

# NATIONAL TREASURE AT RISK:

## Protecting Alaska's Bristol Bay from Offshore Drilling



Looking out onto Bristol Bay at the Kvichak River mouth.

## MARINE TREASURE AT RISK: OFFSHORE DRILLING IN ALASKA'S BRISTOL BAY

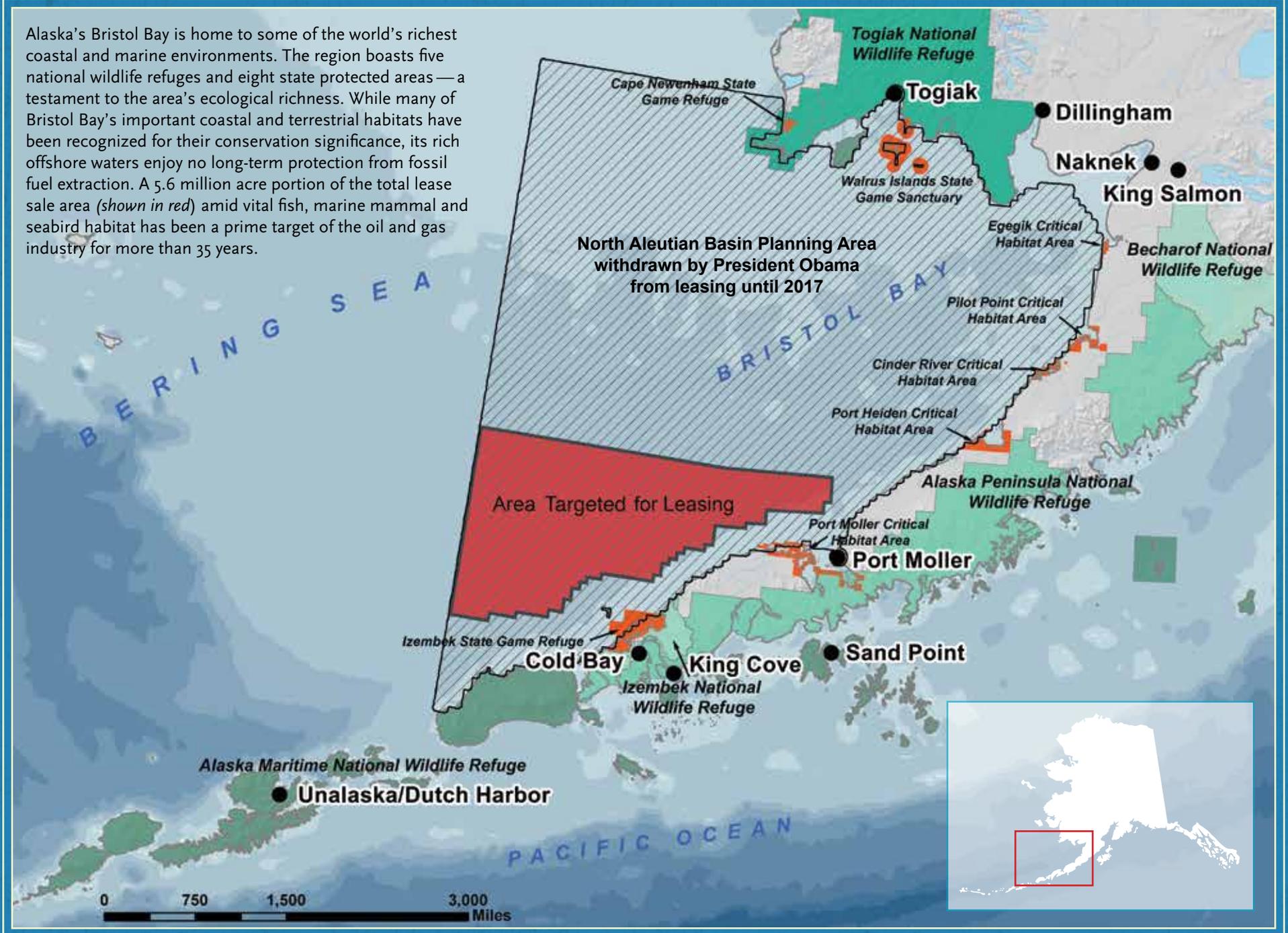
Tucked within the remote reaches of southwest Alaska, Bristol Bay and the surrounding southeast Bering Sea waters represent one of the most economically, ecologically and culturally important marine ecosystems on Earth. Lying beneath this rich and productive swath of ocean are oil and gas resources that have been the target of industry since the 1970s. Bristol Bay has only narrowly escaped the powerful drive to develop its oil and gas twice in recent history. Strong opposition to drilling from local residents, Alaska Native tribes and fishermen has helped tip the scales in favor of keeping the area off limits. However, the pursuit for Bristol Bay's subsea fossil fuels will surely continue unless a long-term solution is put in place. After more than 35 years of ongoing controversy and debate, the time has come to provide this global gem the permanent protection from offshore drilling it deserves.

The waters targeted for oil and gas development in Bristol Bay and the southeast Bering Sea lie at the epicenter of our nation's most well-managed and economically important commercial fisheries—including the largest runs of wild salmon on the planet. But drilling would risk much more than the annual \$2 billion dollar fisheries economy and the tens of thousands of related jobs these renewable resources support. Alaska Native cultures of the region rely on centuries old hunting, fishing and gathering traditions. Those practices depend not only on healthy fisheries, but marine mammals, seabirds and waterfowl that are a part of the unique Bristol Bay web of life.

*National Treasure at Risk: Protecting Alaska's Bristol Bay from Offshore Drilling* provides a glimpse of the remarkable living marine resources that thrive in this corner of the Earth. The report profiles species of fish, marine mammals and seabirds that have particularly important habitat within and surrounding the area targeted for drilling. It includes an informative discussion of the potential impacts from offshore drilling such as oil spills, drilling discharges, infrastructure and seismic surveys that pose risks to the region's marine ecosystem and the people who depend on its continued health. The report concludes with a call to our nation's policy makers to recognize that the potential economic, cultural and ecological consequences of offshore oil and gas development in Bristol Bay and the southeast Bering Sea vastly outweigh the possible benefits. This marine treasure stands out as an area in our nation that should be permanently protected from offshore oil and gas drilling.

## PROTECTED AREAS IN BRISTOL BAY AND SOUTHEAST BERING SEA

Alaska's Bristol Bay is home to some of the world's richest coastal and marine environments. The region boasts five national wildlife refuges and eight state protected areas—a testament to the area's ecological richness. While many of Bristol Bay's important coastal and terrestrial habitats have been recognized for their conservation significance, its rich offshore waters enjoy no long-term protection from fossil fuel extraction. A 5.6 million acre portion of the total lease sale area (shown in red) amid vital fish, marine mammal and seabird habitat has been a prime target of the oil and gas industry for more than 35 years.





## BRISTOL BAY: THIRTY-FIVE YEARS OF CONTROVERSY

The Bering Sea, a vast northern extension of the Pacific Ocean, is among the most magnificent marine ecosystems on Earth. Lapping the coastlines of Russia and Alaska, the Bering Sea's extraordinary biological diversity is sustained by its winter sea ice and strong upwelling of nutrient-rich waters over its broad and shallow continental shelf.

Bristol Bay and the adjacent waters of the southeast Bering Sea encompass a large portion of this productive shelf—including more than 33 million acres of open sea, islands, marine canyons and estuaries. A tremendous variety of marine life thrives here including at least 450 species of fish, crustaceans and mollusks, 50 species of seabirds and 25 species of marine mammals. Aleut, Yupik and Athabaskan peoples have relied on this bounty for thousands of years. The region's lucrative, renewable fisheries resources account for 40% of the nation's entire seafood harvest and drive not only the local economy, but support fishermen, families and businesses across Alaska and the Pacific Northwest.<sup>1</sup>

Here too, hidden beneath the waters of the Bering Sea and Bristol Bay, are fossil fuels. The former Minerals Management Service (MMS) (*now the Bureau of Ocean Energy Management, Regulation and Enforcement*) estimated the mean technically recoverable resources in the North Aleutian Basin (*planning area including Bristol Bay and the southeast Bering Sea*) at 750 million barrels of oil and 8.6 trillion cubic feet of gas. While oil and gas companies are eager to access this potential, these figures equate to only 1% of the oil and less than 2% of the natural gas reserves estimated to exist in the nation's Outer Continental Shelf.<sup>2</sup>

For the past 35 years, a controversial and costly battle has been waged over access to the oil and gas resources beneath these waters teeming with life. A review of the tangled history of the issue in the region illustrates the enduring nature of the threat. In 1974, Interior Secretary Morton under President Ford began examining the prospect for offshore drilling in Bristol Bay. At that time, the State of Alaska was strongly opposed to leasing here and successfully persuaded the Department of the Interior (DOI) to cancel proposed lease sales in the region until the early 1980s.<sup>3</sup> Finally the State's resistance could no longer stop the push for Bristol Bay's fossil fuels and DOI scheduled a North Aleutian Basin lease sale for 1985.



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*“Prudent management of our resources means striking a balance, but in Bristol Bay it just wasn’t there. The prospect of discovering oil was slight and it was far outweighed by the value of Bristol Bay’s fisheries.”*

—ALASKA GOVERNOR TONY KNOWLES STATEMENT  
AFTER THE BRISTOL BAY BUYBACK, 1995.<sup>4</sup>

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In an attempt to stop the sale from moving forward, the State of Alaska and nearly 20 tribal, conservation and fishing organizations who were vehemently opposed to drilling filed a lawsuit. In 1986, DOI was allowed to move forward with North Aleutian Basin Lease Sale 92, but a court ordered injunction required bids to be held in a locked vault pending resolution of the suit. In 1988, the Ninth Circuit Court of Appeals ruled in favor of the federal government’s decision to lease, and eight companies were granted rights to tracts valued at \$95 million in the heart of the Bering Sea’s productive shelf.<sup>5</sup>

However, one year later political tides turned when the *Exxon Valdez* ran aground in Prince William Sound and the devastating impact of a major oil spill in Alaska’s waters became starkly obvious. The spill provided the impetus for Congress to intervene. In 1989, the North Aleutian Basin was added to the congressional moratorium which prohibited offshore drilling in select areas of our nation’s oceans.

Not long after, the oil companies countered by filing a takings suit against the federal government. After years of political wrangling, on July 31, 1995 a landmark settlement to buy back the Bristol Bay leases from the oil companies was announced.<sup>6</sup>

In 1998, President Clinton further bolstered protection for Bristol Bay from offshore drilling when he added it to the areas included in an executive ban—also known as a presidential withdrawal—on offshore oil and gas leasing. By the end of the 1990s, after a decade of lawsuits, Bristol Bay enjoyed two layers of protection. However, the congressional moratorium was subject to the annual appropriations process in Congress. Likewise, a short-term executive ban ordered by one president, could easily be revoked by another. Hence, this period of dual protection was short-lived.

In 2003, Alaska’s congressional delegation had Bristol Bay removed from the congressional moratorium. In January 2007, President George W. Bush lifted the presidential withdrawal for Bristol Bay. This cleared the way for MMS to once again include a Bristol Bay lease sale in its Final 2007-2012 Outer Continental Shelf Oil and Gas Leasing Program. North Aleutian Basin Sale 214 was scheduled for 2011 in the very same 5.6 million acre block of waters that was previously sold and bought back.

Calling Bristol Bay a “national treasure,” in March 2010 President Obama and Secretary of the Interior Ken Salazar announced the cancellation of that lease sale and protection of the area from drilling by presidential withdrawal through 2017.<sup>7</sup> The decision was a tremendous move in the right direction, applauded by coastal residents, fishermen and conservationists alike. History, however, clearly indicates a significant threat remains and the push to drill has already been revived. Permanent protection of Bristol Bay is imperative to help ensure that this ecological treasure remains healthy for future generations of Alaskans, Americans and people worldwide.





