PRINCE WILLIAM SOUND
SUBAREA CONTINGENCY PLAN

BACKGROUND
SECTION

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 facility, or onshore facility operating within the boundaries of the Prince William Sound Subarea.

For its planning process, the federal government has designated the entire state of Alaska as a planning "region" and divided this region into four planning "areas" that the USCG and EPA must address. The State of Alaska has divided the state into ten planning regions of which one is the "Prince William Sound Region." As part of the Unified Plan, this SCP addresses this Prince William Sound 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 OPA 90. Any review for consistency between government and industry plans should address recognition of socially, 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 Prince William Sound Subarea is the area of the state south of 63° 30' North latitude, west of 142° West longitude, and east of the Cook Inlet Subarea (which is that area encompassed by the boundaries of the Kenai Peninsula Borough, the Municipality of Anchorage, and the Matanuska-Susitna 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 which the territorial sea is measured. (18 AAC 75.495)
Prince William Sound (PWS) is an extensive body of water covering an area of approximately 2,500 square miles with 3,500 miles of shoreline. The entrance to the Sound is 58 miles across and extends from Cape Puget to Point Whitshed. The entrance is protected by a series of islands: Montague (which experienced as much as 35 feet of uplift during the 1964 earthquake), Hinchinbrook, and Hawkins. Most of the islands and peninsulas are tree-covered with rocky and sometimes precipitous shorelines. Located next to the entrance on the eastern part of the Sound is the Copper River Delta which has extensive tidal flats that support a variety of wildlife which is are important to the PWS ecosystem.

The Prince William Sound region is characterized by isolated coastal and inland communities. Valdez, Whittier and Cordova are the major communities along the coastline. The Glenn, Richardson, and Edgerton Highways transect the region. Several coastal communities including Valdez and Whittier are connected to the interior highway network, which provides transportation routes to the larger communities of Fairbanks and Anchorage.

The city of Valdez is located at the northeastern end of Port Valdez, a body of water approximately 12 miles long and 2.5 miles wide, located in northeast Prince William Sound. The Port is a natural deep water fjord, virtually surrounded by mountains, and the most northerly ice-free port in North America. From Port Valdez the water route proceeds southwest through Valdez Narrows to Valdez Arm and into Prince William Sound. The shoreline is dominated by steeply-inclined rock walls with occasional sloping, rocky beaches and gravel deltas.

Extensive sand-silt-rock tidal flats are found east of Valdez at the mouths of the Lowe River and Valdez Glacier outflow stream and west of Valdez at the mouth of Mineral Creek. The Port Valdez has a maximum depth of 810 feet, a shallow sill of 390 feet, and an average depth of 675 feet. Tidal currents within the port are not strong, generally less than .75 knots. Wind-driven currents dominate surface movement during high wind periods but waves rarely exceed 3 feet.

The city of Cordova sits on the east side of Orca Inlet and is located in southeast Prince William Sound. Mount Eyak and Mount Eccles, the two most prominent visual features, sit directly above the town. Due to the 1964 earthquake, Orca Inlet experienced as much as 6.3 feet of uplift. The average flood tide is approximately 1.8 knots and the average ebbtide is approximately 1.0 knot.

The town of Whittier, located at the end of Passage Canal, a fjord on the northwestern side of Prince William Sound, has rail and highway connections to Anchorage and beyond. The port serves as one of the major ocean vessel-railroad transfer points for the State of Alaska, a regular embarkation/debarkation point for cruise ship and ferry traffic, and the primary access point for Anchorage-based recreational boaters entering Prince William Sound.

Industrial facilities within the subarea include the Trans Alaska Pipeline system (TAPS) and its Marine Terminal located in Valdez and several seafood processing facilities, primarily in Cordova and Valdez.

The subarea encompasses a very diverse array of topographical features, including a large archipelago with numerous small, uninhabited islands; steep-sided fjords; rocky or boulder-strewn shorelines; pebble and gravel pocket-beaches; areas of substantial forests; extremely mountainous terrain; tundra; extensive ice fields; numerous tidewater and piedmont glaciers; river deltas and broad tidal mudflats; and fields of muskeg.

The region supports a wide range of wildlife. Larger, terrestrial mammals include moose, Sitka deer, caribou, brown and black bears, wolf, coyote, fox, wolverine, lynx, Dall sheep, and mountain goat. Smaller mammals include beaver, hare, lemming, marmot, marten, mink, muskrat, pika, porcupine, river otter, shrew, squirrel, vole, and weasel. Marine mammals found in the PWS Subarea include humpback whale, orca, porpoise, sea lion, harbor seal, and sea otter.

Many songbirds, shorebirds and waterfowl reside in the region or stay as seasonal residents. During the spring and fall, the inland and shoreline areas become a haven for migratory waterfowl and other birds. This is especially true for larger river deltas, such as the massive one at the Copper River, which sees one of the larger influxes of migratory birds in North America.

Some residents engage in a subsistence lifestyle and have long depended upon the availability of plant and animal resources in the area. Any spill of significance, especially coastal, could devastate the subsistence food harvest and seriously threaten the normal means of existence for many residents. Long-term impacts to these food resources could have a deleterious effect on Native and subsistence lifestyles. The Sensitive Areas Section provides detailed information on the specific resources vulnerable to spills and the locations of these resources within the subarea.

Commercial and sport fisheries play an important part in the lives and the economies of the PWS coastal communities. Dolly Varden, trout, halibut, herring, lingcod, and the five species of salmon are among the many fish sought from the waters in and around PWS. The Prince William Sound Aquaculture Corporation operates five hatcheries that produce hatchery-born, ocean-raised wild salmon for the commercial, sport, personal use, and subsistence fisheries in the PWS and Copper River regions. The mariculture industry is growing in size and importance, and the shellfish/aquatic plants being raised in Alaska include Pacific oysters, blue mussels, littleneck clams, scallops, bull kelp, and Porphyra species of red/brown algae. (Note: Alaska Statute prohibits finfish farming.) This biologically rich and diverse maritime region sees significant vessel traffic ranging from pleasure craft and fishing boats to huge, crude oil tankers, container barges, and large cruise ships. Marine-related petroleum products pose an everyday threat of spill and possible pollution to a largely pristine environment.

The general surface circulation pattern in PWS is predominantly counter-clockwise, with inflow to the Sound through the east side of Hinchinbrook Island and out flow through Montague Strait and other western passes. Outside the Sound, the coastal circulation is driven by the Alaska Coastal Current which flows along the outer coast in an east to west direction. The position of Kayak Island disturbs this flow creating eddies along the outer passes of the Sound. Freshwater input from the large Copper River system strengthens the westward flow of the Coastal Current with a portion of that flow entering the Sound. The Sounds many fjords and embayments tend to have a surface outflow with an inflow at depth. Wind blowing into a bay can reverse the circulation with water moving into the bay on the surface and out of the bay at depth. The length of time for water exchange in longer fjords has not been established.

The mixed marine layer depth within the shallower, more protected areas of the Sound is generally within the top ten meters of the surface. Seasonal changes in solar heating, freshwater input, and wind speed can alter the depths of the marine mixing layer throughout the Sound. Areas with greater freshwater input and less fetch tend to have shallower mixed marine layers when summer solar heating combined with freshwater from rain, snow and ice melt can shoal the surface mixed layer to a depth of less than 5 meters. Fall and winter storms can increase the mixed layer depth to greater than 20 meters in regions with large fetch, such as the central portion of the Sound.

The seasonal changes in winds (See Figure 6) and freshwater input also alter surface water circulation. Wind forcing can disrupt the circulation and, at times, reverse it. In winter, the circulation is normally driven by the easterly and northerly winds which tend to push the surface flow in a southwest direction out of the Sound. In the spring, there is evidence of a weak clockwise circulation in the central basin with a weak counter-clockwise flow in the eastern Sound. In the summer, the circulation in the central basin of PWS is counter-clockwise. With increased precipitation in the fall, the circulation of PWS strengthens to a predominant outflow through both the Montague Strait and Hinchinbrook Entrance. (See Figure 5.)

Tidal currents are strong in the central basin and tend to be oriented in a north-south direction. To the east, at the entrance of Orca Inlet, the tidal currents become smaller (weaker tidal flow) with a clockwise rotation over a tidal cycle. To the west, there is little tendency for tidal rotation. The strongest tidal currents are found in the entrances where the water flow is restricted. Most often the tidal currents are less than a knot; however, at times the tidal current can exceed two knots. The United States Coast Pilot 9 can be referenced and provide more specific information. Weekly updates to the 2013 (31st Edition) can be found at http://nauticalcharts.noaa.gov/nsd/cpdownload.htm.

