



**A Department of the Interior Review of  
Issues and Legislation Related to the  
Potential Oil and Gas Development of the  
Arctic National Wildlife Refuge (ANWR) 1002 Area**

In 2001, President George W. Bush unveiled the National Energy Policy – with 106 recommendations – more than half of which call for improved energy efficiency and conservation, protecting the environment, and diversifying our energy supply through the development of renewable resources. One proposal is for the environmentally responsible production of oil and gas in a small area of Alaska’s 19 million acre Arctic National Wildlife Refuge – known as “ANWR.” This presentation describes the fish, wildlife, and habitat resources of the 1.5 million acre area in ANWR known as the 1002 Area.


# Presentation Outline

- Introduction to the Arctic Refuge's 1.5 million acre 1002 Area
- Oil and gas potential on the coastal plain
- State-of-the-art oil technology
- Legislation considered by past Congresses referenced throughout



We will examine the 1002 Area's oil and gas potential and the state-of-the-art technology available for resource exploration and production in the Arctic. We will identify potential impacts and mitigation of oil and gas development.

Over the past four years, a bipartisan majority in the House of Representatives has twice passed legislation opening the 1002 Area to oil and gas development. Throughout this presentation, we will refer to this previously passed legislation.



***“The [National Energy Policy Development] Group recommends that the President direct the Secretary of the Interior to work with Congress to authorize exploration and, if resources are discovered, development of the 1002 Area of ANWR. Congress should require the use of the best available technology and should require that activities will result in no significant adverse impact to the surrounding environment.”***

**Recommendation of the  
National Energy Policy Development Group  
May 2001**

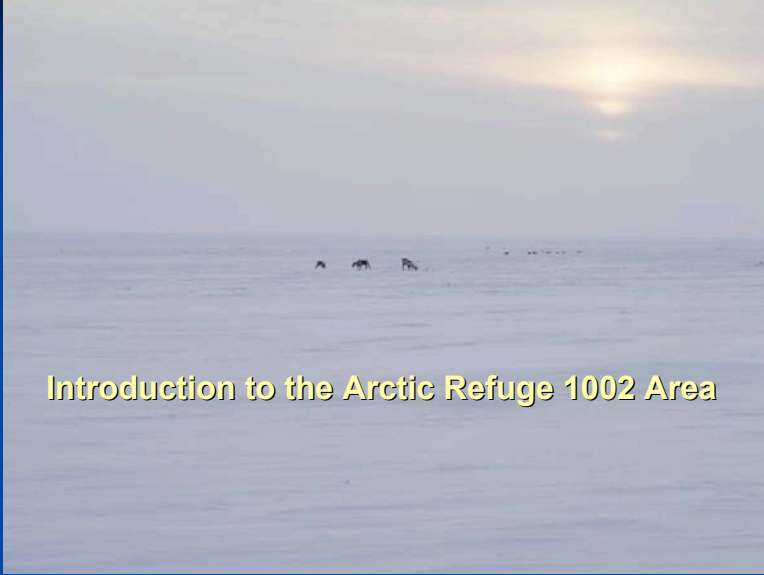
A small portion within the Coastal Plain of the 19 million acre ANWR represents the single greatest prospect for this Nation’s future onshore oil development. As long as the American economy runs on oil and gas, our nation will require a homegrown, stable supply of energy. This is why the Administration and many in Congress have advocated opening a small fraction of ANWR to oil and gas leasing.

## Legislation Considered During the 107<sup>th</sup> and 108<sup>th</sup> Congresses

- Application of the best commercially available technology for operations
- A strict 2,000 acre limit – the maximum surface allowed to be occupied by production and support facilities on the coastal plain
- Activities will create no significant adverse effect – on the environment, including fish and wildlife, their habitat, and subsistence resources
- Where necessary, seasonal limits on oil and gas activities

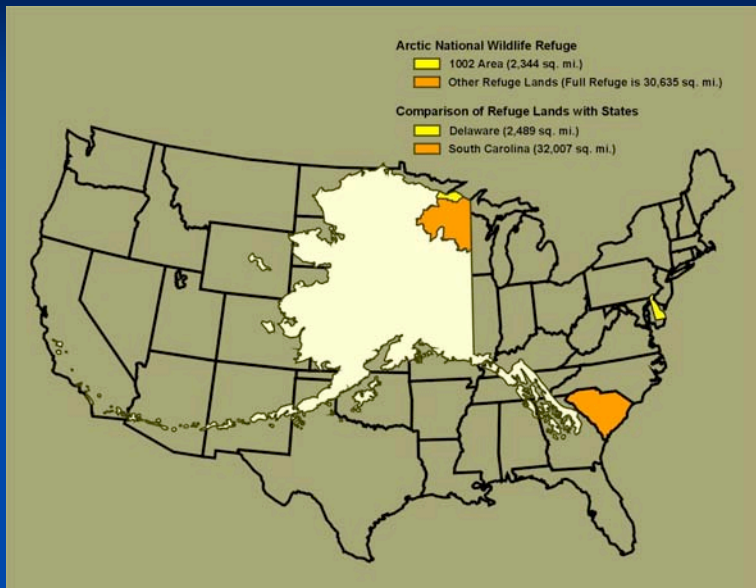
However, because this 1.5 million acre portion of ANWR includes a complex network of wildlife and habitat, both Secretary Gale Norton and many in Congress have called for legislation with the strongest environmental protections ever required for oil and gas leasing. Among the provisions of the legislation:

- Application of the best commercially available technology for exploration, development, and production operations;
- A strict 2,000 acre limit – the maximum surface allowed to be occupied by production and support facilities on the Coastal Plain;
- Activities will create no significant adverse effect – on the environment, including fish and wildlife, their habitat, and subsistence resources.
- Where necessary, seasonal limits on oil and gas activities – to avoid significant adverse effects during periods of concentrated fish and wildlife breeding, denning, nesting, spawning, and migration.



ANWR is the largest and northernmost refuge in the National Wildlife Refuge System. The U.S. Fish and Wildlife Service manages ANWR, with regulatory responsibilities for migratory birds, endangered species, and certain marine mammals. First, an introduction to the history and natural resources of the Refuge's 1002 Area.

## Arctic Refuge 1002 Area



Here's a clear perspective: A map of Alaska superimposed over the lower 48 states.

The orange northeast corner of Alaska? That's ANWR – 19 million acres – roughly the size of South Carolina.

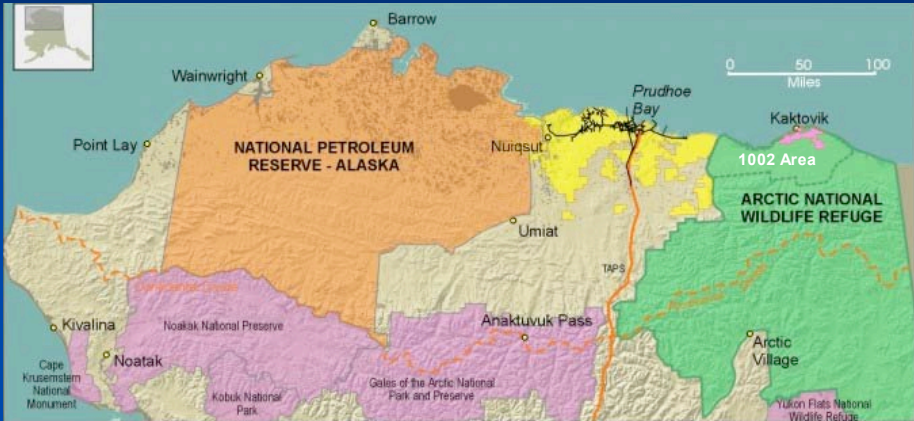
The yellow spot? That's the 1002 Area. 1.5 million acres. About the size of Delaware.

## Arctic Refuge 1002 Area



The 1002 is one small area in an immense region of Alaska. It is known as “the North Slope,” a vast landscape situated between the towering mountains of the Brooks Range and the Arctic Ocean.