*“The Bering Sea region supports the United States’ most productive and valuable fisheries ...”*

– BERING SEA ECOSYSTEM STUDY SCIENCE PLAN, 2004<sup>8</sup>

## NATIONAL FISHERIES STRONGHOLD

While many fish stocks within U.S. waters and around the globe are overfished or have collapsed, Alaska maintains a robust fishing industry. Bristol Bay and the southeast Bering Sea support the most productive commercial fisheries in Alaska and in the larger United States in terms of total pounds landed and overall economic value. As the nation’s “fish basket,” the region accounts for more than 40% of the total U.S. fish catch by weight.<sup>9</sup> Dutch Harbor, a major seafood-processing center in the area, has ranked as the number one fishing port by volume in the nation for the last 20 years.<sup>10</sup> The combined annual value of fisheries that could be affected by oil and gas development in Bristol Bay and southeast Bering Sea fisheries exceeds \$2 billion (*see table p. 6*).

### SNAPSHOT OF FISH SPECIES IN THE SOUTHEAST BERING SEA

NAME (Scientific Name)	COMMERCIAL USE	SUBSISTENCE USE
Sablefish ( <i>Anoplopoma Fimbria</i> )	✓	✓
Arrowtooth Flounder ( <i>Atheresthes Stomias</i> )	✓	
Pacific Herring ( <i>Clupea Pallasii Pallasii</i> )	✓	✓
Bering Cisco ( <i>Coregonus Laurettae</i> )		✓
Pacific Cod ( <i>Gadus Macrocephalus</i> )	✓	✓
Rex Sole ( <i>Glyptocephalus Zachirus</i> )	✓	
Flathead Sole ( <i>Hippoglossoides Elassodon</i> )	✓	
Pacific Halibut ( <i>Hippoglossus Stenolepis</i> )	✓	✓
Rock Sole ( <i>Lepidopsetta Bilineata</i> )	✓	
Yellowfin Sole ( <i>Limanda Aspera</i> )	✓	
Pacific Tomcod ( <i>Microgadus Proximus</i> )		✓
Pink Salmon ( <i>Oncorhynchus Gorbuscha</i> )	✓	✓
Chum Salmon ( <i>Oncorhynchus Keta</i> )	✓	✓
Coho Salmon ( <i>Oncorhynchus Kisutch</i> )	✓	✓
Sockeye Salmon ( <i>Oncorhynchus Nerka</i> )	✓	✓
Chinook Salmon ( <i>Oncorhynchus Tshawytscha</i> )	✓	✓
Dolly Varden ( <i>Salvelinus Malma</i> )		✓
Arctic Rainbow Smelt ( <i>Osmerus Mordax Dentex</i> )		✓
Starry Flounder ( <i>Platichthys Stellatus</i> )	✓	
Alaska Pollock ( <i>Theragra Chalcogramma</i> )	✓	
Fourhorn Sculpin ( <i>Trigloporus Quadricornis</i> )		
Red King Crab ( <i>Paralithodes Camtschaticus</i> )	✓	✓

Main source: Alaska Department of Fish and Game. Community Subsistence Information System.  
<http://www.adfg.alaska.gov/sb/CSIS/index.cfm?ADFG=harvInfo.resourceRegionSelReg>



Bristol Bay and southeast Bering Sea fisheries are economically important locally, statewide and nationally. Commercial fishing is the economic mainstay of southwest Alaska’s communities and provides the primary source of income and jobs for the region’s residents. Subsistence harvest of salmon and other fish continues to supply a vital source of traditional food for Alaska Natives and remains integral to Native cultures throughout western Alaska. The fishing industry is the largest private sector employer in Alaska, providing 56,606 jobs, more than the oil and gas industry, mining and tourism combined.<sup>11</sup>

The economic importance of Bristol Bay and southeast Bering Sea fisheries extends beyond Alaska to the Pacific Northwest. Many vessel owners, permit holders, crew members and seafood processing workers who participate in Alaska’s fisheries are residents of Washington, Oregon and California. Additionally, a majority of Alaska seafood processors base their businesses in the Seattle area. Exports of Alaska’s fish products to countries such as Canada, Japan and China also benefit the entire nation by helping to balance the national trade deficit.<sup>12</sup>

The potential for conflict between important fisheries and offshore fossil fuel activities in Bristol Bay is extremely high. Commercially harvested species including salmon, pollock, Pacific cod, Pacific halibut and red king crab all have scientifically recognized habitat as well as productive harvesting grounds that overlap the area of industry interest (see table, p. 9). Other important fisheries that take

place in the region include black cod (*sablefish*), snow crab, flatfish and herring. The region provides critical nursery habitat for a number of these species, most notably halibut and red king crab.

In the following pages, the report explores valuable and important fisheries that are at risk from potential offshore oil and gas development in the nation’s “fish basket.”

**GROSS COMMERCIAL FISHERY VALUES**  
(value through primary processing), 2010\*

FISHERY	VALUE
Salmon	\$ 449.8 million
Halibut	\$ 234.2 million
Herring	\$ 26.6 million
Crab	\$ 236.4 million
Other	\$ 1.4 million
Groundfish	\$ 1,580.0 million
<b>TOTAL</b>	<b>\$ 2.34 billion</b>

*\*All figures are for Bristol Bay and southeast Bering Sea fisheries except halibut, which represents Bering Sea and Gulf of Alaska because young halibut migrate from the Bering Sea into the Gulf of Alaska when they mature.*

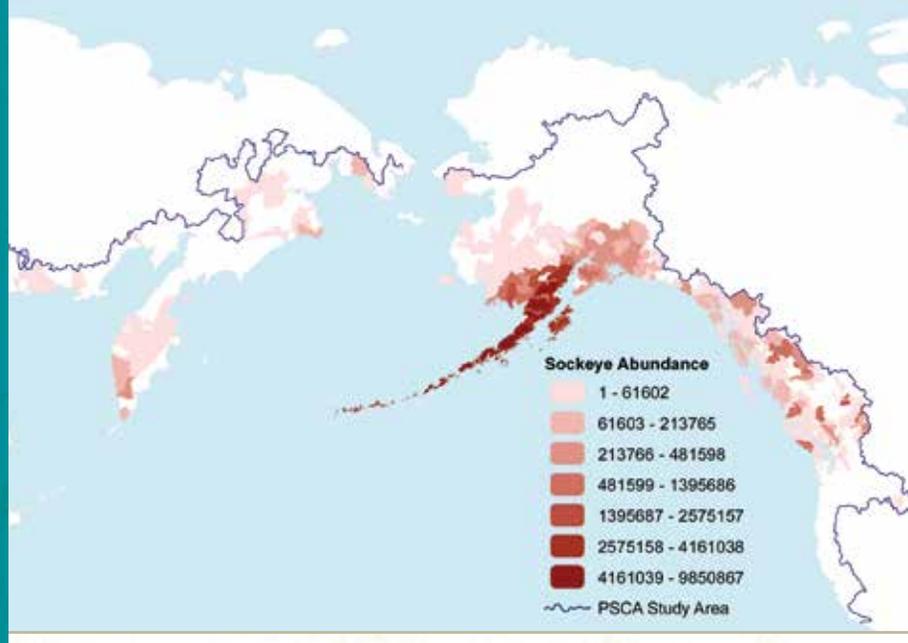
Source: Terry Hiatt et al. December 2011. Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Gulf of Alaska and Bering Sea/Aleutian Islands Area: Economic Status of the Groundfish Fisheries Off Alaska, 2010. Alaska Fishery Science Center. Seattle, WA. See Tables 30 and 31.



*The combined annual value of fisheries potentially affected by offshore drilling exceeds \$2 billion.*



Bristol Bay supports the largest run of sockeye salmon on Earth.



**SOCKEYE SALMON ABUNDANCE IN THE NORTH PACIFIC**

The Bristol Bay region accounts for over 55 percent of global sockeye salmon production.



**BRISTOL BAY'S WILD SALMON**

Bristol Bay boasts the world's largest run of wild sockeye salmon. An estimated 40 million sockeye returned to Bristol Bay in 2010,<sup>13</sup> a sign that the region's salmon stocks remain healthy when many salmon populations around the world are threatened or extinct. In 2010, the ex vessel value (*value before processing*) of the Bristol Bay salmon fishery was \$153 million.<sup>14</sup>

Bristol Bay stands alongside Russia's Kamchatka Peninsula, also in the Bering Sea, as one of the last global strongholds for Pacific salmon. A striking testament to the importance of Bristol Bay is the fact that this single region represents less than five percent of sockeye's North Pacific range, yet accounts for more than half of the global sockeye population.<sup>15</sup>

Not only abundance, but diversity also places Bristol Bay in the international biological spotlight when it comes to salmon. In addition to sockeye, Bristol Bay is also home to four other species of Pacific salmon: chinook (*king*), coho (*silver*), chum (*dog*) and pink (*humpy*) salmon. Among sockeye, many separate breeding stocks or subpopulations have been identified, making Bristol Bay salmon highly resilient. With a varied genetic makeup, the fish are more adept at responding to environmental changes and perturbations — an important trait to have in the dynamic Bering Sea ecosystem. Protection of the remaining highly productive, species-rich salmon ecosystems like Bristol Bay that contain a stronghold of genetic and life history diversity is considered key to the survival of Pacific salmon into the future.<sup>16</sup>

## SALMON CULTURE & ECONOMY AT STAKE

Communities throughout western Alaska rely on nature's tremendous gift of salmon for their economic and cultural survival. Salmon has always been an essential food source for the Aleut, Yupik and Athabaskan peoples in Bristol Bay and the Bering Sea. Native and rural Alaskans depend on wild salmon for sustenance, preserving their catch by freezing, canning, pickling and through traditional methods such as drying and smoking. The commercial salmon fishery, in which many local residents also participate, is the foundation of Bristol Bay's cash economy. Beyond fishing, economic opportunities are scarce and income from the salmon fishery provides the main flow of cash into the region.

The Bristol Bay salmon fishery is also economically important to other parts of Alaska and to the Pacific Northwest. Many fishermen from Alaska's coastal communities participate in the Bristol Bay salmon

fishery and more than 1,000 Bristol Bay permit holders live throughout Washington, Oregon and California.<sup>17</sup> The Bristol Bay watershed also supports world-class sport fishing for salmon and trophy-sized rainbow trout in the region's pristine lakes and rivers. According to a 2007 *Trout Unlimited* report, tourists spend \$61 million annually on Bristol Bay fishing trips.<sup>18</sup>

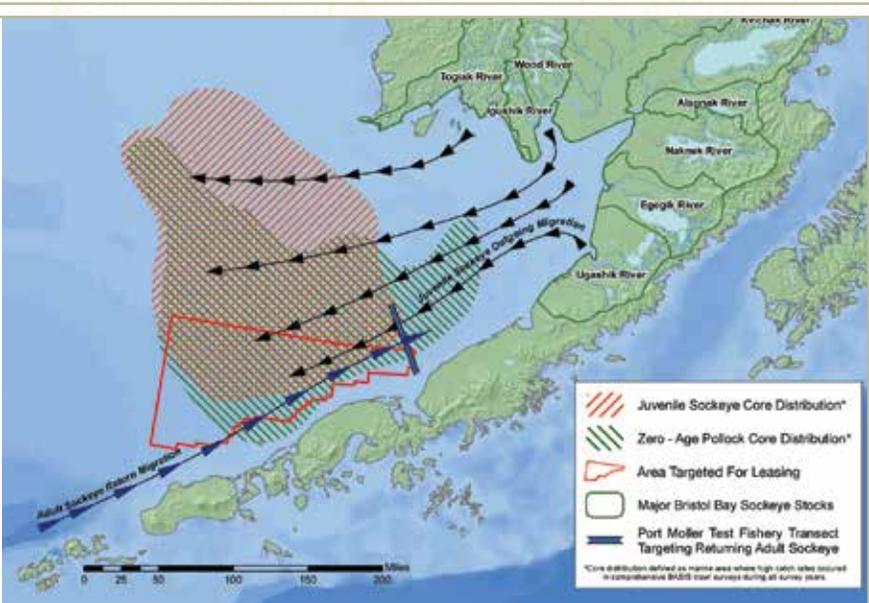
The area targeted for offshore oil and gas leasing overlaps with vital marine habitat for sockeye as well as their prey. Offshore oil and gas activities would place salmon at risk at a number of key points in their life cycle including juvenile outmigration, juvenile rearing and adult return migration. An oil spill in early summer months could potentially impact a number of sockeye year classes, with potential long-term effects on the population. Summertime ocean currents in the area proposed for leasing flow in a northeasterly direction, potentially carrying pollution into sensitive sockeye marine habitat, as well as towards the Bristol Bay salmon fishery. Oil and gas development in the heart of Bristol Bay would present a serious threat to the region's ecology, economy and culture — and potentially to the future of Pacific salmon globally.

