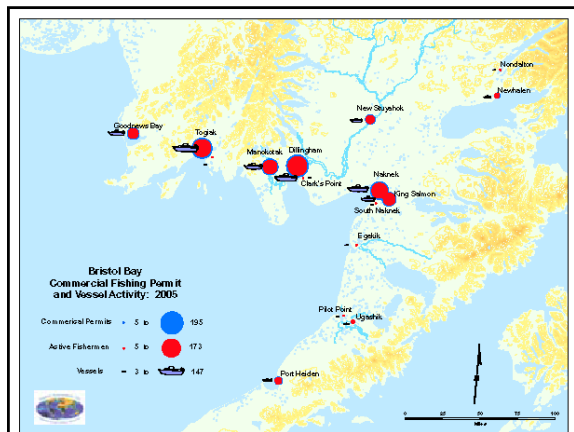
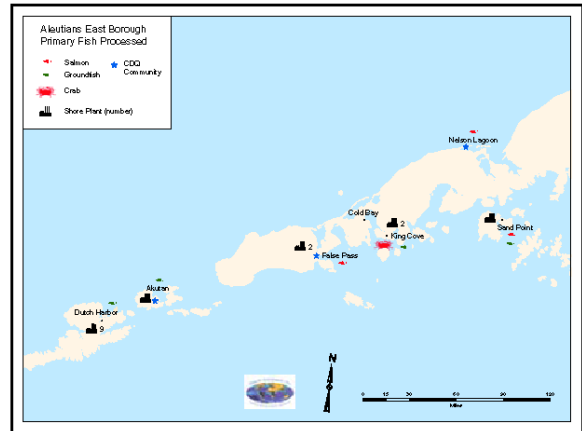


- **Select 1982 Hypotheses about NAB Communities:**
- **Commercial salmon resources** would increasingly constitute an important basis of social & economic change
- **Growth of non-indigenous populations would be less significant than other projections were indicating**, due in part to the effects of ANCSA and limited entry fisheries
- Increased income & predominance of the cash economy were seen as likely, but **class dichotomization would occur where involvement in comm. fisheries mixed**



- Increased correlation between income, economic wealth, and political power would be likely
- Social & economic interaction and political structures in indigenous communities would become more formalized
- **Traditional means of subsistence would decline given increasing availability of imported goods**
- **Adoption of “mainstream” material & social values would accelerate at the expense of traditional orientations**

- In short, there was emphasis on probable responses to exogenous social & economic sources of change, & **prediction: integration of traditional/indigenous and capitalist/American-Alaskan societies inevitable**
- While some of the hypotheses can now be observed as valid, **there is much depth to the story**, and a T-2 round of detailed ethnographic work would aid in adequately assessing social change in the region since 1982
- This would be highly instructive given ongoing potential for OCS development & associated introduction of new agents & forces of change in this unique region of Alaska

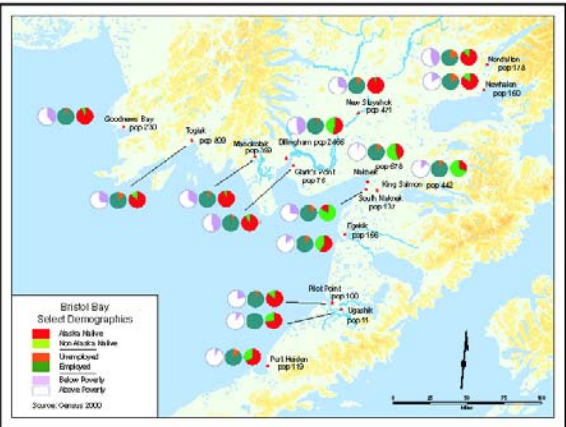
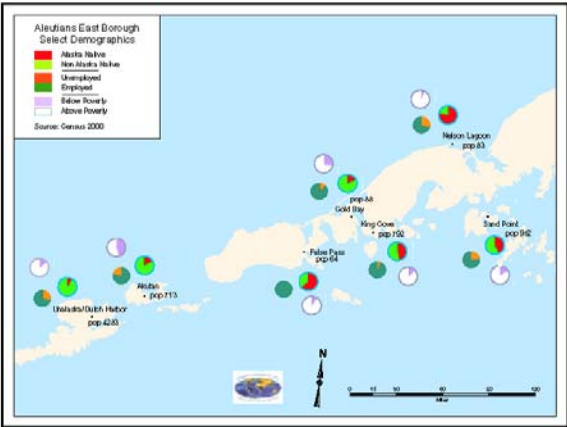
- Given lessons that have been learned since 1982, future analysis is likely to indicate that **traditional Unangan, Alutiiq (& other Alaska Native) values & lifeways being enacted with more resilience than was hypothesized**
- Actually, the authors did recognize the complexity of social change & the probability that indigenous residents would retain individual and collective agency (p. ix):

“In spite of the adoption of western values there will be a reversal of trends toward the amalgamation of ethnic identities and a renewal of the strength of [indigenous] ethnic identity. . .”

- Indeed, it is possible to *accommodate* exogenous forces & factors of change without fully *adopting* them or *sacrificing* identity, and many would argue that Unangan and Alutiq identity are most durable. In fact, indigenous societies have persisted for millenia in Alaska despite a range of challenging factors
- This is highly significant in this context as it is clearly possible for Alaska Natives to nurture identity & associated lifeways while accommodating, articulating with, or otherwise responding to external forces of change
- Cash and capital are now clearly seen as enabling subsistence-oriented lifeways and associated cultural practices. These aspects of life are not mutually exclusive.

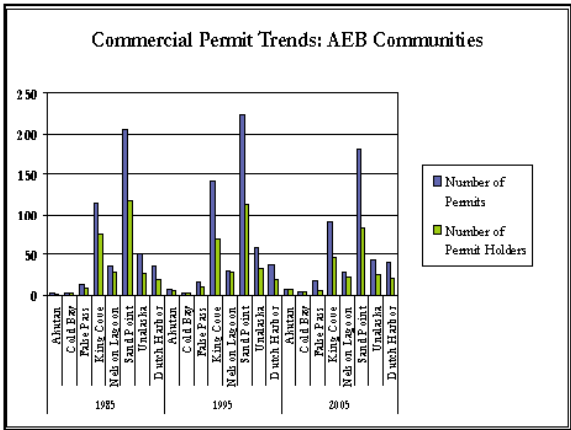
- But one should not infer that these differing ways of life are typically compatible or that attending to traditional lifeways is easy given the pressures of modern societies
- In fact, a conundrum is often generated. That is, cash is *required* in the modern context, but in the absence of opportunity it is not easily *acquired*, particularly if one highly values subsistence practices & associated traditional-cultural lifeways, as these unavoidably require time and energy that cannot be given to capitalist ideals
- As such, forms of economic opportunity that readily enable rather than obviate Alaska Native cultural traditions and practices are typically highly desirable to the practitioners

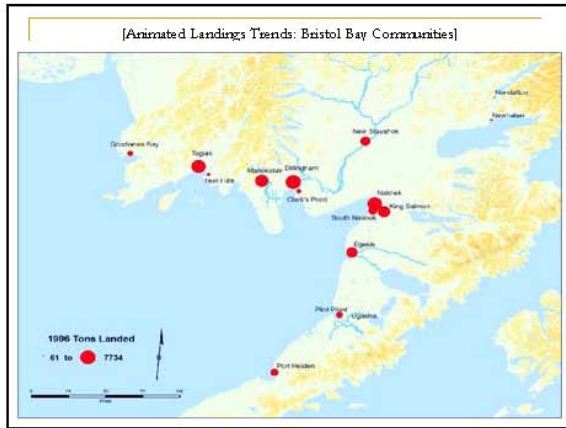
- Understanding the aforementioned conundrum and indigenous interests, and the way these have played out over time in the NAB are **critically important dimensions of social analysis** to be considered in advance of potential OCS development or other source of planned change in the region
- Particularly important given large % of Alaska Natives living in region, local importance of comm. fisheries, extensive Outside participation in comm. fisheries, few employment alternatives, existing socioeconomic conditions in many communities



- The likely community-level social and economic effects of development on the NAB OCS cannot be immediately analyzed or answered
- Although recent social research in the region has covered a broad geographic area (e.g., NMFS fishing community research), its depth of coverage has generally been limited to specific programmatic needs that yield information that is useful but inadequate for generating sufficient understanding of socioeconomic change & its correlates

- Comprehensive social assessment would require work at the level of detail previously conducted for MMS in the region, & careful monitoring of select social and economic variables and indicators over the course of time
- Logically, the research would address the nature of participation of indigenous and non-indigenous residents in predominant & subsidiary industries in the region; the potential nature of their involvement in, or interface with prospective oil & gas industry activity in the NAB; & the dynamic-interactive effects of such participation on involvement in traditional cultural practices





- Effective social assessment will also need to address the potential for **spatial conflict/competition between local (indigenous or non-indigenous) fishing interests and the interests of the oil & gas and other maritime industries** potentially active on or adjacent to the NAB OCS (see MMS Study OCS 2004-038)
- This would also require assessment of the larger systems of navigation and maritime traffic through Unimak Pass and elsewhere in the region



- Various social science research projects have been conducted in the North Aleutian Basin over the last decade [these may be reviewed later in the workshop]
- But the detailed descriptive & theoretically-based research that enabled MMS to comprehensively characterize socioeconomic & socio-cultural aspects of life in the NAB in the early 1980s has **not yet been replicated in the region, leaving a series of important hypotheses not fully tested**

- **By comprehensively revisiting old [and new] socioeconomic variables and theoretical perspectives in advance of prospective further social change, analysts would be able to continue the long-term systematic research begun in the region in the 1980s, and in so doing:**
 - (1) **advance understanding of the human implications of OCS scenarios in the NAB,**
 - (2) **satisfy NEPA- and OCSLA-related social-analytical mandates,** and
 - (3) **generate sufficient information for developing policy that could serve to enhance the life experiences of persons residing in adjacent communities**

- END -

Subsistence Research in the North Aleutian Basin

Brian Davis
Cultural Anthropologist

Former Program Coordinator, Alaska
Department of Fish and Game, Division of
Subsistence

November 28, 2006

Alaska Native Culture Groups

- Yup'ik Eskimo: Goodnews Bay, Togiak
- Alutiiq (Aleut): King Salmon, Chignik
- Unangan Aleut: Unalaska, False Pass
- Athabaskan Indian: Pedro Bay, Naknek

Major Subsistence Resources: Northern Aleutian Basin

- Salmon
- Halibut
- Whitefish
- Herring/Herring Roe
- Smelt
- Cod
- Dolly Varden
- Clams
- Tanner Crab
- King Crab
- Caribou
- Moose
- Harbor Seals
- Sea Lions
- Beluga Whale
- Ducks
- Ptarmigan
- Sea Gull Eggs
- Beaver
- Berries/Vegetation

What Is Subsistence?

- A Legally Defined Harvest or Use
 - State—Stock and Location
 - Federal—Residence and Alaska Native
 - Permitted, Regulated, and Non-
- Any Rural Alaskan Harvest
- Customary Harvests
- Cultural Values Related To Harvest

Subsistence Research: Government

- ADF&G, Division of Subsistence
- ADF&G, Division of Commercial Fisheries
- USF&WS, Migratory Birds, Marine Mammals
- NOAA/NMFS, Marine Mammals, Halibut
- USF&WS, Office of Subsistence Management

*Subsistence Research: Alaska Native Organizations

- BBNA
- A/PIA
- Alaska Native Harbor Seal Commission (ANHSC)
- The Alaska Sea Otter-Steller Sea Lion Commission (TASSC)
- Aleut Marine Mammal Commission (AMMC)
- Qayasiq Walrus Commission (BBNA)

Subsistence Research: Independent Contractors

- Steve Braund & Associates
- Herbert Maschner- Idaho State University
- Robert Wolfe & Associates
- University of Alaska, ISER
- The Nature Conservancy

Subsistence Research: Focus Areas

1. Subsistence Foods Safety
2. Subsistence Traditions, Customs, Education
3. Subsistence Land Use Mapping
4. Subsistence Harvest Assessment

1. Subsistence Foods Safety

- A/PIA, Nat. Inst Env Hlth Sci: Traditional Foods Dietary Benefits and Risks (Atka, St. Paul)
- A/PIA, ANTHC: Maternal/Infant Health
- A/PIA: PSP Project, Sand Point, Unalaska
- ANHSC, NOAA: Harbor Seal Biosampling
- TASSC, USEPA: Contaminant Testing, Sea Gull Eggs, Togiak, Unalaska

2. Subsistence Traditions, Customs, Education

- Tribal Culture Camps: Unalaska, King Cove
- Alaska Native Knowledge Network
- TEK: ADF&G, Bristol Bay/Aleutian Islands' Fisheries
- TEK: BBNA, Togiak TEK
- Customary Trade: BBNA/ADF&G

*3. Subsistence Land Use: Mapping

- Harvest Locations: Point Data
- Hunting/Fishing Locations: Polygon Data
- Routes, Trails, Cabins, Access
- Intensity of Use
- Harvest Concentration
- Duration: 5-year, 10-year, lifetime
- Confidentiality, Anonymity
- Non-Harvest Mapping: Ecological observations

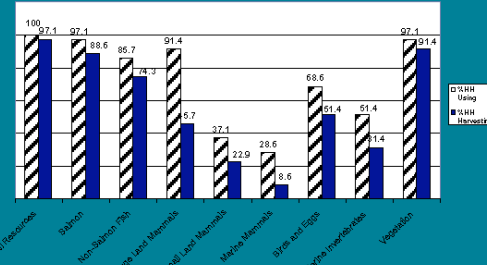
4. Subsistence Harvest Assessment: Organizations

- ADFG, Division of Subsistence: Community Harvest Baseline Data, Harvest Estimates and Participation Levels.
- ADFG, Division of Commercial Fisheries: Permitted Subsistence Fisheries (Salmon, Crab)
- USF&WS: Migratory Bird Harvest Survey
- NOAA/NMFS: Subsistence Halibut Fishery
- ANHSC: Harbor Seal and Steller Sea Lion Harvest
- St. Paul Island Ecosystem Office: Fur Seal Harvest.
- Qayasiq Walrus Commission: Round Island Walrus Harvest

Subsistence Harvest Assessment Data

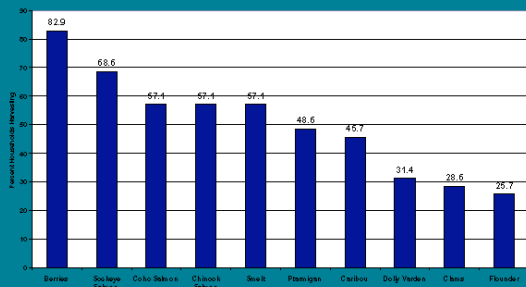
- A. ADF&G Division of Subsistence, Community Studies-- Baseline and Directed
- B. ADF&G, Division of Commercial Fisheries, Bristol Bay Salmon Permit Data, 2003
- C. NOAA/NMFS, Subsistence Halibut Harvest, By Community, 2003-2004
- D. ANHSC, Marine Mammal Harvest, By Community, 1992-2004
- E. USF&WS, Migratory Bird Harvest, 2004, 2005, Not Yet Available

A-1. Subsistence Harvest: Participation Rates, Major Resource Categories. South Naknek, 1992



Source: ADF&G, Division of Subsistence, Community Profile Database

A-2. Subsistence Harvest: Percent of Households Harvesting, By Resource: South Naknek, 1992



Source: ADF&G, Division of Subsistence, Community Profile Database

*A-3. Subsistence Harvest: Top Species in Pounds Usable Weight, Unalaska, Chignik Lake, South Naknek

Unalaska, 1994		Chignik Lake, 2003		South Naknek, 1992	
Total HH: 700 Pop: 1,825		Total HH: 31 Pop: 111		Total HH: 42 Pop: 134	
HH Sample: 16%		HH Sample: 70%		HH Sample: 83%	
Halibut	108,207	Sockeye Salmon	11,822	Caribou	12,240
Sockeye Salmon	44,650	Moose	3,180	Sockeye Salmon	9,787
Coho Salmon	25,162	Spawnot Salmon	3,180	Chinook Salmon	4,405
Pink	19,970	Caribou	2,879	Coho Salmon	2,635
Turner Crab	17,531	Halibut	2,496	Moose	2,692
King Crab	15,851	Brown Bear	1,004	Berries	1,725
Berries	15,433	Turner Crab	827	Shell	1,354
Sea Lion	14,423	Berries	774	Clam Salmon	1,121
Cod	14,137	Butter Clams	549	Spawnots	924
Rockfish	9,882	Chinook Salmon	520	Pink Salmon	500

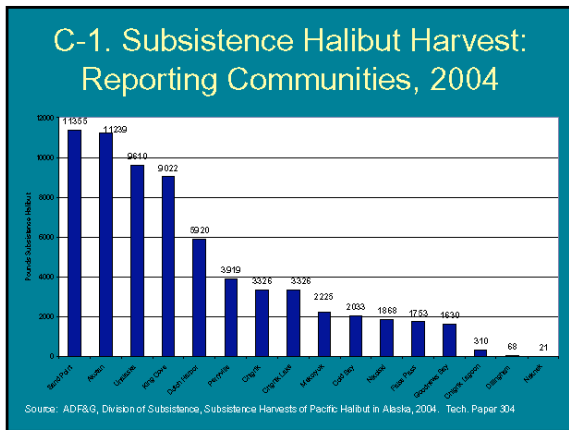
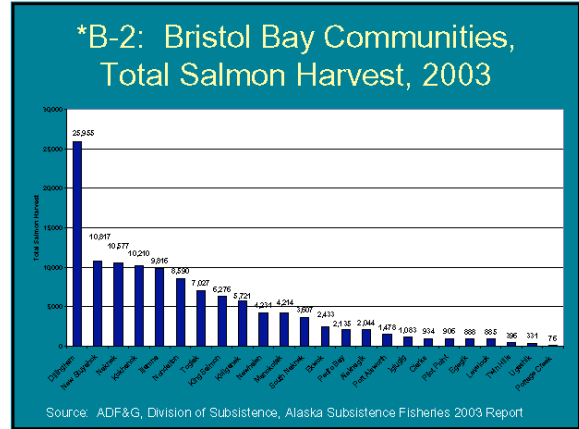
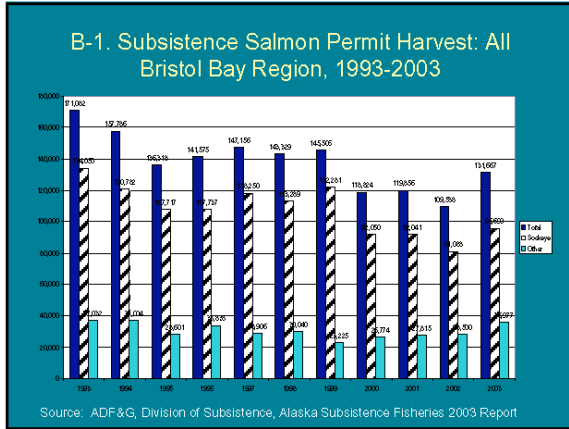
Source: ADF&G, Division of Subsistence, Community Profile Database

A-4. Subsistence Harvest Data: ADF&G Baseline Studies By Year

- Manokotak, 1985
- Clark's Point, 1989
- Dillingham, 1984
- Naknek, 1983
- South Naknek, 1992
- King Salmon, 1983
- Egegik, 1984
- Port Heiden, 1987
- Chigniks, 2003
- Perryville, 2003
- Nelson Lagoon, 1987
- Sand Point, 1992
- King Cove, 1992
- False Pass, 1988
- Akutan, 1990
- Unalaska/Dutch Harbor, 1994
- Nikolski, 1990

A-5. Subsistence Harvest Data: ADF&G Directed Studies

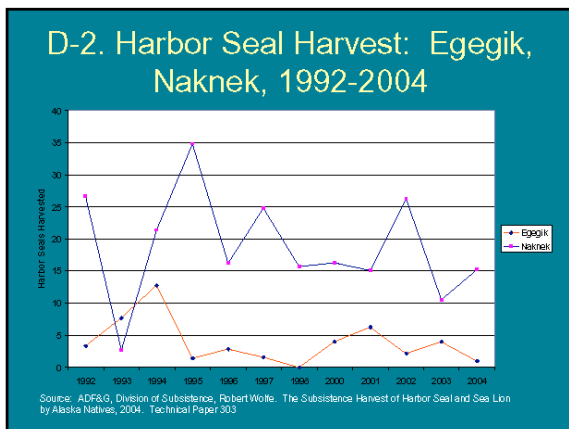
- Birds and Eggs: Akutan, False Pass, Nikolski, Nelson Lagoon, 1996
- Large Land Mammals: 12 Alaska Peninsula Communities, 1995-1997
- Large Land Mammals: Clark's Point, Manokotak, Portage Creek, Togiak, Twin Hills, 2001-2002
- Marine Mammals: Nearly All Communities, 1994-2004



D-1. Marine Mammal Harvest

	Harbor Seal		Sea Lion					
	2004	2003	2004	2003	Harbor Seal	Sea Lion	2004	2003
Alaska Peninsula								
False Pass	2.8	2.8	0	0	Bristol Bay			
King Cove	32.3	11	1.7	0	Egegik		1	4
Sand Point	16	14.3	0	1.3	King Salmon		5	7.3
Prityville	20	61.3	2.2	3.7	Levelock		0	0
Chignik	0	2.8	0	0	Naknek		15.2	10.5
Chignik Lagoon	0	1.1	0	0	Pilot Point		1.9	2.7
Chignik Lake	6.7	8.9	0	0	Port Haden		20	10
					South Naknek		15.4	1.1
					Alakanuk		0	0
Eastern Aleutians								
Adutan	9.5	10.8	4.8	8.7	Clark's		0	0
Unalaska	28.6	14.3	11.4	10	Dillingham		0	0
Nikolski	6	11	2	0	Mandotkat		4	2.2
					Togak		6.9	2.2
					Twin Hills		6.8	5.6
							1.2	0

Source: ADF&G, Division of Subsistence, Robert Wolfe. The Subsistence Harvest of Harbor Seal and Sea Lion by Alaska Natives, 2004. Technical Paper 303



- ### Subsistence Web Sites
- ADF&G, Division of Subsistence: www.subsistence.adfg.state.ak.us
 - AMMC: www.aleutmarinemammals.org
 - ANHSC: www.harborsealcommission.org
 - ANKN: www.ankn.uaf.edu
 - TASSC: www.seaotter-sealion.org
 - A/P/IA: www.apiaf.org
 - BBNA: www.bbna.com
 - NOAA Subsistence Halibut: www.fakr.noaa.gov/ram/subsistence/halibut.htm
 - USF&WS Sub Mgmt: alaska.fws.gov/asm/home