## Arctic Refuge 1002 Area



The North Slope consists primarily of 3 large sections. To the west, the National Petroleum Reserve-Alaska, or NPR-A, managed by the Bureau of Land Management. NPR-A, some 26 million acres, is roughly the size of Indiana. To the east of NPRA, Alaska State land and the site of the Prudhoe Bay oil field. Further east, extending to the Canadian border, is the 19 million acre Arctic National Wildlife Refuge.

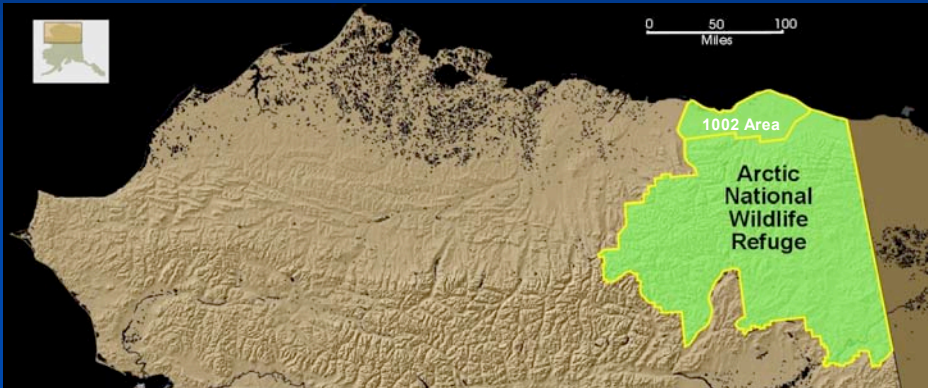


## Arctic Refuge 1002 Area



Stretching for hundreds of miles, the landscape of the North Slope drops from mountain ridges and foothills to a coastal plain that is frozen most months of the year. But in the long days of summer, these lands are abundant with wildlife and plants. Much of the landscape is tundra – a thick, spongy, mat-like vegetation. Unseen beneath the ground is a potentially rich resource of oil and gas.

## Arctic Refuge 1002 Area



The ANWR of today has its origins in 1960, with the creation of the 8.9 million acre Arctic National Wildlife Range. In 1980, Congress passed the Alaska National Interest Lands Conservation Act, or ANILCA. The act more than doubled the area to 19 million acres and renamed it the Arctic National Wildlife Refuge.

ANILCA designated as wilderness most of the lands that had been part of the original Wildlife Range, but one significant portion was excluded from wilderness designation – the 1.5 million acre 1002 Area. In fact, this provision of the law gives the area its name. Congress specified, in ANILCA Section 1002, that this acreage be further studied, with an inventory of its fish and wildlife resources, and its potential for oil and gas production fully examined.

## Arctic Refuge 1002 Area



The 1002 Area is home to an intricate web of arctic wildlife and habitat.

The wildlife most associated with the 1002 Area is the Porcupine Caribou herd, named after its wintering grounds along the Porcupine River of northwest Canada. Numbering nearly 123,000, the caribou herd migrates each year across the Brooks Range, arriving in early summer on the North Slope's Coastal Plain from the 1002 Area and eastward into Canada.

## Arctic Refuge 1002 Area



Contrasting with the migratory nature of the Porcupine Caribou herd are muskoxen, reintroduced to the Arctic Refuge about 35 years ago after an absence dating from the late 1800s. Muskoxen are year-round residents in the 1002. To survive the long winter, approximately 50 animals in smaller, scattered groups carefully conserve their energy reserves by minimizing their activities until summer.

## Arctic Refuge 1002 Area

Polar Bear



In the fall, polar bears from the Beaufort Sea region may visit the 1002 Area along its coast and barrier islands to hunt for prey, rest, and wait for the sea ice to form. Later, toward winter, pregnant females enter dens either on the sea ice or on land and give birth to their young.

## Arctic Refuge 1002 Area



146 species of birds

One hundred forty-six bird species are known to visit the 1002 Area. Approximately one-third of these nest and raise broods during the brief summer while the remainder use the refuge as a resting stopover during spring and fall migrations.

## Arctic Refuge 1002 Area



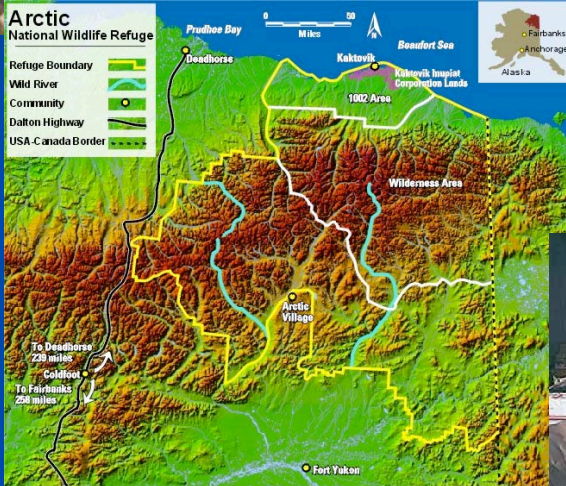
Marine mammals and fish are important subsistence resources



The 1002 Area, including its lagoons, supports 8 species of marine mammals, 62 species of coastal fish, and 7 species of freshwater fish of which the Arctic grayling and Arctic char are common residents. Several of these species are important as subsistence food resources.

# Arctic Refuge 1002 Area

Alaska Native Lands



The City of Kaktovik is located on the northern border of the Arctic Refuge Coastal Plain. It is home to the Inupiat Eskimos. Their subsistence resources include marine mammals, fish, caribou, and muskoxen. The Kaktovik Inupiat Corporation (KIC) owns 92,000 acres of private land within the refuge boundary. This land cannot be developed for oil and gas unless Congress authorizes leasing of the 1.5 million acre 1002 Area. Kaktovik residents support this oil and gas development.

About 100 miles south on the other side of the Brooks Range, the Gwich'in Athabascan people live in villages in Alaska and Canada. Gwich'in rely heavily on the Porcupine Caribou herd for subsistence, and caribou figure prominently in their cultural heritage. Because of their concern over the potential impacts to the herd, the 15 Gwich'in villages of this region oppose oil development in the 1002 Area.



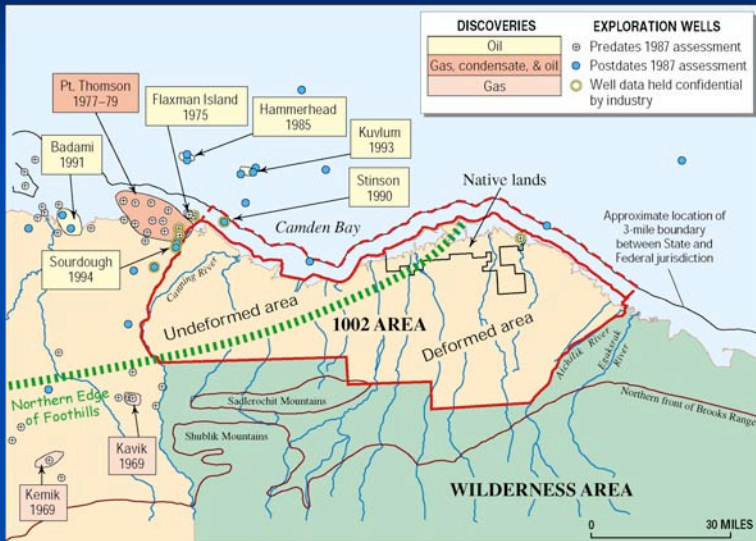


## **Oil and Gas Potential on the Coastal Plain**

As part of its mandate to conduct nationwide, periodic assessments of undiscovered oil and gas resources, the U.S. Geological Survey in 1998 reviewed the potential of the 1002 Area, including resources beneath Federal lands, Native lands in the 1002 Area, and in adjacent State waters.

This section of the presentation addresses the oil and gas potential of Alaska's Coastal Plain and the 1002 Area.

