WA State Board of Pilotage Commissioners

Industry Update: December 9, 2021 BPC Meeting

Vessel Arrivals

*Up 193 YTD Through November – Comparing to Depressed COVID Numbers Last Year*

- Containers down 9
- Bulkers up 24
- Car Carriers up 23
- Cruise/Passenger up 100
- Tankers/ATB’s up 19 (up 15 in November)

Note: Container vessel arrival numbers continue to fluctuate due to the supply chain bottlenecks; suspension of weekly services, changes in services, blank sailings, exta loaders, and sweepers. As mentioned last month, some weekly services have been suspended until further notice. The total amount of time a vessel is in queue, at anchor, drifting or at the dock are considerations in such decisions in addition to evaluating diversions to another port with all that entails (vessel loaded for a particular sequence of port calls, then diverting). Sweepers are vessels dedicated to picking up empties and several have been deployed to the west coast mostly destined for LA/LB.

Container Vessel Queuing: at Anchor, Drifting or Slow Steaming

- Worth repeating: Vessels destined for T18 in Seattle are being informed weeks ahead of scheduled berth slots so that voyage planning can be adjusted to minimize time at anchor, time drifting and fuel use if slow steaming.
- As of the time of this writing (December 1st), there were only 2 container vessels at anchor in the Puget Sound area (recall the peak was 14 with others drifting or doing racetracks in the SJDF on occasion).
- LALB has implemented a queuing system to queue vessels based on day of departure from the previous port. The total number of container vessels at anchor or drifting off of LALB peaked at 86 and is now (at the time of this writing) approaching 50.
- Oakland’s backlog of container ships at anchor or drifting offshore was eliminated due in large part to skipped port calls; recently the backlog has built up slightly again.
- Ongoing supply chain issues involves import containers not being picked up from the terminal in a timely fashion; that reduces the utilization level of the terminal and in turn reduces the speed with which the terminal can work vessels.
Labor Talks to Start in 2022 at Congested West Coast Ports
By Paul Berger, Wall Street Journal
U.S. shippers struggling with supply-chain gridlock on the West Coast face new concerns in the coming year as dockworkers and marine terminals gird for talks on a new labor contract. The private companies that operate port facilities from Washington state to Southern California are due to begin negotiations next year on a multiyear agreement with the union representing 22,400 dockworkers to replace the contract that expires in July 2022, raising the potential for new turmoil over bargaining that has been highly contentious in previous years.

The talks with the International Longshore and Warehouse Union, which happen about every six years, led to severe labor disruptions and shipping delays during the last cycle in 2014 and 2015. This time, the discussions expected to begin early next year will follow some of the worst seaport congestion in memory, as a pandemic-driven imports surge has overwhelmed container terminals and triggered record backlogs of container ships off the ports of Los Angeles and Long Beach.

Maersk Issues First Green Bond to Help Fund Methanol-Powered Newbuilds
Mike Schuler gCaptain
The 10-year, EUR 500 million (USD $678 million) green bond comes under the umbrella of Maersk’s Green Finance Framework. The bond will help fund Maersk’s first feeder vessel and the ground-breaking series of 8 large ocean-going containerships, which will be capable of operating on carbon neutral methanol by 2023 and 2024, respectively.

The transaction, which was placed on Thursday, was well received by investors and was several times oversubscribed with a final order book of EUR 3.7 billion (USD $4.2 bn). The transaction priced at coupon of 0.75%, the lowest coupon ever for Maersk... shipowners have been busy placing orders for newbuilds, making 2021 now the most active year ever for new containership orders. But as others expand their order books, Maersk has mainly remained on the sidelines as it focusses on decarbonizing its operations instead of investing in additional fossil-fuel powered ships. Maersk placed its only shipbuilding order of the year in August for eight methanol-fueled ships representing an investment of $1.4 billion.

“We don’t believe in more fossil fuels,” said Morten Bo Christiansen, vice president and head of decarbonization, during an interview earlier this year.

Amazon, Walmart among 9 companies to receive FTC order for supply chain data
By Shefali Kapadial, Supply Chain Dive
Dive Brief:
- The Federal Trade Commission will order nine major retailers, wholesalers and CPGs to hand over data on supply chain challenges to “shed light on the causes behind ongoing supply chain disruptions,” the agency said Monday.

- The nine companies are Amazon, Associated Wholesale Grocers, C&S Wholesale Grocers, Kraft Heinz, Kroger, McLane, Procter & Gamble, Tyson Foods and Walmart. The firms have 45 days to respond to the FTC’s order.
  The FTC did not respond when asked why it chose these specific companies.

- The companies will have to provide internal documents related to supply chain strategies, pricing decisions and supplier selection. The FTC order asks for the primary factors disrupting procurement, transportation and distribution of products, in addition to the most affected inputs and suppliers, as well as steps to workaround disruptions.

Challenges up and down the supply chain have grabbed the attention of the public sector. The FTC is the latest agency seeking to unearth the causes of disruption.
First Glimpse at October’s TEU Numbers

Up or down?

In a November 8 press release, the National Retail Federation and Global Port Tracker projected that inbound container loads in October would total 2.19 million TEUs, down 1.2% from a year ago. “That year-over-year decline would be the first since July 2020, after which unusually high import volumes began to arrive when stores closed by the pandemic reopened and retailers worked to meet pent-up consumer demand and to stock up for the holidays,” observed the NRF’s release.

A more positive tone was sounded in an email posted on November 18 by box counter John D. McCown, whose eponymous McCown Report claimed that October saw inbound loaded TEU traffic at the nation’s ten largest container ports increase by 1.2% over a year earlier.

To be sure, the Global Port Tracker takes into account three Florida ports (Miami, Port Everglades, and Jacksonville) not covered by the McCown Report. That in itself could make for a world of difference, but the discrepancy’s more immediate cause appears to be that the McCown Report expected 81,955 loaded inbound TEUs to show up at the Port of Oakland in October when in fact the port itself is laying claim to discharging only 69,295 laden TEUs.

How closely the October results released by the ports and these two forecasters remains to be seen. Here at the West Coast Trade Report, we eschew speculating about statistics. As we take pains to remind our readers, the TEU tallies cited in this newsletter are not derived from proprietary algorithms or from information obtained from undisclosed sources but instead represent the actual TEU counts reported by the North American seaports we survey. These ports typically take anywhere from a few days to a few weeks to report their monthly container trade statistics. Because West Coast ports are usually usually more nimble in compiling and releasing their monthly TEU counts than are ports elsewhere in the country, these “First Glimpse” figures may give a misleading indication of the latest trends. Still, we feel that the TEU counts we post more or less represent the official record.

So what are we seeing so far? A year-over-year dip in import containers or an upward nudge?

What we do know is that the Ports of Long Beach and Los Angeles have reported a combined 6.2% decline in inbound loads from a year earlier, while the Port of Oakland sustained a 20.3% drop in inbound loads. Further up the Pacific Coast, the Northwest Seaport Alliance Ports of Seattle and Tacoma recorded a 7.2% year-over-year gain in laden imports. Over the border, Prince Rupert’s containerized import volume was down 14.0% from a year earlier. Elsewhere, Houston enjoyed a 12.0% increase, while along the Atlantic Seaboard inbound loads
were up 12.5% at Virginia, 11.6% at Charleston, 11.4% at Port Everglades, and 11.2% at Savannah.

Honors for being the first U.S. port to post its October figures once again go to the Port of Boston, which saw negative growth in both directions of trade. Import loads at the New England gateway were down by 47.8% from last October and by 59.7% from October 2019. Export loads similarly slumped by 50.2% from a year earlier and by 49.9% from two years ago. Overall container traffic (loads + empties) declined to 11,846 TEUs, off 47.0% from last year and 61.3% from October 2019.

The first major port to post its October numbers was Long Beach, which handled an oddly round 385,000 inbound loads and a more ragged 122,214 outbound loads. However, outbound loads were up 6.6% year-over-year but down 7.2% from two Octobers ago. Total traffic amounted to 789,716 TEUs, 2.1% below the 806,603 total TEUs the port handled a year earlier but up 14.7% from October of pre-pandemic 2019. YTD, Long Beach has handled 7,884,565 TEUs (loads + empties), a 21.0% gain over last year and 23.8% more than it had moved in October 2019.

Next door, the Port of Los Angeles took a more leisurely approach to releasing its container statistics for October but at length posted a sharp 7.8% drop in inbound loads from a year ago. As at Long Beach, the declines were not because there were fewer containers waiting to be discharged, it was that there was less and less room available to accommodate them. A better guide to the port’s performance is that inbound loads this October were 19.0% higher than in the last arguably normal October in 2019. On the other hand, exports of cargo-bearing boxes continued to shrink at the port, with outbound loads down 31.7% from a year earlier and by 30.0% from October 2019, when 42,081 more loaded TEUs left the port than during this October. Empty outbound container traffic in October was up by 2.9% year-over-year but up by 47.6% over October 2019. YTD, total TEU traffic at the Port of LA amounted to 9,079,561 TEUs, up 22.0% over this point last year and by 15.5% over two Octobers ago.

In California, the Port of Oakland saw its inbound loads grow by 12.0% over last October and by 36.9% over the same month in 2019. However, Oakland's traffic in outbound loads slipped by 2.3% from a year earlier and by 13.2% from two Octobers ago. Total container movements through the Texas port this October amounted to 328,486 TEUs, 10.9% more than a year earlier and 27.0% above the port's October 2019 volume.

The numbers from the Northwest Seaport Alliance Ports of Seattle and Tacoma showed a 7.2% year-over-year gain in import loads, which also represented a 12.2% improvement over October 2019. Outbound loads, meanwhile, were similarly down 9.8% from a year earlier and 26.9% from two years earlier. Total international

First Glimpse at October’s TEU Numbers Continued
First Glimpse at October’s TEU Numbers  Continued

Container traffic through the two ports in the year to date (2,488,237 TEUs) was up 8.7% from the first ten months of last year but down by 4.5% from the same period in 2019.

Up in British Columbia, Vancouver saw its trade in inbound loads (172,170 TEUs) slide by 10.9% from a year earlier but rise by 26.4% from October 2019. Export traffic at Vancouver (69,185 TEUs) dropped by 23.1% from a year earlier and by 20.8% from October 2019. The total number of TEUs processed at the port YTD amounted to 3,185,381, up 12.5% and 11.0%, respectively over the two previous years. Further north, the Port of Prince Rupert continued to struggle in October, with import loads (57,891 TEUs) down 14.0% year-over-year but up a slender 0.4% from October 2019. On the other hand, export loads (16,565 TEUs) were up 8.1% from the year before and by 19.0% from October 2019. Total container traffic at the Canadian port in October (110,130 TEUs) dropped by 9.0% from a year earlier but was 8.4% higher than in October 2019. YTD, Prince Rupert has handled a total of 884,729 TEUs, down 5.4% from last year and down 2.8% from this juncture in 2019.

Detailing the September 2021 TEU Numbers

First, some housekeeping notes. We have been obliged to suspend our efforts to include TEU data from the Ports of Manzanillo and Lazaro Cardenas because of timeliness and transparency issues.

Due to the COVID-19 pandemic’s ongoing impact on global trade, we will continue to offer Exhibits 1-3 with columns comparing the container numbers for the latest month for which complete statistics are available with the same month in the two preceding calendar years. We also compare the numbers on a YTD basis.

According to the National Retail Federation (NRF), the U.S. ports covered by Global Port Tracker handled 2.14 million Twenty-Foot Equivalent Units in September. That was down 5.9% from the preceding month but up 1.4% year-over-year. May of this year (2.33 million TEUs) remains the busiest month on record for containerized imports.

As our Exhibit 1 shows, 2,207,700 inbound loads entered the U.S. ports we track, with U.S. West Coast ports handling 1,059,361 TEUs in September, down 3.9% (-42,760 TEUs) from the previous year while up 7.7% (+75,756 TEUs) from the September before that. At the same time, the U.S. East Coast ports we monitor collectively reported handling 1,004,162 inbound loads, a 5.7% (+54,355 TEUs) gain over last September as well as an 18.3% (+155,454 TEUs) increase over September 2019. On the Gulf Coast, Houston’s gain in import loads easily compensated for a sharp drop in inbound loads through New Orleans. The same was not true, however, in British Columbia where an uptick in laden import TEUs at Vancouver was not able to balance off a plunge in import containers at Prince Rupert.

As for the containerized export trade, the proliferation of red ink in Exhibit 2 testifies that traffic up and down the Pacific Coast has been not robust. Only the two smaller California ports – the Port of Hueneme and the Port of San Diego – recorded year-over-year increases. Outbound loads from the two San Pedro Bay ports were down 23.2% (-56,452 TEUs) from a year earlier and down 26.4% (-67,483 TEUs) from two Septembers ago. Outbound loads at Oakland (-13,471 TEUs), the NWSA ports (-9,770 TEUs), Vancouver (-21,644 TEUs), and Prince Rupert (-1,678 TEUs) all declined from a year earlier. Collectively, USWC ports handled 310,795 loaded outbound TEUs in September. Through the first nine months of this year, USWC ports sent 3,232,872 laden TEUs abroad, 301,538 fewer loaded TEUs than they had last year at this point and 592,170 fewer TEUS than in the first three quarters of 2019.

East Coast ports fared somewhat better with container exports, shipping 478,075 laden TEUs in September, just 99 TEUs more than they had a year earlier. Year to date, USEC ports handled 4,734,109 export loads, a 7.2% gain over 2020 but 1.3% off 2019 levels.
<table>
<thead>
<tr>
<th>Port</th>
<th>Sep 2021</th>
<th>Sep 2020</th>
<th>% Change</th>
<th>Sep 2019</th>
<th>Sep 2021 YTD</th>
<th>Sep 2020 YTD</th>
<th>% Change</th>
<th>Sep 2019 YTD</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Los Angeles</strong></td>
<td>468,059</td>
<td>471,795</td>
<td>-0.8%</td>
<td>402,320</td>
<td>4,257,305</td>
<td>3,394,744</td>
<td>25.4%</td>
<td>3,579,938</td>
<td>18.9%</td>
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<tr>
<td><strong>Long Beach</strong></td>
<td>370,230</td>
<td>405,618</td>
<td>-8.7%</td>
<td>354,919</td>
<td>3,475,766</td>
<td>2,807,183</td>
<td>23.8%</td>
<td>2,804,859</td>
<td>23.9%</td>
</tr>
<tr>
<td><strong>San Pedro Bay</strong></td>
<td>838,289</td>
<td>877,413</td>
<td>-4.5%</td>
<td>757,239</td>
<td>7,733,071</td>
<td>6,201,927</td>
<td>24.7%</td>
<td>6,384,797</td>
<td>21.1%</td>
</tr>
<tr>
<td><strong>Oakland</strong></td>
<td>81,789</td>
<td>93,914</td>
<td>-12.9%</td>
<td>131,451</td>
<td>1,101,728</td>
<td>899,629</td>
<td>22.5%</td>
<td>1,058,982</td>
<td>104.0%</td>
</tr>
<tr>
<td><strong>NWSA</strong></td>
<td>122,798</td>
<td>122,543</td>
<td>0.2%</td>
<td>131,451</td>
<td>1,101,728</td>
<td>899,629</td>
<td>22.5%</td>
<td>1,058,982</td>
<td>104.0%</td>
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<tr>
<td><strong>Port of Hueneme</strong></td>
<td>10,210</td>
<td>3,197</td>
<td>219.4%</td>
<td>3,117</td>
<td>71,764</td>
<td>34,582</td>
<td>107.5%</td>
<td>44,902</td>
<td>59.8%</td>
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<tr>
<td><strong>Port of San Diego</strong></td>
<td>6,275</td>
<td>5,054</td>
<td>24.2%</td>
<td>6,902</td>
<td>60,745</td>
<td>56,147</td>
<td>8.2%</td>
<td>53,679</td>
<td>13.2%</td>
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<tr>
<td><strong>USWC Totals</strong></td>
<td>1,059,361</td>
<td>1,102,121</td>
<td>-3.9%</td>
<td>983,615</td>
<td>9,786,333</td>
<td>7,933,245</td>
<td>23.4%</td>
<td>8,280,340</td>
<td>18.2%</td>
</tr>
<tr>
<td><strong>Boston</strong></td>
<td>4,960</td>
<td>13,208</td>
<td>-62.4%</td>
<td>11,608</td>
<td>102,870</td>
<td>115,567</td>
<td>-35.2%</td>
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<tr>
<td><strong>NYNJ</strong></td>
<td>379,190</td>
<td>374,649</td>
<td>1.2%</td>
<td>315,866</td>
<td>2,776,346</td>
<td>2,841,441</td>
<td>20.2%</td>
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<tr>
<td><strong>Maryland</strong></td>
<td>41,993</td>
<td>46,057</td>
<td>-8.8%</td>
<td>45,026</td>
<td>379,426</td>
<td>399,732</td>
<td>-3.6%</td>
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<tr>
<td><strong>Virginia</strong></td>
<td>152,197</td>
<td>121,115</td>
<td>25.7%</td>
<td>114,643</td>
<td>1,232,110</td>
<td>1,035,121</td>
<td>19.0%</td>
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<tr>
<td><strong>South Carolina</strong></td>
<td>98,208</td>
<td>90,399</td>
<td>8.6%</td>
<td>90,111</td>
<td>936,774</td>
<td>1,035,121</td>
<td>9.0%</td>
<td>806,448</td>
<td>16.7%</td>
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<tr>
<td><strong>Georgia</strong></td>
<td>233,275</td>
<td>212,517</td>
<td>9.8%</td>
<td>183,466</td>
<td>1,614,177</td>
<td>1,673,186</td>
<td>23.5%</td>
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<tr>
<td><strong>Jaxport</strong></td>
<td>25,017</td>
<td>27,736</td>
<td>-9.8%</td>
<td>27,309</td>
<td>231,473</td>
<td>267,100</td>
<td>-9.4%</td>
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<tr>
<td><strong>Port Everglades</strong></td>
<td>27,136</td>
<td>24,835</td>
<td>9.3%</td>
<td>25,594</td>
<td>217,964</td>
<td>239,790</td>
<td>12.1%</td>
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<tr>
<td><strong>Miami</strong></td>
<td>42,186</td>
<td>39,291</td>
<td>7.4%</td>
<td>35,085</td>
<td>304,045</td>
<td>362,202</td>
<td>14.5%</td>
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<tr>
<td><strong>USEC Totals</strong></td>
<td>1,044,162</td>
<td>949,807</td>
<td>5.7%</td>
<td>848,708</td>
<td>7,312,577</td>
<td>7,740,587</td>
<td>16.8%</td>
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<tr>
<td><strong>New Orleans</strong></td>
<td>8,790</td>
<td>12,565</td>
<td>-30.0%</td>
<td>11,225</td>
<td>103,678</td>
<td>104,065</td>
<td>-8.3%</td>
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<td><strong>Houston</strong></td>
<td>135,387</td>
<td>121,508</td>
<td>11.4%</td>
<td>106,270</td>
<td>910,279</td>
<td>932,437</td>
<td>26.7%</td>
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<tr>
<td><strong>USGC Totals</strong></td>
<td>144,177</td>
<td>134,073</td>
<td>7.5%</td>
<td>117,495</td>
<td>1,013,957</td>
<td>1,036,502</td>
<td>23.2%</td>
<td></td>
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<tr>
<td><strong>Vancouver</strong></td>
<td>164,750</td>
<td>156,189</td>
<td>5.5%</td>
<td>156,289</td>
<td>1,274,463</td>
<td>1,308,784</td>
<td>12.1%</td>
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<tr>
<td><strong>Prince Rupert</strong></td>
<td>46,430</td>
<td>60,601</td>
<td>-23.4%</td>
<td>63,970</td>
<td>465,556</td>
<td>501,079</td>
<td>-20.5%</td>
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<tr>
<td><strong>BC Totals</strong></td>
<td>211,180</td>
<td>216,790</td>
<td>-2.6%</td>
<td>220,259</td>
<td>1,740,019</td>
<td>1,809,863</td>
<td>3.1%</td>
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<tr>
<td><strong>US/BC Totals</strong></td>
<td>2,418,880</td>
<td>2,402,791</td>
<td>0.7%</td>
<td>2,170,077</td>
<td>17,999,798</td>
<td>18,867,292</td>
<td>16.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>US Total</strong></td>
<td>2,207,700</td>
<td>2,186,001</td>
<td>1.0%</td>
<td>1,949,818</td>
<td>16,259,779</td>
<td>17,057,429</td>
<td>17.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>USWC/BC</strong></td>
<td>1,270,541</td>
<td>1,318,911</td>
<td>-3.7%</td>
<td>1,203,874</td>
<td>9,673,264</td>
<td>10,090,203</td>
<td>15.5%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Individual Ports
## Exhibit 2

### September 2021 - Outbound Loaded TEUs at Selected Ports

<table>
<thead>
<tr>
<th>Port</th>
<th>Sep 2021</th>
<th>Sep 2020</th>
<th>% Change</th>
<th>Sep 2019</th>
<th>% Change</th>
<th>Sep 2021 YTD</th>
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<th>Sep 2019 YTD</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles</td>
<td>75,714</td>
<td>130,397</td>
<td>-41.9%</td>
<td>130,769</td>
<td>-41.2%</td>
<td>932,280</td>
<td>1,136,290</td>
<td>-18.0%</td>
<td>1,347,073</td>
<td>-30.8%</td>
</tr>
<tr>
<td>Long Beach</td>
<td>110,787</td>
<td>112,556</td>
<td>-1.6%</td>
<td>123,215</td>
<td>-10.1%</td>
<td>1,091,963</td>
<td>1,111,553</td>
<td>-1.8%</td>
<td>1,092,069</td>
<td>-0.10%</td>
</tr>
<tr>
<td>San Pedro Bay Totals</td>
<td>186,501</td>
<td>242,953</td>
<td>-23.2%</td>
<td>253,984</td>
<td>-26.4%</td>
<td>2,024,243</td>
<td>2,247,843</td>
<td>-9.9%</td>
<td>2,439,142</td>
<td>-17.0%</td>
</tr>
<tr>
<td>Oakland</td>
<td>62,203</td>
<td>75,674</td>
<td>-17.8%</td>
<td>72,058</td>
<td>-13.7%</td>
<td>661,157</td>
<td>685,771</td>
<td>-3.6%</td>
<td>687,203</td>
<td>-3.8%</td>
</tr>
<tr>
<td>NWSA</td>
<td>57,169</td>
<td>66,939</td>
<td>-14.6%</td>
<td>82,148</td>
<td>30.4%</td>
<td>522,767</td>
<td>589,744</td>
<td>-11.4%</td>
<td>684,558</td>
<td>-23.6%</td>
</tr>
<tr>
<td>Port of Hueneme</td>
<td>4,376</td>
<td>799</td>
<td>447.7%</td>
<td>779</td>
<td>461.7%</td>
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<td>8,642</td>
<td>135.0%</td>
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<td>706</td>
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<td>4,495</td>
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<td>191,756</td>
<td>209,325</td>
<td>-8.4%</td>
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<td>788,980</td>
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<td>-14.6%</td>
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<td>-33.5%</td>
<td>980,736</td>
<td>1,133,390</td>
<td>-13.5%</td>
<td>1,171,266</td>
<td>-16.3%</td>
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<td>Vancouver</td>
<td>67,798</td>
<td>89,442</td>
<td>-24.2%</td>
<td>90,304</td>
<td>-24.9%</td>
<td>704,458</td>
<td>782,883</td>
<td>-10.0%</td>
<td>856,013</td>
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<td>Prince Rupert</td>
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<td>-12.3%</td>
<td>13,370</td>
<td>-10.2%</td>
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<td>146,609</td>
<td>-18.9%</td>
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<td>BC Totals</td>
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<td>-22.6%</td>
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<td>929,492</td>
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<td>US/Canada Total</td>
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<td>1,132,015</td>
<td>-2.7%</td>
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<td>10,014,602</td>
<td>-2.4%</td>
<td>10,794,176</td>
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<td>US Total</td>
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<td>-15.1%</td>
<td>8,947,717</td>
<td>9,085,110</td>
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<td>-23.9%</td>
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<td>4,463,902</td>
<td>-9.1%</td>
<td>4,826,614</td>
<td>-16.0%</td>
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</table>

Source: Individual Ports
Exhibit 3 shows that the U.S. mainland ports we monitor handled 42,918,226 total TEUs (loaded + empty) this year through September. That was up 20.8% (+7,393,297 TEUs) over the same period last year. It was also up 15.4% (+5,721,919 TEUs) over the first three quarters of 2019.