Subsistence Contacts

- Brian Davis, brianbrother@gmail.com
(277-7946)
- Jim Fall, Jim_Fall@fishgame.state.ak.us
- Ron Stanek,
Ron_Stanek@fishgame.state.ak.us
- Molly Chythlook, mchythlook@bbna.com
- Sue Unger, sueu@apiai.org

Bristol Bay / N. Aleutian Basin -- Seabirds & Shorebirds

Presented by Kathy Kuletz, U.S. Fish & Wildlife Service, Anchorage, Alaska

Contributors include (but not limited to)

- Rick Lanctot
- Bob Gill
- Shawn Stephensen
- Liz Labunski
- Rob Suryan
- Gary Drew
- Russ Oates

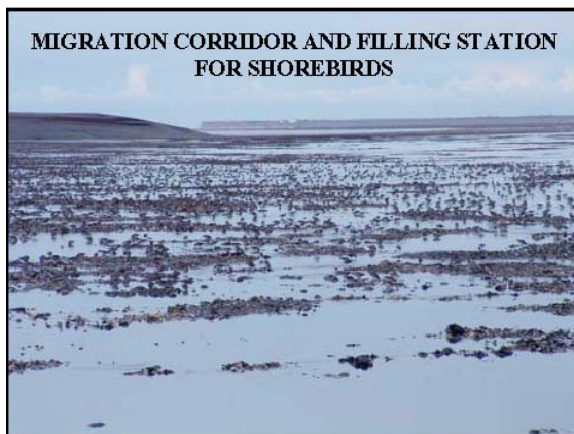
USGS-BRD
Migratory Bird Management (USFWS)
Alaska Maritime Refuge

SHOREBIRDS

-Up to 1/3 of the world population of Bar-tailed Godwits use Egegik Bay in fall

-The only nesting area for a subspecies of Marbled Godwit is found in the Bristol Bay Lowlands

>300,000 shorebirds, primarily Dunlin, were counted during aerial surveys of Alaska Peninsula estuaries in 1999

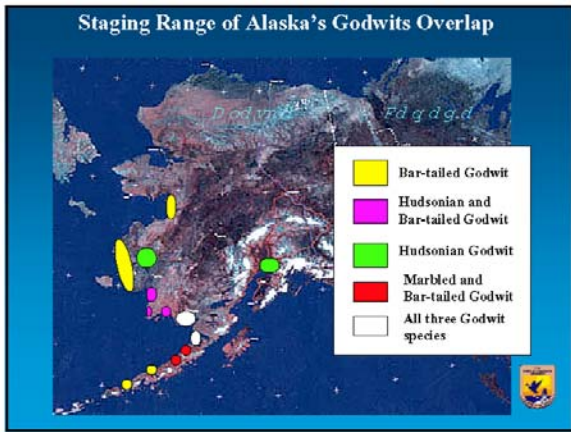
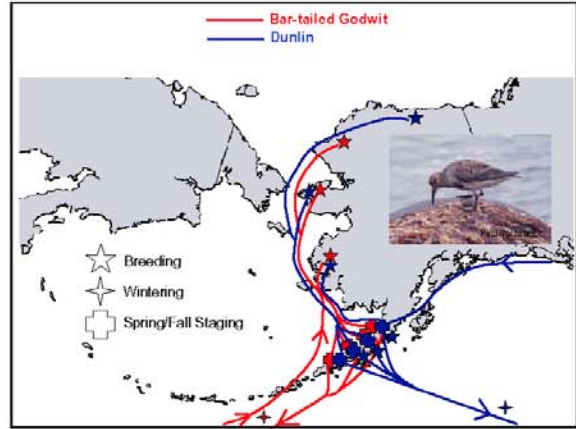
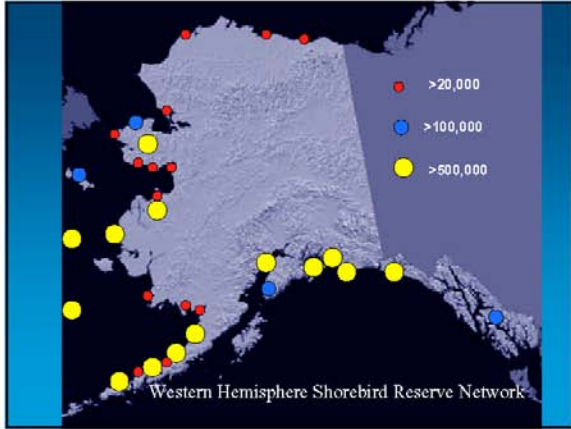


Western Hemisphere Shorebird Reserve Network sites in Alaska

- Hemispheric**
(500,000 birds or 30% of a population)
- International**
(100,000 birds or 10% of a population)

Gillet et al. unpubl.

USGS



SEABIRD COLONIES

30 Colonies within Lease Area with over 60,000 breeding seabirds

44 Colonies between Lease Area and Cape Newenham with over 900,000 breeding seabirds

Predominantly Common Murre and Black-legged Kittiwakes

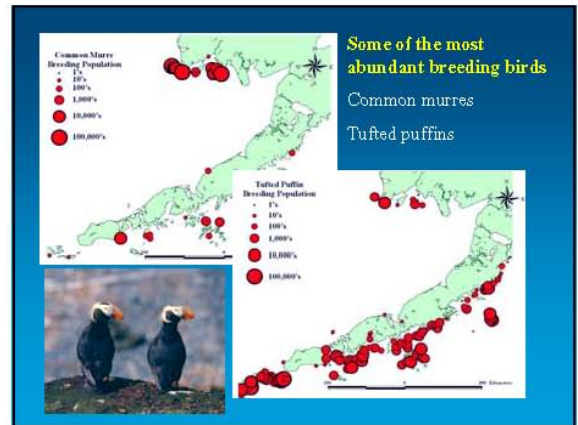
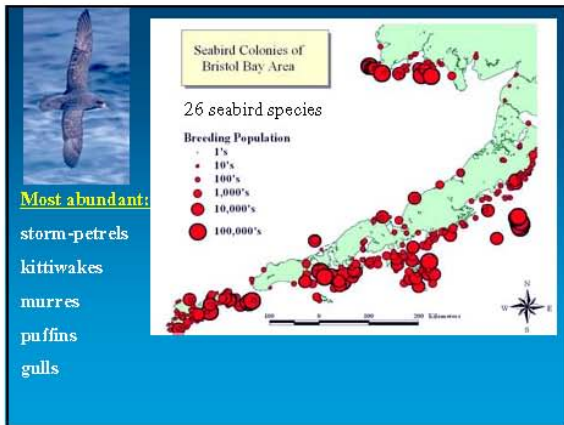
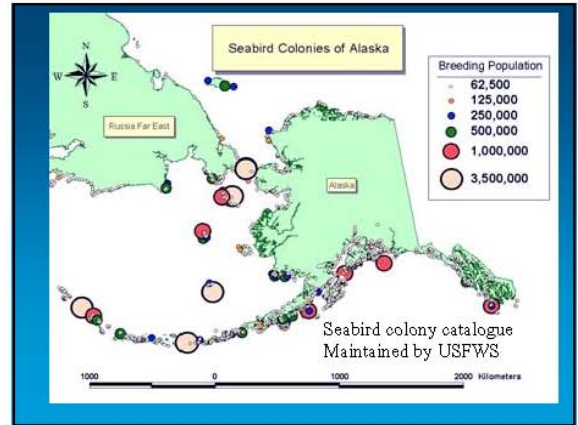
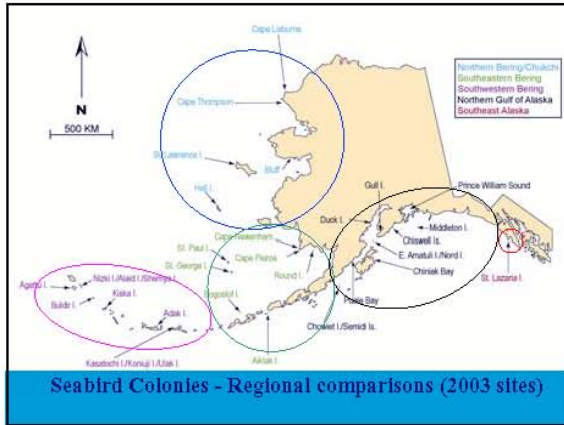
Selected colonies are monitored annually or every few years. Others are censused opportunistically

Productivity

Breeding Chronology

Population Trends

Diet



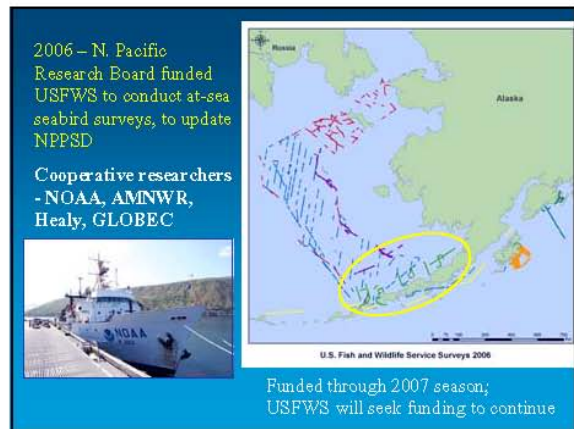
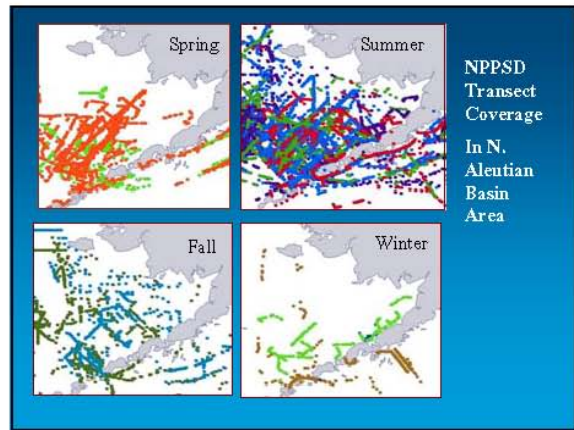
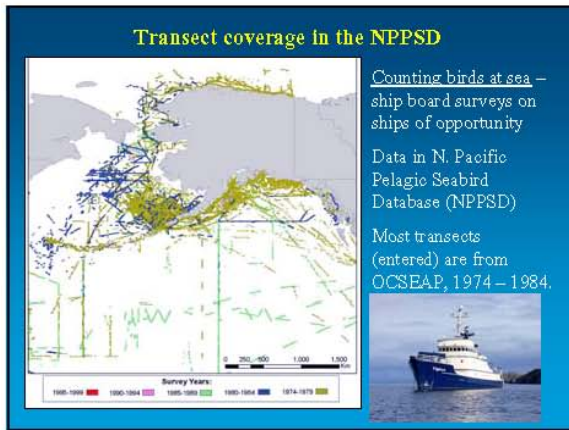
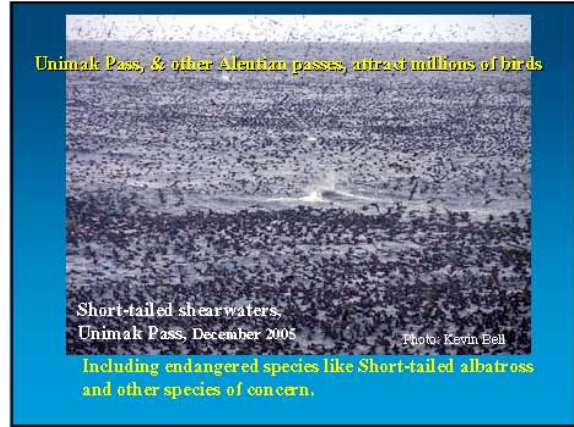
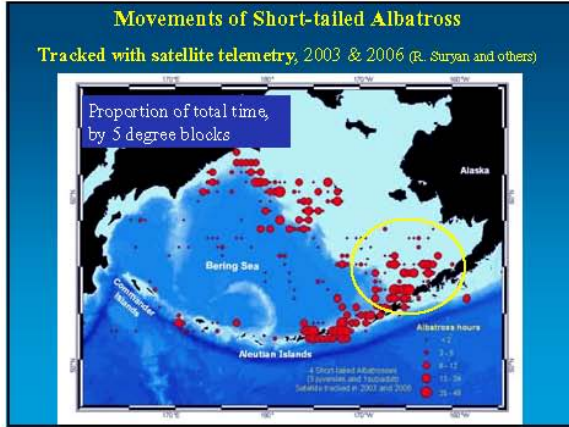
Many of 'our' seabirds don't breed here – they just come to feed in the summer

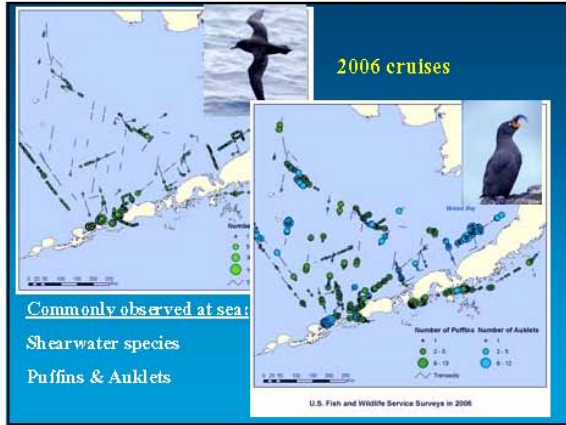
Albatrosses from Hawaii and Japan
Shearwaters from New Zealand and S. America

Albatross wander into the Bristol Bay area, and particularly like the Aleutian passes for feeding.

Laysan albatross
Short-tailed albatross
Endangered Species

Photo: Paul Suchanek

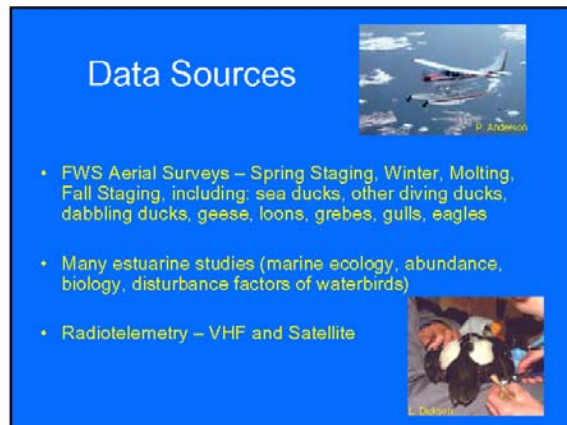





Thanks to:

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 Gary Drew
 Russ Oates

Photo credits:
 Lisa Sheffield
 Paul Suchanek
 Ian Jones
 Tamara Mills
 Liz Labunski
 Kally Kwan
 USFWS employees

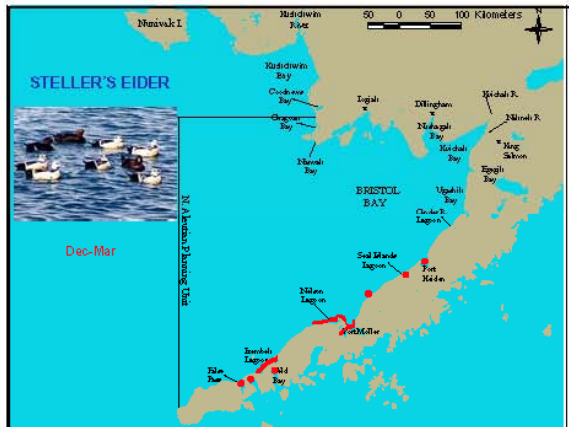
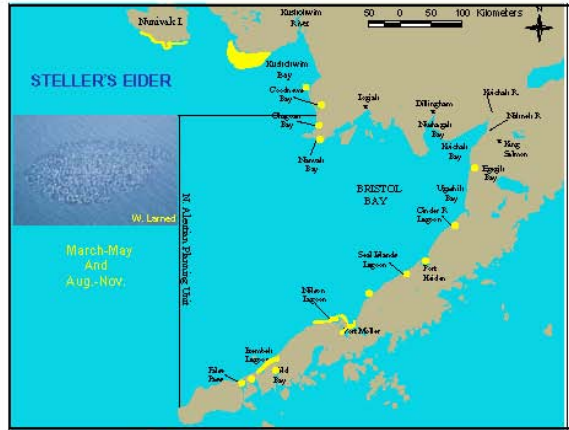


Steller's eider



S. Hayden

- Status: AK breeding pop. "threatened" under ESA, world pop. of concern.
- Reference Population: Pacific Population (<200K)
- Planning area Max Population: 137K
- PA % of Ref. Population: $\pm 70\%$
- Months present: Aug-May
- Concentration sites: All major AK Pen. Lagoons, Chagvan, Nanvak, Goodnews, Kuskokwim Bays, Aug. – May. Molting, migration, winter

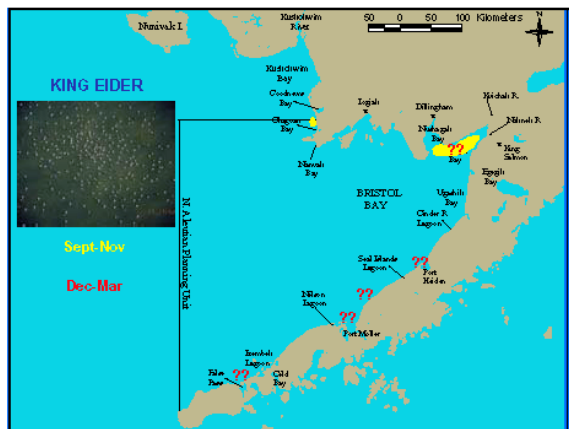
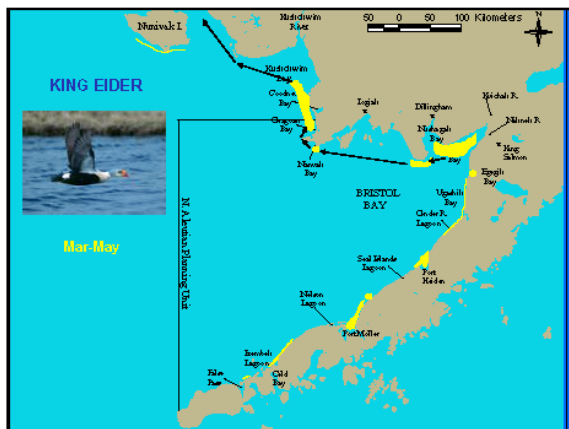


King eider



M. Dronovskoy

- Status: Species of Concern, worldwide decline.
- Reference Population: W. N. Am. (<300-400K)
- Planning area Max Population: 240K (mid-Apr. 1997)
- PA % of Ref. Population: $\pm 70\%$
- Months present: Aug - May
- Concentration sites: Upper BB shoals, mouths of all AP Lagoons, shorelines throughout Planning area



Black Scoter



- Status: Species of Concern, declines worldwide Incl. AK
- Reference Population: W. N. Am. breeding (200K)
- Planning area Max Population: Spring Mig. (48K)
- PA % of Ref. Population: 24%
- Months present: Aug-May
- Greatest Vulnerability: migration (Mar-May), Molt (Aug-Oct), Upper BB shoals, Most AP Lagoons, esp. Pt. Moller, shorelines throughout Planning area

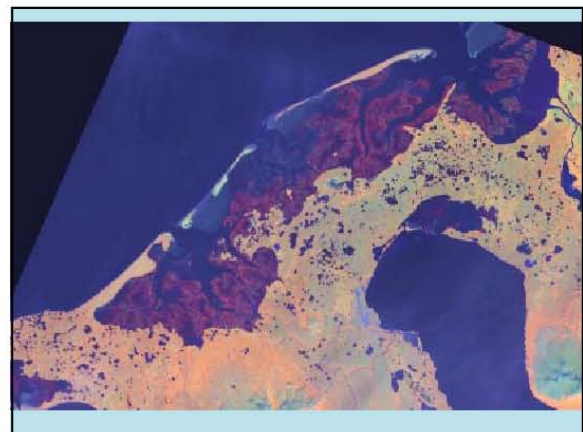


Sea Ducks - vulnerability

- Molting flocks – high nutritional requirements, limited mobility, stress from disturbance
- Migration bottlenecks: many birds transition through staging areas, max numbers exposed to oil/fuel spills, other contaminants, disturbance
- Wintering concentrations – spill response most challenging

DATA GAPS

- Baseline food resource quant/qual data from major coastal/estuarine habitats (prey density, distribution, competitors, contaminants)
- Year-round distribution of sea ducks -- especially winter distribution.
- Relationships of seasonal waterbird distribution & migration to environmental variables, esp. sea ice, weather, prey distribution/abundance, disturbance



Important pinniped populations:
North Aleutian Basin



John L. Bengtson
National Marine Mammal Laboratory
Alaska Fisheries Science Center
National Marine Fisheries Service, NOAA



Important pinniped populations:



Steller sea lions & northern fur seals



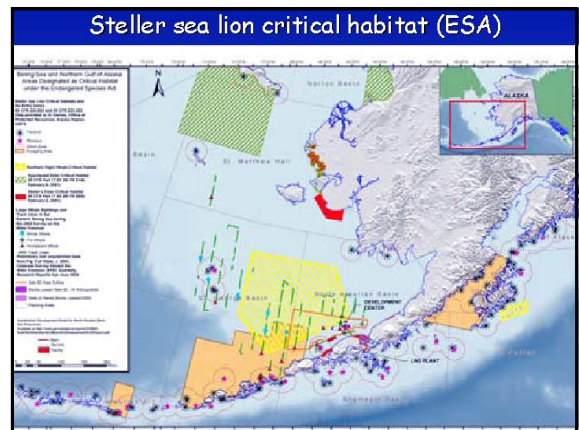
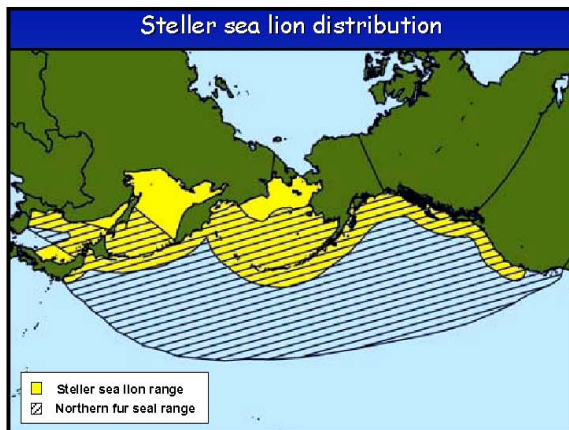
Harbor seals & spotted seals

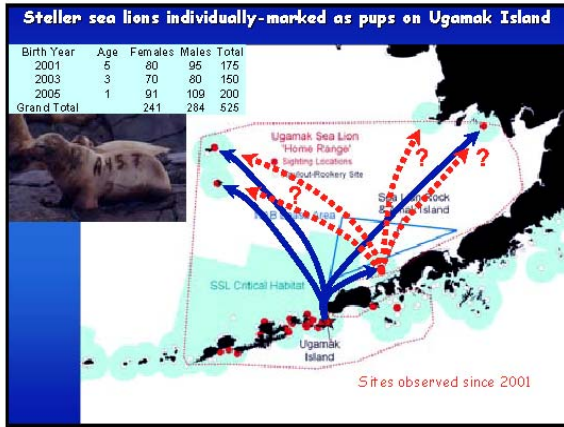
Important pinniped populations:

Distribution & habitats Life history

Abundance & trends Stocks & status

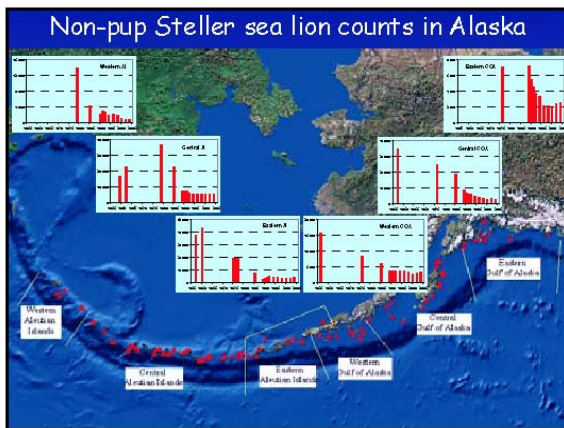
What critical information gaps concerning pinniped populations need to be addressed to assess the potential impacts of oil and gas development in the North Aleutian Basin?





