NORTH SLOPE
SUBAREA CONTINGENCY PLAN

BACKGROUND
SECTION

FIGURES

BACKGROUND: PART ONE – SUPPORT INFORMATION

A. SUBAREA PLAN

This Subarea Contingency Plan (SCP) supplements the Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases (the Unified Plan). The SCP in conjunction with the Unified Plan describes the strategy for a coordinated federal, state and local response to a discharge or substantial threat of discharge of oil or a release of a hazardous substance from a vessel, offshore or onshore facility, or vehicle operating within the boundaries of the North Slope Subarea. For its planning process, the federal government has designated the entire state of Alaska as a planning "region" and the western half of the state as a planning "area." The State of Alaska has divided the state into ten planning regions of which one is the North Slope Region. As part of the Unified Plan, this SCP addresses this North Slope Region or, to avoid confusion with federal terms, Subarea.

The SCP shall be used as a framework for response mechanisms and as a pre-incident guide to identify weaknesses and to evaluate shortfalls in the response structure before an incident. The plan also offers parameters for vessel and facility response plans under the Oil Pollution Act of 1990. Any review for consistency between government and industry plans should address the recognition of economically and environmentally sensitive areas and the related protection strategies, as well as a look at the response personnel and equipment (quantity and type) available within the area (including federal, state, and local government and industry) in comparison to probable need during a response.

B. SUBAREA DESCRIPTION

As defined by Alaska regulations, the North Slope Subarea is the area of the State encompassed by the boundaries of the North Slope Borough, including adjacent shorelines and state waters, and having as its seaward boundary a line drawn in such a manner that each point on it is 200 nautical miles from the baseline from which the territorial sea is measured. Figures E-1 and E-2 depict this area.

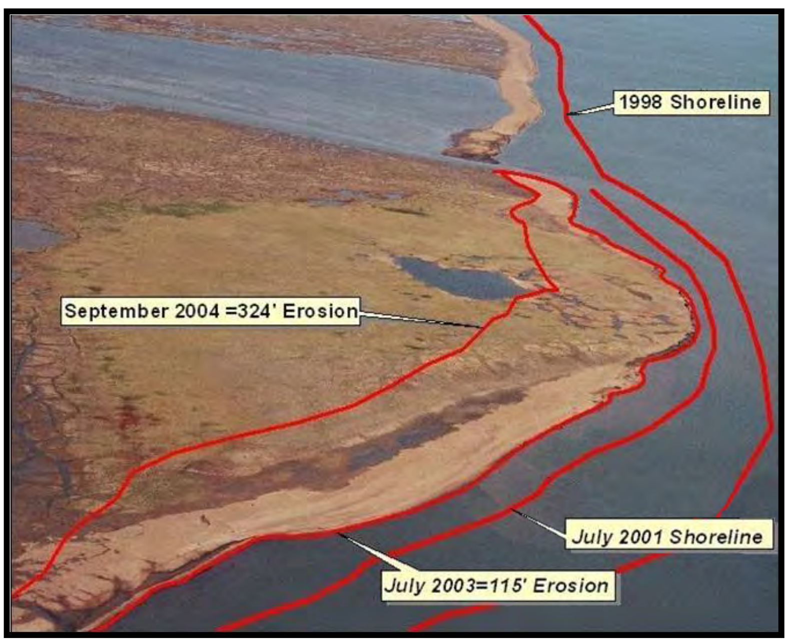
The North Slope Subarea boundaries match those of the North Slope Borough, which is the largest borough in Alaska with over 15% of the state's total land area. The subarea encompasses the entire northern coast and most of the northeastern coast of Alaska along the Arctic Ocean and contains approximately 89,000 sq. miles of land and 5,900 sq. miles of water, making it larger than the State of Utah. The subarea's southern boundary runs in an east - west direction at 68° North latitude, about 105 miles north of the Arctic Circle, which is at latitude 66° 30' North. The subarea extends east to the border with Canada, west to the Chukchi Sea, and north to the Beaufort Sea. Point Barrow (71° 23' N, 156° 29' W), seven miles north of Barrow, is the northernmost point in the US.

Though the subarea lies entirely above the Arctic Circle, portions of the region are in the arctic, transitional, and continental climatic zones. The weather in the region is the result of the interaction between global air movements, land topography, and major weather systems that move north-south and east-west across the Bering Sea. The region's climate is mostly arctic: temperatures range from -56° to 79° Fahrenheit, with summer temperatures averaging 40°F and winter temperatures averaging -17° F, though high winds frequently yield much lower chill factors. The strongest wind recorded in Barrow was from the southwest in February 1989, at 74 mph. On the North Slope, February is the coldest month and July is the warmest. Winters also include periods of approximately 65 days without daylight, depending upon the latitude; correspondingly, summer offers the reverse, with as many days having no sunset. The region is classified as a wet desert, because the average annual precipitation is only about 5 to 7 inches, with snowfall averaging 20 inches. Most of the snow that falls on the tundra is actually snow that has been blown there from somewhere else.

Mountain ranges in the North Slope Subarea include the Brooks Range and the Davidson, Philip Smith, Endicott, and DeLong Mountains. The highest point on the North Slope is Mount Chamberlin (9,020 feet) in the eastern Brooks Range. Apart from the mountains, the region is characterized by rolling, treeless tundra. The larger river basins in the region include the Canning, Sagavanirktok, Colville, Ikpikpuk, Kuk, and Utukok. The Colville River is the longest river (about 428 miles long), and the largest lake, Teshekpuk Lake, southeast of Barrow, is 22 miles long and covers 315 square miles.

Permafrost underlies the entire region. On the Arctic Coastal plain, permafrost starts between 1 to 2 feet below the surface and has been found at depths of 2,000 feet. Permafrost and the surface layer on top of it are remarkably fragile and special construction techniques (e.g., ice roads, gravel pads, structures built on pilings, reinforced concrete foundations with heat radiation devices, etc.) have been devised to protect them.

The Chukchi and Beaufort Seas of the Arctic Ocean are the primary marine waters associated with the subarea. The entire marine area of the region lies within the continental shelf. Sea ice formation in the Chukchi and Beaufort Seas begins in October, and the ice pack persists through late June, although the ice begins to melt and break up in April. The northern coast of Alaska has some of the highest rates of coastal erosion in the world. Coastal erosion in excess of 300 feet in a year has been documented. Coastal erosion in Prudhoe Bay averages 6 to 17 feet per year.



J.W. Dalton Drill Site Erosion. Located east of Barrow on the Beaufort Sea near Teshekpuk Lake and Point Lonely DEW line site. This photograph was taken in 2003 and you can see that between the summers of 2003 and 2004 over 300' of shoreline eroded away along part of the site. Approximately 600' of coastal plain were lost over a six year period. Photo provided by BLM

The Arctic National Wildlife Refuge occupies the eastern half of the region. The portion of the Arctic National Wildlife Refuge within the NSB has an area of approximately 18,500 square miles. Beginning at the western border of the Refuge are the oil fields of Prudhoe Bay, which stretch west approximately 125 miles to the

National Petroleum Reserve – Alaska (NPRA). Created by presidential executive order in 1923 and originally called the Naval Petroleum Reserve, the NPRA contains nearly 37,000 square miles. Approximately 3,900 square miles of the Gates of the Arctic National Park lay within the North Slope Subarea along the Brooks Range, and the Noatak National Preserve, directly to the west, contains nearly 3000 square miles. Along the coast at Point Hope lies the Chukchi Sea portion of the Alaska Maritime National Wildlife Refuge, which includes approximately 370 square miles.

The population of the borough consists of 74% Alaska Native or part Native. Inupiat Eskimos, the majority of permanent residents, have lived in the region for centuries, active in trading between Alaskan and Canadian bands. (The oldest inhabited site on the North Slope is the Mesa Site, about 200 miles South of Barrow on the northern flank of the Brooks Range. It was first inhabited about 11,700 to 9,700 years ago.) Traditional marine mammal hunts and other subsistence practices are an active part of the present-day Inupiat culture.

During World War II, Atqasuk was a source of coal. Oil exploration in the 1960s led to the development of the huge reserves found in Prudhoe Bay and, subsequently, building of the Trans-Alaska Pipeline in the 1970s.

The Borough incorporated in 1972. There are eight North Slope villages (Anaktuvuk Pass, Atqasuk, Barrow, Nuiqsut, Kaktovik, Point Hope, Point Lay and Wainwright) and an unincorporated town serving the oil industry (Deadhorse). The total borough population recently dropped below 7000, with most permanent residents living in Barrow, the largest village (population near 4200) and the center of local government for the North Slope Borough. After the passage of the Alaska Native Claims Settlement Act (ANCSA) in 1971, families from Barrow re-settled the abandoned villages of Atqasuk and Nuiqsut. North Slope oil field operations provide employment to over 5,000 non-residents, who rotate in and out of oil work sites from Anchorage, other areas of the state, and the lower 48. Census figures are not indicative of this transient work site population.

Air travel provides the only year-round access, while land transportation provides seasonal access. There is no road system connecting the North Slope villages to each other. "Cat-trains" are sometimes used to transport freight overland from Barrow during the winter. Barges operating from Dutch Harbor or Cook Inlet deliver noncrude oils to the villages. Deliveries are ice dependent, and do not occur when too much remains from winter or when new ice forms.

The only road from "outside" is the James Dalton Highway (formerly called the Haul Road), which essentially parallels the Trans-Alaska Pipeline System (TAPS) starting at Livengood, north of Fairbanks, and ending at Deadhorse in the Prudhoe Bay area. Apart from cargo and passenger airplanes, travel on the North Slope is by boat in the summer and snowmachine in the winter. In late summer, some supplies are barged from Anchorage or Seattle to the coastal villages and the industrial facilities at Prudhoe Bay. In winter, large vehicles with huge balloon-like tires or wide tracks are used for oil exploration activities. Routine industrial traffic uses ice roads, which are constructed through a process of pouring water over the frozen tundra or onto the surface of a lake; the water quickly freezes and is solid enough to drive on.

Human activities in the Arctic Region revolve around the subsistence, sport, and commercial uses of fish and wildlife. Oil and gas development and production on the arctic coastal plain has provided the primary source of wage employment and government funds. Infrastructure development is minimal by national standards, except within the developed oil fields.

The North Slope region encompasses a vast area that has relatively limited risks in some respects, but elevated risks when considering certain factors. The North Slope has a very small population covering thousands of square miles. The number of facilities storing, handling and transferring refined products is very small. These facilities typically provide fuel mainly for the generation of electricity and heating homes. The fuel is also used to power vehicles and vessels which are relatively few in number as well. Tank barges provide fuel to these facilities no more than twice each year and only during the short open-water season. Numerous exploratory and production wells exist in the region and produce a large amount of crude oil which is piped above ground to processing facilities before being shipped through the Trans Alaska Pipeline to Valdez.

Numerous hazards are inherent in the transportation, storage, exploration development and production of petroleum products. The impact of these hazards can be lessened or avoided completely through proper operations. The shoreline geomorphology of this region does not present a hazard to the integrity of a vessel. Most of the shorelines fall into some type of sand/gravel/cobble combination, peat, tidal flats, or vegetated shores.

The operating season is very short in this region because of the late ice breakup and the early freeze-up of the Beaufort and Chukchi Seas. Vessels have been damaged by ice, which is an ever present concern. The movement of ice, whether during freeze-up, breakup, or in the dead of winter can produce great stresses on vessels and structures, all of which could sustain damage in this harsh environment.

Tidal currents and sea states in the Beaufort and Chukchi are not usually extreme and will generally not pose a risk to operations. Strong storms and high winds are unusual during the period when vessels are transiting the region. However, storm surges can occur and would pose a substantial risk to shoreline cleanup operations and personnel.

As with all areas within Alaska, the North Slope region supports a wide range of wildlife. During the season when the North Slope is thawed, the inland and shoreline areas are a haven for migratory waterfowl and other birds. Local communities rely on marine mammals as a traditional food source, and these mammals are present in concentrated areas during certain times of the year. Polar bears roam the ice pack and are very susceptible to oiling, as are almost all of the other mammals, birds, and fish in the region. Residents of the North Slope primarily engage in a subsistence lifestyle and rely heavily on the availability of the resources in the area. Any spill of significance could devastate their food harvest and seriously threaten their normal means of existence. Any long-term impacts to their food resources could have a disastrous impact on their way of life. The Sensitive Areas Section provides detailed information on specific resources and their locations in the region.