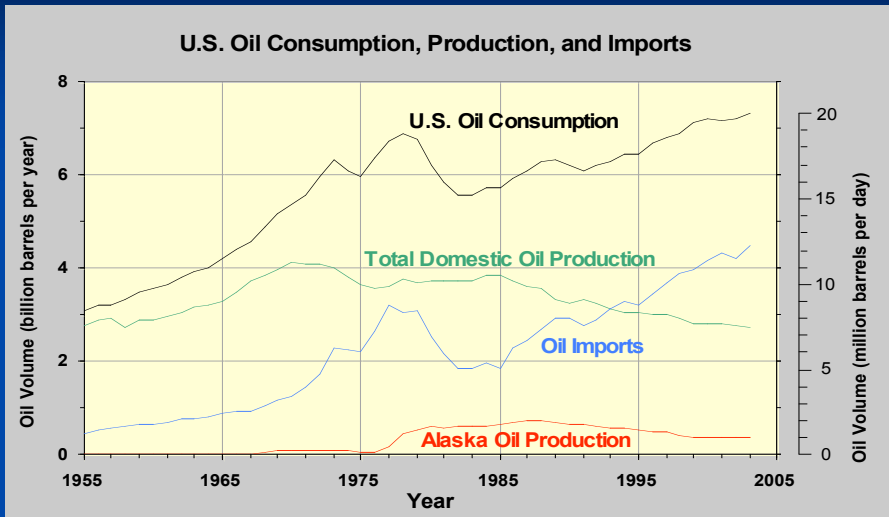
## Oil and Gas Potential



The USGS's 1998 assessment incorporated significant new information that had not been available during a 1987 evaluation. This information included the results of many new exploratory wells drilled on State lands to the west, and in State and Federal waters to the north of the 1002 Area.

Nearly 50 such wells have been drilled adjacent to the 1002 Area, and one on Native lands within the 1002. This exploration has identified 7 oil accumulations north of the foothills and 2 gas accumulations within the foothills.

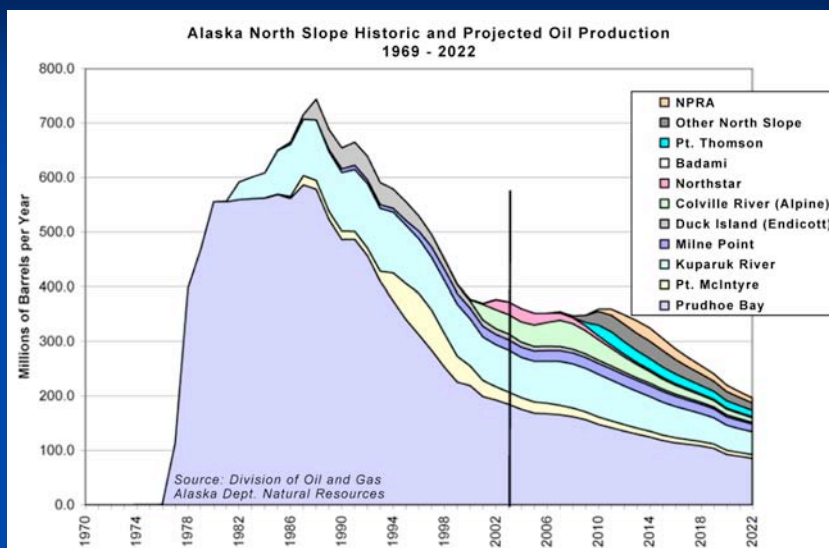
## Oil and Gas Potential



In recent years, U.S. oil consumption has been rising steadily. The Nation currently consumes more than 7 billion barrels of oil each year. Total domestic oil production has been declining for more than two decades, while oil imports have been rising sharply during the same period.

For many years, after the development of the Prudhoe Bay field and completion of the Trans-Alaska Pipeline System, Alaska accounted for 20 to 25 percent of the Nation's oil production. Recently, however, the State's proportion of domestic production has slipped to less than 15 percent.

## Oil and Gas Potential



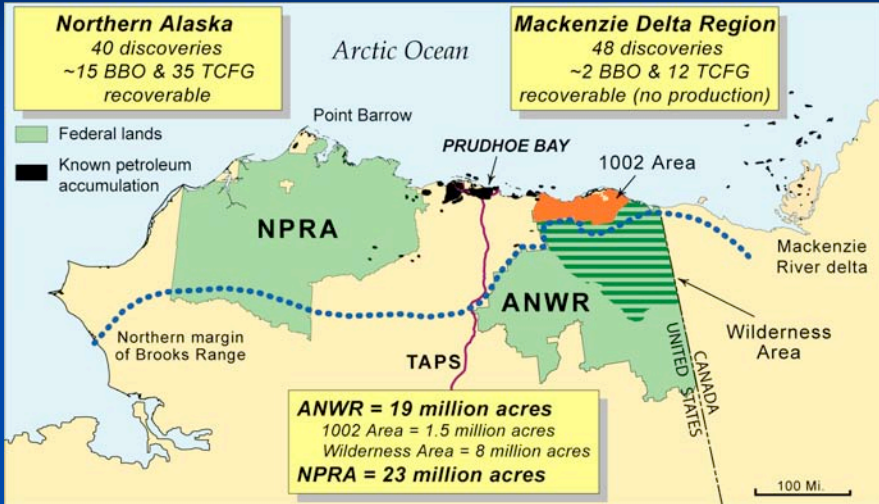
Oil production on the North Slope, which is dominated by the Prudhoe Bay field, peaked in the late 1980s and has declined since. Recent discoveries and developments are projected to slow, but not reverse, this decline. These recent discoveries are smaller fields and their rate of production is not sufficient to offset the rate of decline at Prudhoe Bay.

Most historical oil production depicted in this graph is from Alaska State lands and waters. The pink color in the middle of the graph represents the first production from Federal waters, beginning in 2001 from the Northstar field, which straddles the offshore State–Federal boundary. The first production from onshore Federal acreage, expected to start in 2010 when production begins from newly discovered accumulations in NPR-A, is represented in orange. Federal lands and waters have significant potential to contribute to oil and natural gas production in the future.

Footnote:

Nearly 11 billion barrels of oil have been produced from Prudhoe Bay, and about 3 billion barrels remain to be produced. Prudhoe Bay also contains 35 trillion cubic feet of natural gas – current U.S. consumption of natural gas is about 22 trillion cubic feet per year.

## Oil and Gas Potential



Recognition of its oil and gas potential was one reason why Congress set aside the 1002 Area for future study. What follows is a summary of the most recent estimates of the amount of undiscovered oil that may exist beneath the 1002 Area. These estimates are expressed in terms of probability to show the uncertainty involved in estimating volumes of undiscovered oil in unexplored areas.

## Oil and Gas Potential

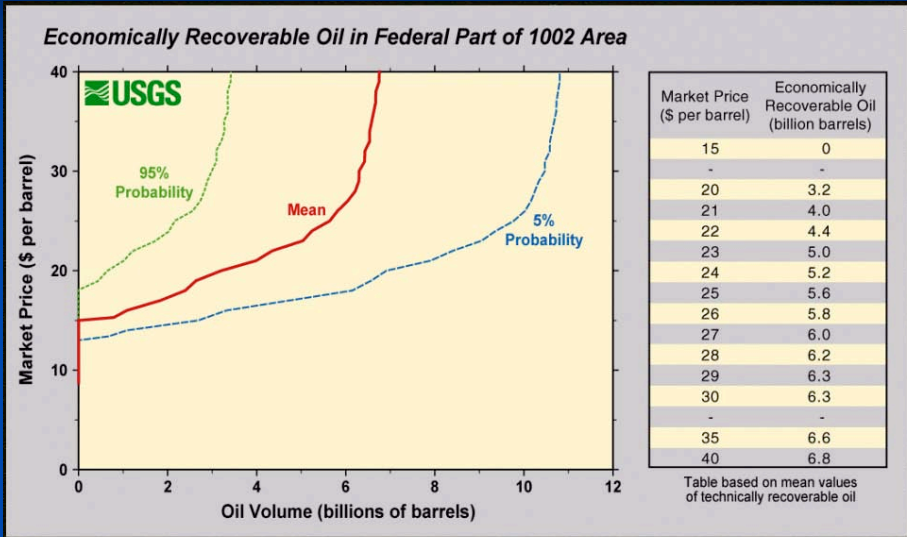
### Estimates of Technically Recoverable Oil in the ANWR 1002 Area (Federal part only)

95% Probability	Mean (Expected Value)	5% Probability
4.2 billion barrels	7.7 billion barrels	11.8 billion barrels

The estimates are based on geologic data. Recovery factors were then applied to project how much of the resource is technically recoverable – the amount of oil that may be recovered regardless of cost. The mean, or expected volume of technically recoverable, undiscovered oil beneath the Federal part of the 1002 is 7.7 billion barrels, with a 95 percent chance of at least 4.2 billion barrels and a 5 percent chance of at least 11.8 billion barrels.