Steller sea lions

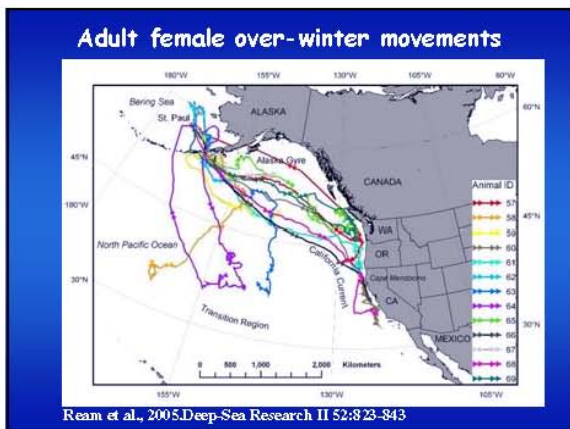
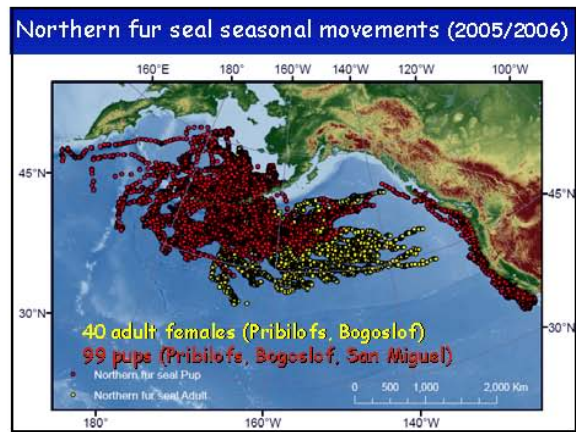
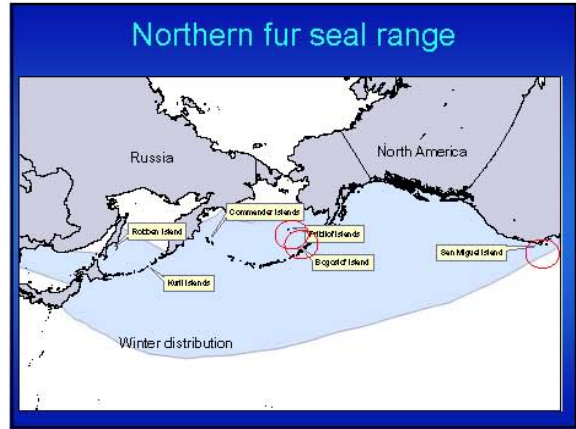
- Give birth to a single pup (median date June 10th)
- Suckling through 9 months to 2-3 years
- Maternal foraging trips 7-24 hours
- Females reproductive at about 4 years old
- Depend on blubber & fur for insulation



Steller sea lions: Critical information needs in the N. Aleutian Basin

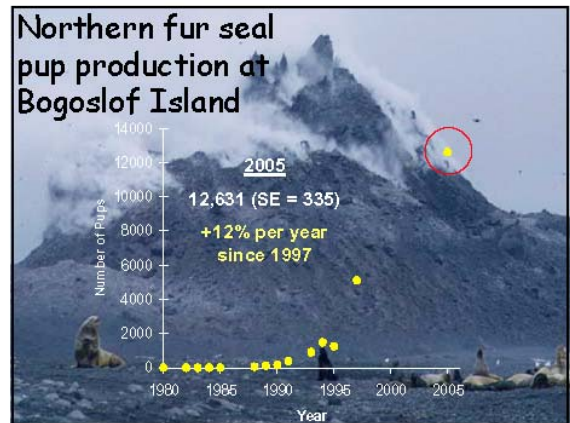
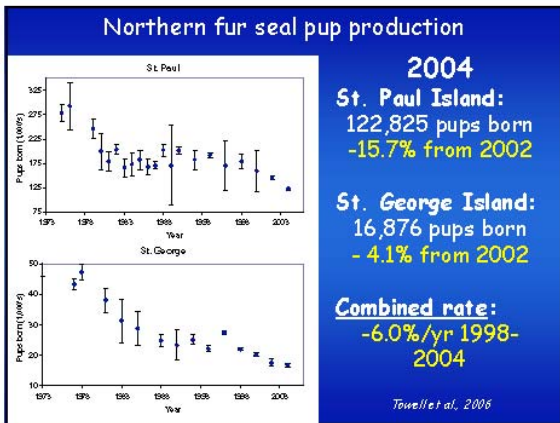
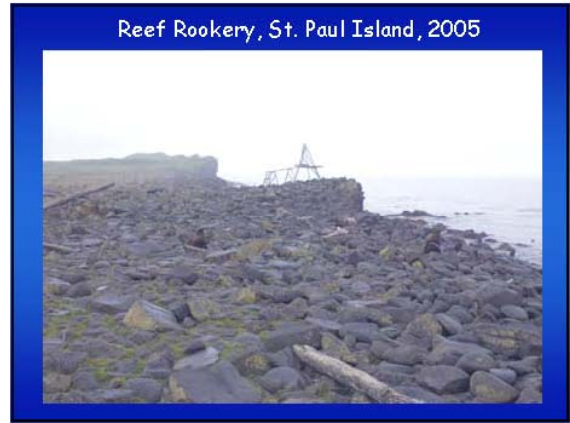
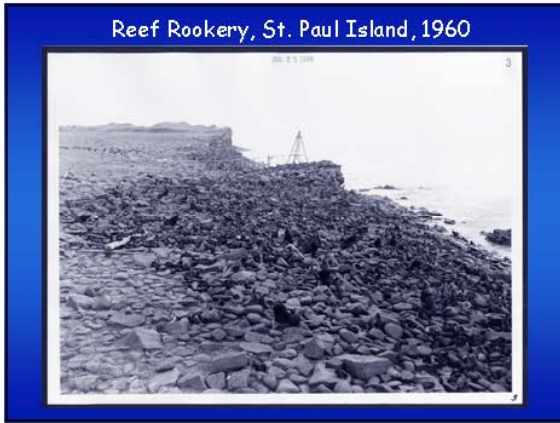
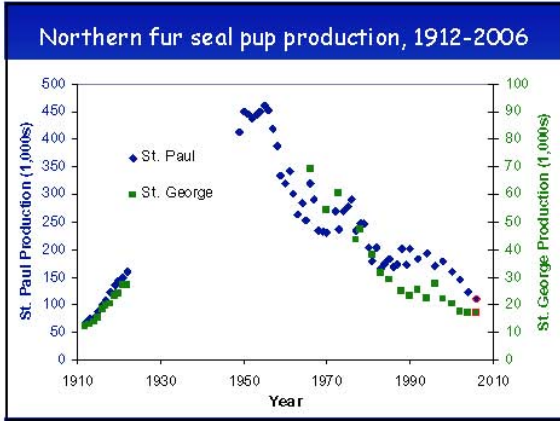
- Seasonal movements
- Seasonal habitat selection and use
- Age-specific dispersal patterns

Satellite tagging
Resighting marked individuals



Northern fur seals

- Give birth to single pup
- Suckling through 4 months
- Maternal foraging trip duration up to 12 days
- Females reproductive at about 3-4 years
- Depend on fur for insulation
- Long history of commercial harvest

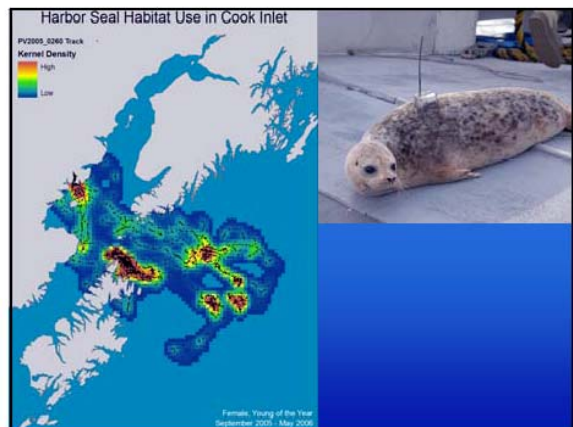
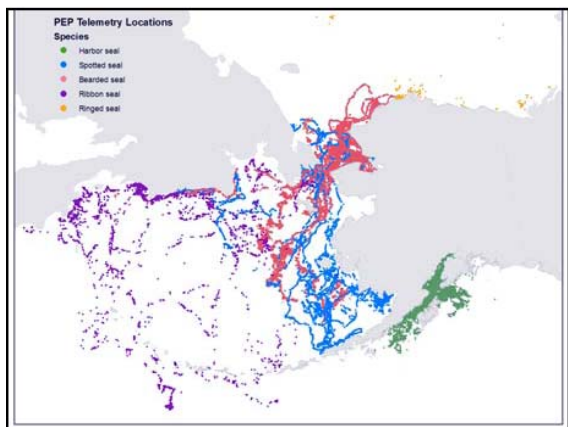
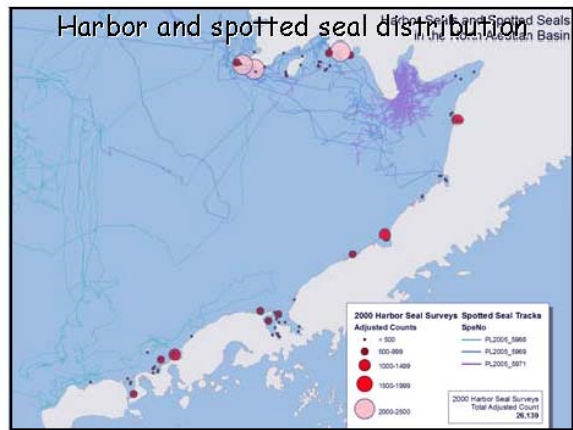
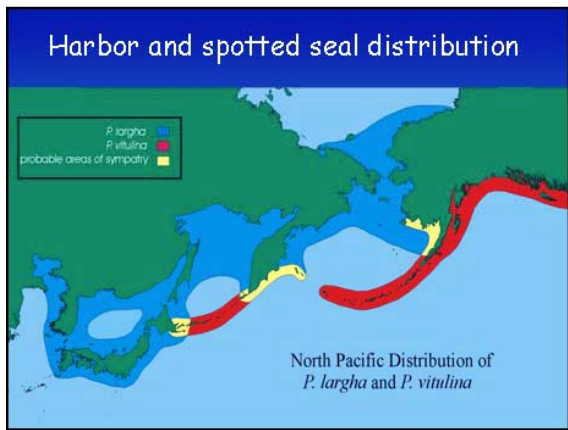


Northern fur seals:
Critical information needs in the N. Aleutian Basin



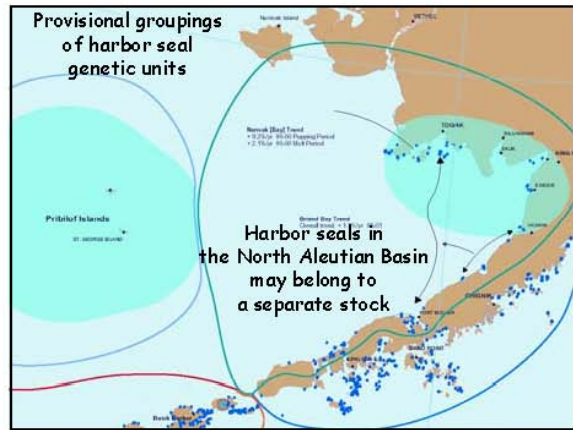
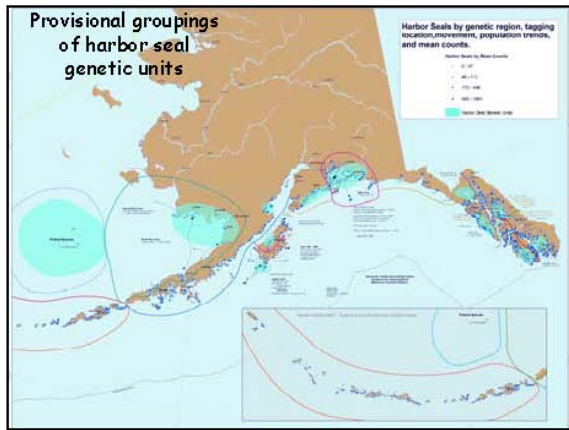
- Seasonal movements
- Seasonal habitat selection and use
- Age-specific dispersal patterns

Satellite tagging



Harbor and spotted seal comparison

	Spotted	Harbor
Habitat:	sea ice & land	coastal & insular
Morphology:	pups w. lanugo	pups w. adult-type pelage
Reproduction:	on sea ice breeding triads Feb - May	on land, glacial ice colonial breeding Apr - July
Movements:	long-range	short- & medium-range

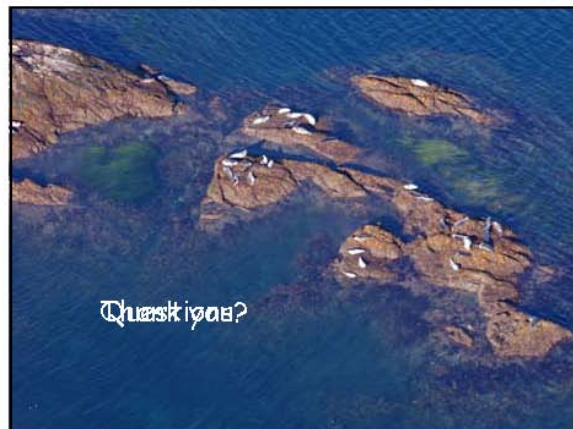


Harbor and spotted seals: Critical information needs in the N. Aleutian Basin

- Seasonal movements
- Seasonal habitat selection and use
- Age-specific dispersal patterns

Satellite tagging

Aerial surveys



Right Whales and Other Cetaceans in the North Aleutian Basin

Phil Clapham & Kim Shelden





FIG. 142. - BALEINE DES BASQUES (Jeanneret : de nature).



National Marine Mammal Laboratory, Seattle, WA, USA

Outline & Intent

- Review what's known (and not known) about the distribution of cetaceans in the NAB lease sale area
- Right whales (the biggest issue)
- Other endangered whales (humpback, fin)
- Other cetaceans (listed or otherwise)
- Recommended research

Eubalaena japonica



Image Center for Coastal Studies

Taxonomy and Status


- Genetics: three oceanic groups clearly discrete and long-separated
- NMFS currently preparing listing to split into three species:
 - E. glacialis* (North Atlantic)
 - E. japonica* (North Pacific)
 - E. australis* (Southern Hemisphere)
- Status in eastern North Pacific: critically endangered

North Pacific: Whaling History

- Began in 1835 on the Northwest Ground
- Depleted by 1849
- Whalers moved into the western North Pacific by 1845
- 21,000-30,000 whales killed in the 1840's
- Some whaling in the early 20th century
- Eastern and western North Pacific RW populations considered separate

Disappearing Whales

- 1941-1964: 598 sightings east of 180
- 1965-1999: 82 sightings
- Where did they all go?



Disappearing Whales

- Soviet catches: 372 whales (mostly in 3 years):
 - 251 Gulf of Alaska
 - 121 Bering Sea
- + others in the Sea of Okhotsk

Today: most endangered stock of large whales in the world

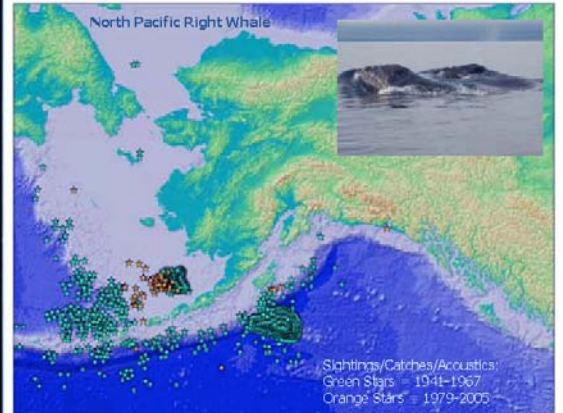


Bering Sea: 35 individuals

Datasets from 1979 to present



North Pacific Right Whale

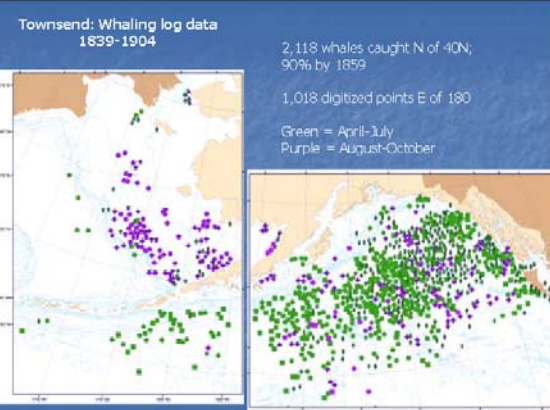


Sightings/Catches/Acoustics
Green Stars = 1941-1967
Orange Stars = 1979-2005

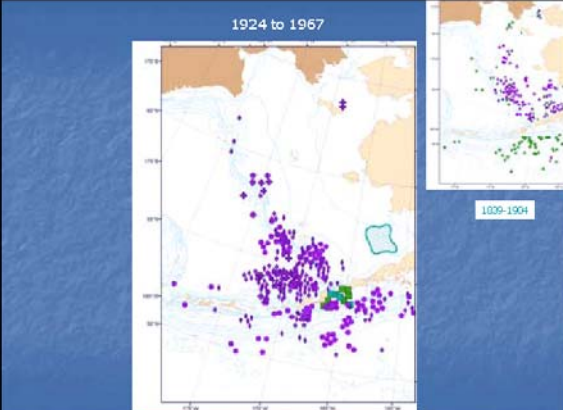
Townsend: Whaling log data 1839-1904

2,118 whales caught N of 40N; 90% by 1859
1,018 digitized points E of 180

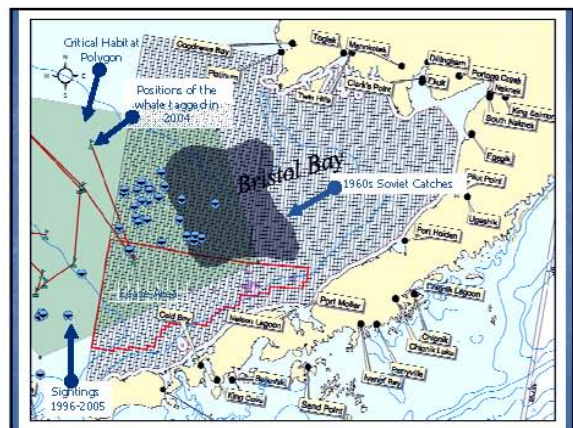
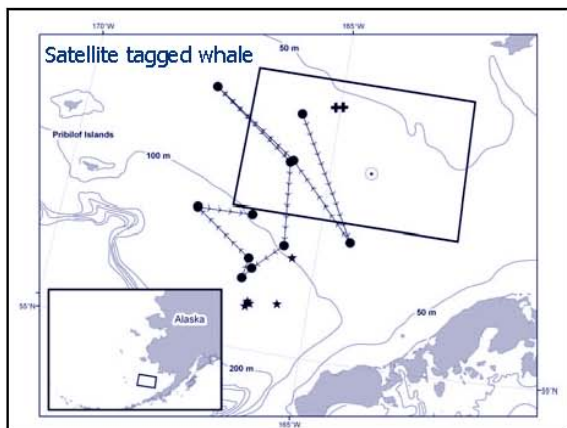
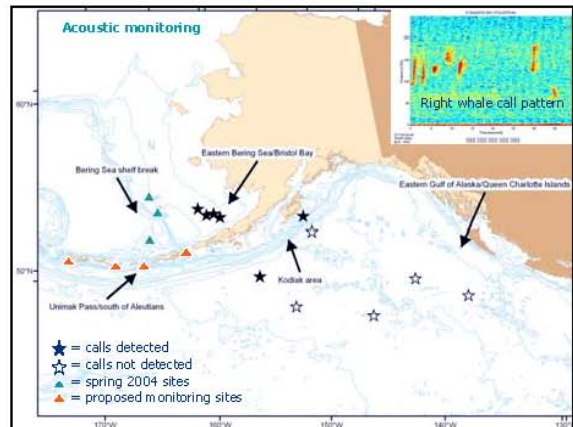
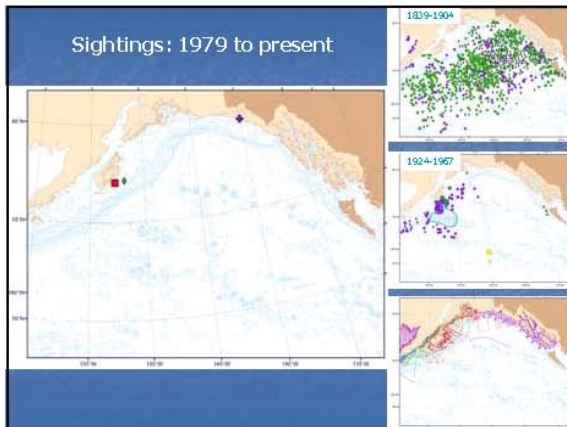
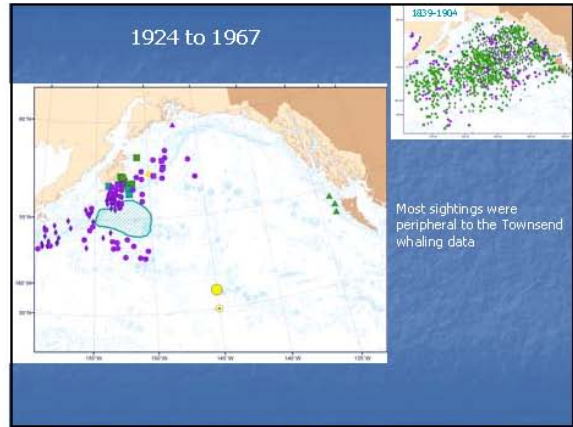
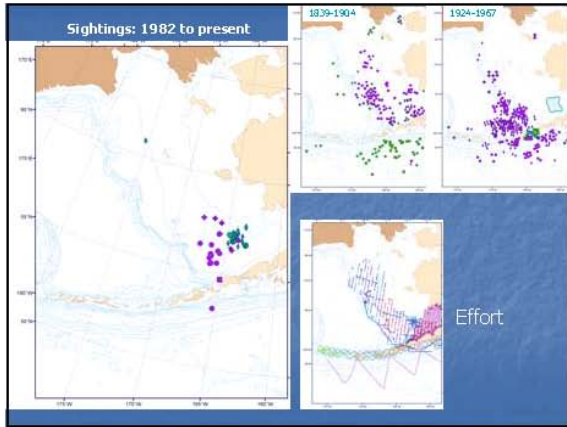
Green = April-July
Purple = August-October

