

THE ARCTIC NATIONAL WILDLIFE REFUGE

AN AMERICAN CROWN JEWEL
IN NEED OF PERMANENT PROTECTION



National
Wildlife Refuge
Association

**NATIONAL
WILDLIFE
FEDERATION**

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PHOTO: USEFWS



PHOTO: KENNETH R. WHITTEN

THE ARCTIC NATIONAL WILDLIFE REFUGE in Alaska's northeast corner is often considered the crown jewel of all national wildlife refuges. President Eisenhower established the Arctic National Wildlife Refuge in 1960 "for the purpose of preserving unique wildlife, wilderness and recreational values."¹

Despite its magnificence and importance, the Arctic Refuge is at serious risk from an oil and gas industry intent on exploiting potential oil and gas resources in the Coastal Plain, the most important wildlife habitat in the entire Arctic Refuge. At risk is the vitally-important calving and post-calving habitat for the Porcupine Caribou Herd, nearly 200,000 animals strong,^{2,3} the nation's most important lands for polar bear denning, as well as breeding habitat for an abundance and diversity of songbirds, shorebirds and waterfowl. Oil and gas development would disturb and destroy the wilderness values

and the pristine habitats where wildlife thrive, and thus harm the subsistence way of life of local indigenous people.

This report unveils the beauty, uniqueness and value of the Arctic Refuge not only for wildlife, but for all of us. It also shows the great harm, and needlessness, of turning the Arctic Refuge into an industrial complex for oil and gas development that not only isn't needed and would harm wildlife, but would also increase climate change.

Some places are just too special to drill, and must be left in their natural state. The Arctic National Wildlife Refuge is one of those special areas. As proposed by President Obama in January, 2015,⁴ the entire Arctic Refuge, including the Coastal Plain, should be forever protected and designated as wilderness—the highest level of conservation protection on Earth—to preserve it forever for wildlife and people.



COLLIN O'MARA
PRESIDENT AND CEO
NATIONAL WILDLIFE
FEDERATION



DAVID HOUGHTON
PRESIDENT
NATIONAL WILDLIFE REFUGE
ASSOCIATION

THE NATIONAL WILDLIFE REFUGE SYSTEM

A SAFE HARBOR FOR WILDLIFE

PHOTO: GARY KRAMER



“ The establishment of the Pelican Island National Wildlife Refuge by my great-great-grandfather, President Theodore Roosevelt, was the start of an American legacy that has grown from that first Refuge to a magnificent system across the entire country dedicated to the conservation and protection of America’s wildlife and habitat. Just as we now benefit from its creation, so we must safeguard it for the future. ”



SIMON ROOSEVELT

IT BEGAN IN 1868 when President Ulysses S. Grant set aside the first area of federally owned land specifically for wildlife conservation in the Pribilof Islands in the Bering Sea to protect fur seals. It took hold as a movement in 1903 when President Theodore Roosevelt established the Pelican Island National Wildlife Refuge to protect resplendently dressed brown pelicans, herons, egrets, and roseate spoonbills. They were being killed in large numbers, with no effort of conservation, to meet the fashion industry’s insatiable appetite for plume feathers to adorn ladies’ hats.

President Roosevelt went on to create over 50 national wildlife refuges and now, more than a century later, the National Wildlife Refuge System has more than 560 refuges. It also oversees 38 wetland management districts, mostly in the upper Midwest where they are very important for waterfowl. The National Wildlife Refuge System is also responsible for the management of nearly a half a billion acres of marine national monuments in the Pacific. It is, simply put, the largest system of lands and waters devoted to wildlife conservation on Earth and it harbors a diversity of life almost too large to comprehend.

National wildlife refuges now exist in every state and territory of the nation, ranging from the smallest refuge, the 0.6 acre Mille Lacs National Wildlife Refuge in Minnesota harboring nesting bird colonies,⁵ to the 19.6 million acre Arctic Refuge



Nesting brown pelicans on Pelican Island National Wildlife Refuge

PHOTO: PELICAN ISLAND NATIONAL WILDLIFE REFUGE

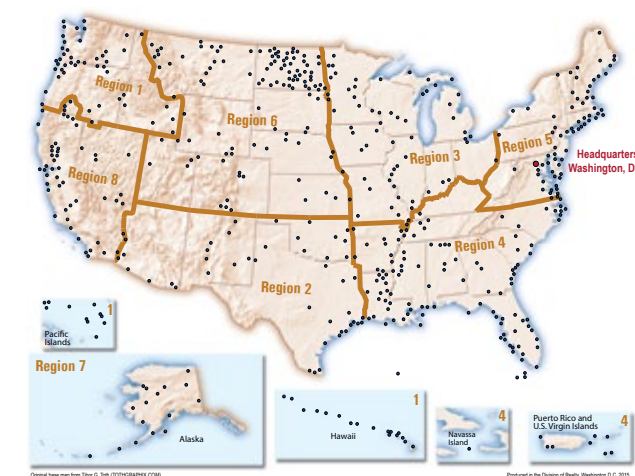


PHOTO: JOHN BATTASO



PHOTO: RYAN HAGERTY

in northeastern Alaska. Stretching from the Virgin Islands to Guam, the Refuge System spans 12 time zones and harbors more than 700 bird species, 220 mammal species, 250 reptile and amphibian species, and more than 1,000 species of fish.⁶



CREDIT: USFWS

National wildlife refuges play a key role in the protection and recovery of many threatened and endangered species. Fifty-nine national wildlife refuges were established specifically to help imperiled species. They harbor at least 380 of the nation’s more than 1,500 endangered or threatened wildlife and plant species.^{7,8}

With their diverse habitats and abundant wildlife, it is no surprise that national wildlife refuges have more than 47 million visitors each year.⁹ For children and adults alike, unique wildlife experiences provide life-long memories of rare birds, huge flocks of migrating ducks, geese and swans, glorious sunsets, moose feeding in shallow wetlands, alligators quietly awaiting their prey, or shorebirds running along the ocean surf. Refuges are enjoyed by many, including bird watchers, wildlife observers, hunters, anglers, photographers, families, teachers, and students. We must all be ever vigilant to ensure that lands in the National Wildlife Refuge System are forever protected for the benefit of fish and wildlife, and all Americans.

THE ARCTIC NATIONAL WILDLIFE REFUGE

A NATIONAL TREASURE

PHOTO: USEFWS

ONE OF THE NATION'S more than 560 national wildlife refuges, the Arctic National Wildlife Refuge is the largest, wildest, and most pristine refuge in the entire National Wildlife Refuge System. It harbors many wildlife species, especially during the short summer months, thanks to a diversity of habitats including rich vegetation, rivers, lakes and ponds, coastal lagoons, and barrier islands of the Coastal Plain, as well as the foothills, mountains, and forests of the Brooks Range.

In 1957 President Eisenhower urged Congress to set aside for protection the northeast corner of Alaska for its wildlife and wilderness values. When Congress failed to do so, in 1960 Secretary of the Interior Fred Seaton under President Eisenhower issued Public Land Order 2214, which established the Arctic National Wildlife Range, including the area known today as the Coastal Plain.¹⁰ The 1.5 million acre Coastal Plain is in the northern portion of the Arctic Refuge and lies adjacent to the Beaufort Sea for nearly 100 miles, extending south about 30 miles toward the Brooks Range. The nearly 8.9 million acres of the Arctic National Wildlife Range was established "for the purpose of preserving unique wildlife, wilderness, and recreational values."¹¹

However, establishment of the Arctic National Wildlife Range came at a steep price. Secretary Seaton's next action that very same day was to open 20 million acres to the west of the Arctic Refuge to commercial oil and gas development