FIGURE 1: PWS SUBAREA

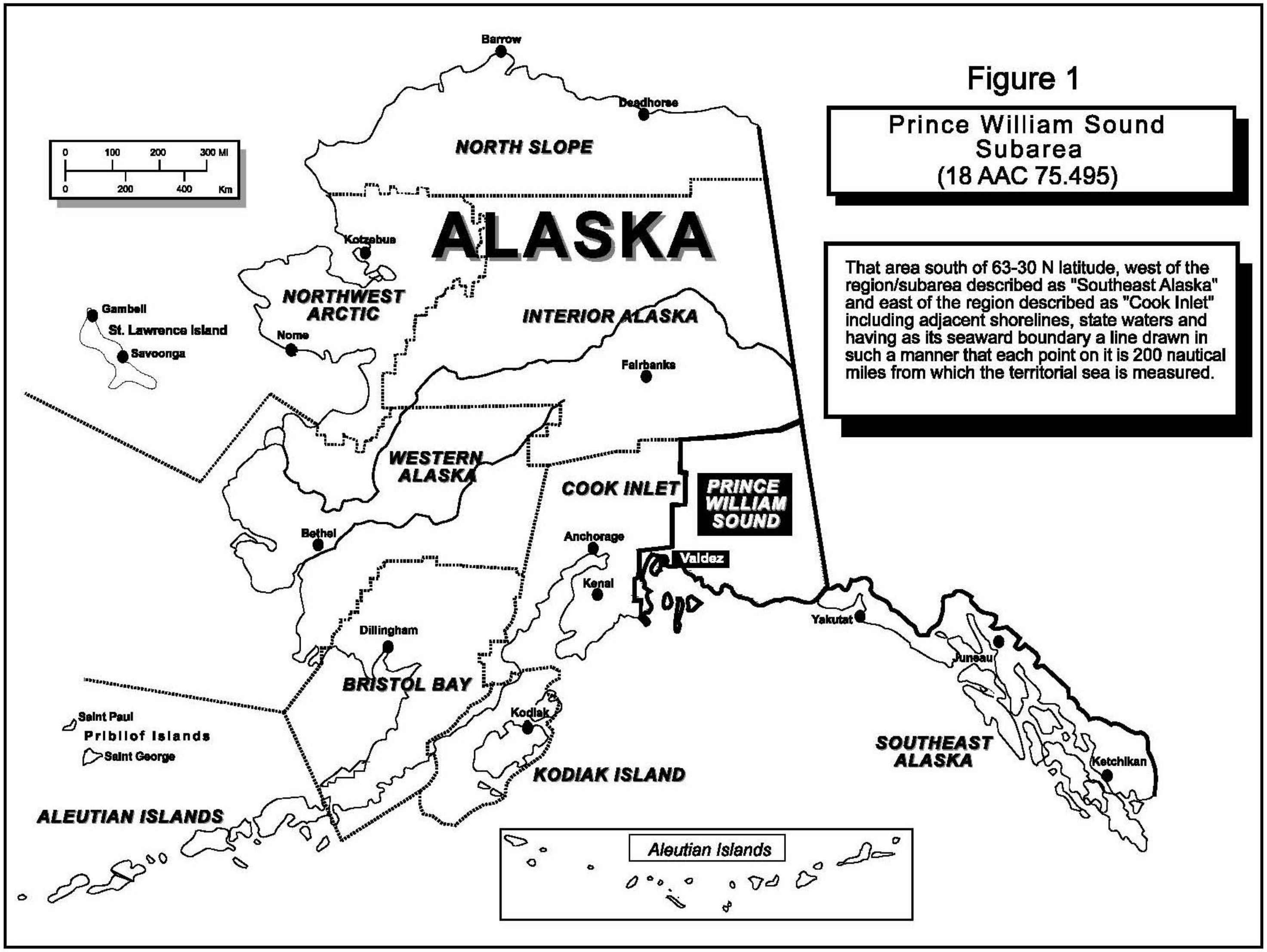


FIGURE 2: PWS DETAILED SUBAREA MAP

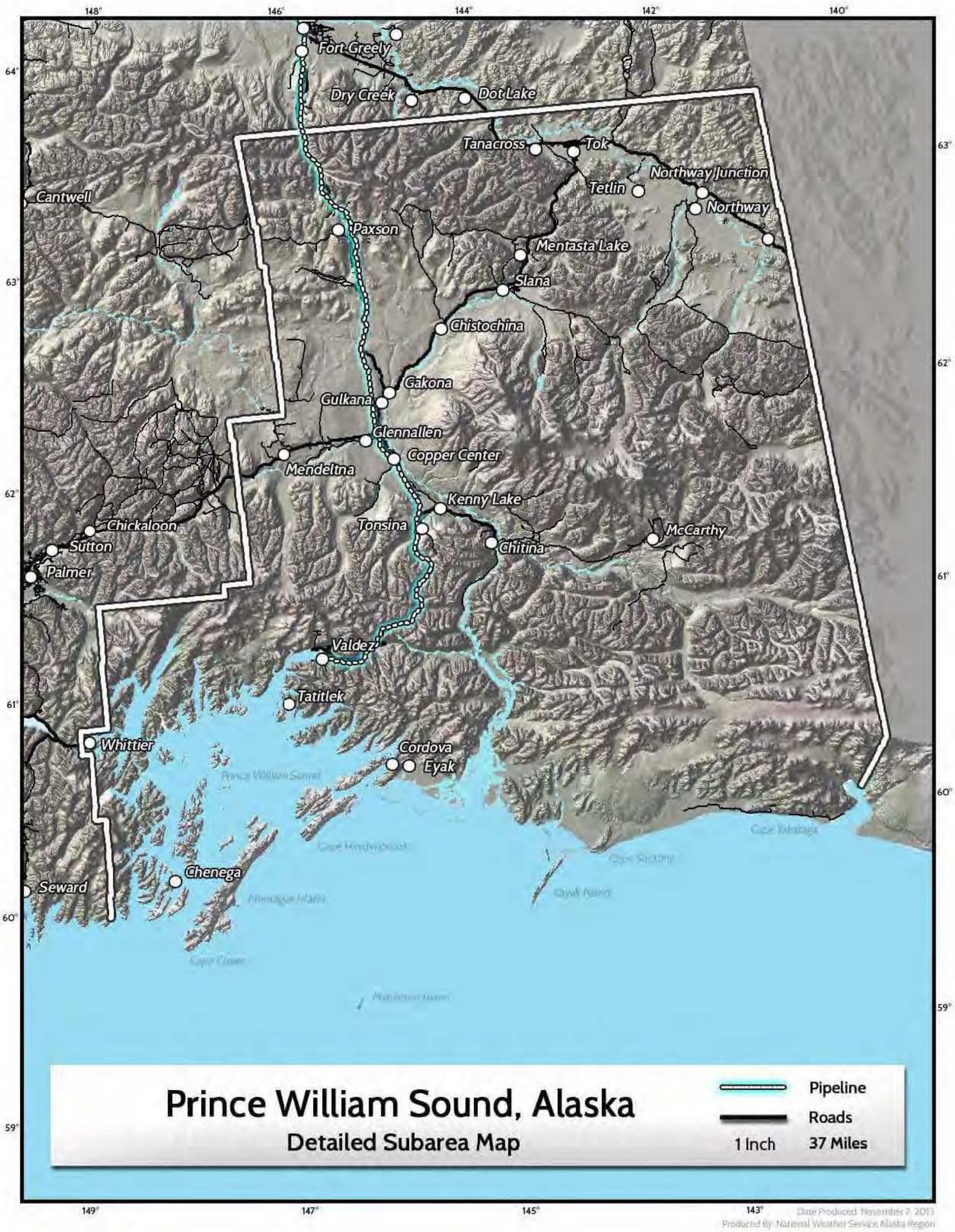


FIGURE 3: PWS USGS TOPO MAP INDEX

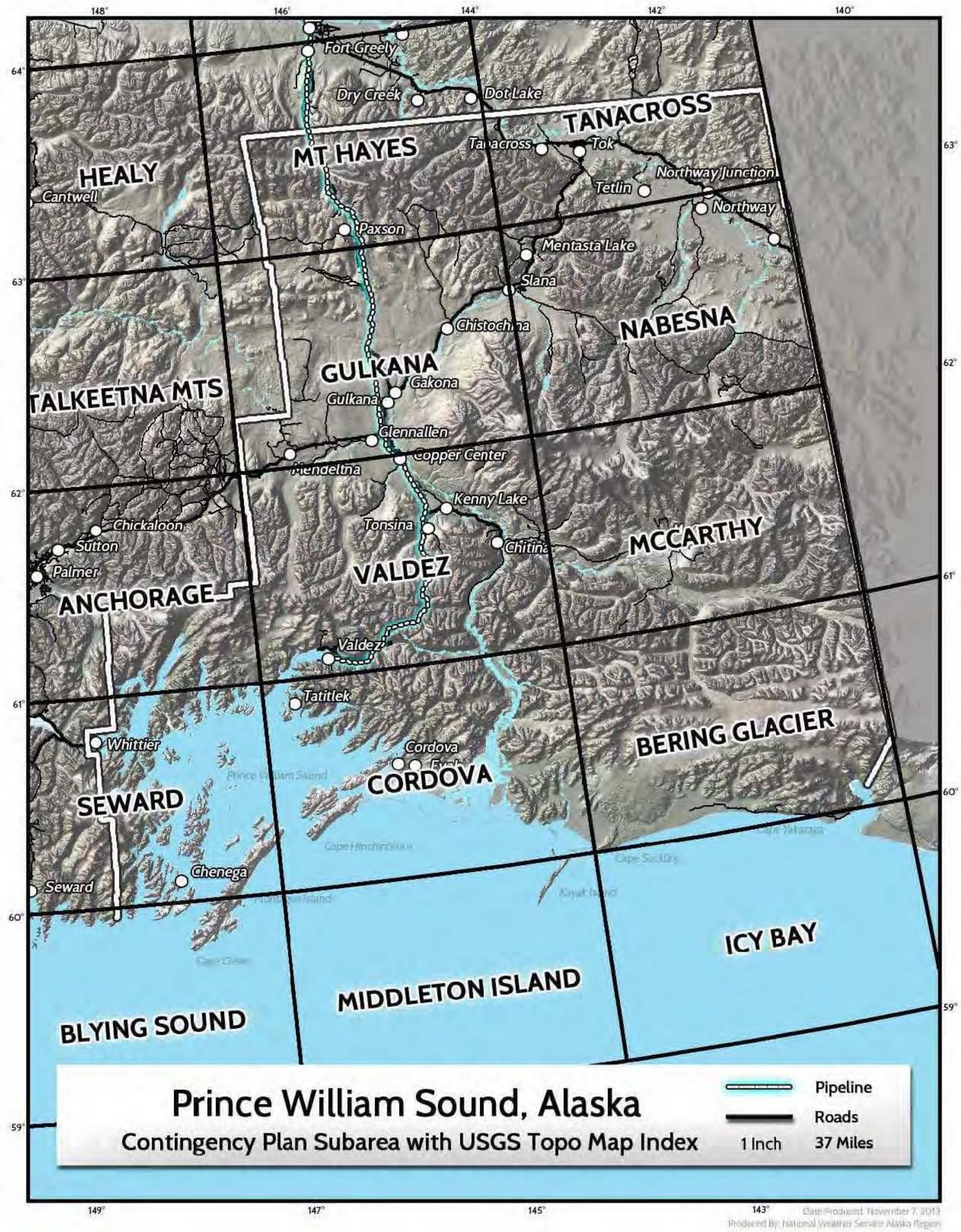
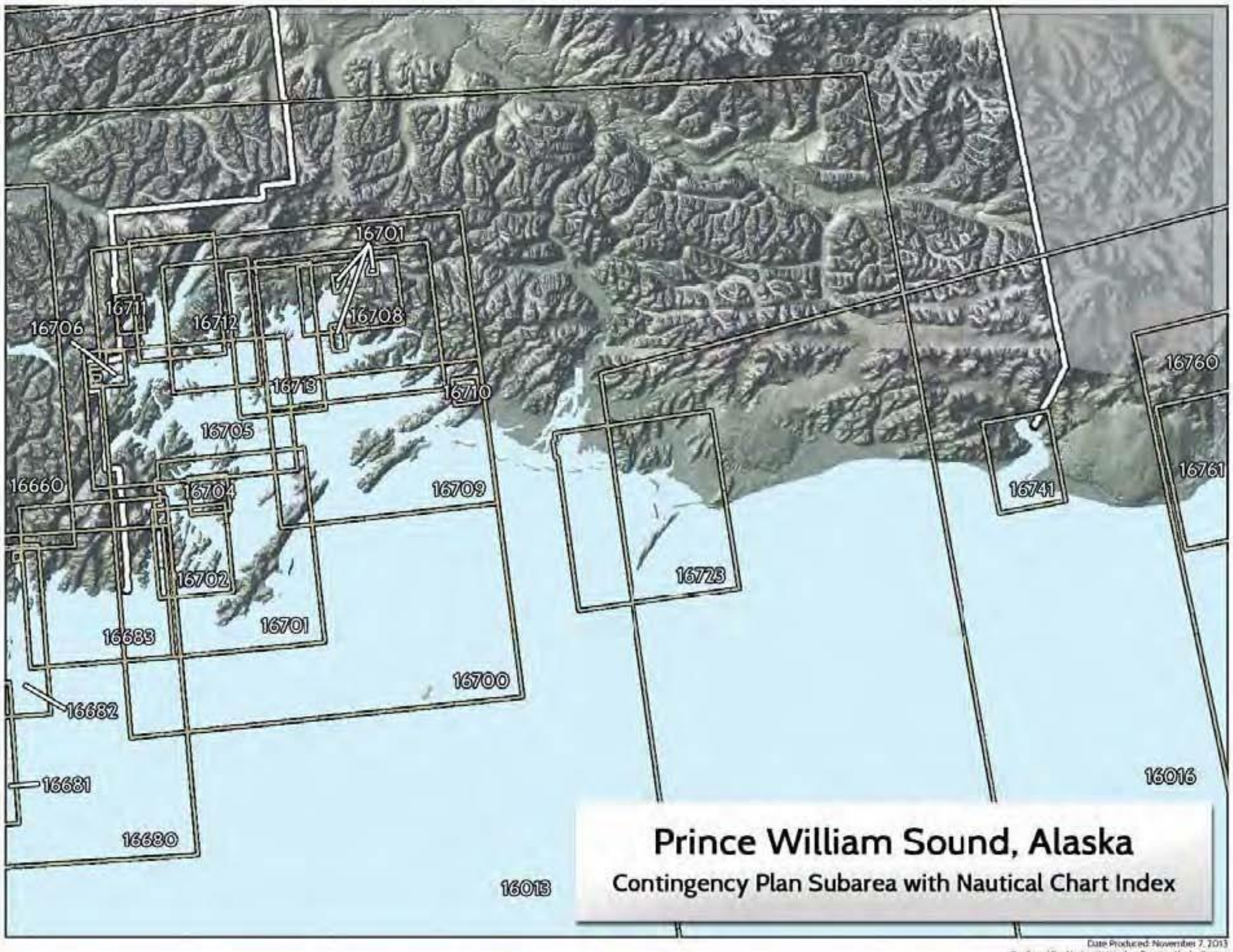
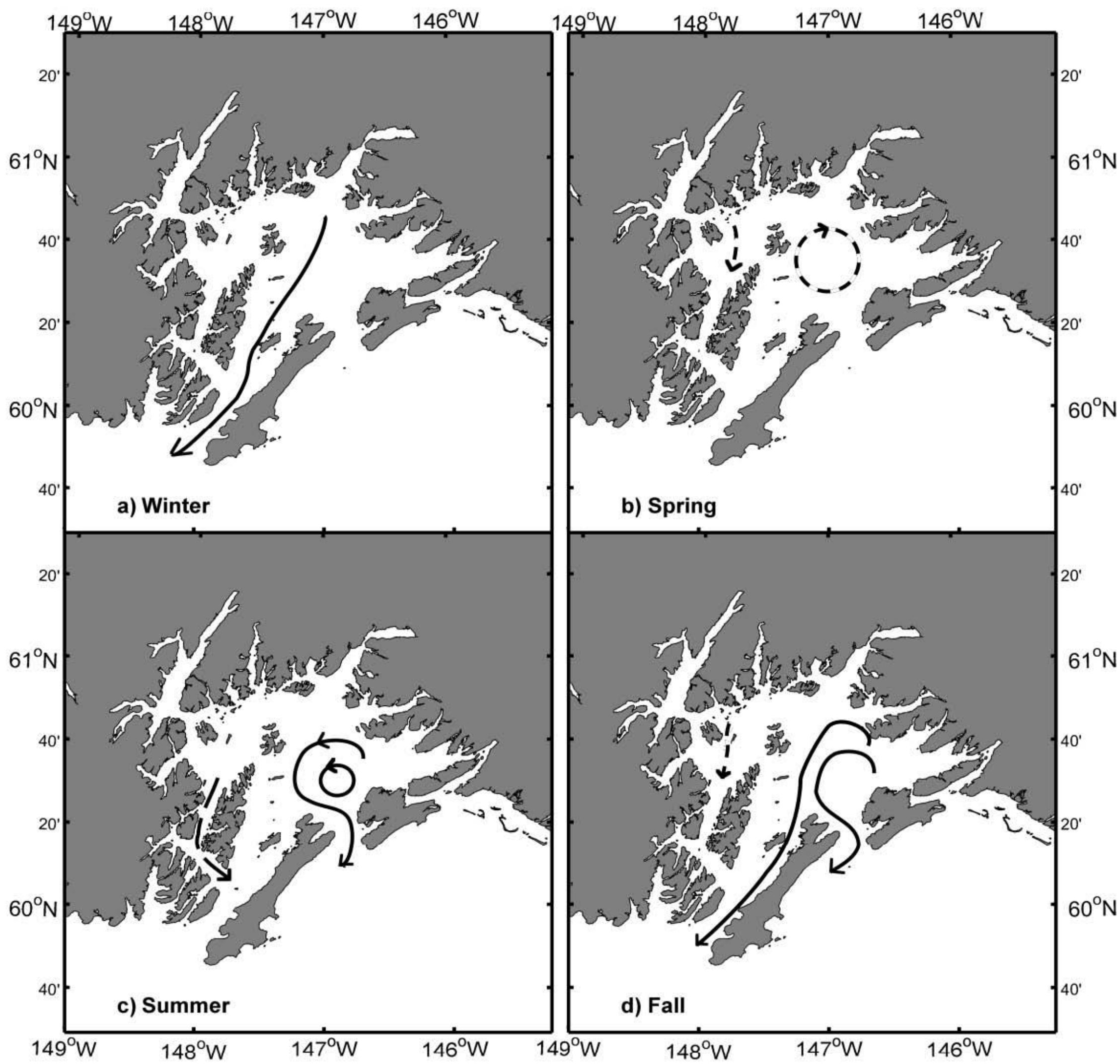