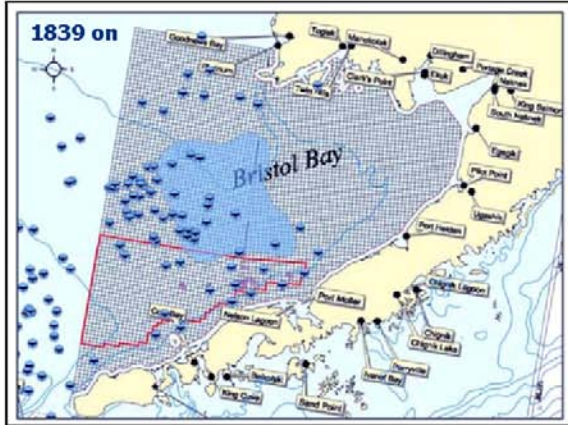


1924 to 1967



1839-1904





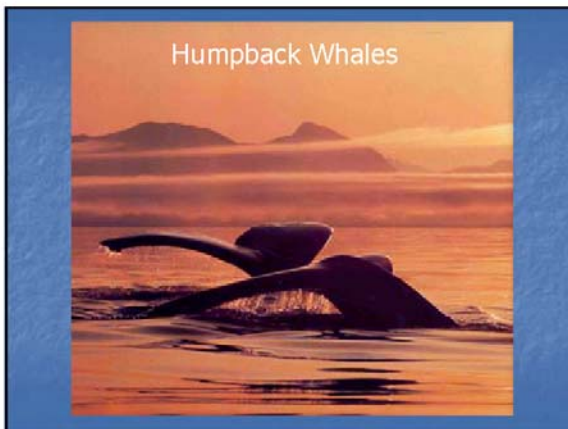
What drives distribution?

Threats

1 entanglement
0 ship strikes
but...
...minimal effort

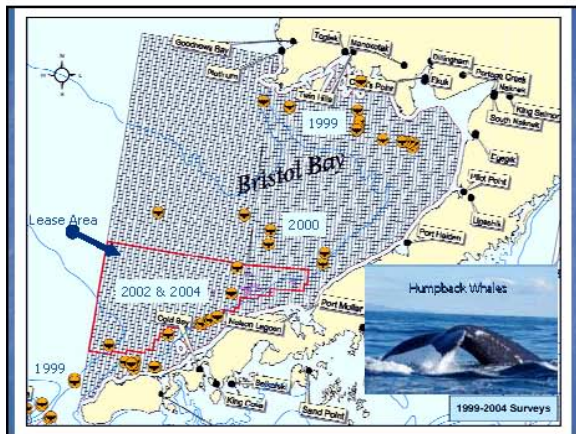
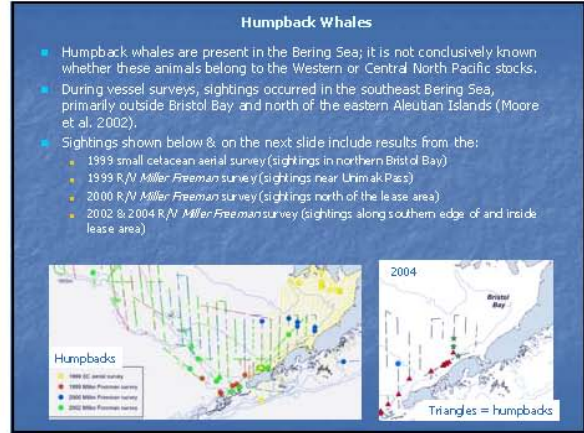
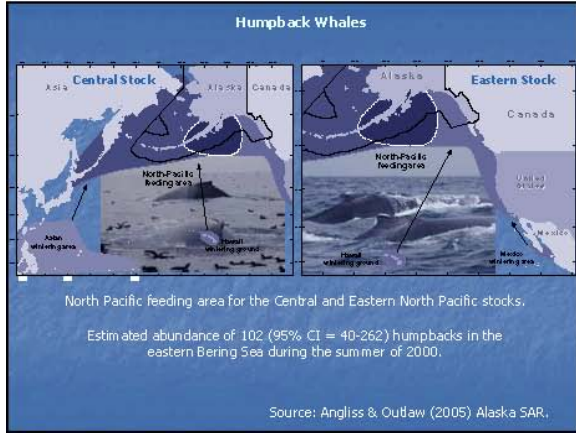
What's Needed

- Basic research on abundance and distribution... but year-round surveys impractical. Instead...
- Satellite tagging
- Acoustic monitoring
- Ecological studies and predictive modeling



Humpback Whales

- Taxonomy: one species worldwide
- US status: endangered
- North Pacific: four breeding populations
- No overall abundance estimate but clearly on the increase



Fin Whales

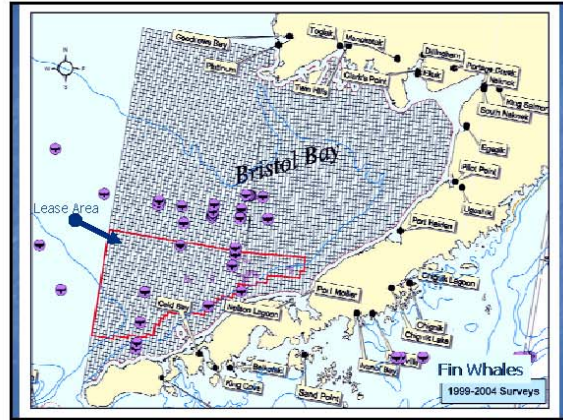
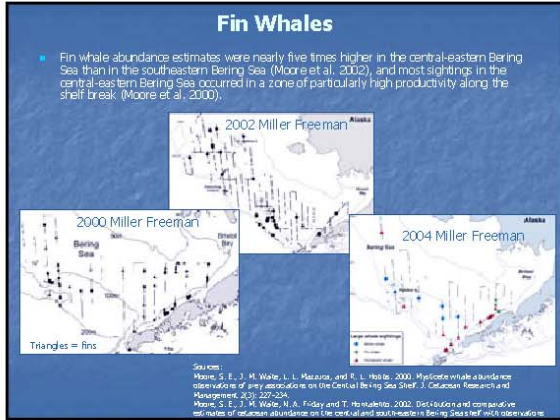
- Taxonomy: one species worldwide
- US status: endangered
- North Pacific population: no overall estimate
- Eastern and western stocks mix in Bering Sea?

Fin Whales

A provisional estimate of 683 (CV = 0.32) fin whales in the Southeastern Bering Sea based on vessel surveys in 1999 and 2000.

*These estimates are considered provisional because they have not been corrected for animals missed on the trackline, animals submerged when the ship passed, and less precise movement.

Source: Angliss & Outlaw (2005) Alaska SAR.



Other cetaceans: MMPA status

Pacific white-sided dolphins (North Pacific stock) = **strategic** (old estimate, known mortality)

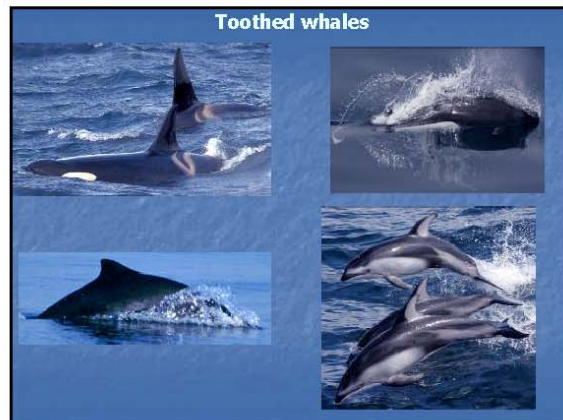
Killer whales
 Eastern North Pacific Alaska Resident stock = not strategic
 GOA, AI, BS Transients = not strategic

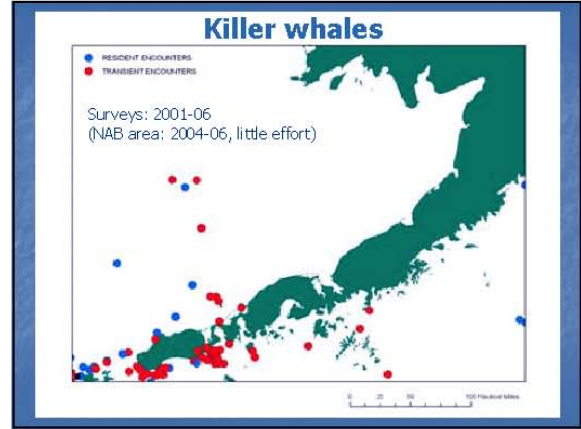
Harbor porpoise (Bering Sea stock) = not strategic

Dall's porpoise (Alaska stock) = not strategic

Gray whales = not strategic (delisted 1994)

Minke whales = not strategic





Summary

Lots of cetaceans in lease-sale area

Year-round occurrence poorly understood

Biggest concern: right whales

Marilyn Marx/CCS

What's Needed


- Basic research on abundance and distribution... but year-round surveys are impractical. Instead...
- Satellite tagging of key species (right, humpback, fin)
- Acoustic monitoring in NAB area
 - Occurrence
 - Changes in distribution or vocalization rates following seismic or other industrial activity
- Ecological studies (right whales)

Impact

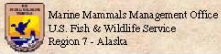
- NAB contains right whale Critical Habitat and is a feeding ground for several species... and proposed areas of interest for industry likely occur in the migratory path.
- Closely related bowhead whales are known to divert from their migratory path at received sound levels of 120dB, which may occur 80km from the seismic source.
- Critical to understand the responses of listed species during feeding and migratory behavior to better identify mitigation and monitoring required.



The North Aleutian Basin: Northern Sea Otters and Pacific Walrus


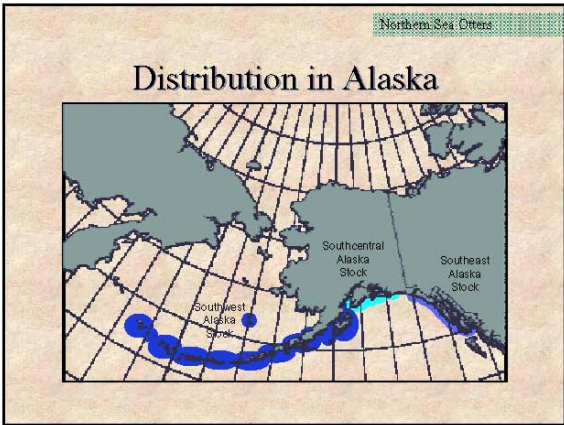


R. Davis/TAMU



Northern Sea Otter (*Enhydra lutris kenyoni*)

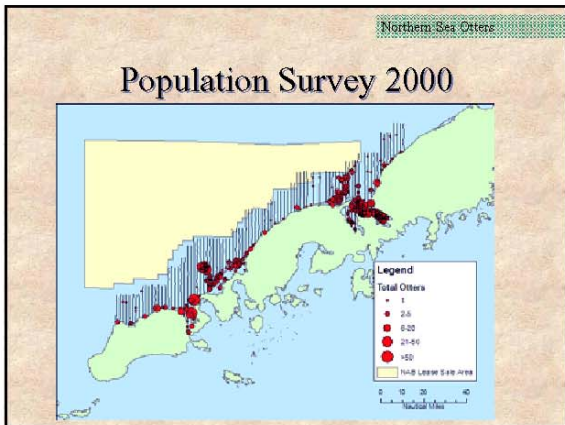
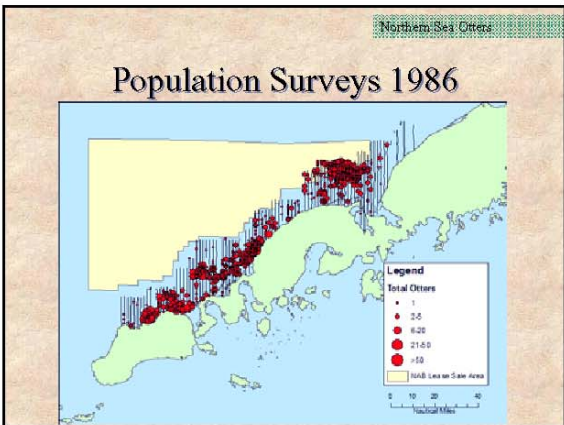
- SW Alaska Population Status: Threatened (2005)

Northern Sea Otters

Population History: Southwest Population Stock

- Nearly hunted to extinction
- 6 Remnant colonies in 1911
- Rapid growth through the 1980s
- Abrupt population declines along the Aleutian archipelago and Alaska Peninsula
- Listed DPS covers the entire SW population stock



Northern Sea Otters

Conservation Concerns for Northern Sea Otters


- Oil and Gas transport/spills
- Improper Waste Disposal in the near shore marine system
- Chronic Disturbance
- Entanglement in Fishing Gear
- Vessel Strikes
- Disease Agents



Northern Sea Otters

Sensitivity to Anthropogenic Disturbances


- Any activity that prevents sea otters from grooming, foraging, or resting can deplete their energy reserves
- May respond to disturbance by moving away from important habitat
- Contaminants and discharge
- Pollutants, such as oil, soils the fur and lowers its insulating value



Northern Sea Otters

Information Gaps: North Aleutian Basin Region

- **Temporal Dynamics of the population**
 - population trend
- **Habitat Use**
 - seasonal/annual movement patterns
 - evaluation of the prey base
- **Health and Condition of the population**
 - body condition
 - indices of health



Northern Sea Otters


Conservation and Management Priorities

- **Population Surveys for Sea Otter Abundance and Distribution**
 - Systematic surveys of sea otters in the near shore and off shore habitats (10 yrs)
- **Longitudinal Studies of Sea Otter Survival, Reproduction, and Movement**
 - radio telemetry studies to assess population demography
- **Health and Condition Studies of Free Ranging Sea Otters**
 - Capture studies to assess health, condition, and potential disease agents

Pacific Walrus

Pacific Walrus (*Odobenus rosmarus divergens*)

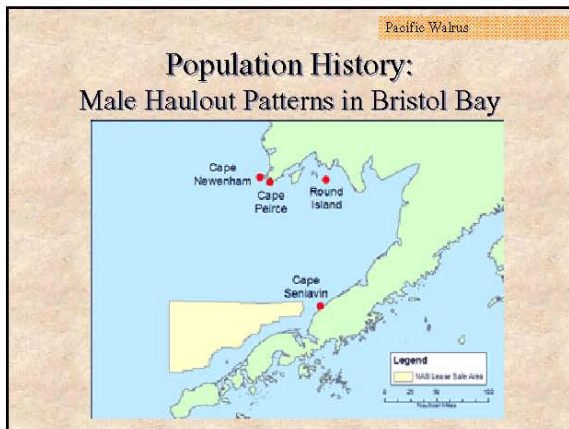
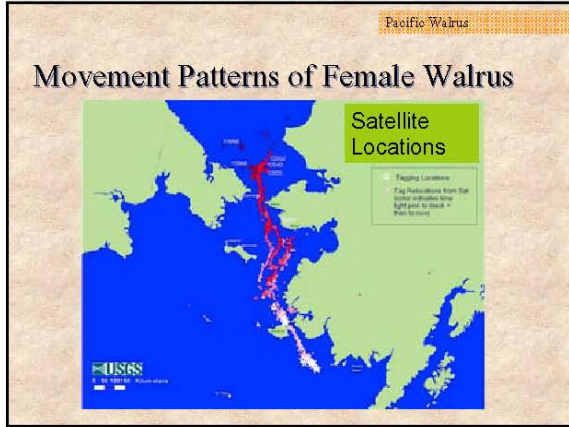
- Population Status: Undetermined



Pacific Walrus

Breeding Distribution in Alaska and Russia





- Pacific Walrus
- ### Activity Patterns and Habitat Use
-
- Long Foraging Excursions
 - 4-10 days in duration
 - 130km from known haul out sites
 - Post trip haulout duration is typically 1-2 days
 - The distance traveled is likely a function of prey density, however the status of walrus prey in Bristol Bay is unknown

- Pacific Walrus
- ### Sensitivity to Anthropogenic Disturbances
-
- Walrus flee haul out sites in response to the sight, sound, or odor of humans and machines
 - Disturbance events occasionally result in animal injuries and mortalities
 - Chronic disturbance events disrupt normal haulout behavior
 - The potential for long-term displacement of animals
 - Walrus may respond to disturbances by moving away from important feeding areas

- Pacific Walrus
- ### Conservation Concerns
- The introduction of noise and related disturbance from oil and gas activities, in breeding, resting and foraging areas
 - Contamination of walrus, their habitat and prey base by pollutants released by local and distant pollution sources

Pacific Walrus

Research and Monitoring Priorities

- **Habitat studies:** Identify/delineate important foraging areas; Investigate seasonal distributions and haulout use patterns. Emphasis on the Cape Seniavin walrus haulout on the Alaska Peninsula
- **Disturbance studies:** Investigate responses to vessel/aircraft traffic and seismic operations
- **Oil spill modeling:** Oil spill trajectories, potential effects on walruses, prey species, and habitats

APPENDIX C

**STUDY PROFILES DEVELOPED AT THE NORTH ALEUTIAN BASIN
INFORMATION STATUS AND RESEARCH PLANNING MEETING**

**C.1 OCEANOGRAPHY, ECOSYSTEMS, AND
FATE AND EFFECTS STUDY PROFILES**

Proposed Study Profile

Region: Alaska
Planning Area: North Aleutian Basin
Title: Modeling of Circulation

MMS Need for Information: Oil spill trajectory analysis for impact assessment on EIS. Physical data to support biological analysis.

Period of Performance:

- Phase 1: FY 2007–2008
- Phase 2: FY 2008–2011

Description

Background

Historic information is out of date, methodology and techniques have improved.

Timing Needs

Phase 1 needed for the EIS and before exploration. Phase 2 needed before the sale in 2012.

Objectives

1. Develop and improve an ocean circulation model that has demonstrated skill at representing the physical processes in the circulation within the domain.
2. Phase 1 adapt existing model for use in the oil spill trajectory analysis for the first North Aleutian Basin sale.
3. Phase 2 improve model to meet all objectives.

Methods

Develop numerical ocean model that includes sea ice processes, tides, eddies, coastal currents, emphasis on surface currents. Includes high-resolution bathymetry and atmospheric forcing. Includes hind-cast of 7- to 15-year period.

Cost and Level of Effort

- Phase 1: \$300,000
- Phase 2: \$1 to \$3 million

Date Information Is Required: 1.5 years before the North Aleutian Basin EISs.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Physical Oceanography Field Program

MMS Need for Information: Supporting data for the modeling effort. Data supporting biological studies. Environmental description for the EIS.

Period of Performance: FY 2008–2012

Description

Background

Insufficient knowledge of coastal flow, transport through Aleutian passes and lagoon exchanges. Insufficient knowledge of shelf-basin exchange, eddies, fronts, stratification, waves and wind forcing, tidal mixing.

Timing Needs

Post-lease.

Objectives

1. Identify and describe critical dynamic processes potentially leading to improved parameterization for ocean modeling.
2. Advance the knowledge of coastal flow processes on the regional environment, including bays and lagoons.
3. Provide data to facilitate biological and ecosystem analyses.
4. Provide data for model verification and sensitivity testing.

Methods

1. Moorings and surface-layer drifters using the Argos GPS system.
2. Multiple, year-round moorings in the passes and across and along the coastal flow, plus one set on the Pacific side.
3. Current meters and pressure sensors at the entrances to lagoons.
4. Conduct three summer and two winter/spring hydrographic surveys.
5. Other instrumentation as appropriate.

Cost and Level of Effort

1. 12–14 moorings for coastal flow at \$100,000 each.

2. 9–10 moorings for the passes at \$100,000 each.
3. Four current meters and pressure sensors at the entrances to lagoons at \$50,000 each.
4. 50 surface-layer drifters at \$5,000 each.
5. One day ship time for each mooring at \$20,000 per day
6. 40 days ship time for the hydrographic surveys at \$20,000 a day.
7. \$500,000 for data analysis and reporting.

Date Information Is Required: Post-lease.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Implementation of a Meteorological Buoy

MMS Need for Information: Required for meteorological and oceanographic modeling, and oil spill trajectory analysis and air quality impact assessment.

Period of Performance: FY 2008–2011

Description

Background

Buoys supports modeling methodology and techniques.

Timing Needs

In conjunction with meteorological modeling.

Objectives

Meteorological data supports all modeling and oceanographic field programs.

Methods

In cooperation with National Oceanic and Atmospheric Administration National Data Buoy Center.

Cost and Level of Effort

Project cost: \$250,000 for the buoy plus \$100,000 per year.

Date Information Is Required: Parallel to the other field programs.