For What It’s Worth
The declared value of containerized imports entering U.S. mainland ports in this year’s third quarter totaled $243.37 billion. Nominally, this was up 16.7% from the same period last year and up 15.5% from the $210.77 billion in containerized imports reported in the third quarter of 2019. The two San Pedro Bay ports together handled imports valued at $82.61 billion, up 6.3% from $77.72 billion the year before and up 10.9% from the $74.49 billion they had handled in the third quarter of pre-pandemic 2019.

Given the fall-off in outbound loaded TEUs from pre-pandemic levels, the declared value of containerized exports remained almost unchanged in nominal terms. This year’s third quarter $67.46 billion in containerized exports was slightly below the $67.66 billion reported in the same nine months of 2019.

Weights and Values
Following along with different ways of gauging containerized trade, we offer here two alternative measures – the declared weight and value of the goods loaded into those TEUs. The percentages in the following exhibits are derived from data compiled by the U.S. Commerce Department that are normally published with a five-week time-lag.

Exhibit 3 shows how the three major USWC gateways have been faring with respect to their respective shares of containerized imports discharged at

<table>
<thead>
<tr>
<th>Exhibit 3</th>
<th>September 2021 Total TEUs (Loaded and Empty) Handled at Selected Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sep 2021</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>8,176,917</td>
</tr>
<tr>
<td>Long Beach</td>
<td>7,094,849</td>
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<tr>
<td>San Pedro Bay Ports</td>
<td>15,271,766</td>
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<tr>
<td>NYNJ</td>
<td>6,659,082</td>
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<td>Georgia</td>
<td>4,148,117</td>
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<td>Vancouver</td>
<td>2,858,235</td>
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<tr>
<td>NWSA</td>
<td>2,803,355</td>
</tr>
<tr>
<td>Virginia</td>
<td>2,588,066</td>
</tr>
<tr>
<td>Houston</td>
<td>2,507,000</td>
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<td>Montreal</td>
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<td>JaxPort</td>
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<td>779,323</td>
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<td>Philadelphia</td>
<td>555,161</td>
</tr>
<tr>
<td>New Orleans</td>
<td>378,660</td>
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<td>Boston</td>
<td>152,436</td>
</tr>
<tr>
<td>Hueneme</td>
<td>160,166</td>
</tr>
<tr>
<td>Port of San Diego</td>
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</tr>
<tr>
<td>Portland, Oregon</td>
<td>71,435</td>
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<tr>
<td>US/Canada Total</td>
<td>47,836,735</td>
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<td>US Mainland Only</td>
<td>42,918,226</td>
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</table>

Source Individual Ports
mainland U.S. seaports in September. Although the five major USWC maritime gateways clearly dominate the movement of containers through ports in the states of California, Oregon, and Washington, smaller USWC ports have boosted the major ports’ combined share of containerized import tonnage through mainland U.S. ports by 1.5-2.0%. In September, the total USWC share of containerized import tonnage through mainland ports was 37.7%, 1.9% higher than the 35.8% share jointly held by the USWC Big Five.

The Port of Hueneme and the Port of San Diego are important ports-of-entry for refrigerated containers laden with fresh fruit imports from Central and South America. And Oregon’s Port of Portland is gradually re-building its international container trade, with the number of total TEUs handled in September (7,364 TEUs) up from just six two years ago. The Port of Everett (Washington) also handles several thousand containers a year, many of them on behalf of a local aircraft manufacturer.

The maritime industry has an affinity for measuring trade in TEUs, but economists generally refer using currency values. So it’s worth noting that the Port of Los Angeles, America’s busiest port overall, ranked just sixth in terms of the dollar value of its containerized exports in September. Its $1.81 billion in containerized exports put it behind Houston ($2.44 billion), PNYNJ ($2.32 billion), Virginia ($2.14 billion), Long Beach ($1.91 billion), and Savannah ($1.82 billion). Two Septembers ago, Los Angeles ranked second behind only Houston as the nation’s top port in terms of the value of containerized exports.

Exhibit 5 displays the shares of U.S. container trade involving the Far East handled by the five major USWC ports. Collectively, these five ports handled 56.9% of all containerized import tonnage that entered U.S. mainland ports from the Far East in September. That was down from last September, when the same five ports received 58.2% of all containerized import tonnage, but it was up from the 56.1% share in the pre-pandemic month of September 2019.

Who Cares Who’s #1, Who’s #5?

Once again, there was no question that the nation’s busiest port in September was the Port of Los Angeles with a total of 903,865 empty and loaded TEUs crossing its docks that month. The neighboring Port of Long Beach was the next busiest port with 748,472 total TEUs. Together, the San Pedro Bay gateway managed to move 1,652,337 TEUs in September. In third came the Port of New York/New Jersey (PNYNJ) with 724,418 total TEUs. Fourth place went to Savannah with 472,062 total TEUs. The Northwest Seaport Alliance Ports of Tacoma and Seattle ranked fifth among the U.S. ports we track with a total of 330,517 total TEUs in September.

Not surprisingly, the Port of Los Angeles was also the nation’s busiest port year-to-date, with 8,176,917 total TEUs through September. Second was Long Beach with 7,094,849 TEUs, while PNYNJ placed third with 6,659,082 TEUs. Fourth-place Savannah handled 4,148,117 total TEUs.
TEUs through the first nine months of this year, while the NWSA ports (2,803,355 TEUs) topped Virginia (2,588,066 TEUs) and Houston (2,507,000 TEUs) for fifth place. (Elsewhere on the continent, Vancouver had handled 2,858,235 total TEUs through the first three quarters of this year.)

Counting loaded boxes only, Los Angeles remained in the lead with 543,773 loaded TEUs in the month of September. Neighboring Long Beach came next with 481,017 loaded TEUs in September, followed by the Port of New York/New Jersey with 479,083 loaded TEUs. Savannah ran well behind with 342,176 loaded TEUs followed by Houston with 205,152 total loads.

In the category of inbound loads in September, Los Angeles (468,059 TEUs) topped PNYNJ (379,190 TEUs) and Long Beach (370,230 TEUs). Inbound loads at fourth place Savannah meanwhile totaled 233,275 TEUs, while fifth place Houston handled 135,387 inbound loaded TEUs.

Once again, export loads were again a different story. The Port of Long Beach led all mainland U.S. ports with 110,787 loaded export TEUs in September, followed closely by Savannah with 108,900 TEUs. PNYNJ came next with 99,893 TEUs, topping Virginia (80,697 TEUs). Los Angeles (75,714 TEUs) claimed fifth place, with Houston trailing behind with 69,765 export loads.

**Mixed Nuts**

Exporters of California' tree nuts posted widely different September numbers.

Almond foreign shipments (163,520,784 pounds in September) were off by 17.2% from a year earlier, with major declines in sales to Europe (-26.0%) and the Asia-Pacific market (-11.1%). On the other hand, exports to the economic powerhouses of Northeast Asia edged up 1.4% over September 2020. Despite the overall decline, this was the second largest September for exports, but 33,867,101 fewer pounds than the record set last year.

Walnuts and pistachio exports were a very different story.

Walnut exports worldwide in September (11,899,000 pounds) were up 43.3% year-over-year and 69.5% over September 2019. 28.6% of all walnut shipments in September went to foreign markets.

**Remarkably, pistachios overtook walnuts as the state's second biggest tree nut export. Pistachio exports in September (61,189,996 pounds) were 171.6% over a year earlier and 139.1% over September 2019. It was the best September by far for pistachio exports. Fully 76.6% of the pistachio crop was shipped abroad in September.**
Finally, a few numbers about the numbers of empties

We have in recent months seen the emergence of a steadily growing army of experts on supply chain issues. The national (i.e., New York-based) and even the international media have developed a keen interest in what’s been going awry in the goods movement business, especially at America’s West Coast seaports. As a result, editors have taken to dispatching reporters to ferret out the facts. Apparently, posing alongside a stack of shipping containers is sufficient to establish one’s authority these days. As a result, the Ports of Long Beach and Los Angeles are now attracting nearly as much worldwide media attention as Britney Spears.

Having lately minted container connoisseurs commenting on ports clogged with containers is not unlike having amateur otolaryngologists talk about nasal mucus. Diagnoses and prescriptions tend to vary widely, usually depending on one’s predispositions or allergies. Among the maritime cognoscenti, where you stand often depends on where you sit along the supply chain. Everyone favors “connecting the dots” in what everyone acknowledges is a very complex set of moving pieces for moving goods from there to here.

Some public officials and trucking industry leaders have taken to blaming shipping lines for stranding thousands of empty containers at or near the nation’s ports. Yet it’s a claim that seems strikingly at odds with what agricultural shippers up and down the West Coast have been alleging. According to exporters of farm produce, shipping lines (“foreign-owned” is the customary dog-whistle increasingly being used to describe the ocean carriers) have been scooping up virtually every empty container and shipping them back to Asia before exporters of patriotically Grown in the USA agricultural commodities can get their hands on them.

It’s a peculiar notion that shipping lines are doing little to address the accumulation of empty containers, especially in Southern California. At a November 16 Port of Los Angeles press conference with U.S. Transportation Secretary Pete Buttigieg, the port’s executive director Gene Seroka reported that shipping lines had already dispatched six additional sweeper ships to pick up 17,500 empty TEUs and that three more were due to arrive to clear away another 2500 boxes. Still, he estimated that there remained some 65,000 empties at the terminals at his ports.

Mr. Seroka noted that many of those empty TEUs have been arriving from regions of the country that do not normally recycle containers through San Pedro Bay. That adds to the challenge the ocean carriers face, but it would be simply incorrect to argue that the shipping lines have been slow to rid the ports of empties. Consider the ports’ September and October container statistics. While we acknowledge that a container discharged in one month might not be turned around and exported later that same month, a look at the balance of box traffic in the two most recent months for which data are available should help better inform public discourse over empties.

In September, 853,292 TEUs (loaded + empties) arrived at the Ports of Los Angeles and Long Beach. That was down 5.4% from the 893,425 inbound TEUs the two ports had handled a year earlier. But outbound empties were meanwhile up by 9.6% to 594,545 TEUs from 542,618 TEUs the year before. Looking a year further back to the more salubrious year of 2019, this September’s inbound traffic was up by 10.2% from two Septembers ago, while the number of outbound empties leaving the two ports jumped by 33.5%.

In October, inbound traffic through San Pedro Bay amounted to 865,843 TEUs, down 6.7% from a year earlier, but outbound empties edged up by 0.8% to 606,052 TEUs from 600,968 TEUs last October. Comparing this October with the pre-pandemic October of 2019, the two ports saw inbound TEUs increase by 11.8% over October 2019, while outbound TEU traffic was up 22.2%.

There’s one more statistic that might be worth introducing into the empty container debate.

In October 2019, the San Pedro Bay ports handled a total of 1,458,614 TEUs of which 51.1% were inbound. A year later, reflecting the sudden import surge that began late that summer, inbound traffic’s share of all container moves at the two ports leapt to 54.8%. But by this October, outbound empties represented 51.2% of the 1,692,360 total TEUs the ports handled that month. So, despite the steady wave of containerized imports that have continued to inundate the ports and the nation’s supply chains, the inbound/outbound balance of container traffic at the San Pedro Bay ports had returned.
Detailing the September 2021 TEU Numbers  Continued

Exhibit 6  
Recent History of Empty TEUs Exports from San Pedro Bay
Source: Ports of Long Beach and Los Angeles

Exhibit 7  
Empty TEU Exports from Major USWC Ports: 2020-2021YTD
Source: Individual Ports

Exhibit 8  
Outbound Loads vs. Empties at Major USWC Ports: 2020-2021YTD
Source: Individual Ports
to a ratio more characteristic of normal times because of the faster growth in outbound loads.

Hard statistical data are unlikely to make anyone happy, but maybe a couple of graphs will help illuminate the controversy over the whereabouts of all those empty containers.

**Exhibit 6** deals specifically with the situation at the nation’s largest port complex. It clearly reveals a huge upswing in the number of outbound empties from the Ports of Long Beach and Los Angeles. **Exhibit 7** displays the rise of empty TEUs from the major U.S. West Coast seaports since January of last year. **Exhibit 8** compares the volume of loaded versus empty TEUs that have been leaving the five major U.S. West Coast ports since January of last year.

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**Jock O’Connell’s Commentary:**

**The Orange Groves of Saskatoon**

This column is about climate change, agriculture, and West Coast seaports, but it starts at around 40,000 feet above sea level on a flight from Copenhagen to San Francisco earlier this month. As one does on eleven-hour flights, I tend to glance periodically at the flight monitor to check our location. And so it was that about eight hours into the flight I noticed we were flying over Saskatoon, the largest metropolis in the sparsely populated Canadian Province of Saskatchewan.

Realizing we were so close to Saskatchewan caused me to chuckle as I began wondering how the citrus orchards down there were faring as another winter freeze descended on a land that is north of North Dakota but contains more than 40% of Canada’s cultivated farmland.

Citrus on the prairie? What are you talking about, O’Connell?

Well, you see, some seven or eight years ago, I got a phone call from a gentleman who asked if I could possibly be so kind to put him in touch with executives in California’s fruit processing industry. Yes, I replied, but first who are you? Turns out he was one of those excessively polite Canadians who in this case worked for Saskatchewan’s agricultural ministry.

“We’ve been studying some remarkable projections about global warming [as climate change was known back then] and we think we may have to change our cropping patterns within a few decades.”

You’re not the only ones, I thought. Worrying about climate change was then fast emerging as a growth industry.

But talk about advance planning. Saskatchewan is a place that puts the winter into winter wheat and now they’re thinking citrus. So, after arriving home from SFO, I checked to see whether their cropping patterns up north of the border had begun to shift.

Well, according to the province’s agricultural statistics, it’s not yet growing oranges or lemons or limes, at least in any commercial quantities. Nor are there any traces of cherries or grapes or even tree nuts. With warming temperatures, the local growing season there may be getting a shade longer, but Saskatchewan farming is still mostly about wheat, canola, barley, dairy products, and pulse crops like lentils and chickpeas.

Growers of specialty crops in California, Oregon, and Washington need not fret about competition from Saskatchewan...at least not yet.

To be sure, Canadian climate scientists are continuing to predict warmer winters, longer growing seasons, and beneficially higher yields for the province’s farmers. But, for reasons evident in the North American Drought Monitor shown here, they are also concerned about water supplies.
According to an article I managed to track down in Saskatoon’s local newspaper, a warmer climate without adequate moisture in the soil can involve a nasty tradeoff: “Moisture is a transformative element driving the physics, chemistry and biology of healthy soil. Water brings life. Without it, you’re looking at a pile of lifeless, and increasingly useless, dirt.”

Which gets us back to our side of the 49th parallel, where much of the West is enduring drought conditions ranging from merely Severe to downright Exceptional. Among the areas most affected are the major agricultural regions of central Washington and Oregon along with almost the entire state of California.

The U.S. Department of Agriculture ranks states according to the productive prowess of their growers and ranchers based on their total farm receipts. Collectively, in 2020, U.S. farms took in $357.16 billion. Washington State’s $9.89 billion in farm receipts put it in eleventh place nationally, just behind North Carolina but ahead of Missouri. With $5.06 billion in farm receipts, Oregon ranked 26th between Kentucky and Mississippi. Now here’s something that always surprises a few folks, but America’s leading agricultural state is not Iowa or Kansas or Nebraska or any of the other amber waves of grain states in the nation’s midsection. It is California, whose $49.08 billion in farm receipts last year was roughly double second-place Iowa’s $25.70 billion.

The problem is that much of that revenue is earned by growers in drought-ridden regions in the West, and nowhere is this more evident than in California’s vast Central Valley, whose default condition is basically that of an arid desert. That, of course, was long before an intricate network of dams, reservoirs, aqueducts, and pumping stations brought water to the valley’s farms and turned the region into the most valuable piece of agricultural real estate on the planet. Unfortunately, most of that infrastructure for capturing and distributing water dates back to the middle of the 20th century, when California’s population was less than half what it is now and when climate conditions were far less frenetic.

Dwindling water resources are not the sole problem challenging farms, orchards, and dairies in the western states. The Central Valley’s population is California’s fastest growing. Between now and mid-century, Fresno County’s population is expected to grow by 20.0%, to 1,226,158 from 1,021,649. Kern County should grow in population by 31.1% to 1,207,086 from 920,651. The number of residents in San Joaquin County should increase by 24.9% to 968,662 from 775,350, while neighboring Stanislaus County is anticipated to have 18.9% more residents (668,224) by mid-century. Having more residents not only implies more demand for water but a greater need for housing in a state that still feels uncomfortable about density. And because those who value land by the acre are at a distinct disadvantage vis a vis those who price it at the square-foot, Central Valley growers have every reason to fear their neighbors.

Still, as UCLA climate scientist Daniel Swain has observed, it’s the extreme variability in weather that poses the greater immediate danger to agriculture. “We are seeing the driest of dries, the wettest of wets, and the hottest of hots,” he told a Public Policy Institute of California video conference on November 15. As if Mother Nature wanted to underscore his point, just three weeks earlier parts of drought-stricken Northern California received the most rainfall ever recorded in a single day, enough to prompt the National Weather Service to issue flood warnings.
Commentary Continued

The unprecedented variability in climate also shreds longstanding water management policies. For example, California Department of Water Resources chief Karla Nemeth concedes that her agency’s forecasting models for managing the state’s water supply have been upended by climate change. Not only was last winter’s snow fall in the Sierras less than forecast, the portion of the snowpack that eventually finds its way into the state’s reservoirs was much less than predicted. In more normal times, her department estimates that 60% of the spring and summer runoff will wind up in reservoirs. But this year, that “runoff efficiency rate” was nearer to 20%. More of the runoff had seeped into depleted aquifers or had simply evaporated due to higher-than-normal temperatures in the spring. Circumstances are no longer normal.

So what does this have to do with the ports? Well, consider that California’s most lucrative non-dairy farm product is the almond, over two-thirds of which are exported. And, since only about five percent of all almond exports go to Canada and Mexico, the rest are typically shipped abroad in oceanborne containers. Similarly, a third of Washington State’s apple crop is normally exported each year as are a quarter of its cherry harvest and up to 90% of its wheat. Just over 40% of Oregon’s farm produce likewise go to foreign markets.