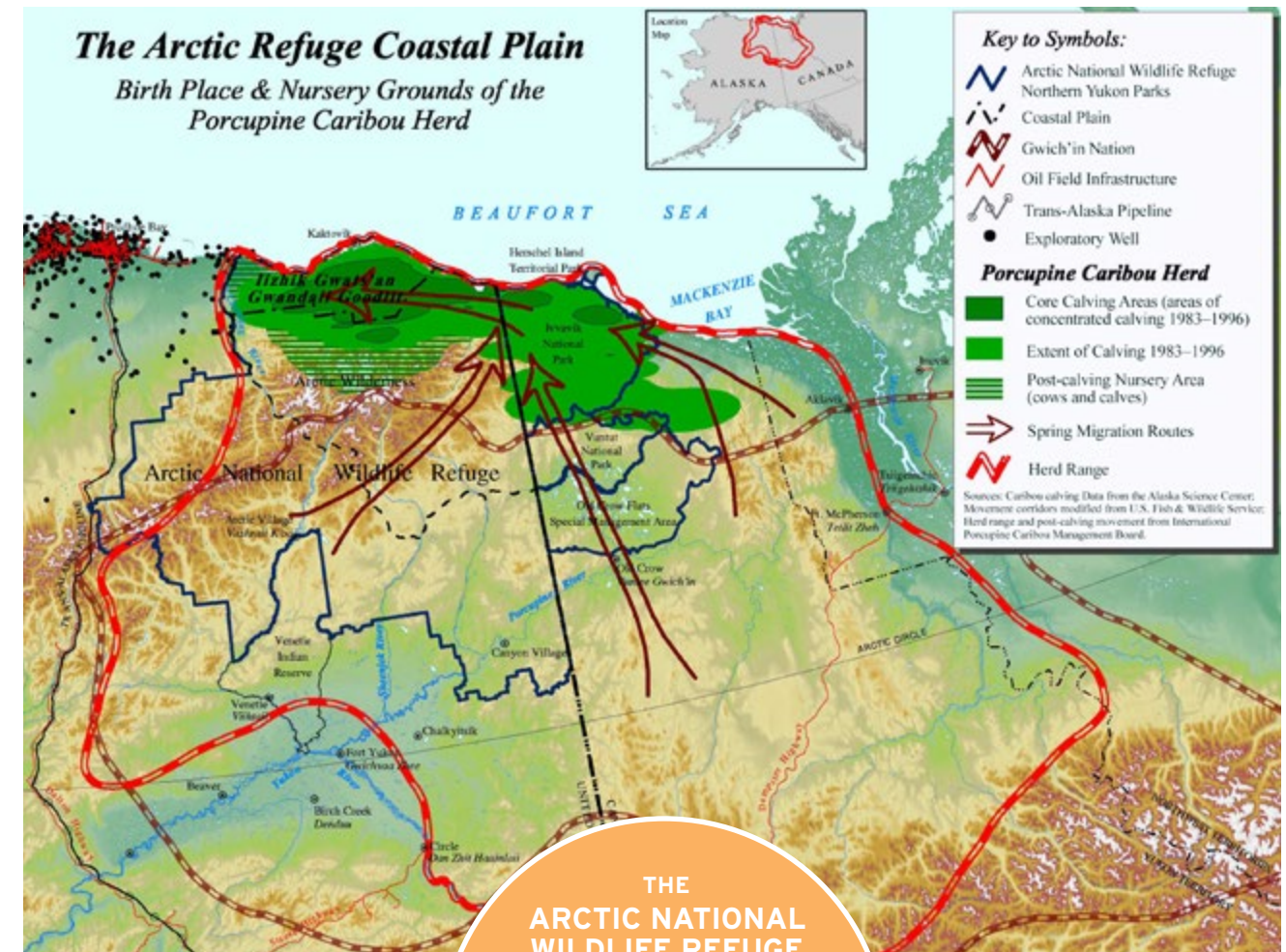
“For the wilderness explorer, whether primarily a fisherman, hunter, photographer, or mountain climber, certain portions of the Arctic coast and the north slope river valleys, ... and their great background of lofty mountains, offer a wilderness experience not duplicated elsewhere in our country.”



FRED SEATON
SECRETARY OF THE INTERIOR
EISENHOWER ADMINISTRATION

by rescinding a withdrawal of lands for the Department of Defense.¹² These lands were made available for selection by the State of Alaska, which wisely chose the state lands where Prudhoe Bay, America's largest oil field would be later discovered. Today, the oil and gas industry on Alaska's North Slope spans an area the size of Rhode Island. The Trans-Alaska Pipeline was built to transport oil to Valdez where it would then be shipped by ocean-going oil tankers.¹³

In 1980, passage of the Alaska National Interest Lands Conservation Act (ANILCA)¹⁴ renamed the area as the Arctic National Wildlife Refuge and enlarged its size to 19.6 million acres to



THE ARCTIC NATIONAL WILDLIFE REFUGE IS THE **LARGEST & MOST PRISTINE** OF AMERICA'S REFUGES

encompass wintering grounds of the Porcupine Caribou Herd. This law expanded the purposes of the Arctic Refuge to include fulfilling international wildlife treaty obligations, providing for subsistence uses, and ensuring water quality and quantity. It also put great emphasis on the fish and wildlife values of the area:

*"to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, the Porcupine Caribou Herd (including participation in coordinating ecological studies on this herd and the Western Arctic Caribou Herd), polar bears, grizzly bears, muskox, Dall sheep, wolves, wolverines, snow geese, peregrine falcons and other migratory birds, and Arctic char and grayling."*¹⁵

The Alaska National Interest Lands Conservation Act protected the 1.5 million acres of the Coastal Plain, but did not designate it as wilderness, as was the rest of the original Arctic Range. Instead, the Department of Interior was directed to determine the Coastal Plain's fish and wildlife resources, assess the potential amount of oil and gas resources, and analyze the potential impact of development of oil and gas

resources on the fish and wildlife.¹⁶ Their studies were completed and a report sent to Congress in 1987.

Because the Coastal Plain is currently protected by law from exploration and development, it would require legislation enacted by Congress to allow drilling in this pristine landscape for oil and gas exploration and development. It would also require an act of Congress to designate the Coastal Plain as wilderness.

Despite the Coastal Plain being the biological heart of the Arctic Refuge, the oil and gas industry and its supporters want to exploit its potential oil and gas resources. Until Congress designates the Coastal Plain as wilderness under the Wilderness Act, it will remain threatened by oil and gas exploration and development.

“This last American wilderness must remain sacrosanct.”¹⁷

WILLIAM O. DOUGLAS
U.S. SUPREME COURT JUSTICE

Indigenous People

For millennia, indigenous people have lived in and around today's Arctic Refuge. The Gwich'in, known as People of the Caribou, live in 15 villages within the range of the Porcupine Caribou Herd's migration routes in the United States and Canada.¹⁸ Arctic Village is at the Arctic Refuge border in the Brooks Range. On the Arctic Ocean coast at the Arctic Refuge's northern border is the Inupiat village of Kaktovik which uses bowhead whales, fish, seals, and caribou as important sources of food and for their cultural values. Caribou are interwoven into the daily lives of the indigenous people, particularly the Gwich'in.

“ We are the Caribou People... Caribou are not just what we eat; they are who we are. They are in our stories and songs and the whole way we see the world. Caribou are our life. Without caribou we wouldn't exist.”¹⁹ ”

SARAH JAMES

NEETS'AII GWICH'IN, ARCTIC VILLAGE GWICH'IN STEERING COMMITTEE



Sarah James

PHOTO: PAMELA A. MILLER

The Arctic Refuge is of importance to indigenous people in many ways, including spiritually, for food and clothing from caribou and other food sources such as fish and berries. Oil and gas exploration and development in the Arctic Refuge would forever change the way of life of the Gwich'in because their long-standing culture is so intertwined with the caribou of the Porcupine Caribou Herd.

The Arctic Refuge is important for sustenance, culture and provides extraordinary wilderness, wildlife, and recreational values for all Americans and the world. In particular, its Coastal Plain harbors a unique community of wildlife that is both breath-taking and unparalleled among national wildlife refuges.

A Diversity and Abundance of Wildlife and Wildlife Habitat

The tremendous value of the Arctic Refuge is revealed by the fact that “The Arctic Refuge is the only conservation system unit that protects, in an undisturbed condition, a complete spectrum of the arctic ecosystems in North America.”²⁰ These fragile ecosystems range from the highest peaks of the Brooks Range reaching 9,000 feet, to boreal forests in the Yukon River watershed, to tundra of the Coastal Plain, to streams and rivers, to coastal bays and lagoons, and to barrier islands.

Within these habitats are more than 200 species of birds, 37 land mammal species, 8 marine mammal species and 42 species of fish.²¹ Well known species include caribou, gray wolves, polar bears, and even muskoxen. The abundance of breeding and migratory wetland birds is remarkable to witness in the summer.

BIRDS

Some refuges, like the Arctic Refuge, are not frequently visited by people, but are “closer” to us than we might initially realize. During the short summer, upwards of 200 bird species²² may pass through or nest in the Arctic Refuge. Because of their ability to migrate long distances, nearly all bird species of the Arctic Refuge migrate south to avoid the brutal winters. All 50 states are visited by birds from the Arctic Refuge.

A few species hardy enough to occasionally overwinter on the Refuge include the gyrfalcon, common raven, American dipper, and hoary redpoll. Rock and willow ptarmigan are common year-round residents, using their seasonal plumage



Some of the bird species that migrate from the Arctic Refuge to the lower-48 states.

CREDIT: USFWS

change from brown in the summer to white in the winter to blend in with their habitat. In marked contrast to these residents, the arctic tern makes an annual 25,000 mile round-trip voyage to Antarctica—a year-round average of more than 70 miles per day—yet taking a month or more to raise its progeny in the far north.²³ In the more rugged terrain of the Arctic Refuge peregrine falcons, gyrfalcons, and golden eagles can be found nesting and raising their young on cliffs.²⁴

THE SNOWY OWL

Most owls, hawks, and eagles that breed in the Arctic Refuge venture far to the south in winter. However, the snowy owl is a notable exception and likely one of the Arctic Refuge's most popular species, perhaps in part because it brings to mind Hedwig, the beloved owl that was Harry Potter's pet throughout the popular book series.²⁵

A common summer resident in the Arctic Refuge during years of high lemming populations, the snowy owl actually nests on the ground. Although sometimes they stay through the winter, when lemming populations are low, snowy owls are especially well-known for migrating as far south as the northern half of the lower-48 states.