Proposed Study Profile

Region: Alaska
Planning Area: North Aleutian Basin
Title: Mesoscale Meteorological Modeling

MMS Need for Information: Oil spill trajectory analysis and oceanographic modeling and air quality impact assessment.

Period of Performance: FY 2008–2011

Description

Background

Historic information lacks required detail; modeling methodology and techniques have improved.

Timing Needs

Leads circulation modeling by six months.

Objectives

Apply mesoscale meteorological model that has demonstrated skill at representing the physical processes within the domain.

Methods

Mesoscale meteorological model includes nesting or downscaling information from the larger domain to a high-resolution scale over the eastern Bering Sea. Includes high-resolution topography, radiative fluxes, and ocean thermal effects. Includes six hourly output from hind-cast of 7- to 15-year period.

Cost and Level of Effort

Total project cost: \$600,000

Date Information Is Required: Two years before the North Aleutian Basin EISs.

Proposed Study Profile

Region: Alaska
Planning Area: North Aleutian Basin
Title: Characterization of Sediments

MMS Need for Information: Provides baseline for monitoring and for assessing impacts of pollutants.

Period of Performance: FY 2007–2009

Description

Background

Historic information is out of date, methodology and techniques have improved.

Timing Needs

Needed for the EIS and before exploration.

Objectives

Identify and chemically characterize fine-grain sediments. Create statistically valid sampling design.

Methods

1. Polycyclic aromatic hydrocarbon characterization, standard suite of sediment characteristic, trace metals.
2. Quality control, interlaboratory calibration, and use of reference standards. Sediment coring.

Cost and Level of Effort

10 cores for dating, 3 cores for analysis and 50 surface sediment samples, including 25 for biota at the same location.

- Core Analysis: 10/core = 100 samples at \$1,500 per sample = \$150,000
- Biota: 50 samples at \$1,000/sample = \$50,000
- Ship Time: \$25,000 a day for 2 weeks = \$350,000

Date Information Is Required: Before the North Aleutian Basin EIS.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Characterization of Benthic Communities

MMS Need for Information: Provides baseline for monitoring; basis for assessing impacts, food web, higher trophic levels, and contaminant transfer.

Period of Performance: FY 2007–2009

Description

Background

Historic information is out of date, methodology and techniques have improved.

Timing Needs

Needed for the EIS and before exploration.

Objectives

1. Characterization of present benthic communities.
2. Statistically valid sampling design.
3. Identify primary food-web linkages to fisheries, birds, and marine mammals.
4. Link with oceanographic and biological characteristics.

Methods

Grab samples, box cores, and bottom trawls.

Cost and Level of Effort

Two years of field studies, two 2- to 3-week cruises. Cost not determined.

Date Information Is Required: Before the North Aleutian Basin EIS.

Proposed Study Profile

Region: Alaska
Planning Area: North Aleutian Basin
Title: Sea Ice Edge Productivity

MMS Need for Information: Impact of oil spill on a keystone community.

Period of Performance: FY 2007–2009

Description

Background

Potential oil concentration area if a spill occurred during late winter and spring. This area is used by walrus, seals, and seabirds and supports high algal/plankton productivity.

Timing Needs

Needed for the lease-sale EIS.

Objectives

1. Assess the variability of primary production, and the contribution to secondary production in the ice front.
2. Determine the impacts of petroleum products on the community.

Methods

Ice cores, chlorophyll measurements, plankton samples, and primary productivity experiments. Shipboard laboratory experiments of contaminant effects. The hypothesis to be tested is that incorporation of oil in the sea ice is detrimental to sea ice primary productivity and associated food webs.

Cost and Level of Effort

One to two seasons of field studies. Cost not determined.

Date Information Is Required: Before the North Aleutian Basin EIS.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Identify and Characterize Eelgrass Communities

MMS Need for Information: Keystone habitats for fish, birds, mammals. Essential habitat for migratory birds, shorebirds, and waterfowl. Habitat of international significance. Baseline for impact assessment and monitoring.

Period of Performance: FY 2007–2009

Description

Background

Information on distribution and food web is incomplete and needs to be updated.

Timing Needs

Needed for the lease-sale EIS and before exploration.

Objectives

1. Identify the distribution of eelgrass communities.
2. Identify primary food-web linkages to fisheries, birds, and marine mammals.
3. Coordinate with coastal flow and tidal studies.
4. Link to the shore bird and waterfowl studies and subsistence studies.
5. Provide a basis for restoration planning.

Methods

1. Transect and quadrat surveys.
2. Genetic identification of subpopulations.
3. Isotope ratio studies of food webs.
4. Scuba surveys where necessary.
5. Seasonal studies integrated with waterfowl information.

Cost and Level of Effort

Two years of field studies. Cost not determined.

Date Information Is Required: Before the North Aleutian Basin EIS.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Intertidal Community Characterization

MMS Need for Information: Basis for assessing oil spill and construction impacts, food web, higher trophic levels, and contaminant transfer.

Period of Performance: FY 2007–2009

Description

Background

Little historic information is available. Potential area of high impact.

Timing Needs

Needed for the lease-sale EIS and before exploration.

Objectives

1. Characterize present communities.
2. Identify primary food-web linkages to fisheries, birds, and marine mammals.
3. Include the intertidal zone of Amak Island and isolated rocky intertidal important for marine mammals and seabirds.

Methods

Quadrat samples, shoreline transects, visual and scuba surveys.

Cost and Level of Effort

Two years of field studies. Cost not determined.

Date Information Is Required: Before the North Aleutian Basin EIS.

C.2 SOCIOECONOMICS AND SUBSISTENCE STUDY PROFILES

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: North Aleutian Basin Socioeconomics Study, Phase I

MMS Need for Information: The information from this study will be used for NEPA analysis and documentation for the North Aleutian Basin prior to oil and gas exploration and development in that region.

Period of Performance: FY 2007–2009

Description

Background

The oil and gas industry has expressed interest in leasing part of the North Aleutian Basin to search for and possibly develop oil and gas deposits; this study would provide key socioeconomic baseline data. The Phase I effort would focus on the following communities and organizations: Nelson Lagoon, Sand Point, Cold Bay, False Pass, King Cove, Unalaska, Community Development Quota Groups, and the associated boroughs closest to proposed development.

Timing Needs

Data should be available for impact analysis prior to oil and gas exploration and development.

Objectives

1. Synthesize a broad range of existing socioeconomic data; for identified communities this information would include basic demographic data, basic data on the economic structure and activities in the region, assessment of labor base in the region (to evaluate local capacity to provide labor to the oil and gas industry, and educational and training requirements to obtain employment at various levels in the oil and gas industry).
2. Identify existing community infrastructure and public services, and capacity to incorporate change that likely would accompany oil and gas exploration and development.
3. Identify socioeconomic aspirations and values.

Methods

1. Conduct community consultations in all places included in Phase I, to ensure local interest in participation.

2. Identify key sources of data: Census data, Aleutians East Borough, Aleut Corporation, Aleutian-Pribilof Islands Association, Eastern Aleutian Tribes, key communities, other pertinent boroughs, Community Development Quota groups, tribal governments, and village corporations.
3. Compile data and identify any key types of information that are unavailable from existing data sources.
4. Conduct focus groups for qualitative data collection and, as possible, obtain data unavailable from existing sources.
5. Conduct basic data analysis (baseline description) and prepare report describing the socioeconomic characteristics of the Phase I area.
6. Conduct community consultations to present data analysis and baseline description to the communities for their evaluation and comments.
7. Assess need for Phase II geographical or topical expansion — the nature of both potential expansions contingent on Phase I results.

Cost and Level of Effort

Total project cost: \$500,000

Date Information Is Required: Preliminary report by fall 2008. Final report by September 2009.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Subsistence Study for North Aleutian Basin

MMS Need for Information: Information will be used for National Environmental Policy Act (NEPA) analysis and documentation for North Aleutian Basin prior to oil and gas exploration and development in that region.

Period of Performance: FY 2007–2010

Description

Background

The oil and gas industry has expressed interest in leasing part of the North Aleutian Basin to search for, and possibly develop, oil and gas deposits; this study would provide key current subsistence baseline data. The subsistence study would include Nelson Lagoon, Cold Bay, False Pass, and three other settlements in the region as representative communities.

Timing Needs

Data will be collected and compiled as soon as possible.

Objectives

1. To gather current household and community data on subsistence activities — subsistence resources harvest, harvest levels of different resources, locations of subsistence activities for various resources, levels of participation for subsistence harvest and structure of resource exchange, timing for resource harvests.
2. For Nelson Lagoon, Cold Bay, False Pass, and three other representative settlements in the region, the data collected would include information on subsistence harvest and use similar to the standard data collected by the Alaska Department of Fish and Game, Division of Subsistence, using its standard survey tool and methods.
3. The subsistence survey would collect additional information on subsistence that would help to assess any potential impacts from oil and gas exploration and development. Such information would include household economic input into subsistence (particularly in the form of equipment), details on sharing subsistence harvest among members of a community, enhanced information on the timing of subsistence harvests for various resources, traditional knowledge data (particularly on the locations and populations of subsistence resources), map data that includes information on relative importance of various locations to subsistence harvests, and information on the subsistence cycle with respect to wage employment.

Methods

1. Conduct community consultations in all places from which data were collected, to ensure local interest in participation and accuracy of the information obtained.
2. Conduct an Alaska Department of Fish and Game subsistence survey, modified as necessary to obtain the additional information described above under *Objectives*.
3. Integrate as appropriate revised biological data on subsistence resources.
4. Compile data from the survey.
5. Conduct basic data analysis (baseline description) and prepare report describing the subsistence activities in each of the target communities.
6. Conduct community consultations to present data analysis/baseline description to the communities for their evaluation and comments.

Cost and Level of Effort

Total project cost: \$350,000

Date Information Is Required: Final report is needed by spring 2010.

C.3 FISH AND FISHERIES STUDY PROFILES

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: North Aleutian Basin Nearshore Forage Fish Seasonal Distribution and Spawning Survey

MMS Need for Information: Forage fish are an important component of the North Aleutian Basin ecosystem, primarily as prey to marine mammals, seabirds, and commercially important fish species. Study information will be used to prepare an EIS in 2010.

Period of Performance: FY 2007–2009

Description

Background

The southeast Bering Sea is a data-rich location for marine fish distribution and abundance information. Similar information is lacking, however, for shallow nearshore waters along most of the Alaska Peninsula. Shallow nearshore waters (< 5 m deep and < 20 m offshore) are some of most productive habitats in Alaska and many Fishery Management Plan species use nearshore habitats at some point in their life cycle. Alaska has more than 50% of the U.S. coastline; most is pristine, but all of it is vulnerable to changing environmental perturbations and increasing stress from shoreline development. In particular, information is needed on the function and use of nearshore habitats by most forage species (e.g., capelin, Pacific sand lance, Pacific sandfish) because of their importance as a prey resource for higher-level-trophic consumers (e.g., marine mammals, fish), and the susceptibility of nearshore spawning and rearing areas to disturbance from oil and other shoreline development. *Exxon Valdez* oil spill studies have demonstrated that oil impacts are greatest in the nearshore zone, and that oil persists in this zone for decades. This is a high-priority habitat to assess species presence, seasonality, and vulnerability.

Standard research surveys by the Alaska Fisheries Science Center in the Bering Sea sample all habitats except the nearshore, and the standard surveys do not target forage fish. This project will assess the seasonal distribution, habitat use, relative abundance, diet, and energy density of forage fish in the nearshore ecosystem of the North Aleutian Basin. Because nearshore habitats are vulnerable to human disturbance, a better understanding of how the nearshore environment supports ecologically important forage fish species is needed to help managers conserve forage fish populations and protect essential habitats. We know that several forage fish species use the nearshore environment, but we do not fully understand their dependence and fidelity to the different habitats types within the nearshore, or which habitats are more important for different life stages. Seasonal changes in the use of nearshore habitats or energetics of forage fish are also not known.

Objectives

This study will help address information gaps on forage fish in the North Aleutian Basin by assessing:

1. Seasonal use of nearshore habitats,
2. Relative fish abundance in different habitat type, and
3. Energy flux and relative growth of forage fishes in different seasons.

Methods

1. Conduct a seasonal fish use and habitat assessment study in the North Aleutian Basin. Nearshore fishes will be sampled in spring, summer, and fall with a variety of gear types (e.g., beach seine, small boat trawling, purse seine, jigging, remotely operated vehicle). Sampling will be in nearshore waters in a variety of habitat types (e.g., sand/gravel beaches, eelgrass), as well as the shallow nearshore areas down to 20 m. At each sampling site, we will measure habitat characteristics following ShoreZone ground-truthing protocols. Because nearshore seasonal fish use can be difficult to assess, especially in remote locations in winter, we will review new technology such as using an in-situ underwater camera that intermittently takes pictures and would allow assessment of fish habitat use.
2. All fish captured will be identified and counted, and a subsample of individuals will be measured for fork length. For the primary forage fish species, including capelin, Pacific herring, Pacific sand lance, and Pacific sandfish, additional sampling will include collection of otoliths, stomachs, and whole fish.
3. Several assessments will be made on the status of the fish, including age, diet, and energetics analyses. The seasonal sampling (fall, spring) are critical time periods for the energetics assessments. Young fish with inadequate energy reserves going into the winter have poor survival potential. These data for the forage fish species as well as the top predators are critical to modelers
4. All data will be added to an existing database. This database will be linked into the Alaska ShoreZone/Fish Atlas ArcIMS Web site hosted by the NMFS, Alaska Regional Office. This website will be dynamic and will be continually updated as more data become available. The Web site contains detailed information throughout Alaska on shoreline geomorphology (substrate, slope, etc.), fish use by habitat type, other biological characteristics (taxonomic lists, rare species, etc.), and digital images for documentation. MMS scientists and managers will be able to query the database to obtain site-specific information on habitat type and associated fish assemblages in the Basin and in the Beaufort and Chukchi Seas.

Cost and Level of Effort

Total project cost: \$300,000, including \$90,000 for vessel and \$150,000 for aerial survey platform.

Date Information Is Required: Study results will be used in EIS preparation in 2010. The study design review will be due July 2007. Fieldwork will be completed in FY 2008-2009, and results reported in late 2009.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Seasonal Distribution and Condition of Juvenile Pacific Salmon and Young of the Year Pollock within the North Aleutian Basin

MMS Need for Information: Pacific salmon and forage fish are an important component of the North Aleutian Basin ecosystem, primarily as prey to marine mammals, seabirds, and commercially important fish species. Study information will be used to prepare an EIS in 2010.

Period of Performance: FY 2008–2010

Description

Background

The southeast Bering Sea is a data-rich location for marine fish distribution, abundance, and condition information. Similar information is lacking, however, for epipelagic communities within nearshore waters along the Alaska Peninsula. In particular, information is needed on the function and use of nearshore habitats by most forage species (e.g., juvenile salmon, capelin, Pacific sand lance, Pacific sandfish, and Pacific herring) because of their importance as a prey resource for higher-level-trophic consumers (e.g., marine mammals, fish), and the susceptibility of nearshore spawning and rearing areas to disturbance from human activities.

We know that juvenile salmon experience high marine mortality rates during the first year at sea and that size of the fish plays an important role, with larger fish having higher marine survival rates. Size-dependent mortality of juvenile salmon is believed to be concentrated during two marine life history stages. The first stage occurs just after juvenile salmon enter the marine environment, where smaller individuals are believed to experience higher size-selective predation. The second stage occurs following the first summer at sea, when smaller individuals may not have sufficient energy reserves to survive late fall and winter.

Standard research surveys by the Alaska Fisheries Science Center's Ocean Carrying Capacity Program in the Bering Sea sample the epipelagic fish communities within the North Aleutian Basin from nearshore and offshore habitats during late summer and early fall. The annual surveys (2000–2006) have provided much needed data for our understanding of how ocean conditions affect growth and marine survival of Pacific salmon after their first summer at sea. However, our understanding of the processes that affect marine survival of juvenile salmon during their first few months at sea is limited, especially for western Alaska salmon stocks.

We propose to use a similar grid sampling system within Bristol Bay and along the Alaska Peninsula during July to add a seasonal component to our research. A similar survey during July 1999 indicated that sockeye, chinook, coho, pink, and chum salmon from Bristol Bay watersheds and several forage fish species (i.e., capelin, sand lance, sandfish, and rainbow smelt)

use the nearshore environment of Bristol Bay and the Alaska Peninsula. An earlier study during the late 1960s also indicated that juvenile Bristol Bay sockeye salmon utilized these environments during their first few months at sea. This project will assess the seasonality (summer, fall), distribution, relative abundance, diet, energy density, size, and potential predators of juvenile salmon and other forage fish in the nearshore ecosystem (> 20 m to 100 m) of the North Aleutian Basin. This information is lacking because salmon and other forage fish species are usually not targeted for assessment, and nearshore areas are seldom surveyed as fish habitat. Because nearshore habitats are vulnerable to human disturbance, a better understanding of how the nearshore environment supports ecologically important juvenile salmon and other forage fish species is needed to help managers conserve these populations and protect essential habitats. In addition, we do not know the effect of season on the utilization of nearshore habitats or energetics of salmon and forage fish during summer.

Objectives

This study will help address information gaps on forage fish in the Basin by assessing:

1. Seasonal (summer and fall) use of nearshore habitats (> 20 m to 100 m).
2. Relative fish abundance by habitat type.
3. Energy flux and relative growth of salmon and forage fishes through seasonal change.

Methods

1. Conduct a seasonal fish use and habitat assessment study in the North Aleutian Basin. Nearshore fishes will be sampled in July (summer) and again in our annual surveys in August and September (fall) with a surface trawl (top 15 m of the water column). Sampling will be in waters 20 m deep or greater. At each sampling site, we will measure physical and biological oceanographic characteristics and biological characteristics of salmon and forage fish species.
2. All fish captured will be identified and counted and a subsample of individuals will be measured for fork length. Several assessments will be made on the status of the fish, including age, diet, and energetic analyses. The seasonal sampling (summer, fall) are critical time periods for the energetic and growth assessments. Young fish with inadequate energy reserves going into the winter have poor survival potential. These data are of critical importance to modelers.
3. Archive environmental data and specimens to provide a cost-effective means of future hypothesis testing by MMS and other agencies.

Cost and Level of Effort

Total cost: \$600,000, including \$350,000 for a vessel

Date Information Is Required: Study results will be used in EIS preparation in 2010. The study design review will be due July 2007. Fieldwork will be completed in FY 2008-2009, and results reported in late 2009.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: North Aleutian Basin Ichthyoplankton and Zooplankton Monitoring

MMS Need for Information: Zooplankton and larval fishes are important to energy transfer and recruitment dynamics of commercially important species in the Eastern Bering Sea ecosystem. Baseline data on fish larvae and zooplankton abundance and distribution along the North Aleutian Basin are necessary to understand coupling between biological and physical variables, and energy linkages between lower and higher trophic levels. These data will be invaluable to the MMS in determining damage to the environment in the event of an oil spill or leak. In addition, the data provided from this study could also be used to evaluate the potential impacts of drilling structures. Study information will be used in NEPA analysis and documentation for Bristol Bay lease sales and development and production plans.

Period of Performance: FY 2007–2010

Description

Background

Lower-trophic-level production is critical to energy transfer through food webs. Larval fish survival is often a recruitment bottleneck for commercial species. Information on lower-trophic-level dynamics in the North Aleutian Basin is needed to understand present conditions and to serve as a baseline to assess potential impacts of oil and gas development on Bering Sea marine species. The North Aleutian Basin and Bristol Bay are among the world's most productive ecosystems, so understanding zooplankton (diversity, distribution, production) and ichthyoplankton (diversity, growth, survival, recruitment) dynamics is fundamental to understanding and assessing repercussions at higher trophic levels. This type of fundamental information is critical to accurate and successful assessment of potential affects of oil and gas development in this region. Vertebrate and invertebrate species that spend all or parts of their life histories in the near surface could be highly vulnerable to the impacts of oil leaks or spills, and improved information on the ecology of these species will be invaluable to assessing impacts of oil and gas development. Fish eggs, especially for walleye pollock and flatfishes, may be particularly vulnerable.

The NOAA Eco-FOCI Program currently conducts research in the North Aleutian Basin, along the Alaska Peninsula from Unimak Island to Bristol Bay (offshore of the 50 m isobath). We propose to expand our surveys in 2008 in spring (May) and autumn (September) to include Bristol Bay inshore of the 50 m isobath. This will provide new information on current conditions on the Bering Sea Inner Shelf, and will provide much-needed information on seasonality of production. In addition, we will collaborate with Eco-FOCI physical oceanographers at the NOAA Pacific Marine Environmental Laboratory, who can incorporate the distribution and life history information into oceanographic models of transport. We would also work with another

NOAA program, BASIS, (Bering Aleutian Salmon International Survey) that samples the Bristol Bay area in the summer (August 2008) to identify the larval fishes collected during their survey and incorporate the data into the project.

Objectives

1. Extend two existing NMFS surveys to include zooplankton and ichthyoplankton sampling in Bristol Bay inshore of the 50 m isobath in 2008 (May, September). Collaborate to analyze ichthyoplankton samples from BASIS collections made in August 2008. Assess ichthyoplankton and zooplankton diversity, distribution, and abundance along the North Aleutian Basin and in Bristol Bay to allow assessment of future changes in the planktonic community.
2. Evaluate vertical and horizontal abundance and size distribution of eggs and larvae of several key economic and ecologically important species, including walleye pollock, Pacific cod, northern rock sole (*Lepidopsetta polyxystra*), and capelin (*Mallotus villosus*).
3. Document the vertical and horizontal patterns of abundance of marine zooplankton, particularly those species and life history stages that are most important for the recruitment dynamics of commercially valuable fish species.
4. Evaluate species composition and assemblage structure of ichthyoplankton and zooplankton assemblages in Bristol Bay.
5. Relate observed patterns to predominant physical oceanographic conditions.

Methods

1. Design a series of stations in Bristol Bay on a fixed grid. Conduct neuston, depth-discrete, and oblique sampling for zooplankton and ichthyoplankton in May and September 2008.
2. Send samples to the Plankton Sorting and Identification Center (ZSIOP) in Szczecin, Poland. Eco-FOCI has a 30-year history of joint cooperation and taxonomic expertise with ZSIOP. Verify sorts at the AFSC in Seattle and archive specimens at the University of Washington Fish Collection, where we have a long-term commitment to store and access our samples. Summarize information on fish distribution, relative abundance, locations and times of critical or sensitive life history stage habitats, and trophic structure in GIS and report format. Provide results for NEPA analyses.
3. For the primary ichthyoplankton and zooplankton species, summarize vertical and horizontal distribution and relate patterns to environmental variables.
4. Archive biological and environmental data and specimens to provide a cost-effective means of future hypothesis testing by MMS and other agencies.

