OCS Report
MMS 2000-082

Oil-Spill Risk Analysis: Liberty Development and Production Plan

U.S. Department of the Interior
Minerals Management Service
Environmental Division

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Introduction

The proposed Liberty development and production plan (DPP) pertains to Outer Continental Shelf (OCS) activities on lease OCS-Y-1650 (Sale 144) in the Beaufort Sea. This report examines the probabilities of contact of hypothetical oil spills if the Liberty DPP proceeds and commercial quantities of oil are produced.

Because oil spills may occur from activities associated with offshore oil production and transportation, the Minerals Management Service (MMS) formally assesses the risk of hypothetical oil spills. When the significance of accidental oil spills is evaluated, it is important to remember that the occurrence of such spills is fundamentally a matter of probability. The probability that an oil spill will contact a specific environmental resource within a given time of travel from a certain location or spill point is termed a *conditional probability*; the "condition" being that a spill is assumed to have occurred. Also, the winds, ice, and ocean currents that transport oil spills cannot be known for certain. A probabilistic event such as oil-spill contact to an environmentally sensitive area cannot be predicted, only an estimate of its likelihood (its probability) can be quantified.

This report summarizes results of the oil-spill risk analysis (OSRA) conducted for the Liberty DPP. The objective of this analysis was to estimate the relative oil-spill contacts associated with oil production and transportation from the proposed gravel island and pipeline alternatives. The MMS will analyze these oil-spill contacts in the environmental impact statement (EIS) being prepared for the proposed Liberty DPP. A description of the OSRA model used in this analysis can be found in previous papers (Smith et al., 1982; LaBelle and Anderson, 1985).

Summary of the Proposed Action

The Liberty development project is located on lease OCS-Y-1650 in Foggy Island Bay. The OSRA study area extends from latitude 69^{o} N. to 72.5^{o} N. and from longitude 138^{o} W. to 157^{o} W. (fig. 1).

Locations of Liberty, Tern, and Southern Gravel Islands

The proposed Liberty development project will use a self-contained offshore drilling/production facility located on a conventional gravel island. Figure 2 shows the location of the Liberty (LI), Tern (TI), and Southern (AP1) gravel islands, the sites that large oil spills, if they were to occur, would originate from. The Liberty gravel island has an oval shape and is centered at 70^{o}16'45.35556" N. and 147^{o}33'29.0891" W. (fig. 1). In the EIS for the Liberty DPP, there are several alternative proposed actions. For Alternative I (the proposed action), LI is used as the location of the Liberty gravel island. For Alternative III.A, AP1 is used as the location of the Southern gravel island, and for Alternative III.B, TI is used as the location of the Tern gravel island.

Locations of Proposed and Alternative Pipelines

Figure 2 also shows the location of the proposed pipeline (PP1-PP2) from Liberty gravel island, the eastern pipeline (AP1-AP2) from the Southern gravel island, and the Tern pipeline (TP1-TP2) from the Tern gravel island. The transportation scenario for the proposed action (Alternative I) assumes that BP Exploration (Alaska), Inc. would transport

oil from the Liberty gravel island (LI) to shore through a subsea pipeline, with a landfall at approximately 1.5 miles (2.5 km) west of the Kadleroshilik River. The OSRA uses two hypothetical spill sites (PP1 and PP2) to represent the source of hypothetical spills from this pipeline. Spill site PP1 represents the source of spills that occur further offshore, and PP2 represents the source of spills that occur nearshore. The Alternative III.A pipeline scenario assumes the pipeline would make landfall at approximately 2 miles (3.2 km) east of the Kadleroshilik River. Under this alternative, the OSRA uses two hypothetical spill sites (AP1 and AP2) to represent the sources of spills from the eastern alternative pipeline, with AP1 representing spills that occur further offshore, and AP2 representing spills that occur nearshore. (Note: AP1 also represents the location of the Southern gravel island.) The Alternative III.B pipeline scenario also assumes the pipeline would make landfall 2 miles (3.2 km) east of the Kadleroshilik River. For this alternative, the OSRA launches spills from hypothetical spill sites TP1 and TP2 to represent the source of spills from the Tern Island alternative pipeline. Spill site TP1 represents the source of spills that occur further offshore, and TP2 represents spills that occur nearshore. An existing onshore pipeline from Badami would transport oil to Pump Station 1 of the Trans-Alaska Pipeline System.

Framework of the Analysis

The OSRA depends not only on the meteorologic, oceanographic, geographic, and sea-ice conditions of the study area, but also on the environmental resource areas at risk from oil spills.

Environmental Resource Areas

The MMS analysts in the Alaska OCS Region, who will prepare the EIS for the Liberty DPP, selected 62 environmental resource areas to be analyzed. Appendix A (figs. A-1 through A-6) contains maps showing the locations of these areas. These environmental resource areas were digitized in the same coordinate system, or base map, used for the trajectory simulations. Each environmental resource area that is typically present year-round was treated as being vulnerable to oil all year. This method assumes that the environmental resource area is sensitive to oil-spill effects throughout the entire year rather than seasonally. Each environmental resource area not usually present year-round was treated as vulnerable to contact from oil spills only during the months it is likely to be present. The digitized environmental resource areas, their months of vulnerability, and the illustrations depicting their locations are shown in the following list.

The locations of 20 boundary segments located along the edges of the study area were also digitized in the same coordinate system to quantify spill trajectories that may travel out of the study area (fig. A-7). Each boundary segment was treated as being vulnerable all year.

Environmental Resource Area	Months Assumed Vulnerable	Figure
Spring Lead 1	April-May	A-1
Spring Lead 2	April-May	A-2
Spring Lead 3	April-May	A-3
Spring Lead 4	April-May	A-1
Spring Lead 5	April-May	A-2
Ice/Sea Segment 6	January-December	A-1
Ice/Sea Segment 7	January-December	A-1
Ice/Sea Segment 8	January-December	A-2
Ice/Sea Segment 9	January-December	A-1
Ice/Sea Segment 10	January-December	A-2
Ice/Sea Segment 11	January-December	A-1
Ice/Sea Segment 12	January-December	A-2
Ice/Sea Segment 13	January-December	A-1
Environmental Resource Area (ERA) 14	May-October	A-2
ERA 15	May-October	A-1
ERA 16	May-October	A-2
ERA 17	May-October	A-1
ERA 18	May-October	A-2
ERA 19	May-October	A-1
ERA 20	May-October	A-2
ERA 21	May-October	A-2
Simpson Lagoon	May-October	A-3
Gwyder Bay	May-October	A-4
ERA 24	May-October	A-2
Prudhoe Bay	May-October	A-3
ERA 26	May-October	A-4
ERA 27	May-October	A-5
ERA 28	May-October	A-3
ERA 29	May-October	A-4
ERA 30	May-October	A-4
ERA 31	January-December	A-3
Boulder Patch I	January-December	A-4
Boulder Patch II	May-October	A-5
ERA 34	May-October	A-3
ERA 35	May-October	A-6
ERA 36	May-October	A-3
ERA 37	May-October	A-4
ERA 38	May-October	A-3
ERA 39	May-October	A-2
ERA 40	May-October	A-3
ERA 41	May-October	A-2
Canning River	May-October	A-3
ERA 43	May-October	A-2
Simpson Cove	May-October	A-3
ERA 45	May-October	A-2
Arey Lagoon, Hula Hula River	May-October	A-3
Whaling Area/Kaktovik	August-October	A-4
Thetis Island	January-December	A-4
Spy Island	January-December	A-5
Leavitt and Pingok Islands	January-December	A-6
Bertoncini, Bodfish, and Cottle Islands	January-December	A-5
Long Island	January-December	A-6
Egg and Stump Islands	January-December	A-5
West Dock	January-December	A-6
Reindeer and Argo Islands	January-December	A-6
Cross and No Name Islands	January-December	A-6
Endicott Causeway	January-December	A-6
Narwhal, Jeanette and Karluk Islands	January-December	A-1
Tigvariak Island	January-December	A-6
Pole and Belvedere Islands	January-December	A-5
Challenge, Alaska, and Dutchess and Northstar Islands	January-December	A-5
Flaxman Island	January-December	A-4

Also included in the analysis was an additional environmental resource area, land, which comprised the entire study area coastline. Upon contacting land, the trajectory simulation is ended. Land was further analyzed by dividing the Beaufort Sea coastline into 51 land segments, 38 of which are in the study area (fig. 3). Land Segments 6 through 19 and 32 through 43 are each approximately 18.64 miles (30 km) long. Land segments 20 through 31 are closest to the Liberty project and are each approximately 12.43 miles (20 km) long.

Because the trajectory model simulates an oil spill as a point, each environmental resource area was digitized with an areal extent slightly greater than it actually occupies. For example, the digitized shoreline environmental resource areas extend a short distance offshore. This extension allows the OSRA model to simulate a spill that approaches and partially contacts the environmental resource area (or boundary segment), then withdraws and continues along its path. For this analysis, the model calculated trajectory simulations over two seasons: winter (October-June) and summer (July-September).

Oil-Spill Trajectory Simulations

The trajectory simulation portion of the model consists of many hypothetical oil-spill trajectories that collectively represent the mean surface transport and the variability of the surface transport as a function of time and space. The trajectories represent the Lagrangian motion that a particle on the surface might take under given wind, ice, and ocean current conditions. Multiple trajectories are simulated to give a statistical representation, over time and space, of possible transport under the range of wind, ice, and ocean current conditions that exist in the area.

Current and Ice Information From a General Circulation Model

Trajectories are constructed from simulations of wind-driven and density-induced ocean flow fields, and the ice motion field. The basic approach is to simulate these time and spatially dependent currents separately, then to combine them through linear superposition to produce an oil-transport vector. This vector is then used to create a trajectory. Simulations are performed for two seasons, winter (October-June) and summer (July-September). The choice of this seasonal division was based on meteorological, climatological, and biological cycles, as well as consultation with Alaska Region EIS analysts. Hedström et al. (1995), and Hedström (1994) detail the modeling of each ice motion field and ocean current component. Brief summaries of the methods and assumptions follow.

For cases where the ice concentration is below 80 percent, each trajectory is constructed using vector addition of the ocean current field and 3.5 percent of the instantaneous wind field—a method based on work done by Huang and Monastero (1982), Smith et al. (1982), and Stolzenbach et al. (1977). For cases where the ice concentration is 80 percent or greater, the model ice velocity is used to transport the oil. Equations 1 and 2 show the components of motion that are simulated and used to describe the oil transport:

$$U_{oil} = U_{current} + 0.035\ U_{wind} \quad (1)$$

or

$$U_{oil} = U_{ice} \quad (2)$$

where: U_{oil} = oil drift vector
$U_{current}$ = current vector (when ice concentration <80%)
U_{wind} = wind speed at 10 m above the sea surface
U_{ice} = ice vector (when ice concentration $\geq$80%)

The wind drift factor was estimated to be 0.035, with a variable drift angle ranging from 0^o to 25^o clockwise. The drift angle was computed as a function of wind speed according to the formula in Samuels et al. (1982). (The drift angle is inversely related to wind speed.)

For each trajectory simulation, the start time for the first trajectory was the first day of the season (winter or summer) of the first year of wind data (1980) at 6 a.m. Greenwich Mean Time (GMT). The summer season consists of July 1-September 30, and the winter season is October 1-June 30. Each subsequent trajectory was started every 1 day on average, at 6 a.m. GMT. A total of 3,000 trajectories (1,500 in winter, 1,500 in summer) was launched from the Liberty and Tern gravel islands over the 17 years of wind data (1980-1996), and results of these trajectory simulations were combined to represent platform risk (fig. 2). Transportation risks were represented by 3,000 trajectories launched from each hypothetical spill point on the pipelines (PP1, PP2, AP1, AP2, TP1, and TP2—fig. 2; note that AP1 represents the location of the Southern gravel island).

Offshore: For the Beaufort/Chukchi Sea, the $U_{current}$ and U_{ice} are simulated using a three-dimensional coupled ice-ocean hydrodynamic model (Hedström et al., 1995; Hedström, 1994). This model is based on the ocean model of Haidvogel et al. (1991), and the ice model of Hibler (1979). The location of each trajectory at each time interval is used to select the appropriate ice concentration. Depending on the ice concentration, either the ice or water velocity with wind drift from the stored results of the Haidvogel et al. (1991), coupled ice-ocean model is used (see eq. 1 and 2 above). Surface transport of the oil slick for each spill was simulated as a series of straight-line displacements in 1-hour increments of a point governed by the U_{oil} vectors.

The trajectories age while they are in the water/on the ice. For each day that the hypothetical spill is in the water, the spill ages—up to a total of 30 days. While the spill is in the ice ($\geq$80% concentration), the aging process is suspended. The maximum time allowed for the transport of oil in the ice is 360 days after which the trajectory is terminated. The 30-day limit is maintained for spill trajectories in open water.

Summer trajectories are those that start between the beginning of July and the end of September. Therefore, any trajectory contact to an environmental resource area, land segment, or boundary segment beginning at the end of September is considered a summer contact and is counted along with the rest of the contacts from spills launched in the summer.

Nearshore: Inshore of the 20-meter bathymetry contour, $U_{current}$ is simulated using a two-dimensional hydrodynamic model developed by the National Oceanic and Atmospheric Administration (NOAA) (Galt, 1980). This model does not have an ice component. In this model, we added an ice mask within the 0-meter and 20-meter water-depth contours to simulate the observed shorefast ice zone (fig. 4). We apply the mask from November 1-June 15. For the months of November through June 15, U_{ice} is zero, and the ice concentration is greater than or equal to 80 percent. The two-dimensional model incorporated the barrier islands, in addition to the coastline. The model of the shallow water is based on the wind forcing and the continuity equation. The model was originally developed to simulate wind-driven shallow water dynamics in lagoons and shallow coastal areas with a complex shoreline. The solutions are determined by a finite element model where the primary balance is between the wind forcing friction, the pressure gradients, Coriolis accelerations, and the bottom friction. The time dependencies are considered small, and the solution is determined by iteration of the velocity and sea-level equations, until the balanced solution is calculated. The wind is the primary forcing function, and a sea-level boundary condition of no anomaly produced by the particular wind stress is applied far offshore, at the northern boundary of the OSRA domain. An example of the currents simulated by this model for a 10-meter/second wind from the east is shown in figure 5.

The results of the model were compared to current meter data from the Endicott Environmental Monitoring Program to determine if the model was simulating the first order transport and the dominant flow. The model simulation was similar to the current meter velocities during summer. Example time series from 1985 show the current flow at Endicott Station ED1 for the U (east-west) and V (north-south) components, plotted on the same axis with the current derived from the NOAA model for U and V (Der-U and Der-V). The series show many events that coincide in time, and that the currents derived from the NOAA model are generally in good correspondence with the measured currents. Some of the events in the measured currents are not particularly well represented, and that is probably due to forcing of the current by something other than wind, such as low frequency alongshore wave motions.

Wind Information

We used the 17-year reanalysis of the wind fields provided to us by Rutgers. The analysis of the wind fields are derived from the National Aeronautics and Space Association/NOAA TIROS Operational Vertical Sounder (TOVS) Polar Pathfinder Data Set. These state-of-the-art data are being readied for distribution to the Arctic modeling community as a product of this MMS/Rutgers modeling effort. Available from January 1980 through December 1996, the TOVS Polar Pathfinder Data Set provides observations of areas poleward of latitude 60^{o} N. at a resolution of 100 x 100 km. Designed to address the particular needs of the polar research community, the data set is centered on the North Pole and has been gridded using an equal-area azimuthal projection, a version of the Equal-Area Scalable Earth-Grid. Variables retrieved from satellite-observed radiances for this product include atmospheric temperature, water vapor, skin surface temperature, total effective cloud fraction, cloud top pressure and temperature, solar zenith elevation, surface pressure, turning angle between geostrophic wind and surface stress over ice, emissivity, boundary layer stratification, and geostophic draft coefficient. The algorithm used to generate these grids has been validated

through comparisons with surface observations from the North Polar drifting meteorological station.

As the simulated oil spills moved, any contacts with environmental resource areas were recorded. Spill movement continued until the spill contacted land, moved out of the study area, or aged more than 30 days in open water or 360 days in ice conditions.

The trajectories simulated by the model represent hypothetical pathways of oil slicks; they do not directly consider cleanup, dispersion, or weathering processes that could determine the quantity or properties of the oil that might eventually contact environmental resource areas or land segments. An implicit analysis of weathering and decay can be considered by noting the age of simulated trajectories when they contact environmental resource areas. For this analysis, the periods selected were 1, 3, 10, and 30 days (60 and 360 days in ice conditions) to represent implicit measures of oil weathering as well as matters relating to containment and cleanup.

Conditional Probabilities

The probability that an oil spill will contact a specific environmental resource area, land segment, or boundary segment within a given time of travel from a certain location or spill site is termed a *conditional probability*, the condition being that a spill is assumed to have occurred. Conditional probabilities of contact for 1, 3, 10, and 30 days (60 and 360 days in ice conditions) were calculated for the gravel islands and for the pipeline route segments. These conditional probabilities of contact with environmental resource areas and land segments are presented on an annual basis in tables 1 through 12 and, on a seasonal basis, in appendices B and C.

Discussion

Conditional probabilities assume a spill has occurred and the transport of the spilled oil depends only on the winds, ice, and ocean currents in the study area. For Liberty, conditional probabilities of contact were estimated for 1, 3, 10, 30, 60, or 360 days during both winter (appendix B) and summer (appendix C). Winter spills are spills that begin in October through June, melt out of the ice and contact during the open-water period. Summer spills are spills that begin in July through September.