For comparison, the U.S. currently consumes more than 7 billion barrels of oil per year. Of this, the U.S. imports about 4 billion barrels and produces about 3 billion barrels. Large oil fields contribute to the Nation's oil supply over a span of decades. For example, although the ultimate total oil recovery of about 14 billion barrels from the Prudhoe Bay field equals less than 2 years of current U.S. consumption, the production from Prudhoe Bay represented between 15 and 25 percent of total annual U.S. production for the past quarter century.

## Oil and Gas Potential

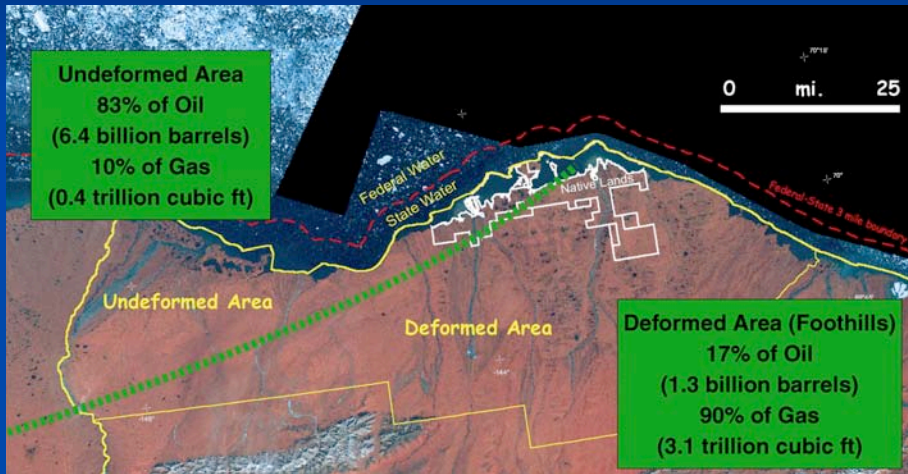


This shows the amount of undiscovered oil that might be economically recoverable in the 1002 over a range of market prices. The costs of finding, developing, producing, and transporting the oil to a west coast refinery, and an assumed 12 percent return on investment, are all included in this analysis. For example, at a market price of \$40 per barrel, the mean volume of economically recoverable oil – represented here by a red line – is 6.8 billion barrels.

This economic analysis assumes that larger accumulations are discovered first, and support the development of infrastructure, making smaller accumulations more economically viable. The costs assumed in this analysis take that infrastructure development into account as well as the economy of developing smaller fields.

## Oil and Gas Potential

Distribution of 1002 Area Undiscovered Oil & Gas Resources  
(technically recoverable, mean-value estimates)



The geologic terrain of the area signals sharp differences in oil and natural gas potential. On the right, the geologically deformed land – where the rock layers have been intensely folded and faulted – in the southeastern foothill areas of the 1002 show the most potential for natural gas, while undeformed areas in the northwestern section – shown here on the left – hold the greatest potential for technically recoverable oil resources.



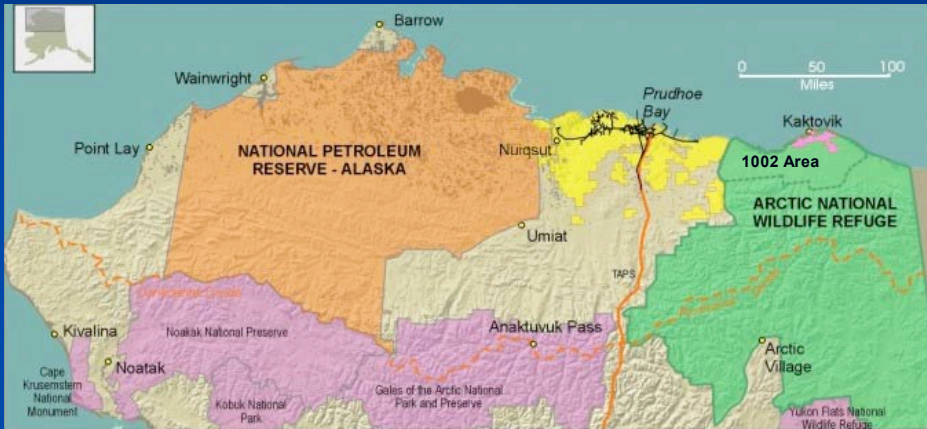
## State of the Art Technology



Now, a look at state-of-the-art technology used in oil and gas operations in the Arctic.

The Bureau of Land Management administers the National Petroleum Reserve-Alaska, and is a partner in overseeing the operations of the Trans-Alaska Pipeline. In this capacity, BLM provides information about state-of-the-art technology for oil and gas operations in the Arctic.

## State of the Art Technology



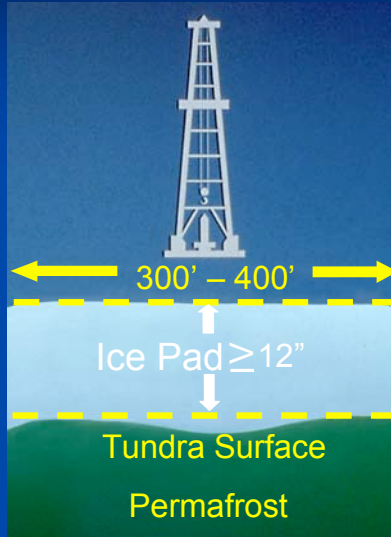
Much has been learned since the 1968 discovery of the Prudhoe Bay oil field on the North Slope. Today, the impacts on the North Slope's environment and wildlife are avoided or minimized due to improvements in exploration and development technology. The BLM's program for oil and gas leasing in the National Petroleum Reserve – Alaska provides an example of this progress. The NPR-A contains valuable wildlife, habitat and energy resources. Based on what we've learned from Prudhoe Bay, BLM analyzed methods to explore and develop oil and gas with less impact on the Arctic environment.

## State of the Art Technology



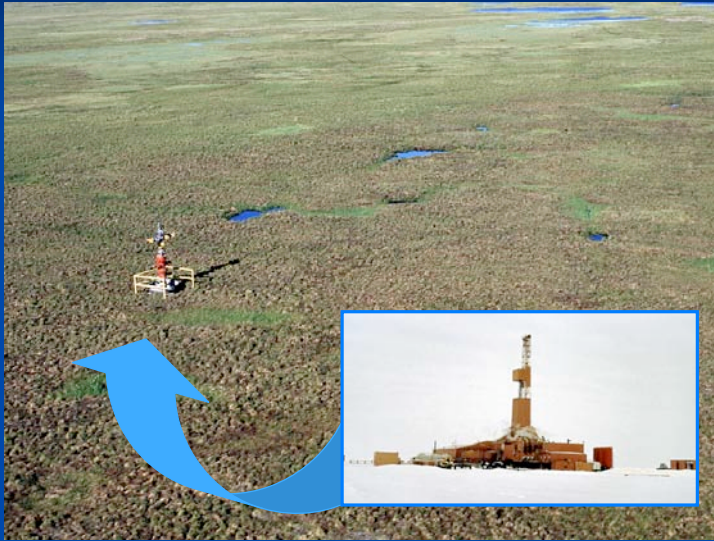
Much of the Coastal Plain is soft and spongy in the summer. With 30-below temperatures not uncommon, Northern Alaska's winters are bitterly cold. Wintertime is the best time to uncover resource potential. With the Coastal Plain frozen and covered with snow, seismic trains can traverse the tundra, searching for underground deposits of hydrocarbons. The frozen winter conditions minimize potential impacts to tundra vegetation, soils, and hydrology and potential conflicts with most wildlife. In this way, the harsh climate is the environment's best ally.