### SOCKEYE SALMON DISTRIBUTION AND MIGRATORY PATHWAYS IN THE SOUTHEAST BERING SEA

Sockeye salmon migrate, feed and grow in the waters both within and surrounding the area targeted for oil and gas leasing, placing them at greater risk during critical life stages.



*Several key marine habitats for Bristol Bay's sockeye salmon, including migration routes and juvenile feeding grounds, occur in waters targeted for drilling.*





Fish habitat for all life stages of valuable pollock overlaps the proposed leasing area.



## GROUND FISH

The multi-billion dollar Bering Sea groundfish fishery is the largest in the U.S., with the annual harvest ranging from 1.3 to 1.9 million metric tons since 2000.<sup>19</sup> Species harvested in the Bering Sea groundfish fishery include walleye pollock, Pacific cod, yellowfin sole, rock sole, arrowtooth flounder and blackcod (*sablefish*).

Pollock accounts for the vast majority of the groundfish catch, with a harvest so enormous that it is one of the two largest single-species fisheries in the world. Pollock's white flesh is processed into a variety of seafood products including surimi that is sold as imitation crab meat and whitefish fillets used

in fish sandwiches. Relatively short-lived and fast growing, pollock are also an important prey source for a variety of seabirds, marine mammals and other commercial fish species such as salmon.

Designated essential fish habitat (EFH) for all life stages of pollock (*eggs, larvae, juvenile and adults*) as well as other fish species in the Bering Sea groundfish suite overlaps the area targeted for offshore oil and gas leasing. In addition to important habitat, fishing grounds for these valuable species would also become home to drilling rigs and pipelines if offshore development occurs (*see table below*).

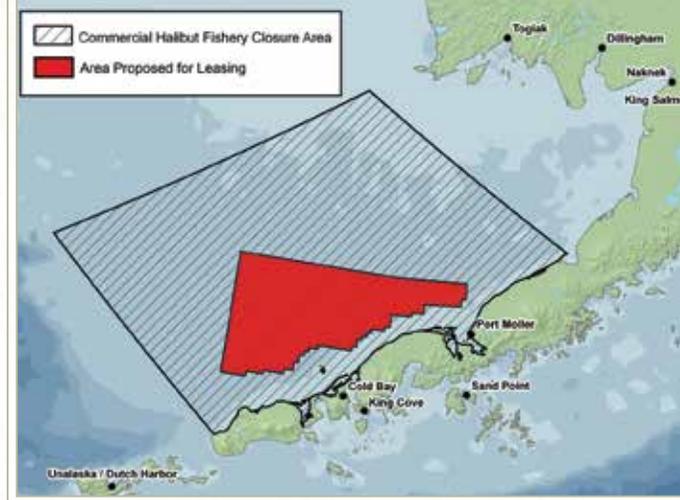
### FISHING GROUNDS & FISH HABITAT OVERLAP WITH PROPOSED OFFSHORE OIL & GAS LEASING AREA

FISHERY	HABITAT OVERLAP	FISHING GROUNDS OVERLAP
 Bristol Bay sockeye salmon	Smolt outmigration routes, juvenile feeding grounds, adult migration routes	
 Area M (Alaska Peninsula) sockeye salmon	Migration routes, nursery grounds	Proposed pipeline route would pass through fishing grounds near Herendeen Bay/Port Moller
 Pacific halibut	Nursery grounds for the entire North Pacific population	Proposed lease area falls within waters closed to halibut fishing since 1967 to protect important habitat ( <i>see map p. 10</i> )
 Bristol Bay red king crab	Essential fish habitat for eggs, larvae, juveniles, adults; Proposed lease area overlaps waters closed to trawling to protect sensitive crab habitat ( <i>see map p. 11</i> )	Nearly 100% of species catch taken from proposed lease area
 Bering Sea/Aleutian Islands (BSAI) pollock	Essential fish habitat for eggs, larvae, juveniles, adults	Percent of total BSAI harvest from proposed lease area: trawl 21%
 BSAI Pacific cod	Essential fish habitat for eggs, larvae, juveniles, adults	Percent of total BSAI harvest from proposed lease area: trawl 40%, longline 11%, pot 28%
 BSAI flatfish	Essential fish habitat for yellowfin sole, flathead sole and rock sole	Percent of total BSAI harvest from proposed lease area: yellowfin sole trawl 7%, flathead sole trawl 55%, rock sole trawl 14%

Sources: National Marine Fisheries Service. 2005. "Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska." Appendix D. Evans, D. 2006. "Federal Fisheries of the North Aleutian Basin." Presentation at the North Aleutian Basin Information Status and Research Planning Meeting. Anchorage, AK. November 28 - December 1.

## HALIBUT NURSERY GROUNDS IN THE SOUTHEAST BERING SEA

The proposed leasing area falls within a larger area that is designated a halibut nursery—closed to halibut fishing since 1967—and provides critical habitat that supports the Pacific halibut population.



## PACIFIC HALIBUT

Alaska-caught Pacific halibut with its firm, white flaky meat is currently one of the most in-demand seafood products across North America. These large flatfish can grow to over 500 pounds and live for more than 50 years. Halibut is a groundfish species managed separately from other bottom-dwelling fish by the International Pacific Halibut Commission (IPHC) since 1923.

Pacific halibut supports a lucrative commercial fishery across Alaska. In 2010, the ex vessel value of the halibut fishery was \$193 million, and fishermen received on average nearly \$5.00 per pound at the dock.<sup>20</sup> Top ports for landing halibut include Kodiak, Homer, Seward, Sitka, Petersburg and Dutch Harbor. Halibut is also landed in several Bering Sea villages under the unique Community Development Quota (CDQ) program which provides Native communities with a share of the harvest.<sup>21</sup> Halibut fishing is vital to the economies of these communities and provides millions in income to crew members and skippers throughout Alaska. In 2009, the most recent year for which data is provided by the Alaska Department of Labor, the halibut fishery employed a workforce of almost 6,400 skippers and crew.<sup>22</sup> In addition to commercial use, Pacific halibut is also harvested for subsistence purposes throughout Alaska. The species drives an extremely

valuable sport fishing industry that contributes millions of dollars to coastal economies in communities such as Homer, Seward and Sitka.

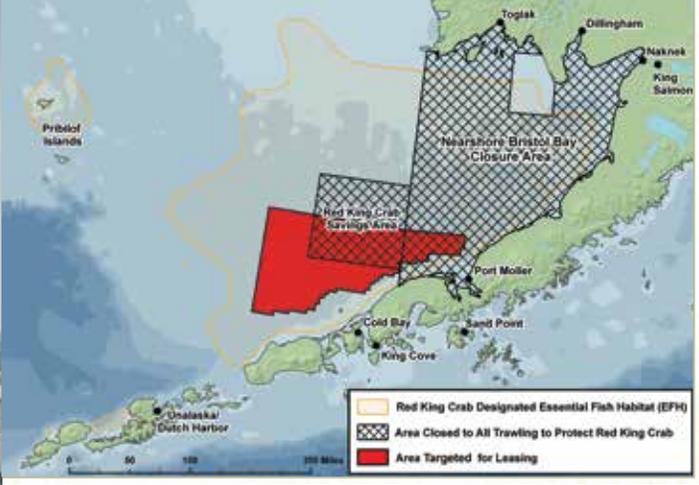
While much of the halibut harvest takes place in the Gulf of Alaska, the waters of Bristol Bay and the southeast Bering Sea shelf are nursery grounds important to the overall health of the Pacific halibut population.<sup>23</sup> Young halibut spend two or three years growing in these rich, nursery areas, after which they migrate to other parts of the Bering Sea, through the Aleutian passes and into the North Pacific where they live out their adult lives. Satellite tagging studies have confirmed this migration, with some tagged fish in the Bering Sea migrating hundreds of miles south.<sup>24</sup>

The importance of these nursery grounds has been recognized by fishery managers for decades. In 1967, the IPHC closed a significant area of the southeast Bering Sea to halibut fishing in order to protect young fish during this sensitive life stage (*see map above*).<sup>25</sup> This closure area coincides with the waters targeted for oil and gas leasing. Degradation of this crucial habitat could potentially have far-reaching impacts to the many communities across Alaska that depend upon halibut for subsistence, commercial and sport harvests.



*The outer continental shelf waters of Bristol Bay and the southeast Bering Sea provide nursery habitat crucial to the overall Pacific halibut population.*





### RED KING CRAB HABITAT AND PROTECTED AREAS IN THE SOUTHEAST BERING SEA

If offshore drilling occurs in Bristol Bay, it will take place directly on top of essential fish habitat for valuable red king crab. The fishing industry itself has recognized the importance and sensitivity of the region for crab by closing large areas to trawling to protect habitats vital to the Bristol Bay red king crab population.