Comparisons Among Spill Locations

In general, there are 0- to 2-percent differences in the probability of contact to the majority of the environmental resource areas or land segments when Liberty Island (LI), Southern Island (AP1), and Tern Island (TI) are compared. Each of these islands are within 1.2-1.4 miles of each other, and there are no geographic barriers to spills between these island locations.

Comparisons Through Time

The proposed alternative islands and their associated pipelines are close to shore, and it is understandable that spills have a probability of contact to the adjacent coastline.

1 Day: Spills originating at the nearshore hypothetical spill sites during the winter have the higher probabilities of contact to shore within 1 day. The environmental resource areas with these higher probabilities of contact are within a 5-mile radius. Within 1 day, the three barrier island groups—Narwhal, Jeanette and Karluk Islands; Tigvariak Island; and the Endicott Causeway—each have a 1-percent probability of contact or less from spills originating from any of the proposed gravel islands (table B-1). Spills starting during winter from the hypothetical spill sites (Liberty Island, Southern Island, Tern Island, proposed pipeline, eastern pipeline, and Tern pipeline) have a probability of contact to land segments 25 through 26 ranging from less than 0.5 percent to 4 percent (table B-7).

The environmental resource areas with the highest probability of contact within 1 day during the summer are located within a 10-mile radius. The three barrier island groups with the highest probability of contact ranging from 1 to 14 percent are Narwhal, Jeanette and Karluk Islands; Tigvariak Island, and the Endicott Causeway (table C-1). Spills starting during summer from the hypothetical spill sites have a probability of contact to Land Segments 25 through 28 ranging from 1 to 46 percent (table C-7). The nearshore hypothetical spill sites (PP2, AP2, TP2) have the higher probabilities of contact to these land segments.

3-10 Days: The environmental resource areas with the higher probabilities of contact (4-7%) from the proposed gravel islands are within a 5-mile radius. The exception to this is environmental resource area 35, which is directly adjacent to Tern Island (TI). It has a 33-percent probability of contact within 1 to10 days from TI during winter (tables B-2 and B-3). By 3-10 days, spills starting during winter from the hypothetical spill sites have a probability of contact to land segments 25 through 28, ranging from 1 to 6 percent (table B8 and 9). Additional land segments 23, 27, and 28 have a less than 0.5 to 2 percent probability of contact.

By 3-10 days, spills starting during summer from the hypothetical spill sites have the higher probabilities of contact to environmental resource areas that are within a 15-mile radius, ranging from 13-60-percent (tables C-2 and C-3). By 3-10 days, spills starting during the summer from the hypothetical spill sites have a probability of contacting additional land segments 21-24 and 29-34 ranging from less than 0.5 to 6 percent. The highest probability of contact is to land segments 25-28 and range from 4 to 55 percent (tables C-9 and C-9). Most of the probabilities of contact to land segments are within 10 days, because there are only small percentage increases between 10 and 30 days.

30 Days: By 30 days, spills starting during winter from the hypothetical spill sites have the higher probabilities of contact (8-11%) to the environmental resource areas that are within a 5-mile radius (table B-4). The exceptions to this are environmental resource areas 35 and 36, which are directly adjacent to TI and TP2, respectively. Environmental Resource Areas 35 has a 33-percent probability of contact from spills originating at TI, and environmental resource area 36 has a 33-percent probability of contact from spills originating at TP2. By 30 days, spills starting during the winter from the hypothetical spill sites have the greater probability of contact to land segments 25 through 26, ranging from 1 to 10 percent (table B-10). Additional land segments 22, 23, 27, 28, and 29 have a less than 0.5- to 3-percent probability of contact.

By 30 days, the paths of spills starting during summer from the hypothetical spill sites extend farther from the hypothetical spill sites. The higher probabilities of contact to environmental resource areas are to those located within a 30-mile radius and range from 13 to 60 percent (table C-4). By 30 days, additional land segments 19 and 20 have a probability of contact ranging from less than 0.5 percent to 1 percent. These land segments are approximately 80-125 kilometers and 114-170 kilometers to the west and east, respectively.

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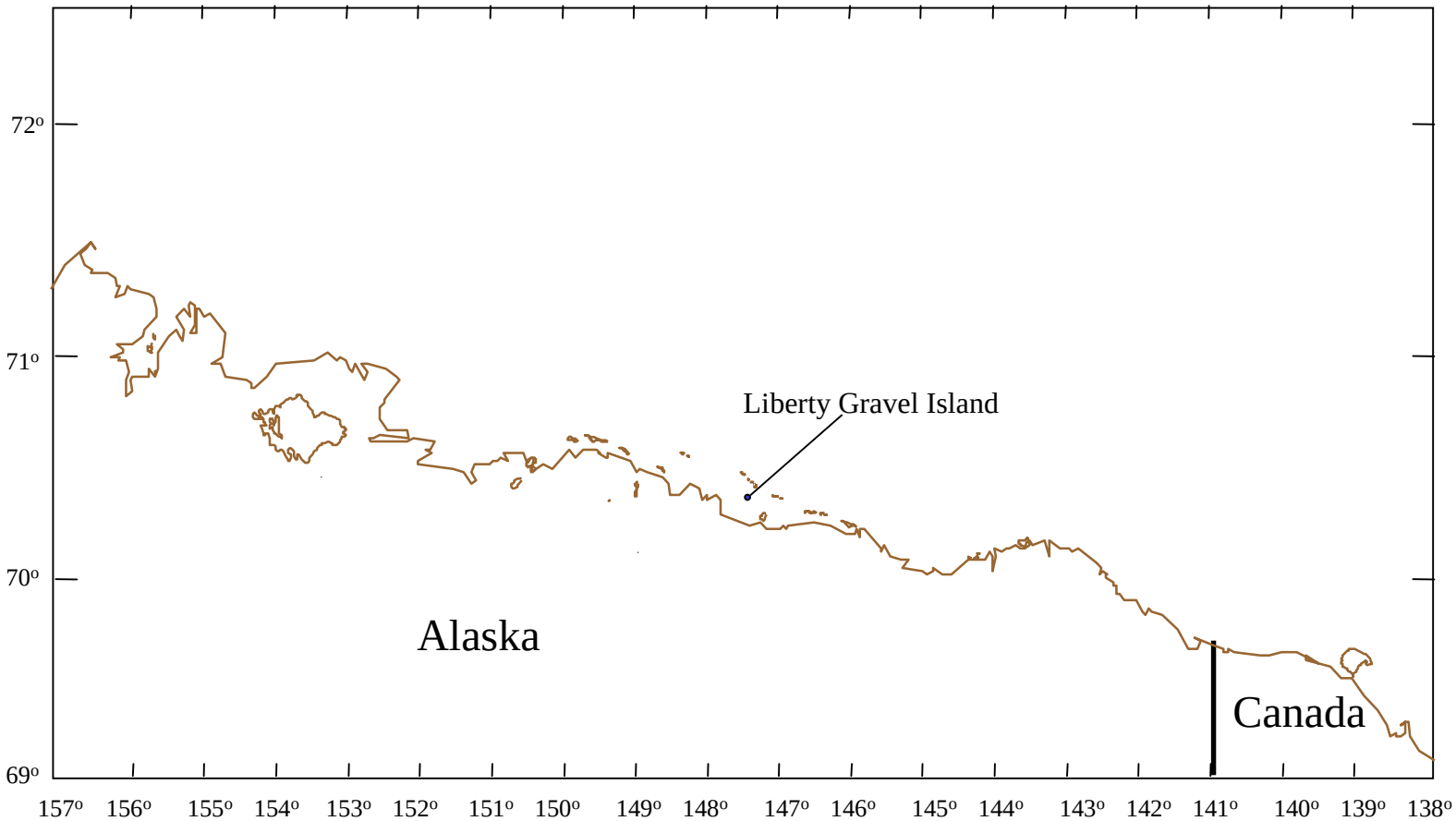

Figure 1. Locations of Study Area and Liberty Gravel Island, Liberty DPP.

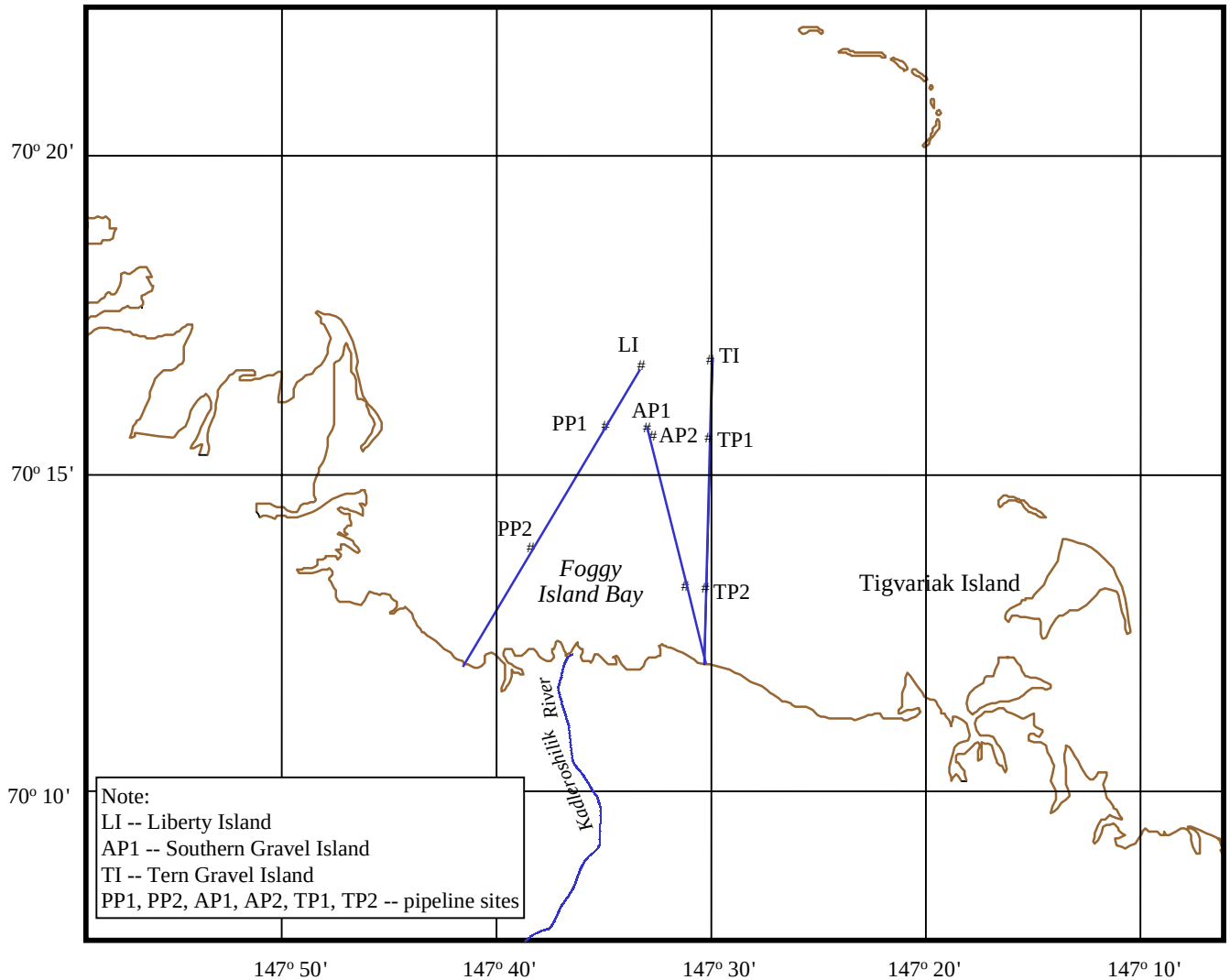

Figure 2. Locations of Hypothetical Spill Sites, Liberty DPP.

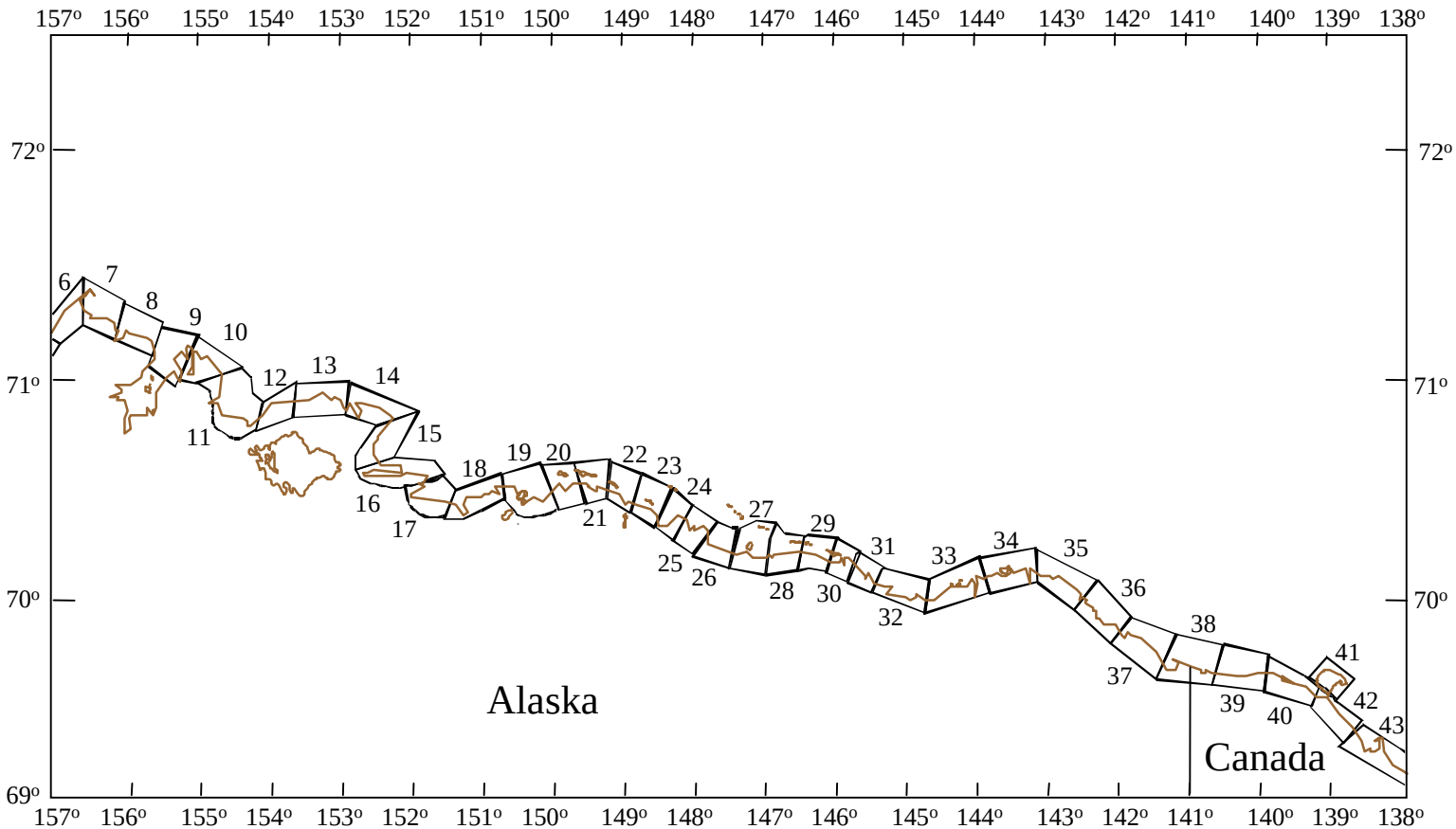

Figure 3. Study Area Coastline Divided into Land Segments, Liberty DPP.