Figure E-1: North Slope Subarea

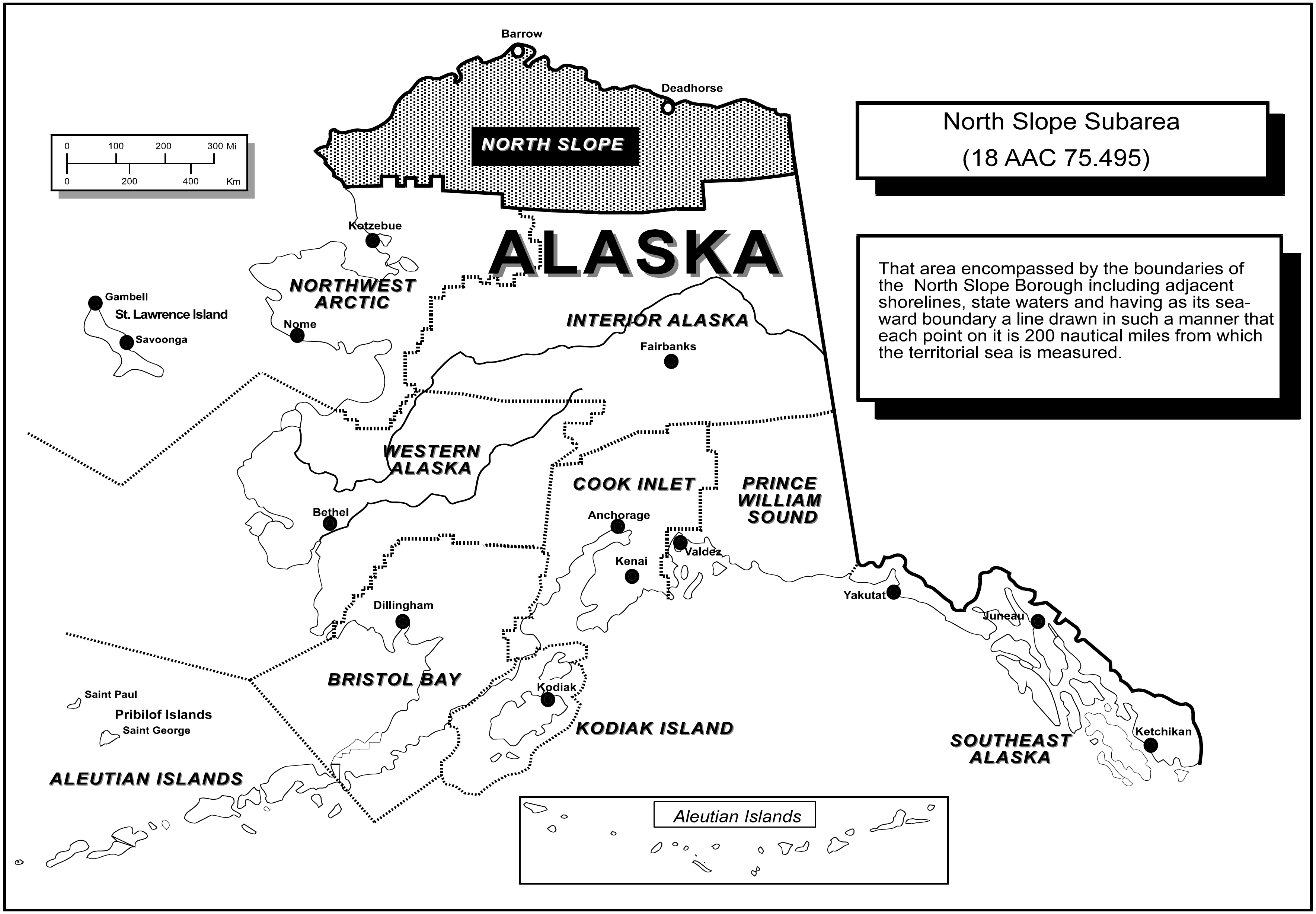


Figure E-2: Subarea Detailed Map

North Slope Subarea Detailed Map – to view the map, please go to the DNR ***Prevention and Emergency Response Subarea Plan Maps*** website located at: http://www.asgdc.state.ak.us/maps/cplans/ns/ns5base.pdf

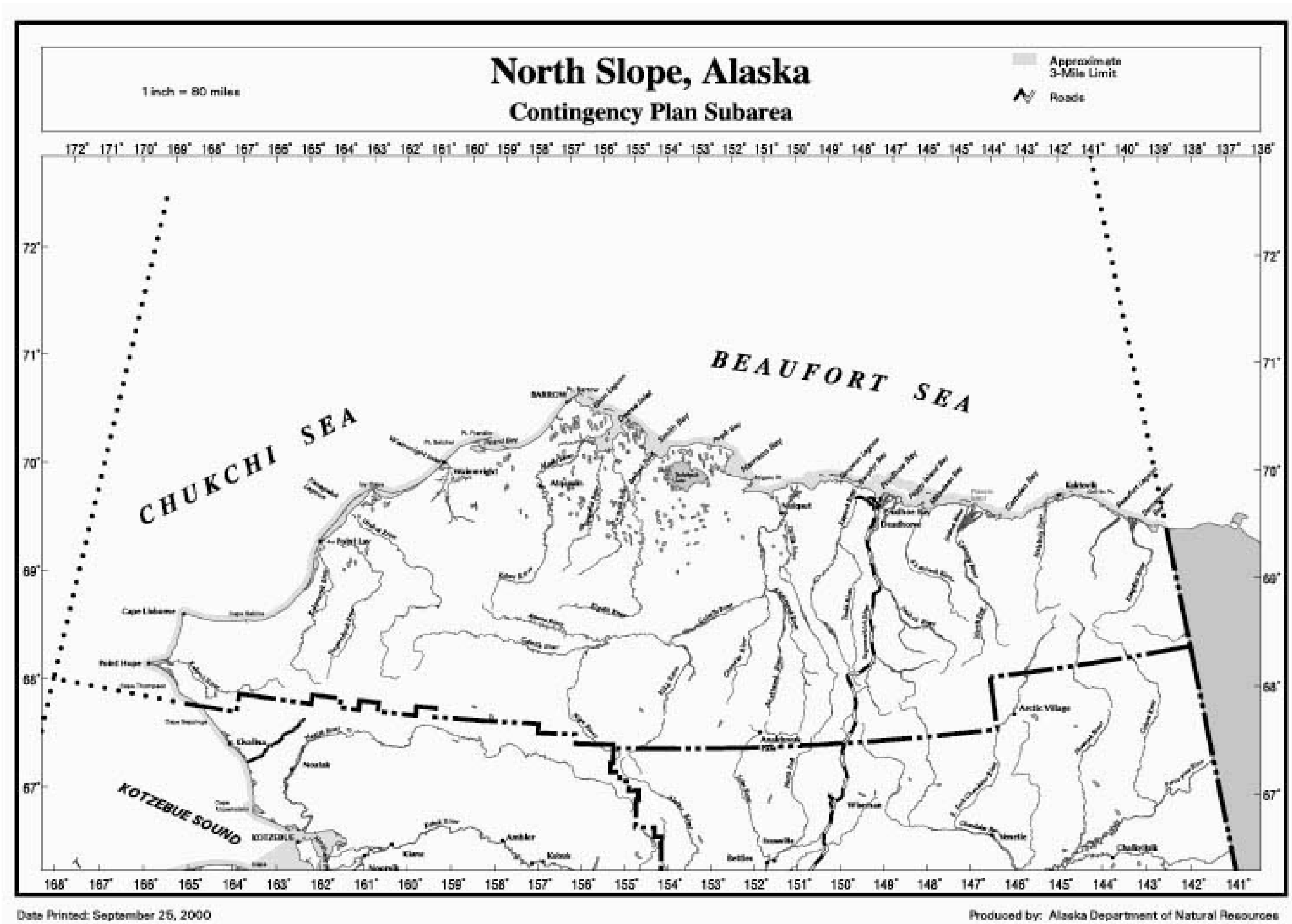


Figure E-3: Subarea Nautical Chart Map Index

North Slope Nautical Chart Map Index – to view the map, please go to the DNR ***Prevention and Emergency Response Subarea Plan Maps*** website located at: http://www.asgdc.state.ak.us/maps/cplans/ns/ns5naut.pdf

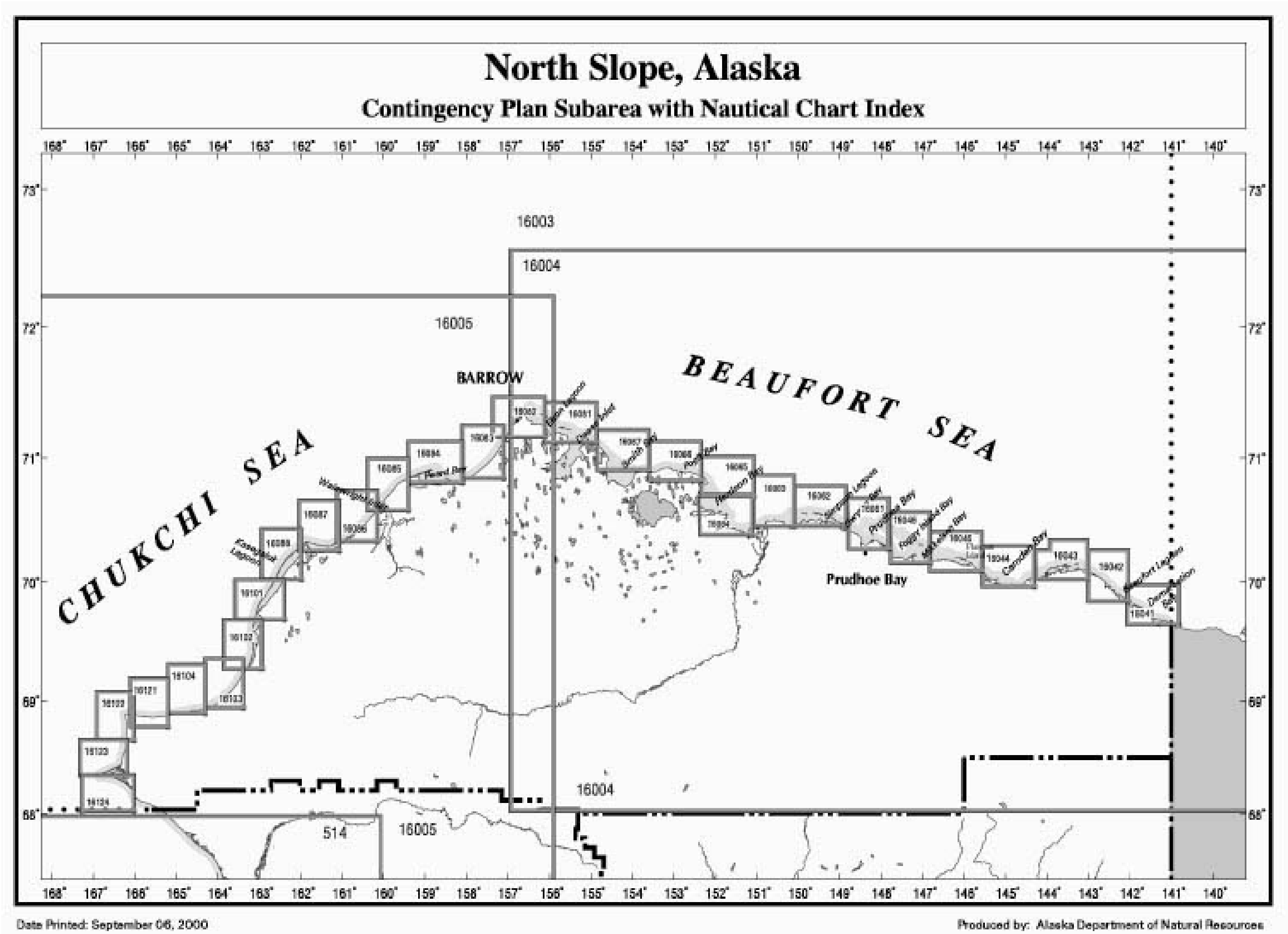
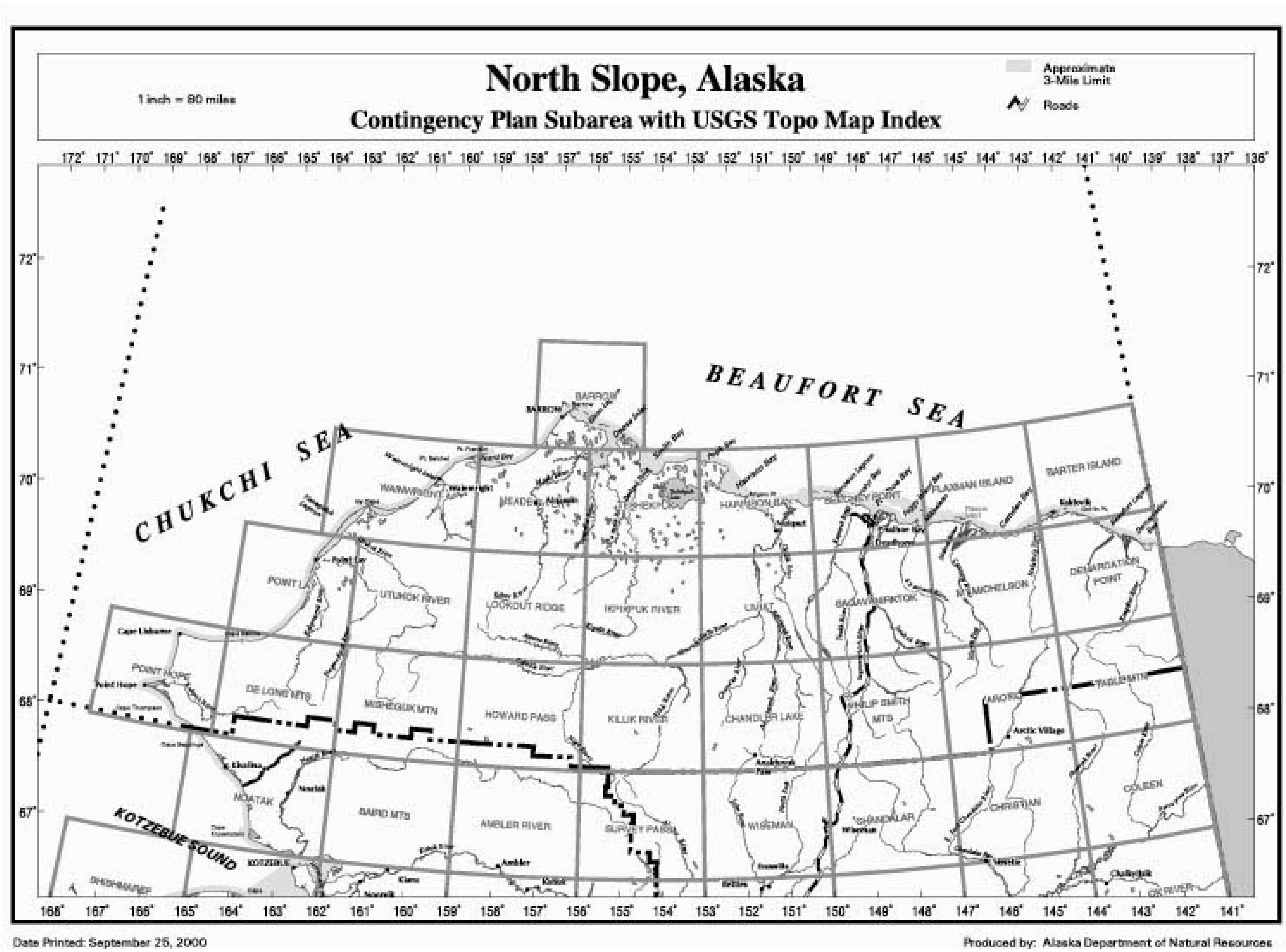


Figure E-4: Subarea USGS Topo Map Index

North Slope USGS Quadrangles Map Index – to view the map from the ARRT website, please go to the DNR ***Prevention and Emergency Response Subarea Plan Maps*** website located at: http://www.asgdc.state.ak.us/maps/cplans/ns/ns5quad.pdf



C. AREA OF RESPONSIBILITY

This subarea contingency plan covers the region outlined above in subpart A. The USCG Captain of the Port (COTP) is the predesignated FOSC for the Coastal Zone which encompasses all navigable waters seaward of the mean high tide line and an area of shoreline 1,000 yards inland of the coastline. The Environmental Protection Agency is the predesignated FOSC for the Inland Zone which encompasses all lands, rivers, streams, and drainages inland of the 1000-yard wide band which parallels the Alaskan coastline. These zones are clearly defined in the Unified Plan. It is possible that incidents may occur in locations that do not fall under federal jurisdiction, and there will be no FOSC in these instances.