To get a firmer understanding of what agriculture in the Pacific Coast states means for West Coast ports, let’s look at the one agricultural export that is largely grown in the West – Edible Fruits and Nuts or EF&N, for short.

Last year, $9.32 billion in EF&N exports left U.S. ports for foreign markets. $8.20 billion (88.0%) of these shipments were containerized. In tonnage terms, 90.9% of 2020 maritime exports of EF&N traveled in containers.

The top six ports handling U.S. exports of EF&N are not unexpectedly all on the U.S. West Coast. Leading the way was the Port of Oakland, which alone has accounted for 56.9% of all EF&N export tonnage from U.S. ports in the first three quarters of 2021. The Port of Los Angeles and Long Beach combined to handle 24.6% of the trade, followed by the Northwest Seaport Alliance Ports of Tacoma and Seattle with a 10.7% share. Next – and ahead of both Houston and Savannah – was the Port of Hueneme with a 1.7% share of the trade.

As Exhibit A reveals, exports of EF&N have been a much bigger business at the Port of Oakland. EF&N exports from the Port of Oakland last year amounted to 1,484,827 metric tons with a value of $5.73 billion.

More critically, while containerized exports of EF&N represented just 2.3% of all containerized export tonnage at the two Southern California ports last year, and 7.7% of all containerized export tonnage from the two Northwest Seaport Alliance ports, they did account for 15.9% of Oakland’s containerized export tonnage in 2020. And where containerized exports of EF&N through the first three quarters of this year were up 2.3% over the same period last year at Los Angeles/Long Beach and down 24.9% at the NWSA ports, the year-over-year increase at Oakland was a robust 11.5%.

Exhibit A

Top Six Gateways for Seaborne U.S. Exports of EF&N: 2010-2020

Source: U.S. Commerce Department
The Port of Oakland’s advantage as a gateway for farm exports stems principally from its proximity to an arc of hyper-productive agricultural enterprises that begins in the wine-soaked Counties of Sonoma and Napa before spilling over into the Sacramento and San Joaquin Valleys before curving back to encompass the Monterey Bay area.

But nature seems bent on threatening that advantage by unleashing a persistent pattern of droughts that have soaked up precious groundwater, higher temperatures that have abused unpicked produce, wildfires that blot out sunlight and taint unharvested fruit, and weather as erratic and unreliable as my uncle Victor’s ’59 Chevy Impala. The port’s export business certainly appears to be the most vulnerable of all the major USWC ports to having West Coast agriculture disrupted by climate change.

For now, though, I hope you all enjoyed a fine celebration of Thanksgiving last Thursday, content in the knowledge that the fresh fruits and nuts you consumed still largely come from this side of the border and not – at least yet – from the fabled groves of Saskatoon.

Disclaimer: The views expressed in Jock’s commentaries are his own and may not reflect the positions of the Pacific Merchant Shipping Association.

The Votes Have All Been Counted – Voters Want Change

By Jordan Royer, PMSA Vice President, External Affairs

Every election has a theme. The one that just completed this month in Washington State appears to be a theme of change. At the Port of Seattle, we will welcome two new commissioners. In Seattle, we have a new Mayor, new City Council member, and a new City Attorney. In fact, the City Attorney-Elect, Ann Davison, is the first Republican to be elected city-wide since 1987. And while it is easier to gauge voter sentiment and messaging in city elections – particularly for Mayor, the results across the board resulted in change.

Of course, bucking the “change” trend is Tacoma. The Port of Tacoma Commission will be unchanged, as all incumbents will return and the Mayor won with a wide margin.

The two new commissioners at the Port of Seattle are Hamdi Mohamed and Toshiko Hasegawa. Ms. Mohamed recently worked for Congresswoman Pramila Jayapal and Toshiko Hasegawa is the Executive Director of the Washington State Commission on Asian Pacific American Affairs. Her father is also long-time State Senator Bob Hasegawa. While they may be new to the port commission, they both have lots of political experience and connections that can be beneficial to the port.

The interesting dynamic will be in policy discussions between the two commissions at the NW Seaport Alliance. There are lots of differences in culture and philosophy between the two cities of Tacoma and Seattle. There has been a natural competition between the two cities over the last 100 years for railroads, museums, stadiums, and containers.

It also should be noted that Mohamed and Hasegawa are replacing two Commissioners, Stephanie Bowman and Peter Steinbrueck, who have each contributed much to the maritime community. Commissioner Bowman was instrumental in creating the NW Seaport Alliance. Commissioner Steinbrueck has been a leader on the environment and the preservation of maritime industrial lands in support of good paying family wage jobs. We should all thank them for their service.

So change is coming. Will it be what the voters asked for? We’ll have to wait and see.
Maritime Leaders Introduce a Plan for Safety and Air Quality

By Jessica Alvarenga, PMSA Manager of Government Affairs

A working group of maritime leaders introduced a plan to reduce the number of idling vessels sitting outside the Ports of Los Angeles and Long Beach while improving maritime safety and air quality.

The pandemic-related increase in cargo volumes have created major impacts throughout the supply chain. Full warehouses, truck driver shortages, and lack of critical equipment like chassis to move cargo have caused cargo to back up on marine terminals. Terminals are filled with containers dwelling over seven days [See graphic below] so there is no room for new arriving vessels to unload causing vessels to idle outside of the ports. The number of vessels idling has been growing dramatically. Last week the ports reached a new record — not a good one — of 83 container vessels at anchor and drifting.

Previously, container vessels were rushing into port to cross the twenty nautical mile mark to be placed on a master queuing list that tracks the order of vessels coming into the ports. This system has been in existence for decades and worked as a fair way to manage labor assignments to load and unload ships, but was causing vessels to race across the Pacific in order to get in line and sit for a week or more. The community and government agencies expressed their concerns about maritime safety and additional emissions from vessels idling outside the harbor.

The Pacific Maritime Association (PMA), the Southern California Marine Exchange, and the Pacific Merchant Shipping Association (PMSA), and their individual member companies, came together to develop a more efficient practice. Effective November 16th, vessels can be placed on the master queuing list upon leaving their last port of departure prior to arriving at the Ports of Los Angeles and Long Beach. This process will allow vessels to slow their speed and delay their arrival on the West Coast closer to their anticipated berthing time. The goal is to reduce vessels at anchor that will improve vessel safety before the onset of winter weather and also reduce both fuel consumption and emissions. Additionally, if vessels arrive more than 72 hours before their berthing time, the vessel master is requested to voluntarily stay outside of a safety and air quality area, ranging from 50-150 miles depending on the direction of travel.

This new strategy is not going to clear the vessels at anchor overnight, but it is expected have an impact over the next several weeks. I’m proud of the industry leaders who worked very hard to quickly develop a fair and transparent system though collaboration.

Interested in membership in PMSA?
Contact Laura Germany for details at: lgermany@pmsaship.com or 510-987-5000.
Import Dwell Time Is Up For October; Rail Dwell Time Is Down

San Pedro Bay Weighted Average Inbound Laden Container Dwell Time in Days

Dwell Time in Days  % > 5 Days

Rail Dwell Time in Days

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The Board of Pilotage Commissioners (BPC) requests the following information be provided to the BPC staff no later than two working days prior to a BPC meeting to give Commissioners ample time to review and prepare possible questions regarding the information provided.

### Activity

<table>
<thead>
<tr>
<th>Activity</th>
<th></th>
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<tr>
<td>Total pilotage assignments:</td>
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<td>Cancellations:</td>
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<tr>
<td>Total ship moves:</td>
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<td>Total delay time:</td>
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<td>2 pilot jobs:</td>
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<td>Reason: PSP GUIDELINES FOR RESTRICTED WATERWAYS</td>
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<tr>
<td>Day of week &amp; date of highest number of assignment:</td>
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<td>28</td>
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<td>Day of week &amp; date of lowest number of assignments:</td>
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<td>Upgrade trips</td>
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<td>3 consecutive night assignments:</td>
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<td>YTD</td>
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### Callback Days/Comp Days

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### Pilots Out of Regular Dispatch Rotation (pilot not available for dispatch during "regular" rotation)

#### A. Training & Continuing Education Programs

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<thead>
<tr>
<th>Start Dt</th>
<th>End Dt</th>
<th>City</th>
<th>Facility</th>
<th>Program Description</th>
<th>Pilot Attendees</th>
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#### B. Board, Committee & Key Government Meetings (BPC, PSP, USCG, USACE, Port & similar)

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<th>End Dt</th>
<th>City</th>
<th>Group</th>
<th>Meeting Description</th>
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<td>Seattle</td>
<td>PSP</td>
<td>Policy Manual</td>
<td>KNU</td>
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<td>2-Nov</td>
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<td>Seattle</td>
<td>PSP</td>
<td>Administrative</td>
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<td>3-Nov</td>
<td>Seattle</td>
<td>PSP</td>
<td>Navsim</td>
<td>MCG, SLI</td>
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<td>3-Nov</td>
<td>3-Nov</td>
<td>Seattle</td>
<td>USCG</td>
<td>FCP</td>
<td>BEN, COL</td>
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<tr>
<td>4-Nov</td>
<td>4-Nov</td>
<td>Seattle</td>
<td>PSP</td>
<td>Policy Manual</td>
<td>COR, JEN, KNU, MYE, ROU, SEM</td>
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<tr>
<td>5-Nov</td>
<td>5-Nov</td>
<td>Seattle</td>
<td>PSP</td>
<td>Women Offshore Conference</td>
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<td>5-Nov</td>
<td>Anacortes</td>
<td>PSP</td>
<td>HollyFrontier</td>
<td>MCG</td>
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<td>8-Nov</td>
<td>8-Nov</td>
<td>Seattle</td>
<td>NOAA</td>
<td>NOAA</td>
<td>LOB, SLI</td>
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<td>9-Nov</td>
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<td>PSP</td>
<td>BOD</td>
<td>ANA, COL, GRD, GRK, KLA, NEW</td>
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<td>PSP</td>
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<td>Seattle</td>
<td>BPC</td>
<td>Vessel Exemption</td>
<td>ANT, MCG</td>
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### 11-Nov 11-Nov Seattle PSP Administrative KLA

### 11-Nov 11-Nov Seattle PSP Navsim MCG, SLI

### 12-Nov 12-Nov Seattle PSP Women Offshore Conference BEN, BOZ

### 12-Nov 14-Nov Seattle PSP Administrative KLA

### 15-Nov 18-Nov Seattle PSP Reference Manual COL, KEN, LOB, MCG, MCN, NIN

### 15-Nov 15-Nov Seattle BPC BPC ANT

### 16-Nov 16-Nov Seattle PSP Rate Committee COL, GAL, GRK, KLA, MOT

### 17-Nov 17-Nov Seattle BPC BPC ANT, BEN, SCR

### 17-Nov 17-Nov Seattle PSP Work/Rest Issues KLA, SCR, VON

### 18-Nov 18-Nov Seattle BPC BPC Prep, BPC ANT, BEN, VON

### 19-Nov 21-Nov Seattle PSP Administrative KLA

### 19-Nov 19-Nov Seattle PSP Legislative VON

### 21-Nov 23-Nov Seattle PSP Watch Schedule HAM, NIN

### 23-Nov 23-Nov Seattle PSP ECHO - WRAS KAL

### 30-Nov 30-Nov Tampa PSP Navtech Conference MCG, SLI

### 30-Nov 30-Nov Grays Harbor BPC TEC ANT, BEN

## C. Other (i.e. injury, not-fit-for-duty status, earned time off, COVID risk)

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<th>Start Dt</th>
<th>End Dt</th>
<th>REASON</th>
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<td>1-Nov</td>
<td>1-Nov</td>
<td>ETO</td>
<td>KEN, MEL, NEW, SOR</td>
</tr>
<tr>
<td>9-Nov</td>
<td>15-Nov</td>
<td>ETO</td>
<td>BOZ, HUP, SEM, SES,</td>
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<tr>
<td>23-Nov</td>
<td>29-Nov</td>
<td>ETO</td>
<td>GAL, GRD, KLA, SLI, VEL</td>
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</table>

### Presentations

If requesting to make a presentation, provide a brief explanation of the subject, the requested amount of

- **Presentations may be deferred if prior arrangements have not been made.**

- **The Board may also defer taking action on issues being presented with less than 1 week notice prior to a schedule Board Meeting to allow adequate time for the Commissioners and the public to review and prepare for discussion.**

### Other Information (Any other information requested or intended to be provided to the BPC)
Grays Harbor District Report

There were 5 arrivals in November for a total of 13 jobs. Year to date through October we have had 63 arrivals for a total of 159 jobs. There are 3 vessels scheduled for December: 2 dry bulk and 1 liquid bulk.

T-2 Update

Dry bulk ship loading operations continue at T-2 utilizing two portable loaders.

Rail Infrastructure

The City of Aberdeen was awarded $2.08 million through the Rebuilding American Infrastructure with Sustainability and Equity (RAISE, formerly known as BUILD) program to fully fund the Preliminary Engineering and Environmental Documentation phases of the Aberdeen US 12 Highway-Rail Separation Project. This funding supplements $1.4 million in existing project funding which includes $200K from the Port of Grays Harbor, $200K from the City of Aberdeen, $300K from Grays Harbor County, and $700K from the State.
SYNOPSIS OF CHANGING VESSEL TRAFFIC TRENDS

ESHB 1578 – Reducing Threats to Southern Resident Killer Whales by Improving the Safety of Oil Transportation

DECEMBER 2021

WASHINGTON STATE
BOARD OF PILOTAGE COMMISSIONERS
2901 3rd Avenue, Suite 500
Seattle, WA 98121
www.pilotage.wa.gov
Publication and Contact Information

This document is available on the Board of Pilotage Commissioners website at:
https://pilotage.wa.gov/oil-transportation-safety.html

The Washington State Department of Ecology Spill Prevention, Preparedness, and Response Program prepared this report for the Board of Pilotage Commissioners. For more information contact:

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Spills Program Prevention Section, Section Manager
Brian.Kirk@ecy.wa.gov
Result for transits of tugs engaged in escort duties .............................................................................. 70
Results for number of oil transfers at facilities & anchorages ................................................................. 73
Review of the last five years of vessel entry data .................................................................................... 75
Answers to Research Questions .................................................................................................................. 80
Summary of Findings ................................................................................................................................. 81
Conclusions .............................................................................................................................................. 84
References ............................................................................................................................................... 85
Appendix A Improving the Safety of Oil Transportation Act Sections 1, 2, and 3 ................................. 1
Appendix B Interagency Agreement between the State of Washington, Department of Ecology and Washington Board of Pilotage Commissioners ................................................................. 1
Appendix C Oil Transportation Safety Committee Charter .................................................................... 1
Appendix D Synopsis of Changing Vessel Traffic Trends Scope of Work .............................................. 1
Appendix E Board of Pilotage Commissioners Interpretive Statement Regarding ESHB 1578 .......... 1
Appendix F Synopsis Terminology .......................................................................................................... 1
Appendix G Maritime Definitions ............................................................................................................ 1
Appendix H Refineries in Study Area ...................................................................................................... 1
Appendix I Anchorages in Study area ...................................................................................................... 1
Appendix J Data Challenges and Mitigation Results ................................................................................ 1
Data Challenges and Mitigation Methods ................................................................................................. 1
Appendix K Transit Data for ATB, Barges > 5,000 DWT and Tankers less than 40,000 DWT ............ 1
Appendix L Articulated Tug/Barge (ATB) ................................................................................................. 1
Appendix M Oil Barges Greater Than 5,000 DWT .................................................................................. 1
Appendix N Oil Barges Less Than 5,000 DWT ......................................................................................... 1
Appendix O Tankers between 5,000 and 40,000 DWT .......................................................................... 1
Appendix P Purpose-built Escort and Ship Assist Tugs ........................................................................... 1
Appendix Q Multi-Purpose Tugs ............................................................................................................... 1

Figures and Tables

Figures
Figure EX- 1 Map of Study area.................................................................................................................. 8
Figure 1 Map of study area ....................................................................................................................... 17
Figure 2 Map of selected waterways and geographic areas in the study area ...................................... 17
Figure 3 Example of Spills Program Integrated Information System (SPIIS) Vessel Arrival and Boarding report for September 1, 2019, to November 30, 2019 ....................................................... 24
Figure 4 Example of vessel information from the website Marine Traffic .............................................. 25
Figure 37 Development of international maritime trade and global output, 2006 – 2020 (UNCTAD, 2020)
Figure 38 Number of entering transits for tankers to Washington and Canadian ports over the past ten years (Ecology, n.d.-a) ................................................................. 77
Figure 39 Vessel entering and transit report (VEAT) data showing ATB transits and entering transits in Puget Sound for the last 10 years ................................................................. 78
Figure 40 Puget Sound barge transits and entering transits for Puget Sound ....................... 79
Figure H 1 Map showing refinery locations in study area ....................................................... 1
Figure I 1 Map showing anchorages in the study area ............................................................ 1
Figure K 1 Rosario Strait transits by vessels newly subject to tug escort requirements, comparing Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021) by month ........................................................................................................ 1
Figure K 2 Haro Strait transits by vessels newly subject to tug escort requirements, comparing Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021) by month ........................................................................................................ 2
Figure K 3 ATB transits Rosario Strait and connected waterways east Year 1 and Year 2 ........ 3
Figure K 4 ATB transits Haro Strait Year 1 and Year 2 ............................................................ 3
Figure K 5 Barges greater than 5,000 DWT transits in Rosario Strait and connected waterways to the east year 1 and year 2 .................................................................................... 4
Figure K 6 Barges greater than 5,000 DWT transits Haro Strait Year 1 and Year 2 ................. 4
Figure K 7 Tankers less than 40,000 DWT transits Rosario Strait and connected waterways east Year 1 and Year 2 ................................................................................................. 5
Figure K 8 Tankers less than 40,000 DWT transits in Haro Strait Year 1 and Year 2 .............. 5

Tables

Table EX - 1 Number and percentage of transits for vessels newly subject to the tug escort requirements in Year 1 (September 1, 2019 to August 31, 2020) and Year 2 (September 1, 2020 to August 31, 2021), in Haro and Rosario Straits ................................................................. 11

Table 1 Synopsis Step matched to Outcome, Data Source and Analysis Method ......................... 20
Table 2 Articulated Tug Barge (ATB) units that transited the study area in the synopsis period 27
Table 3 Oil barges greater than 5,000 DWT that transited the study area in the synopsis period ...................................................................................................................... 27
Table 4 Oil barges less than 5,000 DWT that transited the study area in the synopsis period ....... 28
Table 5 Oil refineries in study area with common name, year constructed, and current capacity in barrels per day (Smith, 2015). ................................................................................................. 45
Table 6 List of anchorages in study area .................................................................................... 47
Table 7 Synopsis data source matched to its challenge, issue, mitigation method, and evaluation of effect on synopsis results .............................................................................................. 53
Table 8 Route Selection for vessels that fall under new escort requirements with change in the number of transits from Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021) ........................................................................................................ 58
Table 9 VEAT data showing the annual increase or decrease in the number of ATB transits year-over-year for Rosario and Haro Straits ......................................................................................... 58
Table 10 Data for Haro Strait ATB transits Year 1 (September 1, 2019, to August 31, 2020) and Year 2 (September 1, 2020, to August 31, 2021).......................................................................................................................... 59
Table 11 VEAT data showing the annual increase or decrease in the number of barges greater than 5,000 DWT transits year-over-year for Rosario and Haro Straits .................................................. 61
Table 12 Barges greater than 5,000 DWT Haro Strait transits, Year 1 (September 1, 2019 to August 31, 2020) and Year 2 (September 1, 2020 to August 31, 2021)...................................................... 62
Table 13 Number of tankers greater than 40,000 DWT transiting crossing lines, including change in number of tankers, from Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021).................................................................................................................... 65
Table 14 Crossing line transit data for tankers greater than 40,000 DWT, including change in number of transits, from Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021).................................................................................................................... 65
Table 15 Transit data for barges less than 5,000 DWT in Rosario and Haro Straits for Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021).......................................................................................................................... 66
Table 16 Rosario ‘engaged in bunkering’ transits for Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021)................................................................. 68
Table 17 Number of purpose-built escort tugs and change from Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021)................................................................. 71
Table 18 Crossing line transit data for purpose-built escort tugs and change from Year 1 to Year 2 71
Table 19 Number of Multi-Purpose tugs, and change, from Year 1 (September 1, 2019, to August 31, 2020) to Year 2 (September 1, 2020, to August 31, 2021)............................................................................. 72
Table 20 Multi-purpose crossing line transits, and change, from Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021)............................................................................. 72
Table 21 Crossing line transits all tugs for Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021) with change in number of crossing transits ............................ 73
Table 22 Number of oil transfers at facilities in the study area and change from Year 1 (September 1, 2019 to August 31, 2020) and Year 2 (September 1, 2020 to August 31, 2021). .......................... 74
Table 23 Number of oil transfers in study area anchorages and change from Year 1 (September 1, 2019 to August 31, 2020) and Year 2 (September 1, 2020 to August 31, 2021)................................. 74
Table 24 VEAT entering transit data from 2016 to 2020 ................................................................... 76
Table H 1 Refineries in study area including common name, year constructed and capacity in barrels per day .......................................................................................................................... 1
Table I 1 Anchorages in study area, with abbreviation, number of vessels allowed, and maximum number of days allowed ........................................................................................................... 2
Table J 1 Engaged in bunkering and unknown transits as a percent of total transits .................. 3
Table J 2 Number of unknown entering transits as a percentage of all entering transits, all unknown transits, and total number of all transit types by vessel type for year 1 and year 2...... 4
Table L 1 Articulated Tug/Barge (ATB) which operate on the west coast .................................................. 1
Table M 1Oil barges greater than 5,000 DWT which operate on the west coast ......................... 1
Table N 1 List of oil barges less than 5,000 DWT which operate in Washington waters ............ 1
Table O-1 List of purpose-built escort tugs ...................................................................................... 1
Table P 1 List of purpose-built escort and ship assist tugs in Pacific Northwest ......................... 1
Table Q 1 List of multi-purpose tugs which operated in the Study Area ........................................ 1
Executive Summary

Overview

On September 1, 2020, new tug escort requirements took effect for certain tank vessels carrying oil as cargo in Rosario Strait and connected waterways to the east (RCW 88.16.190). This synopsis answers questions about changes in vessel traffic and oil transfers after the new tug escort requirements took effect.