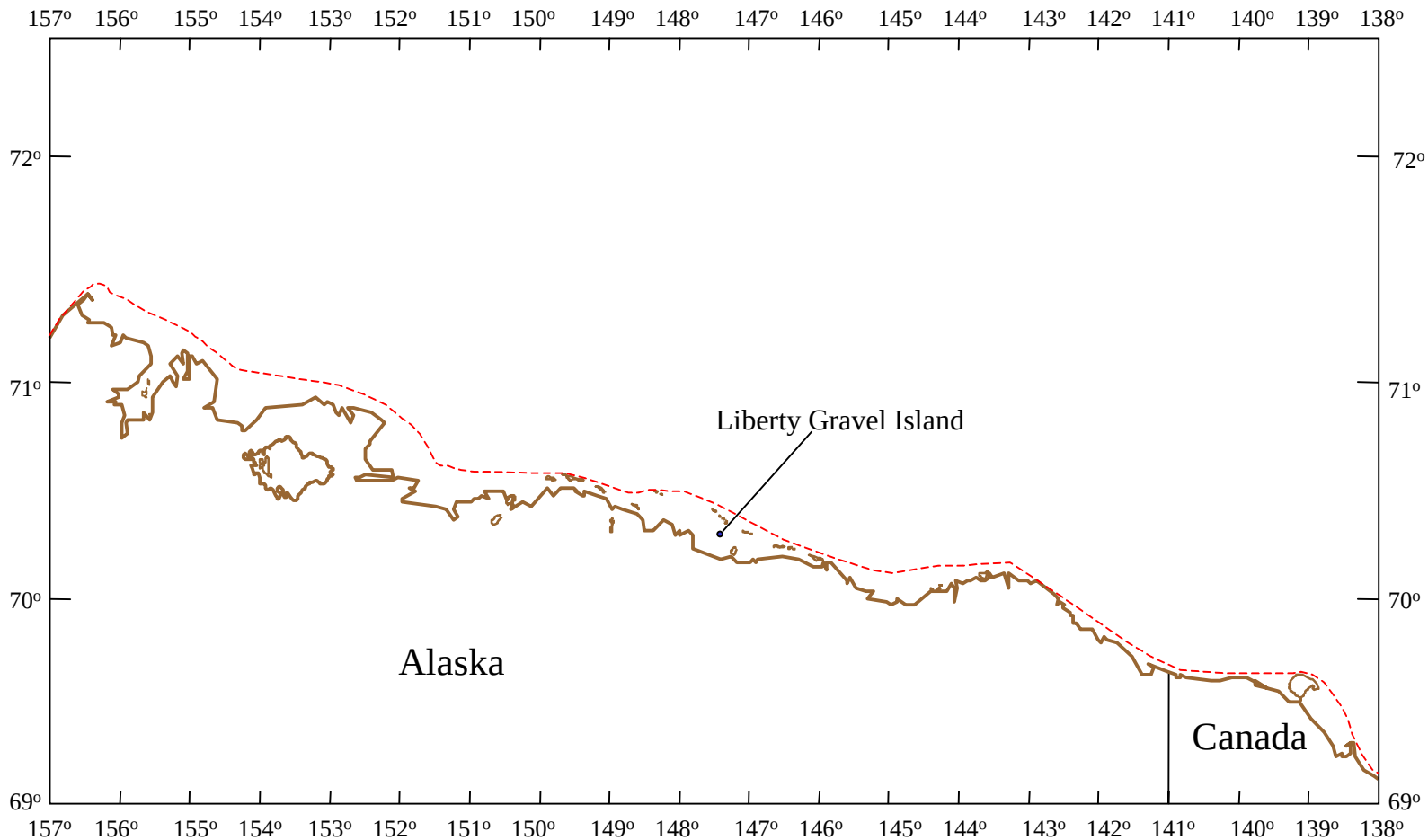

Figure 4. Location of Ice Line, Liberty DPP.

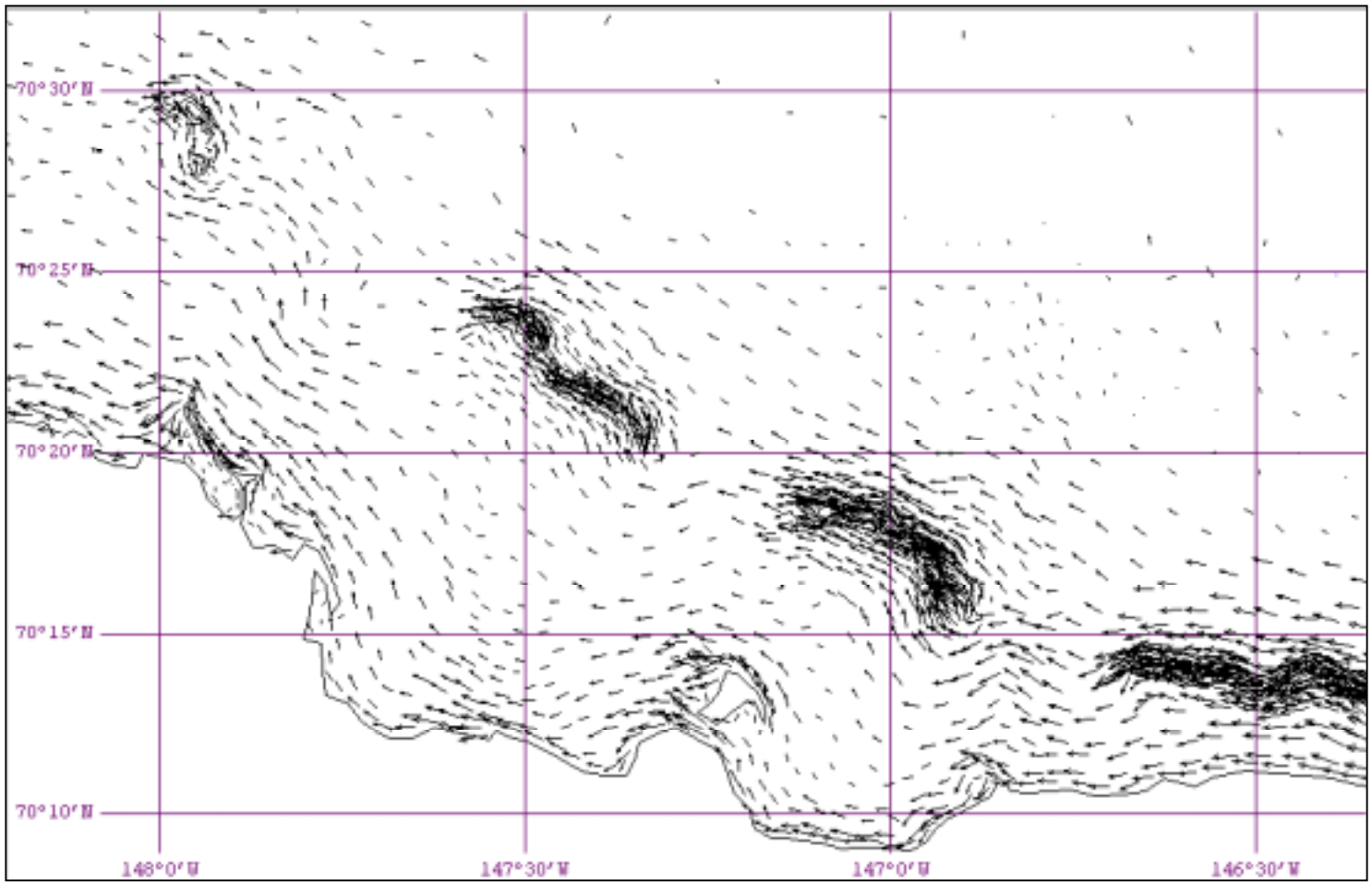

Figure 5. Nearshore Surface Currents Simulated by the NOAA Model for a Wind from the East at 10 meters/second.

Table 1. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location will contact a certain environmental resource area within **1 day**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	8	10	17	9	15	7	9	15
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	.	.	.	.	.	.	.	.
Ice/Sea Segment 8	.	.	.	.	.	.	.	.
Ice/Sea Segment 9	.	.	.	.	.	.	.	.
Ice/Sea Segment 10	.	.	.	.	.	.	.	.
Ice/Sea Segment 11	.	.	.	.	.	.	.	.
Ice/Sea Segment 12	.	.	.	.	.	.	.	.
Ice/Sea Segment 13	.	.	.	.	.	.	.	.
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	.	.	.	.	.	.	.	.
ERA 18	.	.	.	.	.	.	.	.
ERA 19	.	.	.	.	.	.	.	.
ERA 20	.	.	.	.	.	.	.	.
ERA 21	.	.	.	.	.	.	.	.
Simpson Lagoon	.	.	.	.	.	.	.	.
Gwyder Bay	.	.	.	.	.	.	.	.
ERA 24	.	.	.	.	.	.	.	.
Prudhoe Bay	.	.	.	.	.	.	.	.
ERA 26	1	1	.	1	.	1	1	.
ERA 27	2	2	1	2	1	1	1	1
ERA 28	.	.	.	.	.	.	.	.
ERA 29	.	.	.	.	.	.	.	.
ERA 30	.	.	.	.	.	.	.	.
ERA 31	.	.	.	.	.	.	.	.
Boulder Patch I	3	2	1	2	1	2	1	1
Boulder Patch II	16	15	4	11	3	12	10	3
ERA 34	3	5	17	4	9	2	3	8
ERA 35	11	5	1	7	2	50	10	2
ERA 36	4	6	5	7	12	4	7	50
ERA 37	2	2	1	2	1	4	3	1
ERA 38	1	1	1	2	1	2	2	1
ERA 39	.	.	.	.	.	.	.	.
ERA 40	.	.	.	.	.	.	.	.
ERA 41	.	.	.	.	.	.	.	.
Canning River	.	.	.	.	.	.	.	.
ERA 43	.	.	.	.	.	.	.	.
Simpson Cove	.	.	.	.	.	.	.	.
ERA 45	.	.	.	.	.	.	.	.
Arey Lagoon, Hula Hula River	.	.	.	.	.	.	.	.
Whaling Area/Kaktovik	.	.	.	.	.	.	.	.
Thetis Island	.	.	.	.	.	.	.	.
Spy Island	.	.	.	.	.	.	.	.
Leavitt and Pingok Islands	.	.	.	.	.	.	.	.
Bertoncini, Bodfish and Cottle Islands	.	.	.	.	.	.	.	.
Long Island	.	.	.	.	.	.	.	.
Egg and Stump Islands	.	.	.	.	.	.	.	.
West Dock	.	.	.	.	.	.	.	.
Reindeer and Argo Islands	.	.	.	.	.	.	.	.
Cross and No Name Islands	.	.	.	.	.	.	.	.
Endicott Causeway	4	4	3	4	2	3	3	2
Narwhal, Jeanette and Karluk Islands	2	1	.	1	.	2	1	.
Tigvariak Island	3	4	3	4	5	3	5	5
Pole and Belvedere Islands	1	.	.	1	1	1	1	1
Challenge, Alaska, Dutchess and Northstar Islands	.	.	.	.	.	.	.	.
Flaxman Island	.	.	.	.	.	.	.	.

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table 2. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location will contact a certain environmental resource area within **3 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	17	19	23	18	22	16	18	22
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	.	.	.	.	.	.	.	.
Ice/Sea Segment 8	.	.	.	.	.	.	.	.
Ice/Sea Segment 9	.	.	.	.	.	.	.	.
Ice/Sea Segment 10	1	.	.	.	.	1	.	.
Ice/Sea Segment 11	.	.	.	.	.	.	.	.
Ice/Sea Segment 12	.	.	.	.	.	.	.	.
Ice/Sea Segment 13	.	.	.	.	.	.	.	.
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	.	.	.	.	.	.	.	.
ERA 18	.	.	.	.	.	.	.	.
ERA 19	.	.	.	.	.	.	.	.
ERA 20	.	.	.	.	.	.	.	.
ERA 21	.	.	.	.	.	.	.	.
Simpson Lagoon	.	.	.	.	.	.	.	.
Gwyder Bay	1	1	.	.	.	1	.	.
ERA 24	.	.	.	.	.	.	.	.
Prudhoe Bay	1	1	.	1	1	1	1	1
ERA 26	3	2	2	2	2	3	2	2
ERA 27	4	4	3	4	3	4	4	3
ERA 28	2	2	1	2	1	2	2	1
ERA 29	1	1	1	1	.	1	1	.
ERA 30	2	2	1	2	1	2	1	1
ERA 31	1	1	1	1	1	1	1	1
Boulder Patch I	6	4	3	4	3	5	4	3
Boulder Patch II	19	17	7	14	6	15	12	5
ERA 34	4	6	17	6	10	4	5	9
ERA 35	12	7	3	8	4	50	11	4
ERA 36	5	7	6	8	13	5	9	50
ERA 37	4	3	2	4	2	6	4	2
ERA 38	3	3	1	3	2	3	4	2
ERA 39	2	2	1	2	1	3	2	1
ERA 40	1	1	1	1	1	2	2	1
ERA 41	.	.	.	.	.	1	.	.
Canning River	.	.	.	.	.	.	.	.
ERA 43	.	.	.	.	.	.	.	.
Simpson Cove	.	.	.	.	.	.	.	.
ERA 45	.	.	.	.	.	.	.	.
Arey Lagoon, Hula Hula River	.	.	.	.	.	.	.	.
Whaling Area/Kaktovik	.	.	.	.	.	.	.	.
Thetis Island	.	.	.	.	.	.	.	.
Spy Island	.	.	.	.	.	.	.	.
Leavitt and Pingok Islands	.	.	.	.	.	.	.	.
Bertoncini, Bodfish and Cottle Islands	1	.	.	.	.	.	.	.
Long Island	1	1	.	1	.	1	1	.
Egg and Stump Islands	2	2	1	1	1	2	1	1
West Dock	2	2	1	2	1	2	2	1
Reindeer and Argo Islands	1	1	.	1	.	1	1	.
Cross and No Name Islands	1	1	1	1	.	1	1	.
Endicott Causeway	6	6	4	5	4	5	5	4
Narwhal, Jeanette and Karluk Islands	4	4	2	3	2	5	3	2
Tigvariak Island	5	5	4	6	6	5	7	7
Pole and Belvedere Islands	2	2	2	2	2	3	3	2
Challenge, Alaska, Dutchess and Northstar Islands	1	1	1	1	1	1	1	1
Flaxman Island	1	.	.	.	.	1	.	.

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table 3. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location will contact a certain environmental resource area within **10 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	24	25	28	25	28	24	25	28
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	.	.	.	.	.	.	.	.
Ice/Sea Segment 8	.	.	.	.	.	.	.	.
Ice/Sea Segment 9	1	1	1	1	1	1	1	1
Ice/Sea Segment 10	2	2	1	2	1	2	2	1
Ice/Sea Segment 11	2	2	1	2	1	2	2	1
Ice/Sea Segment 12	.	.	.	.	.	.	.	.
Ice/Sea Segment 13	.	.	.	.	.	.	.	.
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	.	.	.	.	.	.	.	.
ERA 18	.	.	.	.	.	.	.	.
ERA 19	.	.	.	.	.	.	.	.
ERA 20	1	.	.	.	.	.	.	.
ERA 21	1	1	.	.	.	1	1	.
Simpson Lagoon	1	1	1	1	1	1	1	1
Gwyder Bay	1	1	1	1	1	1	1	1
ERA 24	1	1	1	1	1	1	1	.
Prudhoe Bay	2	2	1	2	1	2	2	1
ERA 26	4	3	3	3	3	4	4	3
ERA 27	5	5	3	5	4	5	5	4
ERA 28	4	3	2	3	2	4	3	2
ERA 29	2	2	1	2	1	2	2	1
ERA 30	4	3	2	3	2	4	3	2
ERA 31	2	2	2	2	2	3	2	2
Boulder Patch I	7	6	4	6	4	7	6	4
Boulder Patch II	20	18	7	15	7	17	14	7
ERA 34	5	7	18	6	11	4	5	10
ERA 35	13	8	3	9	4	50	12	4
ERA 36	6	8	7	9	14	6	9	50
ERA 37	5	4	2	5	3	7	5	3
ERA 38	4	4	2	4	3	4	5	3
ERA 39	5	4	2	4	3	5	4	3
ERA 40	4	3	2	3	2	4	4	2
ERA 41	2	2	1	2	1	2	2	1
Canning River	1	.	.	.	.	1	.	.
ERA 43	1	1	1	1	1	1	1	1
Simpson Cove	.	.	.	.	.	.	.	.
ERA 45	1	1	.	1	1	1	1	1
Arey Lagoon, Hula Hula River	.	.	.	.	.	.	.	.
Whaling Area/Kaktovik	.	.	.	.	.	1	.	.
Thetis Island	.	.	.	.	.	.	.	.
Spy Island	.	.	.	.	.	.	.	.
Leavitt and Pingok Islands	1	1	.	1	1	1	1	.
Bertoncini, Bodfish and Cottle Islands	2	2	1	2	1	2	1	1
Long Island	2	2	1	2	1	2	2	1
Egg and Stump Islands	3	2	1	3	2	3	3	2
West Dock	3	2	1	2	2	3	3	2
Reindeer and Argo Islands	2	2	1	2	1	2	2	1
Cross and No Name Islands	2	2	1	2	1	2	1	1
Endicott Causeway	7	7	5	6	5	6	6	5
Narwhal, Jeanette and Karluk Islands	5	4	3	4	3	5	4	3
Tigvariak Island	6	6	5	7	7	6	7	8
Pole and Belvedere Islands	3	3	2	3	3	4	4	3
Challenge, Alaska, Dutchess and Northstar Islands	2	2	1	2	2	2	2	2
Flaxman Island	1	1	.	1	1	1	1	.