The snowy owl's spectacular white plumage, which is accented by its large yellow eyes, is a great disguise in the snowy north. The sighting of a snowy owl so far south of its breeding range is an exciting event for people who likely have no other opportunity to see the species in the wild.

WATERFOWL

The Coastal Plain of the Arctic Refuge harbors some 28 species of waterfowl, loons, and grebes. The cackling goose, long-tailed duck, northern pintail, Pacific loon, and tundra swan are common breeders there.²⁶ Snow geese annually congregate in massive numbers ranging from 12,000 to 300,000 birds, using the Coastal Plain as an important staging and fattening-up area prior to their long migration to California and other western states.²⁷

Brant, sometimes called the “sea goose,” migrate from their hatching site on the Coastal Plain around Alaska's entire

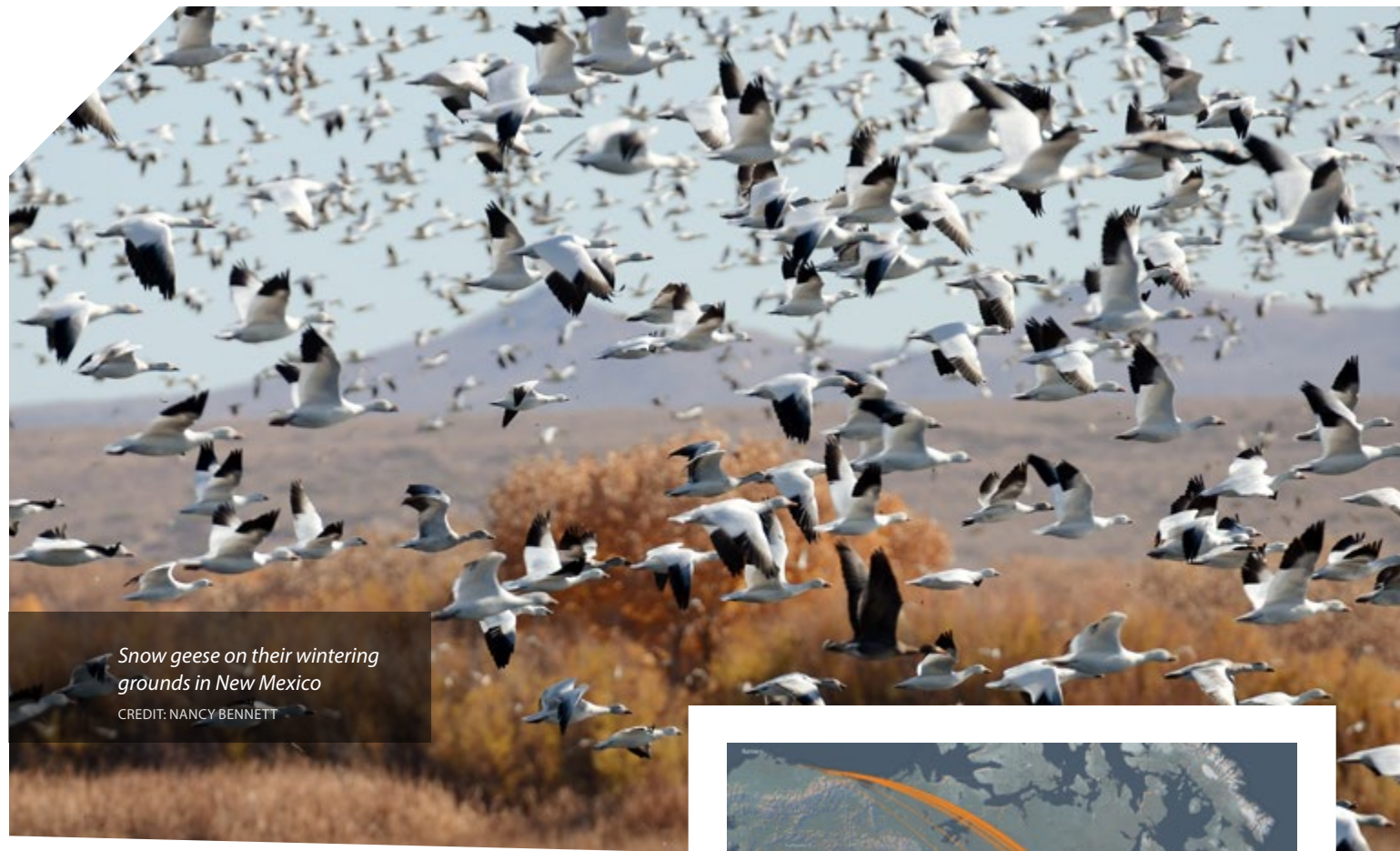
continental coast and southward to where they spend the winter along the Pacific coast of western states.²⁸ Incredibly, tundra swans annually fly four thousand miles from the Arctic Refuge across the continent to the Chesapeake Bay and nearby areas for the winter (Figure 1).²⁹



“As a duck hunter, I know the importance of the Coastal Plain for waterfowl, and as a wilderness that must be forever protected. As hunters we owe this protection not only to future generations, but to the wildlife that reside in these critical habitats”.

Joe Hoffmann, President
Minnesota Conservation Federation

PHOTO: JOHNNY PROTIVINSKY



Snow geese on their wintering grounds in New Mexico

CREDIT: NANCY BENNETT

Particularly important for waterfowl is the Canning River Delta at the western end of the Coastal Plain. It is the largest river on the Coastal Plain and has the largest delta and wetlands in the entire Arctic Refuge. The largest thaw-lake plains in the Arctic Refuge and nearly all the largest deep lakes, are in this area. Loons and tundra swans breed on the delta. It also supports migrant waterfowl that need to fatten up for their long and arduous migration.

SHOREBIRDS OF THE COASTAL PLAIN

The Coastal Plain is visited by some 26 species of shorebirds (Table 1), of which at least fourteen are known to breed there. The U.S. Shorebird Conservation Plan lists seven of these species as highly imperiled.³⁰ Many shorebirds, both in species and numbers, inhabit the Coastal Plain's treeless habitats during the short summer. They find the wet tundra and shallow waters atop the permafrost to be rich sources of invertebrates upon which they depend for nutrition, making this a prime habitat for laying eggs and raising young. In August, large numbers of shorebirds gather on the Coastal Plain, especially near the coast and on tidal wetlands, to build up fat reserves for their arduous and remarkable long-distance migrations to many parts of the world.³¹

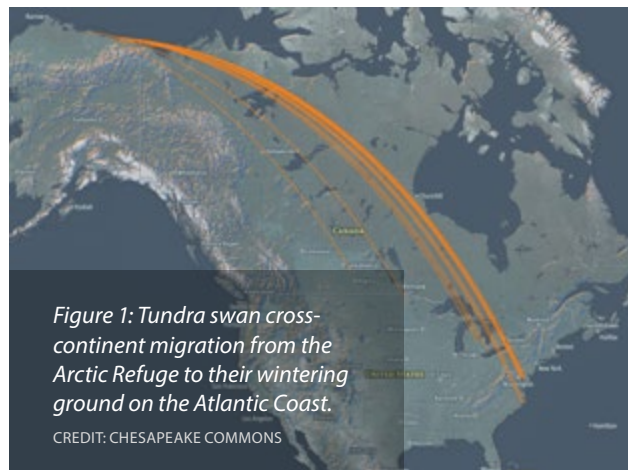


Figure 1: Tundra swan cross-continent migration from the Arctic Refuge to their wintering ground on the Atlantic Coast.

CREDIT: CHESAPEAKE COMMONS

“Many of the shorebirds that visit New Hampshire's coast during fall migration are hatched and raised on the Arctic tundra, and spend the winter in the southern hemisphere, and thus illustrate the need to conserve all the places “our” birds need over the course of their lives.”

PAM HUNT, PH.D.