FIGURE 4: PWS NAUTICAL CHART MAP INDEX



The above NOAA charts are available at the following website:
http://www.asgdc.state.ak.us/maps/cplans/base/AK-Circ.pdf

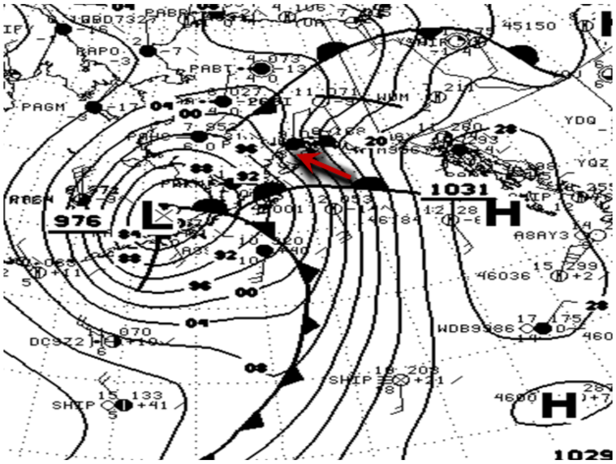
FIGURE 5: NET SURFACE CURRENTS – GULF OF ALASKA



The arrows indicate flow direction or circulation paths by season: (a) Winter; (b) Spring; (c) Summer; and (d) Fall. The dashed lines indicate weak flow. Wind forcing can disrupt the circulation and, at times, even reverse it. But these diagrams provide a general reference for surface flows averaged over a season.
Source: Musgrave, D.L., M.J. Halverson, and W.S. Pegau, Seasonal Surface Circulation, Temperature, and Salinity in Prince William Sound, Alaska, *Cont. Shelf Res.*, **53**, 20-29, 2013

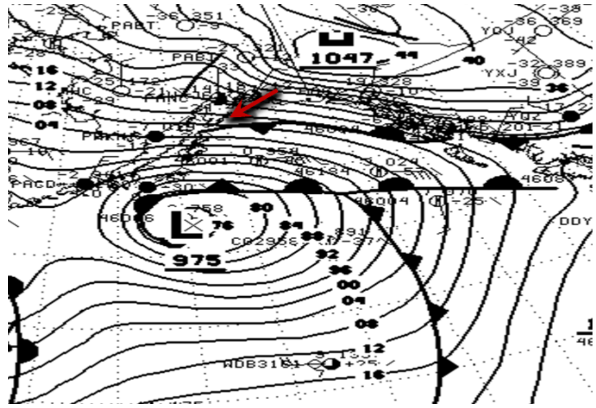
FIGURE 6: PWS SEASONAL WINDS

Southeast Wind (Fall)



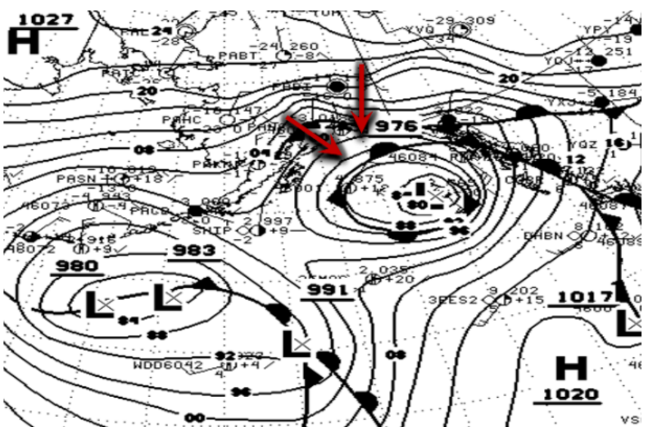
Southeast Wind is most common for PWS anytime of the year. The most common time for strong SE wind is late August through mid-October. Above is the typical surface analysis associated with strong SE wind in PWS.

Northeast Wind (Winter)



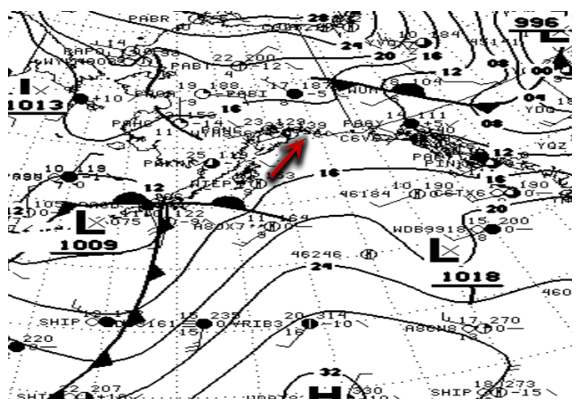
Northeast winds are most common in the winter, but are not exclusive to that season. Northeast winds tend to be more localized than southeast winds and the strongest winds often are not observed in the main part of the sound. Above is the typical Surface Analysis for NE wind in PWS.

North and Northwest Wind (Winter)



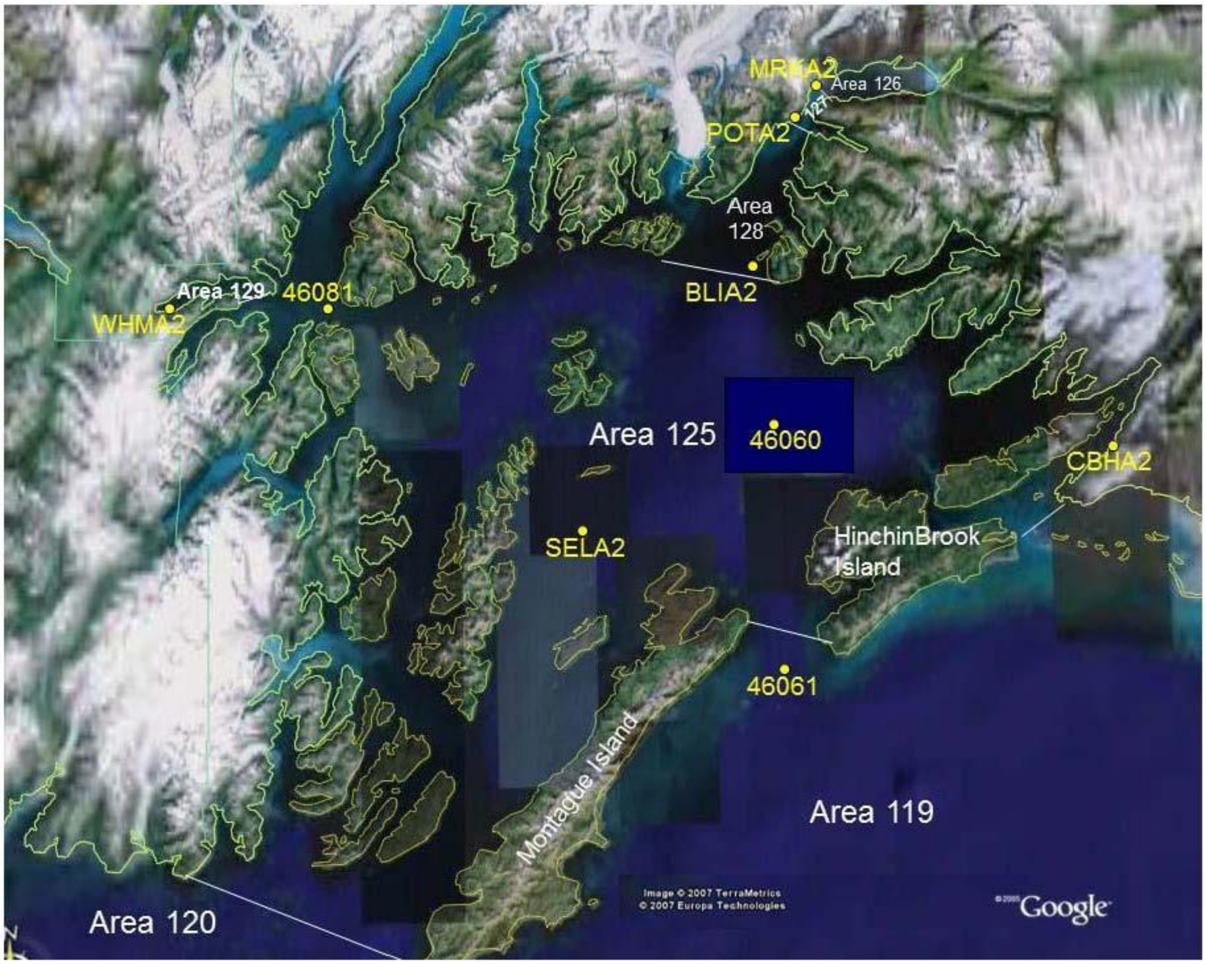
North and Northwest wind are most common in PWS during the late winter to early spring. Above is the typical surface analysis associated with this scenario. These winds are highly channeled and gusty. Typically these winds are also accompanied by super structure icing for vessels.

Southwest and light winds (Summer)



Southwest winds are most common in the summer months in Prince William Sound, and are rare in the winter. The above Surface Analysis is typical for a light wind or SW wind regime for PWS.