Legislative Direction

In 2019 the Washington state legislature passed Engrossed Substitute House Bill (ESHB) 1578: Reducing Threats to Southern Resident Killer Whales by Improving the Oil Transportation Safety Act. The act amended RCW 88.16, 88.46, and 90.56.

Among other actions, the amendments to RCW 88.16 requires tug escorts for oil tankers between 5,000 and 40,000 deadweight tons (DWT) that are laden (carrying cargo onboard), and for laden Articulated Tug Barges (ATB) and oil barges greater than 5,000 DWT when operating in Rosario Strait and connected waterways to the east. (RCW 88.16.190). An ATB is a tank barge and a towing vessel joined by hinged or articulated fixed mechanical equipment affixed or connecting to the stern of the tank barge. The requirement does not apply to vessels providing bunkering or refueling services. The tug escort requirement took effect on September 1, 2020.

Additionally, amendments to RWC 88.16.260 direct the Board of Pilotage Commissioners (BPC) to complete a synopsis of changing vessel traffic trends (RCW 88.16.260(1)(d)(ii)).

Roles and Responsibilities

The BPC and the Washington State Department of Ecology (Ecology) entered into an Interagency Agreement (IAA), provided in Appendix B. This agreement establishes guidelines, roles, and responsibilities for collaboration between Ecology and the BPC in the effective implementation of the amended sections of 88.16 and 88.46 (Ecology & Board of Pilotage Commissioners, 2019).

The IAA includes the following responsibilities for the vessel trends synopsis (Ecology & Board of Pilotage Commissioners, 2019):

- The BPC Staff: Develop scope of changing vessel traffic trends synopsis and submit final synopsis to the legislature.
- The Board of Pilotage Commissioners: Vote to approve scope. Review and approve the Synopsis of Changing Vessel Traffic Trends.
Study Area

Figure EX-1 shows the boundaries of the study area, which includes Washington waters east of a line extending from Discovery Island lighthouse south to New Dungeness lighthouse, and the transboundary waters of Haro Strait, Boundary Pass, and the southern Strait of Georgia (Board of Pilotage Commissioners, 2020b).

Scope of Work

The BPC worked collaboratively with Ecology to create the scope of work, provided in Appendix D. The scope of work was approved at a public hearing of the Board of Pilotage Commissioners on May 21, 2020 (Board of Pilotage Commissioners, 2020d).

Additionally, the BPC developed the State of Washington Board of Pilotage Commissioners Interpretive Statement (Revised September 17, 2020), to create definitions for interpreting terms as they relate to the Act (Board of Pilotage Commissioners, 2020b). The interpretive statement is provided in Appendix E. Further definitions for terms used in the synopsis are included in Appendix F.
Purpose
The intent of the synopsis is to review vessel transits pre- and post-bill implementation to identify changes after Section 2 (tug escort requirement) of the Bill was implemented on September 1, 2020 (Board of Pilotage Commissioners, 2020b).

Research questions
The scope of work identifies the following questions (Board of Pilotage Commissioners, 2020b):

- What changing vessel traffic trends do we see for vessels that newly fall under an escort requirement?
- What changing vessel traffic trends do we see for deep draft and tug traffic that have no additional escort requirements?
- What changing vessel traffic trends do we see for tug escorts?
- How does the overall number of transits (by vessel type) change pre- and post-bill implementation?

Deliverables
The scope of work identifies the following deliverables (Board of Pilotage Commissioners, 2020b):

- Route selection and number of vessel transits pre-and post-bill implementation for the following vessel types. Ecology will explore ways to compare transits on a common scale.
  - vessels that newly fall under an escort requirement
  - deep draft and tug traffic that have no additional escort requirement
  - vessels that are providing bunkering or refueling services
- Routes compared will include, but will not be limited to transits of Rosario Strait and Haro Strait/Boundary Pass.
- Review of tugs engaged in escorting tank vessels in Rosario and connected waterways east, including but not limited to number of transits, names of vessels, and operating companies.
- Number of oil transfers per refinery and per anchorage pre- and post-bill implementation.
- A review of the last five years of existing vessel transit data, to provide context as to the overall trend in vessel movements, based on vessel types. Determining the laden/unladen status of tank vessels, deadweight tonnage of vessels, and details on vessel occupation (i.e., bunkering) would require a manual evaluation of each transit, and is outside the scope of this review.

The scope of work did not include an assessment of the impact of vessel traffic, including escort tugs, on treaty-protected interests and fishing rights of potentially affected federally recognized Indian tribes. The scope of work also did not include an assessment of underwater noise from vessels nor determine volumes of oil transferred during the synopsis period.
Methods
To meet the synopsis deliverables and answer the research questions, Ecology created a series of steps and designed methodologies to achieve the desired outcomes for each step.

Synopsis Steps
1. Research data sources
2. Create lists of vessels
3. Create a record of vessel transits and a determination of transit type
4. Collect data on escort tug activity
5. Collect data on oil transfers
6. Collect data on tanker movements
7. Write a review of the last 5 years of existing vessel transit data

Methodologies
Ecology:
- Researched available data resources in Ecology and industry databases, and vessel tracking systems to identify data sources for use in the synopsis.
- Created lists of vessels newly falling under an escort requirement and vessels with no additional escort requirements.
- Used oil transfer and vessel transit data to determine the route selection and the number of vessel transits by vessel type.
- Reviewed vessel transit data to compile a list of tugs performing escort duties. To determine changes in activity, Ecology compared the number of times these specific escort tugs crossed virtual lines that were placed in key locations within the study area.
- Gathered data on the number of oil transfers in the study area at refineries and anchorages, pre- and post-escort implementation to determine changes in the number of oil transfers in the study area.
- Reviewed data on vessel transits within the study area over the last five years to identify vessel traffic trends.

Data Sources
Ecology’s Advance Notice of Oil Transfer (ANT) system provided data on oil transfers in the study area, and data for assisting in determining the laden or unladen status of transits between transfers.

A subscription service through the Marine Exchange of Puget Sound was used to collect vessel Automatic Identification System (AIS) history data for determining individual vessels and transit routes, and crossing line report data to determine tanker and escort tug movements in the study area.

Ecology’s Spills Program Integrated Information System (SPIIS) web-based application provided data on vessel entry transits, and oil transfers counts at anchorages and facilities in the study area.
Ecology collected data for one year before and one year after tug escort implementation. Year 1 of data collection comprised September 1, 2019 through August 31, 2020. Year 2 was September 1, 2020 through August 31, 2021.

Ecology reviewed data from the past five years of Vessel Entries and Transits in Washington Waters (VEAT) reports. VEAT data are reported for calendar years and use a different methodology than the synopsis, so the number of transits do not match the Year 1 and Year 2 results of the synopsis. The review of VEAT data provided context to the traffic changes which occurred from the year prior to tug escort requirements to the year after the requirements went into effect.

**Data Challenges**

Four data challenges were identified in the synopsis scope of work. Ecology identified an additional seven during data analysis. Ecology developed mitigation methods for eight of the 11 data challenges. The remaining three challenges involving ANT and AIS data had an effect on Ecology’s ability determine if a vessel’s transit was likely loaded with oil (laden).

However, once data collection was complete, Ecology was able to use ANT data to make a reasonable determination of the laden or unladen status for 27 of the 32 Haro Strait transits which Ecology reviewed for the potential influence of the new tug escort requirement in Year 2. The available ANT data did not allow Ecology to determine the laden or unladen status for the remaining five transits.

**Overview of Results**

Table EX – 1 shows the number and percentage of transits for vessels newly subject to the tug escort requirements.

Table EX - 1 Number and percentage of transits for vessels newly subject to the tug escort requirements in Year 1 (September 1, 2019 to August 31, 2020) and Year 2 (September 1, 2020 to August 31, 2021), in Haro and Rosario Straits.

<table>
<thead>
<tr>
<th>ATB</th>
<th>Rosario</th>
<th>Haro</th>
<th>Total Transits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Barge &gt; 5,000 DWT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>787 (94%)</td>
<td>48 (6%)</td>
<td>835 (100%)</td>
</tr>
<tr>
<td>Year 2</td>
<td>841 (91%)</td>
<td>79 (9%)</td>
<td>920 (100%)</td>
</tr>
<tr>
<td><strong>Tankers &lt; 40,000 DWT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>15 (68%)</td>
<td>7 (32%)</td>
<td>22 (100%)</td>
</tr>
<tr>
<td>Year 2</td>
<td>26 (65%)</td>
<td>14 (35%)</td>
<td>40 (100%)</td>
</tr>
<tr>
<td><strong>Total Transits</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Vessel Traffic Trend Synopsis
December 2021
Determining whether the tug escort requirement affected route selection

Ecology used a series of questions to assess whether the tug escort requirement affected route selection for vessel transits. For each Haro Strait transit in Year 2 by tank vessels subject to the new tug escort requirements, Ecology asked:

- Was the selection of Haro Strait a change from previous passages between the same origin and destination by vessels from the same company?
- Would transiting through Rosario Strait be a reasonable option, given the origin and destination? For example, has the tank vessel used Rosario Strait in the past for the same origin and destination?
- Did the vessel transit both Haro and Rosario Straits during a single passage?
- Was the tank vessel likely laden, as determined by the process Ecology used for the synopsis?

Using these questions, Ecology counted a tank vessel’s Haro Strait transit as influenced by the new tug escort requirements if:

- The selection of Haro Strait was a change from previous passages
- A transit through Rosario Strait was a reasonable option
- The passage did not utilize both Haro and Rosario Straits
- The tank vessel was likely laden

Ecology did not count a tank vessel’s Haro Strait transit as influenced by the tug escort requirements in the following situations:

- The vessel’s company had a history of using this route in previous years
- Transiting through Rosario Strait was not a reasonable option, given the origin and destination (e.g., a transit from Victoria, B.C., to Vancouver, B.C.)
- The vessel transited both Haro and Rosario Straits, since laden tank vessels would still require an escort through the Rosario Strait portion of the route
- Ecology could not make a reasonable assumption about the laden or unladen status of a vessel, as an unladen transit through Rosario would not require an escort

Response to Research Questions

Ecology re-ordered the research questions for clarity.

- How does the overall number of transits (by vessel type) change pre- and post-bill implementation?
  - In Year 2, transits by tank vessels subject to the new tug escort requirements increased in both Rosario and Haro Straits.
  - Most of these changes were not related to the tug escort requirement. Some were likely the result of business decisions by companies, the year-to-year variation in the market for crude oil and refined product, and the effects of the global pandemic.
• What changing vessel traffic trends do we see for vessels that newly fall under an escort requirement?
  o The new tug escort requirement did not appear to have affected the route selection of tankers between 5,000 and 40,000 DWT from Year 1 to Year 2.
  o Ecology identified 16 transits through Haro Strait in Year 2 by ATBs and barges greater than 5,000 DWT where the tug escort requirements may have been in factor in deciding the route.
    ▪ ATBs: five of 79 Haro Strait transits may have been affected by the tug escort requirement. These five transits represent 6 percent of the 79 Year 2 Haro Strait transits, and 0.5 percent of the 920 Year 2 total transits through Rosario and Haro Straits.
    ▪ Barges greater than 5,000 DWT: 11 of 16 transits may have been affected by the tug escort requirement. These 11 transits represent 69 percent of the 16 Year 2 Haro Strait transits, and 3 percent of the 349 Year 2 total transits through Rosario and Haro Straits.

• What changing vessel traffic trends do we see for deep draft and tug traffic that have no additional escort requirements?
  o For tankers greater than 40,000 DWT, transits decreased between Year 1 and Year 2 in Rosario Strait, both in the number of crossing line transits and the number of tankers making transits. In Haro Strait and Boundary pass, the change in tankers and crossing line transit numbers was negligible from Year 1 to Year 2.
  o For barges less than 5,000 DWT, there was a decrease in Rosario Strait transits between Year 1 and Year 2. There were no transits through Haro Strait by barges less than 5,000 DWT in Year 1 or Year 2.
  o For barges engaged in bunkering within the study area, there was an overall decrease in transits: an increase of six transits by barges greater than 5,000 DWT and a decrease of 26 transits by barges less than 5,000 DWT. The overall 20 transit decrease may reflect vessels receiving fuel at a location outside of the study area, rather than a decrease in bunkering in the Puget Sound.

• What changing vessel traffic trends do we see for tug escorts?
  o Tug escort movements in the study area increased significantly following the implementation of the new escort requirements, especially for three tugs that were observed both performing escort duties as well as towing oil barges (termed ‘multi-purpose’ tugs for this synopsis).
  o Purpose-built escort tug crossing line transits in the study area increased from 5,991 in Year 1 to 7,321 in Year 2, an increase of 1,330 transits or 22 percent.
  o Multi-purpose tug crossing line transits in the study area increased from 71 in Year 1 to 1,745 in Year 2, an increase of 1,674 transits or over 2,000 percent.
  o Total tug crossing line transits in the study area increased from 6,062 in Year 1 to 9,066 in Year 2, an increase of 3,004 transits or 50 percent.

Detailed responses for each deliverable identified in the scope of work are provided in the Results section of the synopsis.
Conclusions

The purpose of this synopsis was to review vessel transits to identify changes after tug escort requirements were implemented on September 1, 2020 for laden ATBs and oil barges greater than 5,000 DWT, and tankers between 5,000 and 40,000 DWT transiting in Rosario Strait and connected waterways to the east. Unladen tank vessels and barges engaged in bunkering are excluded from the new tug escort requirements.

The most significant findings were:

- The new tug escort requirements did not significantly change tank vessel traffic. Most transits in the study area by tank vessels subject to the tug escort requirement were through Rosario Strait both before and after the tug escort requirement took effect.
  - 94 percent of transits by these tank vessels in Year 1 were through Rosario Strait (1,117 of the 1,183 total transits in Rosario and Haro Straits).
  - 92 percent of transits by these tank vessels in Year 2 were through Rosario Strait (1,200 of the 1,309 total transits in Rosario and Haro Straits).
- In Year 2, five of the 79 Haro Strait transits by ATBs, and 11 of the 16 Haro Strait transits by barges greater than 5,000 DWT were identified where the new tug escort requirements may have been a factor in deciding the route.
- Unrelated to the new tug escort requirement, the border closure between Washington and Canada caused by the pandemic produced a change in traffic patterns for ATBs using pilots.
  - Prior to the pandemic there were no transits by ATBs between Vancouver, B.C., and the study area which used both Rosario and Haro Straits in one passage.
  - After the border closure, the pilots embarked and disembarked in Port Angeles and Victoria, B.C., requiring a transit in both Rosario and Haro Straits if transiting between the study area and Vancouver, B.C. (PPA, 2020).
  - There were 53 of these transits, 17 in Year 1 and 36 in Year 2.
- Escort tug transits increased significantly following the implementation of the new requirements.
  - This was especially notable for multi-purpose tugs, or tugs that performed escort duties as well as towed oil barges.
  - Transits by purpose-built escort tugs over crossing lines in the study area increased by 1,330 transits, from 5,991 in Year 1 to 7,321 in Year 2, an increase of 22 percent.
  - Transits by multi-purpose escort tugs over crossing lines in the study area increased by 1,674 transits, from 71 in Year 1 to 1,745 in Year 2, an increase of over 2,000 percent.
  - The total of transits by all tugs performing escort duties over crossing lines in the study area increased by 3,004 transits, from 6,062 in Year 1 to 9,066 transits in Year 2, an increase of 50 percent.
  - Vessels can transit over multiple crossing lines in a single trip, so the total number of transits over crossing lines does not represent the number of escort trips.
Introduction

Legislative direction

In 2019 the Washington state legislature passed Engrossed Substitute House Bill (ESHB) 1578: Reducing Threats to Southern Resident Killer Whales by Improving the Safety of Oil Transportation Act (the Act). The act amended RCW 88.16, 88.46, and 90.56 with the goal of closing safety gaps related to carrying oil in bulk.

Section 2 of the Act amends RCW 88.16.190 to require tug escorts for laden\(^1\) tankers between 5,000 and 40,000 DWT\(^2\), and laden Articulated Tug Barges (ATB)\(^3\) and oil barges greater than 5,000 DWT\(^4\) when operating in Rosario Strait and connected waterways to the east (RCW 88.16.190\(^5\)). The tug escort requirement became effective September 1, 2020. Section 1, 2 and 3 of the Act are provided in Appendix A.

Section 3 of the Act amends RCW 88.16.260, and directs the BPC to complete a synopsis of changing vessel traffic trends. The relevant portion of RCW 88.16.260 states:

> (1)(a) By December 31, 2025, the board of pilotage commissioners, in consultation with the department of ecology, must adopt rules regarding tug escorts to address the peculiarities of Puget Sound for the following:

(i) Oil tankers of between 5,000 and 40,000 deadweight tons; and

(ii) Both articulated tug barges and towed waterborne vessels or barges that are: (A) Designed to transport oil in bulk internal to the hull; and (B) greater than five thousand deadweight tons.

(b) The requirements of this section do not apply to:

(i) A towed general cargo deck barge; or

(ii) A vessel providing bunkering or refueling services.

(c) The rule making pursuant to (a) of this subsection must be for operating in the waters east of the line extending from Discovery Island light south to New Dungeness light and all points in the Puget Sound area. This rule making must address the tug escort requirements applicable to Rosario Strait and connected waterways to the east established in RCW 88.16.190(2)(a)(ii), and may adjust or suspend those requirements based on expertise developed under subsection (5) of this section.

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\(^1\) The term ‘laden’ means the vessel is carrying cargo onboard. See Appendix G Maritime Definitions.

\(^2\) Deadweight tonnage is a measure of how much weight a ship can carry. Abbreviated to DWT, D.W.T., d.w.t., or dwt See Appendix G Maritime Definitions

\(^3\) An Articulated Tug Barge is a tank barge and a towing vessel joined by hinged or articulated fixed mechanical equipment affixed or connecting to the stern of the tank barge.

\(^4\) The tug escort requirement does not apply to ATB or oil barges when providing bunkers or refueling services.

\(^5\) https://app.leg.wa.gov/RCW/default.aspx?cite=88.16.190
(d) To achieve the rule adoption deadline in (a) of this 2 subsection, the board of pilotage commissioners must adhere to the following interim milestones:

(i) By September 1, 2020, identify and define the zones, specified in subsection (3)(a) of this section, to inform the analysis required under subsection (5) of this section

(ii) By December 31, 2021, complete a synopsis of changing vessel traffic trends;

Ecology and the Board of Pilotage Commissioners Roles

The Washington State Board of Pilotage Commissioners (BPC) and the Washington State Department of Ecology (Ecology) entered into an Interagency Agreement (IAA), provided in Appendix B. This agreement establishes guidelines, roles, and responsibilities for collaboration between Ecology and the BPC in the effective implementation of Sections 2, 3, 4, and 5 of the Act (RCW 88.16.260)(Ecology & Board of Pilotage Commissioners, 2019).

The IAA includes the following responsibilities for the vessel trends synopsis (Ecology & Board of Pilotage Commissioners, 2019):

- The BPC Staff: Develop scope of changing vessel traffic trends synopsis and submit final synopsis to the legislature.
- Board of Pilotage Commissioners: Vote to approve scope. Review and approve the Synopsis of Changing Vessel Traffic Trends.

The BPC established a new committee, the Oil Transportation Safety Committee to conduct analysis and provide recommendations for the Board concerning the responsibilities outlined in RCW 88.16. The Oil Transportation Safety Committee charter is provided in Appendix C.

Committee membership included representatives from tribes, the BPC, Ecology, Puget Sound Pilots, the oil industry, the tug industry, and the environmental community (Board of Pilotage Commissioners, 2019). A duty of the committee was to provide recommendations about the synopsis to the BPC (Board of Pilotage Commissioners, 2019).

The committee met 13 times between December 2019 and December 2021. Minutes from Oil Transportation Safety Committee meetings are available on the BPC website.

Study area

Figure 1 shows the boundaries of the study area, which includes Washington waters east of a line extending from Discovery Island lighthouse south to New Dungeness lighthouse and the transboundary waters of Haro Strait, Boundary Pass, and the southern Strait of Georgia (Board of Pilotage Commissioners, 2020b).

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6 https://pilotage.wa.gov/resources.html
Figure 1 Map of study area

Figure 2 shows a portion of the study area in greater detail, including several of the geographic zones defined by the BPC (Board of Pilotage Commissioners, 2020b). The new tug escort requirement applies to Rosario Strait and connected waterways east.