SENIOR BIOLOGIST, AVIAN CONSERVATION
NEW HAMPSHIRE AUDUBON

TABLE 1

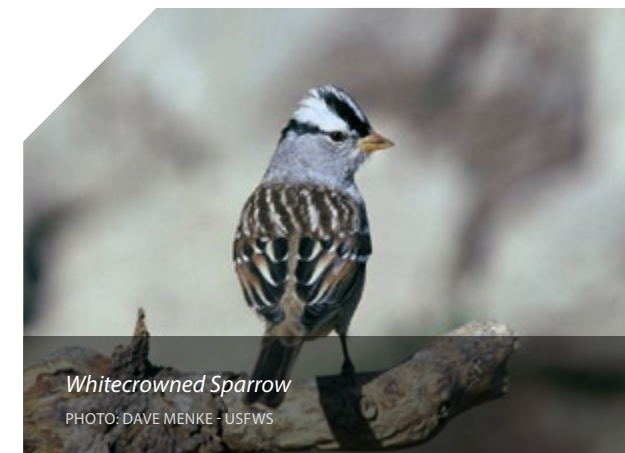
Shorebirds of the Arctic National Wildlife Refuge Coastal Plain

Black-bellied Plover	Ruff
American Golden-Plover*	Semipalmated Plover
Baird's Sandpiper	Semipalmated Sandpiper*
Bar-tailed Godwit	Spotted Sandpiper
Buff-breasted Sandpiper	Stilt Sandpiper
Eurasian Dotterel	Upland Sandpiper*
Hudsonian Godwit	Wandering Tattler
Killdeer	Western Sandpiper
Least Sandpiper	Whimbrel
Long-billed Dowitcher	White-rumped Sandpiper
Pectoral Sandpiper*	Wilson's Phalarope
Red Phalarope	Wilson's Snipe
Red-necked Phalarope*	
Ruddy Turnstone	

*Frequent breeder

SONGBIRDS OF THE COASTAL PLAIN

Even songbirds, quite diminutive in size and some weighing even less than 1/3 of an ounce, make long migrations south from the Coastal Plain where they nest in highest numbers in riparian willows along rivers. Without ever leaving their homes in the lower-48 states, birdwatchers might see some of the Refuge's songbirds such as the white-crowned sparrow, American tree sparrow, common redpoll, hoary redpoll, savannah sparrow, Bohemian waxwing, ruby-crowned kinglet, Lapland longspur, and the varied thrush, among others.³² Northern wheatears and bluethroats wing their way to Africa and



Whitecrowned Sparrow

PHOTO: DAVE MENKE - USFWS

Eurasia, respectively. The wheatear's annual round trip is an incredible 18,000 miles.³³ Other species of note are the eastern yellow wagtail and snow bunting, both of which breed on the Coastal Plain.

“The Arctic, including the Coastal Plain of the Arctic Refuge, is an avian production factory that keeps many bird species riding the winds to, from, and across New Jersey and other states every year. New Jersey is quite connected to the Arctic through a variety of waterfowl, raptors, and songbirds.”

ERIC STILES

PRESIDENT & CEO
NEW JERSEY AUDUBON

MAMMALS

The Arctic Refuge is home to nearly 50 species of terrestrial mammals.³⁴ Especially well-known are the caribou of the Porcupine Caribou Herd. Polar bears, which den on the Coastal Plain, are an iconic species. Less well-known is that the Brooks Range in the Refuge is home for the northernmost population of Dall sheep. Other resident mammals of the Refuge include wolverines, moose, arctic ground squirrels, lynx, and marten. Red fox are common, and on the Coastal Plain arctic fox are common as well.

Muskoxen were also native to the Refuge, but were extirpated from the entire state by the early 20th century. Due to reintroduction programs, a small herd of these ice-age animals now survives on the Coastal Plain of the Arctic Refuge, as well as other areas in Alaska. However, the muskox population on the Refuge has declined to very low numbers in recent years for uncertain reasons, although some dispersion to the east and west has been documented.^{35,36}

CARIBOU

The Arctic Refuge is the preeminent refuge in the National Wildlife Refuge System for caribou. The Coastal Plain is used by both the Porcupine Caribou Herd and the Central Arctic Herd, with overlap primarily in the western portion where the Central Caribou Herd calves and finds refuge from insects.³⁷

The Coastal Plain is especially important for the Porcupine Caribou Herd, which has numbered nearly 200,000 individuals in 2013.³⁸ It has the longest migration of any terrestrial



Caribou calf
PHOTO: KENNETH R. WHITTEN

mammal in North America, nearly 800 miles annually.³⁹ Although the herd ranges over 100,000 square miles, the Coastal Plain is its most important area for calving and post-calving, which occurs in June.⁴⁰ The Coastal Plain is also important as a place to seek refuge from hoards of insects.⁴¹ For the winter, the Porcupine Caribou Herd migrates primarily to the boreal forests on the south side of the Brooks Range within the Arctic Refuge, and to the northern Yukon and the Northwest Territories of Canada, where abundant lichen provide food for winter survival.⁴²

WOLVES, WHALES, AND THE THREE BEARS

The gray wolf is present throughout the Arctic Refuge. Wolves generally den south of the Coastal Plain but frequent the area when caribou migrate to the Arctic Refuge during the summer months. The wolves feed on a diverse array of other wildlife, including birds, ground squirrels, and other small mammals, as well as larger prey including moose, caribou, and Dall sheep.⁴³

Marine mammals use lagoons and bays within the Arctic Refuge and coastal waters off its shores. Their marine habitats are dependent upon a healthy and clean Arctic Refuge by virtue of the rivers which flow northward from the Brooks Range across the Coastal Plain into the Beaufort Sea. The rivers provide a source of prey from anadromous species, such as Dolly Varden (formerly called Arctic char in this area). Marine mammals residing along the Arctic coast and on offshore ice include spotted, ringed, and bearded seals.⁴⁴ Bowhead and beluga whales frequent offshore waters, and provide sustenance for the Inupiat community of Kaktovik.

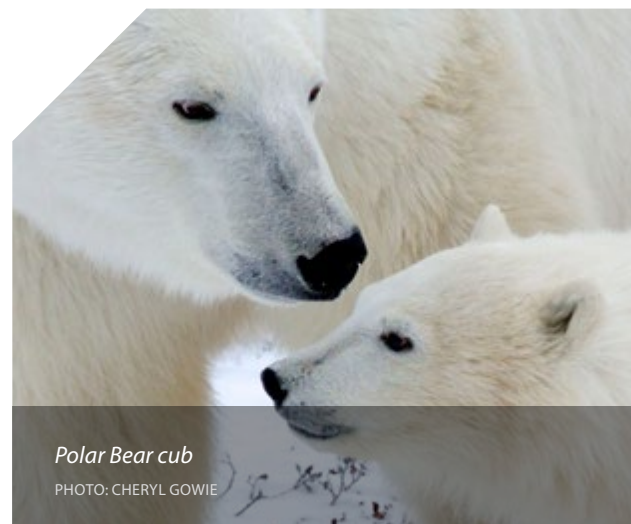
Black bears reside in the Refuge's boreal forests, while brown (grizzly) bears inhabit more open areas such as the Coastal Plain. Only the Arctic and Yukon Delta National Wildlife Refuges are frequented by all three species of bears in North America.^{45,46}

POLAR BEARS

Alaska's northern coast is the most important area in the United States for denning polar bears where they birth and nurse cubs. Additionally, the Coastal Plain within the Arctic Refuge has both more denning bears and more available den habitat than the areas to its west on the central North Slope.⁴⁷ Polar bears den in most of the Coastal Plain,⁴⁸ and the bank habitat required for suitable dens of ice and snow, is widely distributed across the entire Coastal Plain in the Arctic Refuge.⁴⁹

Land-based denning sites have become increasingly important. In the last two decades of the 20th century the proportion of polar bear denning sites along Alaska's northern coast increased from 37% to 62% as the availability of sea ice for denning has declined due to climate change.⁵⁰ Since then, Arctic sea ice conditions have continued their long-term rapid decline,⁵¹ likely making land-based dens even more important.

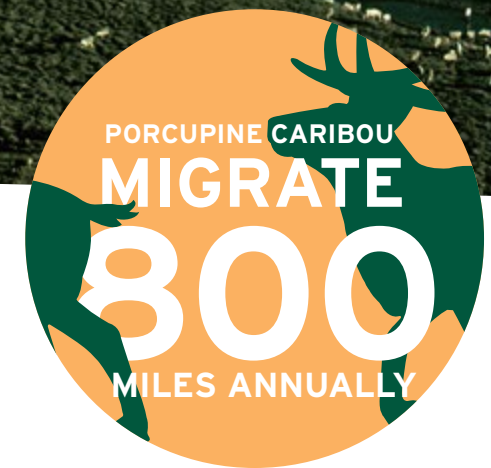
Declining Arctic ice also affects the availability of ringed seals, the polar bear's primary prey. Ringed seals seldom come on land, and polar bears are capable of catching them only on the Arctic ice.⁵² In 2015 the maximum winter sea ice area was the lowest since satellites began monitoring Arctic ice.⁵³ Furthermore, the 1981-2010 average summer sea ice minimum was 3.7 million square miles. In marked contrast, the 2007-2014 summer sea ice minimum was less than half that, at 1.8 million square miles.



Polar Bear cub
PHOTO: CHERYL GOWIE



PHOTO: FRAN MAUER, USFWS



Exploration, development, and use of the potential oil and gas from the Coastal Plain would directly affect polar bears through habitat impacts, and also indirectly as the CO₂ emitted from burning the extracted carbon resources exacerbates climate change and further accelerates ice melt. Already, the oil and gas industry in Alaska is the single largest source in the state of greenhouse gas emissions.⁵⁴ The continuing rapid multi-decadal decline⁵⁵ in the Arctic Ocean ice cover is due to rapidly advancing climate change from carbon emissions, and led to classification of the polar bear as a threatened species in 2008.⁵⁶

FISH

It may be surprising, given its frozen environment much of the year, but the Arctic Refuge is inhabited by more than 40 species of fresh water, anadromous, and marine species along the coast.⁵⁷ Dolly Varden, previously called Arctic char, are popular sportfish, as are arctic grayling. Both are in the salmon family. The grayling is found in Coastal Plain rivers seeking refuge in scarce, unfrozen, deep pockets. Some Dolly Varden, an import

“ These (caribou) are migratory animals that use huge areas. Across the Arctic Circle, virtually all major caribou herds are under threat from industrial development. In order to maintain big migratory herds, you must have large landscapes and you can't afford to fraction them.⁵⁸ ”

ROBERT G. WHITE

ASSOCIATE PROFESSOR OF ZOOPHYSIOLOGY
UNIVERSITY OF ALASKA (RETIRED)



Mural made by Arctic Village children
PHOTO: PAMELA A. MILLER

food fish for local residents, remain in fresh water springs throughout the winter. The Canning River supports the most important over-wintering habitat for both Dolly Varden and Arctic grayling anywhere in the Arctic Refuge.



