the Regional Advisory Councils in preparing correspondence.

The Board is mindful of its obligation to provide the Regional Advisory Councils with clear operating guidelines and policies, and has approved the correspondence policy set out below. The intent of the Regional Advisory Council correspondence policy is to ensure that Councils are able to correspond appropriately with other entities. In addition, the correspondence policy will assist Councils in directing their concerns to others most effectively and forestall any breach of department policy.

The Alaska National Interest Lands Conservation Act, Title VIII required the creation of Alaska's Subsistence Regional Advisory Councils to serve as advisors to the Secretary of the Interior and the Secretary of Agriculture and to provide meaningful local participation in the management of fish and wildlife resources on Federal public lands. Within the framework of Title VIII and the Federal Advisory Committee Act, Congress assigned specific powers and duties to the Regional Advisory Councils. These are also reflected in the Councils' charters. (*Reference: ANILCA Title VIII §805, §808, and §810; Implementing regulations for Title VIII, 50 CFR 100 .11 and 36 CFR 242 .11; Implementing regulations for FACA, 41 CFR Part 102-3.70 and 3.75*)

The Secretaries of Interior and Agriculture created the Federal Subsistence Board and delegated to it the responsibility for managing fish and wildlife resources on Federal public lands. The Board was also given the duty of establishing rules and procedures for the operation of the Regional Advisory Councils. The Office of Subsistence Management was established within the Federal Subsistence Management Program's lead agency, the U.S. Fish and Wildlife Service, to administer the Program. (*Reference: 36 CFR Part 242 and 50 CFR Part 100 Subparts C and D*)

### Policy

1. The subject matter of Council correspondence shall be limited to matters over which the Council has authority under §805(a)(3), §808, §810 of Title VIII, Subpart B §\_\_.11(c) of regulation, and as described in the Council charters.
2. Councils may, and are encouraged to, correspond directly with the Board. The Councils are advisors to the Board.
3. Councils are urged to also make use of the annual report process to bring matters to the

Board's attention.

4. As a general rule, Councils discuss and agree upon proposed correspondence during a public meeting. Occasionally, a Council chair may be requested to write a letter when it is not feasible to wait until a public Council meeting. In such cases, the content of the letter shall be limited to the known position of the Council as discussed in previous Council meetings.
5. Except as noted in Items 6, 7, and 8 of this policy, Councils will transmit all correspondence to the Assistant Regional Director (ARD) of OSM for review prior to mailing. This includes, but is not limited to, letters of support, resolutions, letters offering comment or recommendations, and any other correspondence to any government agency or any tribal or private organization or individual.
  - a. Recognizing that such correspondence is the result of an official Council action and may be urgent, the ARD will respond in a timely manner.
  - b. Modifications identified as necessary by the ARD will be discussed with the Council chair. Councils will make the modifications before sending out the correspondence.
6. Councils may submit written comments requested by Federal land management agencies under ANILCA §810 or requested by regional Subsistence Resource Commissions (SRC) under §808 directly to the requesting agency. Section 808 correspondence includes comments and information solicited by the SRCs and notification of appointment by the Council to an SRC.
7. Councils may submit proposed regulatory changes or written comments regarding proposed regulatory changes affecting subsistence uses within their regions to the Alaska Board of Fisheries or the Alaska Board of Game directly. A copy of any comments or proposals will be forwarded to the ARD when the original is submitted.
8. Administrative correspondence such as letters of appreciation, requests for agency reports at Council meetings, and cover letters for meeting agendas will go through the Council's regional coordinator to the appropriate OSM division chief for review.
9. Councils will submit copies of all correspondence generated by and received by them to OSM to be filed in the administrative record system.
10. Except as noted in Items 6, 7, and 8, Councils or individual Council members acting on behalf of or as representative of the Council may not, through correspondence or any other means of communication, attempt to persuade any elected or appointed political officials, any government agency, or any tribal or private organization or individual to take a particular action on an issue. This does not prohibit Council members from acting in their capacity as private citizens or through other organizations with which they are affiliated.

Approved by the Federal Subsistence Board on June 15, 2004.



**Follow and “Like” us on Facebook!**  
***[www.facebook.com/subsistencealaska](http://www.facebook.com/subsistencealaska)***