FIGURE 7: WEATHER STATIONS



There are significant challenges for forecasting weather regimes in PWS. Even from weather system to weather system, though they look similar, there can be large differences in what is reported at any one station compared to another in any particular part of PWS. One of the reasons for this is that while the east-west distance of PWS that opens into the Gulf of AK (including islands) is only about 100 miles, the number of islands and fjords increase the actual coastline length to over 3,750 miles. BLIA2, POTA2 & MRKA2 stations are all in Port Valdez, Valdez Narrows and Valdez Arm and the southwest portion of PWS does not have any weather observation stations. PWS is characterized with two distinctly different orientations: (1) eastern PWS, dominated by east northeast to west to southwest oriented bays and channels; and (2) western PWS, dominated by north northeast to south southwest-oriented bays and channels. The major geographical features surrounding PWS also play a role in defining its weather patterns. The Chugach Mountains border PWS on the east, west, and north, while Montague & Hinchinbrook Islands buffer winds, weather, and waves from the Gulf of AK to the south. As a result, PWS has generally less severe weather than the adjacent North Gulf Coast waters, especially in the summer, for example, when it can go many days on end with light winds and low seas. Source: NOAA

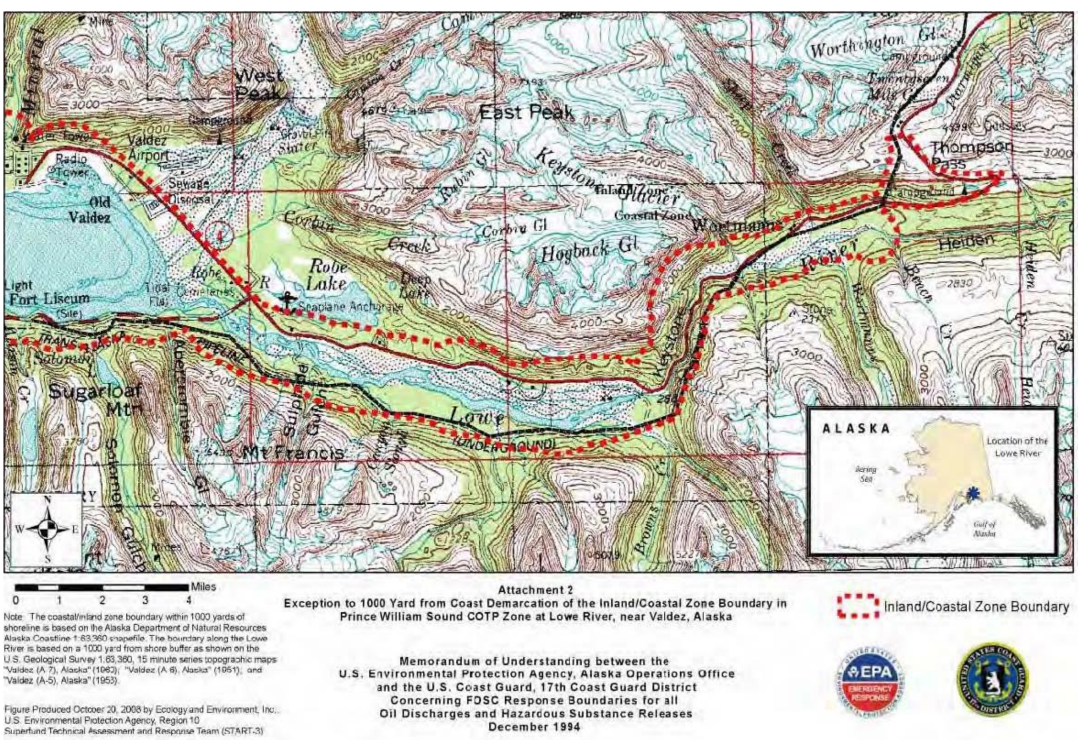
C. AREA OF RESPONSIBILITY

The PWS Subarea is that area described above in part B. The PWS Captain of the Port (COTP) Zone and FOSC area of responsibility for the U.S. Coast Guard (USCG) is included in this subarea. The PWS COTP Zone comprises the area within the boundary which starts at Cape Puget at 148 26' W. longitude, 59 56.06' N. latitude, and proceeds northerly to 61 30' N. latitude; thence easterly to the International Boundary between the United States and Canada; thence southerly along the International Boundary to 60 18.7' N. latitude; thence southwesterly to the sea at 60 01.3' N. latitude, 142 00’ W. longitude; thence southerly along 142 W. longitude to the outermost boundary of the EEZ; thence along the outermost boundary of the EEZ to 148 26' W. longitude to the place of origin at Cape Puget at 59 56.06' N. latitude.

The PWS Subarea is divided into Coastal and Inland Zones to determine federal agency responsibility. In accordance with current Memoranda of Understanding, the USCG is the predesignated Federal On-Scene Coordinator (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 (EPA) is the predesignated FOSC for the Inland Zone which encompasses all lands, rivers, streams, and drainages inward of a 1000-yard wide band that parallels the Alaskan coastline. The USCG will provide the FOSC for all oil discharges and hazardous substance releases in the Coastal Zone and on the Lowe River from Port Valdez to Thompson Pass. The EPA will provide the FOSC for the remainder of the Inland Zone.

The State of Alaska places jurisdiction of spill response for the PWS Subarea under the Central Alaska Response Team (CART) of the Department of Environmental Conservation. The State On-Scene Coordinator (SOSC) for the CART serves as the SOSC for the entire PWS.

FIGURE 8: EPA/USCG MOU LOWE RIVER BOUNDARY



D. REGIONAL STAKEHOLDER COMMITTEE

A Regional Stakeholder Committee (RSC) will normally be activated for significant incidents that involve resources under the jurisdiction of several agencies. The RSC was previously referred to as the Multi-Agency Coordination Committee (MAC). Unlike the MAC defined in the ICS of the National Interagency Incident Management System, 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 9 provides the general location of the regional RSC in relation to the Unified Command organizational structure. Additionally, the suggested/potential membership of the RSC is provided in Figure 9. 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. During incidents where there is no FOSC, federal agencies with jurisdictional responsibilities for resources at risk could participate as a member of the RSC, thus retaining their input on containment, oversight, and cleanup.

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.

RSC activities will be coordinated by the Community Liaison Officer. RSC discussions will be documented and recommendations and dissenting opinions occurring outside of RSC meeting 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 9: PWS REGIONAL STAKEHOLDER COMMITTEE ICS ORGANIZATIONAL POSITION AND MEMBERSHIP

Suggested Membership:

- Prince William Sound Regional Citizens Advisory Council
- Representatives or Community Emergency Coordinators from affected communities. These may include:

Chenega Bay	Glennallen	Northway Junction	Tazlina
Chistochina	Gulkana	Northway Village	Tetlin
Chitina	Kenny Lake	Paxson	Tok
Copper Center	McCarthy	Slana	Tonsina
Cordova	Mentasta Lake	Tanacross	Valdez
Gakona	Northway	Tatitlek	Whittier

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

* The Local On-Scene Coordinator is part of the Unified Command and the Incident Commander during an incident as long as there is an immediate threat to life, health and safety. The LOSC may also be part of the Unified Command during incidents which occur within the local jurisdictional authority and/or where significant local resources are committed to the response.

E. REGIONAL CITIZENS' ADVISORY COUNCIL

The Prince William Sound Regional Citizens' Advisory Council (RCAC) is a local citizens group with an Oil Pollution Act of 1990-mandated role in PWS spill response activities. In this role, the RCAC participates with the incident management team at the emergency operations center and monitors on-water activities during a spill. The RCAC has four primary tasks to perform during a spill: observe, verify, inform, and advise.

By observing and verifying emergency spill response and cleanup efforts, the RCAC is able to properly inform local residents, communities and concerned groups. The RCAC also provides information on local knowledge and concerns to incident commanders that can prove valuable to operational decisions. The RCAC is a resource for the Unified Command and participates in the Regional Stakeholder Committee when it is established and functioning for a spill response.

Specific responsibilities of the RCAC include:

- Providing a voice for local communities and citizens in the policies and decisions that affect them.
- Advising the oil industry and the public on oil spill prevention and response and ways to mitigate the environmental impact of terminal, offshore oil facilities, and tanker operations.
- Monitoring terminal, tanker, and offshore oil facilities operations and implementation of spill prevention and response plans.
- Increasing public awareness of private oil industry's current capabilities in spill prevention and response and the environmental impacts of oil transportation.
- Fostering long term partnership between industry, government and local communities.
- Conducting independent research.
- Participating in, monitoring, and critiquing actual spill responses, spill drills, deployment exercises, and spill simulations conducted by industry. The RCAC also assists industry and regulatory agencies in drill planning and post-drill evaluations.
- Participating in the Regional Stakeholder Committee.

F. SUBAREA COMMITTEE

The primary role of the Subarea Committee (SAC) is to act as a preparedness and planning body for the subarea. The Subarea Committee consists of the predesignated FOSCs and SOSC for the subarea and, depending upon the event or the issues to be addressed, local government representatives. Each member is empowered by their own agency to make decisions on behalf of the agency and to commit the agency to carry out roles and responsibilities as described in this plan and the Unified Plan. The predesignated Federal On-Scene Coordinators for the Subarea (EPA & USCG) and State On-Scene Coordinator (ADEC) will serve in the Executive Steering Committee (ESC).

The PWS SAC is encouraged to solicit advice, guidance or expertise from all appropriate sources and establish workgroups as necessary to accomplish the preparedness and planning tasks. Workgroup participants may include federal, state and local government, facility owners/operators, shipping company representatives, cleanup contractors, emergency response officials, marine pilot associations, academia, environmental groups, consultants, response organizations and representatives from the RCAC. Workgroup chairs must be approved by the ESC and be federal or state representatives.

Subarea Workgroups

The Subarea Committee welcomes interested participants to serve on workgroups in accordance with each individual's area of expertise and the particular needs of the workgroup. Membership to workgroups must be approved by the ESC. However, membership opportunities shall be available to the following:

- U.S Coast Guard, COTP Prince William Sound
- U.S. Environmental Protection Agency
- Alaska Department of Environmental Conservation
- Federally Recognized Tribes and local government where applicable

Each workgroup is directly involved in reviewing the SCP, providing recommendations, and actively participating in the SCP revision process. The Prince William Sound Subarea Committee relies on the input from the four workgroups in accordance with ESC-approved PWS SCP Project Checklist, the PWS Subarea Committee Strategic Plan, and ESC directives.

- Response, Resource and Protection Workgroup: The primary purposes of the Response, Resource and Protection Workgroup are to:
  - Review present and best available technologies and response capabilities in PWS and the US
  - Develop and maintain the Response, Resources, Sensitive Areas, Scenarios, Geographic Response Strategies and Potential Places of Refuge Sections of the SCP
  - Assist with the Hazmat Section of the SCP

- Training and Exercise Workgroup: The Training and Exercise Workgroup will serve under the Response, Resource and Protection Workgroup for the purposes of SCP revisions. The primary purposes of the Training and Exercise Workgroup are to:
  - Communicate training, exercise opportunities, and new technology to the Subarea Committee
  - Track events
  - Invite guest speakers
  - Introduce training and education opportunities

- Outreach Workgroup: The primary purposes of the Outreach Workgroup are to:
  - Coordinate any applicable public review processes
  - Communicate to stakeholders
  - Develop and maintain the SCP Descriptions, Notifications, Community Profiles, Information Directory, Areas of Local Concern Sections of the SCP Plan.

- <u>Planning Workgroup:</u> The primary purposes of the Planning Workgroup are to:
  - Organize the SCP revision process,
  - Develop and maintain the Intro and Background Sections of the SCP Plan.
  - Assist all Workgroups with coordination and communication efforts while supporting ESC approved priorities and objectives.

Membership on the workgroups can vary and fluctuate depending on the needs of the ESC. The list below provides examples of participation that will be found on workgroups:

- Federal government
- Federally-recognized tribes
- State government
- Local government and representatives from local emergency planning committee
- PWS Regional Citizens' Advisory Council
- Industry
- Stakeholders
- Representatives and citizens within the subarea and/or local communities with economic concerns

BACKGROUND: PART TWO – RESPONSE POLICY AND 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 strategies are further delineated in the procedures contained in the Response Section. Additional information can be found in the **Unified Plan**.

A. FEDERAL RESPONSE ACTION PRIORITIES/STRATEGIES

The following priorities are general guidelines for response to a pollution incident within the COTP/FOSC Prince William Sound 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.
- Priority Three: Protection of the Environment by elimination of the pollution source – Containment and recovery of oil in the open water must be effected expeditiously to preclude involvement of the beaches and shorelines. Due to remote locations and restricted accessibility, it is extremely difficult to protect the majority of the coastline by diversion or exclusion methods. Therefore, securing the source and open water containment and recovery are 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 (Unified Plan, Annex F for checklist) of a vessel and its pollutant may be an alternative considered by the OSCs; this strategy 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 open water recovery, protection of the shoreline becomes paramount, especially areas of greatest sensitivity. It is not possible to protect some areas entirely or even in part. It may be necessary to sacrifice some areas in order to achieve the best overall protection of the environment. 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 and conditions are agreeable. Subpart J of the NCP and Annex F of the Unified Plan address in detail the responsibilities of the FOSC in the use of chemicals.
- Priority Five: Protection of the Environment by beach cleanup and the use of sacrificial areas – It may not be possible to protect the entire shoreline from oil; in fact, spilled product may be allowed purposely to come ashore in some areas as an alternative to damaging other, more

sensitive areas. Selection of the proper shoreline cleanup technique depends on many different factors, including the following:

- 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 and other stakeholders. 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 assess the geological and ecological environment of the involved shorelines. Once a consensus is met on these parameters, an approach must be developed to determine the proper treatment required.

Shoreline cleanup options may include the use of physical and/or chemical processes. 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, mechanical tilling, and mechanical removal using heavy equipment. 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 coordinator at the spill. Bioremediation is also considered as a shoreline cleaning method. Bioremediation is the application of nutrients to the shoreline to accelerate the natural biodegradation of oil. The OSCs shall request site-specific guidelines for source protection measures required during shoreline cleanup operations.