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table 4. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location will contact a certain environmental resource area within **30 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	31	32	35	32	35	31	32	35
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	1	1	.	1	1	1	1	1
Ice/Sea Segment 8	1	1	.	1	.	1	1	.
Ice/Sea Segment 9	2	2	1	2	1	2	2	1
Ice/Sea Segment 10	2	2	2	2	2	2	2	2
Ice/Sea Segment 11	3	2	1	2	2	3	3	2
Ice/Sea Segment 12	1	1	.	1	1	1	1	1
Ice/Sea Segment 13	1	1	1	1	1	1	1	1
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	.	.	.	.	.	.	.	.
ERA 18	.	.	.	.	.	.	.	.
ERA 19	1	1	1	1	1	1	1	1
ERA 20	1	1	1	1	1	1	1	1
ERA 21	2	1	1	1	1	2	1	1
Simpson Lagoon	2	2	2	2	1	2	2	1
Gwyder Bay	2	1	1	2	1	2	2	1
ERA 24	2	2	1	2	1	2	2	1
Prudhoe Bay	2	2	1	2	1	2	2	2
ERA 26	4	4	3	4	3	5	4	3
ERA 27	6	6	4	6	5	6	6	5
ERA 28	5	4	3	4	3	5	4	3
ERA 29	3	3	2	3	2	4	3	1
ERA 30	5	4	3	4	3	5	4	3
ERA 31	3	3	2	3	2	4	3	2
Boulder Patch I	9	7	5	7	5	9	7	5
Boulder Patch II	23	21	9	18	8	20	17	8
ERA 34	6	7	21	7	13	5	6	12
ERA 35	16	10	5	12	5	50	15	5
ERA 36	7	9	9	11	17	7	11	50
ERA 37	7	5	4	6	3	9	7	3
ERA 38	5	5	2	5	3	5	6	3
ERA 39	6	5	3	6	3	7	6	3
ERA 40	5	4	2	5	3	5	5	3
ERA 41	3	2	1	2	2	3	3	2
Canning River	1	.	.	1	.	1	1	.
ERA 43	2	2	1	2	1	2	2	1
Simpson Cove	.	.	.	.	.	.	.	.
ERA 45	1	1	1	1	1	2	1	1
Arey Lagoon, Hula Hula River	.	.	.	.	.	.	.	.
Whaling Area/Kaktovik	1	1	.	1	1	1	1	1
Thetis Island	1	.	.	.	.	1	.	.
Spy Island	1	1	1	1	1	1	1	.
Leavitt and Pingok Islands	1	1	1	1	1	1	1	1
Bertoncini, Bodfish and Cottle Islands	3	2	2	2	1	2	2	1
Long Island	3	2	2	2	1	3	2	1
Egg and Stump Islands	4	3	2	3	2	3	3	2
West Dock	4	3	2	3	2	4	3	2
Reindeer and Argo Islands	3	3	2	2	1	3	2	1
Cross and No Name Islands	3	2	2	2	1	3	2	1
Endicott Causeway	8	8	6	7	6	7	7	6
Narwhal, Jeanette and Karluk Islands	7	6	3	5	3	7	5	3
Tigvariak Island	7	7	6	8	9	7	9	9
Pole and Belvedere Islands	5	4	3	5	4	5	5	4
Challenge, Alaska, Dutchess and Northstar Islands	3	2	2	3	2	3	3	2
Flaxman Island	2	1	.	1	1	2	1	1

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table 5. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location will contact a certain environmental resource area within **60 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	40	41	44	41	44	40	41	44
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	1	1	1	1	1	1	1	1
Ice/Sea Segment 8	1	1	1	1	1	1	1	1
Ice/Sea Segment 9	2	2	2	2	2	2	2	2
Ice/Sea Segment 10	3	2	2	2	2	3	2	2
Ice/Sea Segment 11	3	3	1	3	2	3	3	2
Ice/Sea Segment 12	1	1	.	1	1	1	1	1
Ice/Sea Segment 13	1	1	1	1	1	1	1	1
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	1	.	.	.	.	1	.	.
ERA 18	1	1	1	1	.	1	1	.
ERA 19	1	1	1	1	1	1	1	1
ERA 20	2	1	1	1	1	2	1	1
ERA 21	2	2	1	2	1	2	2	1
Simpson Lagoon	4	3	2	3	2	4	3	2
Gwyder Bay	2	2	1	2	2	2	2	2
ERA 24	3	2	1	2	1	3	2	1
Prudhoe Bay	3	3	1	2	2	3	2	2
ERA 26	5	5	5	5	5	6	5	4
ERA 27	7	7	5	7	6	6	7	6
ERA 28	7	6	5	5	4	7	6	4
ERA 29	4	3	2	4	2	5	4	2
ERA 30	6	5	4	5	3	6	5	3
ERA 31	4	4	3	3	2	5	4	2
Boulder Patch I	11	9	7	9	7	11	9	7
Boulder Patch II	28	26	12	22	10	24	20	10
ERA 34	6	8	25	8	16	5	6	15
ERA 35	19	13	6	15	6	50	19	6
ERA 36	8	11	12	13	20	9	13	50
ERA 37	9	7	5	8	4	11	9	4
ERA 38	6	6	3	6	4	6	7	4
ERA 39	7	6	4	6	4	8	6	4
ERA 40	6	6	3	6	4	7	6	4
ERA 41	3	3	2	3	2	4	3	2
Canning River	1	1	1	1	1	1	1	.
ERA 43	2	2	1	2	2	3	2	2
Simpson Cove	1	.	.	.	.	1	.	.
ERA 45	2	1	1	1	1	2	2	1
Arey Lagoon, Hula Hula River	.	.	.	.	.	1	.	.
Whaling Area/Kaktovik	1	1	.	1	1	1	1	1
Thetis Island	1	1	1	1	1	1	1	1
Spy Island	1	1	1	1	1	1	1	1
Leavitt and Pingok Islands	2	2	1	2	1	2	2	1
Bertoncini, Bodfish and Cottle Islands	4	4	3	3	2	4	3	2
Long Island	4	3	2	3	2	4	3	1
Egg and Stump Islands	5	4	3	4	3	4	4	3
West Dock	5	3	2	4	3	5	4	3
Reindeer and Argo Islands	4	3	2	3	2	4	3	2
Cross and No Name Islands	4	3	2	3	1	4	3	1
Endicott Causeway	9	9	8	8	7	8	8	7
Narwhal, Jeanette and Karluk Islands	8	7	4	6	3	8	6	3
Tigvariak Island	8	9	8	10	11	8	10	11
Pole and Belvedere Islands	6	6	3	6	4	6	7	4
Challenge, Alaska, Dutchess and Northstar Islands	4	3	2	4	3	4	4	3
Flaxman Island	2	2	1	2	1	2	2	1

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table 6. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location will contact a certain environmental resource area within **360 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	97	97	98	97	98	97	97	98
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	1	1	1	1	1	1	1	1
Ice/Sea Segment 7	2	1	1	1	1	2	2	1
Ice/Sea Segment 8	1	1	1	1	1	1	1	1
Ice/Sea Segment 9	4	4	3	4	2	4	4	2
Ice/Sea Segment 10	5	4	3	4	2	5	4	2
Ice/Sea Segment 11	6	6	4	6	5	7	6	6
Ice/Sea Segment 12	1	1	1	1	1	1	1	1
Ice/Sea Segment 13	1	1	1	1	1	1	1	1
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	1	.	.
ERA 16	2	2	1	1	.	2	1	.
ERA 17	3	3	3	2	2	3	2	1
ERA 18	3	3	2	2	1	3	2	1
ERA 19	2	2	2	2	1	2	2	1
ERA 20	4	4	3	4	2	5	4	2
ERA 21	7	7	4	6	3	8	6	2
Simpson Lagoon	13	12	8	11	6	13	11	6
Gwyder Bay	3	2	4	4	4	5	4	4
ERA 24	8	7	4	7	3	8	7	3
Prudhoe Bay	5	5	3	5	4	6	5	4
ERA 26	9	10	13	12	11	12	12	11
ERA 27	13	14	13	15	14	11	14	14
ERA 28	18	15	14	14	10	20	15	10
ERA 29	11	9	5	9	3	12	11	3
ERA 30	12	10	8	10	4	12	10	4
ERA 31	10	9	7	8	3	13	8	3
Boulder Patch I	24	20	17	22	16	27	23	16
Boulder Patch II	59	57	29	47	22	51	45	22
ERA 34	11	13	54	13	33	7	10	32
ERA 35	43	30	14	35	14	**	45	13
ERA 36	16	23	30	26	44	19	26	**
ERA 37	21	17	14	18	8	28	24	7
ERA 38	14	14	6	14	9	14	17	9
ERA 39	15	13	8	14	8	17	15	8
ERA 40	15	14	6	14	7	15	13	8
ERA 41	8	7	5	8	6	9	8	6
Canning River	4	3	1	3	1	4	3	1
ERA 43	5	5	3	6	4	7	6	4
Simpson Cove	2	2	2	2	1	3	2	2
ERA 45	3	3	2	3	2	4	3	3
Arey Lagoon, Hula Hula River	1	1	1	1	1	2	1	2
Whaling Area/Kaktovik	2	2	1	2	1	2	2	1
Thetis Island	4	4	3	3	2	4	3	2
Spy Island	5	4	4	4	2	5	4	2
Leavitt and Pingok Islands	7	7	5	6	3	8	6	3
Bertoncini, Bodfish and Cottle Islands	14	13	9	12	7	15	12	6
Long Island	9	7	6	6	3	11	7	3
Egg and Stump Islands	12	9	6	10	7	8	9	7
West Dock	11	7	5	9	8	11	10	9
Reindeer and Argo Islands	10	7	7	6	4	10	6	4
Cross and No Name Islands	10	7	5	8	2	11	9	2
Endicott Causeway	17	19	20	17	14	15	16	14
Narwhal, Jeanette and Karluk Islands	19	17	8	12	4	18	11	3
Tigvariak Island	14	18	19	19	25	16	21	25
Pole and Belvedere Islands	15	14	6	15	9	15	17	9
Challenge, Alaska, Dutchess and Northstar Islands	11	10	6	10	6	11	10	6
Flaxman Island	7	5	1	6	2	7	7	2

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table 7. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location will contact a certain land segment within **1 day**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
25	1	1	2	1	1	1	1	1
26	5	7	15	6	12	4	5	12
27	1	2	.	2	1	1	2	2
28	.	.	.	.	1	.	.	1

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table 8. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location will contact a certain land segment within **3 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
23	1	1	.	1	.	1	1	.
24	.	.	.	1	.	1	1	.
25	3	3	3	3	2	3	3	2
26	7	9	18	8	15	6	8	14
27	3	3	1	3	3	3	4	3
28	1	1	1	2	2	2	2	2

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table 9. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location will contact a certain land segment within **10 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
21	1	1	.	1	.	1	1	.
22	1	1	1	1	1	1	1	1
23	2	2	1	2	1	2	2	1
24	1	1	.	1	1	1	1	1
25	4	4	4	4	3	4	4	3
26	8	10	19	10	16	7	9	15
27	3	3	2	4	3	4	4	4
28	2	2	2	2	3	2	3	3
29	1	1	.	1	.	1	1	.

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table 10. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location will contact a certain land segment within **30 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
21	1	1	1	1	1	1	1	.
22	2	1	1	2	1	2	2	1
23	3	2	1	2	1	3	2	1
24	1	1	1	1	1	1	1	1
25	4	4	4	4	3	4	4	3
26	10	12	21	11	18	9	11	17
27	4	4	2	5	4	5	5	5
28	3	3	3	3	3	3	3	3
29	1	1	.	1	1	1	1	1
30	1	.	.	.	.	1	.	.
33	.	.	.	.	.	1	.	.

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table 11. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location will contact a certain land segment within **60 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
19	1	1	.	.	.	1	.	.
21	2	2	1	1	1	2	1	1
22	2	1	1	2	2	2	2	2
23	4	3	1	3	2	4	3	2
24	1	2	1	1	1	1	1	1
25	5	5	5	5	4	5	5	4
26	12	15	25	14	21	10	13	20
27	5	5	3	6	6	7	7	7
28	3	3	4	4	4	3	4	4
29	1	2	.	1	1	1	1	1
30	1	1	.	1	.	1	1	.
32	1	.	.	.	.	1	.	.
33	1	.	.	.	.	1	1	.
34	.	.	.	.	.	1	.	.

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table 12. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location will contact a certain land segment within **360 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
16	2	2	2	2	.	2	1	.
17	2	1	2	1	1	2	1	1
18	1	1	.	.	.	1	.	.
19	1	1	1	1	1	2	1	1
20	1	1	1	1	.	1	1	.
21	6	6	4	6	4	6	6	3
22	4	3	3	4	4	6	5	4
23	10	7	3	7	5	9	7	5
24	2	3	2	3	2	1	3	2
25	9	10	9	10	7	8	9	7
26	27	31	48	29	40	19	25	38
27	13	12	9	14	17	17	17	19
28	7	7	9	8	8	7	8	8
29	4	5	1	4	4	3	3	4
30	3	2	1	3	1	3	3	.
31	1	1	.	1	.	1	1	.
32	2	2	2	2	1	3	2	1
33	2	1	1	2	3	3	2	3
34	1	1	.	1	.	1	1	.

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Appendix A

Locations of Environmental Resource Areas

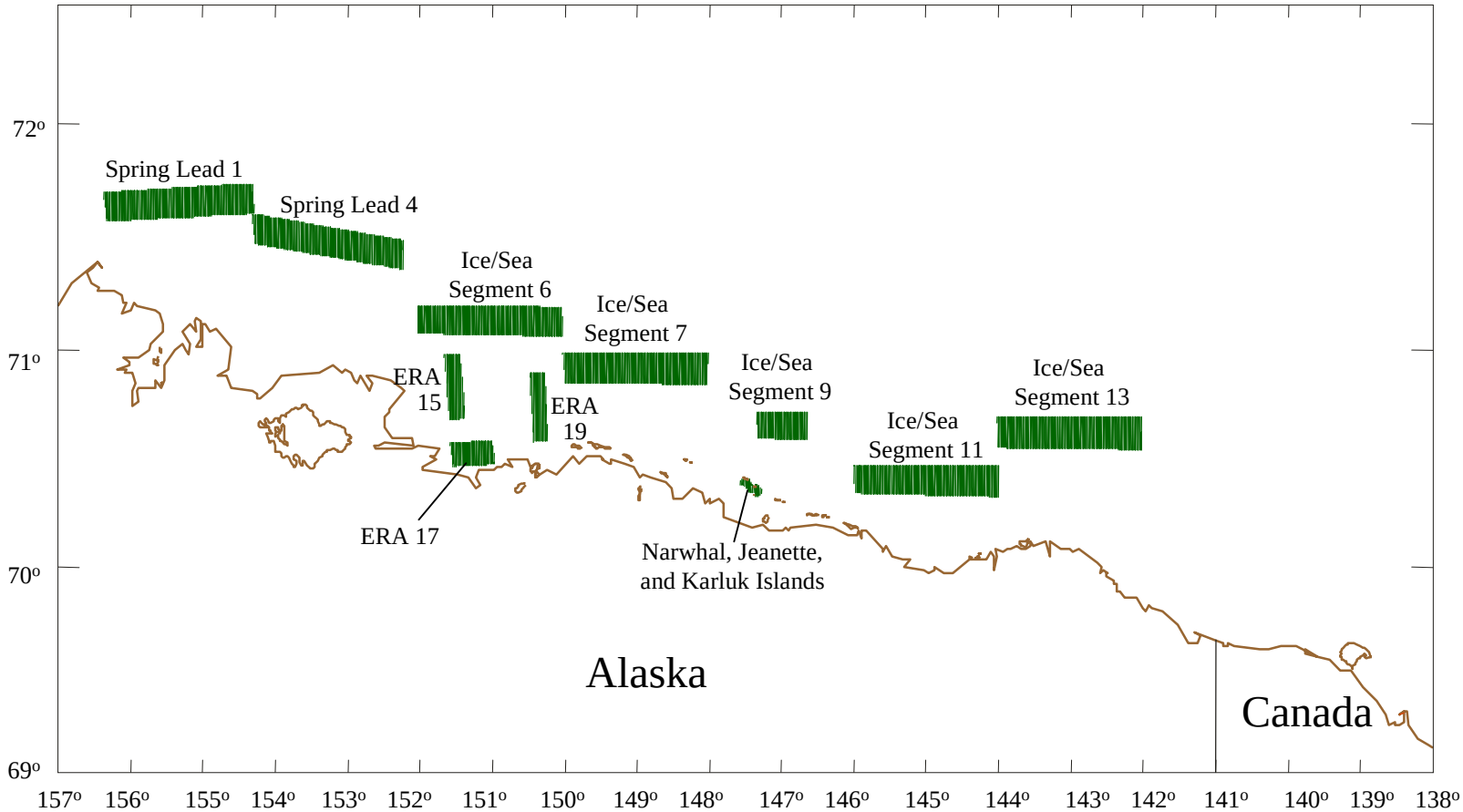

Figure A-1. Locations of Spring Leads 1 and 4; Ice/Sea Segments 6, 7, 9, 11, and 13; Narwhal, Jeanette, and Karluk Islands; and Environmental Resource Areas 15, 17, and 19.