The State of Alaska places jurisdiction of spill response for the North Slope Subarea under the Northern Alaska Response Team (NART) of the Alaska Department of Environmental Conservation. The SOSC for the NART is the predesignated SOSC for the entire North Slope Subarea.

Memoranda of Understanding (MOU) or Memoranda of Agreement (MOA), both of which delineate agency and OSC responsibilities, exist between the USCG and the EPA, between the USCG and the Alaska Department of Environmental Conservation (ADEC), and between the EPA and the ADEC. **Annex K of the Unified Plan** includes copies of these MOUs/MOAs.

D. REGIONAL STAKEHOLDER COMMITTEE

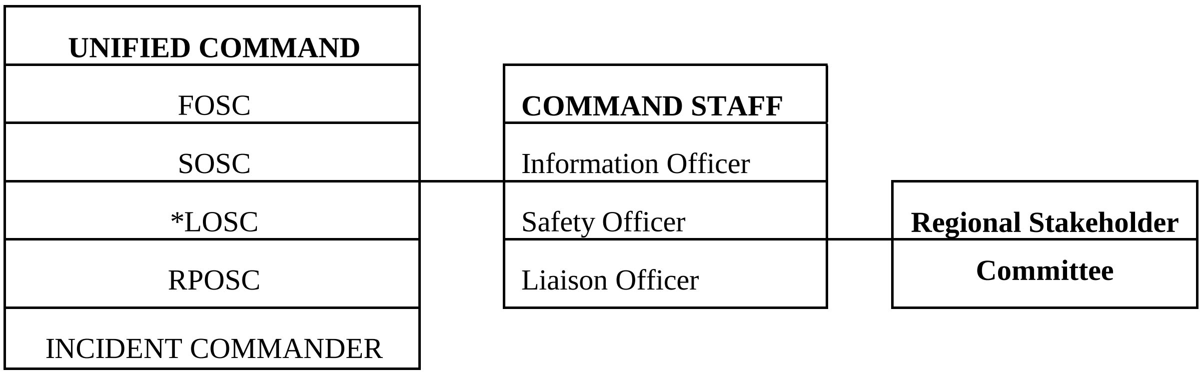
A Regional Stakeholder Committee (RSC) will normally be activated for significant incidents. The RSC was previously referred to as the Multi-Agency Coordination Committee (MAC). Unlike the MAC defined in the ICS of the National Incident Management System (NIMS), the RSC for a spill response does not play a direct role in setting incident priorities or allocating resources. The RSC can advise the Unified Command (under the guidance of the Community Liaison Officer) and provide comments and recommendations on incident priorities, objectives and action plans.

Figure E-5 provides the general location of the RSC in relation to the Unified Command organizational structure. Additionally, the suggested/potential membership of the RSC is provided in Figure E-5. Membership on the RSC is dependent upon the location of the incident and the interests or jurisdiction of the affected communities, landowners, and special interest groups. Government agencies will not normally use the RSC to provide input to the Unified Command. Federal agency personnel will participate within the ICS structure under the leadership of the FOSC; state personnel will do so under the guidance of the SOSC. During an incident in which no FOSC is taking part, federal agencies with jurisdictional responsibilities for resources at risk could participate as a member of the RSC, thus retaining a channel for input on containment, oversight, and cleanup. The preferred approach is to include these agencies as part of the overall ICS structure.

As indicated above, the RSC is not directly involved in tactical operations, though some of its members may be. The RSC's role is to convey to the Unified Command information relating to the authority, concerns and expertise of its members. RSC members recommend to the Unified Command overall objectives and priorities and review the Incident Action Plans developed by the Unified Command.

RSC activities will be coordinated by the Community Liaison Officer. RSC discussions will be documented, and recommendations or dissenting opinions expressed outside of the RSC meetings with the Unified Command will be communicated to the Unified Command through the Liaison Officer. The RSC will be chaired initially by the Community Liaison Officer. After convening, the RSC will then elect its own chair.

Figure E-5: North Slope Subarea Regional Stakeholder Committee ICS Organizational Position and Membership



Suggested membership of the Regional Stakeholder Committee:

- Representatives or Community Emergency Coordinators from affected communities, which may include:
-

North Slope Borough	Deadhorse	Point Hope
Anaktuvuk Pass	Kaktovik	Point Lay
Atqasuk	Lisburne	Wainwright
City of Barrow	Nuiqsut	

- Private landowners and leaseholders
- Native corporations, organizations and communities
- Representatives from federally-recognized tribes
- Special interest groups affected by the incident

** As long as there is an immediate threat to life, health or safety, the Local On-Scene Coordinator serves as the Incident Commander and is part of the Unified Command.*

E. SUBAREA COMMITTEE

The primary role of the Subarea Committee is to act as a preparedness and planning body for the subarea. The pre-designated Federal On-Scene Coordinators (EPA and USCG) for the subarea and the pre-designated State On-Scene Coordinator from the ADEC compose the primary membership of the Subarea Committee. Depending upon the event or the issues to be addressed, a representative from the North Slope Borough or local or tribal government representatives may also serve on the North Slope Subarea Committee. Each member is empowered by their own agency to make decisions on behalf of their organization and to commit the organization to carrying out roles and responsibilities as described in this plan and the **Unified Plan**.

The Subarea Committee is encouraged to solicit advice, guidance or expertise from all appropriate sources and establish work groups as necessary to accomplish the preparedness and planning tasks. The FOSC should solicit the advice of the Alaska Regional Response Team (ARRT) to determine appropriate work group representatives from federal, state and local agencies. Work Group participants may include facility owners/operators, shipping company representatives, cleanup contractors, emergency response officials, marine pilot associations, academia, environmental groups, consultants, response organizations and federal, state and local agency representatives.

1. Subarea Committee Members

The North Slope Subarea Committee is comprised of representatives from the following federal, state and local agencies:

- ❖ U.S. Coast Guard, COTP Western Alaska
- ❖ U.S. Environmental Protection Agency
- ❖ Alaska Department of Environmental Conservation
- ❖ North Slope Borough or local government when applicable

The North Slope Subarea Committee also seeks advice and expertise concerning environmental and economic issues from international, federal, state and local agencies and private industries, such as the following:

- Local borough, city and tribal governments
- Federally-recognized tribes
- Regional/local businesses, especially petroleum-related, such as BP, ConocoPhillips, APSC and others
- Local Emergency Planning Committees
- Alaska Department of Fish and Game
- Alaska Department of Natural Resources
- Alaska Department of Military and Veteran Affairs
- National Marine Fisheries Service
- National Oceanic and Atmospheric Administration
- U.S. Department of the Interior-Office of Environmental Policy and Compliance
  - U.S. Fish and Wildlife Service
  - National Park Service
  - Bureau of Land Management
  - Bureau of Ocean Energy Management, Regulation and Enforcement
- U.S. Forest Service
- Canada (Yukon Territory)

2. Subarea Work Groups

The Subarea Committee seeks to solicit advice, guidance or expertise from all appropriate sources and establish work groups as necessary to accomplish the preparedness and planning tasks. The Subarea Committee selects the work group members and provides general direction and guidance for the work groups. In addition to federal, state and local agency representatives, work group participants may include facility owners/operators, shipping company representatives, cleanup contractors, emergency response officials, marine pilot associations, academia, environmental groups, consultants, response organizations and representatives from any applicable regional citizens' advisory councils.

The North Slope Subarea Committee has formed the following work groups:

> The Sensitive Areas Work Group is chaired by the Department of Interior-Office of Environmental Policy and Compliance representative. This work group coordinates the preparation of the necessary information for each separate subarea and ensures that the information is submitted in a common format. Participation by local community staff is vital to acquire local input and validate existing information. The North Slope subarea-specific sensitive areas information has been prepared and incorporated into the Sensitive Areas section of this plan.
>
> The Logistics Work Group is co-chaired by representatives from the USCG, the EPA, and the ADEC. This work group is responsible for preparing the Resources Section of this plan.
>
> The Operations Work Group is co-chaired by representatives from the USCG, the ADEC and the EPA. This work group is responsible for scenario development and the refinement/expansion of the Emergency Notification Lists located in the Response Section of this plan.

BACKGROUND: PART TWO – RESPONSE POLICY & STRATEGIES

The strategy for responding to a specific spill or hazmat incident depends upon numerous factors. The strategy can change as the situation changes. As a general rule, the strategies listed below should be used as a guide in developing an effective response. Consider all factors that may affect the particular situation and revise/modify/expand these priorities as the situation dictates. The Response Section of this plan contains specific information on response procedures and ramp-up timelines. Additional information can be found in **the Unified Plan**.

The Alaska Clean Seas Technical Manual provides specific tactics, strategies, and the resources necessary to support a given strategy. See the Geographic Response Strategies Section (ACS Technical Manual, Quick Reference Section) for a summary of the tactics, response strategies, and maps contained in the technical manual.

A. FEDERAL RESPONSE ACTION PRIORITIES/STRATEGIES

The following priorities are general guidelines for response to a pollution incident within the COTP Western Alaska Zone. They are based on the premise that the safety of life is of paramount importance in any pollution incident, with the protection of property and the environment, although important, being secondary. Nothing in this part is meant to indicate that higher priority items must be completed before performing a lower priority task. They may be carried out simultaneously or in the most logical sequence for each individual incident.

Priority One – Safety of Life. For all incidents which may occur, the safety of personnel, including response personnel, must be given absolute priority. No personnel are to be sent into an affected area without first determining the hazards involved and that adequate precautions have been taken to protect personnel.

Priority Two – Safety of Vessel/Facility and Cargo. The facility and/or vessel and its cargo shall become the second priority, behind the Safety of Life.

Priority Three – Protection of the Environment by elimination of the pollution source. Containment and recovery of oil must be effected expeditiously to preclude sustained impacts to the inland waters of the U.S. Due to remote locations and restricted accessibility, it is extremely difficult to protect these locations through diversion or exclusion methods. Therefore, securing the source and rapid containment and recovery is especially critical and should normally be the first line of defense to protect the environment. Likewise, spills which occur on land or in upland water courses will be dammed, boomed, diked, etc., as feasible to prevent the spread of the pollutant downstream. NOTE: *In situ* burning (see below) of a vessel and its pollutant may be an alternative considered by the OSC which places environmental protection priorities above saving the vessel and its cargo.

Priority Four – Protection of the Environment by diversion/exclusion, dispersion, or *in situ* burning. In the event that the location of a spill or the weather conditions do not permit rapid recovery, protection of the inland waters of the U.S. becomes paramount, especially areas of greatest sensitivity. It may not be possible to protect some areas entirely or even in part. The OSC may consider *in situ* burning as a response option: refer to the **Unified Plan** for an *in situ* burning checklist. The use of dispersants must be considered early in the response phase while the oil is in the open water. Subpart J of the NCP and the **Unified Plan (Annex F)** address in detail the responsibilities of the OSC in the use of chemicals.

<u>Priority Five</u> – Protection of the Environment by beach cleanup and the use of Sacrificial Areas. It may not be possible to protect the inland waters adjoining shoreline from oil. In fact, it may be allowed purposely to come ashore in some areas as an alternative to damaging others. Selection of the proper shoreline cleanup technique depends on many different factors including the following:

- Type of substrate
- Amount of oil on the shoreline
- Depth of oil in the sediment
- Type of oil (tar balls, pooled oil, viscous coating, etc.)
- Trafficability of equipment on the shoreline
- Environmental or cultural sensitivity of the oil shoreline
- Prevailing oceanographic and meteorological conditions

The best way to minimize debate over the most appropriate response is to involve all interested government and private agencies. The shoreline assessment groups shall attempt to agree on the amount and character of the oil that is on the shorelines, anticipate interactions between the stranded oil and the environment, and the geological and ecological environment of the involved shorelines. Once a consensus is met, a process is necessary to determine the proper treatment required.

Shoreline cleanup options may include the use of physical and/or chemical processes. Chemical shoreline cleanup products may increase the efficiency of water-washing during the cleanup of contaminated shorelines. However, the product must be listed on the EPA National Contingency Plan Product Schedule and authorization must be obtained from the ARRT and the government on-scene coordinators at the spill. Physical shoreline cleaning methods include techniques such as: natural recovery, manual sorbent application, manual removal of oiled materials, low pressure flushing (ambient temperature), vacuum trucks, warm water washing, high pressure flushing, manual scraping, and mechanical removal using heavy equipment. Bioremediation also may be considered as a shoreline cleaning method. Bioremediation is the application of nutrients to the shoreline to accelerate the natural biodegradation of oil.

B. STATE OF ALASKA RESPONSE PRIORITIES

1. **Safety:** Ensure the safety of persons involved, responding, or exposed to the immediate effects of the incident.

2. **Public Health:** Ensure protection of public health and welfare from the direct or indirect effects of contamination of drinking water, air, and food.

3. **Environment:** Ensure protection of the environment, natural and cultural resources, and biota from the direct or indirect effects of contamination.

4. **Cleanup:** Ensure adequate containment, control, cleanup and disposal by the responsible party or supplement or take over when cleanup is inadequate.

5. **Restoration:** Ensure assessment of contamination and damage and restoration of property, natural resources and the environment.

6. **Cost Recovery:** Ensure recovery of costs and penalties to the Response Fund for response, containment, removal, remedial actions, or damage.

