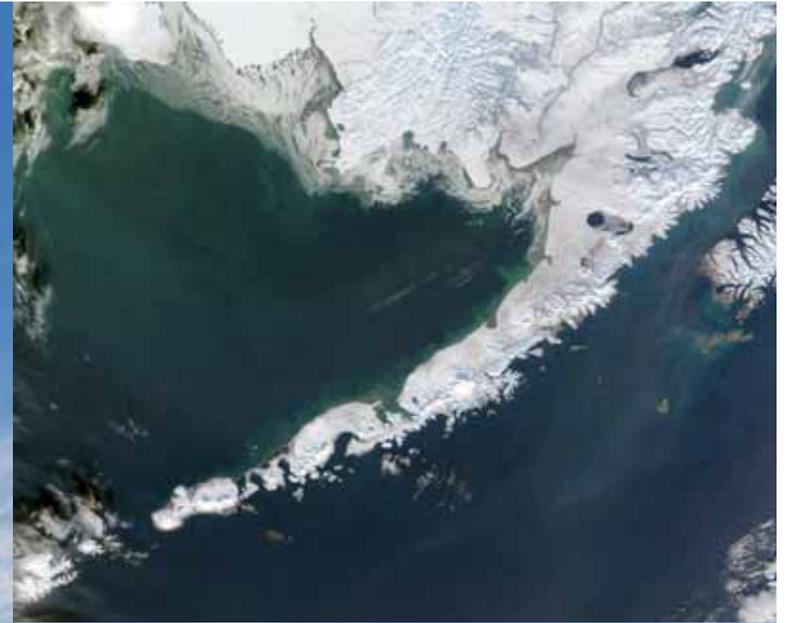


*Bristol Bay
and the
Southeast
Bering Sea:
Worth
Protecting*



Kelly Harrell
Bristol Bay Project Coordinator
Alaska Marine Conservation Council

March 2008

About AMCC

- Community-based organization
- Board and members represent:
 - Commercial fishermen
 - Sport fishermen
 - Subsistence harvesters
 - Coastal community residents & marine resource users across Alaska



AMCC Mission

“Healthy Oceans, Healthy Communities”

“To protect the natural diversity and integrity of Alaska’s marine ecosystems by working with coastal communities whose well being depends upon healthy oceans.”



Friends of Bristol Bay Program

- Started in response to lifting of congressional ban
- Support restoring protection from offshore oil and gas activities
- Support efforts to build a sustainable future for the region focused on its renewable assets



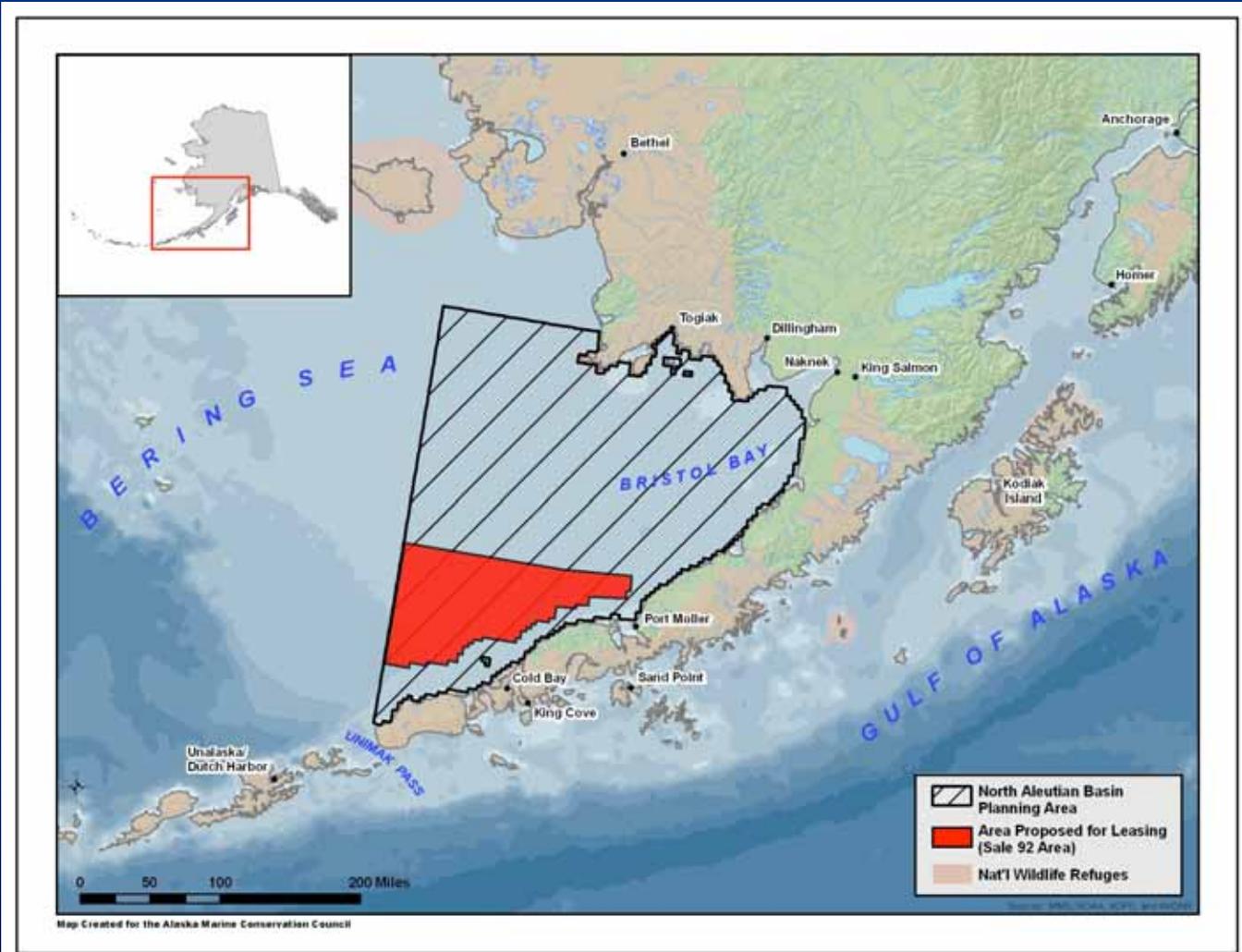
Fisheries of Bristol Bay and the Southeastern Bering Sea