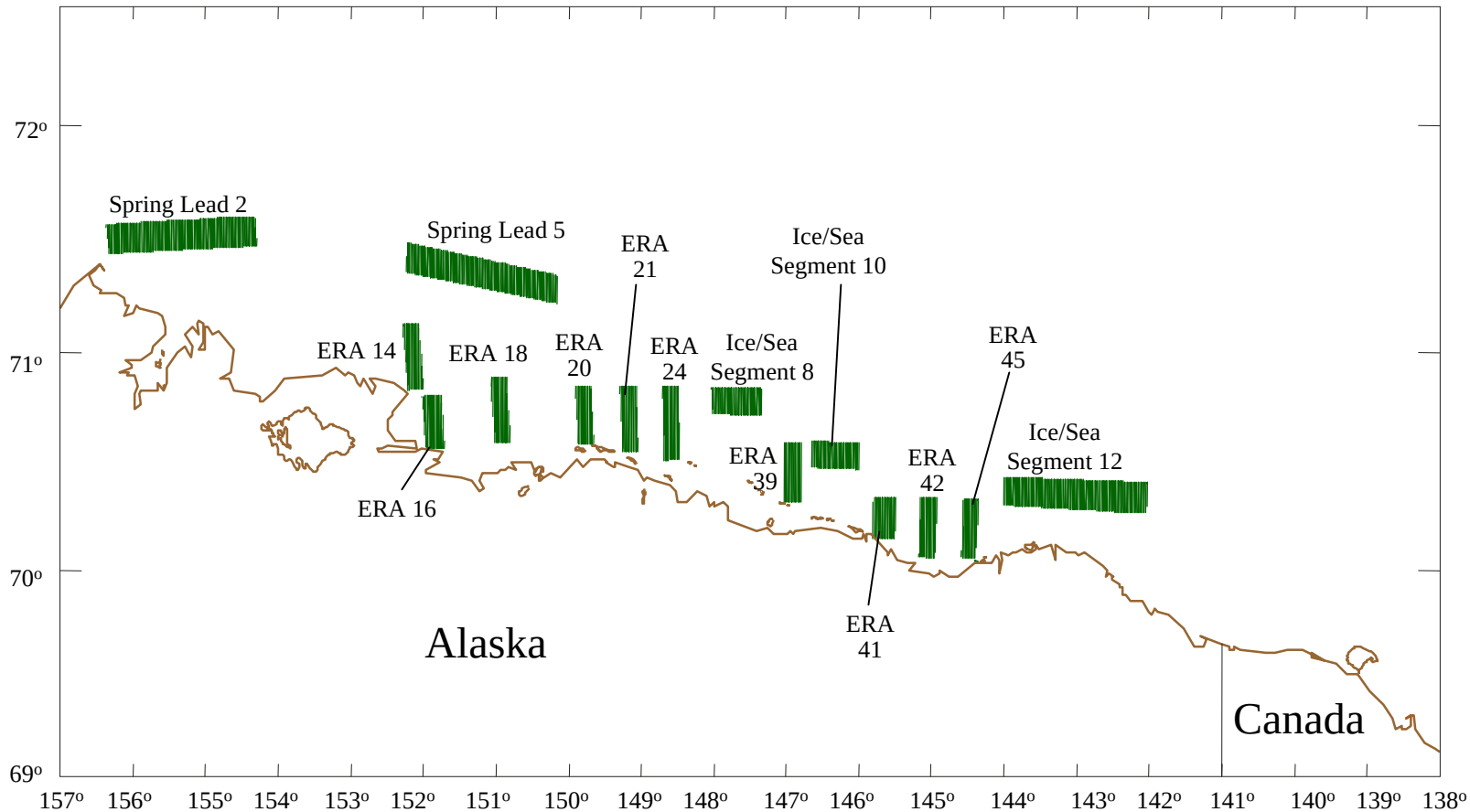

Figure A-2. Locations of Spring Leads 2 and 5; Ice/Sea Segments 8, 10, and 12; and Environmental Resource Areas 14, 16, 18, 20, 21, 24, 39, 41, 42, and 45.

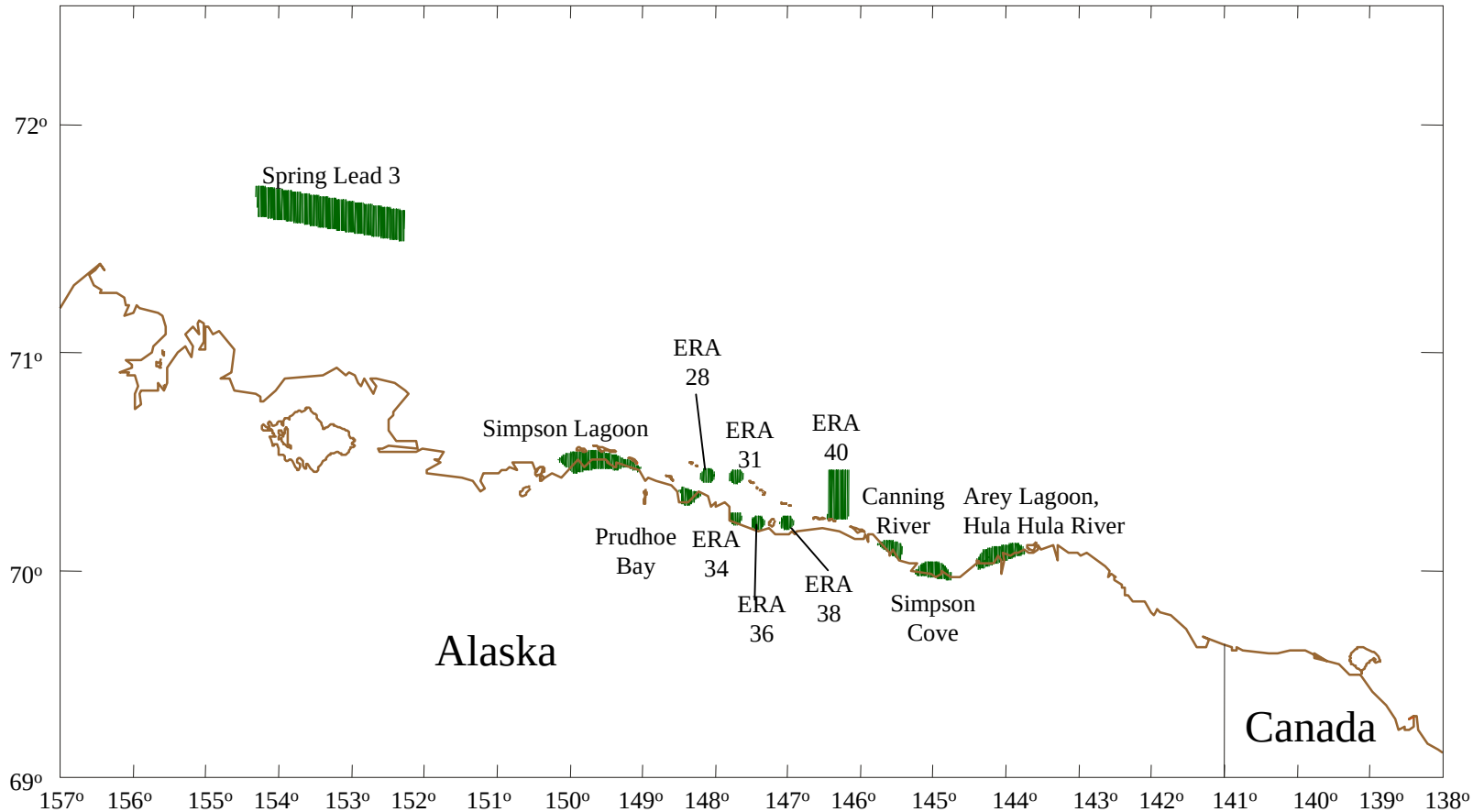

Figure A-3. Locations of Spring Lead 3; Simpson Lagoon; Prudhoe Bay; Environmental Resource Areas 28, 31, 34, 36, 38, and 40; Canning River; and Arey Lagoon, Hula Hula River.

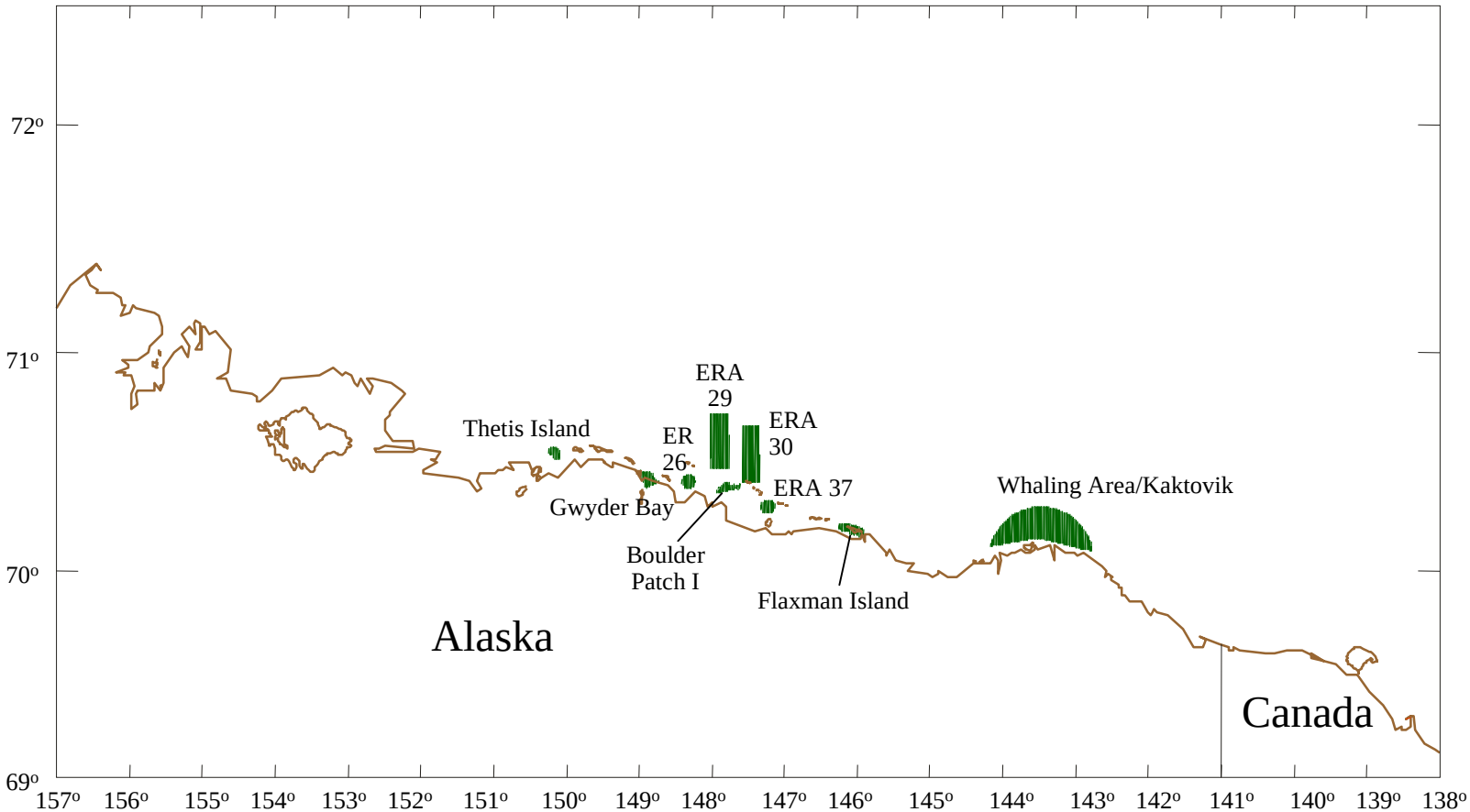

Figure A-4. Locations of Thetis Island; Gwyder Bay; Boulder Patch I; Environmental Resource Areas 26, 29, 30, and 37; Flaxman Island; and Whaling Area/Kaktovik.

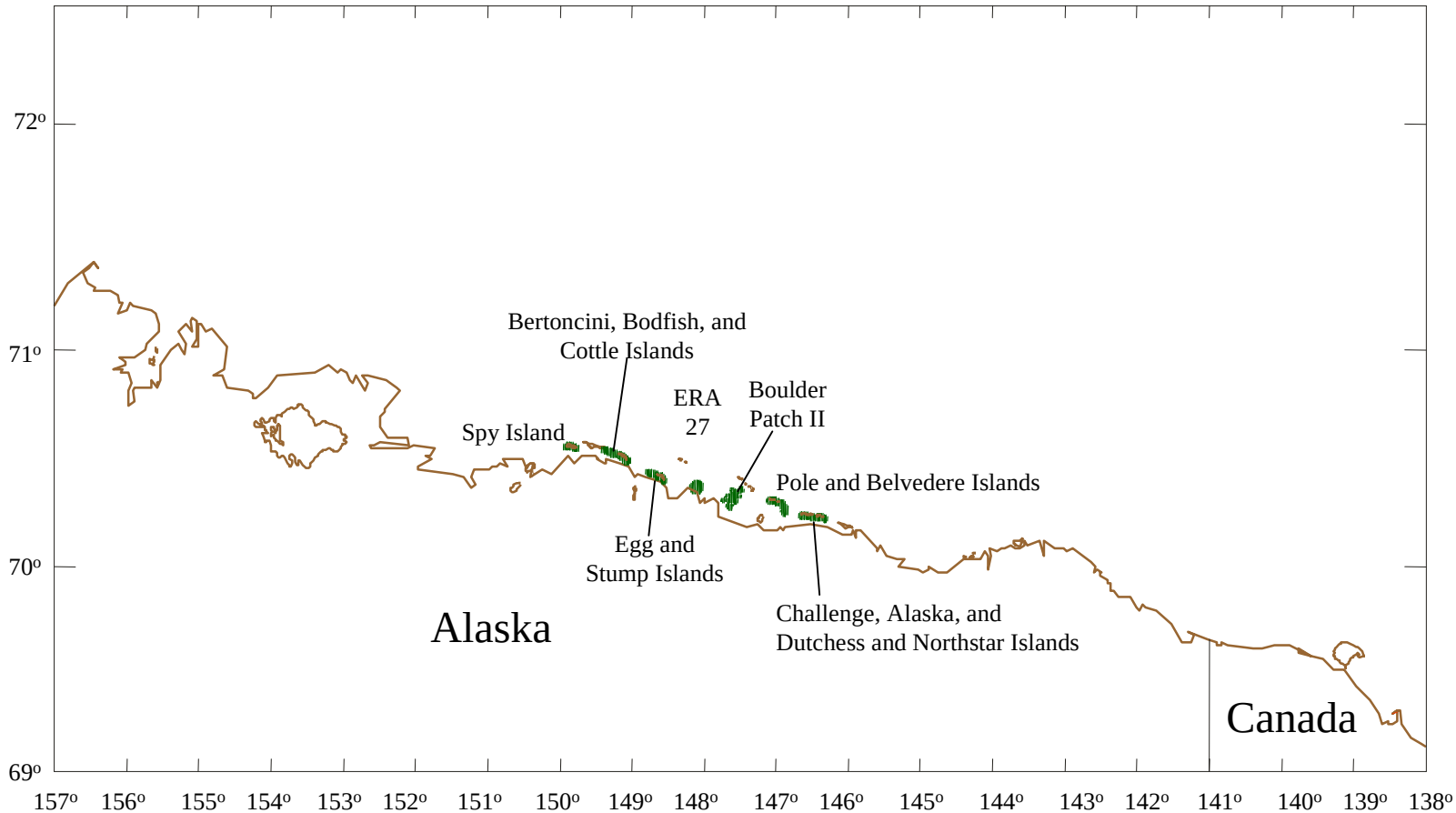

Figure A-5. Locations of Spy Island; Bertoncini, Bodfish, and Cottle Islands; Egg and Stump Islands; Environmental Resource Area 27; Boulder Patch II; Pole and Belvedere Islands; and Challenge, Alaska, and Dutchess and Northstar Islands.

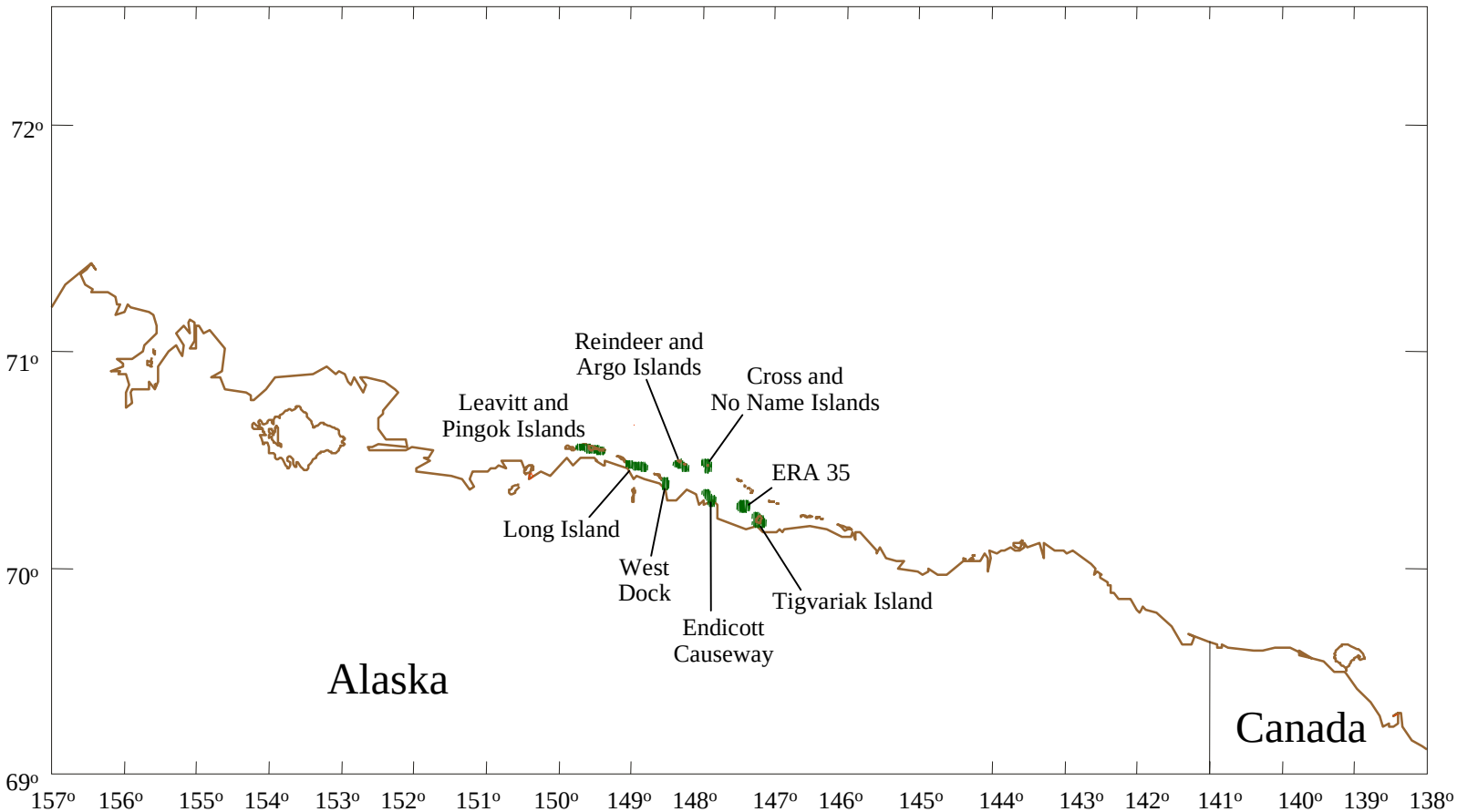

Figure A-6. Locations of Leavitt and Pingok Islands; Long Island; Reindeer and Argo Islands; West Dock; Endicott Causeway; Cross and No Name Islands; Tigvariak Island; and Environmental Resource Area 35.