(This Page Intentionally Blank)

BACKGROUND: PART THREE – SUBAREA SPILL HISTORY & OIL FATE

A. NAVIGABLE WATERS SPILL HISTORY

The North Slope Subarea experiences a limited amount of vessel traffic, primarily resupply barges and fuel barges. Any response to spills in this subarea is compounded by the relatively short ice-free periods on the open ocean. The many crude oil development and production platforms operating in the Prudhoe Bay offshore area, as well as the volume of oil product transported, especially by pipeline, increase the probability of a major oil spills to the surrounding waters. Fortunately, spills to water have been few. The most significant occurred in August of 1988 when the Tanker 570 lost 68,000 gallons of arctic heating fuel. No product was recovered.

Listed below is a brief synopsis of the significant releases of petroleum products. This information was collected from the ADEC spill database; a complete listing of all spill events is available through ADEC.

Date	**Location-Incident**	**Substance**	**Quantity**
08/XX/88		Arctic Heating Fuel	68,000 gallons
05/19/97	Offshore Pad #10	Diesel	7,560 gallons
07/17/99	Offshore F-Pad, W Prudhoe Bay	Natural Gas	4,200 pounds
01/22/01	Offshore R-pad, E Prudhoe Bay	Diesel	2,856 gallons
04/12/05	Offshore DS14 pipeline, E Prudhoe Bay	Crude Oil	1,260 gallons

B. INLAND SPILL HISTORY

Date	Location-Incident	Substance	Quantity
06/03/71	BP side of ARCO airfield - unknown	Aviation Fuel	45,000 gallons
01/05/72	BP side of ARCO airfield - human error	Diesel	20,000 gallons
01/01/81	Check Valve 23 – faulty valve	Crude Oil	84,000 gallons
05/07/81	TAPS Pipeline, Mile 5 - unknown	Diesel	10,000 gallons
08/22/81	COTU Fuel Storage Tanks-faulty connection	Diesel	18,900 gallons
10/31/82	Prudhoe Bay Diesel Storage Tank–overtopped	Diesel	8,400 gallons
07/28/83	NSB Service Area #10 - ruptured line	Gasoline	7,550 gallons
08/14/83	Mile 11.5 Dalton Highway - truck accident	Diesel	7,000 gallons
08/29/83	Mile 125, Dalton Highway - truck accident	Diesel	8,350 gallons
06/02/85	Prudhoe Bay PBOC - leak	Crude Oil	10,000 gallons
11/14/85	Prudhoe Bay Fuel Terminal- valve left open	Gasoline	10,500 gallons
11/15/85	CPF Holding Pit, Milne Point - faulty valve	Crude Oil	7,350 gallons
04/25/88	Atqasuk - cause unknown	Diesel	10,000 gallons
06/16/88	Barrow Tank Farm - faulty valve	Diesel	10,000 gallons
07/28/89	CPF Milne Point leak	Crude Oil	38,850 gallons
08/25/89	Drilling Site 2U - unknown	Crude Oil	25,200 gallons
01/31/90	Anaktuvuk Pass Power Plant - ruptured line	Diesel	100,000 gallons
12/10/90	Drilling Site L5 - explosion	Diesel	25,200 gallons
06/17/91	NE Point Lay Tank Farm - unknown	Diesel	6,000 gallons
05/24/94	Wainwright (school district pipeline - ruptured	Diesel	10,000 gallons
03/10/95	East Prudhoe Bay - Storage line ruptured	Diesel	3,000 gallons
12/20/95	West Prudhoe Bay MPU A Pad-vehicle accident	Noncrude Oil	5,670 gallons
01/31/96	Point Lay LRRS bulk storage tank-line ruptured	Diesel	2,200 gallons
04/17/96	Prudhoe Bay - corrosion	Crude Oil	6,300 gallons
06/12/96	Barrow (MarkAir Tank Farm) - leak	Aviation Fuel	3,000 gallons
07/06/96	Wainwright City - valve left open	Diesel	4,000 gallons
02/13/97	Nuiqsut Tank Farm - human error	Diesel	2,000 gallons
03/17/97	East Prudhoe Bay, DS4 - human error	Process Water	994,000 gallons
03/26/97	16 Well #18 - line ruptured	Crude Oil	4,746 gallons
07/15/97	Kuparuk Transmission Line - corrosion	Crude Oil	2,000 gallons
11/1197	Dalton Highway - truck overturned	Diesel	5,217 gallons
11/25/97	Wainwright City Tank - human error	Diesel	5,200 gallons
08/21/00	West Prudhoe, GC-2 eqpt failure	Crude Oil	30,030 gallons
12/17/00	ADOT Sag River Facility - valve failure	Diesel	7,600 gallons
02/19/01	D-Pad Flow pipe - human error	Crude Oil	25,500 gallons
07/27/02	Pipe at NARL site, Barrow - human error	Diesel	1,800 gallons
02/28/03	MCC Fuel Dock - crack in flow fuel pump	Diesel	3,576 gallons
11/17/03	E Prudhoe, Non-crude Terminal - human error	Diesel	11,000 gallons
06/04/04	Point Lay heating oil tank - human error	Diesel	4,000 gallons
07/12/05	Kuparuk Drill Site 1-D – leak	Diesel	1,603 gallons
03/02/06	GC2 transit pipeline - corrosion	Crude Oil	212,252 gallons
04/06/06	Kuparuk Drill Site 1-Q – rollover	Drilling Mud	300,000 pounds
08/06/06	Flow Station-2 – corrosion	Crude Oil	5,040 gallons
08/19/06	Well Pad S Tanker Trailer – rollover	Seawater	8,695 gallons
12/19/06	GC-2 – corrosion	Process Water	234,738 gallons
		Crude Oil	6,300 gallons
04/02/07	Well Pad A – seal failure	Source Water	38,600 gallons

Date	Location-Incident	Substance	Quantity
04/08/07	Drill Site-5 – vehicle rollover	Diesel	6,930 gallons
12/16/07	Drill Site 2U (Kuparuk) – corrosion	Crude Oil	4,284 gallons
03/17/08	Plug and Abandon Well Project (Nuiqsut) ext factors	Crude Oil	2,100 gallons
03/26/08	Kuparuk Gubik #3 – equipment failure	Drilling Mud	10,920 gallons
06/16/08	Skid 50 Prudhoe Bay East Operating Area – line failure	Source Water	49,387 gallons
08/06/08	Well Pad D – human error	Diesel	2,310 gallons
09/07/08	Drill Site-18 – unknown	Process Water	5,544 gallons
09/16/08	Kaktovik Bulk Fuel Farm – line failure	Gasoline	2,000 gallons
11/03/08	Drill Site-11 – line failure	Seawater	61,626 gallons
12/04/08	Oooguruk Aboveground Tank – overfill	Drilling Mud	6,720 gallons
12/25/08	1 L Pad Well 22 – line failure	Produced Water	94,920 gallons
01/12/09	Milne Pt Aboveground Tank – equipment failure	Produced Water	5,712 gallons
		Crude Oil	4,048 gallons
02/03/09	CPF-1 – corrosion	Produced Water	6,900 gallons
02/18/09	Flow Station-2 – corrosion	Crude Oil	1,932 gallons
03/22/09	Drill Site-1L – gauge/site glass failure	Produced Water	9,450 gallons
11/29/09	Lisburne Production Center – line failure	Produced Water	32,500 gallons
		Crude Oil	13,500 gallons
12/02/09	Well Pad R – corrosion	Produced Water	7,140 gallons
06/21/10	West Dock – equipment failure	Produced Water	10,935 gallons

C. HAZMAT RELEASE HISTORY

Listed below is a brief synopsis of significant releases of hazardous substances in the region. This information was collected from the ADEC spill database; a complete listing of all spill events is available through ADEC.

Date	Location-Incident	Substance	Quantity
12/08/81	Dowell Pad, Prudhoe	Acid	700 gallons
07/22/90	Schlumberger Pad	Acid	7,200 gallons
10/12/96	Barrow (NOAA) - intentional release	Ammonia	500 pounds
10/30/01	W Prudhoe Bay Access Road- collision	Hydrochloric Acid	1,764 gallons
10/30/01	U Pad – truck rollover	Hydrochloric Acid	211 gallons

North Slope Subarea

Total Spills: 4,481
Total Volume: 1,916,958
Average Spill Size: 428
Average Spills/Year: 448
Average Volume/Year: 191,696

Top 5 Causes

Cause	Spills	Gallons
Leak	659	1,049,717
Corrosion	98	219,688
Unknown	291	106,844
Other	242	92,585
Valve Failure	377	91,730

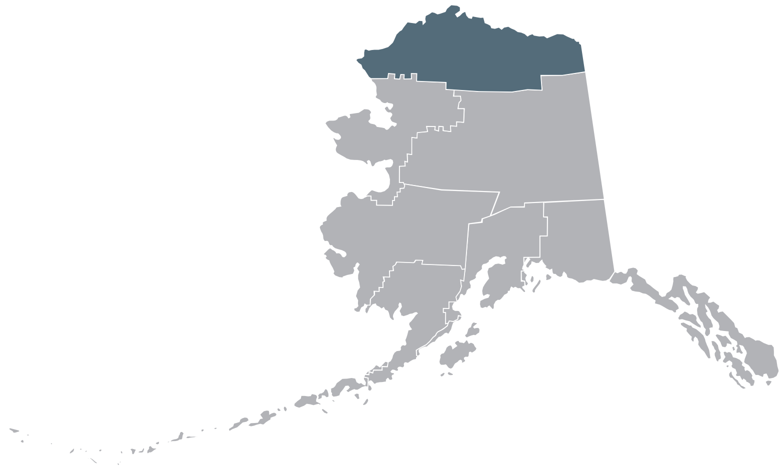
Top 5 Products

Product	Spills	Gallons
Seawater	143	1,067,912
Produced Water	200	349,274
Crude	516	103,397
Diesel	990	98,002
Drilling Muds	206	83,157

Top 5 Facility Types

Facility Type	Spills	Gallons
Oil Production	3,258	1,793,114
Pipeline	343	29,185
Noncrude Terminal	28	23,586
Oil Exploration	95	20,786
Other	173	14,892

NOTE: The data summary above excludes spills reported in pounds and potential spills.



Shoreline: 2,800 miles
Land Area: 57,500,000 acres or 89,800 square miles

There are a total of 10 villages in the region, 8 Native and 2 non-Native (Deadhorse and Cape Lisburne).

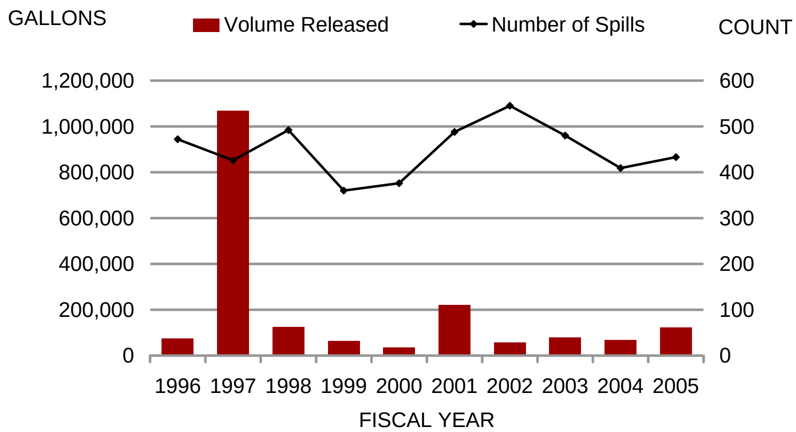
The number of facilities storing, handling, and transferring noncrude products is very small. These facilities typically provide fuel mainly for the generation of electricity and heating homes. The fuel is also used to power vehicles and vessels which are relatively few in number as well. Tank barges provide fuel to these facilities no more than twice each year and only during the short open-water season. Numerous exploratory and production wells exist in the region and produce a large amount of crude oil which is piped above ground to processing facilities before being shipped through the Trans Alaska Pipeline to Valdez.

The highest probability of spills of noncrude products occurs during fuel transfer operations at the remote villages. Historically, the occurrence of spills from facilities during these operations is not significant. Spills of noncrude product that enter the water will rapidly disperse and evaporate making cleanup difficult. Crude oil will be affected by the same natural degradation factors but to a much lesser degree. Crude oil spills will be persistent and will require aggressive actions and innovative techniques in the harsh Arctic environment.

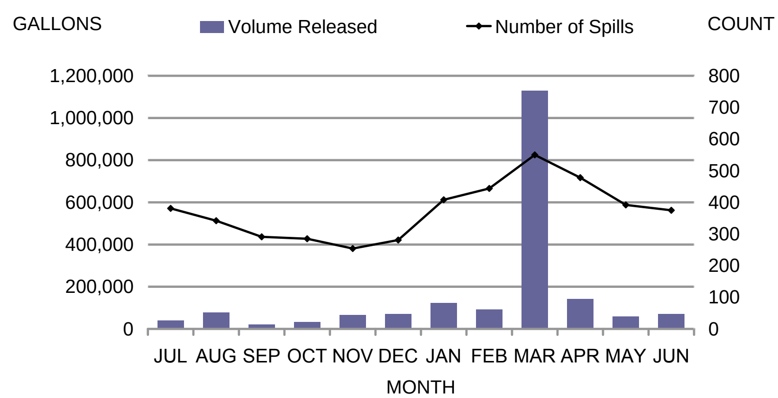
Discernible Trends

- There is no discernible trend in the average number of spills per year and the total volume released (with the exception of FY 2001).
- There appears to be a seasonal increase in the number of spills during the January through April timeframe. This could be the result of increased exploration activities during the winter months.
- 93% of the reported spills in the North Slope subarea were from Transportation facilities. This category includes pipelines that carry crude oil and other substances to the production facilities and on to the Trans Alaska Pipeline System.
- Structural/Mechanical (66%) was the leading cause of most spills in the North Slope subarea, and also accounted for 82% of the total volume spilled.
- 49% of the total number of spills involved noncrude oil, followed by hazardous substances (31%) and crude oil (12%). In terms of total volume, process water represented 75% of the total volume spilled, followed by hazardous substances (13%), noncrude oil (7%), and crude oil (5%).