- Locally, nationally, and globally important
- 40% of total U.S. fisheries catch
- Valued at over \$2 billion annually
- Largest wild salmon runs in the world



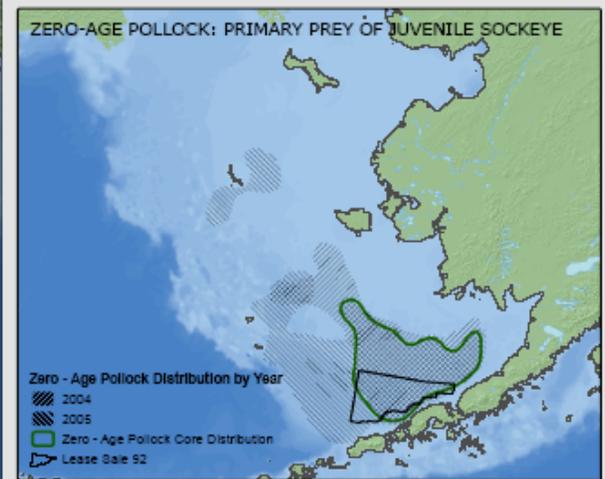
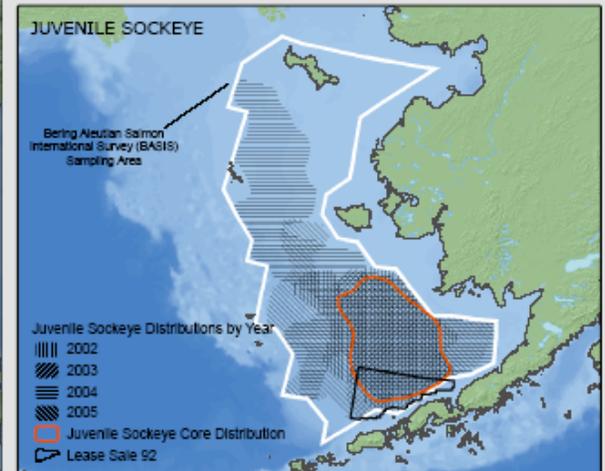
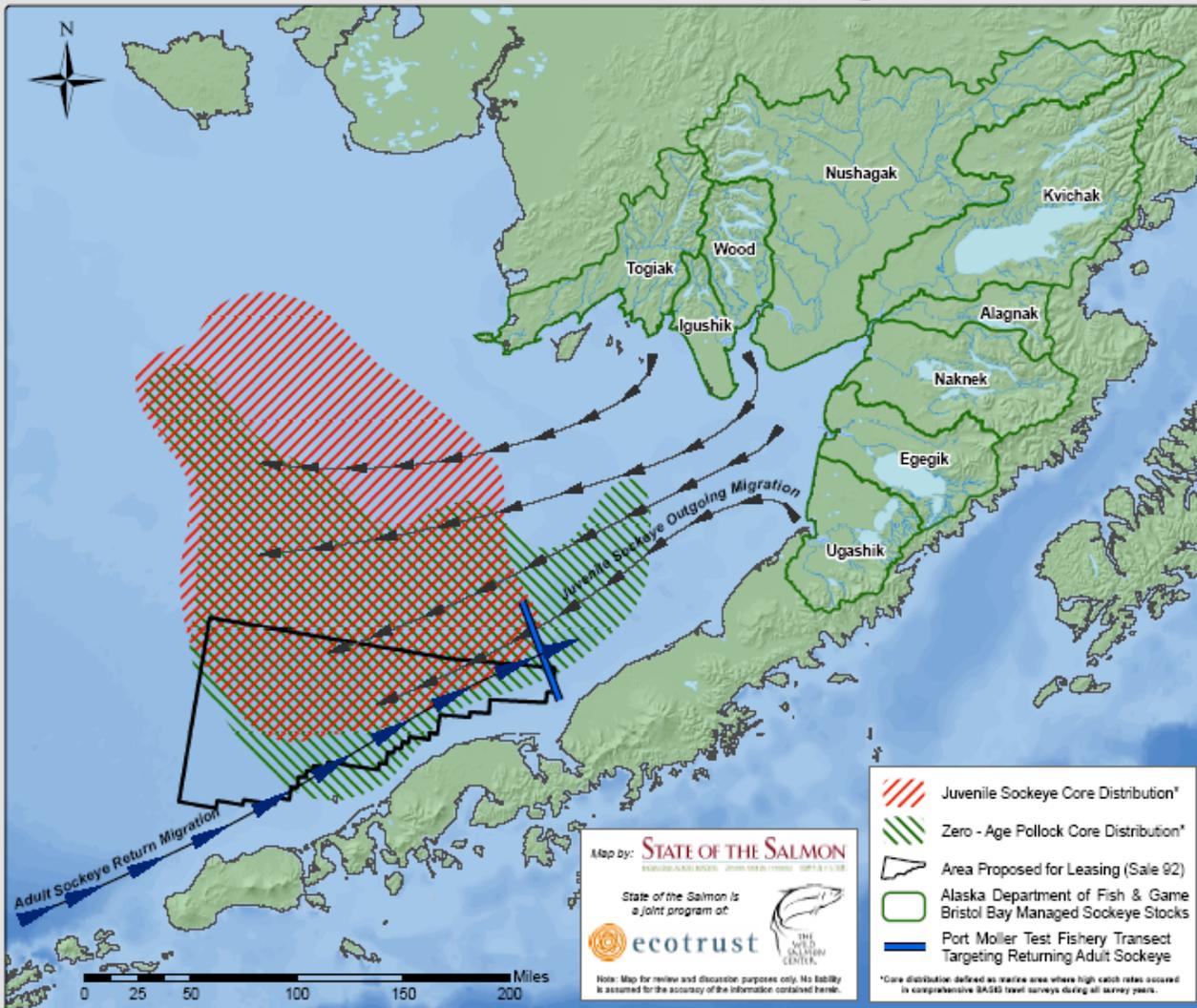
Proposed lease sale area overlaps with fishing grounds and habitat for:

- Pollock
- Cod
- Flatfish
- Halibut
- Herring
- Salmon
- Red king crab
- Tanner crab



Distribution and Migratory Pathways of Sockeye Salmon in the Southeastern Bering Sea

The BASIS cruises, coordinated by the North Pacific Anadromous Fish Commission (NPAFC) are the first to comprehensively map salmon distributions in the Bering Sea. This research is helping to clarify the importance, in particular, of the Bering Sea Shelf to the early marine survival of juvenile sockeye salmon. The maps below display data on sockeye and pollock from the BASIS cruises since 2002.



Methods: High catch rates of Juvenile Sockeye and Zero-Age Pollock taken from Catch per Unit Effort data collected by the Bering-Nutan Salmon International Survey. A threshold was used of >20 CPUE for Juvenile Sockeye and >1000 CPUE for Zero-Age Pollock to define distributional zones of high catch rate annually.

Source: Farley, Ed. et al. 2005. Distribution, Migration Pathways, and Size of Western Alaska Juvenile Salmon Along the Eastern Bering Sea Shelf. Alaska Fishery Research Bulletin 11(1): 15-26. ADFG.

Map by: **STATE OF THE SALMON**
RESTORED AND SOUND. JOIN THE MOVEMENT. 2007-2012

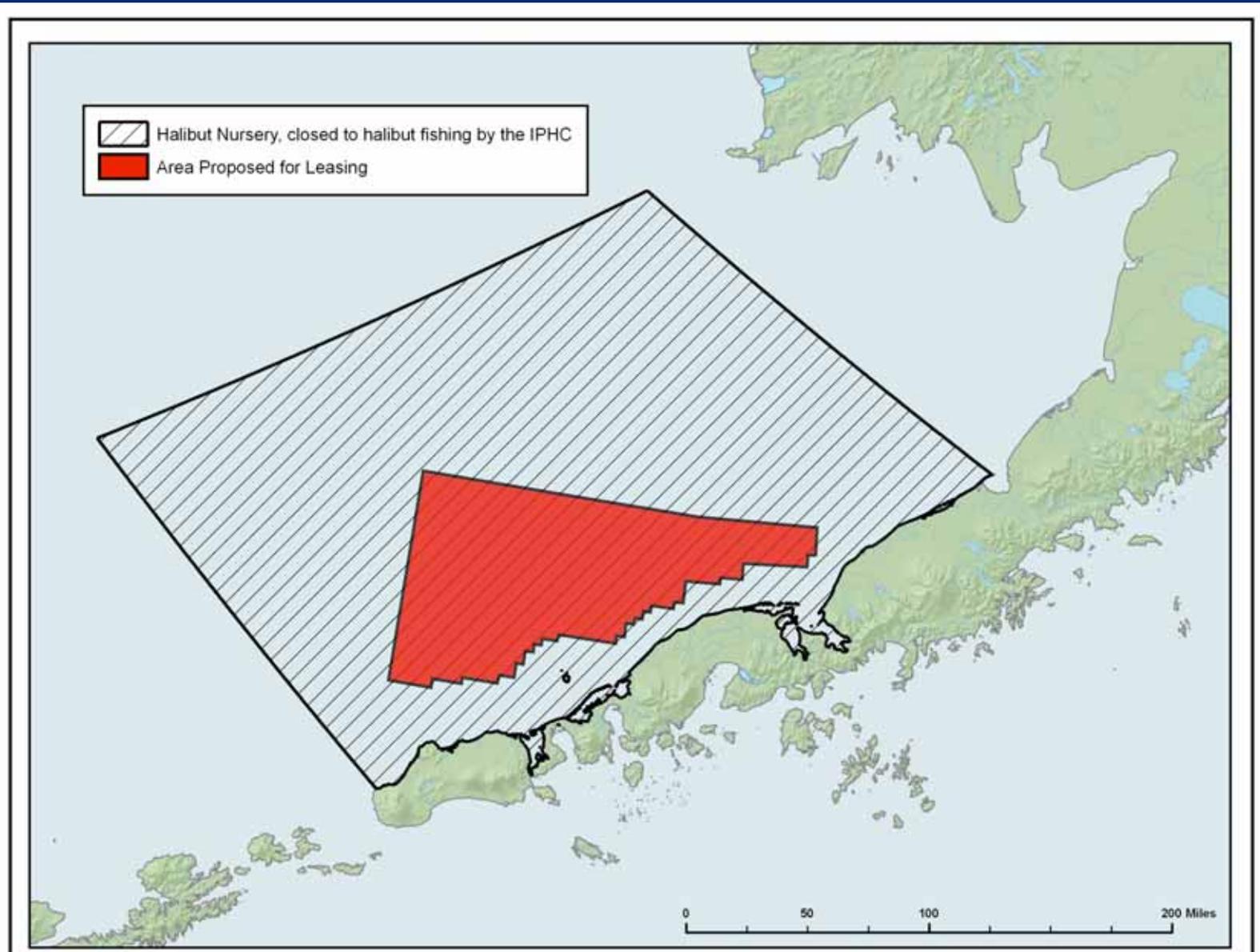
State of the Salmon is a joint program of:

ecotrust **THE WILD SALMON CENTER**

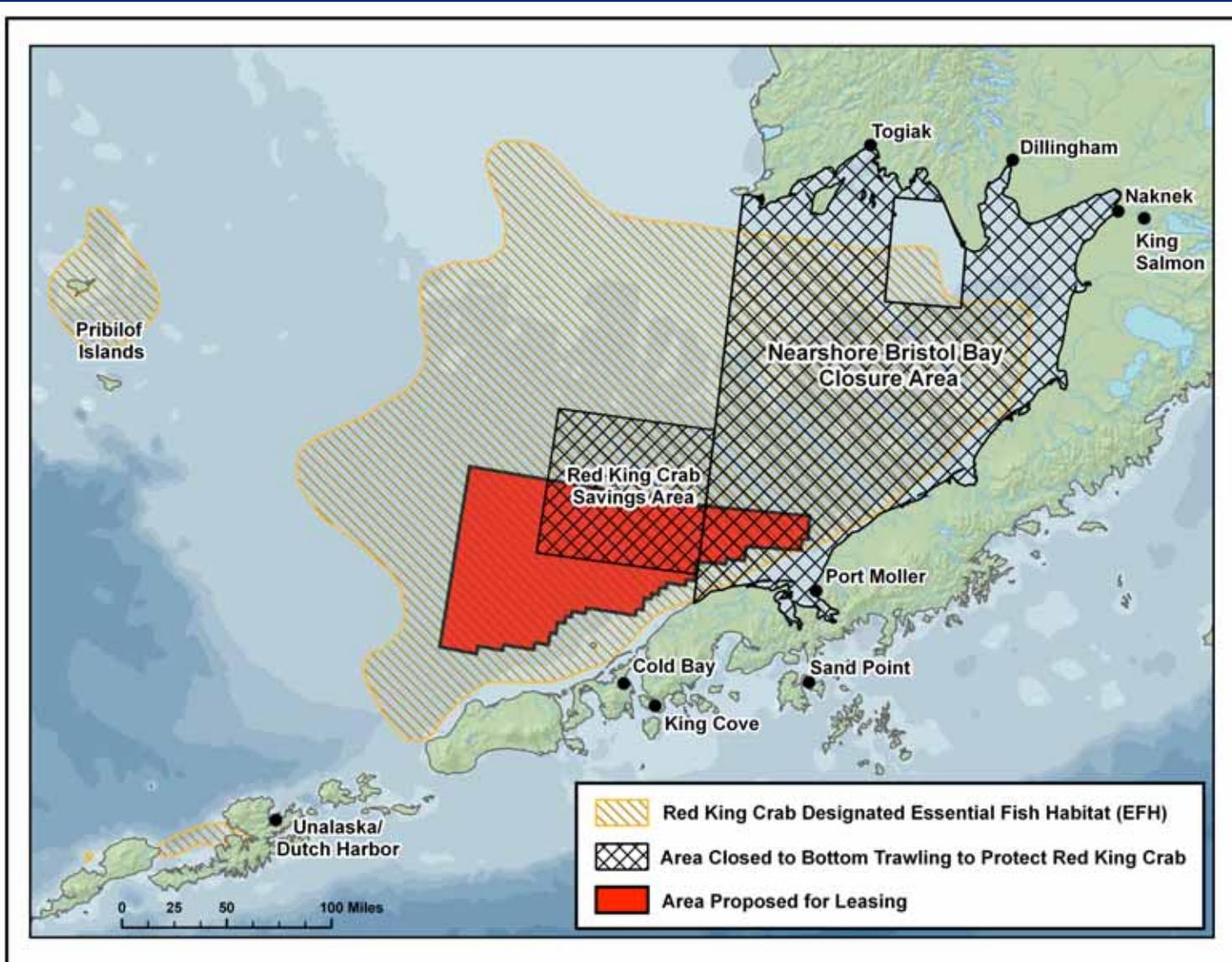
Note: Map for review and discussion purposes only. No liability is assumed for the accuracy of the information contained herein.

*Core distribution defined as marine area where high catch rates occurred in comprehensive BASIS level surveys during all survey years.

Pacific Halibut



Red King Crab



Sea to Shore: Wide Spectrum of Impacts

- Seismic surveys
- Contaminated discharges
- Oil spills
- Infrastructure construction



Natural Gas Only?