Figure 2 Map of selected waterways and geographic areas in the study area
Scope of Work

The BPC worked collaboratively with Ecology to create the scope of work, provided in Appendix D. The scope for the changing traffic trends synopsis was approved at a public hearing of the Board of Pilotage Commissioners on May 21, 2020 (Board of Pilotage Commissioners, 2020d).

The scope of work defines the roles and responsibilities for the BPC and Ecology, states the purpose of the synopsis, defines the research questions, and identifies the methods, data sources and challenges, data collection timeline, and deliverables. The scope describes opportunities for the BPC to review and comment on the synopsis, a process for amending the scope, and the overall timeline for the project (Board of Pilotage Commissioners, 2020b).

Additionally, the BPC developed the State of Washington Board of Pilotage Commissioners Interpretive Statement (Revised September 17, 2020), to create definitions for interpreting terms as they relate to the Act (Board of Pilotage Commissioners, 2020b). The interpretive statement is provided in Appendix E. Further definitions for terms used in the synopsis are provided in Appendix F.

Ecology provided technical assistance to the BPC by preparing the synopsis to meet the scope of work. Ecology used the BPC’s Interpretive Statement to inform decisions on data collection, data analysis methods, and interpretation of data results. Ecology collected data on tank vessels, tank vessel and escort tugs movements, and oil transfers within the study area. Ecology worked collaboratively with the BPC on the process of data collection, data interpretation, and writing the synopsis.

The Scope of Work did not include an assessment of the impact of vessel traffic, including escort tugs, on treaty-protected interests and fishing rights of potentially affected federally recognized Indian tribes. The Scope of Work also did not include an assessment of underwater noise from vessels nor determine volumes of oil transferred during the synopsis period.

Purpose

The intent of the synopsis is to review vessel transits pre- and post-bill implementation to identify changes after Section 2 (tug escort requirement) of the Act was implemented (Board of Pilotage Commissioners, 2020b). The synopsis reports on vessel trends for Washington waters east of a line extending from Discovery Island lighthouse south to New Dungeness lighthouse. It also includes vessel trends for the transboundary waters of Haro Strait, Boundary Pass, and the southern Strait of Georgia.

Research questions

The scope of work identifies the following questions (Board of Pilotage Commissioners, 2020b):

- What changing vessel traffic trends do we see for vessels that newly fall under an escort requirement?
- What changing vessel traffic trends do we see for deep draft and tug traffic that have no additional escort requirements?
- What changing vessel traffic trends do we see for tug escorts?
How does the overall number of transits (by vessel type) change pre- and post-bill implementation?

**Deliverables**

The scope of work identifies the following deliverables (Board of Pilotage Commissioners, 2020b)

- Route selection and number of vessel transits pre-and post-bill implementation for the vessel types below. Ecology will explore ways to compare transits on a common scale.
  - vessels that newly fall under an escort requirement
  - deep draft and tug traffic that have no additional escort requirement
  - vessels that are providing bunkering or refueling services
- Routes compared will include, but will not be limited to transits of Rosario Strait and Haro Strait/Boundary Pass.
- Review of tugs engaged in escorting tank vessels in Rosario and connected waterways east, including but not limited to number of transits, names of vessels, and operating companies.
- Number of oil transfers per refinery and per anchorage pre- and post-bill implementation.
- A review of the last five years of existing vessel transit data, to provide context as to the overall trend in vessel movements, based on vessel types. Determining the laden/unladen status of tank vessels, deadweight tonnage of vessels, and details on vessel occupation (i.e., bunkering) would require a manual evaluation of each transit, and is outside the scope of this review.
Analysis Methods

Ecology created seven synopsis steps to produce the deliverables.

Synopsis Steps

1. Research data sources
2. Create lists of vessels to meet research questions and deliverables
3. Create a record of vessel transits and a determination of transit type
4. Collect data on escort tug activity
5. Collect data on oil transfers
6. Collect data on tanker movements
7. Write a review of the last five years of existing vessel transit data

Table 1 Synopsis Step matched to Outcome, Data Source and Analysis Method

<table>
<thead>
<tr>
<th>Synopsis Step</th>
<th>Outcome</th>
<th>Data Source</th>
<th>Analysis Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Research data sources</td>
<td>List of sources to support next steps in synopsis</td>
<td>• Ecology databases</td>
<td>Review of available data sources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Industry websites and databases</td>
<td></td>
</tr>
<tr>
<td>2. Create lists of vessels to meet research</td>
<td>Vessels which newly fall under escort requirement</td>
<td>• Ecology VEAT(^1) data</td>
<td>VEAT/SPIIS/ANT data review</td>
</tr>
<tr>
<td>questions and deliverables</td>
<td>Vessels with no additional escort requirement</td>
<td>• Ecology ANT(^2) System</td>
<td></td>
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<tr>
<td></td>
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<td>• Ecology SPIIS(^3) System</td>
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<tr>
<td>3. Create a record of vessel transits and a</td>
<td>Spreadsheet with route selection and transit type</td>
<td>• Ecology ANT System</td>
<td>Manual Method</td>
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<td>determination of transit type</td>
<td></td>
<td>• Ecology SPII System</td>
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<td></td>
<td></td>
<td>• Marine Exchange of Puget Sound Web-Based AIS</td>
<td></td>
</tr>
<tr>
<td>4. Collect data on escort tug activity</td>
<td>Data on tugs engaged in escort duties in Rosario and connected waterways</td>
<td>• Marine Exchange of Puget Sound Web-Based AIS</td>
<td>AIS Crossing line method</td>
</tr>
<tr>
<td></td>
<td>east</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Collect data on oil transfers</td>
<td>Data on number of oil transfers per refinery and per anchorage</td>
<td>• Ecology ANT System</td>
<td>SPIIS data report</td>
</tr>
<tr>
<td>6. Collect data on movements of tankers</td>
<td>Data on tanker movements in Rosario, connected waterways east, Haro</td>
<td>• Marine Exchange of Puget Sound Web-Based AIS</td>
<td>AIS Crossing line method</td>
</tr>
<tr>
<td>with no additional escort requirement</td>
<td>Strait, and Boundary Pass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Write a review of the last five years of</td>
<td>A broad overview of past traffic to provide context for the overall</td>
<td>• Ecology VEAT data</td>
<td>VEAT data review</td>
</tr>
<tr>
<td>existing vessel transit data</td>
<td>trend in vessel movements</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Vessel Entries and Transit report (VEAT)
\(^2\) Advance Notice of oil Transfer (ANT)
\(^3\) Spills Integrated Information System (SPIIS)
\(^4\) Automatic Identification System (AIS)
Ecology used the outcomes from the synopsis steps to answer the research questions and provide the synopsis deliverables. The following paragraphs provide a detailed description of the methods Ecology used to produce the outcome for each synopsis step.

Synopsis Step 1: Research Data Sources

Ecology researched available data resources in Ecology and industry databases, and vessel tracking systems and identified the following data sources for use in the synopsis. Data were either publicly available, bought, or owned by Ecology.

Ecology’s Advanced Notice of Oil Transfer (ANT) system

Federal and state regulations require advance notification of oil transfers. 33 CFR 156.118 – Advance Notice of Oil Transfer7 (1990) describes the federal rules regarding notification prior to the transfer of oil over water to or from facilities to vessels, and vessel to vessel transfers. To help prepare for and prevent oil spills, Washington State also requires advance notice of oil transfers8 (Ecology, n.d.-b) for transfers over water per WAC 173-184-1009.

Ecology’s Advance Notice of Oil Transfer (ANT) system is a web-based application that captures and administers ANT information submitted for oil transfer activities. The application satisfies oil transfer reporting requirements of both Ecology and the U.S. Coast Guard (Ecology, n.d.-b). The system contains data on over-water bulk oil transfers of more than 100 gallons from vessels and shore-based facilities that transfer to non-recreational vessels or facilities (Ecology, n.d.-b). ANT data contains the name of the deliverer and receiver as well as the transfer time, location, product, and volume (Ecology n.d.-b).

The Marine Exchange of Puget Sound Web-Based Automatic Identification System (AIS) data

The Automatic Identification System (AIS) broadcast system, as described by the U.S. Coast Guard Navigation Center10 webpage, is a maritime navigation safety and communications tool. Information transmitted by AIS comprises stable vessel data (e.g., type of vessel, and a unique 9-digit identification number or MMSI); dynamic vessel data (e.g., heading, course, and speed); and voyage-related data (e.g., destination, navigational status, estimated time of arrival) (Transportation Research Board & National Research Council, 2003). AIS messages can be stored and analyzed, representing an excellent source of data for vessel activities (Le Tixerant M., Le Guyader D., Gourmelon F., Queffeiec B., 2018).

All of the vessels of interest in this synopsis are required to have a properly functioning AIS (33 C.F.R. §164.46) with the exception of towed oil barges. Ecology tracked the movement of oil

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7 https://www.ecfr.gov/cgi-bin/text-idx?SID=9e21a1e5cbf2aeeec745b992af156f72a&mc=true&node=se33.2.156_1118&rgn=div8
8 https://ecology.wa.gov/Regulations-Permits/Reporting-requirements/Advance-notice-of-oil-transfer
10 https://www.navcen.uscg.gov/?pageName=aismain
barges by combining AIS data from tugs, and oil transfer data from ANT as described below in Synopsis Step 3: Record of vessel transits and determination of transit type.

The Marine Exchange of Puget Sound11 is an association that serves as an information clearinghouse for the maritime industry and waterway users and provides access to AIS data through a program called SiiTech12 (Marine Exchange, n.d.).

SiiTech uses a web-based maritime traffic monitoring system called Web VTS which is designed for ship traffic and monitoring centers. It allows complete interface with AIS data and has features such as AIS vessel track history and zone report creation (SiiTech, n.d.).

Ecology accessed SiiTech via a web-based subscription service through the Marine Exchange of Puget Sound.

Ecology Spills Program Integrated Information System (SPIIS) Database

The Spills Program Integrated Information System (SPIIS) is a web-based application supporting the business practices of the Ecology Spills Program (Ecology, n.d.-e). Among other functions, SPIIS provides the following (Ecology, n.d.-e):

- Vessel arrival details for vessels bound for Washington ports
- Advance Notice of Oil Transfer (ANT) details for oil transfers in Washington waters
- An integrated report center to support program reporting and performance measure requirements

Ecology Vessel Entries and Transit (VEAT) data

For over 20 years, Ecology’s Spills Program has published annual Vessel Entries and Transit (VEAT) reports13. These reports provide information about individual vessels and entering transits for cargo and passenger vessels 300 gross tons14 and larger, and tank ships, ATBs, and tank barges of any tonnage (Ecology, n.d.-a).

VEAT reports also include data on barge transits15 in Washington waters (Ecology, n.d.-a). In 2011 the VEAT report began counting ATB transits separately from tank barge transits, and created a subcategory of entering transits16 for ATBs and tank barges. VEAT data includes the names and operating companies for ATBs and oil barges which transit Washington waters (Ecology, n.d.-a).

VEAT reports list data by vessel destination and vessel type and do not reflect specific products or commodities transported or delivered (Ecology, n.d.-a).

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11 https://marexps.com/
12 https://www.siitech.com/
13 https://ecology.wa.gov/Spills-Cleanup/Spills/Oil-spill-prevention/Preventing-spills
14 Gross tons (GT) is the volumetric measurement of the enclosed space in a vessel, usually used for ship’s manning regulations, safety rules, registration fees, and port dues (Maritime Industrial Foundation, n.d.)
15 For VEAT, a tank barge/ATB transit is defined as any significant move between two locations in Washington state waters, while transporting oil.
16 For VEAT, an entering transits is defined as the passage of a vessel from sea or from Canadian waters into Washington state waters, regardless of destination. An entering transit is a subset of the overall number of transits.
Synopsis Step 2: Create lists of vessels to meet research questions and deliverables

Using data from Ecology’s SPIIS and ANT databases, Ecology performed a series of steps to determine which vessels should be included in analysis. These steps were used to create lists of:

- Vessels newly subject to the new escort tug requirements
  - Tankers between 5,000 and 40,000 DWT
  - ATBs and oil barges over 5,000 DWT
- Vessels with no additional escort requirements
  - Tankers over 40,000 DWT
  - ATBs and oil barges less than 5,000 DWT

Vessels that newly fall under an escort requirement

Tankers between 5,000 and 40,000 DWT

To compare traffic trends for tankers that newly fall under the tug escort requirements, Ecology created a list of tankers between 5,000 and 40,000 DWT that operated in the study area during the synopsis period. This list does not include liquefied natural gas tankers (LNG) or liquefied petroleum gas (LPG) tankers as these cargos do not meet the definition of oil in the scope of work\(^\text{17}\) (Board of Pilotage Commissioners 2020c). Creating the list involved three steps:

**Step 1. Produce a Vessel Arrival and Boarding Report in SPIIS for the study area with the synopsis period as the date range.**

Figure 3 is an example of the Vessel Arrival and Boarding report. The report results include the vessel name, vessel type, arrival date, departure date, location, and inspection information, if available.

\(^{17}\) It is the interpretation of the Board [BPC] that, as per RCW 90.56.010 (19), the definition of “oil” or “oils” means oil of any kind that is liquid at twenty-five degrees Celsius and one atmosphere of pressure and any fractionation thereof.
Step 2. Export the Vessel Arrival and Boarding reports into Excel, sort and manipulate data.

Next, Ecology exported the SPIIS report into Excel, and sorted the list of vessels by vessel type. All vessels with types other than ‘tank ship’ (tankers) were removed. The resultant list of tanker arrival reports was then sorted by location, and all arrivals that were outside the study area were removed.

Step 3. Determine each vessel type and deadweight tonnage.

To determine which of these tankers met the new escort tug requirement of an oil tanker with a deadweight tonnage between 5,000 and 40,000 tons, Ecology determined the type of tanker and deadweight tonnage for each individual tanker using the website Marine Traffic.18

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All LNG/LPG tankers and all tankers with a deadweight tonnage less than 5,000 or greater than 40,000 tons were removed from the list.

The complete list of tankers newly subject to the escort tug rule implementation in Year 1 and Year 2 is provided in Appendix O.

**ATBs and oil barges**

Ecology used VEAT and ANT data to identify ATBs and towed oil barges that operated within the study area and met the new tug escort requirement. This involved four steps:

**Step 1. Identify ATBs and oil barges that transited Washington waters using VEAT data**

VEAT data includes an annual count of all ATBs and oil barges that transited Washington waters, by barge and company name. Ecology created a list of ATBs and oil barges, excluding any barges that transited only in the Columbia River, for the year prior to tug escort implementation and the year after tug escort implementation.

**Step 2. Compare ANT data with VEAT data to identify any additional ATBs or oil barges from January 1, 2021 to August 31, 2021**

VEAT data for 2021 will be published in March 2022. The 2020 VEAT includes information about transits between January 1, 2020, and December 31, 2020. Ecology reviewed ANT oil transfer data to determine if any ATB or oil barges not included in 2019 and 2020 VEAT data transited the study area between January 1, 2021, and August 31, 2021. There were two additional ATBs and one oil barge to add to the list created from VEAT data.
Step 3. Determine the deadweight tonnage for each ATB barge and oil barge on the list

The new escort tug requirement include a deadweight tonnage limit. Barges less than 5,000 DWT do not require escort tugs. Ecology determined which ATB and oil barges met the escort tug 5,000 DWT requirement by using vessel owner/operator websites (Figure 5), commercial websites such as Marine Intelligence, and by contacting companies directly.

![Figure 5 Example of an oil barge company website with vessel-specific information](https://intelligence.marinelink.com/vessels/vessel/cascades-331676)

The results of this step are included as appendices:

- Appendix L – Articulated Tug Barges
- Appendix M – Oil barges greater than 5,000 DWT
- Appendix N – Oil barges less than 5,000 DWT

Step 4. Determine if the ATBs and oil barges on the list transited in the study area during the synopsis period.

Appendices L, M and N include all ATBs and barges that transited in the Puget Sound. To refine the list to only ATBs and barges that transited the study area during the synopsis period, Ecology referred to VEAT data, which includes each ATB and oil barge transfer date and location (Figure 6).
Figure 6 2019 VEAT data for barge Capella showing transfer dates and locations

This step resulted in the following lists of ATBs and oil barges (Tables 2-4).

Table 2 Articulated Tug Barge (ATB) units that transited the study area in the synopsis period

<table>
<thead>
<tr>
<th>ATB Barge Name</th>
<th>ATB Tug Name</th>
<th>Operating Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>550-2</td>
<td>Sound Reliance</td>
<td>Crowley Shipping</td>
</tr>
<tr>
<td>550-3</td>
<td>Ocean Reliance</td>
<td>Crowley Shipping</td>
</tr>
<tr>
<td>650-2</td>
<td>Gulf Reliance</td>
<td>Crowley Shipping</td>
</tr>
<tr>
<td>650-6</td>
<td>Commitment</td>
<td>Crowley Shipping</td>
</tr>
<tr>
<td>650-8</td>
<td>Achievement</td>
<td>Crowley Shipping</td>
</tr>
<tr>
<td>650-10</td>
<td>Vision</td>
<td>Crowley Shipping</td>
</tr>
<tr>
<td>All Aboard For A Cure</td>
<td>Bill Gobel</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Dr. Robert J Beall</td>
<td>Emery Zidell</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Edward Itta</td>
<td>Todd E. Prophet</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Fight ALS</td>
<td>Barry Silerton</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Fight Fanconi Anemia</td>
<td>Min Zidell</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Onedream</td>
<td>Jake Shearer/Min Zidell</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Petro Mariner</td>
<td>Dale R Lindsey</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Zidell Marine 277</td>
<td>One Cure</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>ITB Island Trader</td>
<td>Island Monarch</td>
<td>Island Tug and Barge (Canada)</td>
</tr>
<tr>
<td>DBL 78</td>
<td>Cape Ann</td>
<td>Kirby Offshore Marine</td>
</tr>
<tr>
<td>DBL 185</td>
<td>Dublin Sea</td>
<td>Kirby Offshore Marine</td>
</tr>
<tr>
<td>DBL 185-01</td>
<td>Nancy Peterkin</td>
<td>Kirby Offshore Marine</td>
</tr>
<tr>
<td>OSG 204</td>
<td>OSG Endurance</td>
<td>OSG Ship Management</td>
</tr>
<tr>
<td>Petrochem Supplier</td>
<td>Corpus Christi</td>
<td>U.S. Shipping</td>
</tr>
</tbody>
</table>

Table 3 Oil barges greater than 5,000 DWT that transited the study area in the synopsis period

<table>
<thead>
<tr>
<th>Barge &gt; 5,000 DWT Name</th>
<th>Operating Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Betsy Arntz</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Dottie</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Dr. Bonnie W Ramsey</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Dugan Pearsall</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Lovel Briere</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Nathan Schmidt</td>
<td>Centerline Logistics Corp.</td>
</tr>
</tbody>
</table>
Table 3 Oil barges greater than 5,000 DWT that transited the study area, continued

<table>
<thead>
<tr>
<th>Barge &gt; 5,000 DWT Name</th>
<th>Operating Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olympic Spirit</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Shauna Kay</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Sixty Five Roses</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Antril S.</td>
<td>Cook Inlet Tug And Barge</td>
</tr>
<tr>
<td>Cascades</td>
<td>Kirby Offshore Marine</td>
</tr>
<tr>
<td>Sasanoa</td>
<td>Kirby Offshore Marine</td>
</tr>
<tr>
<td>Pb-32</td>
<td>Marine Petrobulk (Canada)</td>
</tr>
<tr>
<td>Pb-34</td>
<td>Marine Petrobulk (Canada)</td>
</tr>
<tr>
<td>Petrobulker</td>
<td>Marine Petrobulk (Canada)</td>
</tr>
<tr>
<td>Drakes Bay</td>
<td>Sause Bros</td>
</tr>
<tr>
<td>Commencement Bay</td>
<td>Sause Bros</td>
</tr>
<tr>
<td>Seaspan 880 (Ex. Leo)</td>
<td>Seaspan</td>
</tr>
<tr>
<td>Double Skin 311 (DS 311)</td>
<td>Vane Brothers</td>
</tr>
<tr>
<td>Double Skin 313 (DS 313)</td>
<td>Vane Brothers</td>
</tr>
<tr>
<td>Double Skin 505 (DS 505)</td>
<td>Vane Brothers</td>
</tr>
<tr>
<td>Double Skin 501 (DS 501)</td>
<td>Vane Brothers</td>
</tr>
</tbody>
</table>

Table 4 Oil barges less than 5,000 DWT that transited the study area in the synopsis period

<table>
<thead>
<tr>
<th>Barge &lt; 5,000 DWT Name</th>
<th>Operating Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMS 26-1</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>Professor Karen Ann Brown</td>
<td>Centerline Logistics Corp.</td>
</tr>
<tr>
<td>ITB Supplier</td>
<td>Island Tug and Barge (Canada)</td>
</tr>
<tr>
<td>ITB Vancouver</td>
<td>Island Tug and Barge (Canada)</td>
</tr>
<tr>
<td>Global Pilot</td>
<td>Maxum Petroleum</td>
</tr>
<tr>
<td>Global Provider*</td>
<td>Maxum Petroleum</td>
</tr>
<tr>
<td>Seaspan 827</td>
<td>SEASPAN</td>
</tr>
</tbody>
</table>

*The Global Provider is a self-propelled tank vessel less than 5,000 DWTs. Ecology considers the Global Provider an oil barge for purposes of regulation, enforcement, and for VEAT vessel counts.