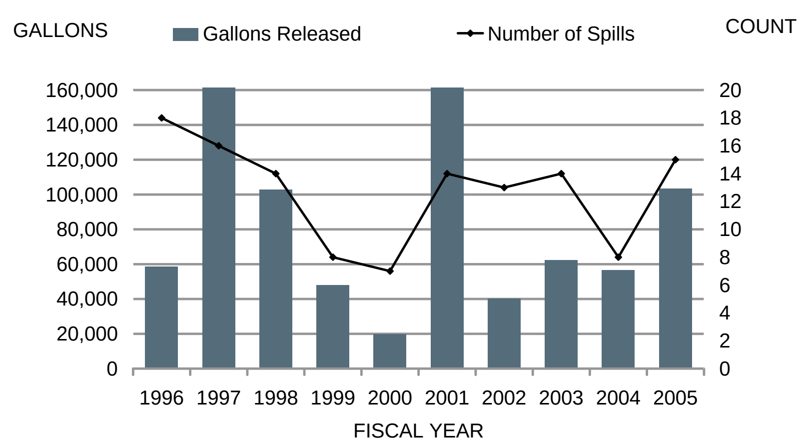
All Spills by Fiscal Year



All Spills by Month



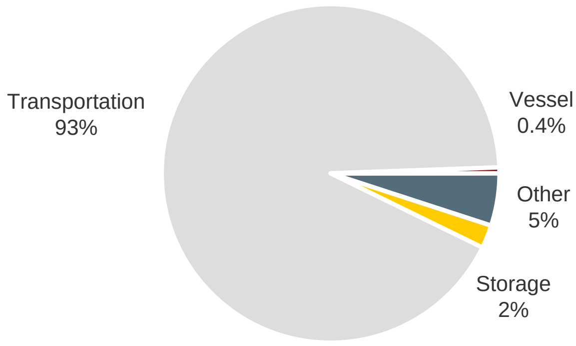
Spills >1,000 gallons



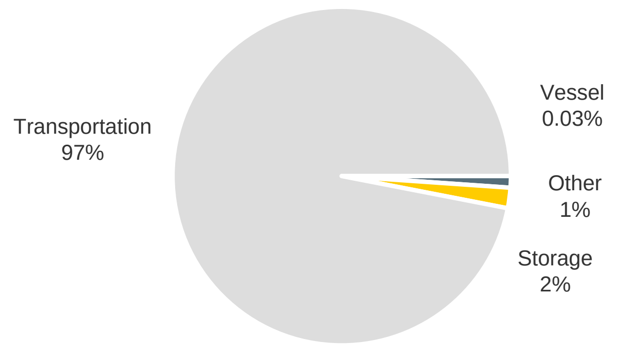
NOTE: Graphs do not include spills reported in pounds or potential spills.

North Slope Subarea Spills by Facility Type

Number of Spills

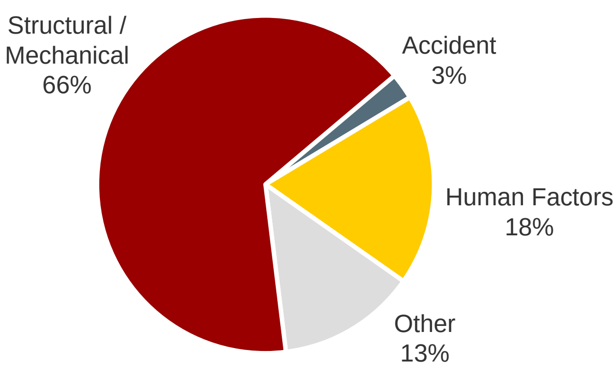


Gallons Released

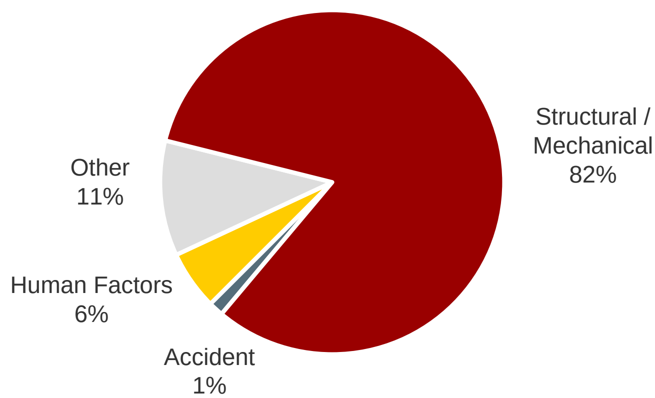


North Slope Subarea Spills by Cause

Number of Spills

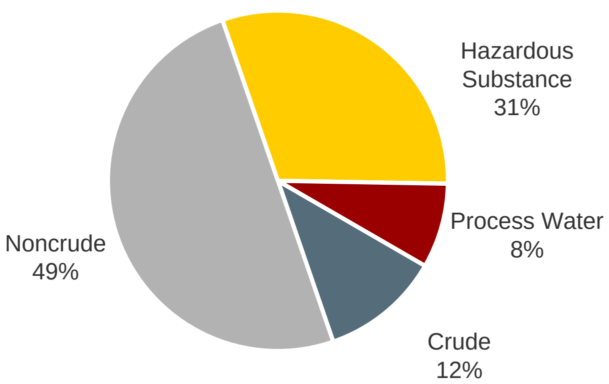


Gallons Released

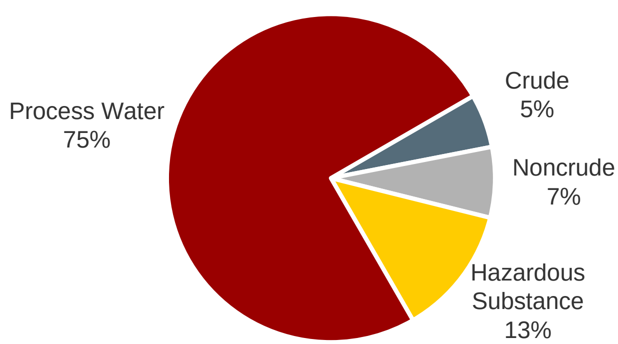


North Slope Subarea Spills by Product

Number of Spills



Gallons Released

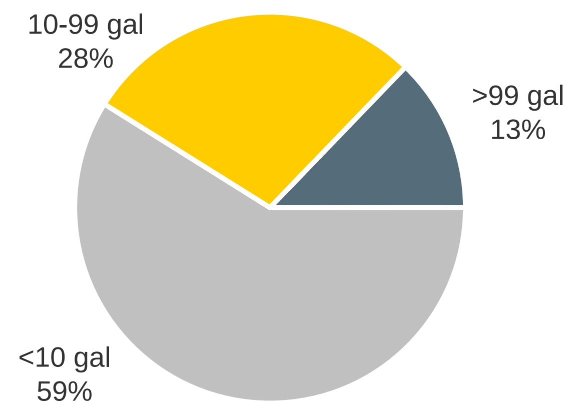


NOTE: Graphs do not include spills reported in pounds or potential spills.

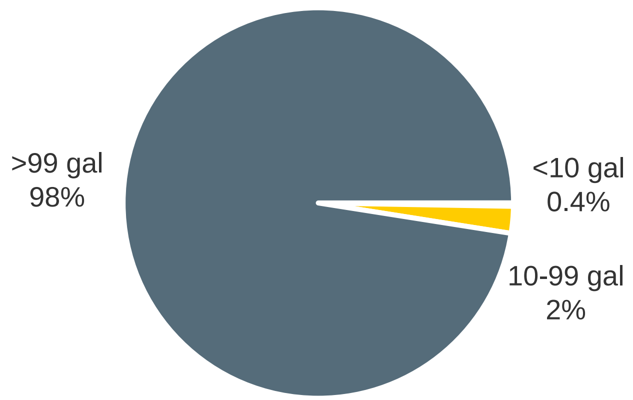
North Slope Subarea Spills by Size Class

- More than half of the spills during the report period were less than 10 gallons in volume.
- Approximately 98% of the total volume released resulted from spills larger than 99 gallons.

Number of Spills



Gallons Released



NOTE: Graphs do not include spills reported in pounds or potential spills.

North Slope Subarea Spills at Regulated vs. Unregulated Facilities

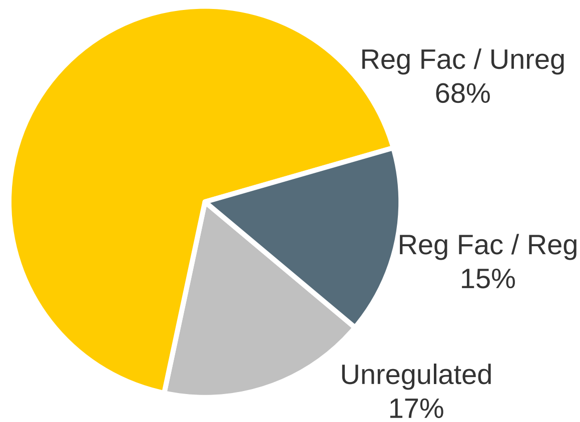
Numerous oil facilities and vessels operating in Alaska are subject to Alaska's spill response planning and financial responsibility statutes. This section summarizes spills from:

- facilities and vessels required by statute to have an approved oil discharge prevention and contingency plan; and,
- non-tank vessels which are required to have an approved certificate of financial responsibility are also included.
- Spills from underground storage tanks are not included in this analysis.

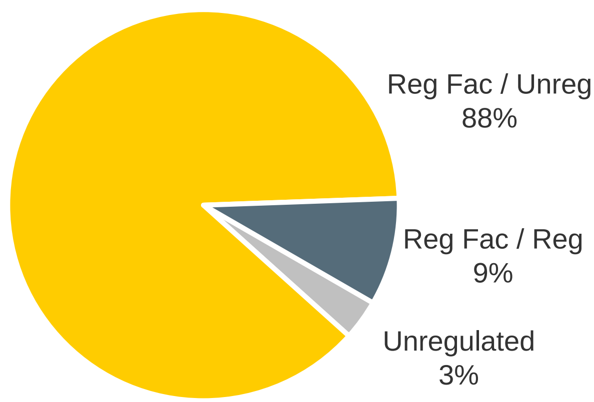
Alaska's contingency planning requirements apply to specific aspects (components) of a facility's or vessel's operations. The analysis in this report distinguishes between spills from regulated versus unregulated components. Examples of spills from unregulated components include:

- a spill from a vehicle at a regulated facility;
- a spill from a fuel tank (below the regulatory threshold of 10,000 barrels) at a regulated facility
- certain piping at oil production facilities

Number of Spills



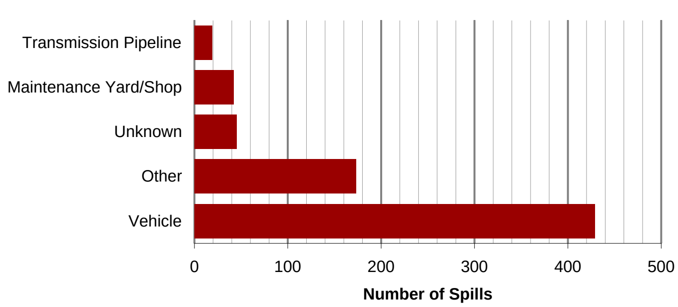
Gallons Released



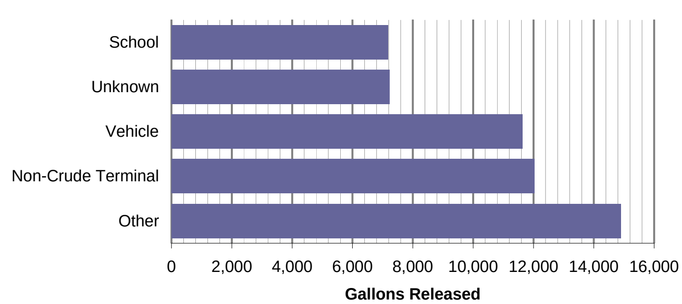
- More than two-thirds of the spills and more than three-quarters of the total volume released during the 10-year period were from unregulated components of regulated facilities.
- Spills from unregulated vehicles accounted for the majority of spills, while spills from Other facilities accounted for the greatest volume released.

Top Unregulated Facilities

Number of Spills



Gallons Released

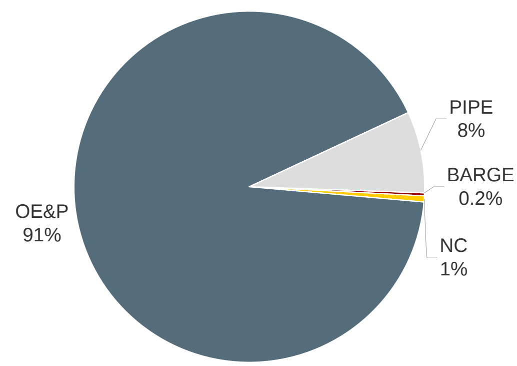


NOTE: Graphs do not include spills reported in pounds or potential spills.

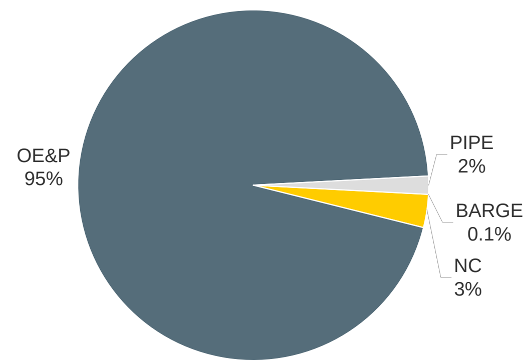
North Slope Subarea Spills by Regulated Facility Type

- Oil Exploration and Production (OE&P) facilities were responsible for more than 90% of the spills during the 10-year period and approximately 95% of the total volume from.

Number of Spills



Gallons Released



NOTE: Graphs do not include process water spills, spills reported in pounds, or potential spills.