## RED KING CRAB

Bristol Bay red king crab — made famous in recent years through the Discovery Channel’s *Deadliest Catch* — has shaped the history, culture and public perception of fishing in Alaska’s waters. Prized for its large size and delectable meat, red king crab has historically been one of the most important fisheries in Alaska. While the red king crab fishery is no longer the high stakes, huge money derby fishery that peaked in 1980, a lucrative Bristol Bay red king crab commercial fishery thrives today. Top ports for processing crab include the Aleutian Islands and Alaska Peninsula communities of Dutch Harbor, King Cove and Akutan. Bering Sea coastal villages also have a quota share in the fishery, and the 2009 ex vessel value for the fishery was \$100 million.<sup>26</sup>

While offshore oil and gas drilling could have negative impacts on numerous fish species that inhabit the area, Bristol Bay red king crab would be especially at risk. Nearly all of the Bristol Bay red king crab catch comes from within the 5.6 million acre area targeted for oil and gas leasing, greatly increasing the opportunities for conflicts

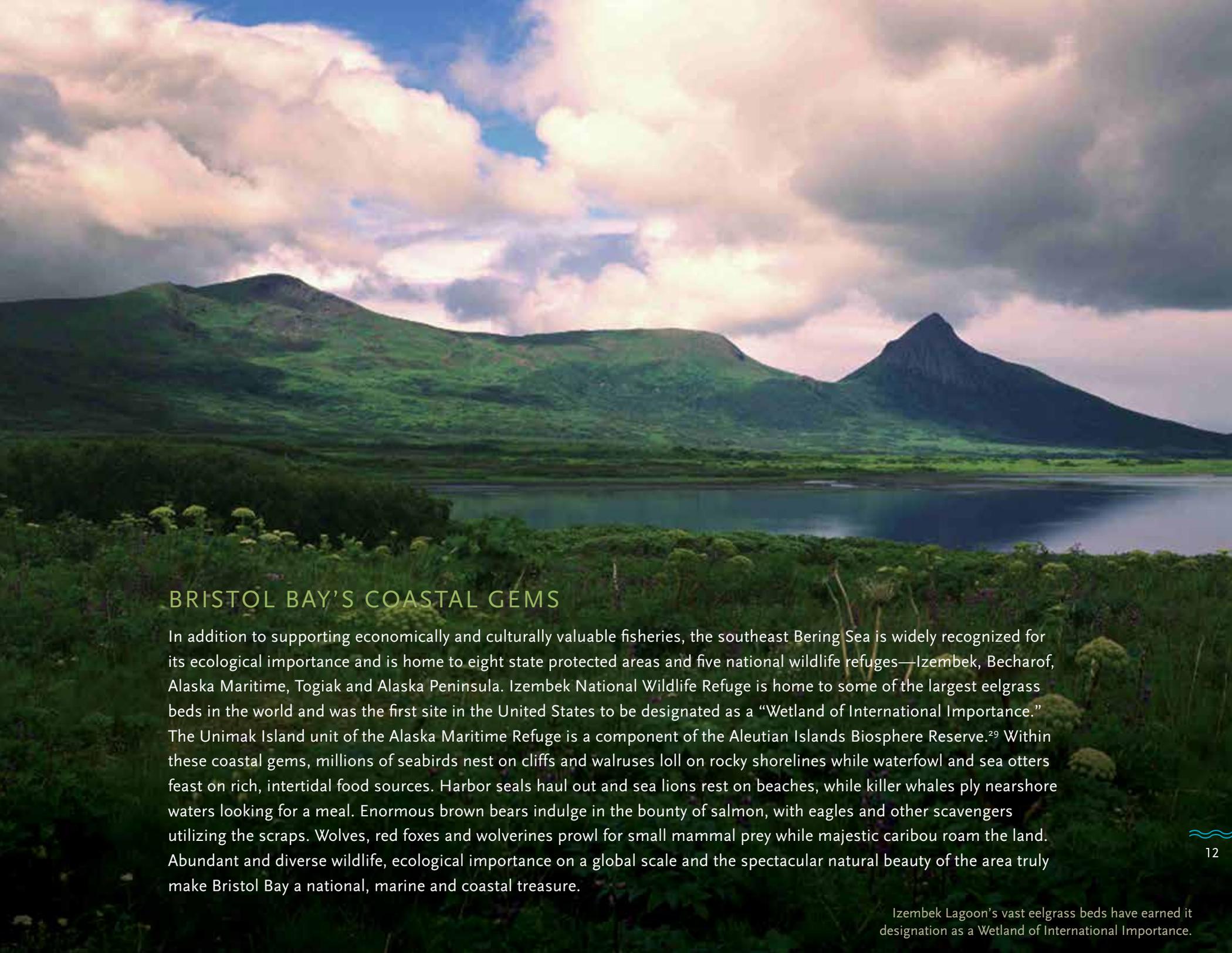
with fishing operations.<sup>27</sup> Furthermore, red king crab relies on southeast Bering Sea habitats throughout every life stage. Essential fish habitat for egg, larvae, juvenile and adult forms of red king crab has been designated in the Bristol Bay/southeast Bering Sea region. In recognition of the importance of this habitat, measures have been put into place by the North Pacific Fishery Management Council to protect crab stocks through a prohibition on bottom trawling in the region (*see map above*).

The Final Environmental Impact Statement for the offshore oil and gas leases sold in Bristol Bay in the 1980s (*North Aleutian Basin Lease Sale 92*) predicted that offshore leasing would result in “major” impacts to the red king crab fishery and to crab as a biological resource because the most vulnerable concentrations of red king crab life stages occur simultaneously with the area at highest risk for an oil spill.<sup>28</sup>



*Federal studies have predicted offshore drilling in Bristol Bay would have “major” impacts on the red king crab population and fishery.*





## BRISTOL BAY'S COASTAL GEMS

In addition to supporting economically and culturally valuable fisheries, the southeast Bering Sea is widely recognized for its ecological importance and is home to eight state protected areas and five national wildlife refuges—Izembek, Becharof, Alaska Maritime, Togiak and Alaska Peninsula. Izembek National Wildlife Refuge is home to some of the largest eelgrass beds in the world and was the first site in the United States to be designated as a “Wetland of International Importance.” The Unimak Island unit of the Alaska Maritime Refuge is a component of the Aleutian Islands Biosphere Reserve.<sup>29</sup> Within these coastal gems, millions of seabirds nest on cliffs and walrus loll on rocky shorelines while waterfowl and sea otters feast on rich, intertidal food sources. Harbor seals haul out and sea lions rest on beaches, while killer whales ply nearshore waters looking for a meal. Enormous brown bears indulge in the bounty of salmon, with eagles and other scavengers utilizing the scraps. Wolves, red foxes and wolverines prowl for small mammal prey while majestic caribou roam the land. Abundant and diverse wildlife, ecological importance on a global scale and the spectacular natural beauty of the area truly make Bristol Bay a national, marine and coastal treasure.

Izembek Lagoon's vast eelgrass beds have earned it designation as a Wetland of International Importance.

Beluga whales live year-round in Bristol Bay and Bering Sea waters.



## MARINE MAMMAL STRONGHOLD

Productive ecology and diverse habitats allow the southeast Bering Sea to serve as a global stronghold for marine mammals. At least 23 different species of marine mammals occur within the coastal and marine waters of the region.<sup>30</sup> While some marine mammals, like Bristol Bay's beluga whales, make the Bering Sea their year-round home, others such as the mighty blue whale migrate from thousands of miles away to forage on the rich food resources found in this oceanic greenbelt.

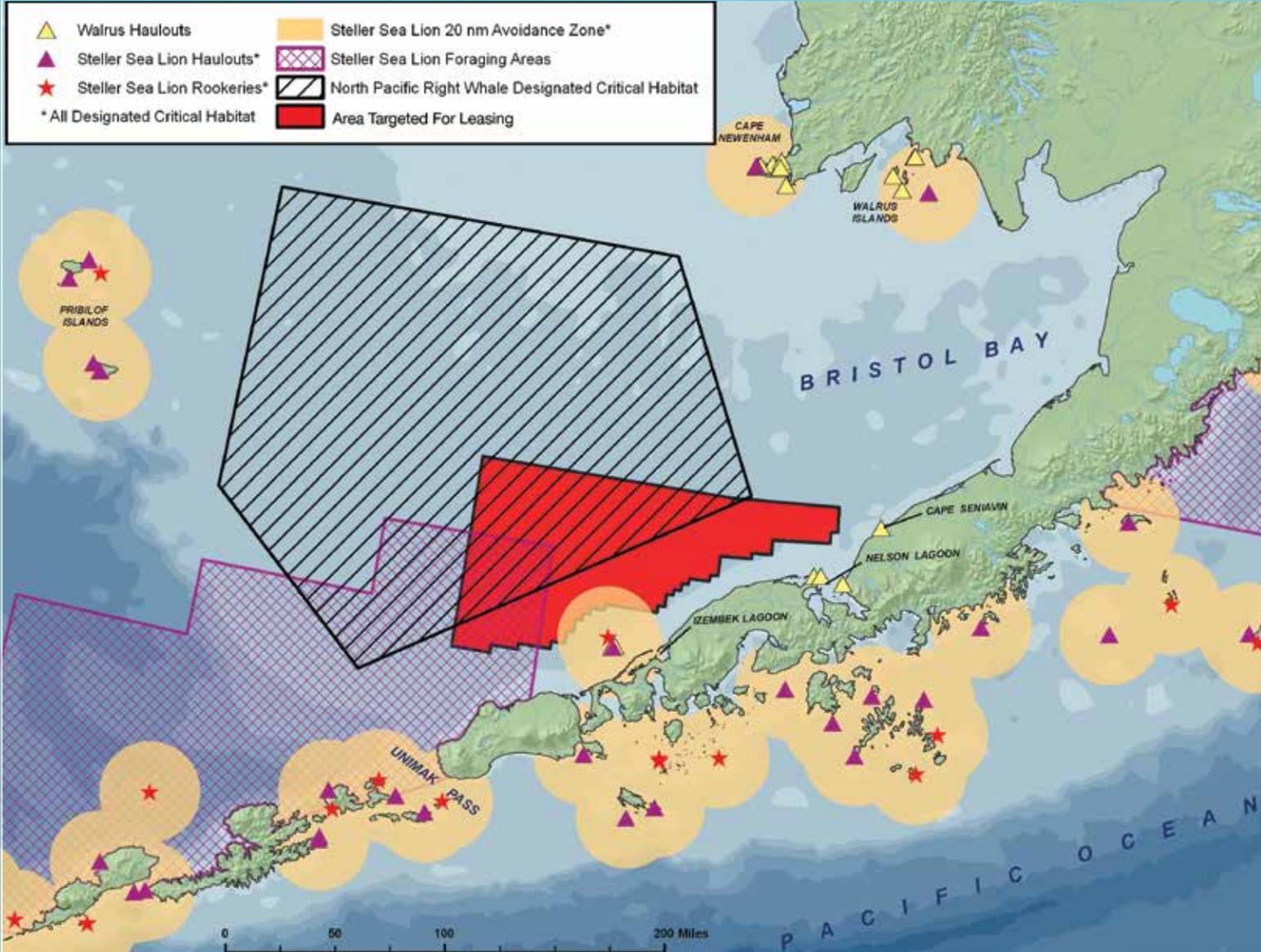
The southeast Bering Sea is a region of contrasts with regard to marine mammals, as both abundance and scarcity accurately describe the status of these amazing sea creatures here. The highest concentrations of Pacific walrus on Earth can be found on the shores of Round Island in the northern part of Bristol Bay where as many as 14,000 walrus have been counted in a single day.<sup>31</sup> At the same time, waters to the south serve as vital feeding grounds for the world's most endangered marine mammal, the North Pacific right whale, whose dangerously low population is estimated at less than 20 individuals.<sup>32</sup>

Current estimates of remaining North Pacific right whales and some other marine mammal species in the Bering Sea represent remnants of large populations that once flourished. Intense hunting of species such as the northern sea otter, decimated their populations, almost to the point of extinction. In more recent decades, steep declines of species including the Steller sea lion and northern fur seal have been observed, with the exact causes still uncertain. Currently, nine marine mammals that occur in the southeast Bering Sea are listed as threatened or endangered under the Endangered Species Act (*see box at right*). Among these species, the North Pacific right whale, northern sea otter and Steller sea lion have designated critical habitat in the Bristol Bay region that overlaps and occurs adjacent to the waters targeted for oil and gas leasing.