**Synopsis Step 3: Create a record of vessel transits and a determination of transit type**

The synopsis purpose is to compare vessel traffic trends by vessel type from the year prior to tug escort implementation to the year after. To accomplish this, Ecology used a manual method to determine the route selection and the number of vessel transits by vessel type using ANT data and AIS data.

Ecology combined the two data sources to determine transit route and the transit type, which was based on the estimated amount of oil carried as cargo onboard vessels. Transit types were defined as ‘likely laden’, ‘likely unladen’, ‘unknown’, or ‘engaged in bunkering’.

The combined methods of determining route selection and transit type involved four steps:
Step 1. Ecology searched the ANT system to create a list of all transfers which occurred in the study area.

Ecology used the “Search Vessel Transfer” query tool in ANT to identify transfers involving the barges in tables 2-4 as either the deliverer or receiver of oil, using the synopsis period for the transfer dates (Figure 7).

![Advance Notice of Oil Transfer (ANT) search page](image)

Figure 7 Advance Notice of Oil Transfer (ANT) search page

The search results were exported to Excel. Figure 8 shows an example of search results for the oil barge Sixty Five Roses over the period September 1, 2019, to November 30, 2019.

In Figure 8, the first group of rows in the spreadsheet are the result of the search for Sixty Five Roses as the deliverer. The second group of rows in the spreadsheet are for the Sixty Five Roses as the receiver.
Figure 8 Example of Advanced Notice of Oil Transfer (ANT) search results for the oil barge Sixty Five Roses

In Figure 9 the two groups of rows for deliverer and receiver were combined and sorted by date. The red box highlights several transfers occurring sequentially outside the study area. Due to the volume of data, consecutive transfers between areas outside the study area were removed.

Transfers before and after the transfer in the study area were not removed. The locations for these transfers were used in the following step to assist in identifying transits and transit types between transfers.

Figure 9 Example in Figure 8 with data combined and sorted by date.

Figure 10 shows the final result of the ANT transfer data for the oil barge Sixty Five Roses with consecutive transfers outside the study area removed. This data was used to populate a new
spreadsheet, which combined ANT data and information about transits from AIS as described in Step 2.

Figure 10 Example of Advanced Notice of Oil Transfer (ANT) search results with consecutive transfers outside of study area removed.

**Step 2. ANT transfer data was used to populate a spreadsheet**

To compare traffic trends for ATBs and oil barges, Ecology created a new spreadsheet to document transfer data and the number and type of transits for each barge in Tables 2-4.

Figure 11 shows an expanded view of all columns on the spreadsheet.

```plaintext
<table>
<thead>
<tr>
<th>Information Source</th>
<th>Barge/Tug</th>
<th>Company</th>
<th>Date</th>
<th>SJDF Transit</th>
<th>Transit Origin</th>
<th>Transit Destination</th>
<th>Rosario Transit</th>
<th>Area East of Rosario Transit</th>
<th>Haro Transit</th>
<th>Transfer Deliverer</th>
<th>Transfer Receiver</th>
<th>Transfer Type</th>
<th>Product Transferred</th>
<th>Quantity Transferred</th>
<th>95% Barge Capacity</th>
<th>Engaged in Bunkering?</th>
<th>Barge activity</th>
<th>Activity Summary</th>
</tr>
</thead>
</table>
```

Figure 11 Spreadsheet columns

The ANT data from Step 1 was entered into the spreadsheet and organized alphabetically by the name of the barge and then chronologically oldest to newest.

Figure 12 shows the transfer data for the oil barge Sixty Five Roses from Figure 10 entered into the spreadsheet.
Each row of the spreadsheet organizes Sixty Five Roses’ transfer data as follows:

The information source was the ANT database. The transit columns ‘SJDF (Strait of Juan de Fuca) Transit’, Rosario Transit’, ‘area east of Rosario Transit’ and ‘Haro Transit’ were filled in with a zero, meaning a transit did not occur through these areas.

The ‘Transit Origin’ and ‘Transit Destination’ columns were both filled in with the city the transfer occurred in.

Because the ‘Transfer Type’ column in this example indicates all of the transfers were either cargo or lightering\(^{20}\) transfers, the ‘Engaged in Bunkering?’ column was filled in with ‘NO’.

The column ‘Barge Activity’ was filled in by reviewing the ‘Transfer Deliverer’ and ‘Transfer Receiver’ columns. For the first row in Figure 12, the barge Sixty Five Roses was in the ‘Transfer Deliver’ column and SeaPort (Tacoma) was in ‘Transfer Receiver’ column. The ‘Barge Activity’ column for this row was entered as: ‘Barge deliver to terminal’.

**Step 3. AIS data was used to determine the vessel’s transit route between transfers**

Using SiiTech WEB VTS to access the AIS history function, Ecology determined vessel transit routes, and added transit data to the spreadsheet.

Because oil barges are not required to have an AIS unit onboard (CFR 33.164.46(b)), Ecology tracked the tug which was paired with the barge at the time of the transit. Many tug and barge combinations were fairly static; however, some companies used several different tugs interchangeably with their barges. If it was necessary to determine which tug was paired with the barge, the ANT transfer data from before or after the transit was referenced for the date, time, and location. The AIS history function was used to identify the tug paired with the barge at the location and time of the transfer.

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\(^{20}\) The term ‘lightering’ means the transfer of a cargo of hazardous material in bulk from one vessel to another. See Appendix G Maritime Definitions
Figure 13 is an example of a section of the spreadsheet with the AIS and ANT data for barge Sixty Five Roses and tug Ann T Cheramie, for September 1, 2019, to November 30, 2019. Each row represents a unique transfer or transit.

<table>
<thead>
<tr>
<th>INFO source</th>
<th>Tug/Barge</th>
<th>Company</th>
<th>Date</th>
<th>SIDF Transit</th>
<th>Transit ORIGIN</th>
<th>Transit DESTINATION</th>
<th>ROSARIO Transit</th>
<th>Area East of Rosario Transit</th>
<th>HARO Transit</th>
<th>Transfer Deliverer</th>
<th>Transfer Receiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIS</td>
<td>SIXTY FIVE RC CENTERLIF</td>
<td>10/2/2019</td>
<td>0</td>
<td>SEATTLE</td>
<td>FERNDALE</td>
<td>1 0</td>
<td>0</td>
<td>Transit/No Transfer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIS</td>
<td>SIXTY FIVE RC CENTERLIF</td>
<td>10/5/2019</td>
<td>0</td>
<td>FERNDALE</td>
<td>ANCHOR AN</td>
<td>1 0</td>
<td>0</td>
<td>Transit/No Transfer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIS</td>
<td>SIXTY FIVE RC CENTERLIF</td>
<td>10/11/2019</td>
<td>0</td>
<td>ANCHOR AN</td>
<td>TACOMA</td>
<td>1 0</td>
<td>0</td>
<td>Transit/No Transfer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIS</td>
<td>SIXTY FIVE RC CENTERLIF</td>
<td>10/15/2019</td>
<td>0</td>
<td>SEATTLE</td>
<td>SEATTLE KIN</td>
<td>0 0</td>
<td>0</td>
<td>Sixty Five SeaPort</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIS</td>
<td>SIXTY FIVE RC CENTERLIF</td>
<td>10/16/2019</td>
<td>0</td>
<td>FERNDALE</td>
<td>FERNDALE P</td>
<td>0 0</td>
<td>0</td>
<td>Trans Porto</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIS</td>
<td>SIXTY FIVE RC CENTERLIF</td>
<td>10/19/2019</td>
<td>0</td>
<td>FERNDALE</td>
<td>SEATTLE</td>
<td>1 0</td>
<td>0</td>
<td>Transit/No Transfer</td>
<td></td>
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</tr>
<tr>
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<td>SIXTY FIVE RC CENTERLIF</td>
<td>10/23/2019</td>
<td>0</td>
<td>SEATTLE</td>
<td>SEATTLE KIN</td>
<td>0 0</td>
<td>0</td>
<td>Sixty Five Kinder Mo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIS</td>
<td>SIXTY FIVE RC CENTERLIF</td>
<td>10/23/2019</td>
<td>0</td>
<td>FERNDALE</td>
<td>FERNDALE P</td>
<td>0 0</td>
<td>0</td>
<td>Trans Porto</td>
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<td>SEATTLE</td>
<td>SEATTLE KIN</td>
<td>0 0</td>
<td>0</td>
<td>Sixty Five Kinder Mo</td>
<td></td>
<td></td>
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</tr>
<tr>
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<td>10/30/2019</td>
<td>0</td>
<td>SEATTLE</td>
<td>SEATTLE TEF</td>
<td>0 0</td>
<td>0</td>
<td>Sixty Five DR. BONN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIS</td>
<td>SIXTY FIVE RC CENTERLIF</td>
<td>10/31/2019</td>
<td>0</td>
<td>FERNDALE</td>
<td>FERNDALE P</td>
<td>0 0</td>
<td>0</td>
<td>Sixty Five</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>SIXTY FIVE RC CENTERLIF</td>
<td>11/1/2019</td>
<td>0</td>
<td>FERNDALE</td>
<td>FERNDALE P</td>
<td>0 0</td>
<td>0</td>
<td>Sixty Five</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIS</td>
<td>SIXTY FIVE RC CENTERLIF</td>
<td>11/2/2019</td>
<td>0</td>
<td>FERNDALE</td>
<td>SEATTLE</td>
<td>1 0</td>
<td>0</td>
<td>Transit/No Transfer</td>
<td></td>
<td></td>
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<td>AIS</td>
<td>SIXTY FIVE RC CENTERLIF</td>
<td>11/3/2019</td>
<td>0</td>
<td>SEATTLE</td>
<td>SEATTLE KIN</td>
<td>0 0</td>
<td>0</td>
<td>Sixty Five Kinder Mo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIS</td>
<td>SIXTY FIVE RC CENTERLIF</td>
<td>11/8/2019</td>
<td>1</td>
<td>FERNDALE</td>
<td>OCEAN</td>
<td>0 0</td>
<td>0</td>
<td>Transit/No Transfer</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 13 Example of a section of the spreadsheet showing transit and transfer information for the barge Sixty Five Roses and tug Ann T Cheramie

Using the data from Figure 13, the following three examples show a typical sequence of events, including the transit of the tug and barge to a transfer location, an oil transfer, and the transit from the transfer location to another destination.

**Transit from Seattle to Ferndale**

ANT data shows the barge Sixty Five Roses transferring cargo in Ferndale on October 2, 2019. AIS data shows the tug Ann T Cheramie in transit from Seattle to Ferndale on October 2, and Ecology determined the Ann T Cheramie was paired with the barge Sixty Five Roses.

Figure 13, line 17: The columns from left to right show:

- ‘Info Source’ was AIS.
- ‘Transit Origin’ was determined either by the site of the last transfer or the tug’s track line using the AIS history function. In this example, the ‘Transit Origin’ was Seattle.
- ‘Transit Destination’ was determined by the site of the next transfer or the tug’s track line using the AIS history function. In this example, the ‘Transit Destination’ was Ferndale.
• Ecology reviewed AIS history to observe the routes used by the transiting vessel. The columns ‘SJDF Transit’, ‘Rosario Transit’, ‘area east of Rosario Transit’, and ‘Haro Transit’ were used to indicate the transit route. In this example, the tug and barge used Rosario Strait for the transit from Seattle to Ferndale, and did not transit in the other areas. Row 17 indicates this by recording ‘0’ for the ‘SJDF Transit’, ‘area east of Rosario Transit’
  and ‘Haro Transit’, and a ‘1’ for ‘Rosario Transit’.

• The ‘Transfer Deliverer’ and ‘Transfer Receiver’ columns were filled in with ‘Transit/no transfer.’

**Transfer at Ferndale**

Figure 13, Row 18: ANT data show barge Sixty Five Roses received oil as cargo from Ferndale Phillips 66 on October 2, 2019.

**Transit from Ferndale to anchorage**

Figure 13, Row 19: AIS data show the tug Ann T Cheramie in transit from Ferndale on October 5, 2019. Ecology determined the tug was paired with the barge Sixty Five Roses. The columns from left to right show:

• ‘Info Source’ was AIS.
• ‘Transit Origin’ was determined by the site of the last transfer or the tug’s track line using the AIS history function. In this example, the ‘Transit Origin’ was Ferndale.
• ‘Transit Destination’ was determined by the site of the next transfer or the tug’s track line using the AIS history function. In this example, the ‘Transit Destination’ was Anchor Anacortes.
• Ecology reviewed AIS history to observe the routes used by the transiting vessel. In this example, the tug and barge used Rosario Strait for the transit from Ferndale to the Anacortes anchorage, and did not transit in the other areas. Row 19 indicates this by recording ‘0’ for the ‘SJDF Transit’, ‘area east of Rosario Transit’, and ‘Haro Transit’, and a ‘1’ for ‘Rosario Transit’.
• ‘Transfer Deliverer’ and ‘Transfer Receiver’ were filled in with ‘Transit/no transfer’

**Transit from anchorage to Tacoma**

Figure 13, Row 20: AIS data shows the tug Ann T Cheramie (with barge Sixty Five Roses) in transit from the Anacortes anchorage on October 11, 2019.

• ‘Info Source’ was AIS.
• ‘Transit Origin’ was determined by the site of the last transfer or the tug’s track line using the AIS history function. In this example, ‘Transit Origin’ was Anchor Anacortes.
• ‘Transit Destination’ was determined by the site of the next transfer or the tug’s track line using the AIS history function. In this example, ‘Transit Destination’ was Tacoma.
• Ecology reviewed AIS history to observe the routes used by transiting vessels. In this example, the tug and barge used Rosario Strait for the transit from the Anacortes

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21 If marked this would indicate the vessel only transited in the connected waterways east of Rosario Strait.
22 This is filled in with a zero because the vessel did not transit exclusively in the waterways east of Rosario Strai
anchorage to Tacoma, and did not transit in the other areas. Row 20 indicates this by recording ‘0’ for the ‘SJDF Transit’, ‘area east of Rosario Transit’, and ‘Haro Transit’, and a ‘1’ for ‘Rosario Transit’.

- ‘Transfer Deliverer’ and ‘Transfer Receiver’ are filled in with ‘Transit/no transfer’

Gaps in dates indicate the vessel was either not underway or was in transit outside the study area.

**Step 4. Determine transit type**

The tug escort requirement covers a laden transit for ATBs and oil barges greater than 5,000 DWT which are not engaged in bunkering operations (RCW 88.16.260).

**Definitions of laden and unladen:**

In the scope of work, the BPC uses a definition from an existing Statement of Policy as adopted by the Board of Pilotage Commissioners in regular session on March 15, 2005 and modified on April 21, 2005 to determine when a tank vessel is in ballast. This statement of policy was used for interpreting the terms laden or in ballast for RCW 88.16.190 and WAC 363-116-500. It describes a tank vessel 40,000 deadweights tons or more as in ballast when the clingage, residue, or other applicable cargo onboard is less than 0.5 percent of the vessel’s maximum cargo carrying capacity or 3,000 barrels, whichever is less (Board of Pilotage Commissioners, 2005).

In the scope of work the BPC further describes a tank vessel below 40,000 deadweight tons, as in ballast when the clingage, residue, or other applicable cargo onboard is less than 2 percent of the vessel’s maximum cargo carrying capacity or 3,000 barrels, whichever is less (Board of Pilotage Commissioners, 2020b). With the ANT data available, Ecology was not able to calculate the precise amount of cargo left onboard a vessel after discharge.

Ecology was able to determine each vessel’s maximum cargo carrying capacity and determine the percent of the maximum capacity for each transfer based on ANT cargo data. For instance a vessel whose maximum loaded capacity is 2,246,250 gallons loads 2,100,000 gallons of diesel. This vessel is loading 93.5 percent of its maximum capacity.

Ecology determined a vessel’s laden or unladen status based on a common industry practice of loading no more than 95 percent of the maximum loaded capacity of the tank vessel. In the example above this vessel is loading a partial load, because it is loading less than 95 percent of its maximum capacity.

Ecology assigned a type to each transit, e.g., ‘likely laden’, ‘likely unladen’, or ‘engaged in bunkering’, by consulting the oil transfers prior to and after each transit.

A vessel’s transit type was considered ‘likely laden’ if the vessel loaded a partial (less than 95 percent of maximum cargo capacity) or full load (equal or greater than 95 percent of maximum

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23 assuming a medium density oil such as #2 fuel oil with an API gravity at 60°F between 30 and 42 and a specific gravity, at 60/60°F, and the density, at 15.6°C, between 0.88 and 0.82
cargo capacity) at the transfer prior to the transit or discharged a partial or full load at the transfer after the transit.

A vessel’s transit was considered ‘likely unladen’ if the vessel discharged a full capacity load prior to the transit or loaded a full capacity load after the transit.

A transit was considered ‘engaged in bunkering’ if it was a transit either to or from a bunkering.

In some cases Ecology was unable to make a determination of transit type. In these cases the transit type was labeled ‘unknown’.

Figure 14 describes how a determination of the transit status was made.

Figure 14 Logic diagram describing how a transit type was determined

In addition to evaluating transits using the logic diagram, Ecology conducted an extended review of specific Haro Strait transits that were identified as ‘unknown’. This extended review was conducted to determine if tank vessel transits may have been affected by the new tug escort requirement. In these cases, Ecology reviewed ANT data for the oil transfers before or after the transit to see if the amount transferred was reasonably close to 95 percent of the vessel’s cargo capacity.

Figure 15 is a portion of the spreadsheet showing the transfer and transit data for tug Ann T Cheramie and barge Sixty Five Roses using data from steps 2 and 3. Ecology has recorded the barge activity and/or transit type in the column ‘Barge Activity/laden/unladen’. This portion of
the spreadsheet records the barge Sixty Five Roses as transiting in the Strait of Juan de Fuca twice, and Rosario Strait nine times. Of the transits in Rosario five were determined to be laden and four were ‘unknown’.

Figure 15 Example of the spreadsheet for the barge Sixty Five Roses from October 1, 2019, to February 17, 2020

An example of a determination of ‘unknown’:

In Figure 15, Row 835 (second from top row): ANT data shows the barge Sixty Five Roses received 3,360,000 gallons of cutter stock from Phillips 66 in Ferndale. This transfer was considered a partial load, since 95 percent of Sixty Five Roses’ maximum cargo capacity is 3,516,666 gallons. Using the logic diagram in Figure 14, Ecology entered ‘unknown’ as the transit type for the transit from Seattle to Ferndale which preceded the transit.

Additional discussion determining the laden or unladen status of tank vessels is provided in the Data Challenges section and Appendix J.

**Synopsis Step 4: Collect data on escort tug activity**

Ecology reviewed AIS data to compile a list of tugs performing escort duties. To determine changes in activity, Ecology compared the number of times these specific escort tugs crossed virtual lines that were placed in key locations within the study area.

**Tugs engaged in escort activities**

Identifying tugs used for escort duties involved two steps:

**Step 1: Review AIS history to observe tugs performing escort duties**

Using SiiTech Web VTS to access the AIS history function, Ecology observed tugs performing escort duties in the study area. Figure 16 shows an example of the AIS history replay screen, with a tug (and oil barge) and an escort tug.
Step 2: Identify purpose-built tugs and multi-purpose tugs

In Puget Sound there are several purpose-built escort and large ship-assist tugs stationed in or near the study area that historically provided escort tug service. There are also coastal and harbor tugs\(^{24}\) which could be used for tug escort services (Board of Pilotage Commissioners, 2020a) (RCW 88.16.260). For this synopsis, the term multi-purpose tug was used to define a vessel being used for more than one type of service - for instance a coastal or harbor tug, typically used to tow oil barges, also used for escort service.

Ecology researched each tug observed performing escort duties to determine which tugs were purpose-built for escort and ship assist duties. Tug company websites provided information about individual tugs (Figure 17).

\(^{24}\) For a definitions of escort, ship assist, coastal, and harbor tugs see Appendix G Maritime Definitions
The following tugs are in operation in the Pacific Northwest:

<table>
<thead>
<tr>
<th>Vessel Name</th>
<th>Horsepower</th>
<th>Bollard Pull</th>
<th>Propulsion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nanuq</td>
<td>10,192</td>
<td>220,000 lbs</td>
<td>Voith-Schneider Cycloidal</td>
</tr>
<tr>
<td>Tan’erliq</td>
<td>10,192</td>
<td>220,000 lbs</td>
<td>Voith-Schneider Cycloidal</td>
</tr>
<tr>
<td>Response</td>
<td>7,240</td>
<td>154,000 lbs</td>
<td>Voith-Schneider Cycloidal</td>
</tr>
<tr>
<td>Protector</td>
<td>5,500</td>
<td>120,000 lbs</td>
<td>Voith-Schneider Cycloidal</td>
</tr>
<tr>
<td>Guard</td>
<td>5,500</td>
<td>120,000 lbs</td>
<td>Voith-Schneider Cycloidal</td>
</tr>
<tr>
<td>Guide</td>
<td>4,800</td>
<td>111,500 lbs</td>
<td>Voith-Schneider Cycloidal</td>
</tr>
<tr>
<td>Chief</td>
<td>4,800</td>
<td>111,500 lbs</td>
<td>Voith-Schneider Cycloidal</td>
</tr>
</tbody>
</table>

Figure 17 Crowley website\(^{25}\) information on their ship-assist and escort tug fleet operating in Pacific Northwest

Ecology’s AIS review observed purpose-built escort and ship assist tugs exclusively performing escort duties before the new tug escort requirements were implemented. Post-implementation, Ecology observed both purpose-built and multi-purpose tugs performing escort duties.