## State of the Art Technology



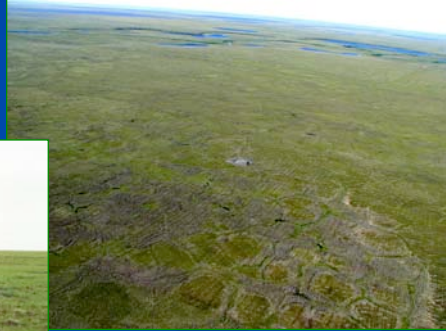
The bitter cold conditions allow for the use of seasonal ice pads, instead of traditional gravel pads, reducing the impact of acquiring and transporting gravel. Ice pads, a foot or more thick, are a natural solution as a base for exploratory well sites.

## State of the Art Technology



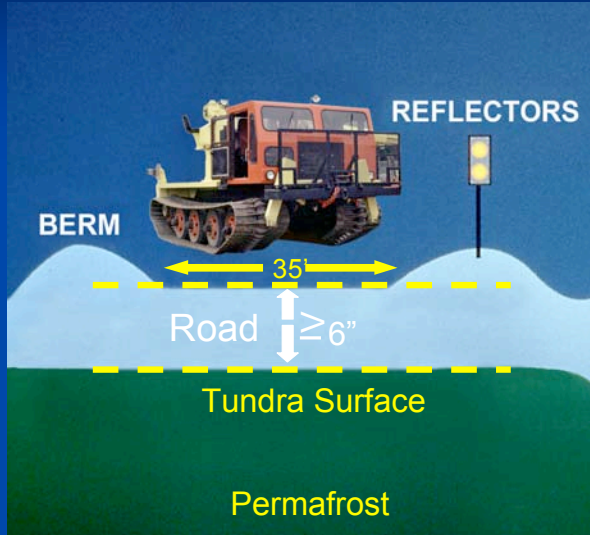
When the summer sun melts the ice pad, environmental impacts are minimal. In the lower right, a snapshot of an exploratory well in NPR-A during winter. The larger photo shows the same area once its ice pad has melted the following summer.

## State of the Art Technology



Here, on the top left, is a photo from June of 2000 showing what remains of an ice pad on a site in use the previous winter. The well was plugged and abandoned. On the lower right? The same site two months later. On the lower left, a small pile of gravel represents the entire surface area disturbed at the wellhead location, an area 20 feet in diameter. The pile is intentionally mounded; it will subside and be level with the surrounding area over time.

## State of the Art Technology



Transportation to the exploration ice pads is by ice road. As with ice pads, these melt away in Spring, reducing impacts to the environment.

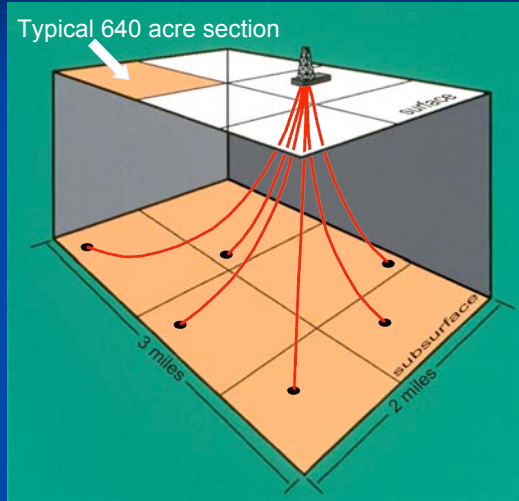
## State of the Art Technology



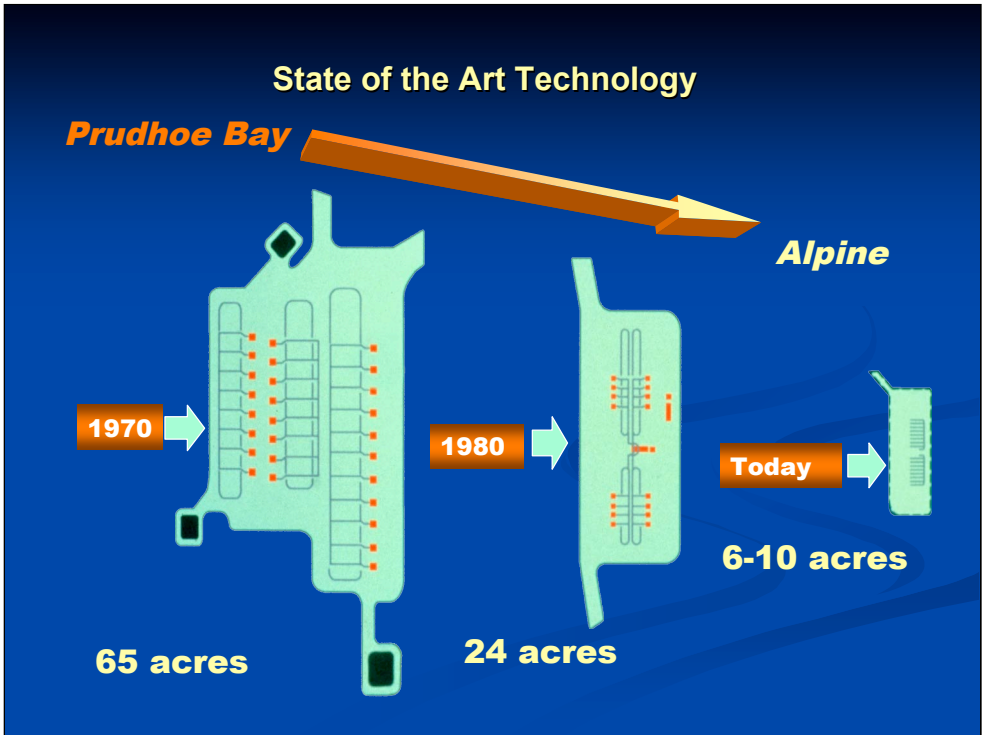
This is all that remains of an ice road the summer after it was last used and melted.



## State of the Art Technology



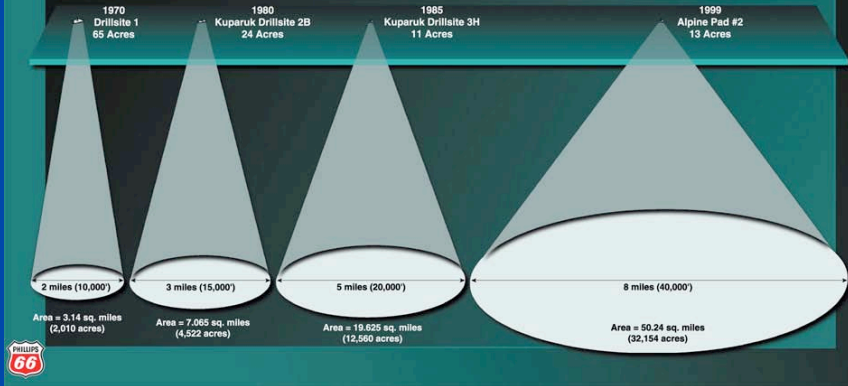
Another technological innovation that greatly lessens environmental impact is extended-reach drilling. Extended-reach wells generally reach twice as far horizontally as vertically, reducing the number of drilling pads needed for production. The current state of extended-reach drilling technology allows over 50 square miles of subsurface resources to be developed from one single surface location.