Arctic Char
PHOTO: USFWS

Wilderness

One of the most remote places in the continental United States, the Arctic Refuge has no roads to or within the Arctic Refuge. The most common form of access is by Alaskan bush planes. This vast unspoiled Arctic Refuge is crossed from east to west by the Brooks Range, towering as high as 9,000 feet. North of the Brooks Range, the 1.5 million acre "Coastal Plain" area contains foothills and tundra plains dotted with lakes, ponds, wetlands, and rivers flowing northward into rich coastal estuaries, coastal lagoons, and bays and shorelines bordering the Beaufort Sea. Together with the adjacent Ivvavik and Vuntut National Parks in Canada, the Arctic Refuge is part of one of the largest protected ecosystems in the world.

As the second largest wilderness in the National Wilderness Preservation System,⁵⁹ The Arctic Refuge offers unparalleled opportunities for those seeking the solace of undisturbed areas and is vicariously enjoyed by many throughout our nation who will never be able to personally experience it. Few areas on Earth remain as unspoiled as the Arctic Refuge. Nonetheless, the Coastal Plain of the Arctic Refuge, which is so vital to an abundance of wildlife, has not yet been designated as wilderness.

“What a country chooses to save is what a country chooses to say about itself.”

MOLLIE BEATTIE
DIRECTOR (FORMER)
U.S. FISH AND WILDLIFE SERVICE

FINAL ENVIRONMENTAL IMPACT STATEMENT 2015

REVISED COMPREHENSIVE CONSERVATION PLAN FOR THE ARCTIC NATIONAL WILDLIFE REFUGE

On January 25, 2015, the Obama Administration released the final Comprehensive Conservation Plan (Conservation Plan).^a For the first time by any administration, the entire Arctic Refuge, including the Coastal Plain, was recommended to be forever protected as wilderness under the Wilderness Act of 1964. The Conservation Plan noted that the proposed Wilderness designation would:

- Achieve the purposes of the Arctic National Wildlife Refuge to conserve fish, wildlife, and their habitats;
- Achieve the purpose of the National Wildlife Refuge System to exemplify qualities of natural condition, wild character, and ecological wholeness;
- Provide the greatest long-term assurance that the Refuge's wildlife and natural diversity would be perpetuated;
- Provide long-term protection for the lands, wildlife, and other resources on which subsistence users depend and would serve to perpetuate the natural conditions in which the region's native cultures evolved; and
- Achieve the purposes of the Wilderness Act and National Wilderness Preservation System to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.

Later, on April 3rd, 2015 President Barack Obama, in a precedent-setting action, sent Congress the Proposed Wilderness recommendations for the Coastal Plain and other areas of the Arctic Refuge along with the U.S. Fish and Wildlife Service's Record of Decision. This significant step at the end of a formal public process established the official U.S. administration position as protecting the Coastal Plain as Wilderness, and is a critical step toward a congressional wilderness designation.^b



“This area is one of the most beautiful, undisturbed places in the world. It is a national treasure and should be permanently protected through legislation for future generations.”

PRESIDENT BARACK OBAMA
APRIL 3, 2015

ARCTIC NATIONAL WILDLIFE REFUGE VISION STATEMENT

This untamed arctic landscape continues to sustain the ecological diversity and special values that inspired the Refuge's establishment. Natural processes continue and traditional cultures thrive with the seasons and changing times; physical and mental challenges test our bodies, minds and spirit; and we honor the land, the wildlife and the native people with respect and restraint. Through responsible stewardship this vast wilderness is passed on, undiminished, to future generations.^a

a. U.S. Fish and Wildlife Service, DOI. 2015. Arctic National Wildlife Refuge Revised Comprehensive Conservation Plan- Final Environmental Impact Statement. Executive Summary. www.fws.gov/home/arctic-ccp/pdfs/Executive_Summary_Jan2015.pdf

b. www.whitehouse.gov/the-press-office/2015/04/03/letter-president-arctic-national-wildlife-refuge-proposed-designations



PHOTO: PAMELA A. MILLER

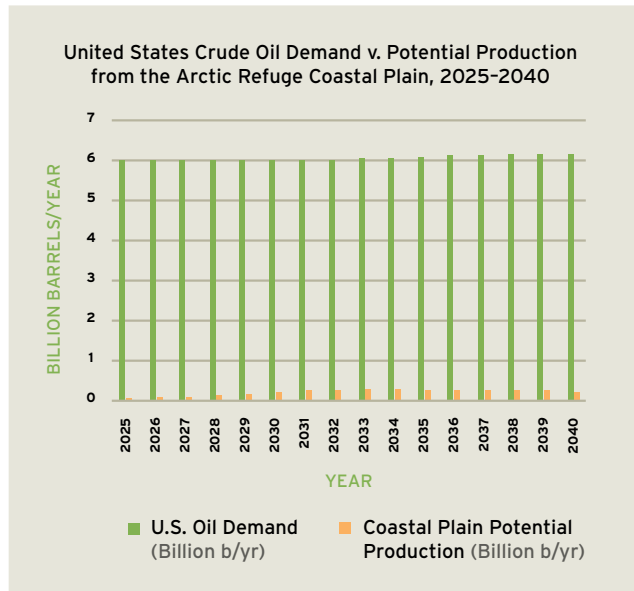
OIL AND GAS RESOURCES

ALL ESTIMATES FOR POTENTIAL OIL AND GAS resources for the Coastal Plain are speculative. The U.S. Geological Survey in 1998 estimated that technically recoverable oil from the Coastal Plain is 10.4 billion barrels.⁶⁰ If oil and gas development in the Coastal Plain was approved by Congress in 2015, and if economically recoverable oil were discovered, production might begin in about 2025. Peak production may then occur in about 2034.⁶¹ That would meet only 4.9%, or less than one-twentieth of projected U.S. daily oil demand, at peak production.⁶²

No Need for Arctic Refuge Oil

Proponents of drilling in the Arctic Refuge have long argued it is necessary to reduce imported oil, especially from the Middle East. However, since 2005 U.S. net petroleum imports have already declined from 12.5 million barrels of oil per day (bpd) to 5 million bpd in 2014.⁶³ This extraordinary decline is a result of increases in conservation and fuel economy as well as a significant increase in domestic oil production.

Continuing efforts in conservation could save far more energy than the Coastal Plain might potential produce. A little-noticed report in 2011 projected reduction in oil imports due to energy conservation for the period of 2012 through 2030 to be about 47 billion barrels of oil.⁶⁴ The energy saved would be nearly five times greater than the total estimated potential of 10.4 billion barrels of oil in the Coastal Plain.



Shipping U.S. Oil Overseas

In 2014 the United States became the largest producer of oil in the world.⁶⁵ In 2015 oil (and other liquid fuel) imports are expected to be only 21% of consumption in contrast to 60% in 2005.⁶⁶ So high is production, that oil companies are lobbying Congress to lift the ban on exporting oil,⁶⁷ which was put in place by the Energy Policy and Conservation Act in 1975.⁶⁸ The ban on the export of Alaska crude was lifted in 1995. In 2014 a tanker shipped North Slope oil to South Korea, foreshadowing a potential increase in exports depending on global markets and U.S. policy.⁶⁹ If oil production were allowed in the Coastal Plain it could suffer the environmental damage while its oil may be shipped to overseas markets.



PHOTO: USFWS

WILDLIFE AND HABITAT IMPACTS

IMPACTS OF OIL AND GAS EXPLORATION and development on the Coastal Plain would be widespread. Unlike at Prudhoe Bay, the Arctic Refuge Coastal Plain oil may be found in as many as 40 separate and much smaller oil fields scattered across the 2,300 square mile pristine Coastal Plain.⁷⁰ It follows that the potential footprint of oil and gas exploration and development would be more widespread across the area than in Prudhoe Bay, and for less than half as much potential oil.

The National Academies of Sciences reported major cumulative impacts of oil development on wildlife, the land, wilderness, and Alaska native cultures across an extensive area of the North Slope. Significant effects to wildlife, including caribou and bowhead whales, are expected to worsen as industry spreads to new areas.⁷¹

Oil and Gas Exploration and Development

Finding and developing oil and gas fields are huge undertakings. While some say that exploration and development can be done with a small impact on the ground, the reality is that oil and gas activities industrialize the areas in which they occur. One cannot have in the same place both a pristine environment and oil and gas activities.