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.

BACKGROUND: PART THREE – SUBAREA SPILL HISTORY AND OIL FATE

Numerous opportunities exist for spills to occur on water because of the high volume of vessel traffic and the pervasive natural navigational hazards. Because of the limited road system, spills related to road vehicles are not frequent. Most inland spills occur from home heating oil tanks or at fuel depots.

Prince William Sound supports a wide variety of marine vessel traffic, including everything from the smallest pleasure craft to the crude oil supertankers calling on the Alyeska Marine Terminal in Port Valdez. On the majority of non-crude oil spills, little if any product is recovered due to the rapid dissipation and evaporation of the product (See the explanation on the "Fate of Spilled Oil" below for further information.), the sea and weather conditions, and the often remote locations of the incidents. When response equipment is deployed, it usually involves the deployment of boom to prevent oil from entering sensitive areas or to encircle the source to prevent the spread of oil, and the use of sorbent materials to collect the fuel. Spill responders generally prefer skimmers for collecting spilled products, but they are not always available in a timely manner when responding to spills in remote locations. The cities of Valdez, Cordova, Glennallen, Mentasta and many other small villages are not immune to oil discharges or hazardous material releases. Because these towns witness a remarkable amount of fuel transfers, the opportunity for spills is high.

The most notable spill in Prince William Sound was the T/V Exxon Valdez grounding incident and subsequent spill of 11 million gallons of crude oil in March of 1989. This catastrophic event led to the passing of the Oil Pollution Act of 1990, which greatly improved oil spill response capabilities in the United States and, most markedly, in Prince William Sound.

The following spill history reflects information obtained from the Alaska Department of Environmental Conservation and U.S. Coast Guard records. This partial listing includes only the more significant spills or hazardous material releases. This abbreviated spill history is provided to give an overall view of the vast array of facility and transportation-related accidents that can occur.

A. <u>SUBAREA SPILL HISTORY</u>

NAVIGABLE WATERS (SPILLS GREATER THAN OR EQUAL TO 1,000 GALLONS)

Date	Incident	Volume and Substance
01/03/89	T/V Thompson Pass, Berth 4, Valdez	60,000 to 75,000 gallons - North Slope Crude
01/16/89	T/V Cove Leader, Berth 3, Valdez	2,500 to 3,000 gallons - North Slope Crude
03/24/89	T/V Exxon Valdez, Bligh Reef	10,800,000 gallons - North Slope Crude
03/04/90	PWS Aquaculture, Cannery Creek Hatchery	2,200 gallons - Diesel
06/01/91	F/V Kristine, Montague Island	1,800 gallons - Diesel
02/29/92	F/V Granny Rosa, Galena Bay	1,500 gallons - Diesel
02/94	Tesoro Fuel Dock	1,000 gallons - Diesel
05/21/94	T/V Eastern Lion	8,400 gallons - North Slope Crude
08/95	M/V Crane (Cordova)	2,100 gallons - Diesel/Oil
03/96	F/V SS Viking (Montague Island)	2,000 gallons - Diesel
1/26/97	Valdez Petro Star Refinery	4,200 gallons - Crude

Date	Incident	Volume and Substance
7/21/97	49er Barge Vessel Incident Between Kodiak and Cordova	2,604 gallons - Diesel (hull failure)
2/9/99	Vessel Incident (Near Naked Island)	1,000 gallons - Diesel (punctured fuel tank)
2/17/99	Valdez Marine Terminal	8,400 gallons - Diesel (overfill)
7/13/99	Valdez Marine Terminal	1,100 gallons - Diesel (Gauge/Site Glass Failure)
7/14/99	Valdez Marine Terminal	1,100 gallons - Diesel (overfill)
7/26/01	M/V Vanguard (North of Glacier Island)	2,000 gallons - Diesel (Vessel Sank)
8/4/01	F/V Windy Bay (Olsen Island)	35,000 gallons - Diesel (Vessel Sank)
2/13/02	Valdez Marine Terminal	3,065 gallons - Diesel (Crack in pipe, line)
5/15/02	Valdez Marine Terminal	1,050 gallons - Non-Crude Oil, other (Line Failure)
9/9/02	Valdez Marine Terminal (Fire Suppression System)	5,500 gallons - Unknown (Human Error)
12/12/02	Valdez Marine Terminal (Ballast Water Treatment Tank)	1,050 gallons - Ballast Water (Leak in pipe, line)
1/29/07	Valdez Marine Terminal (Ballast Water Treatment Tank)	12,600 gallons - Ballast Water (Corrosion in line)
7/21/07	F/V Nordic Viking grounding, Olsen Bay in Port Gravina	3,500 gallons Diesel -(Grounding)
12/28/08	Valdez Petro Star Refinery	1,000 gallons glycol & 200 gal Crude - (Equipment Failure)
12/23/09	Tug Pathfinder, Bligh Reef (PWS)	6,410 gallons Diesel - (Grounding)
4/20/10	F/V Northern Belle, sank 50 nautical miles south west of Middleton Is	1,000 gallons Diesel - (Rollover/Capsize)
7/27/10	F/V Cape Cross, Main Bay - south shoal at mouth	3,000 gallons Diesel - (Human Error)
2/17/11	VMT, powerhouse A boiler	5,000 gallons Ethylene Glycol - (Equipment Failure)
4/20/11	Valdez Marine Terminal, berth 4	1,000 gallons Ethylene Glycol - (Equipment Failure)
5/19/11	Chenega Bay Power Plant	1,618 gallons Diesel - (Equipment Failure)
7/6/11	F/V Copasetic, Off of Cape Puget, near Puget Bay	2,000 gallons diesel, 65 gal Hydraulic/Lube Oil -(Rollover/Capsize)
12/28/11	Cordova Electric Cooperative Admin Bldg	2,800 gallons Diesel - (Human Error/External Factors)
6/29/12	North Dutch Island (Historical spill)	10,000 gallons Diesel -(Other)
7/24/13	Chenega Bay Power Plant, tank spill	1,400 gallons Diesel - (Human Error)

INLAND SPILL HISTORY (SPILLS GREATER THAN OR EQUAL TO 1,000 GALLONS)

Date	Incident
09/26/88	Service Oil Co., Mile 30 Richardson Highway 1,000 gallons - Diesel
02/15/89	ADOT/PF, Thompson Pass 7,000 gallons - Diesel
05/16/89	Columbus Distributor, Mile 166 Glenn Highway 1,400 gallons - Gasoline
6/05/89	Stratton Oil Co., Mile 116 Glenn Highway 10,000 gallons - Gasoline
12/15/89	U.S. Army, Mile 139 Richardson Highway 5,000 gallons - Diesel
04/25/90	ADOT/PF, Cordova 5,000 gallons - Fuel Oil
04/30/90	ADOT/PF, Thompson Pass 1,200 gallons - Diesel
4/26/91	USCG, Potato Point, Port Valdez 3,500 gallons - Diesel
04/26/92	USCG, Potato Point, Port Valdez 5,000 gallons – Diesel
11/07/95	TransAlaska Pipeline System (Pump Station 10) 5,800 pounds - Halon
1/08/95	TransAlaska Pipeline System (Pump Station 10) 5,800 pounds - Halon
04/20/96	TransAlaska Pipeline System (Check Valve 92) 34,073 gallons - North Slope Crude Oil
08/26/96	TransAlaska Pipeline System (Pump Station 10) 2,300 pounds - Halon
10/09/96	Gakona Junction Village Roadhouse 7,000 gallons - Diesel
01/26/97	Petro Star Refinery (Valdez) 4,200 gallons - Crude Oil
02/17/99	Valdez Petroleum Terminal Tank #18 8,400 gallons – Diesel
8/16/99	TransAlaska Pipeline System (Pump Station 10) 4,400 pounds – Halon
10/19/99	Cordova - Eyak Lake - Waste Oil Release 1,000 gallons – Waste Oil (containment overflow)
7/28/00	Richardson Highway South – Mile 19 Gravel Pit 2,000 gallons - Asphalt (Cause unknown)
8/3/01	Cordova - Orca Power Generation Plant 1,500 gallons - Diesel (Tank Overfill)
12/31/01	Chitina Electric Power Plant 1,000 gallons - Diesel (Valve failure)

Date	Incident
N/A	Copper River Native Assoc, Copper Center, house #21 1,000 gallons - Diesel (Line failure and crack)
1/11/07	MP81.5 Richardson Highway 1,500 gallons - Diesel (Tank Failure)
1/10/07	Acres Qwik Trip Gas Station 4,000 gallons – Gasoline (Collision/Allision)
6/12/09	Old Historical Spill Site, BLM Land 1,558 gallons –Diesel (Human Error)

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 list is available through ADEC.

Date	Incident
10/1/96	DOTPF Yard (Tok) 5 gallons - Toluene 2,4-Diisocyanate (Cargo Not Secured)
5/3/97	Valdez Marine Terminal-Land Power Vapor Area 1 gallon – Sulfuric Acid (Cause Unknown)
10/18/98	Valdez – Nautilus Seafoods 5 pounds – Anhydrous Ammonia (Valve Failure)
6/7/99	Valdez Small Boat Harbor – F/V Taku 1 pound – Anhydrous Ammonia (Equipment Failure)
6/9/99	Valdez – Nautilus Seafoods 20 pounds – Anhydrous Ammonia (Human Error)
3/24/00	Valdez – Nautilus Seafoods 1 gallon – Anhydrous Ammonia (Line Failure)
1/8/01	Valdez – VMT 100 Gallons – Other (Other)
4/24/01	Cordova – OLAF's Fish Camp 50 Gallons – Other (Other)
4/25/01	Valdez – VMT 3 Gallons - Other (Other)
5/12/01	Valdez Marine Terminal 1 gallon – Hydrogen Peroxide (Equipment Failure)
5/26/01	Pump Station #12 250 Pounds – Halon (Other)
7/17/01	Cordova – ORCA Generation Facility 15 Gallons – Ethylene Glycol (Antifreeze) (Leak)
7/25/01	Valdez – VMT (Land Tug Dock) 250 Gallons – Other (Human Error)
8/28/01	Valdez –VMT (Land emergency Response Building) 400 Pounds – Halon (Other)
12/13/01	Valdez – Crowley Dock 30 Gallons – Other (Human Error)
2/24/02	Pump Station #12 1 Gallon - Ethylene Glycol (Antifreeze) (Equipment Error)
3/31/02	Valdez – Petro Star 350 Pounds – Halon (Leak)
8/21/02	Valdez – VMT 1 Gallon - Ethylene Glycol (Antifreeze) (Seal Failure)
9/4/02	Valdez – VMT 1 Gallon - Ethylene Glycol (Antifreeze) (Vehicle Leak)
9/9/02	Valdez – VMT 5,500 Gallons (Other) (Human Error)

Date	Incident
9/20/02	Valdez Small Boat Harbor – F/V Taku 1 pound – Anhydrous Ammonia (Seal Failure)
9/26/02	Valdez – Nautilus Seafoods 2 gallons – Anhydrous Ammonia (Human Error)
12/17/02	Richardson HWY MP 251.5 3 Gallons – Ethylene Glycol (Antifreeze) (Collision/Allision)
2/1/03	Richardson HWY MP 110 2 Gallons – Ethylene Glycol (Antifreeze) (Leak)
2/19/03	Pump Station #12 20 Pounds Halon (Valve Failure)
3/07/03	Valdez – SERVS Building 4 Gallons – Ethylene Glycol (Antifreeze) (Human Error)
7/23/03	Valdez Marine Terminal 1 gallon – Hydrochloric Acid (Leak)
7/23/03	Valdez Marine Terminal 1 gallon – Hydrochloric Acid (Line Failure)
8/1/03	Valdez – Petro Star 350 Pounds –Halon (Equipment Failure)
8/5/03	Valdez – Nautilus Seafoods 2 gallons – Sulfuric Acid (Cargo Not Secured)
8/6/03	Valdez – VMT (Access Rd) 2 Gallons - Ethylene Glycol (Antifreeze)
9/28/03	Pump Station 11 25 Pounds – Freon (Leak)
11/20/03	Valdez – VMT 35 Gallons – Acid (Human Error)
12/30/03	Valdez – VMT 3 Gallons - Ethylene Glycol (Antifreeze) (Leak)
2/6/04	Valdez – VMT (Warehouse Rd) 2 Gallons - Ethylene Glycol (Antifreeze) (Collision/Allision)
2/26/04	Tatitlek – School 20 Gallons - Glycol, Other (Corrosion)
4/21/04	Pump Station 12 – Tank Farm 1 Gallon – Therminal (Cargo Not Secured)
6/18/04	Pump Station 11 1 Gallon 0 Corrosion Inhibitor (Leak)
6/27/04	Valdez – F/V Steelhead 20 lbs of Freon22 (broken fitting)
8/8/04	Valdez – Nautilus Seafoods 1 pound – Anhydrous Ammonia (Human Error)
8/31/04	Pump Station 11 130 Pounds – Freon (Seal Failure)
2/14/05	Valdez – VMT 2 Gallons- Other (Seal Failure)