Oil companies have also reduced the size of production pads since the early days of Prudhoe Bay. An early Prudhoe Bay field pad containing 20 wells encompassed 65 acres. In those days, muds and cuttings were stored in reserve pits. But modern innovations allow for these drilling byproducts to be re-injected. Wellheads can now be as little as 10 feet apart. This means that production pads of today containing 20 or more wells cover only 6-10 acres. This reduces costs and is more environmentally friendly.

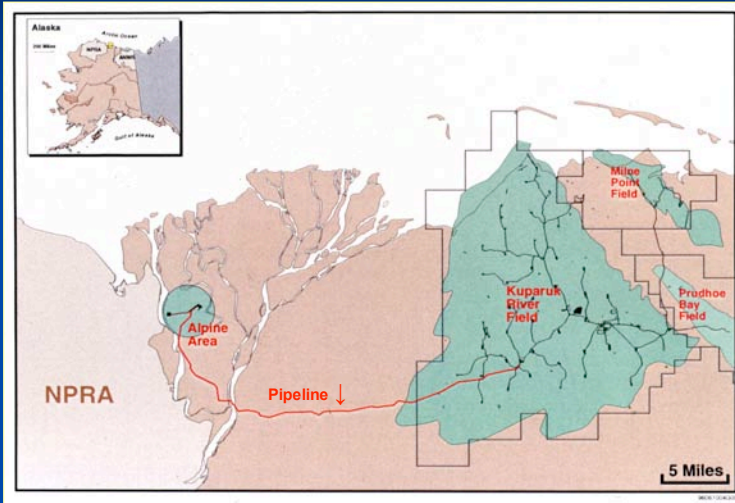
## State of the Art Technology

# Pad Size and Corresponding Subsurface Drillable Acres



The progressively improved combination of smaller pad size and developments in extended-reach drilling allows for the recovery of oil and gas resources from a much greater area with smaller and fewer pads.

## State of the Art Technology



The best example of the many new technologies at work can be found in the Alpine field, just east of NPR-A and west of Prudhoe Bay. Alpine began production in December of 2000. There is no permanent road to the Alpine field, which consists of two gravel well pads, a 2-mile in-field gravel road and a 1-mile gravel airstrip. Total surface disturbance is less than 100 acres. With the use of directional extended-reach drilling, up to one hundred wells will be drilled from the two pads.

## State of the Art Technology



The Alpine facility has the capacity to house 600 workers, transported to and from the project by air. During winter, ice roads carry modular facilities, large equipment and supplies. The Alpine field has gravel fill on less than 100 acres. More than 500 million barrels of oil will be produced from a 40,000 acre subsurface area. Oil is transported by a surface pipeline to the Kuparuk field to the east and, ultimately, Prudhoe Bay to hook up with the Trans-Alaska Pipeline System.

## State of the Art Technology

### Arctic Platform



One innovative approach to addressing remote exploration in Alaska is the reusable modular platform. Requiring no gravel or ice pad, this platform may minimize the footprint and environmental impact of drilling operations in ecologically sensitive areas. The concept for this technology, still in its infancy, was approved in spring of 2002 and the design, fabrication, systems testing, and mobilization to the North Slope was completed by the start of field operations in January 2003. The platform was installed at a location on the North Slope of Alaska. Removal of the platform took place in March 2004, after a winter season of use.

During all phases of the project, the platform was monitored for stability and its impact on the tundra. Should it prove economically feasible, the modular platform may help establish temporary or permanent drilling and production sites in ecologically sensitive areas with a minimal footprint and environmental impact. Because the pieces of the modular platform may be transported by air, it may also be suitable for future use in areas without ice road access.

## Legislation Considered During the 107<sup>th</sup> and 108<sup>th</sup> Congresses

- Required application of the ***best commercially available technology*** for oil and gas exploration, development, and production on all new exploration, development, and production operations.

The legislation previously passed by the House of Representatives did not merely suggest that any development on the Coastal Plain use new technology, it demanded that the best commercial technology be utilized. Such provisions will continue to ensure that new technologies will be applied as they are developed and commercially available.

## Resource Issues and Mitigation



Among other things, the advances in petroleum technology on the North Slope, coupled with other new tools, can be applied to natural resource concerns.

This next section addresses several natural resource issues that could be affected by oil and gas development, including caribou, muskoxen, polar bears, and subsistence resources. This section also identifies possible mitigation measures to avoid or minimize impacts to fish, wildlife and habitat.



## Resource Issues and Mitigation

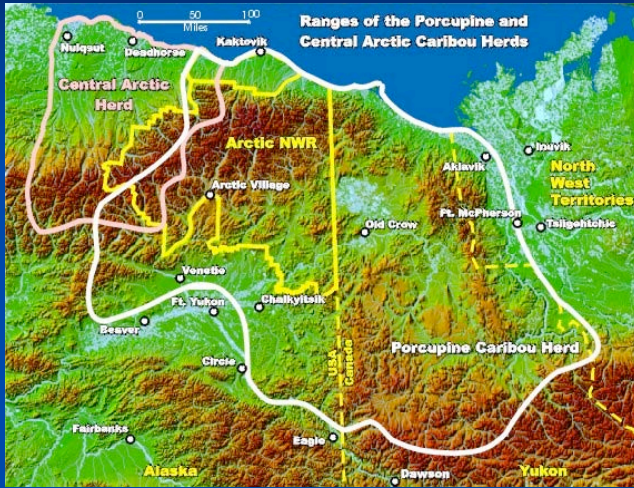
### Caribou



Much of the attention about oil and gas development within the 1002 Area focuses on the Porcupine Caribou herd. This herd is one of 13 large migratory caribou herds that inhabit North America. The largest of these herds contain about 500,000 animals and the smallest about 30,000. The Porcupine herd has both increased and decreased in size during the past 25 years ranging from a high of about 178,000 animals to a low of about 105,000. The current population stands at approximately 123,000 animals.

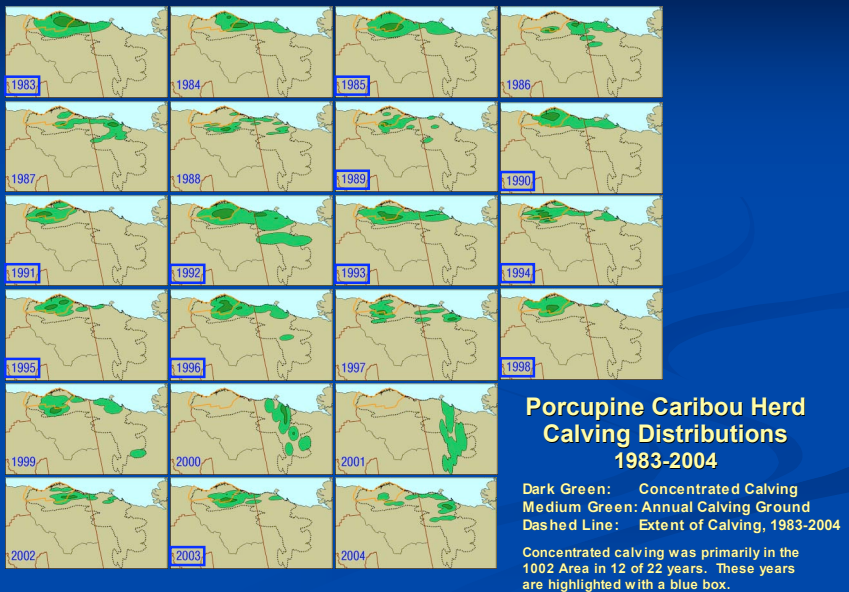
# Resource Issues and Mitigation

## Caribou



Both the Porcupine Caribou herd and the Central Arctic Caribou herd may enter the 1002 Area during some years.