- High interest in 1988 lease sale when no market for natural gas
- Currently no west coast markets for LNG
- If oil were found, it would likely be developed
- No regulatory structure for natural-gas only
- Significant impacts of gas development



Offshore Seismic Surveys: Effects on Fish & Fisheries

- Used to determine location of oil and gas deposits beneath the sea floor
- Kill fish eggs, larvae, juveniles at close range
- Sublethal effects include damage to fish ears other tissues and organs
- Disturbances in migration routes, disruption of spawning activities

“There is evidence from caged and field trials that if seismic is sustained in a confined area then it may lead to mass emigration of fish from an area.”

Rob McCauley, PhD,
Seismic Researcher

Seismic Surveys & Reductions in Fish Catch Rates

Table 1: Reductions in fish catch rates as a result of seismic survey activity

Species	Gear type	Noise level of seismic testing	Catch reduction	Source
Atlantic cod (<i>Gadus morhua</i>)	Trawl	250 decibels (dB)	46-89% lasting at least 5 days	Engas et al. 1993
Atlantic cod (<i>Gadus morhua</i>)	Longline	250 dB	17-45% lasting at least 5 days	Engas et al. 1993
Atlantic cod (<i>Gadus morhua</i>)	Longline	Undetermined, 9.32 miles from source	55-79 % lasting at least 24 hours	Lokkeborg and Soldal, 1993
Haddock (<i>Melanogrammus aeglefinus</i>)	Trawl	250 dB	70-72% lasting at least 5 days	Engas et al. 1993
Haddock (<i>Melanogrammus aeglefinus</i>)	Longline	250 dB	49-73% lasting at least 5 days	Engas et al. 1993
Rockfish (<i>Sebastes</i> spp.)	Longline	223 dB	52%- effect period not determined	Skalski et al., 1992

Seismic Effects on Crab

- Very little research conducted
- Canadian DFO snow crab study found impacts of concern



Corey Arnold



Contaminated Drilling Discharges

- Offshore operations produce contaminated waste streams
- Include heavy metals such as mercury, petroleum residues, radioactive materials

*“Up to 20 exploration wells are anticipated, which could result in the release of up to **10,440 tons of cuttings.**”*

Minerals Management Service, Final EIS for the 5-Year Outer Continental Shelf Leasing Program for 2007-2012, p. IV-181

Effects of Contaminated Drilling Discharges

- Smother fish/crab eggs in the water column & benthic invertebrates
- Physically & ecologically alter seafloor communities
- Accumulation of contaminants in sediments & tissues of fish



NOAA, D. Hyrenbach

“Settling of discharge cuttings on the seafloor could smother some prey species, displace some managed groundfish species, and change substrate composition in the area where the cuttings settle.”

Effects of Contaminated Discharges

- Mercury levels ten times higher at zones near platforms
- Long-term effects on planktonic organisms
- Community-level changes with pollution-tolerant organisms enhanced

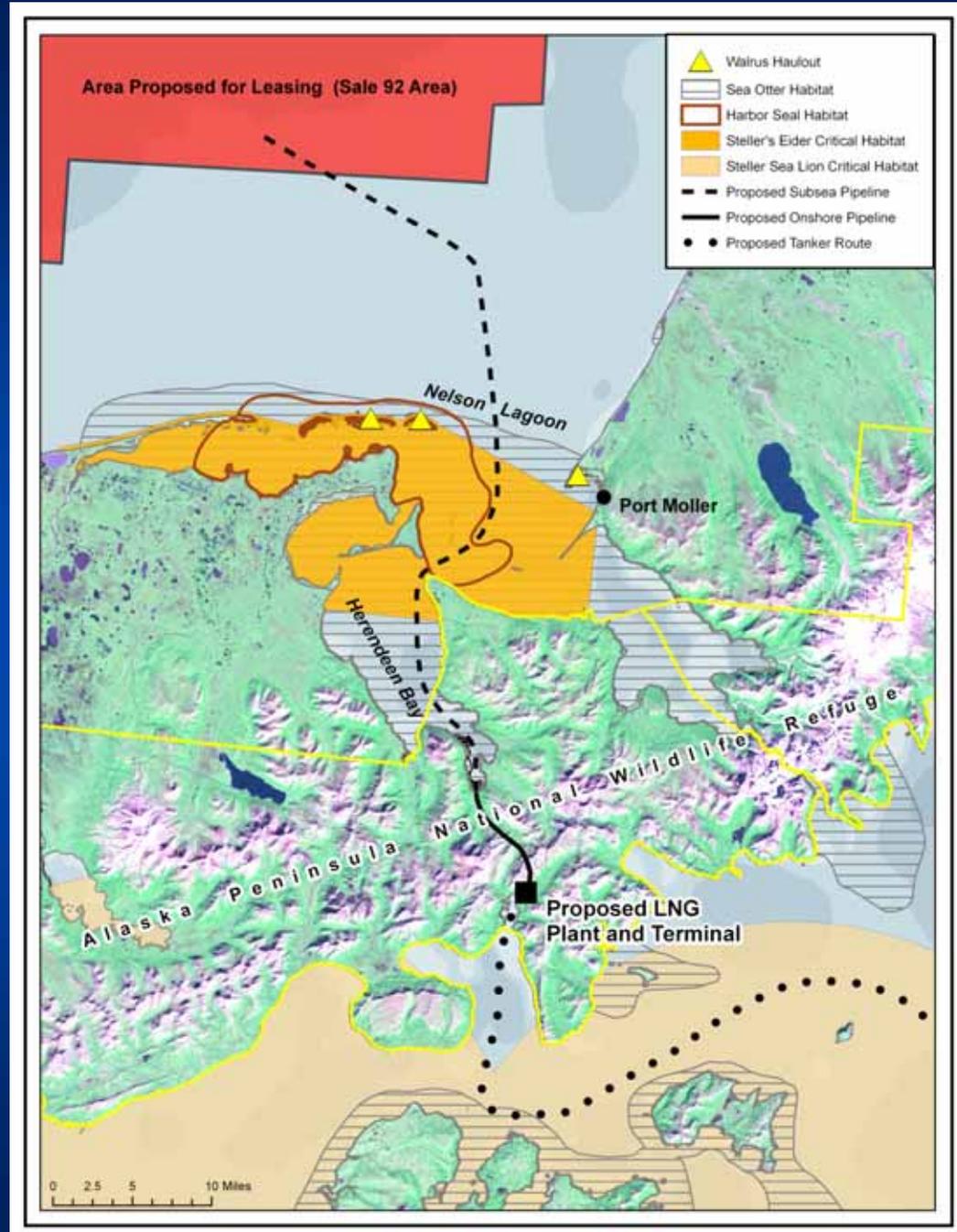
“...the zone near platforms had sediments with higher levels of contaminants and toxicity; reduced levels of abundance, species diversity, genetic diversity, and reproductive success...”