In the early 2000s, the U.S. House of Representatives twice approved legislation allowing oil and gas development in the Coastal Plain. More recently, many versions of Arctic drilling legislation introduced during the 112th Congress (2011-2013) contained language supposedly limiting the area of surface coverage for development to 2,000-acres,⁷² but that is very misleading. First, though seemingly small, the pavement of the New Jersey Turnpike covers fewer than 2,000 acres, spread along its entire 100 mile length.⁷³ The supposed 2,000 acres of surface impact would instead be spread across the entire Coastal Plain like a spider web of wells, processing plants, and other facilities.

Second, these bills appear to have many exceptions to other associated activities and structures, such as the pipelines themselves, gravel mines, exploration drilling, extensive seismic activities, and ice roads, all of which affect wildlife as well as wilderness values. The entire area would also be exposed to extensive air traffic. Moreover, these bills would exempt or severely limit the application of national environmental laws put in place to protect the environment and judicial review laws which provide a means to provide public oversight of the activities.⁷⁴

SEISMIC ACTIVITIES

Oil is searched for using seismic surveys, but discoveries can only be made by drilling. Seismic exploration uses heavy vehicles that crisscross the landscape in a grid-like fashion. These large vehicles, which can weigh 40,000 pounds or more, are often referred to as “thumper trucks.” They emit energy waves into the ground by means of “vibroseis” at select locations which can be detected by a system of monitoring devices distributed across the landscape.⁷⁵ The seismic data allows mapping of underground structures that may contain oil and gas.⁷⁶



The one-time exploration allowed on the Coastal Plain for the 1987 Report to Congress⁷⁷ used two-dimensional seismic technologies, with seismic lines from three to twelve miles apart. Industry, however, now uses more accurate three-dimensional seismic surveys with thumper trucks traveling grid lines as close as a 550 feet apart on the North Slope. The greater density of seismic lines in three-dimensional seismic surveys would be even more damaging to vegetation and permafrost and create more disturbances to wintering wildlife such as denning polar bears and muskoxen.⁷⁸

Furthermore, seismic activities using thumper trucks are not confined to the exploration phase. By doing repeated seismic surveys over time, known as 4-D surveys because of the added dimension of time, they are also used during production to find potential oil reservoirs in the areas that have not yet been tapped.⁷⁹ Seismic activities would thus continue for decades if the Coastal Plain is ever opened to oil and gas exploration and development.

Thumper trucks and other heavy vehicles required for seismic exploration travel directly across the tundra, and can leave visible scars on tundra vegetation, some lasting at least 20

years so far.⁸⁰ The very short growing season makes plant recovery very slow. In some areas, seismic exploration reduces vegetation, increases bare areas, and decreases plant diversity, more so in tundra habitats than wetlands, although the effects are variable.⁸¹

ICE ROADS

Oil and gas development requires a permanent infrastructure: a virtual maze of roads, pipelines, drilling pads, and more. Gaining access to drilling sites requires gravel roads or an ice road that must be built across the frozen tundra during the long winter season. In 2014, for example, the State of Alaska approved 377 miles of ice roads on state lands to the west of the Coastal Plain.⁸² Properly constructed, winter ice roads protect the tundra from significant damage caused by vehicular traffic. However, in some situations there can be damage to the shrubs, forbs, and tussocks on drier upland sites.⁸³

While some ice roads are intended to minimize damage to the tundra, they do lead to other impacts. For example, each mile of ice road requires 1 to 1.5 million gallons of fresh water to construct.⁸⁴ Water is in scarce supply on the Coastal Plain, as it receives an average of only 10 inches of precipitation a year⁸⁵—less than many deserts. With so little precipitation and such cold temperatures, the arctic tundra is essentially a frozen desert, with little fresh water available, especially during the winter.⁸⁶ The abundance of wetlands in the summer gives the misperception of plentiful water supplies, but these are shallow wetlands existing on top of permafrost. Only about nine million gallons of water are available on the Coastal Plain during the winter. This would build only about ten miles of ice road.⁸⁷ Transportation of fresh water to the Coastal Plain for ice roads would increase road traffic.

Unlike further west, the Coastal Plain does not contain many large or deep lakes that could provide fresh water. Extracting fresh water from the small water bodies that are present poses a risk to fish and aquatic invertebrates that survive the winter in small, deep areas that do not freeze. Water withdrawal from ice-covered lakes can cause drops in dissolved oxygen, upper strata water temperatures, and available over-wintering habitat for fish.⁸⁸ Little information is available from the state or the oil and gas industry about the short-term and long-term effects on aquatic life of water withdrawal for building of ice roads.

Finally, rapid climate change is reducing the viability of ice roads due to a shortening period of suitable cold weather. Since



1970, the ice road season has shortened from seven months to five months, with construction now usually commencing in January, rather than November.⁸⁹ Ice roads are becoming less viable with each passing year, making the landscape even less accessible without increased use of permanent roads and air transportation, both of which have large impacts and are increasingly proposed by industry and approved by regulators.

CONSTRUCTED FACILITIES AND ROADS

Constructed facilities include roads, drilling pads, pipelines, housing, and more, all with a significant footprint causing outright destruction of the areas they cover. The simple physical presence of roads has a direct impact, but can also affect nearby areas. Gravel roads cause changes to roadside habitats, including increased depth of permafrost thaw. There are also extensive vegetation changes, as well as early snowmelt that attracts wildlife to roadside areas when there is extensive ice cover across the landscape.⁹⁰ Transporting of gravel requires additional road building simply to access gravel quarries.

INDUSTRIAL ACTIVITIES

The intensity of activity disturbs an area that is much larger than the actual physical footprint, especially its use by wildlife and degradation of habitats. Like a busy major highway versus an infrequently traveled country road, there is a huge difference in how wildlife respond to low- versus

TABLE 2

Impacts of the Infrastructure Needed for Oil and Gas Exploration and Development⁹¹

- Disturbance of wildlife
- Loss of subsistence hunting opportunities
- Increased predation due to presence of garbage
- Change in natural drainage patterns affecting vegetation
- Deposition of alkaline dust over wide areas from road traffic
- Local pollution causing haze and acid rain
- Nitrogen oxides, methane, particulate pollution
- Soil and water contamination from oil and fuel spills

high-frequency human presence, such as vehicular traffic and air travel. Oil and gas exploration and development would exponentially increase human presence and disturbance in the area. These disturbances include noise and visual line of sight. Wildlife behavior and utilization of habitats anywhere within the view and noise area of a road or other structure can be affected. If migration patterns of caribou are affected, the potential disturbance is far greater, including areas off the Arctic Refuge where caribou migrate. Disturbance of

denning polar bears is greatest on land or near shore, making them susceptible to increasing industrial activity on the Coastal Plain.⁹²

Gravel roads would allow year round traffic, including the summer when wildlife abundance, diversity, and reproduction are the greatest. This is also when the Coastal Plain is a vital area for calving and post-calving of the Porcupine Caribou Herd.

PIPELINES

The main stem of the Trans-Akaska Pipeline System is a four diameter pipe which crosses 800 miles of land from Prudhoe Bay to Valdez, Alaska.⁹³ In the oil field complex there are more than a thousand miles of smaller pipelines which cross the North Slope landscape like a spider web.

As with roads, oil pipelines fragment habitat, potentially affecting the movement and location of caribou and other animals. There could be hundreds of miles of pipeline within the Arctic Refuge when a main pipeline and feeder pipelines are taken into consideration. Due to the permafrost and ground conditions, it is likely that pipelines would need to be elevated, minimizing permafrost impacts but providing possible barriers to animal migrations and use of nearby habitats. A maze of above-ground pipelines would destroy wilderness values.

OIL SPILLS

Oil spills associated with oil extraction on the North Slope and oil transport via the Alyeska Pipeline are common, and there is no reason to believe this would change on the Arctic Refuge's Coastal Plain.

The Prudhoe Bay oil fields and Trans-Alaska Pipeline section crossing the North Slope have averaged more than 400 spills annually since 1996.⁹⁴ By 2009, over 6,000 spills of toxic substance totaled over 2.7 million gallons for the 13 year period. Forty different substances from acid to waste oil have been spilled during routine operations—most commonly diesel, crude oil, and hydraulic oil—including spillage of more than 396,000 gallons of crude oil, 122,000 gallons of drilling muds, and more than a million gallons of produced water.

Oil spills have also plagued the rest of the Trans-Alaska Pipeline and associated crude oil tanker transport. In 1989, the Exxon Valdez spilled 11 million gallons into Prince William Sound and its effects are still felt today.⁹⁵ The herring population in Prince William Sound where the Exxon Valdez ran aground, which once sustained



commercial fishing, has never recovered.⁹⁶ Oil can still be found on the beaches of Prince William Sound.^{97,98}

An earlier study of diesel spills in Alaska's Arctic showed that 28 years later there were still substantial toxic hydrocarbons in the soil and little vegetation recovery.⁹⁹ Even relatively small spills, such as ethylene glycol, have caused death when polar bears lick it up.^{100,101} Seawater or produced water spilled from wells and pipelines kill vegetation with long-lasting damage. The oil industry often says that many oil spills are to gravel pads, not directly to tundra, implying there are no consequences but many of these sites become severely contaminated.¹⁰²



Trans-Alaska Pipeline bullet hole spill, 285,600 gallons crude oil spill.