Cost and Level of Effort

Total project cost: \$300,000

Date Information Is Required: Study information will be used in NEPA analysis and documentation for potential North Aleutian Basin lease sales and development and production

plans. The surveys will be implemented in 2008, and final survey results will be due July 2010. Draft and final reports will be due October and December 2010, respectively.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Compile Historical Information about Seismic Surveys and Fishery Information in the North Aleutian Basin

MMS Need for Information: Information would be used in NEPA evaluations to evaluate whether seismic surveys within the Sale 92 Area of the North Aleutian Basin would affect commercial fishery catches.

Period of Performance: FY 2007

Description

Background

Data are available on locations and timing of seismic surveys conducted within the North Aleutian Basin. It may be possible to use these data to quantify the effect of seismic surveys on fishery catch. There may be some difficulties in making inferences from these kinds of data, but attempts will be made to control for the effects of confounding variables.

Timing Needs

This evaluation would be a high priority for consideration for deferral areas prior to the lease-sale EIS.

Objectives

Evaluate whether there is evidence that seismic surveys within the Sale 92 Area of the North Aleutian Basin would affect commercial fishery catches.

Methods

1. Overlay historic seismic data for Sale 92 Area with available catch-per-unit effort from same time and place.
2. Look at seismic effects studies for similar fish species (e.g., Engas on cod).

Cost and Level of Effort

One-month literature review, 3 months analyst effort for fishery data, 2 months of analysis, 3 months for seismic data collation. This would be a relatively low-cost, rapid assessment.

Date Information Is Required: Prior to lease-sale EIS.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Evaluation of Potential for Space-Use Conflicts between Fishery Activities and Oil and Gas Development Activities within the Sale 92 Area

MMS Need for Information: Information would be used in NEPA evaluations to evaluate whether oil and gas development within the Sale 92 Area of the North Aleutian Basin would affect commercial fishery catches.

Period of Performance: FY 2007

Description

Background

Data are available from NMFS on commercial fishery catches in the North Aleutian Basin. These data include information on locations of catches, species, and gear types used. It may be possible to use these data to quantify potential conflicts between oil and gas development and commercial fisheries.

Timing Needs

This evaluation would be a high priority for consideration for deferral areas prior to lease-sale EIS.

Objectives

Identify potential conflicts between development and commercial fisheries within the Sale 92 Area of the North Aleutian Basin.

Methods

Map the historic distribution of fishery catch data (catch per unit effort, species, numbers, gear type) in the Sale 92 Area.

Cost and Level of Effort

One month literature review, 3 months analyst effort for fishery data, 2 months of analysis, 3 months for data collation. This would be a relatively low-cost, rapid assessment.

Date Information Is Required: Prior to lease-sale EIS.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Nearshore Distribution of Juvenile Flatfishes in the Eastern Bering Sea

MMS Need for Information: The Eastern Bering Sea shelf is home to a group of flatfish species that are found in large abundance and are important in the Bering Sea ecosystem and to the coastal communities. The timing and distribution patterns of the juvenile flatfish settlement is directly related to annual recruitment success and is influenced by large-scale pressure fields and local seasonal hydrography. The proposed study will verify the cross-shelf flow mechanism and the role of the formation of the inner front in the settlement of juvenile flatfish and would allow researchers to differentiate shifts in flatfish productions caused by habitat disturbance, density dependence, or temporal shifts in climate forcing. Study information will be used in NEPA analyses and documentation for North Aleutian Basin lease sales and for development and production plans.

Period of Performance: FY 2007–2009

Description

Background

Knowledge of the distribution and settlement patterns of juvenile flatfish is required to evaluate the potential environmental impacts of oil and gas development in the Eastern Bering Sea. Retrospective analysis of spring pressure fields in the Eastern Bering Sea revealed that a decadal shift in cross-shelf wind patterns occurred in 1977 and 1989, and perhaps again in 2000. Retrospective analyses of crab and flatfish stocks in the region suggest that these shifts in cross-shelf winds may influence the advection of flatfish larvae to suitable nursery areas. A feasibility study was conducted in the eastern Bering Sea in August 2003 to determine whether ages 0 and 1 flatfish could be captured in nearshore areas with a small beam trawl and to obtain physical data on the location and structure of the inner front and sediment grain size. The cruise was successful in accomplishing the stated objectives, but was limited in time and space due to its exploratory nature.

This study would expand the beam trawl survey of the coastal and middle domains on both sides of the inner front in the northern Bristol Bay area. The size and quality of the inner front would be determined and sediment collected to assess which processes are critical to density dependent effects on recruitment success and which are the result of large-scale oceanographic effects.

Objectives

1. Determine the distribution and abundance of juvenile flatfish (and crab) species relative to the inner front of northern Bristol Bay.

2. Obtain physical data on the location and structure of the inner front and collect sediment samples to determine the structure of the sediment in the nursery area relative to depth, fish abundance, and the location of the inner front.

Methods

1. Perform a two-week juvenile flatfish survey of the northern Bristol Bay area using the plumbstaff beam trawl, conductivity-temperature-depth casts, and sediment grabs.
2. Analyze the data in conjunction with hydrographic current models and stock assessment recruitment estimates of juvenile flatfish.

Cost and Level of Effort

Total cost: \$360,000, including \$250,000 for a vessel

Date Information Is Required: Study information will be used in NEPA analyses and documentation for North Aleutian Basin lease sales and for development and production plans. The survey would be conducted in August 2007. Hydrographic model applications and data analysis should be completed by December 2009.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: North Aleutian Basin Fishing Communities

MMS Need for Information: This study will allow MMS to understand connections between specific fishing grounds in the North Aleutian Basin and human fishing communities on shore. It is necessary to understand these connections in order to analyze potential social impacts (per NEPA) on the human environment of leasing activity in different ocean areas and to improve social and economic aspects of oil spill risk assessment.

Period of Performance: FY 2007–2010

Description

Background

The North Aleutian Basin has some of the world's richest fishing grounds, which have provided enormous social and economic benefits to fishing communities in Alaska and other states. Many communities in the region are highly dependent on commercial fishing as the major economic activity currently available. The potential for oil and gas development leases in marine locations in the region creates the need for assessment of potential impacts on these communities. In addition to socioeconomic impacts created by shore-based activities, socioeconomic impacts may occur from effects to ocean fishing grounds from closed fishing areas, reduced harvest, or other impacts to catch.

Commercial fishing patterns indicate that fish harvested from certain ocean locations are likely to be landed for processing in a given community. Fish harvested from other locations are likely to be landed elsewhere. Thus, communities will have different risk and impact profiles under different development scenarios. To understand the different risks and vulnerabilities of specific communities, it is necessary to understand which ocean areas they rely on. This study will use geographic information system (GIS) analysis to link communities to particular ocean areas through commercial fishing patterns, enabling a detailed assessment of potential impacts.

The information required for this study already exists in state and federal records. No new primary data will need to be collected. Catch location is recorded as ADFG statistical areas (about 10 square miles) on fish tickets, along with landing information (port codes). By connecting these data in a GIS, we can map which areas of the ocean typically produce fish for which fishing communities. The study will produce a quantitative assessment of potential impacts on communities that receive fish landings from areas already identified as potential lease sites.

The study will also produce an interactive tool which can be used to assess potential impacts on different communities under other leasing scenarios and various oil spill scenarios.

The end user will be able to click on an area or areas of the ocean and the tool will return information on how many fish (by species and season) caught in those areas were received by which ports. Ex-vessel fish prices will be used to translate this information into the value of these fish per community. When combined with oil spill trajectory models or with localized lease impact models (which can be used to determine which ocean areas to select), the tool will predict which communities will be most affected under a specific scenario. In the event of an actual oil spill, the tool can also provide a rapid assessment of the most economically vulnerable communities.

The methods behind this type of analysis have been pioneered by geographer Kevin St. Martin at Rutgers University for use in socioeconomic analysis for fisheries management plans and have been applied in a limited manner to the study of some West Coast fisheries. They have not yet been applied in Alaska.

Objectives

The objectives of this study are to provide a GIS tool that can be used to:

1. Analyze the potential socioeconomic impacts of different leasing scenarios on fishing communities.
2. Quickly assess the fishing communities most vulnerable to impacts in the aftermath of an oil spill (as mediated through closed fishing grounds or other effects).
3. Provide a basis in quantitative data for the distribution of mitigation efforts to the fishing communities most likely to be affected.

Methods

1. Data: ADFG statistical areas (catch) and ports codes (landings) as extracted from ADFG fish tickets and other existing records.
2. Geographic scope: Marine areas and ports of the North Aleutian Basin.
3. Software: ArcGIS (an electronic geographic information system).
4. Method: Interactive GIS mapping of catch locations by port, species, and season. Assess value using ex-vessel fish prices. Apply to different development scenarios.

Cost and Level of Effort

Total cost: \$127,000

Date Information Is Required: A summary report and interactive CD will be available by mid-2009.

Proposed Study Profile

Region: Alaska
Planning Area: North Aleutian Basin
Title: Bering Sea Fish Catalog

MMS Need for Information: MMS needs organized fish ecology and behavior information for Arctic Alaska environmental impact assessments and informed decision-making pertaining to leasing activity in Arctic Alaska.

Period of Performance: FY 2007–2010

Description

Background

The most comprehensive source of data on the distribution and biology of Bering Sea fishes and benthic invertebrates are provided by the groundfish bottom trawl surveys conducted each summer by the Alaska Fisheries Science Center. The data series, which extends back to 1972, includes the catch in weight and numbers per unit of area trawled, size distribution by sex, and for select species, age, body weight, and maturity. Currently these data reside in the RACEBASE Oracle database, which is accessible only to Alaska Fisheries Science Center staff; however, a new database is under construction that will have a Web-based interface allowing extraction of data and GIS mapping. One way to increase the access of these data for MMS staff is to speed up the development of the Web-based access system by using contract html and Oracle programmers. Another contract person would be hired to construct a metadata section of the database that better defines its contents and allows the user to make more informative selections of data for further analysis and plotting.

Objectives

1. Build a Web-based access system to the RACEBASE survey database using contract html and Oracle programmers. The system will allow data selection, downloading, and plotting with a GIS system.
2. Build a Web-based metadata catalog for RACEBASE so that uninformed users can quickly understand the content of the database and formulate data selections more efficiently. The catalog will also document changes in survey methodology to allow more appropriate interpretation of survey results.

Methods

1. Contract html and Oracle programmers will be hired to build a Web-based access system to RACEBASE and create a metadata catalog to allow a better understanding of the content of the database. This will allow MMS staff and others to directly query the database and either have the resulting data downloaded or plotted with a GIS.

Cost and Level of Effort

Total cost: \$150,000

Date Information Is Required: Contract programmers will be hired in early FY 2007. The metadata catalog will be completed during FY 2007 and the final Web-based access system will be completed by October 2009.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Bering Sea Seasonal Fish Migration

MMS Need for Information: Marine fish species are important in the Bering Sea ecosystem and to the coastal communities. Distribution patterns of these fish are available only during the summer when they are surveyed by the Alaska Fisheries Science Center bottom trawl survey. The proposed study will discern the seasonal movements of individual fish and allow estimation of fish distribution during other seasons. Study information will be used in NEPA analyses and documentation for North Aleutian Basin lease sales and for development and production plans.

Period of Performance: FY 2007–2010

Description

Background

Evaluation of the potential environmental impacts of oil and gas development in the Bering Sea requires knowledge of the spatial distributions of marine fishes throughout the year. Such distributions are determined each summer by the groundfish trawl surveys that have been conducted by the Alaska Fisheries Science Center since 1972. Since many fish species are known to make extensive seasonal migrations, summer distributions may not be indicative of distributions at other times of the year. Using bottom trawl surveys to determine distributions outside of the summer months is difficult and often ineffective because the short days and rough seas severely reduce the number of stations that can be completed per day. An alternative way of determining seasonal fish movement is to use fish tagging systems that allow repositioning individual fish continuously over time. One such system, known as FRAFOS, is now in operation in areas along the East Coast. The system consists a number of low-frequency sound transmitters attached to moorings spread out at distances of 50–100 km. Individual fish are fitted with small tags housing acoustic receivers that record the arrival time of the sound pulse from each mooring. These data are then used to triangulate fish position. Tags are later retrieved from fish captured by the commercial fishery. The tags have a battery life of over two years and allow daily position fixes. Pacific cod and halibut, because they are large, robust fish with long migration paths, would be the first species to be tagged with this system.

Objectives

1. Obtain daily position data for Pacific cod and halibut to plot the trajectory of individual fish over the course of a year or more at liberty.
2. Combine the trajectories with the summer distributions to estimate the seasonal shift in distribution of each species.

Methods

1. Place low-frequency transmitters on each of the four oceanographic moorings maintained by the Pacific Environmental Lab, and place two additional transmitters on new deep-water moorings.
2. Place FRAFOS tags externally on 50 cod and 50 halibut using standard Alaska Fisheries Science Center tagging methodology. Previous NMFS research placing similar tags on cod obtained about 40% return rate.
3. Since NMFS has an ongoing tagging program for cod and the International Pacific Halibut Commission has a similar program for halibut, little additional advertising will be required to inform the fishing community about the tag return program.

Cost and Level of Effort

Total cost: \$350,000 including \$100,000 for a vessel

Date Information Is Required: Study information will be used in NEPA analyses and documentation for North Aleutian Basin lease sales and for development and production plans. The initial placement of transmitters and deployment of FRAFOS tags will begin in July 2007. Fish trajectories and movement patterns should be completed in December 2009.

C.4 BIRD STUDY PROFILES

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Spatial and Temporal Distribution of Steller's Eiders and Other Waterbirds in the North Aleutian Basin Project Area

MMS Need for Information: Present spatial and temporal information on Steller's eiders and several other bird species of management concern is inadequate to predict and assess potential impacts of oil and gas exploration and development in the North Aleutian Basin planning area. Study information will be used in NEPA analyses and documentation for North Aleutian Basin lease sales, for exploration plans, and for development and production plans. This study is considered the highest priority of the six bird studies proposed for the North Aleutian Basin.

Period of Performance: FY 2007–2011

Description

Background

The project area, especially the lower Alaska Peninsula lagoons, is widely known as critical habitat for the federally listed Steller's eider, and as a staging and molting area for many shorebirds and waterfowl of global and regional conservation concern. For instance, the entire listed population of Steller's eiders is present in the North Aleutian Basin during major portions of their annual cycle. In addition, the area hosts nearly the entire populations of species of management concern, including Pacific brant, Emperor geese, and cackling Canada geese, during portions of the year. The importance of the area to waterbirds is reflected in the designation of over 40 sites protected under various international, federal, state, and other programs. However, most distribution and abundance data are both out of date and seasonally biased, and thus inadequate for evaluation of waterbirds' vulnerability to both acute and chronic impacts of oil and gas activities.

Timing Needs

Because potential impacts would occur from all phases of leasing, the need for this information is immediate.

Objectives

The study would document abundance and distribution of waterfowl and shorebirds throughout the annual cycle within bays, lagoons, and other nearshore habitats between Izembek Lagoon and Goodnews Bay.

Methods

1. Aerial surveys: Seasonal shoreline-based comprehensive aerial surveys would be conducted, using methods described in Larned (2005), and Mallek and Dau (2006). These

methods consist of periodic censuses, augmented by replicated sampling schemes for certain habitats, e.g., Kvichak Shoals. Winter distribution will be emphasized because that is the season about which the least is known.

2. Ground-based shorebird surveys: Small camps will be distributed at four to six locations between Izembek Lagoon and Kvichak Bay. Personnel in camps will document species composition, estimate abundance, peak arrival and peak departure, and estimate turnover rates throughout the spring and fall migration periods. Several winter visits would be made to determine the presence of rock sandpipers and other shorebirds in post-migration periods.
3. Telemetry: Use conventional and satellite telemetry techniques to determine distribution, turnover rates, and habitat use. Investigate use of geolocator recording devices as a means to determine characteristics such as habitat use, migration timing, and turnover rates.

Cost and Level of Effort

Costs would include permits needed for Steller's eider implants; public relations efforts with subsistence hunters; and weather constraints for aerial surveys in all seasons, particularly winter; one full-time and three part-time principal investigators (PIs) and one technician; and operations costs. The estimated costs are as follows:

- 1 PI (full time, \$100,000) + 3 sub-PIs (1 for each major methodology, half year, \$50,000 each) + 1 technician (full time, \$50,000) = \$300,000/year × 5 years = \$1.5 million
- Aerial surveys \$40,000/survey × 5 surveys/year = \$200,000/year × 5 years = \$1 million
- Ground surveys logistics, materials, and analytical \$60,000/year × 5 years = \$300,000
- 20 telemetry transmitters at \$7,000 each = \$140,000
- Total cost: \$2.94 million

Date Information Is Required: Prior to lease-sale EISs.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Spatial and Temporal Distributions of Birds at Sea

MMS Need for Information: The lack of seasonal at-sea distribution and abundance information on short-tailed albatross and other seabirds makes it impossible for MMS to adequately complete impact analyses as required by NEPA or to complete Section 7 consultations for the proposed lease sales in the North Aleutian Basin. A number of oil and gas exploration and development activities have the potential to directly and indirectly impact a number of bird species, but the estimated magnitude or significance of these effects would be inaccurate if based on existing datasets.

Information gained from this research would allow the MMS analysts and managers in cooperation with other interested parties to address major gaps in knowledge for over 60 species. In addition, this information would provide valuable documentation for analysts and managers for lease sales in the 2007–2012 program and development and production plans from existing leases. This study is considered the second highest priority of six bird studies proposed for the North Aleutian Basin.

Period of Performance: FY 2007–2011

Description

Background

Breeding seabirds are generally monitored at colonies, yet they spend most of the year dispersed offshore. Additionally, one half or more of all seabirds do not breed because they are too young or there is limited nesting habitat. Recently, U.S. Geological Survey and USFWS consolidated historic at-sea survey data into the North Pacific Pelagic Seabird Database (NPPSD), but most of these data were collected in the 1970s–1980s. MMS will require current data on seabird distribution and abundance in the North Aleutian Basin. Since the 1980s many seabird species have declined and changes have occurred in ocean ecosystems. These changes may have affected the foraging patterns of seabirds. To address this data gap, this project would update seabird distribution data for the southern North Aleutian Basin. It would also provide first-time coverage for the northern Basin, which has not been adequately surveyed previously, and would include the winter months, for which few at-sea data have been collected. This project will use standardized protocols for marine bird surveys. Data will be entered into the NPPSD, providing access to multiple users. The final goal will be to integrate the seabird data with the oceanographic and fisheries data, to determine what oceanographic properties and prey distribution define bird distribution in the Basin.

The study would be implemented in two phases, with the first efforts focused on seabird distribution in offshore waters covered by ongoing fisheries and marine mammal surveys. The

second phase will require dedicated surveys using smaller vessels and support vessels to survey more nearshore waters, particularly in the northern Basin.

Timing Needs

Phase one would conduct surveys beginning in 2007, and would likely continue through summer 2009. The second phase would occur from 2008 through 2010.

Objectives

1. Describe spatial and seasonal distribution of birds at sea in the North Aleutian Basin.
2. Implement collaborative studies of prey availability by working with concurrent studies of invertebrate, zooplankton, and forage fish availability within foraging range of the selected colonies.

Methods

1. Coordinate with oceanographic, fisheries, and marine mammal research to conduct at-sea surveys for birds.
2. When coordination with other studies does not meet the requirements of this project, survey vessels will be contracted to provide survey platforms.
3. Adult diet will be determined by collection of adults at foraging sites, in cooperation with oceanographic and fisheries (invertebrate and forage fish) studies.

Cost and Level of Effort

Costs would include vessel charter time (assuming no coordination with other projects) for 6 months/year (\$600,000). Beyond ship contracts, basic yearly operating costs include travel (\$30,000), permanent and seasonal personnel (\$150,000), equipment and diet analysis (\$50,000). Total = \$830,000/ year, 2007–2010 (without ship time, \$230,000). A final year of synthesis and completion of final report = \$100,000.

Total cost: \$3.42 million

Date Information Is Required: Data to be entered annually into the NPPSD. Annual reports on survey effort will be provided. Final report completed in 2011.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Seabird Colony Census and Diet Studies in the North Aleutian Basin and Southern Alaska Peninsula

MMS Need for Information: The data on seabird colonies in the North Aleutian Basin are not current, which makes it difficult to address potential impacts to seabird populations within the proposed lease-sale areas relative to potential offshore oil and gas exploration and development. Information gained from this research would allow MMS analysts and managers in cooperation with other interested parties to address major gaps in knowledge for use in NEPA evaluations for the oil and gas activities in the North Aleutian Basin. This study is considered the third highest priority of the six bird studies proposed for the North Aleutian Basin.

Period of Performance: FY 2007–2011

Description

Background

In the proposed lease-sale area and adjacent North Aleutian Basin there are approximately 44 seabird colonies and nearly a million nesting birds of 26 species. Most of the colony census data is 10–20 years old, and current breeding population sizes are not known. Additionally, seabird diet during the breeding season has only been studied sporadically and opportunistically at a few colony sites. Since these colonies have been surveyed, there have been major changes in the marine ecosystem, which could have affected seabird population trends and foraging habits. Similar data gaps exist for seabird colonies on the south side of the Alaska Peninsula, where approximately 2 million birds were recorded nesting in past surveys. Cumulatively, the colonies in this region represent a substantial proportion of the breeding seabirds along the North American coasts. Seabirds are a protected resource under the Migratory Bird Treaty Act and international treaty obligations.

Seabird colonies on the north side of the Alaska Peninsula will be affected by early exploration and development activities. Seabird colonies on the south side will be affected during development of transportation infrastructure and vessel traffic during the production and oil delivery phase. Thus, this study would be implemented in two phases, with the first efforts focused on seabird colonies on the north side, and the second focused on the seabird colonies on the south side of the Alaska Peninsula.

Timing Needs

During Phase 1, censuses would be conducted of colonies in the North Aleutian Basin beginning in 2007, and would likely continue through summer 2009. Phase 2 studies would cover the south Alaska Peninsula in 2009 through 2011.

Objectives

1. Re-census colonies in the North Aleutian Basin area.
2. Re-census colonies on the southern Alaska Peninsula within 150 km of any proposed oil transport facility.
3. Conduct diet studies at selected colonies in the North Aleutian Basin and southern Alaska Peninsula.
4. Implement collaborative studies of prey availability by working with concurrent studies of invertebrate, zooplankton, and forage fish availability within foraging range of the selected colonies.