Montagna, Paul. “GOOMEX: Experimental Design and What the Data Mean.” Minerals Management Service Website. Accessed June 22, 2005 at:

Infrastructure Construction & Emplacement

Development scenario:

- Up to 20 exploration wells
- 200 production wells
- 4-6 platforms
- 150 miles of offshore pipeline (impacting up to 555 acres of benthic habitat)
- 50 miles onshore pipeline
- 2 pipeline landfalls
- Waste facility, processing facility, LNG plant



Infrastructure Construction & Emplacement

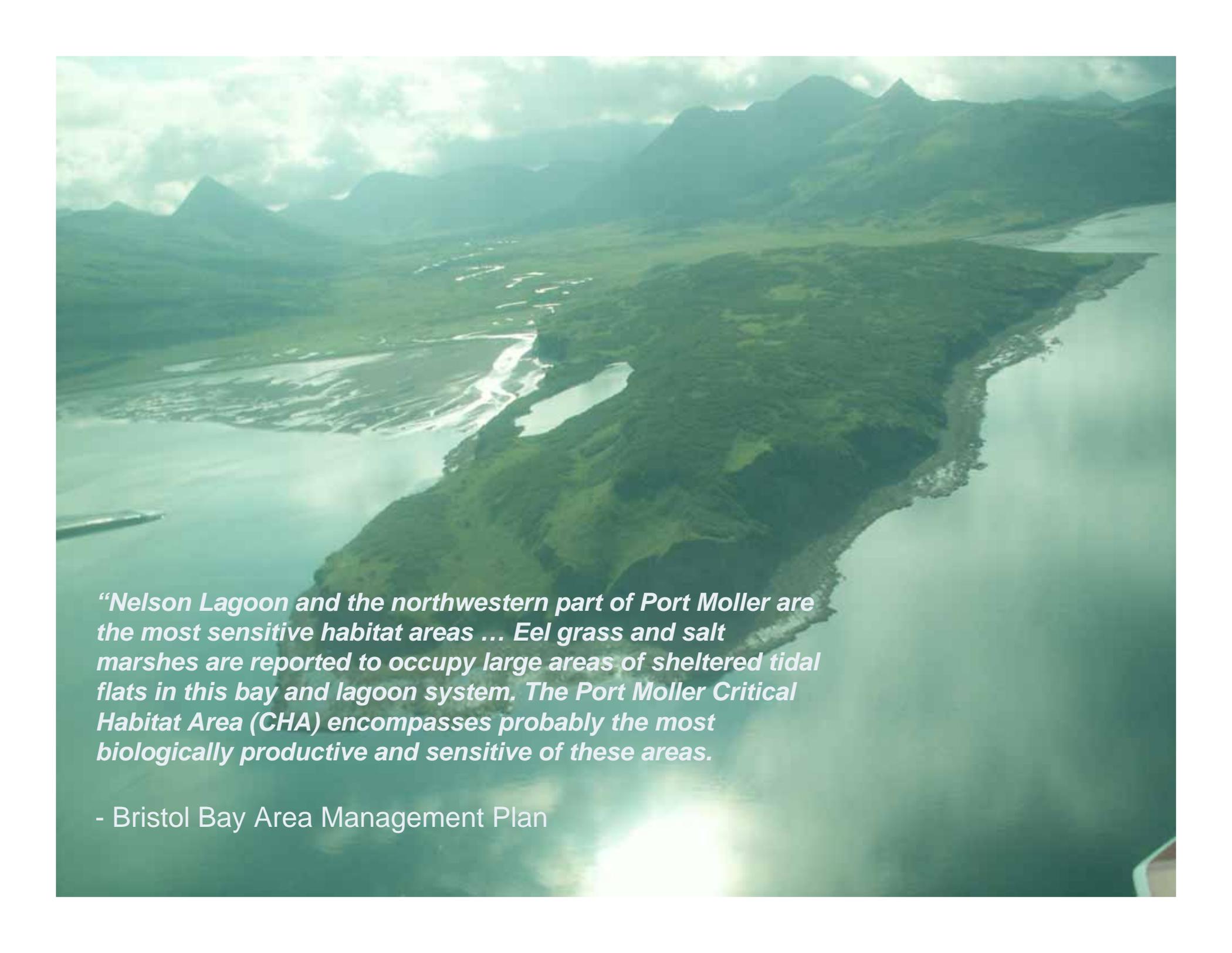
- Habitat loss and degradation
- Erosion, increased sedimentation, & water pollution

“Water quality would be **degraded** near construction sites by runoff of particulate matter, heavy metals, petroleum products, and chemicals into local streams, estuaries, and bays.”