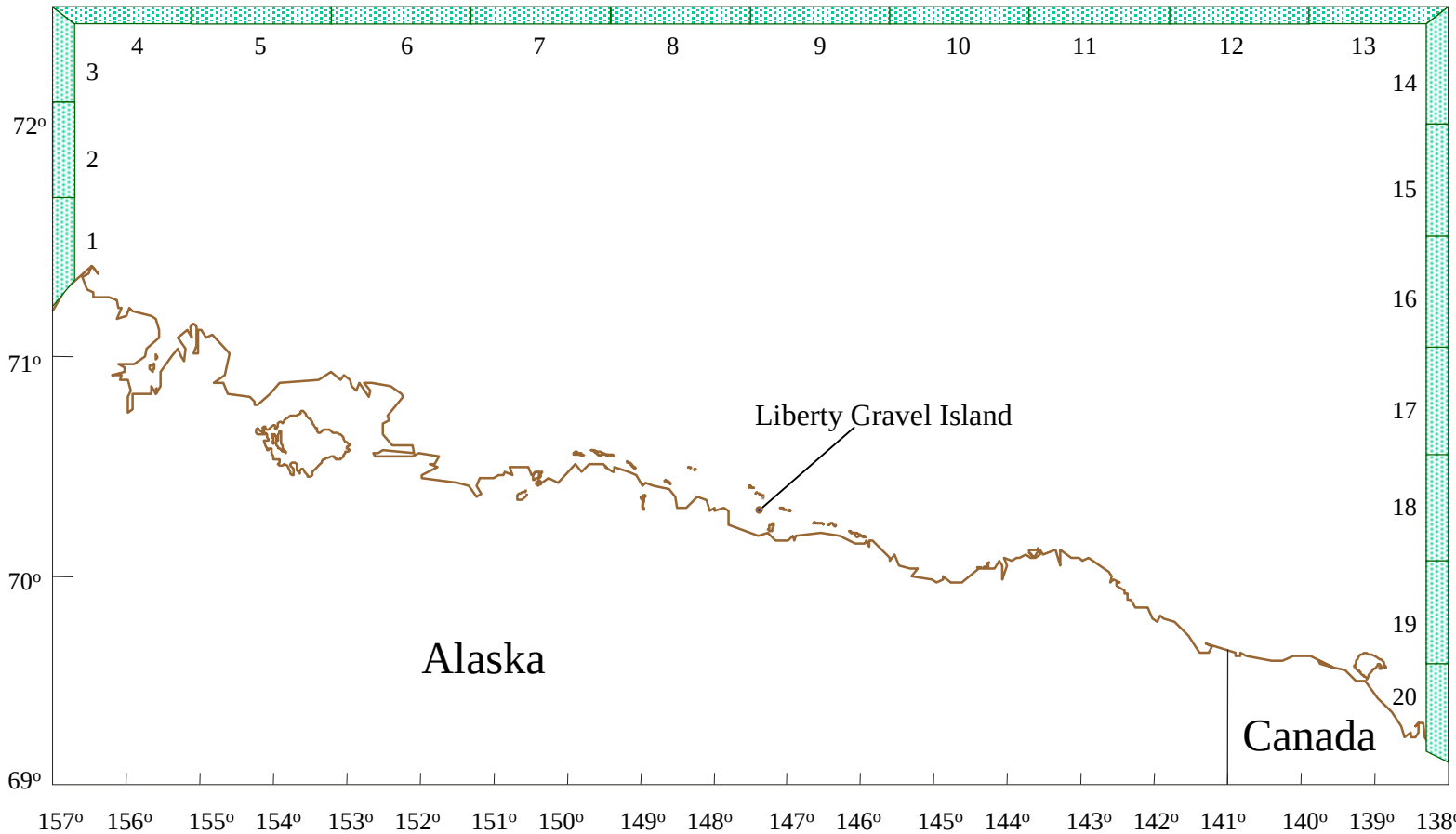

Figure A-7. Locations of Boundary Segments 1-20.

Appendix B

Conditional Probabilities of Contact to Environmental Resource Areas and Land Segments in the Winter Season

Table B-1. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **winter season** will contact a certain environmental resource area within **1 day**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	1	2	5	2	4	1	2	4
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	.	.	.	.	.	.	.	.
Ice/Sea Segment 8	.	.	.	.	.	.	.	.
Ice/Sea Segment 9	.	.	.	.	.	.	.	.
Ice/Sea Segment 10	.	.	.	.	.	.	.	.
Ice/Sea Segment 11	.	.	.	.	.	.	.	.
Ice/Sea Segment 12	.	.	.	.	.	.	.	.
Ice/Sea Segment 13	.	.	.	.	.	.	.	.
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	.	.	.	.	.	.	.	.
ERA 18	.	.	.	.	.	.	.	.
ERA 19	.	.	.	.	.	.	.	.
ERA 20	.	.	.	.	.	.	.	.
ERA 21	.	.	.	.	.	.	.	.
Simpson Lagoon	.	.	.	.	.	.	.	.
Gwyder Bay	.	.	.	.	.	.	.	.
ERA 24	.	.	.	.	.	.	.	.
Prudhoe Bay	.	.	.	.	.	.	.	.
ERA 26	.	.	.	.	.	.	.	.
ERA 27	.	.	.	.	.	.	.	.
ERA 28	.	.	.	.	.	.	.	.
ERA 29	.	.	.	.	.	.	.	.
ERA 30	.	.	.	.	.	.	.	.
ERA 31	.	.	.	.	.	.	.	.
Boulder Patch I	1	.	.	.	.	.	.	.
Boulder Patch II	5	5	2	3	1	3	2	1
ERA 34	1	1	5	1	2	.	1	2
ERA 35	4	2	1	3	1	33	4	1
ERA 36	1	2	2	2	4	1	2	33
ERA 37	1	1	.	1	.	2	1	.
ERA 38	.	1	.	1	1	.	1	1
ERA 39	.	.	.	.	.	.	.	.
ERA 40	.	.	.	.	.	.	.	.
ERA 41	.	.	.	.	.	.	.	.
Canning River	.	.	.	.	.	.	.	.
ERA 43	.	.	.	.	.	.	.	.
Simpson Cove	.	.	.	.	.	.	.	.
ERA 45	.	.	.	.	.	.	.	.
Arey Lagoon, Hula Hula River	.	.	.	.	.	.	.	.
Whaling Area/Kaktovik	.	.	.	.	.	.	.	.
Thetis Island	.	.	.	.	.	.	.	.
Spy Island	.	.	.	.	.	.	.	.
Leavitt and Pingok Islands	.	.	.	.	.	.	.	.
Bertoncini, Bodfish and Cottle Islands	.	.	.	.	.	.	.	.
Long Island	.	.	.	.	.	.	.	.
Egg and Stump Islands	.	.	.	.	.	.	.	.
West Dock	.	.	.	.	.	.	.	.
Reindeer and Argo Islands	.	.	.	.	.	.	.	.
Cross and No Name Islands	.	.	.	.	.	.	.	.
Endicott Causeway	1	1	1	1	.	.	.	.
Narwhal, Jeanette and Karluk Islands	1	.	.	.	.	1	.	.
Tigvariak Island	1	1	1	1	2	1	1	2
Pole and Belvedere Islands	.	.	.	.	.	1	.	.
Challenge, Alaska, Dutchess and Northstar Islands	.	.	.	.	.	.	.	.
Flaxman Island	.	.	.	.	.	.	.	.

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table B-2. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **winter season** will contact a certain environmental resource area within **3 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	4	5	7	5	6	4	5	6
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	.	.	.	.	.	.	.	.
Ice/Sea Segment 8	.	.	.	.	.	.	.	.
Ice/Sea Segment 9	.	.	.	.	.	.	.	.
Ice/Sea Segment 10	.	.	.	.	.	.	.	.
Ice/Sea Segment 11	.	.	.	.	.	.	.	.
Ice/Sea Segment 12	.	.	.	.	.	.	.	.
Ice/Sea Segment 13	.	.	.	.	.	.	.	.
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	.	.	.	.	.	.	.	.
ERA 18	.	.	.	.	.	.	.	.
ERA 19	.	.	.	.	.	.	.	.
ERA 20	.	.	.	.	.	.	.	.
ERA 21	.	.	.	.	.	.	.	.
Simpson Lagoon	.	.	.	.	.	.	.	.
Gwyder Bay	.	.	.	.	.	.	.	.
ERA 24	.	.	.	.	.	.	.	.
Prudhoe Bay	.	.	.	.	.	.	.	.
ERA 26	.	.	.	.	.	1	.	.
ERA 27	1	1	1	1	1	1	1	1
ERA 28	1	1	.	.	.	.	.	.
ERA 29	.	.	.	.	.	.	.	.
ERA 30	1	1	.	1	.	1	1	.
ERA 31	.	.	.	.	.	.	.	.
Boulder Patch I	1	1	1	1	1	1	1	1
Boulder Patch II	6	5	3	4	2	4	4	2
ERA 34	1	2	6	2	3	1	1	3
ERA 35	5	3	2	4	2	33	5	2
ERA 36	2	2	2	3	5	2	3	33
ERA 37	2	1	.	2	1	2	2	1
ERA 38	1	1	1	1	1	1	1	1
ERA 39	1	1	.	1	.	1	1	.
ERA 40	.	.	.	1	1	1	1	1
ERA 41	.	.	.	.	.	.	.	.
Canning River	.	.	.	.	.	.	.	.
ERA 43	.	.	.	.	.	.	.	.
Simpson Cove	.	.	.	.	.	.	.	.
ERA 45	.	.	.	.	.	.	.	.
Arey Lagoon, Hula Hula River	.	.	.	.	.	.	.	.
Whaling Area/Kaktovik	.	.	.	.	.	.	.	.
Thetis Island	.	.	.	.	.	.	.	.
Spy Island	.	.	.	.	.	.	.	.
Leavitt and Pingok Islands	.	.	.	.	.	.	.	.
Bertoncini, Bodfish and Cottle Islands	.	.	.	.	.	.	.	.
Long Island	.	.	.	.	.	.	.	.
Egg and Stump Islands	.	.	.	.	.	.	.	.
West Dock	.	.	.	.	.	.	.	.
Reindeer and Argo Islands	.	.	.	.	.	.	.	.
Cross and No Name Islands	.	.	.	.	.	.	.	.
Endicott Causeway	1	1	1	1	1	1	1	1
Narwhal, Jeanette and Karluk Islands	2	2	1	2	1	2	2	1
Tigvariak Island	2	2	1	2	2	1	2	3
Pole and Belvedere Islands	1	1	1	1	1	1	1	1
Challenge, Alaska, Dutchess and Northstar Islands	.	.	.	.	.	.	.	1
Flaxman Island	.	.	.	.	.	.	.	.

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table B-3. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **winter season** will contact a certain environmental resource area within **10 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	8	8	9	8	9	8	8	9
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	.	.	.	.	.	.	.	.
Ice/Sea Segment 8	.	.	.	.	.	.	.	.
Ice/Sea Segment 9	1	1	1	1	1	1	1	1
Ice/Sea Segment 10	1	1	1	1	1	1	1	1
Ice/Sea Segment 11	1	1	.	1	1	1	1	1
Ice/Sea Segment 12	.	.	.	.	.	.	.	.
Ice/Sea Segment 13	.	.	.	.	.	.	.	.
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	.	.	.	.	.	.	.	.
ERA 18	.	.	.	.	.	.	.	.
ERA 19	.	.	.	.	.	.	.	.
ERA 20	.	.	.	.	.	.	.	.
ERA 21	.	.	.	.	.	.	.	.
Simpson Lagoon	.	.	.	.	.	.	.	.
Gwyder Bay	.	.	.	.	.	.	.	.
ERA 24	.	.	.	.	.	.	.	.
Prudhoe Bay	1	1	.	1	.	1	1	.
ERA 26	1	1	1	1	1	1	1	1
ERA 27	1	1	1	1	1	1	1	1
ERA 28	1	1	1	1	1	1	1	1
ERA 29	1	.	.	.	.	1	.	.
ERA 30	1	1	1	1	1	1	1	1
ERA 31	1	1	1	1	.	1	.	.
Boulder Patch I	3	2	2	2	2	3	2	2
Boulder Patch II	7	7	3	5	3	6	5	3
ERA 34	1	2	7	2	4	1	2	3
ERA 35	6	4	2	5	2	33	6	2
ERA 36	2	3	3	3	6	2	3	33
ERA 37	3	2	1	2	1	3	3	1
ERA 38	2	1	1	2	2	2	2	2
ERA 39	2	2	1	2	1	2	2	1
ERA 40	1	1	1	2	1	2	2	1
ERA 41	1	1	.	1	.	1	1	.
Canning River	.	.	.	.	.	.	.	.
ERA 43	.	.	.	.	.	.	.	.
Simpson Cove	.	.	.	.	.	.	.	.
ERA 45	.	.	.	.	.	.	.	.
Arey Lagoon, Hula Hula River	.	.	.	.	.	.	.	.
Whaling Area/Kaktovik	.	.	.	.	.	.	.	.
Thetis Island	.	.	.	.	.	.	.	.
Spy Island	.	.	.	.	.	.	.	.
Leavitt and Pingok Islands	.	.	.	.	.	.	.	.
Bertoncini, Bodfish and Cottle Islands	.	.	.	.	.	.	.	.
Long Island	.	.	.	.	.	.	.	.
Egg and Stump Islands	1	1	.	1	.	1	.	.
West Dock	1	1	.	1	.	1	1	.
Reindeer and Argo Islands	1	1	1	1	.	1	.	.
Cross and No Name Islands	1	.	.	1	.	1	.	.
Endicott Causeway	2	2	2	2	1	2	1	1
Narwhal, Jeanette and Karluk Islands	3	2	1	2	1	3	2	1
Tigvariak Island	2	2	2	3	3	2	3	3
Pole and Belvedere Islands	2	2	1	2	2	2	2	2
Challenge, Alaska, Dutchess and Northstar Islands	1	1	1	1	1	1	1	1
Flaxman Island	.	.	.	.	.	.	.	.

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table B-4. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **winter season** will contact a certain environmental resource area within **30 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	13	14	16	14	16	13	14	16
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	.	.	.	.	.	.	.	.
Ice/Sea Segment 8	1	1	.	1	.	1	1	.
Ice/Sea Segment 9	1	1	1	1	1	1	1	1
Ice/Sea Segment 10	2	2	1	2	1	2	2	1
Ice/Sea Segment 11	1	1	1	1	1	1	1	1
Ice/Sea Segment 12	.	.	.	.	.	.	.	.
Ice/Sea Segment 13	.	.	.	.	.	.	.	.
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	.	.	.	.	.	.	.	.
ERA 18	.	.	.	.	.	.	.	.
ERA 19	.	.	.	.	.	.	.	.
ERA 20	.	.	.	.	.	.	.	.
ERA 21	.	.	.	.	.	.	.	.
Simpson Lagoon	.	.	.	.	.	.	.	.
Gwyder Bay	.	.	.	.	.	.	.	.
ERA 24	1	.	.	.	.	.	.	.
Prudhoe Bay	1	1	.	1	1	1	1	1
ERA 26	1	1	2	1	2	2	1	1
ERA 27	2	2	2	2	2	1	2	2
ERA 28	3	3	2	2	2	3	2	2
ERA 29	1	1	1	1	.	1	1	.
ERA 30	2	2	1	2	1	2	1	1
ERA 31	1	1	1	1	1	2	1	.
Boulder Patch I	4	4	3	4	3	5	4	3
Boulder Patch II	11	10	6	8	5	9	8	5
ERA 34	2	3	10	3	6	1	2	6
ERA 35	10	7	3	8	3	33	9	3
ERA 36	3	5	6	5	9	4	5	33
ERA 37	4	3	2	4	2	6	5	2
ERA 38	3	3	1	3	2	3	3	2
ERA 39	3	3	2	3	2	3	3	2
ERA 40	2	2	1	3	2	3	2	1
ERA 41	1	1	.	1	1	1	1	1
Canning River	.	.	.	.	.	.	.	.
ERA 43	1	1	.	1	.	1	1	.
Simpson Cove	.	.	.	.	.	.	.	.
ERA 45	.	.	.	.	.	.	.	.
Arey Lagoon, Hula Hula River	.	.	.	.	.	.	.	.
Whaling Area/Kaktovik	.	.	.	.	.	.	.	.
Thetis Island	.	.	.	.	.	.	.	.
Spy Island	.	.	.	.	.	.	.	.
Leavitt and Pingok Islands	.	.	.	.	.	1	.	.
Bertoncini, Bodfish and Cottle Islands	1	1	1	1	.	1	1	.
Long Island	1	1	1	1	.	1	1	.
Egg and Stump Islands	2	1	1	1	1	1	1	1
West Dock	2	1	1	1	1	2	1	1
Reindeer and Argo Islands	1	1	1	1	1	1	1	1
Cross and No Name Islands	1	1	.	1	.	2	1	.
Endicott Causeway	3	3	3	3	2	2	2	2
Narwhal, Jeanette and Karluk Islands	4	4	2	3	1	4	2	1
Tigvariak Island	3	4	4	4	5	3	4	5
Pole and Belvedere Islands	3	3	2	3	3	3	4	2
Challenge, Alaska, Dutchess and Northstar Islands	2	2	1	2	1	2	2	1
Flaxman Island	1	1	.	1	.	1	1	.

