Oil Spills: Are They Still a Major Problem?

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Underwood Engineering

Nancy E. Kinner
University Professor
Professor, Civil & Environmental Engineering
Coastal Response Research Center

Exxon Valdez Tanker Spill: 1989

Photo credit: NOAA
Deepwater Horizon Spill: 2010

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Number of spills per year on average:
- 1970-79: 28.5 spills per year on average
- 1980-89: 9.8 spills per year on average
- 1990-99: 7.7 spills per year on average
- 2000-09: 6.2 spills per year on average
- 2010-16: 3.7 spills per year on average
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Passage [NWPF], following Canada’s Arctic coast. In the future, a Central Arctic Ocean route across the pole may also be possible. Whichever Arctic route a vessel takes, they will be required to travel through the study area since the Bering Strait is the only marine passage between the Arctic Ocean and the North Pacific. Simplified versions of these three routes are shown in Figure 7.1.

Figure 7-1 Emerging Arctic shipping routes (based on Arctic Council, 2009). The NWPF is one portion of the larger Northwest Passage, but is the focus here because of our attention to the western portion and the Bering Strait and Sea.
Figure 7-2 Comparison of distance traveled by vessels on routes from Hamburg, Germany to Hong Kong, China and Vancouver, Canada (Rognlies, 2000)
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Figure 6: U.S./Russian Maritime Boundary. Source: McNelis, 1991

Figure 4-2 Bulk carrier (left) and tanker (right) routes through the Bering Sea (based on July 2010 – August 2013 satellite AIS data compiled by the Aleutian Islands and Bering Sea LCC, Wildlife Conservation Society, and University of Alaska Fairbanks’ SNAP using eXactEarth data). For more information on these data, see https://suspicio.org/
**2008 – 2012 Arctic Activity**

- Total Vessels in the Arctic:
  - 2008: 120
  - 2009: 130
  - 2010: 160
  - 2011: 190
  - 2012: 200

- Bering Strait Transits:
  - 2008: 210
  - 2009: 260
  - 2010: 430
  - 2011: 410
  - 2012: 480

Figure 8: Bering Strait Traffic 2008-2012. Source: USCG

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**Figure E5.2** Percentage of overall weighted oil exposure attributed to activities. Note that the 46% of Tankers calling at U.S. ports (or lightering) does not include those serving Red Dog mine.

- Tankers calling at U.S. ports or lightering to barge 46%
- Vessels calling at Red Dog 19%
- Vessels transiting through the study area 13%
- Cargo vessels calling at Russian ports in study area 6%
- Tankers calling at Russian ports in study area 5%
- All other vessel activity (including Cargo vessels calling at U.S. ports) 10%
Figure 9: All vessel tracks in the Bering Strait/Bering Sea region 2013-2015. Source: Fletcher and Robinson, 2016

Figure 6-5: Vessel tracks by month, with tracks from 2013-2015 combined.
Figure 6-11: Locations in study area where lightering from tankers to barges may have occurred based on vessel tracks observed, 2013-2015


Figure 10: Vessels operating in the U.S. and Russian zones by type and draft. Source: Fletcher and Robinson, 2016
Table 4-6: Operating days associated with Cargo: Bulk, Cargo: Other, and Tanker activities assigned to the Russian zone

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>CARGO: BULK</th>
<th>CARGO: OTHER</th>
<th>TANKERS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russian fisheries</td>
<td>--</td>
<td>143</td>
<td>16</td>
<td>159</td>
</tr>
<tr>
<td>Calling on Russian port</td>
<td>31</td>
<td>1,433</td>
<td>325</td>
<td>1,790</td>
</tr>
<tr>
<td>Transiting</td>
<td>25</td>
<td>270</td>
<td>135</td>
<td>434</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>1,846</td>
<td>477</td>
<td>2,383</td>
</tr>
</tbody>
</table>


Table 5-1: Summary of Aleutian Island and Bering Sea Spills in ADEC database from August 1994 - March 2012 (ADEC, 2012)

<table>
<thead>
<tr>
<th>Vessel Type</th>
<th>Number of Spills</th>
<th>Total Spill Volume (gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barge</td>
<td>3</td>
<td>502</td>
</tr>
<tr>
<td>Cargo</td>
<td>10</td>
<td>*335,823</td>
</tr>
<tr>
<td>Fishing</td>
<td><strong>55</strong></td>
<td>11,560</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>348,311</td>
</tr>
</tbody>
</table>

*135,712 gallons from MV Selendong Ayu spill in the Aleutian Islands
**55 of these were associated with fishing vessels less than 400 GT
Figure 3: A map of oil leases in the Russian Arctic. Green = Rosneft, red = Gazprom, orange = Lukoil, yellow = others. Source: https://cryopolitics.com/2016/12/30/arctic-oil-russia-pushes-north-as-u-s-blocks-alaska-leasing/

Table 1: Oil Characteristics from Select Russian Fields (Source: EIA)

<table>
<thead>
<tr>
<th>Location</th>
<th>Grade of Crude</th>
<th>API°</th>
<th>% Sulfur Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prirazlomnove</td>
<td>Medium heavy</td>
<td>24</td>
<td>2.3</td>
</tr>
<tr>
<td>Novoportovaskove</td>
<td>Medium light</td>
<td>30-35</td>
<td>0.1</td>
</tr>
</tbody>
</table>
Figure 4: Russia's crude oil and condensate exports by destination, 2015.
Source: U.S. Energy Information Administration based on Russian export statistics and partner country import statistics, Global Trade Tracker.
Source: https://www.eia.gov/beta/international/analysis.cfm?iso=RUS

Figure 5: Russian Crude Exports in 2013 and Calculated Spare Export Capacity.
Source: https://www.eia.gov/dnav/ps/psarnx/rus/annex/a1_2014.htm
Figure 2: Track of tanker from Prirazlomnoye to Rotterdam and the Yamal region.

Figure 4: Russia's crude oil and condensate exports by destination, 2015.
Source: [https://www.eia.gov/beta/international/analysis.cfm?iso=RUS](https://www.eia.gov/beta/international/analysis.cfm?iso=RUS)
Russian Nuclear Icebreaker

Figure 7: Overview of USCG PARS for the Bering Sea. Source: USCG.
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Bering Sea Vessel Traffic Risk analysis, December 2016, Nuka Research & Planning Group, LLC
Figure 3.7 Areas important to ice-based seals in the Bering Sea.

BERING SEA COMMERCIAL FISHERIES

Unless otherwise noted, economic figures are based on Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Bering Sea/Nootka Island Region (Auclair et al., 2015). The most recent economic data are provided where available.
Figure 5.1 Typical oil spread and weathering processes. The way oil behaves when it reaches the marine environment will depend on the oil type and conditions during and after the spill (TOPP Ltd., 2016; NOAA, n.d.-c).

Figure 5.2 Examples of pathways and effects for different species in the presence of spilled oil.

Figure 1: Eastern Arctic Russian Marine Coordination Centers. Source: http://www.arctic-lio.com/nsr_searchandrescue

Figure 2-3 Response resources located around the U.S. Bering Sea. Assets are primarily designed for response to small spills in the marinas, shoreline, or inland areas. Additional assets would be mobilized from other parts of Alaska and the Lower 48 as needed and weather permitting. Map developed based on information from APOA shown in Table. Note: Information is subject to change.
http://crrc.unh.edu/

Nancy E. Kinner, PhD

Professor, Civil & Environmental Engineering
University of New Hampshire
UNH Director, Coastal Response Research Center
Director, Center for Spills & Environmental Hazards

nancy.kinner@unh.edu