Minerals Management Service, Final EIS for the 5-Year Outer Continental Shelf Leasing Program for 2007-2012

*“Pipeline crossings (onshore) of streams could affect **Essential Fish Habitat (EFH)** for several life stages of managed anadromous salmon, including eggs, larvae, juveniles, and adults.”*

Minerals Management Service, Final EIS for the 5-Year Outer Continental Shelf Leasing Program for 2007-2012

An aerial photograph of a coastal region. In the foreground, a large body of water (a bay or lagoon) is visible, with a small boat on the left. The middle ground shows a peninsula or headland with dense green vegetation and a small pond. The background features a range of mountains under a cloudy sky. The overall scene is a mix of natural coastal and mountainous terrain.

“Nelson Lagoon and the northwestern part of Port Moller are the most sensitive habitat areas ... Eel grass and salt marshes are reported to occupy large areas of sheltered tidal flats in this bay and lagoon system. The Port Moller Critical Habitat Area (CHA) encompasses probably the most biologically productive and sensitive of these areas.

- Bristol Bay Area Management Plan

Unavoidable Risk: Oil Spills

- Oil spills remain the rule, rather than the exception
- Numerous spills predicted to occur in Bristol Bay if leasing takes place



“The following potential spills have been postulated for waters of the North Aleutian Planning Area under the proposed action: up to one large condensate spill (i.e. \geq 1,000 bbl); up to 2 spills with volumes between 50 and 999 bbl; and up to 10 spills with volumes less than 100 bbl.”

Minerals Management Service, Final EIS for the 5-Year Outer Continental Shelf Leasing Program for 2007-2012

Oil Spills from OCS Operations

- Spill rates from platforms improved over last 30 years
- Spill rates from OCS pipelines increased



“The spill rates for U.S. OCS pipelines in the last 15 years are slightly higher than the entire record, with rates for spills greater than or equal to 1,000 bbl...”

Anderson and Labelle, MMS (2000)

Hurricanes Katrina and Rita

- 220 platforms & drilling rigs destroyed or seriously damages
- Damage to 535 pipeline segments
- More than 154 spills totaling more than 700,000 gallons
- Largest spill: 3,625 barrels (152,000 gallons)