Ecology developed two lists – a list of purpose-built tugs provided in Appendix P, and a list of multi-purpose tugs provided in Appendix Q.

**Escort tug patterns of activity**

Ecology used crossing lines to collect data on escort tug movements in the study area. This involved three steps:

**Step 1 – Create the crossing lines (zones)**

The Marine Exchange AIS system refers to all shapes, including crossing lines, drawn on the AIS chart as ‘zones’.\(^{26}\) To create crossing line zones, Ecology placed two latitude and longitude points on the AIS chart and drew a line between them. Ecology named each crossing line, for example Saddlebag to Guemes Island (Figure 18).

\(^{25}\) https://www.crowley.com/shipping/sae/fleet/#pacific-northwest

\(^{26}\) In the Marine Exchange system a ‘crossing line’ is labeled ‘Zone Type - Line L’ (drawn from left to right across the chart) or ‘Zone Type - Line R’ (drawn from right to left across chart). The direction of the drawn line is used to determine the relationship of a vessel’s crossing and interpret the vessel ‘entering’ or ‘exiting’ the zone.
Figure 18 AIS screen used for creating crossing lines

Figure 19 shows the location of the following escort tug crossing lines:

- Rosario Strait North
- Rosario Strait South
- Guemes Channel (Guemes Island to Cap Sante on Fidalgo Island)
- Bellingham Channel (Guemes Island to Cypress Island)
- Sinclair Island to Lummi Island
- Saddlebag Island to Guemes Island
Figure 19 Map showing the crossing lines for escort tug reports

**Step 2 - Create a group of vessels (filter)**

Ecology used the Maritime Mobile Service Identity (MMSI) number\(^{27}\) for each tug in Appendix P and Q to define ‘groups’ in AIS (Figure 20).

\(^{27}\) The MMSI number uniquely identifies a vessel in AIS. See Appendix G Maritime Definitions.
These groups were then used to create a filter for Enter/Exit reports.

![Filters](image1.png)

**Figure 21 Creating filters using groups**

**Step 3 - Run AIS reports**

Ecology created reports using the zones (crossing line) and filters (group). Figure 22 shows the Saddlebag to Guemes Island Escort Tug report creation. Crossing line reports were each run twice for the synopsis period, once with the purpose-built tugs and once with the multi-purpose tugs.

![Reports](image2.png)

**Figure 22 Creating reports using zones and filter groups**

Figure 23 shows the reports created for the synopsis. The crossing lines (zones) are named, and the filter of escort tug or multi-purpose tug are available. Reports were run by setting the starting date and time and the ending date and time and then exporting the results to Excel.
Figure 23 Crossing line reports for escort tugs, multi-purpose tugs, and tankers

A sample of the Saddlebag to Guemes Island Escort Tugs report results for start date July 1, 2020, and end date August 31, 2020, is shown in Figure 24. This portion of the report shows the escort tug, TUG RESPONSE, transiting the Saddlebag to Guemes Island crossing line 30 times between July 6, 2020, and August 31, 2020.

Figure 24 Sample of Enter/Exit Report for Saddlebag to Guemes Island Tug Response

A tug performing escort duties can transit several crossing lines in one ‘trip’. For this synopsis a trip is defined as the time from when the tug’s dispatch assigned the tug to an escort job until the tug returns to station28. Tugs performing escort duties may transit crossing lines while waiting for an assigned vessel, while traveling to meet an assigned vessel or traveling back to their assigned station, or while transiting the area for other business purposes.

28 See Appendix F, Synopsis Terminology
Example for an escort tug stationed near the Cherry Point refinery:

A tug stationed near the northern refinery is assigned an inbound escort for an ATB transiting to the Vendovi anchorage in Anacortes.

The escort tug leaves Cherry Point and transits the Rosario Strait north and south crossing lines to meet the ATB. The tug escorts the ATB to the Vendovi Anchorage, transiting the Rosario Strait south, Guemes Channel, and Saddlebag to Guemes Island crossing lines. After finishing the escort job, the tug transits the Sinclair Island to Lummi Island and the Rosario Strait north crossing lines to return to station near Cherry Point. This trip transited crossing lines seven times.

After this trip the escort tug transited to Seattle and then returned to Cherry Point. The escort tug crossed the Rosario Strait north and south crossing lines twice. Although the tug was not performing escort tug duties, these four crossing line transits are counted using the crossing line method.

Example for an escort tug stationed near Anacortes:

A tug stationed near Anacortes is assigned a tug and oil barge to escort from a March Point refinery to the south end of Rosario Strait. The escort tug got underway and transit the Guemes Channel crossing line five times\(^{29}\) while waiting for the tug and barge to finish getting underway from the refinery. The escort tug escorts the tug and oil barge through the Guemes Channel and the south end of Rosario Strait transiting the Guemes Channel and Rosario Strait south crossing lines. After finishing the escort the tug returns to station transiting the Rosario Strait south and the Guemes Channel crossing lines. This trip transited crossing lines nine times.

**Synopsis Step 5: Collect data on oil transfers**

To determine changes in the number of oil transfers in the study area, Ecology gathered data on the number of oil transfers in the study area at refineries and anchorages, pre- and post-escort implementation.

**Refineries in study area**

There are five major oil refineries in Washington. The four located in the study area are shown in Table 5 and Figure 25. Appendix H has additional information on these refineries.

\(^{29}\) Each transit was greater than five minutes from the previous transit. Crossing line transits closer than five minutes apart were not counted as vessel was assumed holding station near the crossing line rather than purposefully transiting over the crossing line.
Table 5 Oil refineries in study area with common name, year constructed, and current capacity in barrels per day (Smith, 2015).

<table>
<thead>
<tr>
<th>Refinery Name</th>
<th>Common name</th>
<th>Year Constructed</th>
<th>Current Capacity (bbls/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tesoro Refining &amp; Marketing Company</td>
<td>Anacortes Refinery</td>
<td>1955</td>
<td>119,000</td>
</tr>
<tr>
<td>BP Cherry Point Refinery</td>
<td>BP Cherry Point/Cherry Point</td>
<td>1971</td>
<td>225,000</td>
</tr>
<tr>
<td>Phillips 66 Ferndale Refinery</td>
<td>Phillips 66 Ferndale</td>
<td>1954</td>
<td>100,000</td>
</tr>
<tr>
<td>Shell Puget Sound Refinery¹</td>
<td>Shell Puget Sound/March Point Shell</td>
<td>1957</td>
<td>145,000</td>
</tr>
</tbody>
</table>

¹ Shell Puget Sound refinery was sold to HollyFrontier Corporation (Shell US, 2021).

* barrels/day

Note: Shell Puget Sound refinery was sold to HollyFrontier Corporation (Shell US, 2021).

Figure 25 Map of refineries in the study area³⁰

³⁰ On May 4, 2021 Shell, US website (2021) Shell announced it had reached an agreement for the sale of its Puget Sound Refinery near Anacortes, Washington to a subsidiary of HollyFrontier Corporation, an independent refiner headquartered in Texas.
Anchorages in study area

Anchorages in the Puget Sound are established in 33 C.F.R. Parts 109-110\(^{31}\) and specific regulations applicable to each anchorage are contained in 33 C.F.R. 110.230, Subpart B\(^{32}\). The General Anchorages in Puget Sound are intended for the use of commercial deep draft vessels greater than 200 feet in length, including Articulated and Integrated Tug Barge (ATB) combinations (Puget Sound Harbor Safety Committee, 2017).

In 2017, the Coast Guard issued a Notice of Proposed Rulemaking for the creation of new anchorage areas (Regulations.gov. 2017). The Coast Guard withdrew the proposed rulemaking in 2018 in response to public comments and to better analyze potential impacts to tribal treaty rights, especially treaty fishing rights (Regulations.gov. 2018).

The Puget Sound Harbor Safety Plan\(^{33}\) includes a section on anchoring in the Standards of Care portion of the plan with a table of anchorages available for use in Puget Sound. Several of the anchorages identified in the Coast Guard 2017 Notice of Proposed Rulemaking are listed in the Harbor Safety Plan table, as non-designated anchorages.

Table 6 and Figure 26 show anchorages commonly used in the study area for tankers, ATBs, and tug and barge units.

Appendix I has additional information on anchorages in the study area.

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\(^{31}\) https://www.ecfr.gov/current/title-33/chapter-I/subchapter-I/part-109
\(^{32}\) https://www.ecfr.gov/current/title-33/chapter-I/subchapter-I/part-110/subpart-B#110.228
\(^{33}\) https://static1.squarespace.com/static/59356b2ce3df280bc208d8b6/t/596ee7365016e13e3f335456/1500440374598/zHSP+Sec+C++Anchor.pdf
Table 6 List of anchorages in study area.

<table>
<thead>
<tr>
<th>General Anchorages</th>
<th>Abbreviations</th>
<th>Number of Vessels</th>
<th>Max Stay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bellingham Bay</td>
<td>BB</td>
<td>4</td>
<td>30 days</td>
</tr>
<tr>
<td>Cherry Point</td>
<td>CP</td>
<td>1</td>
<td>30 days</td>
</tr>
<tr>
<td>Anacortes West</td>
<td>ANW</td>
<td>1</td>
<td>6 days</td>
</tr>
<tr>
<td>Anacortes Central</td>
<td>ANC</td>
<td>1</td>
<td>10 days</td>
</tr>
<tr>
<td>Anacortes East</td>
<td>ANE</td>
<td>1</td>
<td>10 days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Designated Anchorages</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendovi Island East</td>
<td>VIE</td>
<td>4</td>
</tr>
<tr>
<td>Vendovi Island South</td>
<td>VIS</td>
<td>1</td>
</tr>
<tr>
<td>William Point (ATBs only)</td>
<td>WP</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional ATB Anchorage</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Neptune Beach</td>
<td>NB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Barge Anchorage*</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Jack Island North</td>
<td>JIN</td>
<td>N/A</td>
</tr>
<tr>
<td>Jack Island South</td>
<td>JIS</td>
<td>N/A</td>
</tr>
<tr>
<td>Cap Sante</td>
<td>CS</td>
<td>N/A</td>
</tr>
<tr>
<td>Hat Island</td>
<td>HI</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Additional anchorages for oil barges are not the Puget Sound Harbor Safety Plan anchorage table, but are noted on nautical chart (NOAA chart 18421).

Figure 26 Map of anchorages in the study area
Determining the number of oil transfers

Using reports from SPIIS, Ecology collected data on the number of transfers at the facilities and anchorages in the study area. SPIIS reports share data with the ANT system. The ANT system assigns a unique number to each oil transfer and Ecology used these unique ANT numbers to count oil transfers. Collecting the oil transfer data involved the following steps:

**Step 1 Run a vessel oil transfer report in SPIIS for each refinery and anchorage**

The SPIIS Vessel Oil Transfer report returns all of the ANT entries for the selected location over the specified date range. Figure 27 is an example of the SPIIS Vessel Oil Transfer report screen for oil transfers at the Ferndale Philipps 66 refinery from September 1, 2019, to September 30, 2019.

![SPIIS Vessel Oil Transfer Report](image)

Figure 27 Spills Program Integrated Information System (SPIIS) report Vessel Oil Transfer
Step 2 Export results into Excel and sort by ANT number

Report results were exported from SPIIS into Excel to allow for sorting, as shown in Figure 28.

![Figure 28 Export of SPIIS Vessel Oil Transfer report results for Ferndale Phillips 66 refinery](image)

Step 3 Verify each unique ANT number is counted once, for transfers with multiple types of oil

The ANT system assigns a unique number for each oil transfer. If more than one product is entered for the transfer, each transfer type, product, and quantity will be assigned to this unique ANT number. Transfers involving multiple products at the same time may have more than one entry using the same ANT number. For the synopsis, each transfer operation was only counted once. In Figure 29, the duplicate ANT numbers are highlighted in gray.

![Figure 29 Spills Program Integrated Information System (SPIIS) report Vessel Oil Transfer](image)

Step 4 Count unique ANTs for each refinery and anchorage

Each unique ANT number is counted. In Figure 29, the oil transfer count for the Ferndale Phillips 66 refinery from September 1, 2019, to September 8, 2019 is 12 unique ANT transfers.
Synopsis Step 6: Collect data on movements of tankers with no additional escort requirements

In addition to comparing the transits of tugs pre- and post-tug escort implementation, the scope of work required Ecology to determine any changes in the transits of deep draft vessels with no additional escort requirements. Ecology consulted with the BPC to define ‘deep draft vessels with no additional escort requirement’ as oil tankers which already required tug escort within the study area (i.e., oil tankers greater than 40,000 DWT). LNG and LPG tankers were not considered as they did not meet the definition of oil tanker as given in the scope of work34 (Board of Pilotage Commissioners, 2020b).

Oil Tanker Movements

To determine if the tug escort rule implementation had any effect on traffic patterns for oil tankers over 40,000 DWT, Ecology used crossing lines to collect data on tanker movements. This was similar to the method used to gather data on escort tug patterns of activity. The Crossing Line method for tankers with no additional escort requirements had four steps:

Step 1 – Create crossing lines (zones)

In consultation with the BPC and Puget Sound pilots the crossing lines below were created to count tanker transits in Haro Strait and Boundary Pass, Rosario Strait, and connected waterways east of Rosario Strait.

- Bellingham Channel (Guemes Island to Cypress Island)
- Boundary Pass
- Guemes Channel (Guemes Island to Cap Sante on Fidalgo Island)
- Haro Strait
- Rosario Strait north
- Rosario Strait south
- Saddlebag Island to Guemes Island
- Sinclair Island to Lummi Island

The crossing lines are the same as those used for escort tug movements, with the addition of Haro Strait and Boundary Pass. Because deep draft tankers frequently use Haro Strait and Boundary Pass, these crossing lines were added to the data set.

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34 Oil - It is the interpretation of the Board that, as per RCW 90.56.010 (19), the definition of “oil” or “oils” means oil of any kind that is liquid at twenty-five degrees Celsius and one atmosphere of pressure and any fractionation thereof.
Figure 30 Map showing crossing lines for tankers not subject to the new tug escort requirements

**Step 2 Create a filter using vessel type ‘tanker’**

The Marine Exchange Web-based AIS program allows the user to select a ship type as a filter. Figure 31 is a screenshot of the filter showing tanker as ship type.

![Filter Screenshot](image)

Figure 31 Create AIS report filter for ‘tankers’
Step 3 Run AIS reports

![AIS report screenshot]

Figure 32 Run AIS crossing line reports

Step 4 Delete tankers less than 40,000 DWT

The crossing line report results were exported into Excel. Each tanker’s type and deadweight tonnage was determined using the Marine Traffic website. LNG and LPG as well as vessels with deadweight tonnage less than 40,000 tons were removed and not counted in the crossing line report. In Figure 33 four tankers over 40,000 DWT transited the crossing line ‘Boundary Pass’ eight times.

![Crossing line report table]

Figure 33 Example of Boundary Pass tanker crossing line report. Tankers less than 40,000 deadweight tons are highlighted in blue.

Synopsis Step 7: Write a review of the last 5 years of existing vessel transit data

Ecology used VEAT data to review traffic trends for synopsis vessel types over the last five years. The review is a broad overview of the use of Rosario Strait, connected waterways east, Haro Strait, and Boundary Pass by ATBs, oil barges and tankers. This review is meant to provide a measure to compare to the changes which occurred in the traffic prior to tug escort requirements to the year after the requirements went into effect.
Data Challenges

The Synopsis of Changing Vessel Traffic Trends Scope of Work (Appendix D) identifies four data challenges (Board of Pilotage Commissioners, 2020b):

- ANTs use barge names and AIS tracks tug but not barges
- Towed oil barges are not always towed by the same vessel
- Linking vessel routes to ANTs could be prohibitively time consuming if not automated
- Marine Exchange crossing line data does not provide route information, or information on laden or unladen status

Ecology identified an additional seven challenges related to data. Three data challenges involving ANT and AIS data had an effect on Ecology’s ability determine a vessel transit type, i.e., if was ‘likely laden’ or ‘likely unladen’.

Table 7 provides the combined list of data challenges, and an evaluation of their impact on the results of the synopsis. Appendix J describes all of the data challenges and mitigation methods in more detail.

Table 7 Synopsis data source matched to its challenge, issue, mitigation method, and evaluation of effect on synopsis results

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Challenge/Issue</th>
<th>Issue</th>
<th>Mitigation Method</th>
<th>Effect on Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIS</td>
<td>AIS transmits on Very High Frequency (VHF) wavelengths which are line of sight</td>
<td>Signal can be blocked or lost</td>
<td>AIS history function was used to move forward or backward through time in one hour increments until the signal reestablished</td>
<td>None</td>
</tr>
<tr>
<td>AIS</td>
<td>Some AIS data is self-reported by operator</td>
<td>Inaccuracies in AIS data</td>
<td>Vessel’s unique MMSI numbers were used for creating filters or performing vessel searches</td>
<td>None</td>
</tr>
<tr>
<td>AIS/ANT</td>
<td>Transfer data was retrieved from the ANT system and transit data was retrieved from the AIS system</td>
<td>ANTs use barge names and AIS uses vessel names, and towed oil barges are not always towed by the same vessel</td>
<td>Many tug/barge combinations were stable. If determining a match was necessary, Ecology compared ANT and AIS data</td>
<td>None</td>
</tr>
<tr>
<td>AIS/ANT</td>
<td>Transfer data was retrieved from the ANT system and transit data was retrieved from the AIS system</td>
<td>Linking vessel routes to ANTs could be prohibitively time consuming if not automated</td>
<td>The manual method devised by Ecology made linking AIS data to ANT data manageable for this synopsis</td>
<td>None</td>
</tr>
</tbody>
</table>
Table 7 Synopsis data source matched to its challenge, issue, mitigation method, and evaluation of effect on synopsis results, continued

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Challenge/Issue</th>
<th>Issue</th>
<th>Mitigation Method</th>
<th>Effect on Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIS/ANT</td>
<td>Marine Exchange crossing line data does not provide route information, or information on laden or unladen status</td>
<td>No single data source provides information about whether a tank vessel meets the definition of laden or unladen for a particular transit</td>
<td>The manual method and a logic diagram were used to determine the transit type where possible, and a transit type of ‘unknown’ was assigned if the status could not be determined</td>
<td>Uncertainty in determining transit type</td>
</tr>
<tr>
<td>ANT</td>
<td>Ecology’s ANT system only includes oil transfers that take place in Washington waters</td>
<td>Incomplete information about oil onboard vessels</td>
<td>None</td>
<td>Uncertainty in determining transit type</td>
</tr>
<tr>
<td>ANT</td>
<td>ANT data is entered by the oil deliverer</td>
<td>Inaccuracies in ANT data</td>
<td>Ecology uses a quality assurance process for ANT data to identify and correct inaccuracies</td>
<td>None</td>
</tr>
<tr>
<td>ANT</td>
<td>The ANT database uses volume (gallons) rather than weight to express the quantity of cargo transferred</td>
<td>Oil volumes change with temperature and density, introducing error into determining the vessel’s loaded capacity</td>
<td>None</td>
<td>Uncertainty in determining transit type</td>
</tr>
<tr>
<td>SPIIS</td>
<td>SPIIS only contains arrival data for vessels bound for Washington ports</td>
<td>Gaps in SPIIS data</td>
<td>AIS crossing lines were used for data collected in Haro Strait and Boundary Pass</td>
<td>None</td>
</tr>
<tr>
<td>SPIIS</td>
<td>SPIIS vessel entry data can be affected by incomplete, inaccurate, or incorrectly entered Marine Exchange data</td>
<td>Inaccuracies in SPIIS data</td>
<td>Ecology ensures SPIIS data which is incomplete, duplicated, or inaccurate is corrected or removed as appropriate</td>
<td>None</td>
</tr>
<tr>
<td>VEAT</td>
<td>VEAT data was not available for the beginning of 2021</td>
<td>Gap in VEAT data</td>
<td>ANT data was substituted for VEAT data for the missing 2021 period</td>
<td>None</td>
</tr>
</tbody>
</table>
Result of data challenges on ability to determine transit type

Ecology combined two data sources to determine transit route and estimate the amount of oil carried as cargo onboard vessels. Transit were defined as ‘likely laden’, ‘likely unladen’, ‘unknown’, or ‘engaged in bunkering’.

Ecology was able to determine:

- A vessel’s route 100 percent of the time using AIS
- The transit type ‘engaged in bunkering’ 100 percent of the time using ANT data
- The transit type ‘likely laden’ or ‘likely unladen’
  - 48 percent of the time for the time for ATB
  - 65 percent of the time for barges greater than 5,000 DWT
  - 73 percent of the time for barges less than 5,000 DWT

Once data collection was complete, Ecology used a series of questions to set a criteria for evaluating if a Haro Strait transit was influenced by the new tug escort requirements. See additional discussion in the Results section.

Of 109 Haro Strait transits by vessels newly subject to the tug escort requirements, 38 were between the Strait of Juan de Fuca and Vancouver, B.C., and two between Victoria, B.C. and Vancouver, B.C. This is the usual route for these vessels. 44 transits used both Haro and Rosario Straits, and because a laden tank vessels would still require an escort through the Rosario Strait portion of the route, these transits were not counted as influenced by the escort tug requirement. Altogether, 84 of the 109 Haro Strait transits did not meet the criteria for likely influenced by the new tug escort requirement.