PHOTO: BLM

While the cumulative effects of many smaller spills are of concern, the risk of a high volume catastrophic spill or spills are too great to accept for the Coastal Plain and other areas to where its oil would be shipped.

A large spill on the Coastal Plain, inside a national wildlife refuge, would be disastrous. A large amount of activity and equipment would be required to try to address the spill. If it



Prudhoe Bay Oil Field

PHOTO: PAMELA A MILLER

occurred in the summer, breeding wildlife would be impacted and potentially oiled. Streams would also carry the oil northward into coastal lagoons, bays, and river deltas within the Arctic Refuge and the coastal waters of the Beaufort Sea. Waterborne oil is very difficult to contain and the amount recovered is usually but a small proportion of that spilled. The shallow streams and rivers and their aquatic resources, including Dolly Varden and Arctic grayling, would be at significant risk. Furthermore, oil could be present for decades as it degrades slowly at low temperatures like those on the Coastal Plain.

Climate Change

The northern location of the Arctic Refuge makes it especially susceptible to climate change. The greatest increases in temperature due to climate change have been in polar areas of the world, with temperatures rising nearly twice as fast in the Arctic than in the rest of the world. The average temperature of Alaska rose 3.5 ° Fahrenheit from 1949 and 2005.¹⁰³ World-wide temperatures continue to rise, with 2014 the warmest in the modern record.^{104,105}

Burning of the potential oil and gas from the Coastal Plain would contribute further to climate change through CO₂ and

other greenhouse gas emissions, adding to the large effects already taking place in the northern region where the Arctic Refuge is located. Air temperatures on the Arctic Refuge are projected to increase on average about 1° Fahrenheit per decade, reaching a cumulative increase of about 6° Fahrenheit by 2040, compared to historical temperatures.¹⁰⁶

Climate change increases coastal erosion, wildfire, and the evaporation of lakes and ponds on the Arctic Refuge.¹⁰⁷ The northern location not only exposes the Refuge to greater changes in climate, but also reduces the ability of refuge habitats to recover from habitat disturbances. The very short growing season with resultant slow growth of vegetation means that damage will be long-lasting.

Due to climate change, the Porcupine Caribou Herd may lose up to 21% of its wintering habitat by the end of this century.¹⁰⁸ These are boreal forest habitats in the southern portion of the Arctic Refuge as well as to the south and east of the Arctic Refuge. The lichens, low-bush cranberry shrub, and other plants are susceptible to fire. Loss of wintering habitat would likely reduce the herd's population and effect their migration patterns.

Loss of glacier ice in the Brooks Range of the Arctic Refuge may affect river flows to the coast and result in profound changes to habitats for migratory birds, fish, and marine



Eroding Bluff on Arctic Refuge Coastline
PHOTO: PAMELA A. MILLER



PHOTO: USFWS

mammals, while summer sea ice disappearance in the adjacent Beaufort Sea is already impacting polar bears, ringed seals, and other wildlife.¹⁰⁹ Permafrost temperatures in Alaska are rising, with the greatest increases projected for northern Alaska, including the Arctic Refuge.¹¹⁰ Northern Alaska's roads and communities are susceptible to melting permafrost, making the surface less stable.¹¹¹

Wilderness Impacts

Few areas remain in the United States which are so natural and wild as the Arctic Refuge, especially its biological heart, the Coastal Plain. Industrial exploration and development of the Coastal Plain for its potential oil and gas would destroy its value as a wilderness.

“ I hope that the United States of America is not so rich that she can afford to let these wildernesses pass by. Or so poor that she cannot afford to keep them. ”

MARGARET (MARDY) MURIE

“WILDERNESS AND ARCTIC CHAMPION”¹¹²

Recognizing the importance for Americans of forever protecting some areas in their natural condition, the United States Congress in 1964 passed The Wilderness Act. The Arctic Refuge is the last opportunity to preserve a pristine, undisturbed ecosystem running from mountain top to the sea within the Arctic Circle. The last and critical missing piece from realizing such an important and unique wilderness is the Coastal Plain of the Arctic Refuge. The presence of any oil and gas facilities and activities in the Coastal Plain, along with the resulting noise, pollution, wildlife disturbance, habitat loss, and habitat degradation, would forever destroy this historic opportunity to protect it as wilderness.

OIL AND GAS EXPLORATION AND DEVELOPMENT in the Coastal Plain of the Arctic National Wildlife Refuge would be like a flaw in a diamond. The flaw affects and degrades the quality and beauty of the entire diamond. Any flaw in the Coastal Plain diamond, such as oil wells, roads, or pipelines, totally destroys this wilderness jewel.

The entire Arctic Refuge deserves to be protected forever as wilderness and as one of the few places on earth wherein the first priority is wildlife conservation. The U.S. Fish and Wildlife Service affirmed this value by stating:

*(The Arctic (National Wildlife) Refuge exemplifies the idea of wilderness- to leave some remnants of this nation's natural heritage intact, wild, and free of the human intent to control, alter, or manipulate the natural order. Embodying tangible and intangible values, the Refuge's wilderness characteristics include natural conditions, natural quiet, wild character, and exceptional opportunities for solitude, adventure, and immersion in the natural world.*¹¹³

**ARCTIC NATIONAL WILDLIFE REFUGE
COMPREHENSIVE CONSERVATION PLAN**

U.S. FISH AND WILDLIFE SERVICE

Numerous energy alternatives are available that preclude any reason for exploiting what potential oil and gas resources there may be in the Coastal Plain of the Arctic Refuge. Energy conservation and development of sustainable energy sources dwarf whatever energy could be extracted from the Coastal Plain. Simply put, despoiling of the Coastal Plain for exploitation of its potential oil and gas resources is not necessary.

The threat of oil and gas development is very real and Congress has attempted to allow this development numerous times over several decades. In 2012 the House of Representatives approved a bill that would have allowed exploration and development of potential oil and gas from the Coastal Plain. At that time, Congressman Young stated “This is my 12th time passing ANWR (oil and gas development on the Coastal Plain) out of the House and although this is a momentous day, there is still work to be done. The Senate should not drag its feet on this bill.”¹¹⁴ Although many drilling bills have been voted on by the House and Senate, only one has been sent to the President—as a rider attached to the national budget in 1995.¹¹⁵ President Clinton's veto of the budget bill saved the Coastal Plain from development and production.

We can and must take action now to forever protect the Coastal Plain of the Arctic National Wildlife Refuge by designating it as wilderness as recommended by the U.S. Fish and Wildlife Service in the 2015 Comprehensive Conservation Plan¹¹⁶ and supported by President Obama.

Congress Should Designate the Entire Arctic Refuge as Wilderness

Wilderness designation would forever provide a place for Americans to enjoy a virtually untouched and magnificent landscape, which oil and gas exploration and development would destroy. Also, by designating the Coastal Plain as a wilderness, the diverse and abundant wildlife, including birds that migrate to all continental states, South America, Eurasia and Australia, will continue to have a place to breed and migrate. These birds and many other Coastal Plain wildlife including caribou, snowy owls, and ptarmigan, would forever have a safe place to thrive.

Congressional action is necessary to officially designate the remainder of the Arctic Refuge, including the Coastal Plain, as a wilderness in accordance with the National Wilderness Act. Allowing development and exploitation of the Coastal Plain's potential oil and gas resources would degrade and destroy the area's unique character. Furthermore, alternative energy sources are available and being developed even further, such as wind and solar power, which are renewable and much less damaging to the environment.

“ ... I... believe that the ANWR (Arctic National Wildlife Refuge) is a pristine place and if they found oil in the Grand Canyon, I don't think I'd drill in the Grand Canyon.”¹¹⁷ ”

SENATOR JOHN MCCAIN

Offshore oil and gas development in the Beaufort Sea along the Arctic Refuge's coast should also be prohibited. The risk is too great that an oil spill would wash ashore into its coastal lagoons, bays, and river deltas, despoiling the coastline as was the Gulf of Mexico coast in the 2010 BP oil disaster, and Prince William Sound when the Exxon Valdez oil tanker ran aground. Water-borne oil is difficult to recover. Only about 10-15% of the spilled oil from the Exxon Valdez oil tanker was ever recovered.¹¹⁸

Increase Conservation and Develop Clean Energy Resources

Even as the United States continues to depend on fossil fuels in the near-term, increasing energy efficiency and expanding clean energy alternatives is vital to not only reducing the need for oil and natural gas—and the pressure to drill in cherished landscapes—but decrease carbon pollution that is causing climate change.

There is huge potential in the United States for generating clean energy, such as solar and wind power, as well as bioenergy, geothermal, and other power sources. In the United States, more than 50 times as much clean energy potential exists relative to electricity generation in 2013.^{119, 120}

Perversely, working against the development of clean energy sources and facilitating continued carbon-emissions are massive federal and state subsidies to the oil and gas industry, as well as to consumers using carbon-based fuels. Ironically, at the same time that we must dramatically reduce use of carbon-based fuels, the annual federal and state subsidies for oil, gas, and coal companies are approximately \$21 billion.