Major Spills in the North Slope Subarea

Date	Spill Name	Product	Gallons
3/17/1997	East Prudhoe Bay, DS 4	Seawater	994,400
1/31/1990	Anaktuvuk Pass Power Plant, ruptured line	diesel	100,000
4/15/2001	Kuparuk, From CPF1 To Drill Site 1B	Produced Water	92,400
1/1/1981	Check Valve 23, faulty valve	crude oil	84,000
8/1/1988	Tanker 570	heating fuel	68,000
1/10/1998	Kuparuk, Arco DS 1A	Produced Water	63,000
3/26/2005	Kuparuk 2-H Pad	Produced Water	51,198
6/3/1971	ARCO airfield	aviation fuel	45,000
7/28/1989	CPF Milne Point	crude oil	38,850
8/21/2000	W Prudhoe Bay,GC-2	Crude	30,030
1/8/2000	West Prudhoe Bay, GC-3 Flare	Other	30,000
6/18/2004	Flow Station 2	Produced Water	28,350
2/19/2001	W Prudhoe Bay, Between D-Pad And GC	Crude	25,500
8/25/1989	Drilling Site 2U leak	crude oil	25,200
12/10/1990	Drilling Site L5 explosion	diesel	25,200
3/5/1999	Arco, Alpine, Colville River Crossing-East Bank	Other	24,654
1/5/1972	BP side of ARCO airfield	diesel	20,000
1/16/2001	Northstar Containment Cell #6	Drilling Muds	18,900
8/22/1981	COTU Fuel Storage Tanks	diesel	18,900
2/3/2005	CPF Pad	Methyl Alcohol (Methanol)	12,811
11/7/1995	West Prudhoe Bay, Y Pad Behind Well 7	Seawater	12,600
12/18/2002	West North Slope, B.P. Price Pad.	Drilling Muds	12,118
2/26/2002	West Prudhoe Bay, Well Pad A	Source Water	11,611
3/5/2001	Pump Station 1, FBU Main Meter Bldg	Halon	11,400
11/17/2003	Deadhorse	Diesel	11,000
4/13/2003	Kuparuk, 1H Pad Manifold Bldg Release	Produced Water	10,810
10/6/1998	Kuparuk, Arco, Drill Site 1L	Produced Water	10,500
10/8/1998	Kuparuk, Arco, Drill Site 1-L	Produced Water	10,500
11/14/1985	Prudhoe Bay Fuel Terminal, valve left open	gasoline	10,500
5/7/1981	Mile 5 TAPS	diesel	10,000
6/2/1985	Prudhoe Bay PBOC leak	crude oil	10,000
4/25/1988	Atqasuk	diesel	10,000
6/16/1988	Barrow Tank Farm, faulty valve	diesel	10,000
5/24/1994	Wainwright (School District pipeline)	diesel	10,000
11/1/1996	SIP	Seawater	9,695
1/7/1996	Kuparuk, DS 2D Arco Prod Water Spill	Produced Water	8,820
10/31/1982	Diesel Storage Tank (PBOC), Prudhoe Bay	diesel	8,400
8/29/1983	Mile 125, Dalton Highway, truck accident	diesel	8,350
12/10/2000	Milne Point, Central Processing Facility	Source Water	7,754
12/17/2000	E North Slope, ADOT Sag River Maintenance Station	Diesel	7,600
5/19/1997	North Slope, Arco Pad 10	Diesel	7,560
7/28/1983	NSB Service Area #10, ruptured line	gasoline	7,550
11/15/1985	CPF Holding Pit, Milne Point, faulty valve	crude oil	7,350
8/14/1983	Mile 11.5 Dalton Highway, truck accident	diesel	7,000
8/1/2002	Lisburne Production Center	Produced Water	6,301
7/23/1999	West North Slope, Arco Kuparuk Hset, Well 15 Pwi L	Produced Water	6,300

Major Spills in the North Slope Subarea *(continued from previous page)*

Date	Spill Name	Product	Gallons
2/28/2005	Spy Island Sea Floor Mud	Drilling Muds	6,300
3/2/2000	East Prudhoe Bay, CGF Module 4907	Drag Reducing Agent	6,000
5/27/2003	Flowline Between GC1 And Q Pad LDF Y-36	Crude	6,000
6/17/1991	NE Point Lay Tank Farm	diesel	6,000
3/6/2001	E Prudhoe Bay, G1 Facility, Surfcote Pad G1	Drilling Muds	5,880
8/16/1997	West Prudhoe Bay, Arco.	Therminal	5,700
8/7/1995	West Prudhoe Bay, GC 1 BP Glycol Spill	Ethylene Glycol (Antifreeze)	5,700
4/14/2003	CPF 3	Seawater	5,670
12/20/1995	West Prudhoe Bay, MPU A Pad, BP Drilling Cuttings	Other	5,670
2/19/2001	East Prudhoe Bay, DS-7 Well-8 Blowout	Seawater	5,345
12/4/2004	Well Pad Z	Produced Water	5,250
11/11/1997	M.P. 289 Dalton Highway Truck Rollover	Diesel	5,217
11/25/1997	Wainwright City, Day Tank by Water Plant	Diesel	5,200
6/10/1999	East North Slope, DS14, Well 29 Flowline Blowout	Produced Water	5,107
2/17/2005	Drill Site 11 Methanol Release	Methyl Alcohol (Methanol)	5,040
3/10/2002	Seawater Injection Well CD2-24	Seawater	4,998
3/26/1997	East Prudhoe Bay, DS 16 Well 18	Crude	4,914
12/6/2003	CFP At Milne Point	Produced Water	4,831
5/22/1998	Kuparuk, Arco DS 2N-341	Drilling Muds	4,820
4/6/1997	East Prudhoe Bay, CGF	Drag Reducing Agent	4,670
6/3/2005	Lisburne Production Center	Produced Water	4,600
5/29/2002	Flow Sta 2 Produced Water Release	Produced Water	4,469
3/21/2003	Endicott	Produced Water	4,366
7/10/2000	Kuparuk, 2N Tarn Well 316, Nabors 19E	Drilling Muds	4,200
1/1/2005	Gathering Center 2	Other	4,200
7/6/1996	Wainwright City Diesel Spill	Diesel	4,000
6/4/2004	Point Lay School Diesel Spill	Diesel	4,000
2/28/2003	MCC Fuel Dock	Diesel	3,576
3/1/2003		Diesel	3,576
11/23/1995	Kuparuk, CPF 1 Seawater	Other	3,403
7/15/1997	East North Slope, Arco DS4.	Seawater	3,360
5/3/1998	Milne Point, BP B Pad.	Seawater	3,360
5/28/2002	Seawater Injection Plant	Seawater	3,150
1/9/2002	KCS Pad	Seawater	3,108
11/15/1997	Kuparuk, Arco Between CPF1 & Flare Pit.	Produced Water	3,030
5/20/2003	Spine Road, Deadhorse	Drilling Muds	3,030
12/5/2004	Endicott Production Facility Glycol Release	Propylene Glycol	3,000
3/10/1995	E Prudhoe Bay (Prudhoe Bay Storage), line ruptured	diesel	3,000
6/12/1996	Barrow (MarkAir Tank Farm), leak	aviation fuel	3,000
4/17/2005	DS 14	Produced Water	2,940
12/29/1995	Endicott, Well 1-33 BP Drilling Mud	Drilling Muds	2,940
1/22/2001	West Prudhoe Bay, R-Pad, Well 3-AI	Diesel	2,856
8/16/1995	North Slope, Remote GV #53	Propane (LPG)	2,843
12/15/2001	Well Pad A Flow Sta 2 Produced Water Release	Produced Water	2,600
6/17/1997	North Slope, BP Central Facility Pad Mod-53.	Other	2,520
6/19/1997	East North Slope, B.P CFP Module 53.	Other	2,520

Major Spills in the North Slope Subarea *(continued from previous page)*

Date	Spill Name	Product	Gallons
8/16/2002	Well Pad A-22 Explosion/Fire	Methyl Alcohol (Methanol)	2,520
3/18/2004	CPF 1	Seawater	2,520
3/16/2004	Point Hope Day Tank Overfill	Diesel	2,500
1/1/2002	Alyeska Brine Release PS-1	Other	2,450
9/11/1995	Kuparuk DS 1Q-20	Other	2,310
10/17/1996	Milne Point, MPU C Pad	Produced Water	2,268
1/31/1996	Point Lay LRRS Frontec Diesel Spill	Diesel	2,200
2/19/2001	West Prudhoe Bay, Between D-Pad And GC Flowline	Methyl Alcohol (Methanol)	2,100
4/13/1998	West North Slope, Arco CPF 3.	Produced Water	2,100
5/20/2003	East Operating Area Prudhoe Bay, Grind & Inject	Drilling Muds	2,100
9/9/2004	Z-Pad Doyon Drilling Seawater Spill	Seawater	2,100
10/5/1995	East Prudhoe Bay, DS 6-3 (Arco)	Other	2,100
2/13/1997	Nuiqsut Tank Farm	Diesel	2,000
6/22/1997	Milne Point, BP Between F And L Pad Rollover	Diesel	2,000
7/15/1997	Kuparuk, Arco DS 3B, 3F & 3G.	Crude	2,000
5/19/1999	BP, WOA, D Pad	Diesel	2,000
1/6/2000	East Prudhoe Bay, Drillsite 9	Seawater	2,000
5/16/1997	North Slope, Arco 2C	Seawater	1,974
4/13/1999	West North Slope, Kuparuk, 1CP	Drilling Muds	1,890
7/27/2002	NARL Site	Diesel	1,800
5/12/2004	2 M Pad	Produced Water	1,782
10/30/2001	West Prudhoe Bay Access Road	Hydrochloric Acid	1,764
4/30/1997	West Prudhoe, West Pad	Crude	1,732
5/25/2003	Gathering Center 2	Produced Water	1,681
12/2/1995	Milne Point L Pad BP Drill Cuttings	Drilling Muds	1,680
3/14/1998	Alpine Colville River Crossing	Other	1,600
9/21/1999	West North Slope, GC-1 Pad Mod 525	Ethylene Glycol (Antifreeze)	1,600
2/28/2004	CPF 1, Kuparuk Topping Unit	Naphtha	1,600
11/27/1996	CPF 1	Ethylene Glycol (Antifreeze)	1,533
12/24/2000	East Prudhoe Bay, Bulk Fuel Facility, Tank #3	Diesel	1,512
9/15/2001	Caribou Corp Maintenance Shop	Waste Oil (all types)	1,500
6/22/2000	West North Slope, Alpine Development Project	Seawater	1,492
8/21/2000	W Prudhoe Bay, GC-2 Produced Water Handling Sec	Ethylene Glycol (Antifreeze)	1,470
8/15/1999	W North Slope, Kuparuk Hset, 1l Manifold Building	Produced Water	1,350
3/8/2003	East North Slope Northstar Island	Other	1,300
6/10/1999	East North Slope, DS14, Well29 Flowline Blowout	Crude	1,277
8/30/1995	Kuparuk, CPF 1	Ethylene Glycol (Antifreeze)	1,270
6/30/1996	Kuparuk, DS 1F Well 20	Other	1,260
3/29/1997	East Prudhoe Bay, DS 9	Methyl Alcohol (Methanol)	1,260
6/24/1997	Kuparuk, Arco 1G Well 6.	Seawater	1,260
3/21/1998	Kuparuk, Arco , 1Y-13	Produced Water	1,260
11/13/1998	West Prudhoe Bay, BP, CFP	Source Water	1,260
5/1/2002	L-1 Module	Ethylene Glycol (Antifreeze)	1,260
9/11/2004	Seawater Injection Plant	Seawater	1,260
4/12/2005	DS 14	Crude	1,260
8/6/1995	Kuparuk, 2C Pad	Produced Water	1,260

Major Spills in the North Slope Subarea *(continued from previous page)*

Date	Spill Name	Product	Gallons
10/20/1998	Point Mcintyre, BP, Rig 33E	Drilling Muds	1,210
1/27/1998	BP, West North Slope, GC-3.	Crude	1,200
10/30/2001	U Pad Truck Rollover	Source Water	1,200
12/25/1995	Milne Point, H Pad Source Water	Other	1,200
11/30/2001	Kuparuk, DS 1E	Produced Water	1,146
8/30/2004	Drill Site 15	Drilling Muds	1,134
2/16/2005	Well Pad S	Produced Water	1,116
4/7/2002	Kuparuk, DS-2A Crude Release	Produced Water	1,104
6/30/1996	W Prudhoe Bay Mukluk Pad, puncture in storage tank	diesel	1,100
7/13/1999	Wainwright Water Treatment Plant, Nano Storage	Other	1,100
4/17/1996	West Prudhoe Bay, GC 2	Crude	1,075
4/17/1996	West Prudhoe Bay, GC 2	Produced Water	1,075
8/16/2002	Well Pad A	Seawater	1,050
8/13/2004	1 E Pad	Drilling Muds	1,050
7/21/1997	North Slope, Arco Lisburne Production Center.	Crude	1,008
2/2/2001	East Prudhoe Bay, Northern Gas Injection Pad Well	Crude	1,008

Data Sources:
Department of Environmental Conservation
North Slope Subarea Contingency Plan for Oil and Hazardous Substance Discharges/Releases, April 2007

Contingency Plan Facilities in the North Slope Subarea

Facility Name	Facility Type
Island Tug and Barge, Ltd. Barges [(1)]	Barge
Crowley Barges [(1)]	Barge
Sea Coast Transportation Barges [(1)]	Barge
Northern Transportation Barges	Barge
Pioneer Natural Resources Alaska, Inc., Thetis Island	Offshore Exploration
Kerr-McGee - Northwest Milne Point	Offshore Exploration
BPX Endicott	Offshore Production
BPX Northstar	Offshore Production
ENI - Nikaitchuq	Offshore Production
Oooguruk Development Project	Offshore Production
Anadarko - Jacob's Ladder	Onshore Exploration
Anadarko - Altamura North & South	Onshore Exploration
Anadarko - Whiskey Gulch A & B	Onshore Exploration
ConocoPhillips - Puviaq Drillsite	Onshore Exploration
ConocoPhillips - Carbon 1 Drillsite	Onshore Exploration
ConocoPhillips - Scout 1 Drillsite	Onshore Exploration
ConocoPhillips - Intrepid 1-3	Onshore Exploration
ConocoPhillips - Noatak1-3	Onshore Exploration
Pioneer North Slope Exploration - Cronus #1	Onshore Exploration
Pioneer North Slope Exploration - Hailstorm #1	Onshore Exploration
FEX L.P. Northwest NPR-A Exploration Drilling Prog - Aklaq #6	Onshore Exploration
FEX L.P. Northwest NPR-A Exploration Drilling Prog - Aklaq	Onshore Exploration
FEX L.P. Northwest NPR-A Exploration Drilling Prog - Aklaqyaaq #1	Onshore Exploration
FEX L.P. Northwest NPR-A Exploration Drilling Prog - Amaguq #2	Onshore Exploration
ConocoPhillips - Kuparuk River Unit	Onshore Production
BPX Badami Development Area	Onshore Production
BPX Milne Point Unit	Onshore Production
ConocoPhillips -Alpine Development Field	Onshore Production
BPX Greater Prudhoe Bay (GPB)	Onshore Production
ConocoPhillips Kuparuk Pipeline	Pipeline
Eskimos Inc. - Block B Tank Farm	Noncrude Terminal
North Slope Borough NSB Barrow Facility	Noncrude Terminal
North Slope Borough NSB Pt Hope Facility	Noncrude Terminal
North Slope Borough NSB Atqasuk Facility	Noncrude Terminal
North Slope Borough NSB Nuiqsut Facility	Noncrude Terminal

NOTES:

(1) Authorized to operate statewide

Active Contaminated Sites in the North Slope Subarea

This table summarizes the number of active contaminated site cleanup projects in the North Slope subarea as of August 20, 2007.