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table B-5. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **winter season** will contact a certain environmental resource area within **60 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	23	23	26	23	26	22	23	26
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	1	1	.	1	.	1	1	.
Ice/Sea Segment 8	1	1	.	1	1	1	1	1
Ice/Sea Segment 9	2	2	1	2	1	2	2	1
Ice/Sea Segment 10	2	2	1	2	1	2	2	1
Ice/Sea Segment 11	1	1	1	1	1	1	1	1
Ice/Sea Segment 12	.	.	.	.	.	.	.	.
Ice/Sea Segment 13	.	.	.	.	.	.	.	.
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	.	.	.	.	.	.	.	.
ERA 18	.	.	.	.	.	.	.	.
ERA 19	.	.	.	.	.	.	.	.
ERA 20	1	1	1	1	.	1	1	.
ERA 21	1	1	1	1	.	1	1	.
Simpson Lagoon	1	1	1	1	1	2	1	1
Gwyder Bay	1	.	1	1	1	1	1	1
ERA 24	1	1	.	1	.	1	1	.
Prudhoe Bay	1	1	1	1	1	2	1	1
ERA 26	2	2	4	3	3	3	3	3
ERA 27	3	3	4	3	4	2	3	4
ERA 28	5	5	4	4	3	5	4	3
ERA 29	2	1	1	1	.	2	2	.
ERA 30	3	3	2	2	1	3	2	1
ERA 31	3	2	2	2	1	3	2	1
Boulder Patch I	7	6	5	7	5	8	7	5
Boulder Patch II	17	17	9	14	7	15	13	7
ERA 34	3	3	17	4	10	2	3	9
ERA 35	14	10	5	12	5	33	15	4
ERA 36	5	7	9	8	14	6	8	33
ERA 37	7	5	4	6	3	9	8	3
ERA 38	4	4	2	4	3	4	5	3
ERA 39	4	4	2	4	2	5	4	2
ERA 40	4	4	2	4	2	4	3	2
ERA 41	1	1	1	1	1	2	2	1
Canning River	.	.	.	.	.	1	.	.
ERA 43	1	1	.	1	1	1	1	1
Simpson Cove	.	.	.	.	.	.	.	.
ERA 45	.	.	.	.	.	.	.	.
Arey Lagoon, Hula Hula River	.	.	.	.	.	.	.	.
Whaling Area/Kaktovik	.	.	.	.	.	.	.	.
Thetis Island	1	1	.	.	.	1	1	.
Spy Island	1	1	1	1	.	1	1	.
Leavitt and Pingok Islands	1	1	1	1	.	1	1	.
Bertoncini, Bodfish and Cottle Islands	2	2	2	2	1	2	2	1
Long Island	2	1	1	1	1	2	1	1
Egg and Stump Islands	3	2	2	3	2	2	2	2
West Dock	3	2	1	2	2	3	2	2
Reindeer and Argo Islands	3	2	2	1	1	2	1	1
Cross and No Name Islands	2	2	1	2	.	3	2	.
Endicott Causeway	4	5	6	4	4	4	4	4
Narwhal, Jeanette and Karluk Islands	6	6	3	4	1	6	3	1
Tigvariak Island	4	6	6	6	8	5	7	8
Pole and Belvedere Islands	5	4	2	5	3	5	5	3
Challenge, Alaska, Dutchess and Northstar Islands	3	3	2	3	2	3	3	2
Flaxman Island	1	1	.	1	.	1	1	.

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table B-6. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **winter season** will contact a certain environmental resource area within **360 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	98	98	99	98	99	98	98	99
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	1	1	1	1	1	1	1	1
Ice/Sea Segment 7	1	1	1	1	1	1	1	1
Ice/Sea Segment 8	1	1	1	1	1	1	1	1
Ice/Sea Segment 9	4	4	3	4	2	4	4	2
Ice/Sea Segment 10	5	4	3	4	2	4	4	1
Ice/Sea Segment 11	5	5	4	5	5	6	6	6
Ice/Sea Segment 12	1	1	.	1	.	1	1	.
Ice/Sea Segment 13	.	.	.	.	.	.	.	.
ERA 14	.	.	.	.	.	.	.	.
ERA 15	1	.	.	.	.	1	.	.
ERA 16	2	2	1	2	.	2	1	.
ERA 17	4	4	4	3	2	4	3	2
ERA 18	4	3	3	3	1	4	3	1
ERA 19	2	2	2	2	1	2	2	1
ERA 20	4	4	3	3	1	5	4	1
ERA 21	7	7	4	6	2	8	6	2
Simpson Lagoon	14	13	9	12	7	15	13	6
Gwyder Bay	2	1	4	3	4	4	3	4
ERA 24	8	8	4	7	3	8	7	2
Prudhoe Bay	5	5	3	4	4	6	4	4
ERA 26	8	9	15	12	12	11	12	11
ERA 27	12	13	14	14	15	9	13	15
ERA 28	20	17	17	16	11	23	17	11
ERA 29	11	8	5	9	2	12	11	2
ERA 30	11	9	7	9	3	11	9	2
ERA 31	11	10	6	8	2	13	8	1
Boulder Patch I	25	20	18	23	17	28	25	17
Boulder Patch II	59	58	33	48	23	50	46	23
ERA 34	9	10	55	11	33	4	8	32
ERA 35	46	34	15	39	15	**	49	13
ERA 36	16	22	34	25	45	19	25	**
ERA 37	23	19	16	20	8	31	27	7
ERA 38	15	15	7	14	10	14	18	9
ERA 39	15	13	8	14	8	17	14	7
ERA 40	16	15	6	15	7	16	13	7
ERA 41	7	7	5	8	6	9	8	6
Canning River	4	3	1	3	1	4	3	1
ERA 43	4	4	4	6	4	7	6	4
Simpson Cove	2	2	2	3	2	3	3	2
ERA 45	2	2	1	2	2	3	3	2
Arey Lagoon, Hula Hula River	1	1	1	1	1	2	1	2
Whaling Area/Kaktovik	1	1	1	1	1	1	1	.
Thetis Island	5	5	4	4	2	5	4	2
Spy Island	5	5	4	4	2	6	4	2
Leavitt and Pingok Islands	8	8	6	7	3	9	7	3
Bertoncini, Bodfish and Cottle Islands	15	15	10	13	7	17	14	6
Long Island	8	7	6	6	3	11	7	2
Egg and Stump Islands	12	9	6	11	7	8	8	7
West Dock	11	7	5	9	9	12	10	10
Reindeer and Argo Islands	10	8	8	5	4	10	5	4
Cross and No Name Islands	11	7	5	8	1	12	9	1
Endicott Causeway	15	18	21	16	13	13	15	13
Narwhal, Jeanette and Karluk Islands	21	19	8	12	3	19	11	2
Tigvariak Island	13	18	22	19	26	15	20	27
Pole and Belvedere Islands	16	15	6	16	9	16	19	9
Challenge, Alaska, Dutchess and Northstar Islands	13	12	6	12	7	12	11	6
Flaxman Island	7	5	1	7	2	8	7	2

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table B-7. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **winter season** will contact a certain land segment within **1 day**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
25	1	.	.	.	.	.	.	.
26	1	1	4	1	4	1	1	3

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table B-8. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **winter season** will contact a certain land segment within **3 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
25	1	1	1	1	1	1	1	1
26	2	2	6	2	4	2	2	4
27	1	1	.	1	1	1	1	1
28	.	.	.	.	1	1	.	1

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table B-9. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **winter season** will contact a certain land segment within **10 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
23	1	1	.	1	.	1	1	.
25	1	1	1	1	1	1	1	1
26	3	3	6	3	6	3	3	5
27	1	2	1	1	1	1	1	1
28	1	1	1	1	1	1	1	1

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table B-10. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **winter season** will contact a certain land segment within **30 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
22	.	.	.	.	1	.	.	1
23	2	1	.	1	1	2	1	1
25	2	2	2	2	1	1	2	1
26	5	5	10	5	8	4	5	8
27	2	2	1	2	3	3	3	3
28	1	1	1	1	1	1	1	1
29	.	1	.	.	.	.	.	.

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table B-11. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **winter season** will contact a certain land segment within **60 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
21	1	1	1	1	1	1	1	1
22	1	.	1	1	1	1	1	1
23	3	2	1	2	1	3	2	2
24	.	1	.	1	.	.	1	.
25	3	3	2	3	2	2	3	2
26	8	9	15	8	12	6	7	12
27	4	4	3	4	5	5	5	6
28	2	2	2	2	2	2	2	2
29	1	1	.	1	1	.	.	1
30	.	.	.	.	.	.	1	.

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table B-12. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **winter season** will contact a certain land segment within **360 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
16	3	2	2	2	1	2	2	.
17	2	2	2	2	1	2	2	1
18	1	1	1	.	.	1	1	.
19	1	1	1	1	1	2	1	1
20	1	1	1	1	.	1	1	.
21	7	7	4	7	4	7	6	4
22	4	2	3	4	4	6	4	4
23	11	8	3	8	5	10	8	6
24	1	3	2	3	2	1	3	1
25	7	9	8	9	6	7	8	5
26	27	30	46	28	37	18	24	36
27	13	12	10	14	20	19	17	22
28	7	7	10	7	8	8	8	8
29	5	6	2	4	4	3	3	4
30	3	2	1	3	1	4	4	.
31	1	.	.	1	.	1	.	.
32	2	3	2	3	2	3	2	2
33	1	1	1	2	3	3	3	3
34	.	.	.	1	.	1	1	.

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Appendix C

Conditional Probabilities of Contact to Environmental Resource Areas and Land Segments in the Summer Season

Table C-1. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **summer season** will contact a certain environmental resource area within **1 day**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	27	34	54	32	48	23	30	48
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	.	.	.	.	.	.	.	.
Ice/Sea Segment 8	.	.	.	.	.	.	.	.
Ice/Sea Segment 9	.	.	.	.	.	.	.	.
Ice/Sea Segment 10	.	.	.	.	.	.	.	.
Ice/Sea Segment 11	.	.	.	.	.	.	.	.
Ice/Sea Segment 12	.	.	.	.	.	.	.	.
Ice/Sea Segment 13	.	.	.	.	.	.	.	.
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	.	.	.	.	.	.	.	.
ERA 18	.	.	.	.	.	.	.	.
ERA 19	.	.	.	.	.	.	.	.
ERA 20	.	.	.	.	.	.	.	.
ERA 21	.	.	.	.	.	.	.	.
Simpson Lagoon	.	.	.	.	.	.	.	.
Gwyder Bay	.	.	.	.	.	.	.	.
ERA 24	.	.	.	.	.	.	.	.
Prudhoe Bay	1	2	.	2	.	1	1	.
ERA 26	3	3	.	2	1	2	2	1
ERA 27	9	9	2	7	3	6	6	2
ERA 28	2	1	1	1	1	1	1	1
ERA 29	.	.	.	.	.	.	.	.
ERA 30	.	.	.	.	.	.	.	.
ERA 31	.	.	.	.	.	.	.	.
Boulder Patch I	10	7	2	5	2	7	4	1
Boulder Patch II	52	47	12	36	9	39	31	9
ERA 34	10	15	50	13	29	8	11	27
ERA 35	29	13	4	19	5	**	28	5
ERA 36	12	19	15	21	36	12	22	**
ERA 37	6	5	3	6	3	10	7	3
ERA 38	4	4	1	5	2	6	7	3
ERA 39	1	1	.	1	.	1	1	.
ERA 40	.	.	.	.	.	.	.	.
ERA 41	.	.	.	.	.	.	.	.
Canning River	.	.	.	.	.	.	.	.
ERA 43	.	.	.	.	.	.	.	.
Simpson Cove	.	.	.	.	.	.	.	.
ERA 45	.	.	.	.	.	.	.	.
Arey Lagoon, Hula Hula River	.	.	.	.	.	.	.	.
Whaling Area/Kaktovik	.	.	.	.	.	.	.	.
Thetis Island	.	.	.	.	.	.	.	.
Spy Island	.	.	.	.	.	.	.	.
Leavitt and Pingok Islands	.	.	.	.	.	.	.	.
Bertoncini, Bodfish and Cottle Islands	.	.	.	.	.	.	.	.
Long Island	.	.	.	.	.	.	.	.
Egg and Stump Islands	.	1	.	.	.	.	.	.
West Dock	1	1	.	1	.	.	.	.
Reindeer and Argo Islands	.	.	.	.	.	.	.	.
Cross and No Name Islands	.	.	.	.	.	.	.	.
Endicott Causeway	14	15	10	13	9	10	11	8
Narwhal, Jeanette and Karluk Islands	6	4	1	4	.	5	3	.
Tigvariak Island	10	11	7	13	13	10	14	15
Pole and Belvedere Islands	1	1	1	2	2	2	3	2
Challenge, Alaska, Dutchess and Northstar Islands	1	.	.	.	.	1	.	.
Flaxman Island	.	.	.	.	.	.	.	.

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table C-2. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **summer season** will contact a certain environmental resource area within **3 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	54	59	72	59	70	51	58	70
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	.	.	.	.	.	.	.	.
Ice/Sea Segment 8	.	.	.	.	.	.	.	.
Ice/Sea Segment 9	.	.	.	.	.	.	.	.
Ice/Sea Segment 10	1	.	.	.	.	1	.	.
Ice/Sea Segment 11	1	1	.	1	1	1	1	1
Ice/Sea Segment 12	.	.	.	.	.	.	.	.
Ice/Sea Segment 13	.	.	.	.	.	.	.	.
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	.	.	.	.	.	.	.	.
ERA 18	.	.	.	.	.	.	.	.
ERA 19	.	.	.	.	.	.	.	.
ERA 20	.	.	.	.	.	.	.	.
ERA 21	.	.	.	.	.	.	.	.
Simpson Lagoon	2	1	1	1	.	1	1	.
Gwyder Bay	2	2	.	2	.	2	1	1
ERA 24	1	1	.	1	.	1	1	.
Prudhoe Bay	4	4	2	4	2	4	4	2
ERA 26	10	9	5	9	6	9	9	5
ERA 27	15	15	8	15	9	14	14	9
ERA 28	7	6	3	5	3	7	5	3
ERA 29	3	3	2	3	1	3	2	1
ERA 30	6	6	3	5	2	5	4	2
ERA 31	4	4	4	3	3	4	3	3
Boulder Patch I	18	13	9	13	9	18	13	9
Boulder Patch II	59	53	18	42	16	48	38	15
ERA 34	15	20	51	17	32	13	15	30
ERA 35	33	18	7	22	9	**	30	9
ERA 36	14	22	18	25	39	15	26	**
ERA 37	12	8	6	10	6	16	11	6
ERA 38	10	10	3	11	5	11	12	6
ERA 39	6	6	3	6	4	8	7	4
ERA 40	4	3	2	4	3	4	4	3
ERA 41	1	1	.	1	1	1	1	1
Canning River	.	.	.	.	.	1	.	.
ERA 43	.	.	.	.	.	1	.	.
Simpson Cove	.	.	.	.	.	.	.	.
ERA 45	.	.	.	.	.	.	.	.
Arey Lagoon, Hula Hula River	.	.	.	.	.	.	.	.
Whaling Area/Kaktovik	.	.	.	.	.	.	.	.
Thetis Island	.	.	.	.	.	.	.	.
Spy Island	.	.	.	.	.	.	.	.
Leavitt and Pingok Islands	.	.	1	.	1	.	.	1
Bertoncini, Bodfish and Cottle Islands	2	2	1	2	1	2	2	1
Long Island	3	2	1	2	1	3	2	1
Egg and Stump Islands	6	5	2	5	2	5	5	2
West Dock	7	6	2	6	3	6	5	3
Reindeer and Argo Islands	4	3	1	3	1	3	3	1
Cross and No Name Islands	2	2	2	2	2	2	2	1
Endicott Causeway	19	20	14	18	14	18	18	14
Narwhal, Jeanette and Karluk Islands	11	8	6	9	5	12	9	5
Tigvariak Island	14	16	11	18	18	15	20	19
Pole and Belvedere Islands	6	5	4	6	6	7	7	6
Challenge, Alaska, Dutchess and Northstar Islands	2	2	2	2	2	3	2	2
Flaxman Island	1	1	.	1	.	1	1	.