Methods

1. Colony census techniques will follow protocols outlined in Alaska Maritime National Wildlife Refuge (AMNWR) and USFWS manuals. Colony censuses will be prioritized following the USFWS report Colony Re-Census Plan, which provides dates of last census and reliability of census data for each site. The new colony census data will be integrated into the Seabird Colony Database housed with USFWS in Anchorage.
2. Chick diet will be monitored by collecting prey deliveries at the nest of species representative of all foraging guilds of locally nesting birds. Diet studies will be coordinated to complement the sampling conducted at colonies monitored by the AMNWR and associated Seabird, Marine Mammal, and Oceanographic Coordinated Investigations study locations.
3. Adult diet will be determined by collection of adults at foraging sites, or by nonlethal methods where possible. A second phase of the diet study would begin a reference study of fatty acid signatures for prey in the Basin to facilitate future diet studies that will not require collection of seabird stomachs.
4. Data on prey availability (from plankton and fish studies) will be integrated with the seabird diet information via a link with the seabird diet database being developed by USFWS and AMNWR.

Cost and Level of Effort

Yearly costs would include vessel charter time for 2 months/year (\$150,000), permanent and seasonal personnel (\$120,000), equipment and camp/collection operations and diet analysis (\$80,000). Total = \$350,000/year from 2007 to 2010. A final year of synthesis and completion of final report = \$120,000.

Total cost: \$1.52 million

Date Information Is Required: Colony census data to be entered annually. Annual reports on colony and diet studies available January following field season. Final report completed in 2011.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Aerial Remote Sensing of Distribution and Abundance of Eelgrass in the North Aleutian Basin Planning Area

MMS Need for Information: Eelgrass resources are an important component of the estuarine and nearshore systems of the North Aleutian Basin. Eelgrass is important forage for eiders, brant, and nursery for juvenile marine and anadromous fish, and is vital to nutrient input and cycling of the North Aleutian Basin. Understanding the distribution and abundance of eelgrass is essential and will enable MMS to more thoroughly understand and predict the potential effects of oil and gas development in the North Aleutian Basin. This study is considered the fourth highest priority of the six bird studies proposed for the North Aleutian Basin.

Period of Performance: FY 2008–2010

Description

Background

Eelgrass studies are needed to obtain current distribution and abundance information. Data at the most basic level outside of Izembek Lagoon is needed. This study will begin to establish baseline knowledge of eelgrass distribution and status in the North Aleutian Basin planning area.

Objectives

1. Map distribution and abundance of eelgrass within the North Aleutian Basin planning area.
2. Design a long-term eelgrass monitoring plan for the North Aleutian Basin planning area.

Methods

1. Review existing imagery.
2. Evaluate sources of imagery (i.e., satellite, low-level photography, ground survey) and expand as necessary.
3. Design survey methods for long-term comparability, cost-effectiveness, and incorporation of future technological and remote sensing advances.
4. Conduct the survey according to most the appropriate methodology for mapping distribution and abundance.
5. Digitize data.
6. Determine level of sampling necessary to monitor changes in distribution and abundance.

Cost and Level of Effort:

Total cost: \$400,000

Date Information Is Required: Study products are presently needed to enhance assimilation into environmental assessment and NEPA process of the North Aleutian Basin. The survey design will be due July 2007. Initial surveys will be implemented in May through September 2008. Initial survey results will be due April 2009. Draft and final reports are due October and December 2009, respectively.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Estuarine System Studies – Izembek and Port Moller Lagoons

MMS Need for Information: Bird resources are an important component in the estuarine systems of the North Aleutian Basin. Understanding the structure and function of these systems, represented by Izembek and Port Moller Lagoons, will enable MMS to more thoroughly understand and predict the potential effects of oil and gas development in the North Aleutian Basin. This study is considered the fifth highest priority of the six bird studies proposed for the North Aleutian Basin.

Period of Performance: FY 2007–2010

Description

Background

Consistent estuarine systems studies are needed to obtain fundamental and current resource information. Data at the most basic level are needed. There has been no effort to date to use an interdisciplinary approach to understand these systems, of which birds are an integral element. Izembek and Nelson Lagoons and the Port Moller complex are among the most important estuarine systems in North America and are globally important (Ramsar convention designation). In addition to the need for basic distribution data, ecological information is necessary to assess the potential effects of offshore development. However, life history strategies, foraging, population dynamics, and other aspects of estuarine bird behavior and ecology are, for the most part, poorly understood.

This study will begin to establish baseline knowledge of bird ecology in the North Aleutian Basin planning area. Concurrent collection of interdisciplinary data will help complete our understanding of these systems.

Objectives

1. Design a long-term bird monitoring plan for Izembek and Nelson Lagoon/Port Moller complex, including:
 - Distribution and habitat use (seasonal, spatial, temporal patterns of movement)
 - Abundance (seasonal, spatial, temporal)
 - Forage requirements
 - Stressors
 - Background contaminants levels
 - Disturbance and consumption use
 - Predation

- Climate, including ice cover
- Forage quantity and quality

Focal species for these monitoring efforts are:

- Brant (Izembek Lagoon only)
 - Emperor goose
 - Steller's eider
 - Dunlin
 - Western sandpiper
2. Ensure that interdisciplinary evaluations of system components known to determine bird use of these areas, such as chemistry, climate, oceanography, benthic, vegetative (i.e., mapping of eelgrass distribution), fish, and marine mammals, are done concurrently and combined with the above bird information to form an understanding of the function of these systems.

Methods

1. Construct and evaluate conceptual model.
2. Review existing data sources.
3. Evaluate existing survey designs and expand as necessary.
4. Design survey methods for long-term comparability, cost-effectiveness, and incorporation of future technological and remote sensing advances.
5. Conduct survey to determine distribution, abundance, and patterns of movements.
6. Conduct survey to determine forage relationships.
7. Conduct study to determine physiological requirements of focal species, being certain to include background levels of contaminants and other stressors.
8. Combine focal species information with other interdisciplinary data.

Cost and Level of Effort

\$250,000/year for 3 years (not including cost-sharing with physical sciences)

Total cost: \$750,000

Date Information Is Required: Study products are presently needed to enhance assimilation into environmental assessment and NEPA process of the North Aleutian Basin. The study design will be due July 2007. Initial design will be implemented in October 2007. Initial model will be operating by October 2008. Operational model will be completed by October 2009.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Spatial and Temporal Patterns of Bird Movements

MMS Need for Information: Recent interest for oil development in the North Aleutian Basin requires some knowledge of marine bird distribution and timing of use. In particular, it is critical to identify high-use areas within the region for Steller's eiders, short-tailed albatross (listed as endangered), and other species of concern due to declining population trends, global importance, and the increased potential for collisions with oil and gas infrastructure. This area is of international importance to a wide variety of birds that use the area for important life history stages including migration stopovers, overwintering, and molting. The general lack of information on pre- and post-breeding movements and staging areas makes it difficult to address potential oil and gas-related effects on these species molting, wintering, and staging in this region. Information gained from this research would allow MMS analysts and managers, in cooperation with other interested parties, to address some major gaps in knowledge for these species required for NEPA evaluations of proposed oil and gas development activities in the North Aleutian Basin. This study is considered the lowest priority of six bird studies proposed for the North Aleutian Basin.

Period of Performance: FY 2007–2011

Description

Background

The North Aleutian Basin is of international significance because birds from throughout North and South America and Asia congregate there. Locally, it is well documented that birds in the pelagic environment are attracted to light sources. Thousands are killed annually in collisions with vessels. Millions of waterfowl, shorebirds, and seabirds migrate through, breed, overwinter, and stage in the lease area, including Steller's eiders and short-tailed albatrosses, both listed species. The planning area provides wintering habitat for approximately 70% of the Pacific population of Steller's eiders.

Millions of birds may move through and forage within the lease area. They may be attracted to manmade light sources and vulnerable to striking manmade objects. As exploration and operations activities proceed in the planning area there will be a significant increase in the amount of light and consequently the potential for increased bird strikes.

On a larger spatial scale, it is well known that large numbers of species that use the area for molting, staging, or overwintering migrate to distant locations to complete their annual life cycles. Thus, any effects from oil and gas leasing and exploration may have consequences at an international level.

Objectives

1. Develop a model to be used by MMS to assess the potential for bird strikes in the North Aleutian Basin by identifying the timing, patterns of movement, species composition, and numbers of birds transiting the lease area and correlate these movements with weather and other environmental variables.
2. Identify the patterns of movements of birds on local and global spatial scales throughout annual cycles.
3. Facilitate analysis of survey data by identifying movements and turnover rates within the lease area.
4. Mark birds with a variety of life histories including common murres, black-legged kittiwakes, crested auklets, shearwaters, dunlins, Steller's and king eiders, and black scoters.

Methods

1. Mark a sample of birds within the proposed lease-sale area (multi-species) using telemetry (in combination with other distribution studies).
2. Conduct onshore and offshore radar studies.
3. Record onshore and offshore visual observations (in combination with other distribution studies).

Cost and Level of Effort

\$500,000/year for 5 years

Total cost: \$2.5 million

Date Information Is Required: Prior to the completion of any development and production plan EIS.

C.5 MARINE MAMMAL STUDY PROFILES

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Distribution, Abundance, and Habitat Use of North Pacific Right Whales

MMS Need for Information: The eastern population of the North Pacific right whale (*Eubalaena japonica*) is arguably the rarest stock of whales anywhere in the world. Right whales throughout the North Pacific were drastically reduced by commercial whaling beginning in 1835, and the remnant eastern population was almost wiped out by illegal Soviet catches in the 1960s. Today, the surviving population likely numbers fewer than 100 whales, although little is known of its abundance, movements and current habitat use. Because of its endangered status under the ESA (and designated as “critically endangered” by the International Union for the Conservation of Nature and Natural Resources), the eastern North Pacific right whale is among the highest priorities for recovery efforts by NMFS. Under NEPA, MMS will be required to evaluate how federal actions associated with oil and gas development may impact right whales, which are known to feed in the North Aleutian Basin lease-sale area. The occurrence, distribution, and habitat use of this species in the area may play an important role in determining where and when exploration or access to petroleum reserves may be conducted.

Period of Performance: FY 2007–2010

Description

Background

Historical data as well as recent observations confirm that the North Aleutian Basin lease-sale area is used by right whales for at least the period May through September; although it is generally assumed that the animals migrate out of the area during winter, this assumption is based on very little information and has never been confirmed. It is also assumed that right whales occupy the North Aleutian Basin area to feed on copepods, but oceanographic and foraging ecology studies of the region that would support this assumption are lacking. Multidisciplinary surveys of the lease-sale area and adjacent regions would provide crucial information on the occurrence and habitat use of right whales in this region. A parallel study would examine movements of individual whales using satellite-monitored radio tags, a technique that has proven very useful in this and other species of large whales because it allows more cost-effective and practical collection of distributional information for longer periods than can be obtained by regular sighting surveys.

Timing Needs

Because of the extremely vulnerable status of this population and the potential for industry activities (notably seismic surveys) to begin as early as 2007 or 2008, it is essential that at least the tagging work is begun in the summer of 2007. At least three seasons of study are required to capture interannual variation in animal movements and habitat characteristics and to increase the sample size of tagged whales.

Objectives

1. Conduct a multidisciplinary project involving aerial- and ship-based sighting surveys, and physical and biological sampling to characterize right whale habitat over spatial scales of tens of kilometers in and around the Basin.
2. Through animal-borne acoustic tagging and concurrent oceanographic observations, characterize right whale foraging behavior and prey distribution over spatial scales of hundreds of meters to kilometers.
3. Through animal-borne satellite tagging, determine the extent to which the Basin is used by right whales, and their movements throughout the Bering Sea and elsewhere.
4. Collect biopsy samples of right whales for genetic, pollutant, and dietary analysis, and samples of copepods to establish a prey pollutant baseline.

Methods

We will conduct several integrated research activities from the same platform in the same region that will provide information on right whale ecology and behavior at various spatial scales; these will include sightings surveys (quarterly aerial surveys, annual ship-based surveys), physical/biological sampling, and acoustic and satellite tagging of whales. Integration of these activities will ensure that observations at one spatial scale can be appropriately interpreted in the context of observations at larger spatial scales. We will coordinate our activities with other programs (e.g., Bering Ecosystem Study and North Pacific Research Board's Integrated Ecosystem Research Program) so that our relatively small-scale observations can be put into the context of conditions and processes occurring over the broader Bering Sea. The satellite tagging portion of the project will begin in the summer of 2007 and will involve attaching up to 15 tags to right whales in the southeastern Bering Sea over 3 years. Integrated ecosystem observations and sighting surveys will begin in 2008.

Distribution and movement data from this study will be combined with information from acoustic recording devices (see separate study plan) to assess the occurrence of right whales in the Basin year-round and, possibly, to study the response of tagged whales to seismic surveys.

Biopsy samples of right whales will be taken during tagging operations for analysis of genetics, pollutants, and diet. In addition, samples of copepods will be taken during oceanographic operations to establish a baseline for contaminants in right whale prey prior to oil and gas development activity.

Cost and Level of Effort

- FY 2007: \$615,000 (cruise, aerial surveys, and satellite tagging)
- FY 2008: \$1,050,000 (cruise, aerial surveys, satellite tagging, and oceanography)
- FY 2009: \$1,050,000 (cruise, aerial surveys, satellite tagging, and oceanography)
- FY 2010: \$475,000 (aerial surveys, analysis, and write-up)
- Total Cost: \$3.19 million

Date Information Is Required: A final report is needed by the end of the funding period, September 2010. Information derived from the earlier phases of the tagging study should be made available as soon as possible to assess potential impacts of industrial activity on movements and habitat use.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Seasonal Acoustic Monitoring of Right Whales and Other Endangered Cetaceans in the North Aleutian Basin

MMS Need for Information: At least nine species of cetaceans are known to occur in the North Aleutian Basin lease-sale area. These include the North Pacific right whale (*Eubalaena japonica*), humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), gray whale (*Eschrichtius robustus*), minke whale (*Balaenoptera acutorostrata*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoena dallii*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), and the killer whale (*Orcinus orca*). It is likely that, to one extent or another, the area represents a feeding ground for all of these species during at least spring, summer, and fall; however, there has been relatively little survey effort in the region, and none during winter. Recent data from autonomous recording devices in the Gulf of Alaska and southeast Bering Sea (i.e., the North Aleutian Basin lease-sale area) have indicated that some species (including fin whales) are present year-round, a finding that contradicts conventional wisdom about migratory behavior. Such devices offer great potential to continuously monitor the occurrence of cetaceans, as well as to obtain baseline ambient noise data and information on calling rates during exploratory activities.

Overall, the pattern of occurrence of cetaceans in the Basin is unclear, and needs to be clarified in light of the likely oil and gas development and associated activities. Under the NEPA, MMS will be required to evaluate how federal actions associated with oil and gas development may impact right whales and other cetaceans, which are known to feed in the Basin. The occurrence, distribution, and habitat use of all of these species in the area may play an important role in determining where and when exploration or access to petroleum reserves may be conducted. Right whales are of particular concern given their critically endangered status and the paucity of knowledge regarding the extent to which they use the Basin.

Period of Performance: FY 2007–2010

Description

Background

North Pacific right whales are critically endangered as a result of commercial whaling beginning in 1835 and devastating illegal catches by the USSR in the 1960s. They are known to use the Basin as a feeding ground, but the nature and extent of their occurrence remains unclear, and acquisition of this knowledge is urgently required for recovery efforts and petroleum resource development activities. Surveys conducted periodically by NMFS since 1999 have recorded other cetaceans in the region in summer, but the expense of conducting season-long or year-round visual surveys in the Bering Sea has precluded development of a clear picture of cetacean habitat use in this region. In contrast, acoustic monitoring is a proven means of

detecting cetacean vocalizations over months or years, with the added advantage that detections are 24 hours a day, as well as during the darkness and bad weather that hinder visual observation.

Timing Needs

Because of the potential for seismic surveys as early as 2007 or 2008, it is essential that recorders be deployed in the summer of 2007. This will allow gathering of baseline acoustic data — or, in the event that seismic work is occurring in the summer of 2007, would ensure that recorders were in place to assess the potential impact of these surveys.

Objectives

1. Deploy passive acoustic recorders in the Basin to monitor occurrence of right whales and other cetaceans year-round.
2. Compare acoustic results with data from visual surveys conducted in the region to assess the vocalization rate relative to the number of whales observed.
3. Collect baseline ambient noise data, and assess changes in calling rates during and following seismic surveys.

Methods

Acoustic monitoring will be conducted using passive acoustic recorders (i.e., PMEL recorders, DASARS, HARPS, PALS, and/or Cornell Pop-ups) deployed in the Basin, and subsequently retrieved for analysis after variable periods of from several months to more than a year. The devices will be deployed beginning in the summer of 2007, and will be rotated in and out on a regular schedule coincident with the availability of vessel support.

Stored acoustic data will be analyzed subsequent to retrieval beginning in 2008, and results will be used to modify the design of visual and oceanographic surveys for right whales as appropriate. Comparison of the acoustic data with sightings of right whales from planned visual surveys and satellite tagging studies will permit an assessment of the proportion of the local population that is vocalizing (and thus acoustically detectable). Detection of seismic survey noise will also permit a comparison of cetacean calling rates during and after such activities.

Cost and Level of Effort

- FY 2007: \$350,000 (recorder construction and salary)
- FY 2008: \$150,000 (recorder turnaround and salary)
- FY 2009: \$150,000 (recorder turnaround and salary)
- FY 2010: \$70,000 (analysis and salary)
- Total Cost: \$720,000

Date Information Is Required: A final report is needed by the end of the funding period, September 2010. Analysis of acoustic data from earlier phases of the project should be provided as soon as practicable in order to enable preliminary assessments of species occurrence and impacts of seismic activity.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Abundance, Distribution, and Seasonal Movements of Humpback Whales, Fin Whales, and Other Cetaceans in the North Aleutian Basin.

MMS Need for Information: Humpback whales (*Megaptera novaeangliae*) and fin whales (*Balaenoptera physalus*) are both listed as endangered under the ESA. Both species, as well as other cetaceans, regularly use the Bering Sea and adjacent waters as a feeding ground in spring, summer, and fall. Under NEPA, MMS will be required to evaluate how federal actions associated with oil and gas development may impact these species, whose range is known from NMFS surveys to include the North Aleutian Basin lease-sale area. The occurrence, distribution, and habitat use of humpback and fin whales, and other cetacean species, may play an important role in determining where and when exploration or access to petroleum reserves may occur.

Period of Performance: FY 2007–2010

Description

Background

Humpback whales and fin whales both inhabit the Bering Sea during spring, summer, and fall, and feed there on euphausiids and small schooling fish. The humpback whales in this area are probably primarily part of the Central North Pacific stock, although it is known that some individuals in this region migrate to the western North Pacific to breed and calve. The population identity of fin whales in the region is less clear, but evidence from mark recoveries suggest that at least two breeding populations of this species (and eastern and western stock) mix on a common Bering Sea feeding ground. Both species were heavily exploited by commercial whaling in the North Pacific in the 20th century, with humpback whale populations suffering additional damage from illegal Soviet catches in the 1960s.

Although some distributional data exist regarding humpback whales, fin whales, and other cetaceans in the Basin, there are few data on their occurrence outside summer, and sighting surveys to fill these gaps year-round would be impractical and prohibitively expensive. A directed satellite-tagging study of both these large-whale species would provide essential information on the movements of individuals, the extent to which the Basin is used, and the population identity of these animals. Surveys for other cetaceans conducted concurrent to satellite tagging would provide valuable information about the distribution and occurrence of other species.

Timing Needs

Given funding and logistical constraints, the full program of work would likely not be practicable in the summer of 2007, although opportunistic tagging could be conducted at this time concurrent with a separate survey for right whales. The full project would begin in the

summer of 2008, likely in July or August when weather conditions are optimal for field operations.

Objectives

1. Conduct ship-based sightings surveys of cetaceans in the Basin and adjacent regions to assess the distribution and local abundance of humpback whales, fin whales, and other cetaceans.
2. Through satellite tagging of individual fin and humpback whales, monitor their movements and use of the Basin and adjacent waters.
3. Through long-term tag attachments, assess the migratory destinations of individual whales and, thus, their population identity.
4. As possible, assess whether distribution and habitat use change in response to seismic survey activities.

Methods

Line-transect sighting survey protocols will be followed to obtain data on the local abundance and distribution of cetaceans in the lease-sale area and surroundings. During these surveys, searches will be made for humpback and fin whales that may be suitable for satellite tagging in the Basin and adjacent regions. Satellite tags will be attached to humpback and fin whales in the Bering Sea beginning in the summer of 2008, with preparatory work (and possibly a few tags put out) in 2007. Tags will be similar in design to those successfully deployed on humpback whales by the same researchers elsewhere; the transmitters are monitored by the ARGOS system. An appropriate research vessel will be chartered for approximately 3 weeks for the 2008-2009 tagging; any tags deployed in the summer of 2007 will be deployed on an opportunistic basis from a separate cruise whose principal objective will be the tagging of North Pacific right whales.

Cost and Level of Effort

- FY 2007: \$60,000 (preparation and opportunistic tagging)
- FY 2008: \$350,000 (cruise and satellite tagging)
- FY 2009: \$350,000 (cruise and satellite tagging)
- FY 2010: \$85,000 (salary and analysis)
- Total Cost: \$845,000

Date Information Is Required: A final report is needed by the end of the study, June 2010.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Health Assessment of Stranding Marine Mammals in the North Aleutian Basin

MMS Need for Information: There are many species of cetaceans and pinnipeds whose range includes the North Aleutian Basin and adjacent waters. Several of these species are critical components of the Alaska Native subsistence harvest, and have the potential to be negatively affected by oil and gas exploration and production that may soon occur in the Basin. Under NEPA, MMS will be required to evaluate how federal actions associated with oil and gas development may affect these species. The MMS will need current baseline information on causes of mortality for comparison with future years when the oil and gas industry initiates major operations in this area.

Period of Performance: FY 2008–2011

Description

Background

The North Aleutian Basin is a key part of the range of several species of marine mammals, including North Pacific right whales, humpback whales, fin whales, killer whales, harbor porpoise, Dall's porpoise, gray whales, Steller sea lions, harbor seals, spotted seals, sea otters, and walrus. These mammals are top-level consumers and as such, their health is a visible indicator of the "health" of the local ecosystem. Previous studies supported by the MMS (e.g., Fay et al. 1979) documented stranding levels and causes of mortality in the late 1970s, but no directed studies in this area have occurred recently.