Primary Contaminant	Sites	%
Petroleum	148	73%
Hazardous Substances	55	27%
Total	203	

North Slope Subarea Spill Preparedness and Response Initiatives

Response Corps and Equipment Depots

Community	CRSA	Conex	Nearshore	Other Equipment
Barrow	■			
PS 4		●		

North Slope Contingency Plan for Oil and Hazardous Substance Spills and Releases

The current plan is dated April 2007, and includes major revisions and updates to the plan. The plan can be accessed at the following website: http://www.dec.state.ak.us/spar/perp/plans/scp_ns.htm

D. OIL FATE AND GENERAL RISK ASSESSMENT

1. Fate of Spilled Oil

Natural processes that may act to reduce the severity of an oil spill or accelerate the decomposition of spilled oil are always at work in the aquatic environment. These natural processes include weathering, evaporation, oxidation, biodegradation, and emulsification.

- **Weathering** is a series of chemical and physical changes that cause spilled oil to break down and become heavier than water. Winds, waves, and currents may result in natural *dispersion*, breaking a slick into droplets which are then distributed throughout the water. These droplets may also result in the creation of a secondary slick or thin film on the surface of the water.

- **Evaporation** occurs when the lighter substances within the oil mixture become vapors and leave the surface of the water. This process leaves behind the heavier components of the oil, which may undergo further weathering or may sink to the ocean floor. For example, spills of lighter refined petroleum-based products such as kerosene and gasoline contain a high proportion of flammable components known as *light ends*. These may evaporate completely within a few hours, thereby reducing the toxic effects to the environment. Heavier oils leave a thicker, more viscous residue, which may have serious physical and chemical impacts on the environment. Wind, waves, and currents increase both evaporation and natural dispersion.

- **Oxidation** occurs when oil contacts the water and oxygen combines with the oil to produce water-soluble compounds. This process affects oil slicks mostly around their edges. Thick slicks may only partially oxidize, forming *tar balls*. These dense, sticky, black spheres may linger in the environment, and can collect in the sediments of slow moving streams or lakes or wash up on shorelines long after a spill.

- **Biodegradation** occurs when micro-organisms such as bacteria feed on oil. A wide range of micro-organisms is required for a significant reduction of the oil. To sustain biodegradation, nutrients such as nitrogen and phosphorus are sometimes added to the water to encourage the micro-organisms to grow and reproduce. Biodegradation tends to work best in warm water environments.

- **Emulsification** is a process that forms *emulsions* consisting of a mixture of small droplets of oil and water. Emulsions are formed by wave action, and greatly hamper weathering and cleanup processes. Two types of emulsions exist: water-in-oil and oil-in-water. Water-in-oil emulsions are frequently called "chocolate mousse," and they are formed when strong currents or wave action causes water to become trapped inside viscous oil. Chocolate mousse emulsions may linger in the environment for months or even years. Oil and water emulsions cause oil to sink and disappear from the surface, which give the false impression that it is gone and the threat to the environment has ended.

2. General Risk Assessment

In the remote villages, where refined products are stored in tank farms, the highest probability of spills occurs during fuel transfer of refined products to the tank farm from another source, such as the fuel barge, or from feeder lines from the tank farm onto users. This is not to say that these spills are common.

The oil industry, especially active in the North Slope Subarea, includes onshore and offshore wellheads, crude oil production facilities, major crude oil and non-crude oil storage, and pipeline facilities. Most exploration and production work is concentrated in the Prudhoe Bay area, but other oil production activities extend westward to Oliktok Point. The Trans-Alaska Pipeline System originates at Prudhoe Bay, and two of the pump stations are located in the North Slope Subarea. Refined products are stored in tank farms at the oil production facilities. Pipeline leaks within the vast industrial complex pose one of the greatest risks for spills.

Another threat for spills, especially chemical releases, comes from trucking accidents on the long and remote Dalton Highway. Several large diesel fuel spills have resulted from vehicle accidents.

The various types of petroleum products respond quite differently when released into the environment. Spills of refined product that enter the water generally will disperse and experience significant evaporation, making recovery difficult. Crude oil will be affected by the same natural degradation factors but to a much lesser degree. Crude oil spills are "persistent" in nature and will require aggressive actions and innovative techniques to be successful in the harsh Arctic environment.

Spills that occur in the Beaufort Sea will tend to flow from east to west according to the currents and the predominant winds. Beaufort Sea spills will, therefore, typically not be driven ashore immediately, and impacts reaching the shoreline can be expected to be spread over a larger area rather than a higher level of oiling along a smaller area. Spills in the Chukchi will typically be carried away from shore by prevailing winds and currents, though this does not mean that shoreline impacts should not be anticipated; spills rarely behave as expected. In all spill events, planning should address the possibility of the shoreline being affected by the release.

Spills in the Arctic require careful preplanning to overcome the effects imposed by the cold-weather environment. Machinery and people face significant challenges when operating in acute cold. The severe stresses imposed by operating in winter conditions with extreme temperatures and the extended darkness can seriously reduce individual efficiency over a given period. Recovery of oil in broken ice conditions is tremendously difficult and hazardous. Cold weather conditions can prove beneficial, at times: ice and snow can act effectively as natural barriers, impeding the spread of oil, and can be used effectively to create berms for spill containment. Techniques for organizing and responding to spills in arctic environments have been developed and these documents should be consulted during an event.

The summer months expose many more species, both in diversity and numbers, to the negative effects of an oil spills. Whereas in winter, most species have left the regions and the snow and ice conditions may buffer the soil from the impact of release oil, during the warmer months the land, flora and fauna are all quite vulnerable to an oil spill. Though, summer daylight increases the available work hours to allow almost continuous operations, the extended light does not increase the number of hours response personnel can safely perform tasks.

E. ICE, WIND AND CURRENTS

The following is an overview of wind, tide, ice and current conditions in the Beaufort and Chukchi Seas. Much of the available data is general in nature and should be supplemented by area-specific updates and any information available from local residents. Included herein are wind data, tidal ranges, data on a variety of ice conditions and maps of net surface currents. Using the current edition of the U.S. Department of Commerce National Oceanic and Atmospheric Administration tide current tables for the Pacific coast of North America, it is possible to predict the times of ebb and flood tides for points within this region.

1. Sea Ice Conditions

Chukchi Sea: Sea ice within the Chukchi Sea is mostly first-year ice, with multi-year ice occurring most commonly in northward and westward areas. Ice forms between October and early December. A persistent polynya (a recurring area of open water in ice-covered regions) occurs along the eastern edge of the Chukchi Sea from the Cape Thompson area south of Point Hope to an area slightly north of Point Barrow. The Chukchi Polynya is an important pathway for migrating bowhead and beluga whales, polar bears and walrus, and for eiders and other birds in the spring before the ice opens elsewhere.

Currents and winds keep the polynya open between the fast ice and the pack ice. Stable fast ice typically extends from shore outward as far as the 20 m contour along the edge of the Chukchi Polynya. First-year ice forms along the edge of the polynya during the winter. The average width of the polynya between February and April is about 1 km or less. The polynya is wider at its southern end, and by June has an average width of 75 km near Point Lay. By August, its average width at Point Lay is 300 km. Spring or summer storms may move the pack ice toward shore at times, and reduce the extent of the polynya. Maximum ice retreat occurs in September and the area of the polynya at this time is essentially open water.

Beaufort Sea: Ice in the Beaufort Sea is less dynamic than that in the Chukchi Sea. Ice begins forming in late September or early October and extensive areas of fast ice form in late October and November. Ice within the barrier islands generally is stable for most of the ice season. Grounded fast ice occurs within the 2 m isobath and floating ice occurs from the 2 m isobath to the 15 or 20 m isobath. The flaw zone occurs at the interface between the fast and the pack ice. In March or early April, a lead usually opens in the Beaufort Sea from Point Barrow to Banks Island in the Canadian Beaufort Sea and is used by migrating whales and polar bears. In late May or early June, North Slope rivers break up and floods over the fast ice surrounding their deltas. This warm freshwater serves to hasten the decay of the fast ice in these areas. Breakup of fast ice occurs in June and July, with most of the ice inside of the 10 m isobath melted by mid July. Concurrently, the pack ice decays so that its southern edge consists of broken floes rather than continuous ice. The maximum extent of open water occurs in mid to late September. Winds may move the ice back to shore at any time during summer.

Average Arctic Marine Breakup and Freezeup Dates

Location	Avg. Breakup Date	Avg. Freezeup Date	Avg. Years Record
Kotzebue	May 31	October 23	14
Pt. Hope	June 20	November 11	8
Pt. Lay	June 24	November 4	4
Wainwright	June 29	October 2	7
Pt. Barrow	July 22	October 3	31

Source: AEIDC. 1983.

2. Current Data

Tidal observations along the Chukchi and Beaufort Sea coast are scattered and therefore considered too spare to draw a consistent picture of the tide distribution. The attached table provides tide data for the Chukchi and Beaufort Seas. However, all theoretical models of tides must be verified with observations at tidal stations.

Chukchi Sea: As indicated in the following figures, a warm current enters the Chukchi Sea via Bering Strait and flows around Point Barrow to approximately 148°-152°W in the Beaufort sea. In the Chukchi, this current concentrates near the surface and overlies dense, relict bottom water trapped by the shallow depths. It has a fairly uniform velocity which averages 45 centimeter per second (cm/s) in the summer and 10 cm/s in winter. This flow has many meanders and eddies and is slowed somewhat by dominant northeasterly winds. To the east, in deeper waters, the warm water mass descends to mid-depths. Maximum temperatures are observed in 30- to 50-m depths. Water movement from the Bering Strait to Cape Lisburne takes 10-15 days in the summer. Tidal currents are rotary and very weak in the Chukchi. They vary from .3 to .9 cm/s depending on the location and tidal stage. Nearshore the tidal currents appear to be small, on the order of 1 cm/s. Kotzebue Sound currents are mostly tide- and wind-induced. Velocities through and within the sound are very slow, averaging less than 0.1 cm/s.

Beaufort Sea: As indicated the following figures, the large-scale clockwise Beaufort Gyre moves waters from the Canadian Basin westward in the deeper offshore regions. Gyre velocities reach 5-10 cm/s north of the Alaskan coast. Another dominant circulation feature is the Alaskan Coastal Current which enters the Beaufort Sea through the Barrow Sea Canyon. Velocities are usually 10-15 cm/s to the east, but the jet frequency reverses in direction, resulting in a lower net eastward movement of about 7 cm/s.

3. Winds

In many cases, spill trajectory is determined primarily by winds, especially when currents are weak. Winds are typically from the east and northeast in the Chukchi Sea, with an average velocity of 5 to 35 knots. Winds are typically from the east and northeast in the western Beaufort Sea and from the east or west in the eastern Beaufort Sea. Taku winds, which typically occur in the winter along the mountains, are generally from the north or the east and are much stronger, with an average velocity of 30 to 70 knots, gusting to 100 knots. Taku wind conditions generally last from 3 days to 3 weeks.

4. Spill Trajectory Modeling

The behavior of spilled oil on water is the result of the complex interaction of the forces described above. Accordingly, trajectory modeling can be difficult. NOAA is capable of generating computerized spill trajectory forecasts. Requests for this service should be directed to:

John Whitney
Scientific Support Coordinator
National Oceanic and Atmospheric Administration
510 L Street, Suite 100
Anchorage, AK 99501

working hours: 271-3593
fax: 271-3139
after hours: 346-1634
beeper: 275-3134

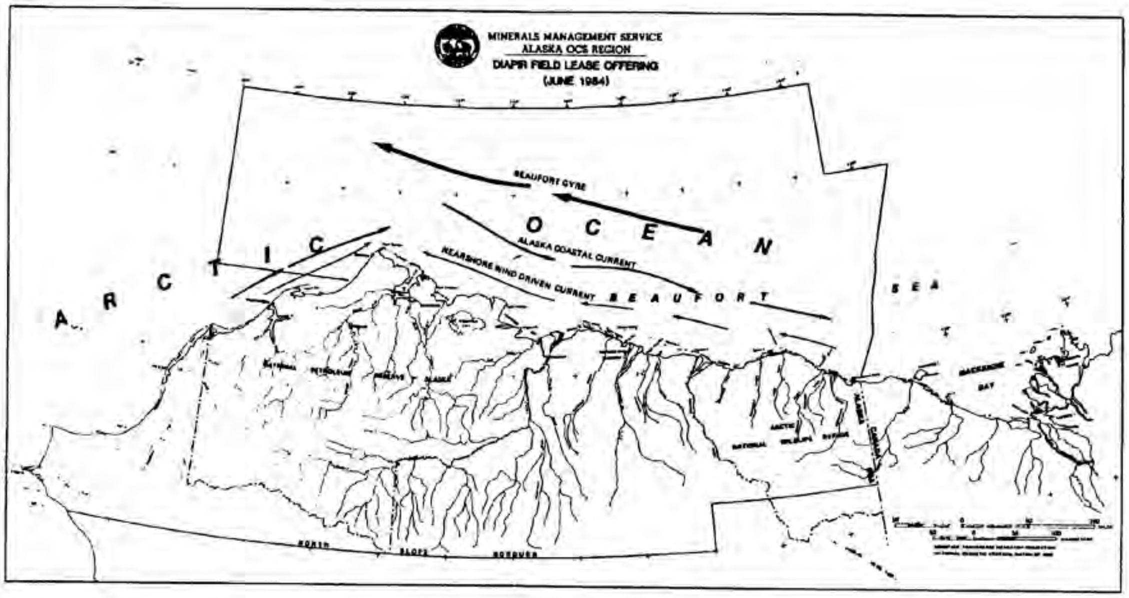
5. Data Sources

Hood and Zimmerman (eds). Gulf of Alaska: Physical Environment and Biological Resource. (Gulf of Alaska net surface currents)

LaBelle, J.C. and J.L. Wise. 1983. Alaska Marine Ice Atlas.