The future of these ocean residents depends on maintaining the integrity of habitats. But offshore oil and gas activities amid important feeding, breeding, migratory and summering grounds could affect the recovery of many of these marine mammal species. Marine mammal experts convened in 2006 to discuss the impacts of oil and gas development in Bristol Bay. They affirmed that offshore drilling activities have the potential to cause significant impacts to marine mammals that occur in the region and adversely change a stock's population trajectory from recovering to not recovering—or even declining.<sup>33</sup>



## MARINE MAMMAL HABITAT IN BRISTOL BAY AND SOUTHEAST BERING SEA



### BRISTOL BAY AND BERING SEA MARINE MAMMAL SPECIES LISTED AS ENDANGERED OR THREATENED UNDER THE ENDANGERED SPECIES ACT (ESA)

- 1  Blue Whale  
(*Balaenoptera Musculus*)

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- 2  Bowhead Whale  
(*Balaenoptera Mysticetus*)

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- 3  Fin Whale  
(*Balaenoptera Physalus*)

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- 4  Humpback Whale  
(*Megaptera Novaeangliae*)

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- 5  North Pacific Right Whale  
(*Eubalaena Japonica*)

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- 6  Northern Sea Otter  
(*Enhydra Lutris*)

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- 7  Sei Whale  
(*Balaenoptera Borealis*)

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- 8  Sperm Whale  
(*Physeter Macrocephalus*)

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- 9  Steller Sea Lion —  
Western Stock  
(*Eumetopias Jubatus*)

Important habitat for threatened and endangered marine mammal species — including designated critical habitat for the world’s most endangered whale, the North Pacific right whale — overlaps and surrounds the area targeted for oil and gas leasing. Unimak Pass, the aquatic “gateway” to the Bering Sea, is a concentrated migratory route for marine mammals including a host of threatened and endangered species.



Marine mammals are a critical part of the ocean ecosystem and also play important roles in human economic and cultural systems in Bristol Bay and Bering Sea communities, as well as in distant locations throughout their range. Species such as Pacific walrus, beluga whale, fur seal, Steller sea lion and harbor seal, remain vital to Alaska Native subsistence traditions. Other species such as the gray whale support economically important tourism industries along the Pacific coast in the places where they give birth and migrate. These geographic connections create transboundary responsibilities to help ensure the survival of these marine mammals for those who depend on their health, as well as for future generations.

In this section, we feature case studies on five marine mammal species that have important habitat in the southeast Bering Sea and would face significant threats from offshore oil and gas drilling: the North Pacific right whale, northern sea otter, Steller sea lion, northern fur seal and Pacific walrus.

## SNAPSHOT OF MARINE MAMMALS IN BRISTOL BAY AND THE SOUTHEAST BERING SEA

NAME ( <i>Scientific Name</i> )	ESA STATUS	MMPA STATUS	SUBSISTENCE USE
Bearded Seal ( <i>Erignathus Barbatus</i> )	P		Y
Beluga Whale ( <i>Delphinapterus Leucas</i> )			Y
Blue Whale ( <i>Balaenoptera Musculus</i> )	E	D	
Bowhead Whale ( <i>Balaenoptera Mysticetus</i> )	E	D	Y
Dall's Porpoise ( <i>Phocoenoides Dalli</i> )			
Fin Whale ( <i>Balaenoptera Physalus</i> )	E	D	
Gray Whale ( <i>Eschrichtius Robustus</i> )			
Humpback Whale ( <i>Megaptera Novaeangliae</i> )	E	D	
Harbor Porpoise ( <i>Phocoena Phocoena</i> )			
Harbor Seal ( <i>Phocoena Phocoena</i> )			Y
Killer Whale ( <i>Orcinus Orca</i> )			
Minke Whale ( <i>Balaenoptera Acutorostrata</i> )			
North Pacific Right Whale ( <i>Eubalaena Glacialis</i> )	E	D	
Northern Sea Otter ( <i>Enhydra Lutris</i> )	T	D	Y
Northern Fur Seal ( <i>Callorhinus Ursinus</i> )		D	Y
Pacific Walrus ( <i>Odobenus Rosmarus Divergens</i> )	C		Y
Pacific White-sided Dolphin ( <i>Lagenorhynchus Obliquidens</i> )			
Ribbon Seal ( <i>Phoca Fasciata</i> )			Y
Ringed Seal ( <i>Phoca Hispida</i> )	P		Y
Sei Whale ( <i>Balaenoptera Borealis</i> )	E	D	
Sperm Whale ( <i>Physeter Macrocephalus</i> )	E	D	
Spotted Seal ( <i>Phoca Largha</i> )			Y
Steller Sea Lion—	E	D	Y
Western Stock ( <i>Eumetopias Jubatus</i> )			

**ESA STATUS** = Endangered (E), Threatened (T), Candidate (C), Proposed (P).

**MMPA STATUS** = The term "depleted" (D) is used for any marine mammal species or population that is determined to be below its optimum sustainable population. This includes, but is not limited to, all marine mammal species and stocks listed under the ESA.

Main reference: NOAA. Marine Mammal Stock Assessment Reports. [www.nmfs.noaa.gov/pr/sars/](http://www.nmfs.noaa.gov/pr/sars/)



## NORTH PACIFIC RIGHT WHALE

Twenty years ago, little hope existed for the recovery of the North Pacific right whale population. Referred to as the "right" whale to kill, because of its slow speed, docile nature and buoyancy after death, this cetacean species was hunted intensely and nearly exterminated by the beginning of the 20th century.<sup>34</sup>

However in 1996, a group of these filter-feeding, or baleen, mammals was discovered in the southeast Bering Sea.<sup>35</sup> In 2004, three cow and calf pairs were sighted during research cruises in the southeast Bering Sea, raising hopes that the species could be recovering.<sup>36</sup> The North Pacific right whale population remains critically low, with some estimates suggesting 15-20 individuals inhabiting the southeast Bering Sea region.<sup>37</sup>

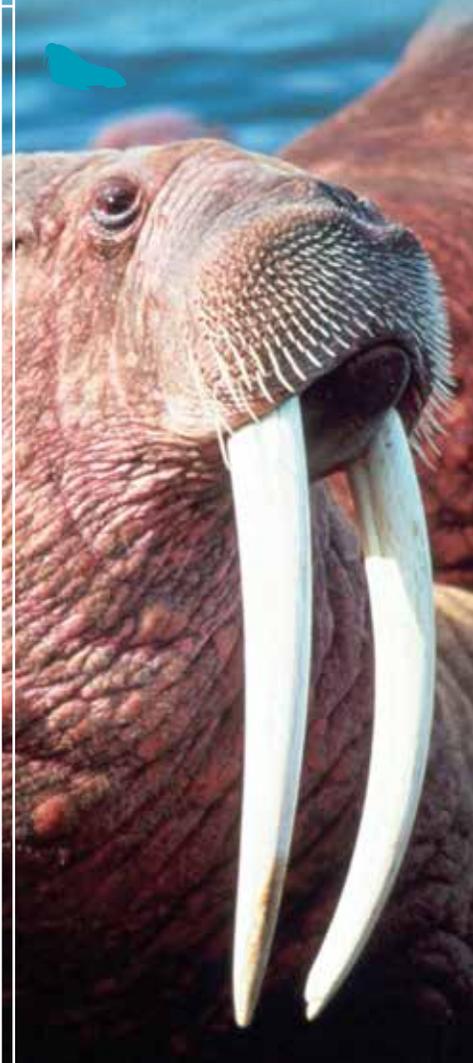
Closely related to its Atlantic cousin, the North Pacific right whale only recently received recognition as its own distinct species and therefore a separate listing under the Endangered Species Act. As a requirement of this listing, the National Marine Fisheries Service (NMFS) designated critical habitat deemed crucial to the continued survival of the species. Ninety-seven percent of this habitat (36,750 square miles), is in the southeast Bering Sea with the remaining three percent of critical habitat in the Gulf of Alaska.

Scientific research leading to the critical habitat designation revealed that the North Pacific right whale's primary feeding grounds are located in Bristol Bay and the southeast Bering Sea where they gorge on masses of zooplankton, suggesting that this area is particularly suited to the whale's biological needs.<sup>38</sup> Beyond the location of their feeding grounds, little is known about the whale's ecology. Calving locations, nursery grounds, wintering areas and migratory routes remain a mystery. More than 50 percent of the area targeted for oil and gas development overlaps the North Pacific right whale's summertime feeding grounds which have been designated as critical habitat.

*The North Pacific right whale – recognized recently as a separate species from the North Atlantic right whale (shown below) – has critical habitat in Bristol Bay that overlaps waters targeted for drilling.*



*Offshore drilling activities, including the construction and placement of infrastructure, could disturb or displace walrus from important resting and feeding sites.*



## PACIFIC WALRUS

The walrus has long loomed large in the popular imagination and in the lives of arctic peoples who have relied on walrus for millennia, harvesting the whole animal for food, tools and shelter. The massive size, ruddy skin and mustached, tusked face of the walrus make it instantly identifiable, whether seen swimming in frigid waters, lounging on ice floes, or lolling on remote beaches.

Walrus are pinnipeds—marine mammals with flippers related to seals and sea lions. The walrus is the sole species in the family Odobenidae, the so-called tooth walkers. Unlike the fish-feeding seals and sea lions from which they diverged, walrus have adapted to feed on benthic invertebrates such as clams, crabs and sea cucumbers. Walrus use their massive upper canines, or tusks, to guide themselves along the seafloor. Their bristly moustache helps them find prey, which they shuck with their lips and a powerful tongue. Experts estimate the population to be roughly 129,000 animals.<sup>39</sup>

Pacific walrus move seasonally with the shifting sea ice edge. Most of the population gathers on the pack ice that forms in the Bering Sea during the winter months. In spring, adult females and calves follow the retreating ice north through the Bering Strait. They return south as seasonal ice forms in November and December.<sup>40</sup> Significant concentrations of males remain in Bristol Bay throughout the summer, with thousands of walrus

consistently occupying four active haulout (*resting*) sites, including Cape Seniavin, Round Island, Cape Pierce and Cape Newenham (*see map p. 14*). By early to mid-December, most of the females and calves move back into Bering Sea and Bristol Bay waters to rejoin the males.<sup>41</sup>

This connection with the ice edge and the shallower depths of the inner continental shelf allows walrus to forage on their bottom-dwelling prey, give birth, nurse their calves in waters calmed by sea ice, rest and protect their young on ice floes. Walrus have the longest reproductive cycle of any pinniped—just one calf is born every two years, with longer intervals common. Calves are nursed for a full year or more before they are weaned.

Under normal conditions, the long reproductive interval of Pacific walrus is compensated for by very low predation— their isolated haulouts and remote ice-edge habitat offer protection from land and marine predators. But several features of their ecology make Pacific walrus particularly vulnerable to oil spills and offshore oil and gas activities. These include consistent use of selected beach sites, high sensitivity to disturbances at haulout sites, concentrated distribution of females and young, and heavy reliance on ice edge habitat in shallow waters.

## NORTHERN FUR SEAL AND STELLER SEA LION

The northern fur seal and Steller sea lion are predators that live in the waters and on the shores of the southeast Bering Sea. For centuries, indigenous people have used the flesh, skin and bones from both species for meat, clothing, boats, tools and weapons. Otariids, or eared pinniped species, the northern fur seal and Steller sea lion use their flexible flippers and extraordinary strength to move quickly on land.

Both northern fur seals and Steller sea lions rely on protected coasts and islands to rest and reproduce. Fur seals breed in enormous, concentrated rookeries numbering in the hundreds of thousands. Sea lions breed in smaller, dense aggregations. These sleek marine predators forage across vast stretches of ocean in pursuit of fish and squid. Sea lions tend to use continental shelf habitats throughout the year, while fur seals migrate to the Gulf of Alaska in winter.<sup>42</sup>

The dense pelt of the northern fur seal, whose scientific name *Callorhinus* means “beautiful hide,” nearly doomed the species. Pelagic, or open sea, sealers commercially harvested several million animals during the 19th century, with a cascading impact on populations. Combined with intensive harvests at their rookeries, the total population was reduced to around 200,000 by 1911 when an international treaty banned pelagic sealing.