Date	Incident
4/3/05	VMT – Flammable Storage Locker 400 Pounds – Halon (Other)
4/25/05	Valdez – Animal Shelter Parking lot 300 Gallons – Other (Equipment Failure)
5/2/05	Pump Station #11 – Air boat 3 Gallons - Ethylene Glycol (Antifreeze) (Equipment Failure)
6/23/05	Pump Station #12 – Tank Farm 15 Gallons – Therminal (Corrosion/Equipment Failure)
7/16/05	Valdez – Sea Hawk Seafoods 5 Pounds – Ammonia (leak)
9/7/05	Valdez – VMT 1 Gallon – Glycol (Overfill)
11/6/05	Pump Station #11 1 Gallon – Glycol (Overfill)
1/17/06	VMT – Check Point Charlie 1 Gallon - Glycol (Human Error)
4/14/06	Valdez – VMT 5 Gallons - Ethylene Glycol (Antifreeze) (Seal Failure)
5/8/06	Valdez – Sea Hawk Seafoods 1 Gallon - Ammonia (Anhydrous) (Seal Failure)
9/28/06	Valdez – VMT 2 Gallons – Other (Leak/Equipment Failure)
11/12/06	Pump Station #12 1.5 Gallons - Ethylene Glycol (Antifreeze) (Leak)
11/17/06	Pump Station #11 9 Gallons - Ethylene Glycol (Antifreeze) (Equipment Failure)
3/23/07	Glennallen Response Base 1 Gallon - Ethylene Glycol (Antifreeze) (Crack)
3/25/07	Valdez – Petro Star 110 Gallons - Propylene Glycol (Human Error)
4/9/08	Valdez – Petro Star 125 gallons - Ethylene Glycol (Antifreeze) (Equipment Failure)
4/16/07	HAARP Facility 125 Gallons - Ethylene Glycol (Antifreeze) (Equipment Failure)
5/12/08	Point Bentink Light 3 Gallons - Hydrochloric Acid (External Factors fm Battery)
6/25/08	Cordova - Trident Seafood 40 Gallons - Ammonia (Anhydrous) (Leak/Human Error)
8/26/08	Valdez - Valdez Recycling 375 Gallons – Oil, 150 Gallons - Ethylene Glycol (Antifreeze), 2 Pounds – Lead (Intentional Release)
9/15/08	Alyeska – BWT 1 Gallon - Sulfur (Solid) (Human Error)
12/28/08	Valdez – Petro Star 200 Gallons – Crude, 1,000 Gallons – Glycol (Equipment Failure)

Date	Incident
10/5/09	Cordova - Trident Seafoods 10 Pounds - Ammonia (Anhydrous) (Seal Failure)
11/22/09	Fairmont Island - Fairmont Cannery 51 Pounds – Propane (LPG), 16 Pounds – Other, 15 Gallons – Used Oil, 9 Pounds – Grease (Cargo Not Secured)
2/17/11	Valdez – VMT 5,000 Gallons - Ethylene Glycol (Antifreeze) (Equipment Failure)
4/20/11	Valdez –VMT 1,000 Gallons - Ethylene Glycol (Antifreeze) (Equipment Failure)
5/27/11	Valdez – Shooting range 10 Pounds- Other (Human Error)
2/14/13	Valdez – VMT 2 Gallons - Ethylene Glycol (Antifreeze) (Equipment Failure/Vehicle Leak)
4/2/13	Valdez – Petro Star 9 Gallons - Propylene Glycol (Human Error)
5/31/13	Valdez Container Terminal – BBC Arizona 50 Gallons - Transformer Oil (Leak)
7/22/13	Valdez – Small Boat Harbor 5 Gallons – Gasoline, 25 Gallons - Glycol, Other (Equipment Failure)
8/8/13	Naked Island - F/V Randi Lynn 250 Pounds - Ammonia (Anhydrous) (Seal Failure/Corrosion)

B. CLOSER LOOK AT SOME NOTEWORTHY

January 3, 1989 T/V Thompson Pass
Location: Berth 4, Valdez Marine Terminal
Product: 60,000 to 75,000 gallons of ANS crude oil
An oily sheen was initially observed in while the vessel was offloading at a southern port. During on-loading operations at the Valdez Marine Terminal, crude oil was released through a crack in the hull.

March 24, 1989 T/V Exxon Valdez
Location: Near the mouth of the Valdez Arm, off Bligh I. in Prince William Sound
Product: Nearly 11 million gallons of ANS crude oil
Just after midnight, the supertanker Exxon Valdez, containing more than 53 million gallons of oil, ran aground on the charted rocks of Bligh Reef after exiting the prescribed tanker navigation lanes in an effort to avoid icebergs from nearby Columbia Glacier. The impact ruptured eight of the eleven cargo tanks. Oil spewed out of the tanker in such quantities that, for a while, the slick stood at over two feet thick in places. Within 36 hours after the grounding, and with the weather holding calm, air reconnaissance reported the oil slick to be 10 miles long and 3 to 7 mile wide. Despite calm weather for the first three days, spill response efforts were stymied by confusion, lack of equipment, and misunderstandings over proper response and control. A major storm, boasting winds up to 73mph, blasted through the Sound on Sunday night, March 26, spreading oil in all directions and coating the first of many miles of shoreline. Eventually, over 1200 miles of coastline would be impacted by oil, including the outer Kenai coast and islands, reaching the mouth of Kachemak Bay, and out to Kodiak Island and the Alaskan Peninsula. Exxon mounted a major shoreline cleanup effort during the summer of 1989, and similar but much reduced cleanup activities during the summers of 1990 and 1991. Recent studies report various parts of the coastal ecosystem still exhibiting negative effects from the oil spill.

April 20, 1996 TAPS Check Valve 92
Location: Alyeska Pipeline MP 593.7, at check valve 92, about 7 miles south of Pump Station 10.
Product: 34,073 gallons of ANS Crude Oil
The leak was caused by a leak in the by-pass valve threadlet. Alyeska discovered crude oil in two metal culvert access pipes about 60 feet north of check valve 92. About 16 inches of crude (about 100 gallons) was pumped from the pipes. Oil seeped into the pipes at a rate of about 6 - 8 gallons per hour. Alyeska reduced the pipeline throughput from 1.5 million barrels per day to 700,000 barrels per day, and pumped crude oil from the storage tanks at PS 10 to make storage available in case the line needs to be evacuated for repairs. An Incident Management Team was activated and based at Pump Station 10. Four task forces were organized to address the spill. Task force 1 excavated in the area around check valve 92. Task force 2 excavated near the metal culvert pipes and located the leading edge of the spill. Task force 3 established a contaminated soil stockpile and Task Force 4 provided decon. DEC and Joint Pipeline Office staff responded and monitored initial and follow-on response actions and reviewed cleanup plans.

August 4, 2001 F/V Windy Bay
Location: Olsen Rock, east of Olsen Island, northern Prince William Sound
Product: 35,000 gallons of diesel
The F/V Windy Bay ran aground at 10:45 am and sank at 1:56 pm in about 1000 feet of water. The vessel contained 35,000 gallons of diesel fuel at the time of sinking. The vessel also carried 100 gallons lube oil and 300-500 gallons hydraulic fluid. An on scene responder estimated the daily release rate at about 60 gallons fuel a day. Because of the great depth for the boom anchoring systems, oversized

anchors and buoys were mobilized. The Coast Guard, Dec, Alaska Chadux and SERVS responded to the incident. Containment boom was deployed to protect identified sensitive areas. The open-water recovery operations applied two Current Buster systems. Wildlife in the area included numerous seabirds, bald eagles, sea otters, sea lions, and humpback whales. Seven dead oiled birds were recovered (6 Marbled Murrelets and 1 Scoter). USF&WS otter specialists demobilized after observing that sixty otters in the area exhibited normal behavior and did not appear to have suffered any impacts. One SCAT team assessed shorelines for oil-impacts. Approximately 5.7 miles of shoreline were surveyed. Beach cleanup crews worked on Little Fairmont and Little Olsen Island. Natural flushing supplemented with low-pressure water spray was used on the oiled shoreline at these locations.

August 18, 2003 F/V Valiant Maid
Location: Spike Island, Cordova, Prince William Sound
Product: 700 gallons of diesel fuel, and several gallons of engine oil
The 42 gross ton wooden vessel hit a rock, split apart and sank in 45' of water. The contents of the vessel's fuel tanks were released. The vessel was rolled to its starboard side on August 20, 2003 and divers installed a flange on the port side tank just after slack tide. After pumping only sea water from the port tank, and upon investigation by the divers, it was determined that only residual fuel remained on board the vessel. Containment boom was deployed around the vesse,l and small amounts of sheen were seen inside the boom, which remained in place through the recovery of the vessel. A wildlife survey around Pike Island revealed no stressed wildlife. The spill did affect the marine waters and rock shores of the nearby island.

January 11, 2007 Big State Logistics
Location: Mile Post 81, Richardson Highway, Squirrel Creek Hill
Product: 750 gallons of diesel fuel
A tractor trailer transporting 14,000 gallons of diesel fuel northbound from Valdez to Fairbanks jack-knifed while attempting to travel up Squirrel Creek Hill. During the accident the manifold for the pup-tank was damaged, releasing approximately 750 gallons of diesel fuel onto the frozen road surface. The spill was contained to the roadway and pooled liquids recovered with sorbent materials. Big State Logistics worked with the State of Alaska Department of Transportation to scrape the ice-compacted road surface to recover any additional fuel-contaminated ice and snow, which was transported from the site for appropriate disposal. Responders pumped fuel from the pup-tank into another tractor trailer that was mobilized from Valdez. Other than the immediate impact to the Richardson Highway, no other resources, including wildlife, were affected.

December 28, 2008 Petro Star Refinery Fire
Location: Mile 2.5 Dayville Road, Valdez
Product: 200 gallons of ANS crude oil; 5,000-8,000 gallons of water contaminated with oil; 100 gallons of propylene glycol
A fire in the refractory tower at the refinery caused the discharge. The Petro Star Fire Team, the Valdez Fire Department, and the Alyeska Marine Terminal Fire Team combined to extinguish the fire at 12:40 A.M. on December 29, 2008. The entire process area was isolated from energy sources, and a work plan was developed to safely remove all of the remaining hydrocarbons in the system. Following that, workers began dismantling the plant and preparing it for rebuilding. The Alaska Chadux Corporation response crew employed an excavator and a loader to scrape up the firewater ice that was contaminated with crude oil, glycol, and aqueous firefighting foam (AFFF). A large snow melter melted the contaminated ice for decanting to collect the oil, which was hauled to the Valdez Wastewater Treatment Plant for final treatment. Very strong winds scoured the site and downwind snow areas, and

a location was found where firewater appeared to have escaped the perimeter dike at a drain. However, testing indicated the oil content was minimal and within regulatory limits.

December 23, 2009 Tug Pathfinder
Location: Bligh Reef, Prince William Sound
Product: 6,410 gallons of diesel fuel
The 136-foot tug had completed an ice survey and was headed back to Port Valdez at the time of the grounding. The grounding caused extensive damage to the hull, tearing a 4 to 5 foot hole at the keel. Crowley Maritime Corporation (the responsible party) completed an assessment of the volume of diesel fuel released from the tug; a third party consultant measured all fuel recovered from the tug Crowley estimated 6,410 gallons of fuel released into the environment. The marine waters of Prince William Sound were affected by the spill, but no oiled wildlife nor shoreline impacts were reported.

August 11, 2013 F/V Fate Hunter
Location: Approximately 7 miles west of Valdez, and less than one mile from Shoup Bay in Port Valdez
Product: 1,500 gallons of diesel fuel, 300 gallons of hydraulic oil and 100 gallons of lube oil
The 65-foot steel-hulled fishing tender was returning to Valdez, after taking 150,000 pounds of salmon on board, when it ran aground. Responders secured the vessel to shore with lines and surrounded it with containment and sorbent boom. When the vessel orientation shifted during recovery operations, small bubbles of oil were occasionally released, causing a light sheen, which was collected by sorbent material. No sheen was observed outside the boom. Based on dive surveys, Alaska Chadux and Global Diving and Salvage determined the safest option for removing the fuel and hydraulic/lube oils was to conduct lightering operations while the vessel remained at its current location. Lightering removed nearly 1300 gallons of fuel from the vessel. Alaska Marine Response conducted vessel recovery operations. The vessel, heavily loaded with fish, sat precariously on a ledge, threatening to slide into deeper water. A large 6-inch diameter diesel-powered macerating trash pump successfully pumped approximately 150,000 pounds of pink salmon from the hold of the vessel, creating a pink slurry that was discharged deep underwater just offshore from the recovery operations. While fish were being removed from the vessel, the fish hold hatch covers were modified to provide an air tight seal so water could be pumped out of the holds and air pumped into them in order to provide additional lift to the vessel. F/V Fate Hunter salvage operations were successful, and the vessel refloated and towed to Cordova. There were no reported impacts to wildlife.