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table C-3. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **summer season** will contact a certain environmental resource area within **10 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	74	78	86	78	85	73	77	84
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	1	1	1	1	1	1	1	1
Ice/Sea Segment 8	1	1	.	1	.	1	1	.
Ice/Sea Segment 9	3	3	2	3	2	2	2	2
Ice/Sea Segment 10	3	3	1	2	2	3	2	2
Ice/Sea Segment 11	5	5	2	5	3	6	5	3
Ice/Sea Segment 12	1	1	.	1	1	1	1	1
Ice/Sea Segment 13	1	1	1	1	1	1	1	1
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	1	.	.	.	1	1	1	1
ERA 18	.	.	.	.	.	.	.	.
ERA 19	.	.	1	.	1	.	.	.
ERA 20	2	1	1	1	1	1	1	1
ERA 21	2	2	.	2	.	2	2	1
Simpson Lagoon	5	5	3	5	3	5	4	2
Gwyder Bay	5	4	3	4	4	4	5	4
ERA 24	4	3	2	3	2	4	3	2
Prudhoe Bay	6	6	3	5	4	6	5	4
ERA 26	12	12	8	11	9	13	12	9
ERA 27	17	17	10	17	11	17	16	11
ERA 28	11	9	5	8	6	11	9	6
ERA 29	7	7	5	6	4	8	7	4
ERA 30	11	10	7	10	7	12	10	7
ERA 31	7	7	7	7	6	8	7	6
Boulder Patch I	21	16	12	16	12	21	16	12
Boulder Patch II	60	54	19	44	18	50	41	18
ERA 34	16	21	52	19	33	14	17	31
ERA 35	34	18	8	23	10	**	31	10
ERA 36	16	24	19	26	40	17	27	**
ERA 37	13	9	7	11	7	17	13	7
ERA 38	12	11	4	12	6	13	14	6
ERA 39	13	11	5	11	6	14	12	6
ERA 40	10	8	4	8	6	11	9	6
ERA 41	6	5	3	4	4	6	5	4
Canning River	2	1	1	1	1	2	1	1
ERA 43	3	3	2	3	2	4	3	2
Simpson Cove	1	.	.	.	.	1	.	.
ERA 45	3	2	2	2	2	3	2	2
Arey Lagoon, Hula Hula River	1	.	.	.	.	1	.	.
Whaling Area/Kaktovik	1	1	1	1	2	2	2	2
Thetis Island	1	1	1	1	1	1	1	1
Spy Island	1	1	1	1	1	1	1	1
Leavitt and Pingok Islands	3	2	2	2	2	3	2	2
Bertoncini, Bodfish and Cottle Islands	6	6	3	5	3	6	5	3
Long Island	8	6	4	6	4	7	6	3
Egg and Stump Islands	9	8	5	9	6	9	9	6
West Dock	9	8	4	8	5	9	8	5
Reindeer and Argo Islands	7	6	3	6	3	7	6	3
Cross and No Name Islands	6	6	4	5	4	6	5	4
Endicott Causeway	21	21	15	20	16	21	20	16
Narwhal, Jeanette and Karluk Islands	13	10	6	10	7	14	10	7
Tigvariak Island	16	17	12	20	19	17	21	20
Pole and Belvedere Islands	8	8	6	8	7	9	9	8
Challenge, Alaska, Dutchess and Northstar Islands	5	4	3	4	4	6	4	4
Flaxman Island	3	2	1	2	1	4	3	1

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table C-4. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **summer season** will contact a certain environmental resource area within **30 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	87	88	94	88	92	86	88	92
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	3	2	1	2	2	3	2	2
Ice/Sea Segment 8	1	1	.	1	.	1	1	.
Ice/Sea Segment 9	3	3	2	3	2	3	3	2
Ice/Sea Segment 10	4	4	3	4	3	5	4	3
Ice/Sea Segment 11	8	7	3	6	4	8	7	4
Ice/Sea Segment 12	3	3	1	3	2	3	3	2
Ice/Sea Segment 13	3	3	2	3	2	3	3	2
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	.	.	.	.	.	.	.	.
ERA 17	1	1	1	1	1	1	1	1
ERA 18	1	1	1	1	1	1	1	1
ERA 19	2	1	2	2	2	2	2	2
ERA 20	4	3	2	3	3	3	3	2
ERA 21	6	5	3	4	3	5	4	3
Simpson Lagoon	8	7	5	7	4	8	6	4
Gwyder Bay	6	5	3	5	4	5	5	4
ERA 24	7	5	4	5	4	7	5	4
Prudhoe Bay	6	6	3	6	4	7	6	4
ERA 26	13	12	8	12	9	14	13	9
ERA 27	18	17	10	17	11	18	17	11
ERA 28	11	9	6	9	6	12	9	6
ERA 29	10	9	6	9	5	11	9	5
ERA 30	13	12	8	12	8	14	12	8
ERA 31	9	8	7	8	6	10	9	6
Boulder Patch I	21	16	12	16	12	22	17	12
Boulder Patch II	60	54	20	45	19	51	42	18
ERA 34	17	22	52	19	33	15	17	31
ERA 35	34	19	9	24	11	**	32	10
ERA 36	17	24	19	27	40	18	28	**
ERA 37	14	10	7	12	8	18	14	7
ERA 38	12	12	5	13	6	14	14	7
ERA 39	15	13	7	14	8	17	14	8
ERA 40	13	10	6	11	7	13	11	8
ERA 41	9	7	5	7	6	9	7	6
Canning River	3	2	1	2	2	3	2	2
ERA 43	7	5	2	5	4	8	6	4
Simpson Cove	2	1	.	1	.	2	1	.
ERA 45	5	4	2	4	3	5	4	3
Arey Lagoon, Hula Hula River	1	1	.	1	1	1	1	1
Whaling Area/Kaktovik	3	2	1	2	2	3	2	2
Thetis Island	2	1	1	1	1	1	1	1
Spy Island	2	2	2	2	2	2	2	1
Leavitt and Pingok Islands	4	3	2	3	3	4	3	3
Bertoncini, Bodfish and Cottle Islands	8	7	5	7	5	8	7	4
Long Island	9	7	5	7	4	9	7	4
Egg and Stump Islands	10	9	5	9	6	10	10	6
West Dock	10	8	4	8	5	10	9	5
Reindeer and Argo Islands	8	6	4	7	4	8	6	4
Cross and No Name Islands	7	7	5	6	4	7	6	4
Endicott Causeway	22	22	16	20	16	21	20	16
Narwhal, Jeanette and Karluk Islands	15	12	7	12	8	15	12	8
Tigvariak Island	17	18	12	20	19	17	22	21
Pole and Belvedere Islands	10	9	6	9	8	11	11	8
Challenge, Alaska, Dutchess and Northstar Islands	6	5	3	5	4	7	5	5
Flaxman Island	4	3	1	3	2	5	3	2

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table C-5. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **summer season** will contact a certain environmental resource area within **60 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	93	94	97	94	95	93	94	95
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	.	.	.	.	.	.	.	.
Ice/Sea Segment 7	3	3	2	3	2	3	3	2
Ice/Sea Segment 8	2	1	1	1	1	1	1	1
Ice/Sea Segment 9	4	4	2	4	2	4	3	2
Ice/Sea Segment 10	5	4	3	4	3	5	4	3
Ice/Sea Segment 11	8	7	3	7	5	8	7	5
Ice/Sea Segment 12	3	3	1	3	2	3	3	2
Ice/Sea Segment 13	3	3	2	3	2	3	3	2
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	1	.	.	.	.	1	1	.
ERA 17	1	1	1	1	1	1	1	1
ERA 18	2	1	1	1	1	2	1	1
ERA 19	2	2	2	2	2	2	2	2
ERA 20	4	4	2	4	3	4	3	3
ERA 21	7	6	3	5	3	6	5	3
Simpson Lagoon	10	9	6	9	5	10	8	5
Gwyder Bay	6	5	3	5	4	6	5	4
ERA 24	8	7	4	7	4	8	7	5
Prudhoe Bay	7	6	3	6	4	7	6	4
ERA 26	13	13	8	12	9	14	13	9
ERA 27	18	18	10	17	12	18	17	11
ERA 28	12	10	6	9	6	12	10	6
ERA 29	11	10	6	10	6	11	10	6
ERA 30	14	13	8	12	8	14	12	8
ERA 31	9	8	7	8	7	10	9	7
Boulder Patch I	21	17	12	17	12	22	17	12
Boulder Patch II	61	54	20	45	19	51	42	18
ERA 34	17	22	52	19	33	15	17	31
ERA 35	34	19	9	24	11	**	32	10
ERA 36	17	24	19	27	40	18	28	**
ERA 37	15	11	8	12	8	19	14	8
ERA 38	12	12	5	13	6	14	14	7
ERA 39	16	14	7	14	8	18	15	9
ERA 40	14	11	6	11	8	15	12	8
ERA 41	9	8	5	8	6	10	8	7
Canning River	3	2	2	2	2	4	2	2
ERA 43	7	6	3	6	4	8	7	5
Simpson Cove	2	1	.	1	.	2	1	1
ERA 45	5	4	2	4	3	6	5	4
Arey Lagoon, Hula Hula River	2	1	1	1	1	2	1	1
Whaling Area/Kaktovik	3	3	2	2	2	3	3	2
Thetis Island	2	2	1	2	2	2	2	2
Spy Island	3	2	2	2	2	3	2	2
Leavitt and Pingok Islands	4	3	3	4	3	4	4	3
Bertoncini, Bodfish and Cottle Islands	9	8	5	8	5	9	8	5
Long Island	9	7	5	7	4	9	7	4
Egg and Stump Islands	10	9	6	10	6	10	10	6
West Dock	10	8	4	9	5	10	9	5
Reindeer and Argo Islands	8	7	4	7	4	8	7	4
Cross and No Name Islands	8	7	5	7	5	8	6	5
Endicott Causeway	22	22	16	20	16	22	21	16
Narwhal, Jeanette and Karluk Islands	15	12	8	12	8	16	12	8
Tigvariak Island	17	18	12	21	19	18	22	21
Pole and Belvedere Islands	10	9	7	10	8	12	11	8
Challenge, Alaska, Dutchess and Northstar Islands	6	5	4	6	5	8	6	5
Flaxman Island	5	4	1	4	2	6	4	2

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table C-6. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **summer season** will contact a certain environmental resource area within **360 days**, Liberty DPP.

Environmental Resource Area	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
Land	94	94	97	94	96	94	94	96
Spring Lead 1	.	.	.	.	.	.	.	.
Spring Lead 2	.	.	.	.	.	.	.	.
Spring Lead 3	.	.	.	.	.	.	.	.
Spring Lead 4	.	.	.	.	.	.	.	.
Spring Lead 5	.	.	.	.	.	.	.	.
Ice/Sea Segment 6	1	1	.	1	1	1	1	1
Ice/Sea Segment 7	3	3	2	3	2	4	3	2
Ice/Sea Segment 8	2	1	1	1	1	2	1	1
Ice/Sea Segment 9	4	4	2	4	2	4	3	2
Ice/Sea Segment 10	5	5	3	4	3	6	5	3
Ice/Sea Segment 11	8	7	4	7	5	9	7	5
Ice/Sea Segment 12	3	3	1	3	2	3	3	2
Ice/Sea Segment 13	3	3	2	3	2	3	3	2
ERA 14	.	.	.	.	.	.	.	.
ERA 15	.	.	.	.	.	.	.	.
ERA 16	1	.	.	.	.	1	1	.
ERA 17	1	1	1	1	1	1	1	1
ERA 18	2	1	1	1	1	2	1	1
ERA 19	2	2	2	2	2	2	2	2
ERA 20	4	4	2	4	3	4	4	3
ERA 21	7	6	3	5	3	6	5	3
Simpson Lagoon	10	9	6	9	5	10	8	5
Gwyder Bay	6	5	3	5	4	6	5	4
ERA 24	8	7	4	7	4	8	7	5
Prudhoe Bay	7	6	3	6	4	7	6	4
ERA 26	14	13	8	12	9	14	13	9
ERA 27	18	18	10	18	12	18	17	11
ERA 28	12	10	6	9	6	12	10	6
ERA 29	11	10	6	10	6	12	10	6
ERA 30	14	13	8	12	8	14	12	8
ERA 31	9	8	7	8	7	10	9	7
Boulder Patch I	21	17	12	17	12	23	17	12
Boulder Patch II	61	54	20	45	19	51	42	18
ERA 34	17	22	52	19	33	15	17	31
ERA 35	34	19	9	24	11	**	32	10
ERA 36	17	24	19	27	40	18	28	**
ERA 37	15	11	8	13	8	19	14	8
ERA 38	13	12	5	13	6	14	14	7
ERA 39	16	14	7	15	8	18	15	9
ERA 40	14	11	6	12	8	15	12	8
ERA 41	9	8	5	8	6	10	8	7
Canning River	3	2	2	2	2	4	2	2
ERA 43	7	6	3	6	4	9	7	5
Simpson Cove	2	1	.	1	.	2	1	1
ERA 45	5	4	3	4	4	6	5	4
Arey Lagoon, Hula Hula River	2	1	1	1	1	2	1	1
Whaling Area/Kaktovik	3	3	2	3	2	4	3	2
Thetis Island	2	2	1	2	2	2	2	2
Spy Island	3	2	2	2	2	3	2	2
Leavitt and Pingok Islands	4	3	3	4	3	4	4	3
Bertoncini, Bodfish and Cottle Islands	10	8	5	8	5	9	8	5
Long Island	9	7	5	7	4	10	7	4
Egg and Stump Islands	10	9	6	10	6	10	10	6
West Dock	10	8	5	9	5	10	9	5
Reindeer and Argo Islands	8	7	4	7	4	8	7	4
Cross and No Name Islands	8	7	5	7	5	8	6	5
Endicott Causeway	22	22	16	20	16	22	21	16
Narwhal, Jeanette and Karluk Islands	15	12	8	12	8	16	12	8
Tigvariak Island	17	18	12	21	19	18	22	21
Pole and Belvedere Islands	10	9	7	10	8	12	11	8
Challenge, Alaska, Dutchess and Northstar Islands	7	5	4	6	5	8	6	5
Flaxman Island	5	4	1	4	2	6	4	2

Note: ** = Greater than 99.5 percent; . = Less than 0.5 percent.

Table C-7. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **summer season** will contact a certain land segment within **1 day**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
25	4	5	6	4	4	3	3	4
26	17	22	46	20	38	14	18	36
27	5	5	1	7	4	5	7	6
28	1	1	1	1	1	1	2	2

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table C-8. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **summer season** will contact a certain land segment within **3 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
21	1	1	.	.	.	1	.	.
22	1	1	.	1	.	1	1	.
23	4	3	1	3	1	3	3	1
24	1	2	.	2	.	2	2	.
25	9	9	9	9	8	9	8	8
26	22	29	53	27	45	19	25	43
27	9	8	4	10	8	10	11	10
28	4	5	4	6	6	5	6	7
29	1	1	.	1	.	1	1	.
30	1	.	.	.	.	1	.	.

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table C-9. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **summer season** will contact a certain land segment within **10 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
21	2	2	1	2	1	2	2	.
22	4	3	3	4	3	4	4	3
23	6	5	2	5	3	6	5	3
24	2	3	1	3	2	3	2	2
25	12	11	11	11	9	12	11	9
26	25	32	55	29	47	22	28	45
27	10	9	5	12	9	11	13	11
28	6	6	6	7	8	6	7	8
29	3	2	1	2	1	3	2	1
30	1	1	.	1	.	1	1	.
32	1	.	.	.	.	1	.	.
33	1	1	.	1	.	1	1	.
34	.	.	1	.	1	.	.	.

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table C-10. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **summer season** will contact a certain land segment within **30 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
19	1	1	.	.	.	1	.	.
20	1	.	.	1	1	1	1	1
21	3	3	2	3	2	3	3	1
22	5	4	3	5	4	6	5	4
23	7	5	3	5	3	6	5	3
24	3	4	2	3	2	3	3	2
25	12	12	12	11	10	12	11	10
26	26	33	55	30	47	22	28	45
27	11	10	5	13	10	12	14	11
28	7	7	6	8	8	7	8	8
29	3	3	1	3	1	4	3	1
30	2	1	1	1	1	2	1	1
31	1	1	1	1	1	1	1	1
32	2	1	.	1	.	2	1	.
33	2	1	.	1	1	2	1	1
34	1	1	1	1	1	1	1	1

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table C-11. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **summer season** will contact a certain land segment within **60 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
16	1	1	.	1	.	1	1	.
19	2	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1
21	4	4	2	4	2	4	3	2
22	6	4	3	5	4	6	6	4
23	7	5	3	5	3	7	6	3
24	3	4	2	4	2	3	3	2
25	13	12	12	12	10	13	11	10
26	26	33	55	30	47	23	28	45
27	11	10	5	13	10	13	14	11
28	7	7	7	8	8	7	8	8
29	4	3	1	3	2	4	3	2
30	2	2	1	2	1	3	2	1
31	1	1	1	1	1	1	1	1
32	2	1	1	1	.	2	1	.
33	2	1	1	2	1	2	2	1
34	2	1	1	1	1	2	1	1

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

Table C-12. Conditional probabilities (expressed as percent chance) that an oil spill starting at a particular location in the **summer season** will contact a certain land segment within **360 days**, Liberty DPP.

Land Segment	Hypothetical Spill Location							
	LI	PP1	PP2	AP1	AP2	TI	TP1	TP2
16	1	1	.	1	.	1	1	.
19	2	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1
21	4	4	2	4	2	4	3	2
22	6	4	3	5	4	6	6	4
23	7	5	3	5	3	7	6	3
24	3	4	2	4	2	3	3	2
25	13	12	12	12	10	13	11	10
26	26	33	55	30	47	23	28	45
27	11	10	5	13	10	13	14	11
28	7	7	7	8	8	7	8	8
29	4	3	1	3	2	4	3	2
30	2	2	1	2	1	3	2	1
31	1	1	1	1	1	1	1	1
32	2	1	1	1	.	2	1	.
33	2	1	1	2	1	3	2	1
34	2	1	1	1	1	2	1	1

Notes: ** = Greater than 99.5 percent; . = less than 0.5 percent.
Rows with all values less than 0.5 percent are not shown.

The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Royalty Management Program** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.