Nearly all of the remaining animals were on the Pribilof Islands, west of Bristol Bay. In 2004-05, scientists estimated the worldwide population at 1.1 million, with three islands—St. Paul and St. George (*the Pribilof Islands*) and Bogoslof Island—accounting for 55 percent of the annual production, a decrease from 74 percent in 1992. According to a 2006 Stock Assessment Report, the Eastern Pacific stock totals 721,935 northern fur seals, substantially less than historical highs.<sup>43</sup>

In 1997, the western stock of the Steller sea lion, which includes animals living in Bristol Bay, was listed as endangered under the Endangered Species Act. Critical foraging habitat has been designated for the species in the southeast Bering Sea, along with numerous rookeries and haulouts (*see map p. 14*). Surveys show an encouraging three percent annual growth in the western stock of Steller sea lions in recent years.<sup>44</sup> It is unknown whether population growth will continue, but there is no doubt that the population remains precarious. An oil spill would affect these and other marine mammals in a variety of ways including displacement from feeding and breeding areas, decimation and contamination of prey species, pelt oiling, and lung and organ damage from breathing and ingesting toxic vapors and oil.

*Critical habitat for the endangered Steller sea lion—including feeding areas and haulout locations—overlaps and surrounds the area targeted for oil and gas leasing.*



*The threatened southwestern Alaska sea otter population has critical habitat that lies along the proposed path for getting oil and gas extracted offshore to market.*



## NORTHERN SEA OTTER

Sea otters are among the most familiar marine mammals in the North Pacific, thanks to their nearshore habitat, luxurious fur and playful behavior. These creatures live in shallow waters where they dive for urchins, clams, crabs and other invertebrate prey.

Sea otters are an important component of healthy nearshore environments. They are what ecologists call a “keystone species,” exerting a strong and balancing influence on their ecosystem by driving the diversity and abundance of their prey species.<sup>45</sup> Studies have shown that in habitats where sea otters have been extirpated, populations of their sea urchin prey have exploded. The sea urchins in turn overgraze the kelp forests that are natural habitat for sea otters, creating “urchin barrens.”<sup>46</sup>

Sea otters have a slow reproductive rate, bearing a single pup annually with pup survival rates as low as 50 percent. Thus, adults lost to catastrophic events, such as oil spills, are replaced slowly, impeding the recovery to healthy population levels.

Sea otters are exceptionally vulnerable to oil spills, as they rely solely on dense fur for insulation. Oil destroys the insulating properties of their fur, resulting in rapid onset of hypothermia. When oiled sea otters try to clean their matted fur they ingest toxic quantities of oil.

Indeed, thousands of sea otters were killed in Prince William Sound after the 1989 *Exxon Valdez* oil spill, and sea otters in the Sound continue to exhibit toxic effects from the oil decades later.

In 2005, the southwestern Alaska population of northern sea otters, which ranges from the Aleutian Islands to Cook Inlet, was granted threatened status under the Endangered Species Act, meaning they are likely to become endangered within the foreseeable future.<sup>47</sup> This threatened population includes otters that live, feed and reproduce directly adjacent to the area targeted for drilling in Bristol Bay and the southeast Bering Sea. In 2009, the US Fish and Wildlife Service designated critical habitat for the southwestern sea otter population. Among the areas identified as necessary for the continuation of the species are Herendeen Bay and Port Moller — the very same location as the preferred route for oil and gas infrastructure.



## GLOBAL AVIAN STRONGHOLD

Bristol Bay and the surrounding southeast Bering Sea support an extraordinary abundance and diversity of birds. The region's marine waters, lagoons and coastal wetlands are brimming with life, providing essential sustenance for literally tens of millions of birds that converge here every year. More than 90 bird species use Bristol Bay and the southeast Bering Sea for vital activities at different life stages — from breeding, to staging, molting, feeding and wintering. Species native to the Bering Sea, like the emperor goose, rely on the region throughout the year while other species like the short-tailed shearwater are temporary residents.

Bristol Bay represents an avian crossroads in both a geographic and an ecological sense. Four migratory flyways overlap in the region, forming a geographic crossroads, with birds from Africa, Asia, the Central Pacific and the Americas all migrating to and from the region, seeking out its diverse habitats and rich resources. At the same time, the region is an ecological crossroads: globally important concentrations of waterfowl, shorebirds and seabirds all rely on the region, using marine, nearshore lagoon and coastal habitats that cut across the ecological spectrum. Arguably, nowhere else on Earth is as important to so many birds from such a range of continents.

In this section, the report provides a window into the remarkable avian world of Bristol Bay. Highlighted are two Audubon Society programs designed to communicate essential information on bird diversity and abundance. Case studies are provided for three marine bird species that depend on the clean waters, rich food and sheltered habitats of Bristol Bay: Steller's eider, short-tailed shearwater and emperor goose.



## BRISTOL BAY AND THE ALASKA WATCHLIST

The Alaska WatchList is an early warning system that focuses attention on at-risk bird populations before they are in jeopardy of extinction. Bird species on the WatchList are faced with population decline, small population size, limited geographic range and direct threats such as oil spills or habitat loss on their breeding and wintering grounds or along migration routes.

Saving species already pushed to the brink of extinction — the function of the Endangered Species Act — is difficult, costly and controversial. As an alternative approach, Audubon created the science-based WatchList to inspire proactive protection for vulnerable species.

Considering the exceptional importance of Bristol Bay for birds, it is no surprise that three-quarters of the Alaska WatchList species occur here.

### SNAPSHOT OF BIRD LIFE IN BRISTOL BAY AND THE SOUTHEAST BERING SEA

COMMON NAME ( <i>Scientific Name</i> )	ESA STATUS	ALASKA WATCHLIST ( <i>Note 1</i> )	SUBSISTENCE USE ( <i>Note 2</i> )
Red-throated Loon ( <i>Gavia Stellata</i> )		Y	
Short-tailed Albatross ( <i>Phoebastria Albatrus</i> )	E	Y	
Red-faced Cormorant ( <i>Phalacrocorax Urile</i> )		Y	
Tundra Swan ( <i>Cygnus Columbianus</i> )			A
Emperor Goose ( <i>Chen Canagica</i> )		Y	A
Brant ( <i>Branta Bernicla</i> )		Y	A
Common eider ( <i>Somateria Mollissima</i> )		Y	A
King Eider ( <i>Somateria Spectabilis</i> )		Y	A
Steller's Eider ( <i>Polysticta Stelleri</i> )	T	Y	
Black Scoter ( <i>Melanitta Nigra</i> )		Y	A
Long-tailed Duck ( <i>Clangula Hyemalis</i> )			A
Gyrfalcon ( <i>Falco Rusticolus</i> )			
Peregrine Falcon ( <i>Falco Peregrinus Peale</i> )			
Black Oystercatcher ( <i>Haematopus Bachmani</i> )		Y	
Pacific Golden Plover ( <i>Pluvialis Fulva</i> )		Y	
Whimbrel ( <i>Numenius Phaeopus Rufiventris</i> )		Y	
Bristle-thighed Curlew ( <i>Numenius Tahitiensis</i> )		Y	
Bar-tailed Godwit ( <i>Limosa Lapponica Baueri</i> )		Y	
Marbled Godwit ( <i>Limosa Fedoa Beringiae</i> )		Y	
Black Turnstone ( <i>Arenaria Melanocephala</i> )		Y	
Red Knot ( <i>Calidris Canutus Roselaari</i> )		Y	
Dunlin ( <i>Calidris Alpina Pacifica</i> )		Y	
Dunlin ( <i>Calidris Alpina Articola</i> )		Y	
Rock Sandpiper ( <i>Calidris Ptilocnemis Ptilocnemis</i> )		Y	
Rock Sandpiper ( <i>Calidris Ptilocnemis Tschuktschorum</i> )			
Rock Sandpiper ( <i>Calidris Ptilocnemis Couesi</i> )			
Western Sandpiper ( <i>Calidris Mauri</i> )			
Arctic Tern ( <i>Sterna Paradisaea</i> )			E
Aleutian Tern ( <i>Sterna Aleutica</i> )		Y	
Glaucous Gull ( <i>Larus Hyperboreus</i> )			A,E
Mew Gull ( <i>Larus Canus</i> )			E
Sabine's Gull ( <i>Xema Sabini</i> )			E
Red-legged Kittiwake ( <i>Rissa Brevirostris</i> )		Y	
Marbled Murrelet ( <i>Brachyramphus Marmoratus</i> )		Y	
Kittlitz's Murrelet ( <i>Brachyramphus Brevirostris</i> )	C	Y	

**ESA Status:** Endangered (E), Threatened (T), Candidate (C)

**Subsistence Use:** animal (A), eggs (E)

1. Audubon Alaska. 2010. Alaska WatchList. <http://ak.audubon.org/alaska-watchlist>

2. Main source for subsistence information: USFWS. Alaska Migratory Bird Co-Management Council. <http://alaska.fws.gov/ambcc/harvest.htm>

## IMPORTANT BIRD AREAS IN BRISTOL BAY AND THE SOUTHEAST BERING SEA



The Important Bird Area (IBA) program is a global, science-based effort to identify essential habitat for birds. To qualify as an IBA, sites must support species of conservation concern, species with restricted ranges and/or species that congregate in large numbers. Identification as an IBA indicates a site's unique importance for birds. Still, some IBAs are of greater significance than others: a site may be considered important at the global, continental or state level.

The many IBAs of global importance further emphasize the exceptional importance of this area for birds. These IBAs include wintering and staging areas for most of the world's emperor geese and Steller's eiders, staging areas for tens of thousands of marbled godwits and other shorebirds, as well as colonies and foraging grounds for millions of seabirds.



*Most of the emperor goose population congregates at coastal sites in Bristol Bay and along the northern part of the Alaska Peninsula, placing the species at great risk from an oil spill.*



## EMPEROR GOOSE

The emperor goose is a medium-sized, stocky Beringian sea goose that relies heavily on the coastal waters and shorelines of the Bristol Bay region. Unlike nearly all other Alaskan waterfowl species, the emperor goose is a year-round resident and does not undertake an extensive southerly migration. Emperor geese nest on the Yukon-Kuskokwim Delta, stage in spring and fall on the north shore of the Alaska Peninsula and winter along the north and south shore of the Alaska Peninsula and across the Aleutian Islands.<sup>48</sup> Historically an important subsistence food for people living in coastal villages in and around Bristol Bay, the so-called “beach goose” depends on seashore and estuarine habitats for sustenance. There it feeds on clams, mussels, eelgrass and algae during the winter and in preparation for spring and fall migrations.

Emperor geese experienced a dramatic population decline in recent decades, triggering a total ban on sport hunting beginning in 1986. An unprecedented cooperative agreement among Alaska Native stakeholders and government agencies to halt the harvest of emperor geese, even for subsistence use, followed the sport-hunting ban. Although the population is now stable, it has not yet recovered.<sup>49</sup>

Long-term viability of the emperor goose depends on its over-winter survival and reproductive success, which are both affected by the availability of key sites in Bristol Bay and the northern coast of the Alaska Peninsula. An oil spill in the region would jeopardize the survival of the species because the vast majority of the population concentrates for weeks at a time in small coastal areas around Bristol Bay and on the Alaska Peninsula. Their reliance on intertidal feeding during most of the year puts them at risk for oil contamination, as intertidal habitats may retain significant amounts of oil following a spill.

## STELLER'S EIDER

The Steller's eider is a circumpolar arctic sea duck with a global population estimated at less than 220,000 birds. In summer, most Steller's eiders nest across thousands of miles of arctic tundra in northern Siberia. In winter, they migrate to Bristol Bay, which is rich in food and sheltered from storms. Nelson and Izembek Lagoon are major wintering areas for the Pacific population of Steller's eiders, supporting abundant invertebrate populations associated with the largest eelgrass beds in the world. The Steller's eider diet consists almost exclusively of aquatic insects that thrive in the eelgrass beds, sand and mud flats that characterize southern Bristol Bay and Alaska Peninsula estuaries. In summer, hundreds of nonbreeding Steller's eiders gather in small groups along the northwestern coasts of Bristol Bay.