Timing needs

Given funding and logistical constraints, this study could likely not begin until 2008. In early FY 2008, existing survey data would be compiled and examined to identify areas where carcasses typically come ashore so aerial survey effort can be better focused. A full suite of seasonal surveys and necropsies should be conducted for 3 years, beginning in spring of 2008. This study should be repeated periodically after this date if development and production become a reality.

Objectives

1. To identify and determine the normal spatial distribution and numbers of dead and moribund marine mammals by species, sex, and age along the coast of Bristol Bay and to determine the cause of mortality.
2. To collect blood and tissue samples and conduct analyses for contaminants and pathological conditions.

3. To compare results collected from stranded animals to information from specimens collected from living populations.

Methods

Existing survey data will be compiled and examined to identify what new information exists on stranding rates in the Basin and to identify any “hot spots” where animals often come ashore. Aerial surveys of the Bristol Bay shoreline will be conducted once per month during the spring and summer to search for stranded marine mammals. Survey teams will include staff qualified to conduct necropsies of marine mammals. If feasible, once a marine mammal is found, the aircraft will land and staff will conduct a necropsy and collect tissue samples. If not feasible, staff will later attempt to access the area by boat. Tissue samples will be collected and analyzed for contaminants and pathogens. The final report will compare these data with information on marine mammal health collected via other studies.

Cost and Level of Effort

- FY 2008: \$200,000 (1/2 salary for one full-time staff, aircraft, contracts, travel)
- FY 2009: \$300,000 (full salary for one full-time staff, aircraft, contracts, travel, sample analysis)
- FY 2010: \$300,000 (full salary for one full-time staff, aircraft, contracts, travel, sample analysis)
- FY 2011: \$75,000 (salary, analysis, and preparation of final report and publication)
- Total Cost: \$875,000

Date Information Is Required: Final report is needed by the end of the study, September 2011.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Monitoring Seasonal Distribution and Diet of Endangered Steller Sea Lions in the Southeastern Bering Sea and Eastern Aleutian Islands

MMS Need for Information: The Steller sea lion is listed as endangered under the ESA and as a species of concern in the North Aleutian Basin proposed lease-sale area. Information on use of terrestrial and marine habitats by Steller sea lions in the southeastern Bering Sea, including the Basin, is necessary to ensure that oil and gas lease and development activities do not delay the species' recovery. Study findings will be required in NEPA analyses, ongoing ESA Section 7 consultations, and other reviews of post-sale and post-exploration decision making and mitigation.

Period of Performance: FY 2008–2010

Description

Background

Much of the Basin overlaps with designated critical habitat for the endangered western Steller sea lion. As recently as 50 years ago, there were approximately 50,000 sea lions inhabiting the eastern Aleutian Islands west of the Basin, and the total western Steller sea lion population in Alaska (west of 144°W through the Aleutian Islands and Bering Sea) likely numbered over 225,000. Currently, the eastern Aleutian Islands sea lion population numbers less than 10,000, but has been stable since 1990. Criteria in the draft *Steller Sea Lion Recovery Plan* indicate that the species must increase at 3% per year for 30 years in order to be delisted.

The Basin area contains important foraging habitat for sea lions breeding on nearby rookeries on Sea Lion Rock (near Amak Island) and in the Krenitzen Islands west of Unimak Pass. To determine vital rates (survival and reproduction) and follow movements of sea lions, the National Marine Mammal Laboratory (NMML) individually marked (hot-branded) pups born on Ugamak Island in the eastern Aleutian Islands beginning in 2001. Marked sea lions from Ugamak have been sighted most often on haulouts or rookeries bordering the southeastern Bering Sea, indicating that the prey resources (e.g., salmon, pollock, Pacific cod, and Pacific herring) located there are crucial to their survival and reproduction. To date, 525 sea lions have been marked, and have been sighted on 29 different terrestrial haulouts or rookeries in the eastern Aleutian Islands, adjacent North Pacific Ocean, and southeastern Bering Sea, including the Pribilof Islands, Sea Lion Rock/Amak Island, and Round Island in Bristol Bay. Recent population modeling studies suggest that declines in reproductive rates since the late 1970s may be impeding recovery of the western Steller sea lion. Any additional proposed changes within the marine or terrestrial habitats of Steller sea lions that could adversely affect their reproduction or delay their recovery would require close study.

Timing Needs

For information to be available in time to support EIS-related analyses and lease-sale-related ESA Section 7 consultations, surveys would need to be initiated in spring (March) 2008.

Objectives

1. Monitor abundance and pup production of sea lions in summer (June through July) and winter (March) on terrestrial haulout and rookery sites in the eastern Aleutian Islands, western Gulf of Alaska (North Pacific Ocean), Sea Lion Rock/Amak, and in Bristol Bay, 2008-2009.
2. Photograph and record sightings of marked sea lions on terrestrial haulout and rookery sites in the eastern Aleutian Islands, western Gulf of Alaska (North Pacific Ocean), Sea Lion Rock/Amak, and in Bristol Bay.
3. Collect food habits information (scat) to determine sea lion prey species in the eastern Aleutian Islands and southeastern Bering Sea.

Methods

Abundance on terrestrial sites will be monitored by aerial survey photogrammetry. High-resolution photographs of sea lions will be taken vertically over terrestrial sites by using a medium-format camera flying at 700–1,000 feet. Sea lions are counted by age and sex (pups, juveniles, subadult males, adult females, and adult males) from photographs back in the lab. Sea lion population structure (e.g., by age and sex) will be used in population models. Currently, the NMML conducts an aerial survey each summer to count adults and juveniles one year (nonpups in early to mid-June), and pups the next (late June to early July). Funds from this project will be used to extend the summer survey to Bristol Bay and the Pribilof Islands each year (5 days of flight time). In addition, an aerial survey would be conducted of the eastern Aleutian Islands, western Gulf of Alaska, and the ice edge in the southeast Bering Sea in March (10 days of flight time).

NMML conducts a vessel survey in the eastern Aleutian Islands and southeastern Bering Sea in summer (2 weeks during July and August) to record sightings of marked animals and to collect food habits information. For this study profile, a vessel would be chartered in May (1 week) to conduct the same research around haulouts in Bristol Bay during herring spawning time. Marked animals are recorded and photographed from small skiffs launched from a larger vessel; food habits information is collected by going ashore, flushing all animals into the water, and collecting scat. Funds requested would be used to pay for vessel charter and prey species identification.

Cost and Level of Effort

- FY 2007: \$225,000 (aerial survey and population modeling)
- FY 2008: \$225,000 (aerial survey and population modeling)
- Total Cost: \$450,000

Date Information Is Required: An annual interim report will be produced in late 2008 and a final report will be produced in early 2010.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Seasonal Habitat Use by Endangered Steller Sea Lions of the North Aleutian Basin

MMS Need for Information: The Steller sea lion is listed as endangered under the ESA and as a species of concern in the North Aleutian Basin. Information on use of terrestrial and marine habitats by Steller sea lions in the southeastern Bering Sea, including the Basin, is necessary to ensure that oil and gas lease and development activities do not delay the species' recovery. Study findings will be required in NEPA analyses, ongoing ESA Section 7 consultations, and other reviews of pre- and post-sale and pre- and post-exploration decision making and mitigation.

Period of Performance: FY 2008–2010

Description

Background

The North Aleutian Basin includes habitat used by the endangered western stock of Steller sea lions. However, nothing is currently known regarding how this area is used by this species on a seasonal basis and which portions of the Basin are of critical importance to this species for foraging. Information on use of terrestrial and marine habitats by Steller sea lions in the southeastern Bering Sea, including the Basin, is necessary to ensure that oil and gas lease and development activities do not delay the species' recovery. Telemetry studies in the eastern Steller sea lion stock have shown that animals use haulouts as a central place from which foraging trips are made (Raum-Suryan et al. 2002, 2004). The close proximity of the Steller sea lion haulouts and rookery sites at Amak Island, Cape Newenham, Round Island, Akun, Akutan, and Ugamak to the Sale 92 Area suggests that this area may be used as a foraging location.

This study would focus on deploying telemetry instruments (SMRU tags) to monitor location and diving behavior of individual animals beginning in October 2008. A total of 15 instruments would be deployed on young of the year, juvenile, and, possibly, adult females. October 2008 is the earliest possible start date for this project given the current limitation on sea lion permits. Our experience with satellite tag longevity indicates that these deployments would return useful information through the winter and into the early spring of the following year. We propose a second deployment of instruments in May 2009 to gain information on how animals use the area through the summer months and into early fall. Given the molting process of this species, tags would likely fall off the animals in August or September. This deployment schedule would be repeated in the following year. By deploying instruments at two different times throughout the year, information on the habitat use of Steller sea lions throughout the annual cycle will be gained.

Timing Needs

To have information available in time to support EIS-related analyses and lease-sale-related ESA Section 7 consultations, tagging activities would need to be initiated in October 2008.

Objectives

1. Determine seasonal distribution of Steller sea lion in the Basin. Determine the extent to which regions within the Basin are utilized by Steller sea lions for foraging, and the extent to which activities in the area could affect foraging efficiency.
2. Capture Steller sea lions using a variety of on-land or at-sea techniques and attach satellite-linked telemetry devices that record and transmit foraging depths and location. Highlight areas of critical importance through kernel home range analysis.
3. Identify dispersal (migration) through the area to other haulouts surrounding the Basin.
4. Monitor the health and condition of each captured animal.
5. Permanently mark individual animals captured so they may be included in population dynamic research in the area in the future.

Methods

During a 2-year period, two trips will be conducted during spring (April or May) and two during autumn (October or November) to capture and telemeter Steller sea lions among Unimak Pass and Amak Island/Sea Lion Rock areas, or other haulout locations within the Basin. Steller sea lions will be captured using a variety of on-land and at-sea techniques and immobilized with isoflurane gas anesthesia. Satellite telemetry transmitters will be attached and measurements of health and condition collected according to standard procedures developed at NMML, ADFG, and Alaska SeaLife Center. A licensed veterinarian will be present at all times when isoflurane is being administered. Dive depth data are stored by the telemetry device and transmitted when dry (e.g., when the sea lion is at the surface or hauled out on land) to Argos satellites. Locations are determined by triangulation by Argos and variance in location estimate is based on quality of received signals. At-sea distribution and habitat use will be determined through analysis of location and dive data by sea lion age and sex through the use of GIS, animal movement software, and new habitat use models being developed at NMML. All physiological tissues collected will be archived for future contaminants, disease, and diet assessments to provide baseline data in the event of catastrophic events (e.g., oil spill).

Cost and Level of Effort

- FY 2008: \$425,000 (animal capture and tagging)
- FY 2009: \$425,000 (animal capture and tagging)
- FY 2010: \$90,000 (data analyses and report preparation)
- Total Cost: \$940,000

Date Information Is Required: Prior to any ESA consultations for the Sale 92 Area.

Proposed Study Profile

Region: Alaska

Planning Areas: North Aleutian Basin

Title: Seasonal Abundance, Movements and Marine Habitat Use of Harbor Seals and Spotted Seals in the North Aleutian Basin

MMS Need for Information: This study will provide valuable information about the abundance and marine habitat use of harbor and spotted seals within the North Aleutian Basin. The Basin harbor seal population experienced a serious decline in abundance prior to 1995, and very little information is known about spotted seals in the eastern Bering Sea. Both species are protected under the MMPA and are subsistence resources for Alaska Native communities. Information on the distribution, abundance and behavior will be useful for pre-lease activity permitting, lease sale and development, and production plan EISs, as well for baselines against which to monitor impacts of exploration, development, and production if oil- or gas-related development is undertaken in the North Aleutian Basin.

Period of Performance: FY 2008–2011

Description

Background

In recent decades, the abundance of harbor seals has declined across several regions in Alaska. Counts of harbor seals from aerial surveys in the Basin declined about 42% from the mid-1970s to the mid-1990s, though they have increased recently in part of the area. The significance and causes of the decline are unknown, but there is increasing concern about the present and future status of Alaska harbor seal populations. Because of the inherent vulnerability of harbor seals to spilled oil, and their use of on-shore and off-shore habitats, it is particularly important to assess the potential impacts of oil and gas activities on the harbor seal population within the Basin.

Little is known about the population status and trends of spotted seals in Alaska. Spotted seals are closely related to harbor seals, yet, unlike harbor seals, spotted seals have a close association with pack ice and tend to be wider ranging than harbor seals. The two species do, however, have overlapping distributions within the Basin, and like harbor seals, spotted seals use on-shore and off-shore habitats and are inherently vulnerable to the effects of spilled oil.

The Basin is one of only three areas where harbor seals and spotted seals are sympatric. Previous studies of harbor seals and spotted seals in the Basin have been conducted by the ADFG and the NMML. These studies have provided initial information about the movements and population trends of harbor and spotted seals, but have been of insufficient scope to satisfy the information needs associated with oil and gas activities. Aerial survey counts conducted during the molt period (August) by both organizations have provided information on harbor seal abundance and trends, but limited knowledge of seasonal changes in haulout behaviors and

distribution would prevent reliable assessments of potential impacts during other times of the year. This study would provide a comprehensive investigation of seal movement and abundance across multiple seasons and years through coordinated aerial surveys and telemetry studies.

The overlapping distribution of harbor seals and spotted seals provides the opportunity to study two different species without significant additional logistical costs and constraints. Since each species is expected to use the marine habitat in a different manner, this study can provide a broader assessment of the impact of oil or gas exploration activities on marine predators throughout the North Aleutian Basin.

Timing Needs

To provide information in time to support EIS-related analyses and lease-sale-related ESA Section 7 consultations, animal instrumentation and aerial survey activities should begin in 2008.

Objective

The general goal of this study is to employ aerial surveys in conjunction with satellite telemetry to document the abundance, movements, foraging behavior, and marine habitat use of harbor seals and spotted seals in the Basin.

Methods

1. Capture and instrument 20 harbor seals and 10 spotted seals in two successive years (N = 60) with satellite-linked data recorders. Seals to be instrumented will be captured from locations throughout the Basin, in relative numbers approximately proportional to the age and sex structure of the population and local abundance. The telemetry devices will provide GPS-quality locations, haul-out timelines, and data on dive behavior.
2. Conduct 1 year of seasonal aerial surveys for seals throughout the Basin to improve estimates of harbor seal and spotted seal seasonal abundance. Seasonal surveys would be scheduled for the second year of work and based on information learned from the telemetry deployments.
3. Develop necessary statistical analyses or statistical models to produce a correction factor for seal abundance derived from aerial surveys at haulout sites.
4. Use movement and behavioral data from this study with any existing published results or other data in a comprehensive analysis of harbor seal and spotted seal distribution and habitat use in or adjacent to the Basin.
5. Use text, maps, photographs, or other data summaries to portray harbor seal and spotted seal distribution and habitat use in the Basin in assessments of impacts of activities or oil spill risk analysis.
6. Coordinate with researchers from ADFG to build on the experiences and results of previous studies conducted at sites within the Basin.
7. Collaborate with other researchers and organizations to obtain outside support for the analysis of tissue samples collected during capture activities to assess population genetic structure, nutritional status, and health (e.g., baseline disease and contaminant loads).

Cost and Level of Effort:

- FY 2008: \$495,000 (capture and instrumentation of 30 animals)
- FY 2009: \$550,000 (capture and instrumentation of 30 animals; seasonal aerial surveys)
- FY 2010: \$155,000 (data collection and analysis)
- FY 2011: \$155,000 (data collection and analysis)
- Total Cost: \$1,355,000

Date Information Is Required: Quarterly and annual reports are due in 2008–2010. A final report will be produced by July 2011.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Seasonal Distributions, Abundance and Habitat Use Patterns of Pacific Walruses in the North Aleutian Basin Planning Area

MMS Need for Information: Data on seasonal distributions, abundance, and habitat use patterns of Pacific walruses in the North Aleutian Basin are needed to assess and manage potential impacts of planned oil and gas exploration and development activities on the Pacific walrus population. Information on these ecological parameters is lacking or out of date, especially in light of environmental changes that have occurred in the Bering Sea in recent decades. Results from this study will provide information for lease sales, MMPA incidental take authorizations, NEPA analyses, and analysis and development of exploration and development plans. The results will also contribute information useful for developing mitigation measures to reduce potential impacts to walruses from proposed oil and gas exploration and development activities.

Period of Performance: FY 2008–FY 2010

Description

Background

The shallow productive waters of the Basin support some of the largest concentrations of Pacific walruses in the world. Large breeding aggregations form in late winter in the broken pack ice of northern Bristol Bay. Females and dependent young migrate out of the region in spring, following the retreating pack-ice to summer feeding areas in the Chukchi Sea. Adult male walruses remain in the Bristol Bay region through the ice-free season, foraging on rich beds of benthic invertebrates and resting at isolated coastal haulout sites. The number of walruses attending coastal haulout sites in northern Bristol Bay (Round Island, Cape Peirce, and Cape Newenham) has declined in recent years, while the number of animals using haulouts along the Alaska Peninsula (principally at Cape Seniavin) has increased.

Walruses are highly sensitive to anthropogenic disturbances. Noise associated with exploration activities such as seismic surveys, exploratory drilling, marine vessels, and helicopter and aircraft traffic has the potential to disrupt normal resting and feeding behaviors and displace animals from preferred habitats. The number of walruses occupying coastal haulouts in the vicinity of the Sale 92 Area (southwest Bristol Bay) appears to have increased in recent years; however, seasonal distributions, abundance, and habitat use patterns in the region are poorly understood. Information on these parameters is needed to assess potential impacts of proposed activities and to formulate effective mitigation strategies.

Timing Needs

Pre-lease-sale seismic exploration activities in the Basin are anticipated in 2008. Lease sales are projected in 2010 and 2012. Baseline information regarding the seasonal distribution, abundance, and habitat use of walrus in the vicinity of lease-sale areas is required for assessing potential impacts and mitigating disturbances associated with proposed exploration and development scenarios. We propose that the monitoring activities described in this study profile be undertaken in 2008–2010 so that the results may be considered in environmental analyses of proposed lease sales.

Objectives

1. Document seasonal use patterns of walrus haulouts in the vicinity of the Sale 92 Area with aerial photography.
2. Investigate haulout attendance and foraging patterns and locations with satellite telemetry.
3. Use haulout attendance data to improve aerial survey design and provide sightability corrections for abundance estimates.

Methods

1. Conduct biweekly aerial surveys of coastal walrus haulouts along the Alaska Peninsula (April through September).
2. Deploy 30 satellite telemetry tags on walrus at coastal haulouts.
3. Use GIS and probability-based models to define important foraging habitats.
4. Use generalized linear models to estimate sightability correction factors for aerial surveys.

Cost and Level of Effort

- FY 2008: \$220,000
- FY 2009: \$220,000
- FY 2010: \$220,000
- Total Cost: \$660,000

Included costs:

- Satellite tags and data processing fees: \$120,000/year
- Fixed-winged aerial surveys: \$60,000/year
- Field operations and logistics: \$40,000/year

Date Information Is Required: Annual summary reports in December 2008, 2009, and 2010. Final summary report in spring 2011.

Proposed Study Profile

Region: Alaska

Planning Area: North Aleutian Basin

Title: Seasonal Distributions, Abundance and Habitat Use Patterns of Northern Sea Otters in the North Aleutian Basin Planning Area

MMS Need for Information: Data on seasonal distributions, abundance, and habitat use patterns of northern sea otters in the North Aleutian Basin are needed to assess and manage potential impacts of planned oil and gas exploration and development activities on northern sea otters. Information on these ecological parameters is lacking or out of date. Results from this study will provide information for lease sales, ESA Section 7 consultations, MMPA incidental take authorizations, and NEPA analyses, and will provide information for the analysis and development of exploration and/or development plans. The results will also contribute information useful for developing mitigation measures (such as spatial or temporal operating restrictions) to reduce potential impacts to sea otters from proposed oil and gas exploration and development activities.

Period of Performance: FY 2009–FY2011

Description:

Background

Sea otters within the North Aleutian Basin are part of the southwest Alaska population stock, which was listed as a threatened distinct population segment under the ESA in August 2005. This distinct population segment declined in abundance by more than 50% in the past 20 years. In addition to a decline in abundance within the Basin, the population has also undergone a dramatic change in distribution over this time period. Up until the mid-1980s, the population was largely pelagic, with large aggregations of sea otters regularly observed 25 km or more from shore. Aerial surveys conducted in 2000 and 2004 revealed that the current population occurs closer to shore, with extremely high concentrations in the Port Moller and Herendeen Bay areas. In addition, this area is subject to the seasonal advance of sea ice, which can prevent access to feeding areas, thereby impacting sea otter distribution and survival. Recent survey information has been collected during relatively short time periods during summer months (May and July); therefore, seasonal patterns of habitat use are unknown.

Timing Needs

Pre-lease-sale seismic exploration activities in the Basin are anticipated as early as 2007. Lease sales are projected to occur no sooner than 2010. Baseline information regarding the seasonal distribution, abundance, and habitat use of sea otters in and adjacent to the Sale 92 Area is required for assessing potential impacts and mitigating disturbances associated with proposed exploration and development scenarios. The monitoring activities described in this study profile should be undertaken from 2009 through 2011.

Objectives

Sea otters are currently distributed differently than they were prior to the decline in their population that resulted in their being listing as threatened. While current information suggests that the Port Moller and Herendeen Bay areas provide important habitat, the degree to which sea otters use other areas at different times of the year is unknown. The objectives of this study profile are to:

1. Document seasonal distribution and abundance of sea otters both within and adjacent to the Sale 92 Area.
2. Document seasonal habitat use patterns of sea otters both within and adjacent to the Sale 92 Area.

Methods

1. Conduct quarterly aerial surveys of sea otter distribution and abundance in Bristol Bay.
2. Monitor individual sea otter movements and survival using implanted radiotelemetry instruments.

Cost and Level of Effort

- FY 2009: \$670,000 (development of aerial survey design, initiation of quarterly surveys, deployment of radiotelemetry instruments, and initiation of telemetry monitoring)
- FY 2010: \$500,000 (quarterly surveys and telemetry monitoring)
- FY 2011: \$100,000 (data analysis and reporting)
- Total Cost: \$1.27 million

Included costs: development of aerial survey design: \$20,000; radiotelemetry implants: \$150,000; fixed wing aircraft charter for aerial surveys: \$100,000 per survey; fixed wing aircraft charter for monitoring radio-implanted otters: \$100,000/year.

Date Information Is Required: Annual summary reports due December each year. Final report due September 2011.