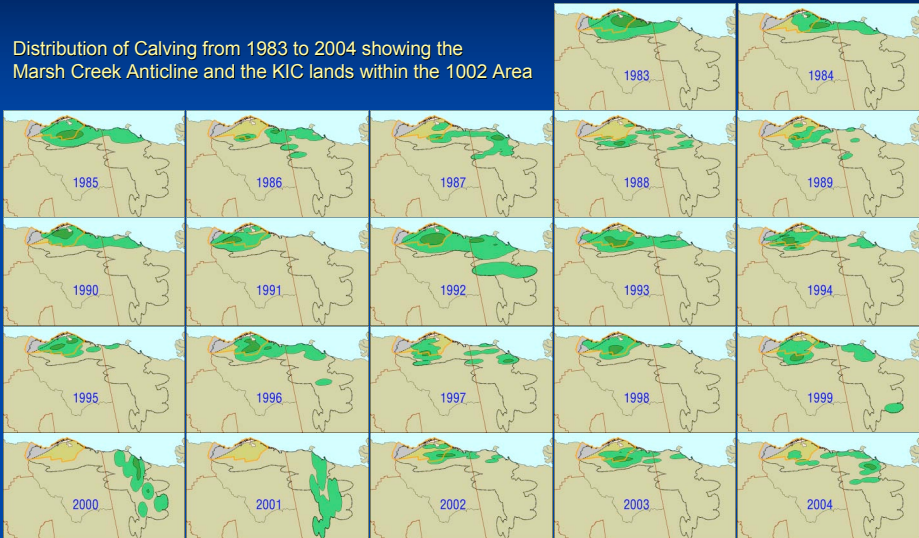
## Resource Issues and Mitigation Caribou



This graph shows the calving distributions of the Porcupine herd for each year from 1983 through 2004. The location of calving varies year by year due to spring snow conditions. Concentrated calving occurred primarily on the 1002 Area in 12 out of 22 years. These years are highlighted with a blue box.

## Resource Issues and Mitigation Caribou

Distribution of Calving from 1983 to 2004 showing the Marsh Creek Anticline and the KIC lands within the 1002 Area



The green areas on this graphic show the annual distribution of calving for all 22 years, but now in relation to the Marsh Creek Anticline, which marks the approximate boundary between undeformed lands – shown here in gray – and deformed lands – shown in yellow – and the Kaktovik Inupiat Corporation lands as well as the entire 1002 Area.

As seen here, concentrated calving occurred south of the Marsh Creek anticline and the undeformed lands in 19 of the last 22 years.

## Resource Issues and Mitigation

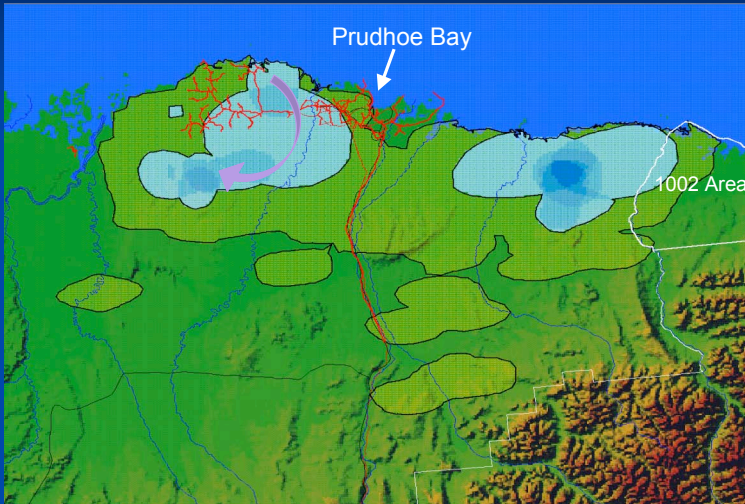
### Caribou



Biologists evaluate potential impacts to the Porcupine Caribou herd from oil and gas development by studying the Central Arctic herd and its association with the North Slope oil fields, recognizing the important ecological differences between the Porcupine Caribou herd and the Central Arctic Caribou herd.

## Resource Issues and Mitigation

### Caribou



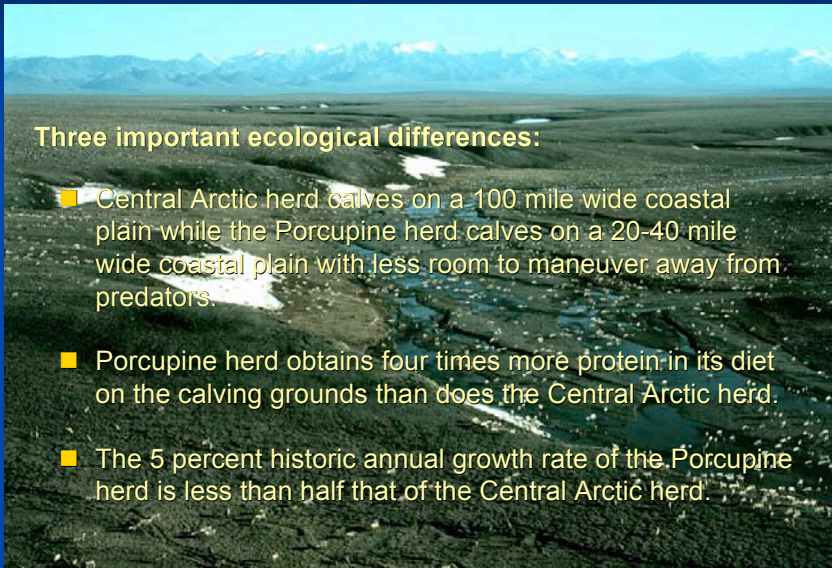
Concentrated calving areas displaced by infrastructure

Adapted from Scott, 2000

The Central Arctic herd has two distinct concentrated calving areas. From 1980 to 1987, the western-most portion of the herd that calved near Prudhoe Bay shifted its location of concentrated calving away from oil field infrastructure, shown here in red. The shift is depicted by the blue arrow. Since 1987, the herd has concentrated its calving south and outside of the oil field in an area of poorer quality forage. Yet despite this shift, the Central Arctic herd increased from 5,000 to its current population of about 31,000 during the period of 1978 to 2002.

## Resource Issues and Mitigation

### Caribou



#### Three important ecological differences:

- Central Arctic herd calves on a 100 mile wide coastal plain while the Porcupine herd calves on a 20-40 mile wide coastal plain with less room to maneuver away from predators.
- Porcupine herd obtains four times more protein in its diet on the calving grounds than does the Central Arctic herd.
- The 5 percent historic annual growth rate of the Porcupine herd is less than half that of the Central Arctic herd.

It is expected that the Porcupine herd would exhibit the same avoidance behavior to infrastructure, relative to its historic concentrated calving area, as was observed for the Central Arctic herd. However, there are three important ecological differences.

First, the Central Arctic herd calves on a 100-mile wide area of the Coastal Plain so displacement has not forced calving into the foothill areas of higher predator density. In contrast, the Coastal Plain of the 1002 Area is much narrower – 20 to 40 miles wide. Here, caribou have less room to maneuver away from predators. Second, the Porcupine herd consumes four times more protein in its diet during calving than does the Central Arctic herd, making forage on the calving grounds more critical. Finally, the maximum historic annual growth rate of the Porcupine herd is approximately 5 percent, one-half the growth rate of the Central Arctic herd, which exceeds ten percent.

Because of these differences, it has been predicted that natural or human-induced stresses on the calving grounds could pose greater risk to the overall health of the Porcupine herd than has been observed for the Central Arctic herd. Also, the Porcupine herd's lower growth rate could mean less capacity to accommodate environmental stresses.

## Resource Issues and Mitigation

### Caribou



To estimate the potential effects of oil and gas development on the Porcupine Caribou herd, biologists from the USGS and U.S. Fish and Wildlife Service have developed an empirical model which relates calf survival as a function of food available to lactating females and to the proportion of calves born in areas with low predation risk. The use of an empirical model allows the Services to examine many different hypothetical development scenarios and the impacts that development could have on the herd. They found that the impact on calf survival varies greatly, depending on where and how much development occurs.