Source: MMS

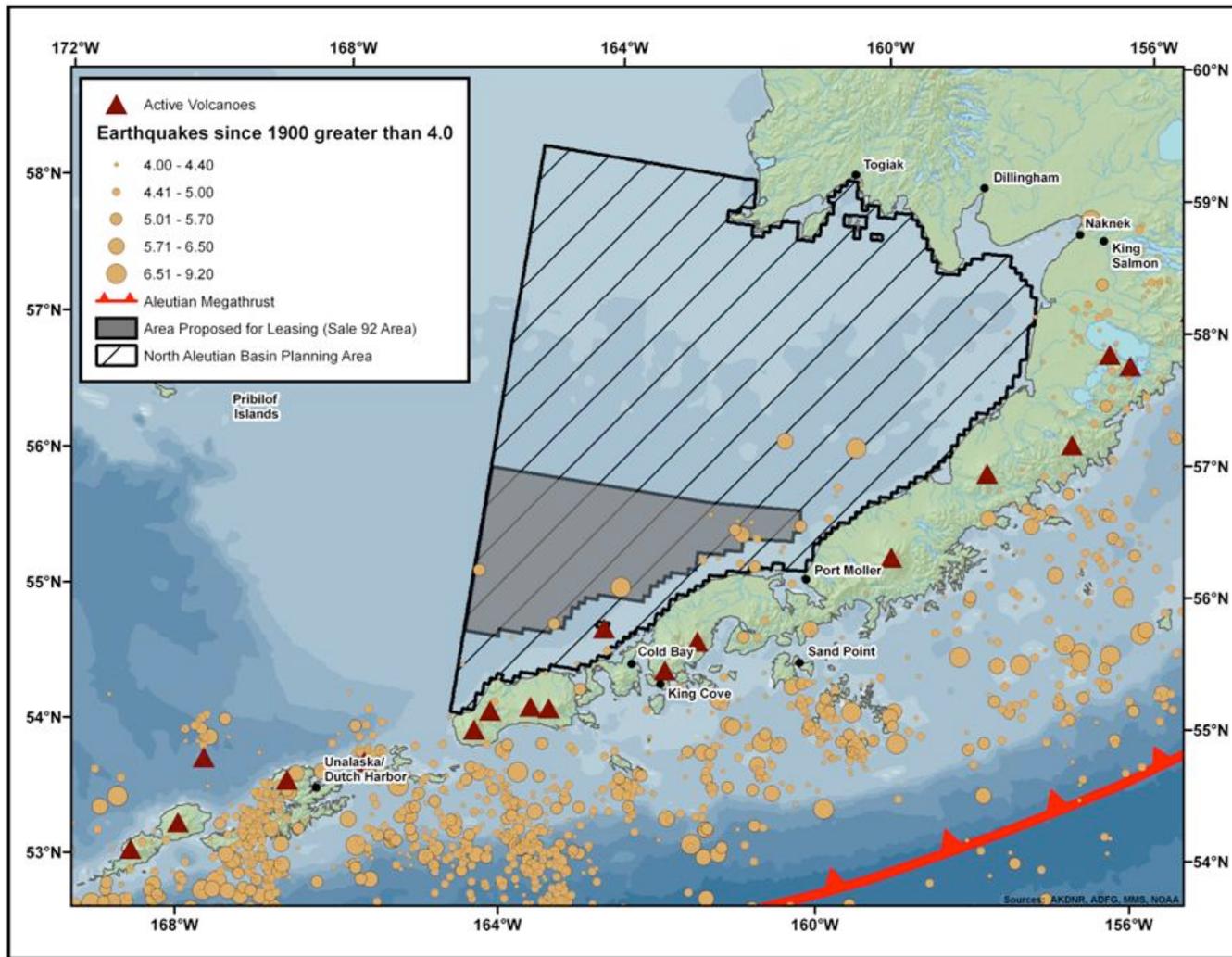
David Helvarg

Chronic Spillage from OCS Operations

- Between 1985 & 1999, there were 19,506 spills between 0 and 42 gallons
(Anderson & Labelle, 2000)
- Oil toxic at very small quantities
- Can cause range of sublethal & lethal impacts such as mutations & reduced reproductive capacity



Hazards to Development



“...the potential for a **large earthquake** in this block poses a **significant threat** to hydrocarbon exploration and production facilities.”

Minerals Management Service, Final EIS for the 5-Year Outer Continental Shelf Leasing Program for 2007-2012

Oil Spills Impacts on Fisheries

- “...a **large spill** could adversely impact **hundreds of millions of eggs and juvenile stages of pelagic species**, including those of anadromous fishes that spawn upstream in tributaries of Bristol Bay.”

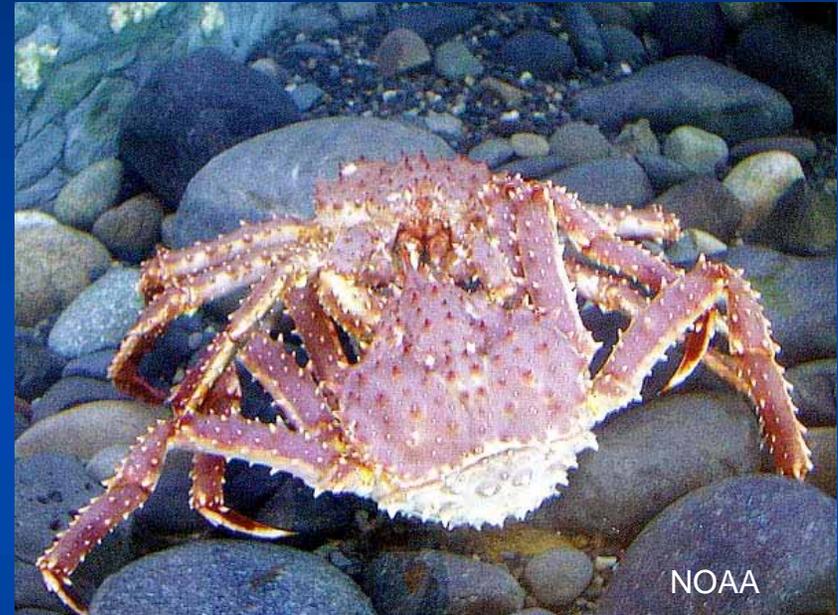


Minerals Management Service, Final EIS for the 5-Year Outer Continental Shelf Leasing Program for 2007-2012

Oil Spill Impacts to Red King Crab

For red king crab, "...significant portions of a year-class could be lost if oil were transported to areas of the benthic environment that were occupied by gravid females."

Minerals Management Service, Final EIS for the 5-Year Outer Continental Shelf Leasing Program for 2007-2012



The 1986 Final EIS for Lease Sale 92 predicted **"major" impacts to the red king crab population & fishery**

- the most vulnerable concentrations of life stages occurred simultaneously with the area at highest risk for an oil spill (Port Moller).

Effects on Marketing & Branding

“Even if stocks of fishery resources are not reduced as a consequence of a spill, **specific fisheries could be closed** due to **actual or perceived contamination** of fish and shellfish tissues. Such closures could result in **considerable loss of income.**”



- Minerals Management Service, Final EIS for the 5-Year Outer Continental Shelf Leasing Program for 2007-2012

Magnitude of Risk is Severe

- Potential for long-term damage
- Potential impacts to entire year classes of fish species that provide the backbone of Alaska's commercial fishing industry
- Few substitutes for fishing income
- Entire regional economy dependent upon fisheries



Photo: NOAA

No Place Else Like It on Earth

- There is no precedent for offshore drilling in a place like the southeast Bering Sea
- No where are the stakes as high

“Any change to this (southeastern Bering Sea) rich ecosystem that causes a reduction in the productivity, change in species composition, or change in the portion of the food web that is usable by mankind, will have a severe societal impact.”

Stabeno et al. (2001) On temporal variability of the physical environment over the south-eastern Bering Sea. *Fisheries Oceanography* 10:1. (81-98).

Sustainable Future for the Bristol Bay Region

- Benefits would be minimal, short-term
- Bristol Bay salmon has bright future
- Lease sale is not a foregone conclusion
- Need to pursue long-term economic strategies for the region based on renewable resources

THANK YOU

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