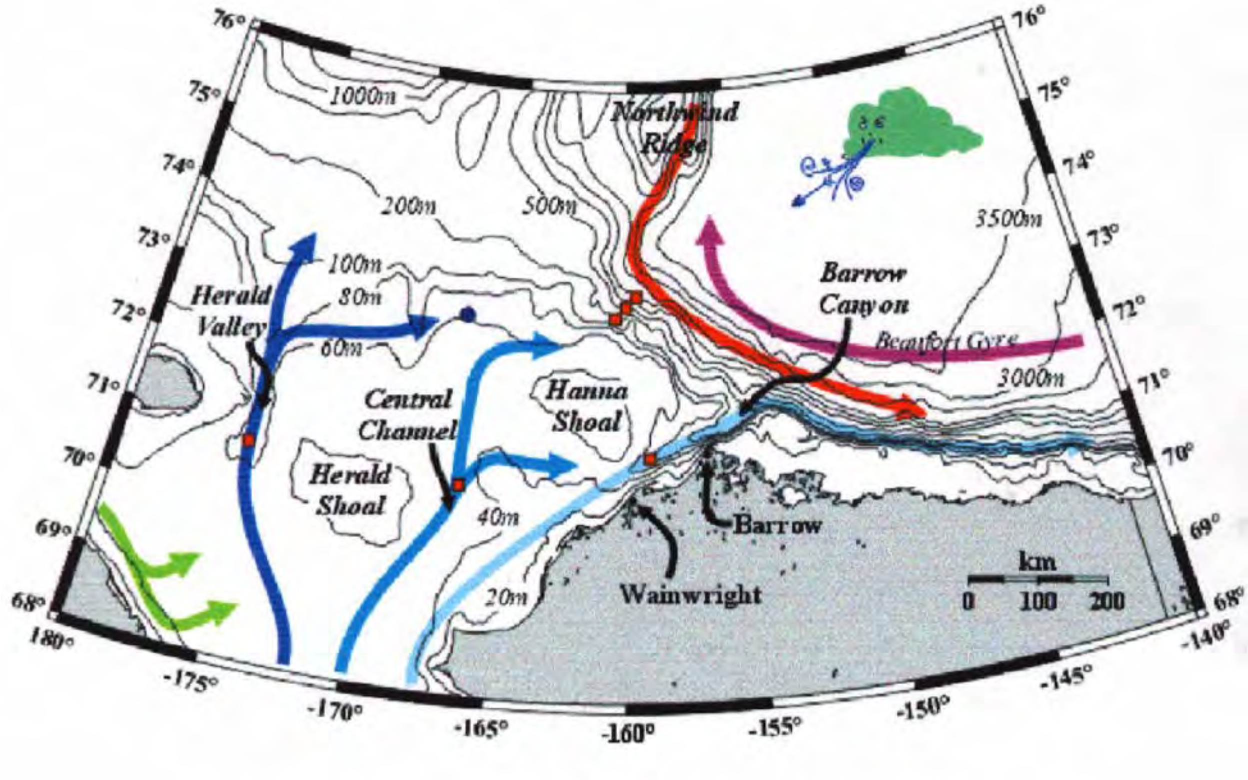
National Climatic Data Center and Arctic Environmental Information and Data Center (AEIDC). 1988. Climatic Atlas, Volume III: Beaufort Sea. (wind roses, tidal range data and map)

U.S. Department of Commerce National Oceanic And Atmospheric Administration. 1989. Tide Current Tables 1990: Pacific Coast of North America and Asia. (tidal current data and information)

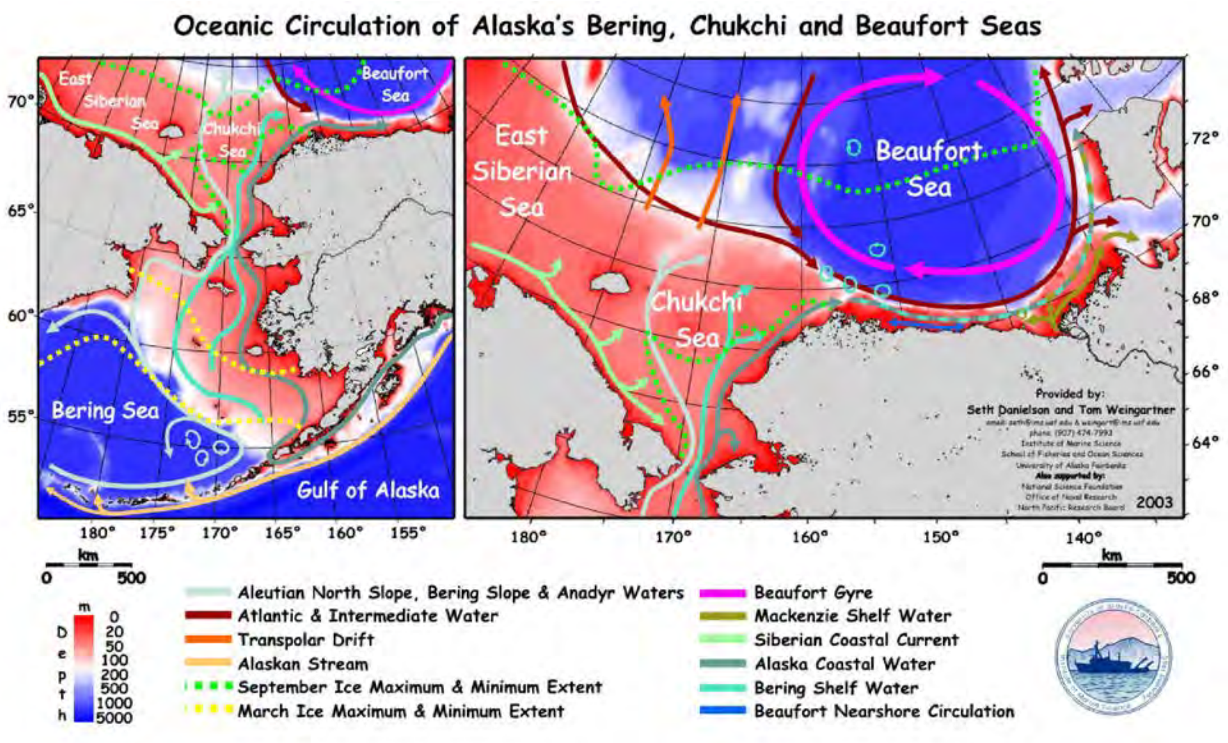


Generalized Arctic Ocean Currents, affecting the Alaska North Slope Coastline.

Diapir Field Environmental Impact Statement, Minerals Management Service, Alaska OCS Region, 1983.



Weingartner, T., 2001, Chukchi Sea Circulation, http://www.ims.uaf.edu/chukchi/#mean


Oceanic Circulation of Alaska's Bering, Chukchi and Beaufort Seas
East Siberian Sea
Chukchi Sea
Beaufort Sea
Bering Sea
Gulf of Alaska
Provided by:
Seth Danielson and Tom Weingartner
2003
km
0
500
Depth
m
0
20
50
100
200
500
1000
5000
Aleutian North Slope, Bering Slope & Anadyr Waters
Atlantic & Intermediate Water
Transpolar Drift
Alaskan Stream
September Ice Maximum & Minimum Extent
March Ice Maximum & Minimum Extent
Beaufort Gyre
Mackenzie Shelf Water
Siberian Coastal Current
Alaska Coastal Water
Bering Shelf Water
Beaufort Nearshore Circulation

(This page intentionally blank)

BACKGROUND: PART FOUR – ABBREVIATIONS AND ACRONYMS

AAC	Alaska Administrative Code
ACP	Area Contingency Plan
ACS	Alaska Clean Seas (North Slope industry spill response cooperative)
ADCCED	Alaska Department of Commerce, Community and Economic Development
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game (also appears as ADFG)
ADMVA	Alaska Department of Military and Veterans Affairs
ADNR	Alaska Department of Natural Resources
ADOT&PF	Alaska Department of Transportation and Public Facilities (also appears as ADOTPF)
AFB	Air Force Base
AIMS	Alaska Incident Management System Guide (for Oil and Hazardous Substance Response)
ALCOM	Alaska Command
ANSC	Alaska North Slope Crude oil
ANWR	Arctic National Wildlife Refuge
APSC	Alyeska Pipeline Service Company
ARRT	Alaska Regional Response Team
AS	Alaska Statute
BBLS	Barrels
BLM	Bureau of Land Management
BOA	Basic Ordering Agreement
BOPD	Barrels of Oil per Day
BP	British Petroleum
BPX WOA	British Petroleum Exploration Western Operations Area
CAH	Central Arctic Herd (caribou)
CAMEO	Computer-Aided Management of Emergency Operations
CCGD 17	Commander, Coast Guard District 17
CFR	Code of Federal Regulations
CISPRI	Cook Inlet Spill Prevention and Response Inc. (industry spill cooperative)
COMDTINST	Commandant Instruction (USCG)
COTP	Captain of the Port (USCG)
CP	Command Post
C-Plan	Contingency Plan
CTAG	Cultural Technical Advisory Group
DOD	Department of Defense
DOI	Department of the Interior
DRAT	District Response Advisory Team
DRG	District Response Group
ECRT	Emergency Communications Response Team (ADMVA)
EMS	Emergency Medical Services
EOC	Emergency Operations Center
EPA	Environmental Protection Agency (also appears as USEPA)
ESI	(Alaskan) Environmental Sensitivity Index
FDA	Food and Drug Administration
F/V	Fishing Vessel
FAA	Federal Aviation Administration

FLIP	Flight Information Publication
FNSB	Fairbanks North Star Borough
FOG	Field Operations Guide
FOSC	Federal On-Scene Coordinator
FPN	Federal Pollution Number
FWPCA	Federal Water Pollution Control Act
GIS	Geographic Information System
GSA	General Services Administration
HAZMAT	Hazardous Materials (also appears as hazmat)
HAZWOPER	Hazardous Waste Operations and Emergency Response
HQ	Headquarters
IC	Incident Commander
ICP	Incident Command Post
ICS	Incident Command System
IDLH	Immediately Dangerous to Life and Health
INMARSAT	International Maritime Satellite Organization
JPO	Joint Pipeline Office (gov't agencies involved with managing/regulating TAPS)
LAT	Latitude
LEPC	Local Emergency Planning Committee
LEPD	Local Emergency Planning District
LERP	Local Emergency Response Plan
LNG	Liquefied Natural Gas
LONG	Longitude
LOSC	Local On-Scene Coordinator
MAR CH	Marine Channel
MESA	Most Environmentally Sensitive Area
M/V	Motor Vessel
MOA	Memoranda of Agreement (may also be Municipality of Anchorage)
MOU	Memoranda of Understanding
MSD	Marine Safety Detachment (USCG)
MSO	Marine Safety Office (USCG)
MSRC	Marine Spill Response Corp. (national industry cooperative)
NART	Northern Alaska Response Team (ADEC)
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NIIMS	National Interagency Incident Management System
NIST	National Institute of Standards and Technology
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOTAMS	Notice to All Mariners (may also be Notice to Airmen)
NPDES	National Pollution Discharge Elimination System
NPFC	National Pollution Fund Center
NRC	National Response Center
NRT	National Response Team
NRDA	(Federal/State) Natural Resource Damage Assessment
NSB	North Slope Borough
NSF	National Strike Force
NSFCC	National Strike Force Coordinating Center
NWR	NOAA Weather Radio
OHMSETT	Oil and Hazardous Material Simulated Environment Test Tank

OPA 90	Oil Pollution Act of 1990
OPCEN	Operations Center
OPS	General Response Operations, also Office of Pipeline Safety (U.S. DOT)
OSC	On-Scene Coordinator
OSHA	Occupational Health and Safety Administration
OSLTF	Oil Spill Liability Trust Fund
OSRO	Oil Spill Response Organization
O/S	On-Scene
PCH	Porcupine Caribou Herd
PIAT	Public Information Assist Team
PIO	Public Information Officer
POLREP	Pollution Report (USCG)
PPE	Personal Protective Equipment
RAC	Response Action Contractor
RCRA	Resource Conservation and Recovery Act of 1978
RP	Responsible Party
RPOSC	Responsible Party On-Scene Coordinator
RQ	Reportable Quantity (as established by the EPA under CERCLA)
RRT	Regional Response Team
SAR	Search and Rescue
SCBA	Self-Contained Breathing Apparatus
SCP	Subarea Contingency Plan
SHPO	State Historic Preservation Officer (ADNR)
SITREP	Situation Report (ADEC)
SONS	Spill of National Significance
SOSC	State On-Scene Coordinator
SSC	Scientific Support Coordinator (NOAA)
STORMS	Standard Oil Spill Response Management System
SUPSALV	U.S. Navy Supervisor of Salvage (also appears as NAVSUPSALV)
TAPS	Trans Alaska Pipeline System
TLH	Teshekpuk Lake Herd (Caribou)
T/V	Tank Vessel
USAF	United States Air Force
USCG	United States Coast Guard
VOSS	Vessel of Opportunity Skimming System
VPSO	Village Public Safety Officer
VTS	Vessel Traffic Separation System/Scheme
WAH	Western Arctic Herd (Caribou)
WX	Weather

(This page intentionally blank)