In the early 1900's, naturalists described the Steller's eider as a common breeder in the Yukon-Kuskokwim Delta.<sup>50</sup> However, by the 1990s, the species had become so rare that it was considered "essentially extirpated" from the Delta. Now designated a threatened species, the Alaska-breeding population of Steller's eiders consists of about 500 birds on Alaska's western North Slope.<sup>51</sup> After breeding on the North Slope, this population flies to the southeast Bering Sea, where they molt their feathers for about three weeks. The birds are flightless during this

period and extremely vulnerable to disturbance. The most important molting sites for Pacific Steller's eiders include Izembek Lagoon, Nelson Lagoon, Port Heiden and the Seal Islands. Izembek and Nelson Lagoon, which are adjacent to the area targeted for oil and gas leasing, are designated as critical habitat by the U.S. Fish and Wildlife Service as are the Pribilof Islands in the Bering Sea. Nelson Lagoon is particularly vulnerable, as the proposed transportation route calls for a pipeline directly through this critical habitat area (*see map p. 27*).



*Now designated as a threatened species, the Steller's eider would face significant threats from offshore drilling activities, including potential pipelines and other infrastructure within its critical habitat.*



*Massive flocks of short-tailed shearwaters that congregate in Bristol Bay's waters to feed would be highly susceptible to an offshore oil spill.*



## SHORT-TAILED SHEARWATER

Flying almost 10,000 miles over several weeks, hundreds of thousands of short-tailed shearwaters migrate from their breeding grounds in Australia and Tasmania across the western Pacific to the Bering Sea. The most abundant seabird in Bristol Bay during summer, the short-tailed shearwater finds what makes the odyssey worthwhile: a world-class buffet of food, consisting mainly of small shrimp-like zooplankton and small fish, such as sand lance and juvenile pollock.

Short-tailed shearwaters are part of a diverse seabird family, which includes species such as petrels, prions and fulmars. All have tube-like nostrils on the top of their upper beak and are believed to be one of a few bird families with a well-developed sense of smell. Like the closely related albatrosses, short-tailed shearwaters are masters of oceanic winds. Their wings, which span three feet, are narrow for efficient high-speed gliding, enabling travel of up to 620 miles per day. Shearwaters are good swimmers and capable divers, commonly reaching depths of 50 feet or more in pursuit of plankton and fish.

Short-tailed shearwaters illustrate one thread of the global tapestry that defines Bristol Bay, and highlight transboundary responsibilities. Although they are not traditionally harvested in Alaska, short-tailed shearwaters are an important part of Aboriginal culture in Tasmania

and islands off southeastern Australia, where chicks are taken for feathers and meat in a sustainable harvest.

Exerting a powerful, but not fully understood influence on the marine ecology of Bristol Bay, the short-tailed shearwater is part of an interdependent web of life. Oil on the plumage of the short-tailed shearwater, or any marine bird, will lead to stress, reduced buoyancy, drowning, loss of insulating properties, hypothermia and death. Ingestion of oil as they preen fouled plumage can be lethal or cause long-term effects that depress breeding success. Oil from the *Exxon Valdez* spill killed hundreds of thousands of seabirds, and led to significant reproductive loss as well.

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*“Any change to this 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.”*

— PHYLLIS STABENO ET AL., 2001<sup>52</sup>

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## NATIONAL TREASURE AT RISK: POTENTIAL IMPACTS OF OFFSHORE DRILLING

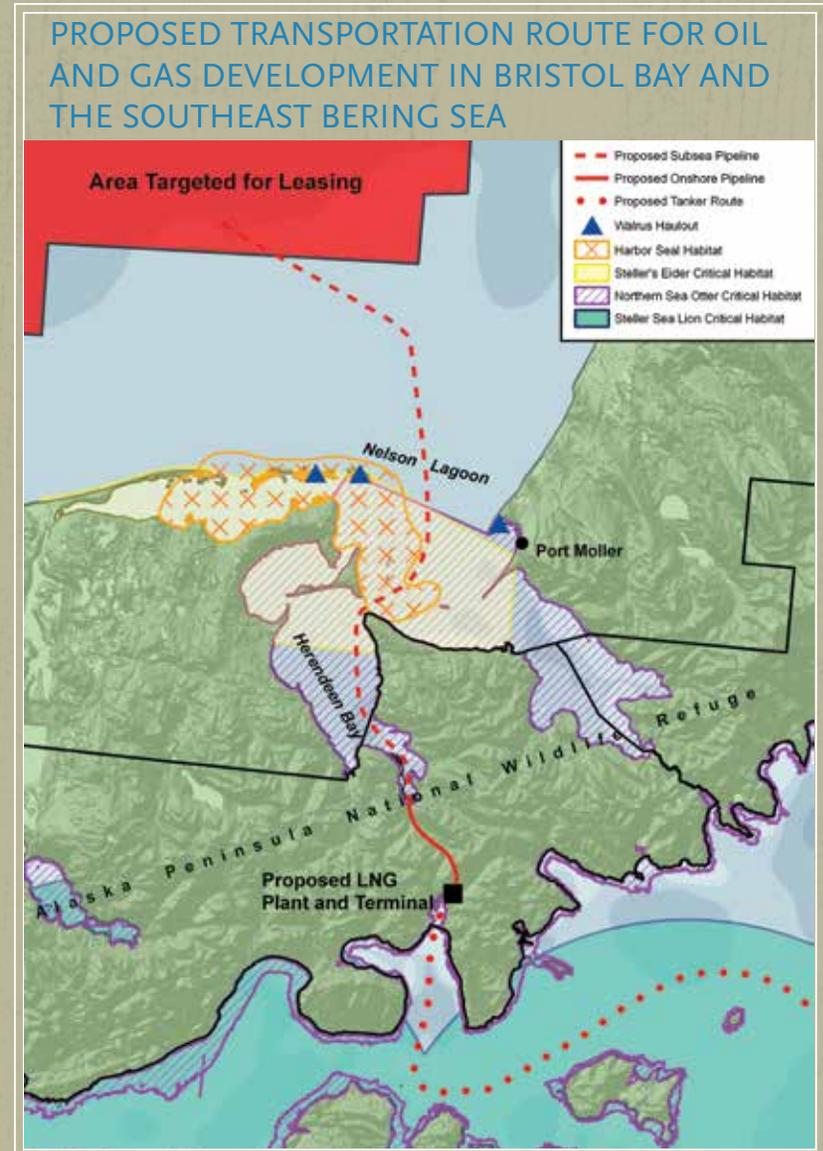
In the spring of 2010, the United States was awakened to the very real and devastating consequences associated with offshore oil and gas drilling. On April 20th, the BP Deepwater Horizon platform offshore of Louisiana experienced a deadly blowout, erupting in an explosion which killed eleven workers. The rig burned ferociously for two days and then sank.

The American public watched in shock as oil spewed at an astounding rate estimated at 35,000 to 60,000 barrels per day and a horrible truth was revealed. The oil industry and the federal government were woefully unprepared to deal with the catastrophe. There were no solid plans in place to halt a blowout of this nature, nor adequately contain or cleanup the toxic oil flowing into the Gulf of Mexico. Multiple attempts to stop the massive spill failed over the course of several months. On July 15, the well was finally plugged. Officials have estimated the total amount of oil spilled at 4.9 million barrels—the largest release of oil in water in the world.<sup>53</sup>

The incident has wreaked havoc on the ocean and coastal environments in the Gulf, as well as on the region's fishing and tourism industries. While millions of dollars, hundreds of businesses and thousands of jobs have been lost, the full impact of this horrible disaster will not be known for years to come.

While the Deepwater Horizon oil spill should serve as the ultimate wakeup call to permanently protect Bristol Bay from offshore drilling, there are numerous other impacts associated with offshore oil and gas operations that could have negative, long-lasting effects on fisheries and marine life of Bristol Bay. Although the concept of "gas-only" drilling has been promoted in Bristol Bay, there is no legal or regulatory framework currently in place that would limit lease holders to natural-gas drilling only, and therefore no guarantee that oil would not be developed if discovered. Additionally, all of the impacts from offshore drilling apply to the development of natural gas resources with the exception of oil spills.

In the following pages we highlight four areas of potential impacts that present the greatest threats to the coastal and marine ecosystems in Bristol Bay and the southeast Bering Sea: infrastructure, oil spills, contaminated discharges and seismic surveys.



The above map depicts the federal government's vision for getting oil and gas resources extracted in Bristol Bay to market. Subsea oil and/or gas pipelines would run from the lease sale area through Herendeen Bay and the Port Moller Critical Habitat Area — a rich, coastal gem recognized as one of the most ecologically important areas on the Alaska Peninsula. The pipelines would pass through designated critical habitat for the Steller's eider, through habitat for harbor seals and threatened sea otters, fishing grounds for the Area M (Alaska Peninsula) salmon fishery, important habitat for red king crab and herring as well as a host of other bird, marine mammal and fish species. After making landfall, the pipelines would run onshore through the Alaska Peninsula Wildlife Refuge and terminate at a potential liquified natural gas (LNG) terminal on the south side of the peninsula.

Source: MMS. 2007. OCS Oil and Gas Leasing Program: 2007-2012, Final EIS.

## INFRASTRUCTURE

The process of developing Bristol Bay's offshore oil and gas and getting it to market would require an expansive infrastructure, enlarging the footprint of fossil fuel extraction far beyond offshore wells and platforms. Marine, coastal and terrestrial habitats would all be impacted by the sprawling infrastructure that would include offshore platforms, exploration wells, production wells, offshore and onshore pipelines, waste and processing facilities, new harbor docks, onshore bases and roads. Habitat loss, contamination of fresh and marine waters, displacement of species, air and noise pollution, erosion, increased sedimentation, dredging of seafloor and interference with commercial and subsistence fishing activities are the inevitable consequences of oil and gas infrastructure. New infrastructure and increased marine traffic also amplify the risks for the introduction of new invasive species.

A transportation route requiring a pipeline through the Port Moller State Critical Habitat Area and across the Alaska Peninsula Wildlife Refuge is envisioned to mobilize oil and gas from Bristol Bay's seabed.<sup>54</sup> Transportation scenarios from the federal government and Shell Oil have described many miles of subsea pipelines that would run from the lease sale area and connect to a major pipeline or pipelines through the sensitive and productive nearshore waters of Nelson Lagoon and Herendeen Bay, also crossing through the Port Moller State Critical Habitat area. The Alaska Department of Natural Resources

describes the richness of the Port Moller area in the Bristol Bay Area Management Plan:

*"Nelson Lagoon and the northwestern part of Port Moller are the most sensitive habitat areas and include a variety of marine mammals, seabirds and seabird colonies, harbor seal and walrus haulouts, and extensive waterfowl concentrations (all seasons) and waterfowl nesting. Eelgrass 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. There are also significant herring spawning concentrations at the southern tip of Herendeen Bay."*<sup>55</sup>

Sensitivity of habitat impacted by needed infrastructure would also continue onshore. After making landfall, the pipeline(s) would travel through the Alaska Peninsula National Wildlife Refuge and across important salmon spawning streams. Construction of a liquefied natural gas (LNG ) plant and terminal near Pavlof Bay as well as a potential oil terminal would be likely be needed (*see map p. 27*). Massive tankers would be filled there, before navigating into the Gulf of Alaska near the south side of Kodiak Island towards markets in North America and/or Asia.<sup>56</sup>

### THE FOLLOWING INFRASTRUCTURE IS ANTICIPATED FOR OFFSHORE DRILLING IN BRISTOL BAY:

- 4 to 6 offshore platforms
- Up to 20 exploration wells
- Up to 200 production wells
- Up to 150 miles of offshore pipeline — gas pipeline and condensate/light crude oil pipeline (*impacting up to 555 acres of benthic habitat*)
- Up to 50 miles of new onshore pipeline
- 2 pipeline landfalls
- 1 waste facility
- 1 processing facility
- 1 shore base and a new dock or causeway for service vessels in onshore areas along the coast of the Alaska Peninsula, Unimak Island, or north of the Bristol Bay coast
- 1 or more new access roads for each new facility and for pipeline maintenance activities

Source: MMS. 2007. "OCS Oil and Gas Leasing Program: 2007-2012, Final EIS." IV-153.