C. PRINCE WILLIAM SOUND SUBAREA OIL SPILL DATA 1995-2005

In 2007, ADEC staff completed and published the report "Ten Year Statewide Summary of Oil and Hazardous Substance Spill Data." This spill data analysis report provides findings related to spills reported to ADEC for the 10-year period extending from July 1, 1995 to June 30, 2005 [State Fiscal Year (FY) 1996-2005]. A 'static' data set was established, which allowed staff to carefully review and QA/QC data. The report covered the entire State and outlined the results for each of the ten subareas.
The data for the Prince William Sound Subarea presented some discernible trends:

- The average number of spills per year in the Prince William Sound Subarea have been on a general decline since Fiscal Year (FY) 1998. The large volume spilled in FY2002 is the result of the F/V Windy Bay spill on August 4, 2001; the vessel sank, releasing approximately 35,000 gallons of diesel into the marine waters of PWS. There were several other large spills, including the Valdez Petroleum Terminal (a spill of 3,065 gallons of diesel on February 13, 2002) and the F/V Vanguard spill (2,000 gallons of diesel to marine waters on July 26, 2001). These three spills accounted for approximately 87% of the total volume for FY2002.

- The same seasonal trend seems to apply for the Prince William Sound subarea. The number of spills appears to roughly reflect the fishing season (in this case, June thru August), with a lesser number of spills occurring during the October thru January-February timeframe.
- The number of spills greater than 1,000 gallons has been reduced significantly since FY2002.
- The number of spills by facility type was fairly evenly distributed between Storage (35%), Vessels (27%), Transportation (25%), and Other (13%). Transportation facilities (30%) had a slight edge over Vessels (29%) and Storage (27%) in terms of the total volume released by facility type.
- Structural/Mechanical problems were the primary cause of 54% of the spills, followed by Human Factors at 23%. In terms of total volume by cause, Human Factors (49%) and Structural/Mechanical causes (44%) accounted for 93% of the total volume released.
- The vast majority (78%) of the spills involved noncrude oil. Noncrude oil spills also accounted for 63% of the total volume released.

PWS TOTALS FOR 1995-2005

Total Spills: 813
Total Volume: 146,436
Average Spill Size: 180
Average Spills/Year: 81
Average Volume/Year: 14,644

Top 5 Causes

Cause	*Spills*	*Gallons*
Human Error	45	42,688
Valve Failure	34	37,300
Overfill	50	20,022
Leak	147	9,428
Line Failure	85	4,920

Top 5 Products

Product	*Spills*	*Gallons*
Diesel	255	79,724
Crude	71	39,613
Other	73	9,918
Unknown	10	5,518
Ballast Water (containing oil)	10	2,614

Top 5 Facility Types

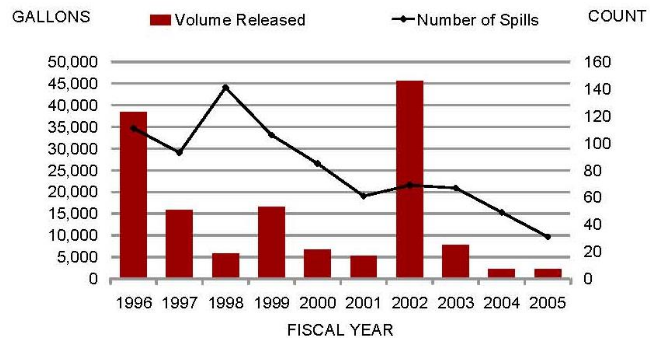
Facility Type	*Spills*	*Gallons*
Vessel	221	42,997
Pipeline	62	36,114
Other	67	17,645
Refinery	46	15,075
Terminal, Crude	173	13,486

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

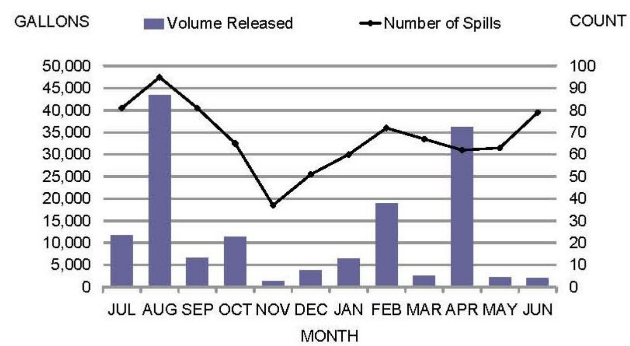
Presented on the following five pages are selected tables, pie charts, and graphs from the Prince William Sound Subarea section of the above-referenced report.

Summary Oil and Hazardous Substance Spills by Subarea, July 1, 1995-June 30, 2005

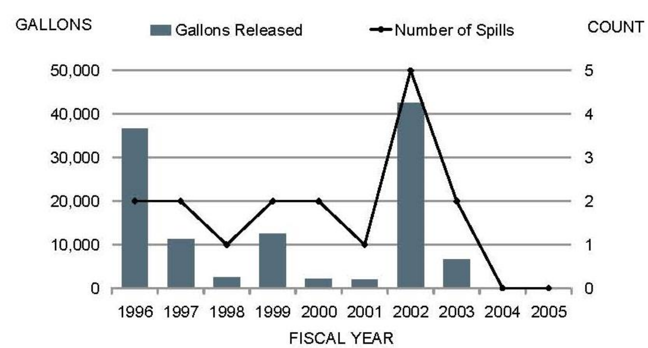
All Spills by Fiscal Year



All Spills by Month



Spills >1,000 gallons

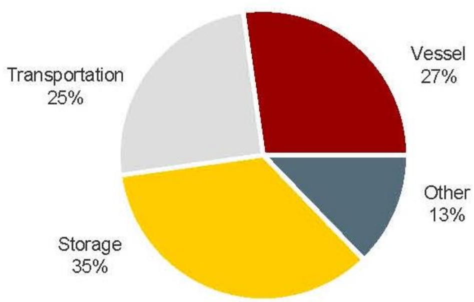


NOTE: Graphs do not include spills reported in pounds or potential spills.

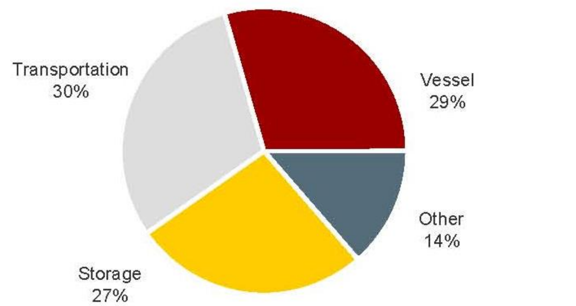
Summary Oil and Hazardous Substance Spills by Subarea, July 1, 1995-June 30, 2005

Prince William Sound Subarea Spills by Facility Type

Number of Spills

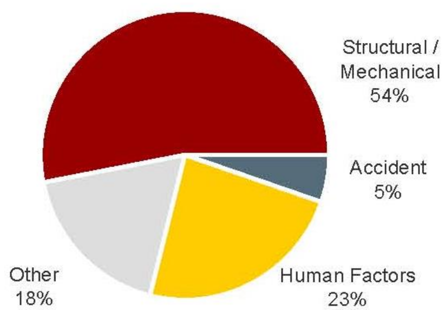


Gallons Released

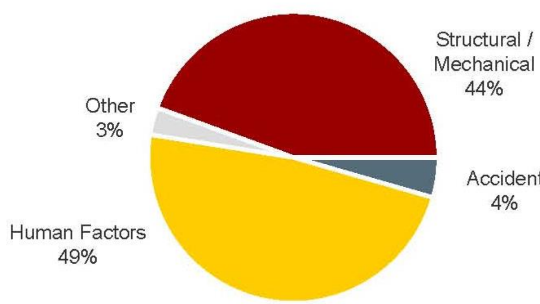


Prince William Sound Subarea Spills by Cause

Number of Spills

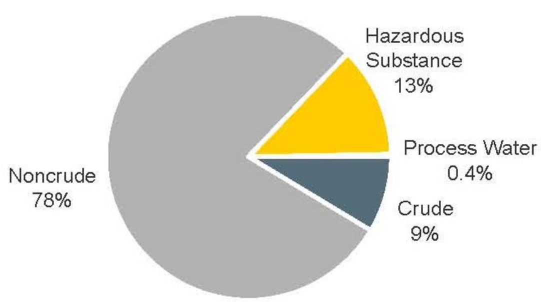


Gallons Released

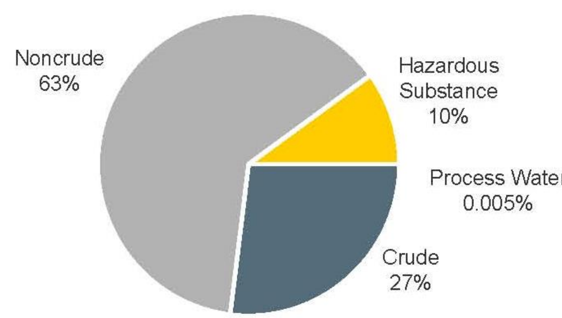


Prince William Sound Subarea Spills by Product

Number of Spills



Gallons Released

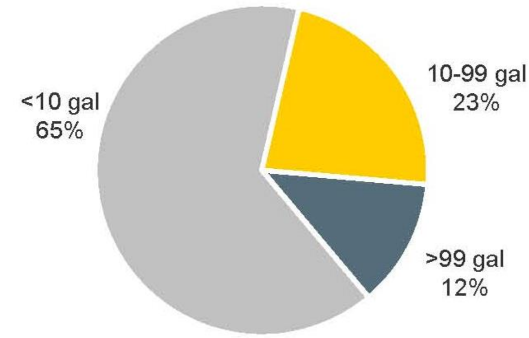


NOTE: Graphs do not include spills reported in pounds or potential spills.

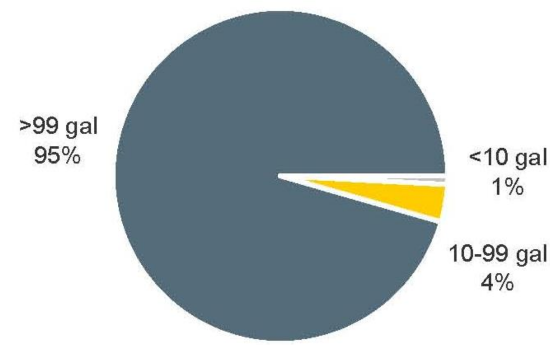
Prince William Sound Subarea Spills by Size Class

- Nearly two-thirds of the spills during the report period were less than 10 gallons in volume.
- Approximately 95% 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.

Prince William Sound Subarea Spills at Regulated vs. Unregulated Facilities

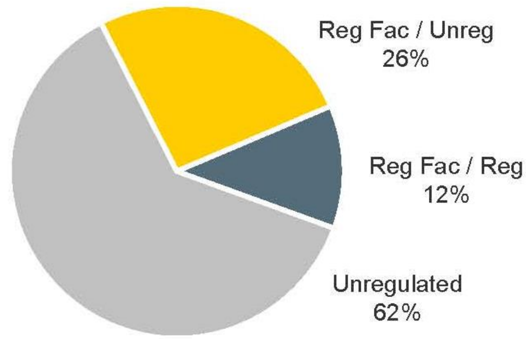
Numerous oil facilities and vessels operating in Alaska are subject to Alaska's spill response planning and financial responsibility statutes. This section summarizes spills from:

- 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.