The biologists examined 7 different development scenarios. Four had a negligible impact, others had a greater impact. The scenario that assumed development structures and activities throughout the entire 1002 Area indicated a substantial reduction of 8.2 percent in calf survival. The development scenarios focusing on the undeformed area, where the USGS believes the most resource potential exists, and Native lands showed a negligible impact.

Tools such as this empirical model can serve an important function in assisting land managers to ensure that activities from oil and gas development have no significant adverse effect on the environment.



## Legislation Considered During the 107<sup>th</sup> and 108<sup>th</sup> Congresses

- Required that the maximum amount of surface acreage covered by production and support facilities **not exceed 2,000 acres on the Coastal Plain.**
- Required that oil and gas exploration, development and production activities on the Coastal Plain result in **no significant adverse effect** on fish and wildlife, their habitat, subsistence resources, and the environment
- Required that a leasing program include **seasonal limitations** on exploration, development, and related activities, where necessary, to avoid significant adverse effects during periods of concentrated fish and wildlife breeding, denning, nesting, spawning and migration

Concerns about the impact of development on the Porcupine Caribou herd and the 1002 Area's overall environment did inspire strict provisions in the previous legislation. These provisions required the maximum surface acreage covered by production and support facilities not to exceed 2,000 of the area's total 1.5 million acres. The legislation also required no significant adverse effect on fish, wildlife, their habitat, subsistence resources, and the environment, and mandated seasonal limitations on exploration, development, and related activities.

## Resource Issues and Mitigation

### Muskoxen



Muskoxen were reintroduced to the Refuge about 35 years ago. Over the past four years, their numbers have declined from an average high of 250 animals to only about 50. While some factors are unknown, poor calf survival due to deep snow during spring calving, newly-learned predation of adult muskoxen by grizzly bears, and an outmigration and dispersion both to State of Alaska lands to the west and to Canada to the east are considered most likely. Minimizing human activities in areas occupied by muskoxen from mid-winter through the calving season could reduce the likelihood of disturbance during the period when muskox energy conservation is critical to their survival.

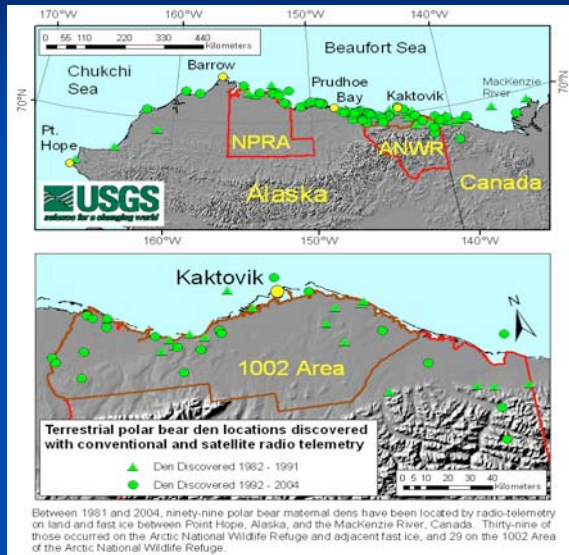
## Resource Issues and Mitigation

### Polar Bears



The impact of development on polar bears is also a consideration in the ANWR discussion. Since 1981, USGS scientists have fitted 476 female polar bears with radio telemetry collars. Through telemetry, scientists have found an equal number of dens on land and on sea ice. Of the 198 dens located and confirmed by telemetry on the Beaufort and Chukchi Sea, 99 occurred on land and fast ice and 99 were on pack ice.

## Resource Issues and Mitigation Polar Bears



The latest information on polar bears in the 1002 Area was updated in 2002 by the USGS. In recent years, biologists have used radio-collar tracking to gather better information regarding the seasonal movement and activities of polar bears.

Polar bear denning occurs at low density across large areas, in relatively uncommon habitats that have been mapped with the aid of information obtained from radio-collar tracking. Incorporating den habitat maps into development scenarios can prevent exposure of most dens to industrial activities. Biologists believe human activities can be limited or geographic placement of industrial activities can be managed during critical time periods in order to minimize exposure of dens to disturbances.

Available data from recent studies indicate polar bears may be relatively resilient to disturbances coming from outside their dens. Denning efforts were not abandoned in some dens exposed to even high levels of activity. Biologists believe polar bears in dens may be less vulnerable to human disturbances than previously thought. Aggressive and proactive spatial and temporal management of human activities, therefore, can minimize or eliminate most of the potential adverse effects of human developments on denning polar bears.

In fact, the polar bear numbers in the Southern Beaufort Sea region appear to have increased throughout the entire history of petroleum development in arctic Alaska. This suggests that managed resource development can be compatible with healthy polar bear populations.

## Legislation Considered During the 107<sup>th</sup> and 108<sup>th</sup> Congresses

- Required that oil and gas exploration, development and production activities on the Coastal Plain result in ***no significant adverse effect*** on fish and wildlife, their habitat, subsistence resources, and the environment
- The leasing program must include “seasonal limitations on exploration, development, and related activities, where necessary, to avoid significant adverse effects during periods of concentrated fish and wildlife breeding, denning, nesting, spawning and migration.”

To address fish and wildlife issues generally, the legislation previously passed by the House required that exploration, development, and production activities on the Coastal Plain result in no significant adverse effect on fish and wildlife, their habitat, subsistence resources, and the environment.

Consistent with scientific findings, the legislation contained a provision that any leasing program in the Refuge must include seasonal limitations to avoid significant adverse impacts during periods of concentrated fish and wildlife breeding, denning, nesting, spawning and migration.

## Legislation Considered During the 107<sup>th</sup> and 108<sup>th</sup> Congresses

- The leasing program shall provide for “[A]voidance of significant adverse effects upon subsistence hunting, fishing, and trapping by subsistence users.”

In addition, the previous legislation required that significant adverse effects upon subsistence hunting, fishing, and trapping be avoided.

## Resource Issues and Mitigation

### Challenges



Photo courtesy of Alaska Department of Fish and Game

Not all mitigation has been successful. Despite efforts to manage the disposal of solid wastes using state-of-the-art dumpsters and employee training, industry has not been able to avoid the attraction of scavengers and predators to the oil field. This has likely increased their distribution and survival on the North Slope to the potential detriment of prey species such as ground nesting birds.

## Legislation Considered During the 107<sup>th</sup> and 108<sup>th</sup> Congresses

The oil and gas program must include requirements as effective as:

- Bear-proof fencing
- Solid waste management plans
- Daily Incineration of putrescible waste
- Employee education programs and prohibitions on feeding wildlife



Photo courtesy of Alaska Department of Fish and Game

Previous legislation recognized these issues, addressing the disposal of solid waste and feeding of wild animals.

These issues also continue to be addressed on the ground. For example, this picture demonstrates the use of bear-proof garbage bins.



## Resource Issues and Mitigation



Clearly, environmental impacts from petroleum industry development on Alaska's North Slope have decreased in recent years compared to 30 years ago. As we have seen, the use of ice roads, ice pads, and low ground pressure vehicles allows exploration with minimal surface impacts. Developing technology, such as the Arctic Platform and more portable arctic rigs have the potential to eliminate the need for ice roads and provide even more protection from exploration and development. Greater care is now given to locate facilities away from critical wildlife habitat such as high quality wetlands used by migratory birds. And extended reach drilling and re-injection of drilling mud and cuttings has greatly reduced the area required for a production pad.



Our nation demands a stable and reliable supply of energy and its citizens expect public lands to be protected. While the Coastal Plain is the Nation's single greatest onshore prospect for development and Congress has proposed to open a small portion of the 19 million acres in the Arctic Refuge, we must not lose sight of its intricate web of Arctic wildlife and habitats.

With the potential for significant oil and gas development, it is essential that any development plan for the area include the strongest possible environmental protections, including the use of best commercially available technology and the requirement that equipment be removed from well sites and that the land be restored to support its previous use for wildlife or subsistence.

These provisions are essential to ensure responsible oil and gas development in the 1002 area of the Arctic National Wildlife Refuge.