*The federal government predicts offshore drilling in Bristol Bay would result in at least one large spill and numerous smaller spills.*

## OIL SPILLS

The recent, catastrophic Deepwater Horizon blowout was a clear demonstration that despite technological improvements within the past 20 years, oil spills are an inevitable consequence of development. Indeed, the federal government's own analysis concedes that numerous spills are likely to occur if drilling in Bristol Bay takes place. MMS estimated that "offshore drilling in Bristol Bay would lead to one large spill (*greater than 1,000 barrels/bbl*), up to two medium sized spills (*between 50 and 999 bbl*), and up to ten smaller spills (*less than 50 bbl*)."57

These spill estimates, however, may be conservative, as they are based on records from OCS development in the Gulf of Mexico and do not account for the extreme geologic and weather conditions in the Bering Sea. MMS has commented that the volcanic activity, seismic activity and sea ice present in the region pose "major geologic hazards to offshore development."<sup>58</sup> Oil spill predictions are based on current best estimates of recoverable oil and gas, but if discoveries turned out to be larger than projected more spills are probable. These estimates also do not incorporate spill probabilities from the tankers that would transport the oil and gas.

Small, chronic spills from offshore oil and gas operations, which occur from platforms, pipelines and support vessels are also a serious problem. Persistent oil pollution is harmful to aquatic life forms causing a range of effects

including mutation, reduced reproductive capacity, physiological impairment, behavioral alteration and death. For example, oil contamination inhibits chemical sensory capacities in crabs which are necessary for reproduction.

A large spill would have serious, long-term impacts in Bristol Bay and the southeast Bering Sea. Currents and winds vary seasonally increasing the year-round risk to the entire ecosystem. In summertime, winds and currents would push oil spilled from offshore platforms or pipelines north into Bristol Bay and along the shoreline of the Alaska Peninsula. Tides and smaller currents have the potential to move spilled oil into sensitive nearshore and coastal environments. A summertime spill would be a major concern for the Bristol Bay salmon fishery, as it would flow in the same direction as the return migratory routes of adult salmon and could also affect outward migrating salmon smolts. A major spill during summer could also likely mean the closure of the salmon fishery for a full season to prevent contaminated products from reaching consumers (*as was the case in Prince William Sound in 1989*).

In winter, winds and currents would move oil northwest into important juvenile pollock and salmon habitat in the Bering Sea. A wintertime spill could also trigger closures for Pacific cod, pollock and red king crab fisheries. The possible presence of sea ice in the region could affect the trajectory of a spill.



Oil and gas pipelines are slated to pass through the Port Moller Critical Habitat Area, which includes the rich eelgrass beds of Nelson Lagoon and productive waters of Herendeen Bay. A spill in this sensitive and ecologically productive coastal environment could contaminate sediments and devastate bottom-dwelling fish and crab species.

The majority of coastal habitats in the Bristol Bay region are highly sensitive to oil spills. Nearly three-quarters of the region's coastline is composed of sand and gravel beaches, sheltered tidal flats or marsh which all have high oil retention properties. In cold climates, persistence of oil in some of these habitats can exceed 30 years.<sup>59</sup> More than 20 years after the *Exxon Valdez* spill in Prince William Sound, for example, significant amounts of oil still remain on many beaches, and the loss rate of the remaining oil is between zero and three percent per year.<sup>60</sup> Techniques for cleaning up oil in these sensitive nearshore environments are not adequate, and in some places cleanup is potentially more harmful than leaving the oil to degrade naturally.

Oil spill cleanup operations in the remote southeast Bering Sea also face unique challenges. In winter, the region receives only a few hours of daylight, reducing the daily time available for cleanup operations. Vessel and air response would be impeded or impossible during a winter storm, which can generate hurricane-force winds and wave heights up to 50 feet.<sup>61</sup> Frigid temperatures in fall, winter

and spring would also complicate spill response, creating hazardous conditions for vessel and air traffic. In Bristol Bay, the difficulty or inability to quickly contain and clean up a spill increases the likelihood that oil would spread to distant shorelines and communities, and remain in the marine ecosystem.

An oil spill in conditions with sea ice is also a possibility in this part of the Bering Sea, a situation that current cleanup technology is not equipped to handle. In heavy ice years, the sea ice extends into the area targeted for leasing and can remain there for several months. Oil spilled near sea ice can become trapped within channels beneath the frozen surface where it can remain for long periods of time. As ice retreats in the spring, oil would move with it, spreading north through the Bering Sea and affecting the sensitive ice-edge ecosystem upon which the spotted seal, Pacific walrus, spectacled eider and other ice-dependent species rely. Oil can concentrate in open ice areas, or leads, in which birds congregate and marine mammals use as breathing holes.

*Spill response in the Bering Sea would be severely impeded or impossible during a significant portion of the year due to severe storms and winter sea ice that can extend into the lease sale area.*



*More than 10,000 tons of contaminated drilling discharges — with the potential to pollute living seafloor habitats that are vital to fish, crab and invertebrates — could be released into Bristol Bay's waters if offshore drilling is allowed.*



## DRILLING DISCHARGES

Even in the absence of an oil spill, offshore oil and gas operations routinely produce solid and liquid waste such as drilling muds, cuttings and produced water. Federal analysis of drilling in our nation's "fish basket," have stated that in Bristol Bay, more than 10,440 tons of drill muds and cuttings "generated during exploratory drilling would be discharged directly at the drill sites and, thus, could adversely affect nearby water quality."<sup>62</sup>

Drilling discharges, and their heavy metal components, can kill marine organisms through smothering and toxic exposure. Discharges can also cause sublethal effects to fish eggs, fry and invertebrates in the mixing zone even at volumes permitted by the Environmental Protection Agency.<sup>63</sup> Disposal of drill cuttings can alter habitat suitability for bottom-dwelling fish and shellfish, potentially causing disturbance and dislocation of groundfish and crab in the area.<sup>64</sup> Environmental studies by MMS in the Gulf of Mexico showed that zones around oil platforms had sediments with higher levels of contaminants and toxicity, reduced levels of abundance, species diversity, genetic diversity and reproductive success.<sup>65</sup> Other studies funded by MMS showed drilling discharges in the Gulf of Mexico caused widespread,

long-term, sublethal effects on planktonic organisms such as amphipods and copepods, which are key food sources for salmon and other types of fish, as well as whales, and seals.<sup>66</sup>

The permitted discharge of thousands of tons of toxic drill wastes into waters that provide essential fish habitat for a variety of commercial fish and subsistence species is a significant concern in Bristol Bay and the southeast Bering Sea.

## SEISMIC SURVEYS

The ocean is an acoustic world where sound penetrates much better than light. Many marine mammals depend on sound instead of sight as their primary sense. Porpoises, whales and seals rely on their sense of hearing to locate prey, avoid predators, choose migration routes and communicate across long distances. Studies have shown that loud noise associated with seismic surveys can mask natural underwater sounds, thereby disrupting vital activities such as breeding, feeding and resting. Marine seismic surveys represent a significant component to an increasingly noisy ocean.<sup>67</sup>

Conducted by specialized ships that tow an array of powerful air guns, offshore seismic surveys create sound waves which are reflected from geological formations beneath the seafloor and help determine the location of oil and gas deposits. The intensity of sound waves produced by the firing of air guns is typically 250 decibels (dB) near the source.<sup>68</sup> For reference, the sound intensity produced by a jackhammer is around 120 dB, loud enough to damage human ears. Exploring and

developing offshore oil and gas resources in the Bristol Bay region would entail thousands of line miles of seismic surveys.

Powerful sound waves can also have a variety of harmful effects on fish. Within close range, seismic surveys have been found to kill adult fish as well as larvae and fish eggs. Studies have also shown that air gun blasts can damage orientation systems and reduce the ability of fish to find food. Researchers have noted disturbances in the migration routes of salmon and physical damage to fish ears and swim bladders.

Although such effects may not kill fish immediately, they can lead to reduced fitness, increasing susceptibility to predation and decreasing the ability to carry out important life activities such as spawning. Research also shows that fish catch rates can be dramatically reduced by more than 50 percent for several days as a result of fish avoidance of the area of a seismic survey (*see table below*).

*Research has shown that fish catch rates can be reduced by more than 50% for several days as a result of fish fleeing the area of a seismic survey.*

### REDUCTIONS IN FISH CATCH RATES AS A RESULT OF SEISMIC SURVEY ACTIVITY

SPECIES	GEAR TYPE	NOISE LEVEL OF SEISMIC TESTING	CATCH REDUCTION
Atlantic cod ( <i>Gadus morhua</i> )	Trawl	250 decibels (dB)	46-69% lasting at least 5 days
Atlantic cod ( <i>Gadus morhua</i> )	Longline	250 db	17-45% lasting at least 5 days
Atlantic cod ( <i>Gadus morhua</i> )	Longline	Undetermined, 9.32 miles from source	55-79% lasting at least 24 hours
Haddock ( <i>Melanogrammus aeglefinus</i> )	Trawl	250 db	70-72% lasting at least 5 days
Haddock ( <i>Melanogrammus aeglefinus</i> )	Longline	250 db	49-73% lasting at least 5 days
Rockfish ( <i>Sebastes spp.</i> )	Longline	223 dB	52%- effect period not determined

Sources: Engas et al. 1993. "Effects of Seismic Shooting on Catch and Catch-viability of Cod and Haddock." *Fisken og Havet* 9:117.  
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## CONCLUSION: THE FUTURE OF BRISTOL BAY

Remarkable abundance, unparalleled beauty, astounding bounty, rich cultural heritage, a jobs engine, provider of healthy food and home to world-class, renewable resources—this is Alaska's Bristol Bay—truly a national, marine treasure. The push to compromise all of this for less than 1% of oil and 2% of natural gas reserves estimated in our nation's Outer Continental Shelf has never made sense. The harm to Bristol Bay's renewable resources and ecological riches from offshore oil and gas development is too high a price for a nonrenewable and ultimately minor contribution to the nation's energy supply.

With the value of the region's commercial fisheries exceeding \$2 billion dollars annually, this is truly one place in our nation's waters where the potential benefits of offshore drilling clearly do not outweigh the potential risks. American taxpayers have already bought back previously sold leases in Bristol Bay and precious government resources are being spent again and again on reevaluating leasing in the region. The time has come to put an end to this cycle of waste and permanently protect Bristol Bay and the southeast Bering Sea's rich waters from offshore drilling.

Dozens of local communities, Alaska Native Tribes and fishing organizations across Alaska that rely on the continued health of the region's waters to support cultural traditions, jobs, businesses and ways of life are united in strongly supporting a lasting protection solution. The people of Bristol Bay are promoting an economy and way of life based on renewable natural resources like the fisheries that sustain the region today.<sup>69</sup>

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**After 35 years of resistance to offshore drilling, the time has come to establish permanent protection for Bristol Bay and the southeast Bering Sea to ensure that this economic, ecological and cultural treasure remains healthy and intact for generations to come.**



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The Alaska Marine Conservation Council (AMCC) advances conservation solutions that address the interdependence between healthy marine ecosystems, strong local economies and coastal traditions. Our community-based approach includes outreach, grassroots advocacy, public policy, research and education.



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