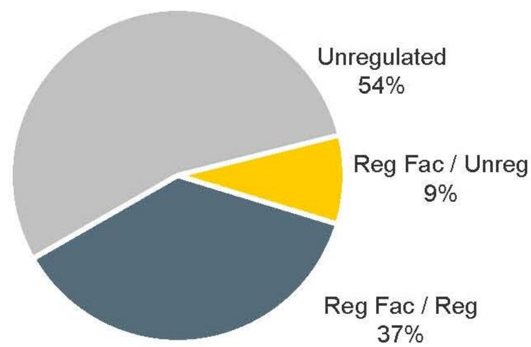
Alaska's contingency planning requirements apply to specific aspects (components) of a facility's or vessel's operations. The analysis in this report distinguishes between spills from regulated versus unregulated components. Examples of spills from unregulated components include:

- 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



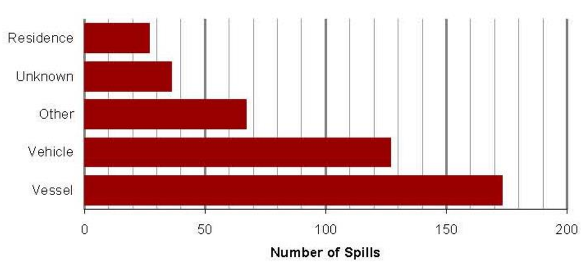
Gallons Released



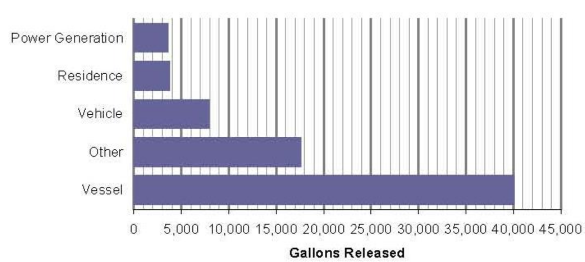
- More than 60% of the spills and more than half of the total volume released during the 10-year period were from unregulated facilities.
- Unregulated vessels were the most frequent source of spills and accounted for the majority of the volume released.

Top Unregulated Facilities

Number of Spills



Gallons Released

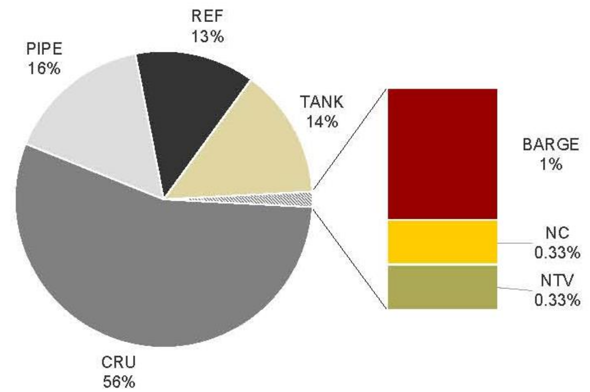


NOTE: Graphs do not include spills reported in pounds or potential spills.

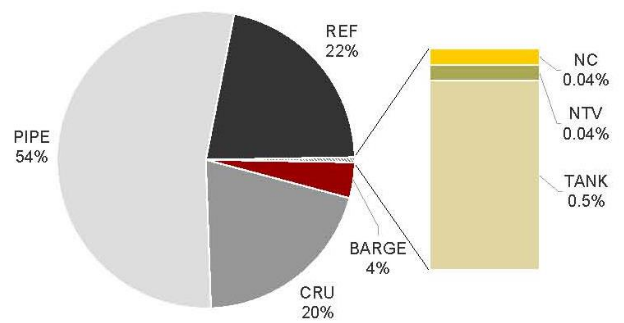
Prince William Sound Subarea Spills by Regulated Facility Type

- Spills at the Valdez Marine Terminal comprised 56% of the total number of regulated facility spills in the Prince William Sound subarea.
- Pipeline facilities (primarily TAPS) were the source of 54% of the total volume released from regulated facilities.

Number of Spills



Gallons Released



Valdez Marine Terminal

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

D. OIL FATE AND GENERAL RISK ASSESSMENT

1. Fate of Spilled Oil

Weathering is a combination of chemical and physical processes that change the physical properties and composition of spilled oil. These processes include evaporation, oxidation, biodegradation, emulsification, dispersion, dissolution, and sedimentation. Below are definitions of these processes and how they relate to oil spills.

- **Evaporation** occurs when substances are converted from liquid state to vapor. During an oil spill, lighter components can evaporate into the atmosphere, leaving behind heavier components. Evaporation rates depend on the composition of the oil and environmental factors like wind, waves, temperature, currents, etc. For example, lighter refined products, such as gasoline, tend to evaporate very quickly because they have a higher proportion of lighter compounds. Heavier oils, like bunker oil, contain relatively few light compounds and leave viscous residues, composed of heavier compounds.
- **Oxidation** is a chemical reaction between two substances, which results in loss of electrons from one of the substances. This chemical reaction can take place between spilled oil and oxygen in the air or water. This reaction can produce water soluble compounds that can dissolve or form persistent compounds call tars. Oxidation of oil is a very slow process but can be enhanced by sunlight.
- **Biodegradation** occurs when microorganisms, such as bacteria, fungi, and yeast, break down a substance by feeding on it. Seawater contains a range of microorganisms that can either partially or completely degrade oil. Nutrient levels, water temperature and oxygen availability can all affect biodegradation, which tends to be quicker in warmer environments.
- **Emulsification** is a process where small droplets of one liquid become suspended in another liquid. During a spill, emulsification takes place when strong currents or waves suspend water droplets in oil. Water-in-oil emulsions are frequently called "mousse" and are more persistent than the original oil.
- **Dispersion** is the break up and diffusion of substances from their original source. In an oil spill, turbulent seas can break oil into various sized droplets and mix them into the water column. Smaller droplets can stay suspended while larger droplets tend to resurface, creating a secondary slick. The amount of oil dispersed depends on the oil's chemical and physical properties and the sea state. For example, lower viscosity oils such as diesel, have higher dispersion rates in rough seas. Chemical dispersants may be used to enhance dispersion.
- **Dissolution** is the process of dissolving one substance in another. Many oils contain light aromatic hydrocarbons, like benzene and toluene, which are water soluble. During a spill, these compounds readily dissolve in water or evaporation into air, which is faster than dissolution.
- **Sedimentation** is a process where spilled oil chemically binds with, or adheres to, particulates in the water column, creating a density greater than the original oil. If the density of oil/particulate compounds becomes greater than water, particles will settle out of the water column. Sedimentation is much more common in shallow, nearshore areas because of the greater amount of suspended particulates.

2. General Risk Assessment for Prince William Sound Subarea

Each of the shoreside communities and remote settlements in the Prince William Sound Subarea faces the risk of oil or hazardous materials pollution from vessel traffic or from any local shoreside facilities.

Considerable vessel traffic transits the waters of the Sound, ranging from small fishing and recreational vessels to fuel and freight barges and crude oil tankers.
Those communities on the road system in the subarea face threats from hazmat transportation mishaps.

To address spills in this subarctic-maritime climatic zone requires careful preplanning to overcome the effects imposed by the moist, cold-weather environment. Machinery and people can face significant challenges; the severe stresses imposed by winter conditions, with extreme temperatures and the extended darkness, can seriously reduce individual efficiency over a given period.

The summer months expose many species, both in diversity and numbers, to the negative effects of petroleum spills, especially land based spills. In the event of spilled product on land during winter months, snow and ice may buffer the flora and fauna as well as keep the oil from entering a watershed. Negative effects are just as serious in the winter months for ocean spills as they are during the summer. Twice daily high/low tides keep the vast majority of the tidal shorelines open to potential exposure to spilled oil. Winter snows drive many land mammals (Sitka black-tailed deer, ermine, river otter, mink, coyote) to spend more time on the shoreline in the winter than in the summer. In turn, exposure to ocean-spilled oil potentially increases in winter for land mammals. Certain local wildlife populations are at particular risk if exposed to oil (e.g., sea otters, puffins) due to oil's effect on fur and feathers.

A number of species leave the region, many stay, while still others move into the area to spend the winter. Harbor seals, Steller sea lions, orcas, sea otters and Dall's porpoise all stay in the winter with comparable numbers to the summer, although distribution varies. Humpback whale numbers take a dip in late August but increase from late September through January. Some of the highest numbers of humpback whales occur in November and December, with the lowest numbers in February.

Bird rookeries empty out during the winter months but many birds stay the winter. Bald eagles migrate from the interior to join resident eagles, as do all 4 species of loon. Flocks of over 200 Pacific loons are often seen in the winter. Common murres leave their rookeries but stay in scattered, offshore groups. Other birds that spend the winter include marbled murrelets, pigeon guillemots, cormorants, scoters and some gulls. Nearshore ducks are also common in the winter months and include harlequins, grebes, mergansers and goldeneyes. Some shorebirds like great blue herons and rock sandpipers even stay the winter, and black oystercatchers can be seen congregating on the shoreline in groups of over 50 individuals.

Forage fish (juvenile pacific herring, sand lance, capelin, juvenile cod to name a few) school close to shore and in small bays in the winter. Many small bays, especially northern bays and glacier fiords, develop winter sheet ice. Ice could hold spilled oil back from impacting the shoreline or the oil could get entrained under the ice and be difficult to recover. However, sheet ice is variable and often short-lived.

E. PWS RISK ASSESSMENT MAPS

Prince William Sound Risk Assessment Maps were prepared as part of the risk assessment process during the development of the Potential Places of Refuge Section of this plan. All risk assessment maps have been relocated in "Change 3" to the Potential Places of Refuge Section of this plan.

BACKGROUND: PART FOUR – ABBREVIATIONS AND ACRONYMS

ACS	Alaska Clean Seas (North Slope industry cooperative)
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game, also as ADFG
ADNR	Alaska Department of Natural Resources
ADOT&PF	Alaska Department of Transportation and Public Facilities; also as ADOTPF
AFB	Air Force Base
ANS or ANSC	Alaska North Slope crude oil
APSC	Alyeska Pipeline Service Company
ARRT	Alaska Regional Response Team; also as AKRRT
BBLS	Barrels
BLM	US Bureau of Land Management
BOA	Basic Ordering Agreement (for federal contractors)
CART	Central Alaska Response Team (ADEC)
CCGD 17	Commander, Coast Guard District 17
CISPRI	Cook Inlet Spill Prevention and Response Inc. (industry cooperative)
COTP	Captain of the Port (USCG)
CTAG	Cultural Technical Advisory Group
DOA	US Department of Agriculture
DOC	US Department of Commerce
DOD	US Department of Defense
DOI	US Department of the Interior
DRAT	District Response Advisory Team (USCG)
DRG	District Response Group (USCG)
EPA	Environmental Protection Agency; also as USEPA
ESC	Executive Steering Committee
ESI	(Alaskan) Environmental Sensitivity Index
F/V	Fishing Vessel
FAA	Federal Aviation Administration
FOSC	Federal On-Scene Coordinator
GIS	Geographic Information System
GRS	Geographic Response Strategies
GSA	General Services Administration
HAZMAT	Hazardous Materials; also as hazmat
HAZWOPER	Hazardous Waste Operations and Emergency Response
IC	Incident Commander
ICS	Incident Command System
IDLH	Immediate Danger to Life and Health
INMARSAT	International Maritime Satellite Organization
JPO	Joint Pipeline Office (gov't agencies involved with managing/regulating TAPS)
LEPC	Local Emergency Planning Committee
LEPD	Local Emergency Planning District
LOSC	Local On-Scene Coordinator
LNG	Liquefied Natural Gas
M/V	Motor Vessel
MLT	Municipal Lands Trustee Program
MOA	Memoranda of Agreement, or Municipality of Anchorage

MOU	Memoranda of Understanding
MSO	Marine Safety Office (USCG)
MSRC	Marine Spill Response Corp. (national industry cooperative)
M/V	Motor Vessel
NART	Northern Alaska Response Team (ADEC)
NCP	National Contingency Plan
NIMS	National 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; also, Notice to Airmen
NPDES	National Pollution Discharge Elimination System
NPFC	National Pollution Fund Center
NRC	National Response Center
NRP	National Response Plan
NRT	National Response Team
NRDA	(Federal/State) Natural Resource Damage Assessment
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
OSC	On-Scene Coordinator
OSRO	Oil Spill Response Office
PIAT	Public Information Assist Team
PIO	Public Information Officer
POLREP	Pollution Report (USCG)
PPOR	Potential Places of Refuge
PWS	Prince William Sound
RCAC	Regional Citizens Advisory Council
RCRA	Resource Conservation and Recovery Act of 1978
RP	Responsible Party
RSC	Regional Stakeholder Committee
RV	Recreational Vehicle
SAC	Subarea Committee
SCP	Subarea Contingency Plan
SART	Southeast Alaska Response Team (ADEC)
SCBA	Self-Contained Breathing Apparatus
SERVS	Ship Escort Response Vessel Service (for Alyeska terminal in Valdez)
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)
SUPSALV	U.S. Navy Supervisor of Salvage, also as NAVSUPSALV
TAPS	Trans Alaska Pipeline System
T/V	Tank Vessel

USCG	United States Coast Guard
VIRS	Visual Information Response System
VMT	Valdez Marine Terminal (APSC)
VTS	Vessel Traffic Separation System/Scheme
WG	Work Group