In addition, consumers of carbon fuels receive subsidies valued at about \$11 billion annually.¹²¹ Carbon-sourced fuels no longer need these financial incentives, which use taxpayer dollars, to encourage their development and use. Yet, these incentives are huge. Among other subsidies, in 2010-2012 ExxonMobil had an effective federal income tax rate of just 15%, while the official corporate rate is 35%.¹²² This was equivalent to an annual average of \$2 billion in tax breaks. Yet, in 2014 the company distributed \$23.6 billion to shareholders for a 5.4% yield.¹²³

Rather than unnecessarily incentivizing the use of carbon fuels, federal and state developments should be redirected to implementing and extending the use of incentives for further development of clean energy sources. Although many incentives for clean energy are in place,¹²⁴ less than 10% of all energy consumed in the United States in 2014 was from renewable sources.¹²⁵ Discontinuation or reduction of the incentives for carbon fuels would encourage further development and conversion to clean energy sources.

Clean energy is a relatively new industry with renewable technologies still being developed, refined, and implemented. Development of any clean energy sources must be done in an



Solar Panels on Nena Russell Health Clinic, Arctic Village
PHOTO: PAMELA A. MILLER

environmentally sensitive manner and with public input. This includes proper planning, siting, risk assessment, and design. The potential effects on wildlife and wildlife habitats must be assessed, including ways to minimize or offset any potential impacts. Energy development proposals should also include assessment of cumulative impacts.

Now is the time to slow and stop the expansion of new dirty energy reserves, such as the massive coal fields in North America and the tar sands in Canada, which threaten important habitat and would lock in more carbon pollution for decades to come. It makes no sense, and in fact there is no need, to exploit the potential oil and gas resources that may exist in the Coastal Plain of the Arctic Refuge.

INCREASE ENERGY CONSERVATION

Looking ahead, with significant investment and effort in energy efficiency, U.S. total energy consumption from all sources in 2050 could be reduced by more than 50% relative to 2010.¹²⁶ Energy conservation can save far more energy than could ever be produced from the Coastal Plain of the Arctic Refuge, even if the highest estimates of recoverable oil are realized. Energy conservation saves dollars, reduces the need to import oil, and also reduces the need to produce domestic oil from environmentally sensitive and special places, like the Coastal Plain of the Arctic Refuge.

There are many opportunities to reduce energy needs. New fuel economy standards for cars and trucks are projected to save more oil—3 million barrels of oil per day—than the United States imports from the Persian Gulf and Venezuela combined.^{127, 128} Increased use of public transportation systems is one of the most effective actions people can take to reduce energy consumption.¹²⁹ **Among the many other options¹³⁰ for citizens to increase their energy efficiency are green homes,¹³¹ geothermal heat pumps,¹³² solar panels,¹³³ buying green energy from the power company,¹³⁴ and using Energy Star rated products.¹³⁵**

USE THE SUN FOR POWER

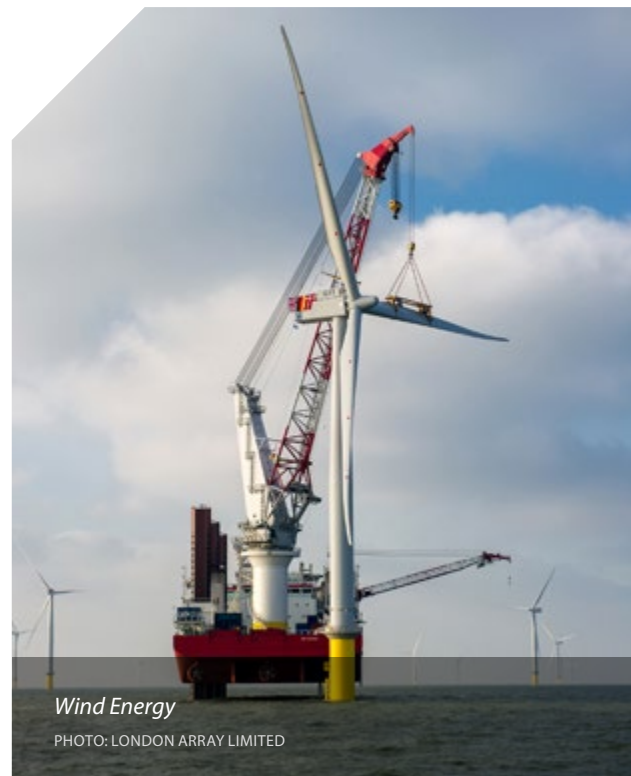
Solar photovoltaic power has more capacity for electric generation than all other clean energy sources combined.¹³⁶ The United States' solar power use is rapidly expanding, with as much solar power brought on line every three weeks in 2014 as for the entire 2008 year.¹³⁷ By the end of March, 2015, total installed solar power in the United States was 21.3 GW, which is enough to power 4.3 million homes.¹³⁸ Nonetheless, solar power potential is very high in the United States and is largely untapped. **Citizens can install solar panels on existing roofs, with little or no environmental impact.**

GROW SUSTAINABLE BIO-ENERGY

Grown in a sustainable and environmentally-sound manner, plants can help address climate change by producing liquid transportation fuels, heat, and electricity. However, as biomass energy is further developed, native habitats should not be converted to biomass crop production. Ideally, biomass plantings would include a mix of native species that closely mimic natural systems and preserve wildlife habitat values. **By transitioning away from food crops (such as corn for biofuel) to sustainable biomass sources such as wastes, perennial grasses, and trees, biofuels can be part of the future for clean energy.**

HARVEST THE POWER OF WIND

One of the fastest growing and largest wind markets on the planet,¹³⁹ by 2014 the United States wind energy industry supported 75,000 jobs distributed across 400 plants in 44



Wind Energy

PHOTO: LONDON ARRAY LIMITED

states.¹⁴⁰ It harnessed enough energy—69.5 GWh—to power more than 17.5 million homes.¹⁴¹ Vastly under-developed and available in all 50 states,¹⁴² offshore and onshore wind power has the potential capacity of generating about 4,000 GWh¹⁴³ and about 10,000GW to 12,000GW, depending upon turbine height.¹⁴⁴ Organizations like the Wind Energy Foundation

are collaborating with others to help advance the use of this technology, thereby reducing our dependence on carbon-based resources.¹⁴⁵

Installation of the Block Island Wind Farm, the first ever commercial offshore wind project in the United States, began in July, 2015.^{146, 147} Offshore wind energy can provide power for millions of Americans while boosting the economy and creating permanent, well-paying jobs. Just one-quarter of our nation's off-shore wind potential would match our nation's entire existing fossil fuel-based electricity generating capacity.¹⁴⁸

To encourage development of both onshore and offshore wind energy, federal and state governments should provide new financial incentives and renewal of existing incentives that promote development of environmentally-sound wind energy technologies.

IMPLEMENT THE CLEAN POWER PLAN

In 2015 the U.S. Environmental Protection Agency (EPA) took an historic step forward by putting in place the Clean Power Plan, which sets the first limits ever on carbon pollution from our country's largest source—power plants. The plan will reduce power plant carbon emissions by 32% by 2030, from the baseline year of 2005. These precedent-setting carbon pollution limits show the leadership of the United States in reducing carbon pollution. With similar efforts around the world, the extent of climate change and its impacts on the Arctic Refuge can be significantly reduced. **We should support the EPA by defending these the Clean Power Plan and working with states to ensure the rules to reduce the carbon emissions from power plants are effectively implemented.**



CONCLUSION

PHOTO: GARY BRAASCH

“Some natural treasures are simply too special to degrade. This crown jewel of the National Wildlife Refuge System is one such place. For the caribou, bear, musk ox, and waterfowl that call this pristine wilderness home—and Native Alaskans that depend upon it—our vigilant efforts to secure permanent protection are absolutely essential.”

COLLIN O'MARA
PRESIDENT AND CEO
NATIONAL WILDLIFE FEDERATION

THE COASTAL PLAIN of the Arctic National Wildlife Refuge must be protected forever as wilderness. The potential oil and gas resources it might have are simply not needed. Clean energy alternatives are available—energy conservation, solar power, wind power, and bioenergy—negating any need to despoil the Coastal Plain. Now is the time for leaders in Congress to turn their attention to designation of the entire Arctic Refuge, including the Coastal Plain as wilderness, protecting it forever. Our children will be forever grateful that we have protected at least a small portion of Earth in pristine condition for them and future generations.

ENDNOTES

PHOTO: USGS

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PHOTO CREDITS

Front Cover: *Truck in Prudhoe Bay oil field* - Pamela A. Miller; *Caribou* - USFWS; *Coastal Plain and Brooks Range* - Gary Braasch
Back Cover: *Arctic Refuge Coastal Plain* - Kenneth R. Whitten; *Snowy Owl* - Kevin McCarthy; *Caribou* - Eric Hatch; *Wolf* - Kenneth R. Whitten; *Tundra Swan* - USFWS

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