Ecology used the logic diagram (Figure 14) to assess whether a transit was likely laden or unladen for the remaining 25 transits. Ecology found the available information allowed a determination of the likely laden or unladen status for 16 of the 25 transits.

For the other nine transits, Ecology could not determine whether the tank vessel was likely laden or unladen using the logic diagram. In these cases, Ecology reviewed ANT data for the oil transfers before or after the transit to see if the amount loaded was reasonably close to 95 percent of the vessels cargo capacity. Ecology identified four transits where a reasonable assumption could be made based on this expanded review. In the remaining five cases, Ecology could not determine whether the vessel was laden or unladen. Four of these transits were by ATBs, and one was by a barge greater than 5,000 DWT.

The data challenges did not impact Ecology’s ability to identify a vessel’s selection of a Rosario Strait or Haro route. The final impact of all data challenges was the inability to determine the likely laden or unladen status of five Haro Strait transits, limiting Ecology’s ability to make a determination on whether these five transits were affected by the new tug escort requirements when making route selection.
Results for Deliverables

The deliverables in the scope of work were:

- Route selection and number of vessel transits for pre-and post-bill implementation for the following vessel types. Ecology will explore ways to compare transits on a common scale. These include:
  - Vessels that newly fall under an escort requirement
  - Deep draft and tug traffic that have no additional escort requirement
  - Vessels that are providing bunkering or refueling services
- Routes compared will include, but will not be limited to transits of Rosario Strait and Haro Strait/Boundary Pass.
- Review of tugs engaged in escorting tank vessels in Rosario and connected waterways east, including but not limited to number of transits, names of vessels, and operating companies.
- Number of oil transfers per refinery and per anchorage pre- and post-bill implementation.
- A review of the last five years of existing vessel transit data, to provide context as to the overall trend in vessel movements, based on vessel types. Determining the laden/unladen status of tank vessels, deadweight tonnage of vessels, and details on vessel occupation (i.e., bunkering) would require a manual evaluation of each transit, and is outside the scope of this review.

The following sections discuss each deliverable in detail. The results for the synopsis research questions and a summary of Ecology’s findings are presented at the end of this chapter.

Results for route selection and number of vessel transits for vessels which newly fall under escort requirements

Overview

Ecology used the manual process described in the Data Analysis Methods section, and a review of VEAT data to evaluate route selection for vessels which newly fall under escort requirements. These vessels are laden ATBs and oil barges greater than 5,000 DWT, and tankers between 5,000 and 40,000 DWT.

Criteria for determining the effect of the tug escort requirement on route selection

Ecology used a series of questions to evaluate whether the tug escort requirement affected route selection for vessel transits. For each Haro Strait transit in Year 2 by tank vessels subject to the new tug escort requirement, Ecology asked:

- Was the selection of Haro Strait a change from previous transits between the same origin and destination by vessels from the same company?

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36 Barges less than 5,000 DWT are exempt from the new tug escort requirements.
Would transiting through Rosario Strait be a reasonable option, given the origin and destination? For instance, has the vessel used Rosario Strait in the past for the same origin and destination?

Did the vessel’s passage include a transit through both Haro and Rosario Straits? The transit through Rosario Strait by a laden vessel would require a tug escort.

Was the tank vessel likely laden, as determined by the process Ecology used for the synopsis?

Using these questions, Ecology counted a tank vessel’s Haro Strait transit as influenced by the new tug escort requirements if:

- The selection of Haro Strait was a change from previous passages
- A transit through Rosario Strait was a reasonable option
- The passage did not utilize both Haro and Rosario Straits
- The tank vessel was likely laden

Ecology did not count a tank vessel’s Haro Strait transit as influenced by the tug escort requirements in the following situations:

- The vessel’s company had a history of using this route in previous years
- Transiting through Rosario Strait was not a reasonable option, given the origin and destination (e.g., a transit from Victoria, B.C., to Vancouver, B.C.)
- The vessel transited both Haro and Rosario Straits, since laden tank vessels would still require an escort through the Rosario Strait portion of the route
- Ecology could not make a reasonable assumption about the laden or unladen status of a vessel, as an unladen transit through Rosario would not require an escort

In cases where Ecology’s process for determining whether a tank vessel was likely laden resulted in a designation of ‘unknown’, Ecology reviewed ANT data to identify whether a reasonable assumption could be made about the status of the transit.

Using these criteria, Ecology observed five transits by ATBs and 11 transits by barges greater than 5,000 DWT through Haro Strait in Year 2 where the tug escort requirements may have been a factor in deciding the route. Ecology did not observe any transits by tankers less than 40,000 DWT where the tug escort requirements may have been a factor in deciding the route. Additional information on these transits is provided below.

**Summary of Transits**

Table 8 shows the number of transits by vessels subject to the new tug escort requirements in Year 1 and Year 2 by vessel type, for Rosario Strait and Haro Strait. Transits for all three types of vessels (ATBs, barges, and tankers) increased in Year 2 compared to Year 1, for both Rosario Strait and Haro Strait.

This increase from September 1, 2020, to August 31, 2021, may be a reflection of the recovering economy in Year 2, during the third quarter of 2020. After a drop of 31.4 percent in gross domestic product (GDP) in the second quarter of 2020 the economy rebounded by an annual rate of 33.1 percent in the third quarter of 2020, according to the ‘advance’ estimate released by the Bureau of Economic Analysis (2020). VEAT data for these vessels shows an
overall decline between calendar year 2019 and 2020, reflecting the economic disruptions earlier in the pandemic.

Ecology reviewed VEAT data for the past five calendar years to determine whether the changes in the number of vessel transits from Year 1 to Year 2 represented a significant change for year-over-year transits. VEAT data has been collected for over 20 years, and can provide useful context for considering the changes in transits shown in the synopsis data. VEAT data are reported for calendar years and use a different methodology than the synopsis, so the number of transits do not match the Year 1 and Year 2 results of the synopsis. Additional discussion is provided in the VEAT data overview section.

**ATB route selection**

Table 8 shows ATB transits in Rosario Strait increased by 54 transits from Year 1 to Year 2. In Haro Strait, Year 2 transits were 31 higher than in Year 1.

Table 8 Route selection for vessels that fall under new escort requirements with change in the number of transits from Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021)

<table>
<thead>
<tr>
<th>Vessel Type / Route Selection</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Transits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel Type</td>
<td>ATB</td>
<td>ATB</td>
<td>Change</td>
</tr>
<tr>
<td>Rosario Strait</td>
<td>787</td>
<td>841</td>
<td>+54</td>
</tr>
<tr>
<td>Haro Strait</td>
<td>48</td>
<td>79</td>
<td>+31</td>
</tr>
<tr>
<td>Vessel type</td>
<td>Barges &gt; 5,000 DWT</td>
<td>Barges &gt; 5,000 DWT</td>
<td>Change</td>
</tr>
<tr>
<td>Rosario Strait</td>
<td>315</td>
<td>333</td>
<td>+18</td>
</tr>
<tr>
<td>Haro Strait</td>
<td>11</td>
<td>16</td>
<td>+5</td>
</tr>
<tr>
<td>Vessel Type</td>
<td>Tankers &lt; 40,000 DWT</td>
<td>Tankers &lt; 40,000 DWT</td>
<td>Change</td>
</tr>
<tr>
<td>Rosario Strait</td>
<td>15</td>
<td>26</td>
<td>+11</td>
</tr>
<tr>
<td>Haro Strait</td>
<td>7</td>
<td>14</td>
<td>+7</td>
</tr>
</tbody>
</table>

Table 9 shows the annual change in the number of ATB transits in both Rosario Strait and Haro Strait based on VEAT data. ATB transits through both straits demonstrate considerable change year-over-year.

Table 9 VEAT data showing the annual increase or decrease in the number of ATB transits year-over-year for Rosario and Haro Straits.

<table>
<thead>
<tr>
<th>Year</th>
<th>Rosario transits</th>
<th>Change</th>
<th>Haro Transits</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>707</td>
<td>-</td>
<td>11</td>
<td>-</td>
</tr>
<tr>
<td>2017</td>
<td>625</td>
<td>-82</td>
<td>21</td>
<td>+10</td>
</tr>
<tr>
<td>2018</td>
<td>684</td>
<td>+59</td>
<td>12</td>
<td>-9</td>
</tr>
<tr>
<td>2019</td>
<td>776</td>
<td>+92</td>
<td>56</td>
<td>+20</td>
</tr>
<tr>
<td>2020</td>
<td>667</td>
<td>-109</td>
<td>83</td>
<td>+24</td>
</tr>
</tbody>
</table>
Rosario Strait

VEAT data show between 2016 and 2020, transits through Rosario ranged from a low of 625 to a high of 776. Yearly changes are between -109 and +92. Overall, this data suggests that ATB transit patterns reflect business changes in the market for refined product transport. In the context of the last five years, the addition of 54 ATB transits in Rosario Strait between Year 1 and Year 2 does not appear to be unusual.

Haro Strait

VEAT data show in Haro Strait between 2016 and 2020 the lowest number of transits was 11 and the highest was 83. Yearly changes range from -9 to +24. The increase in ATB transits by 31 in Year 2 is higher than any year-over-year change observed between 2016 and 2020.

Table 10 shows ATB transits in more detail. In Year 1, out of 48 total Haro transits, 27 were between Vancouver, B.C., and the Strait of Juan de Fuca, and 21 were between Vancouver, BC and locations including Anacortes, Seattle, Tacoma, and Bellingham. 17 of the transits between Vancouver, B.C., and locations in the study area used both Haro and Rosario Straits, all of which occurred after the border closure between Canada and Washington in 2020 due to the pandemic.

In Year 2, 31 of the 79 Haro Strait transits were between Vancouver, B.C., and the Strait of Juan de Fuca, and 45 between Vancouver, B.C., and the study area. Two additional transits were between Vancouver, B.C., and Victoria, B.C. and one was between the ocean and Cherry Point. 35 transits between Vancouver, B.C and the study area used both Haro and Rosario Strait.

Table 10 Data for Haro Strait ATB transits Year 1 (September 1, 2019, to August 31, 2020) and Year 2 (September 1, 2020, to August 31, 2021)

<table>
<thead>
<tr>
<th></th>
<th>Between Strait of JdF&lt;sup&gt;1&lt;/sup&gt; And Vancouver, BC</th>
<th>Between Vancouver, BC And Study Area</th>
<th>Total Haro Strait Transits</th>
<th>Transits using Both Haro and Rosario</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 1</strong></td>
<td>27</td>
<td>21</td>
<td>48</td>
<td>17</td>
</tr>
<tr>
<td><strong>Year 2</strong></td>
<td>31</td>
<td>45</td>
<td>79&lt;sup&gt;2&lt;/sup&gt;</td>
<td>35</td>
</tr>
</tbody>
</table>

<sup>1</sup> Strait of Juan de Fuca  <sup>2</sup> Three transits in Year 2 are not included in columns one and two of this table; two were between Vancouver and Victoria, one was from the ocean to Cherry Point

Canadian and Washington border closure

Much of the change in Haro Strait traffic patterns is likely a result of the pandemic border closure. Prior to the closure, VEAT data show zero transits between Vancouver, B.C., and the study area using both Rosario Strait and Haro Straits in a single passage. ATBs transiting from Washington’s northern refineries to British Columbia could embark or disembark British Columbia Coast Pilots while at refinery docks in Washington and transit to British Columbia by going north through Rosario Strait.

When the COVID-19 pandemic closed the border between Washington and Canada, the Pacific Pilotage Authority suspended out of district assignments for British Columbia Coast Pilots (PPA,
This caused a change in transit patterns by ATBs electing to use pilots. After the border closed, Puget Sound Pilots boarded ATBs for a transit south through Rosario Strait to the Puget Sound Pilot Station off of Port Angeles, Washington. The ATB then turned north and boarded British Columbia Coast Pilots at the pilot station off of Victoria, B.C. to transit through Haro Strait to Vancouver, B.C. This change took effect March 23, 2020, and therefore affected both years of synopsis data.

**ATB transits that may have been influenced by the tug escort requirement in Year 2**

Ecology determined 74 of the 79 Haro Strait transits were likely not affected by the tug escort requirement based on the following:

- 35 transits used both Haro and Rosario Straits, and laden tank vessels would still require an escort through the Rosario Strait portion of the route.
- 31 transits were between the Strait of Juan de Fuca and Vancouver, B.C., and this was a usual route used by the companies’ vessels in previous years.
- For four transits, Ecology could not determine if the transit was ‘likely laden’, or make a reasonable assumption about the status of the transit based on ANT data, as the average amount transferred was 52 percent of the vessel’s full capacity load, well below the vessel’s 95 percent fully laden capacity.
- Two transits were between Victoria, B.C. and Vancouver B.C., making the Haro Strait transit the reasonable option.
- Ecology made an assumption of unladen for one transit between Strait of Juan de Fuca and the refinery at Cherry Point based on ANT data showing the vessel loaded 95 percent of its full load capacity on arrival.
- Ecology made an assumption of unladen for one transit between Tacoma and Vancouver, B.C. based on ANT data. ANT data show the vessel entered the Puget Sound and sat idle for nearly two months, before the barge was vacuumed, the tug fueled and the vessel transited to Vancouver, B.C.

Ecology identified five of the 79 transits through Haro Strait where the tug escort requirements may have been a factor in deciding the route.

Ecology used the series of questions to evaluate the five Haro Strait transits between Vancouver B.C. and Tacoma:

- VEAT data show this company’s ATBs have a history of using Rosario Strait for similar transits.
- Rosario Strait would be a reasonable option for transiting between Vancouver, B.C. and Tacoma, as evidenced by past transits.

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37 The use of pilots is voluntary for ATBs in Rosario Strait and Haro Strait. RCW § 88.16.070 (2018) automatically exempts the following vessels:

1. Any U.S. flag vessel on a voyage in which it is operating exclusively on its coastwise, fishery, and/or recreational (pleasure) endorsement.
2. Any U.S. or Canadian flag vessel engaged exclusively in the coasting (coastwise) trade on the west coast of the Continental United States (including Alaska) and/or British Columbia (BC).
3. Any flag vessel in/outbound to/from Canadian ports which employs a pilot licensed by the Pacific Pilotage Authority (BC Pilots); uses the CVTS; and has appropriate charts (within certain geographic limits)
• The passage did not involve a transit of both Rosario and Haro Straits.
• These five transits were likely laden, based on ANT data and Ecology’s logic diagram.

Ecology determined the five likely laden transits through Haro Strait from Vancouver, B.C. to Tacoma in Year 2 may have been influenced by the tug escort requirement, since there was an observed change in the route selection between Year 1 and Year 2 for this ATB.

**Barges greater than 5,000 DWT**

Table 8 shows an increase of 18 transits in Rosario by barges greater than 5,000 DWT from Year 1 to Year 2. There was also a five transit increase in Haro Strait between Year 1 and Year 2.

Table 11 shows the annual change in transits in Rosario and Haro Strait for the last five years based on VEAT data. Between 2016 and 2020, transits through Rosario ranged from a low of 288 to a high of 656. Yearly changes are between -167 and +15. In Haro Strait, the lowest number of transits was 0 and the highest was 13.

Table 11 VEAT data showing the annual increase or decrease in the number of transits for barges greater than 5,000 DWT, and year-over-year changes, for Rosario and Haro Straits

<table>
<thead>
<tr>
<th>Year</th>
<th>Rosario Transits</th>
<th>Change</th>
<th>Haro Transits</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>656</td>
<td>-</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2017</td>
<td>486</td>
<td>-167</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2018</td>
<td>501</td>
<td>+15</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2019</td>
<td>412</td>
<td>-89</td>
<td>13</td>
<td>+13</td>
</tr>
<tr>
<td>2020</td>
<td>288</td>
<td>-124</td>
<td>9</td>
<td>-4</td>
</tr>
</tbody>
</table>

**Rosario Strait**

The increase of 18 transits in Rosario Strait between Year 1 and Year 2 does not appear to indicate a significant change in transits when compared to VEAT data showing year-over-year changes for the last five years as shown in Table 11.

**Haro Strait**

Synopsis data show barges greater than 5,000 DWT had relatively few transits through Haro Strait in both Year 1 and Year 2. There were eleven transits through Haro Strait in Year 1 by barges of this size, and sixteen transits in Year 2.

VEAT data in Table 11 show zero transits for barges of this size in Haro Strait for years 2016, 2017, and 2018. In February of 2019 a barge began transiting between Vancouver, B.C., and the Strait of Juan de Fuca, and made ten transits in that year. VEAT data show a total of thirteen Haro transits in 2019 and nine in 2020.

The synopsis data show a change in Haro Strait transits between Year 1 and Year 2 after the tug escort requirements were in place for Rosario Strait. In Year 1, the eleven Haro Strait transits were exclusively between Vancouver, B.C., and the Strait of Juan de Fuca. In Year 2, only one transit was between Vancouver, B.C., and the Strait of Juan de Fuca. Table 12 shows the Haro Strait transits for Year 1 and Year 2 in detail.
Table 12 Barges greater than 5,000 DWT Haro Strait transits, Year 1 (September 1, 2019 to August 31, 2020) and Year 2 (September 1, 2020 to August 31, 2021)

<table>
<thead>
<tr>
<th>Barge &gt; 5,000 DWT</th>
<th>Between SJD and Vancouver, BC</th>
<th>Between SJD and Cherry Point/Ferndale</th>
<th>Between Seattle and Cherry Point/Ferndale</th>
<th>Vancouver, BC to Anacortes/Seattle/Tacoma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 transits</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Year 2 transits</td>
<td>-10</td>
<td>5</td>
<td>3</td>
<td>7*</td>
</tr>
<tr>
<td>Change</td>
<td>-10</td>
<td>+5</td>
<td>+3</td>
<td>+7</td>
</tr>
</tbody>
</table>

*Includes two transits from Vancouver, BC to Anacortes that used Haro and Rosario Straits

Note: SJdF is Strait of Juan de Fuca

In Year 2, four barges from three companies made 16 transits through Haro Strait.

**Barges greater than 5,000 DWT: transits that may have been influenced by the tug escort requirement in Year 2**

Ecology counted five of the 16 Haro Strait transits as not affected by the tug escort requirement based on the following:

- Two transits used both Haro and Rosario Straits, and laden tank vessels would still require an escort through the Rosario Strait portion of the route.
- Ecology made an assumption based on ANT data that two transits between the Strait of Juan de Fuca and a northern refinery were likely unladen based on the vessel loading 90 percent and 84 percent of its full load capacity of a heavy oil on arrival.
- One transit was from the Strait of Juan de Fuca to Vancouver, B.C. Because Haro Strait is a reasonable option this transit, and Ecology could not determine whether the barge was laden, the transit did not meet Ecology’s evaluation criteria.

Ecology identified 11 of 16 transits through Haro Strait where the tug escort requirements may have been a factor in deciding the route.

One barge greater than 5,000 DWT made six transits through Haro Strait in Year 2. Four of these transits were carrying a cargo of gasoline from Vancouver, B.C., to Tacoma with a return likely unladen transit through Rosario Strait. The remaining two of the six transits through Haro Strait comprised a passage from Vancouver, B.C., to Anacortes, and back to Vancouver, BC using both Haro Strait and Rosario Strait.

Using the evaluation criteria Ecology found:

- This barge was bought by a different company in 2019, and there was no history of previous transits between the same origin and destination.
- Rosario Strait would be a reasonable option for transiting between Vancouver, B.C. and Tacoma, as evidenced by the four return unladen transits through Rosario Strait.
- Two passages involved transits in both Rosario and Haro Straits.
- Of the six transits through Haro Strait, the barge was likely laden for four of these transits and unladen for two as determined by Ecology’s logic diagram.
Ecology found the four likely laden transits from Vancouver, B.C., to Tacoma were likely influenced by the tug escort requirements.

Two barges greater than 5,000 DWT from another company made nine transits through Haro Strait. One barge had four transits from the Strait of Juan de Fuca to a refinery north of Rosario Strait. Two of these transits were laden. One barge transited Haro Strait five times carrying either crude oil, heavy oil, or bunker fuel. One transit was from Vancouver, B.C., to Tacoma, three transits were between Seattle and Ferndale, and one was from Ferndale to the Strait of Juan de Fuca. All five transits appear to have been laden as the barge loaded and discharged cargo at each transfer.

Using the series of questions to evaluate the first barge’s four transits between the Strait of Juan de Fuca to the refineries north of Rosario Ecology found:

- VEAT data show this company’s barges have a history of using Rosario Strait for similar transits.
- Rosario Strait is a reasonable option for transiting between the Strait of Juan de Fuca and refineries north of Rosario Strait as evidenced by using this route in the past.
- The passages between the Strait of Juan de Fuca and the northern refineries did not include transits through both Rosario and Haro Straits.
- The barge was likely laden for two of the four transits.

Ecology found the two likely laden Haro Strait transits were likely influenced by the tug escort requirements in Rosario Strait.

Using the series of questions to evaluate the other barge’s five transits: one from Vancouver, B.C. to Tacoma, three between Seattle and Ferndale, and one from Ferndale to the Strait of Juan de Fuca, Ecology found:

- VEAT data show this company’s barges have a history of using Rosario Strait for similar transits.
- Rosario Strait is a reasonable option for these transits based on past transit history.
- These passages did not include transits through both Rosario and Haro Straits.
- The barge was likely laden for all five of these transits.

Ecology found the five likely laden Haro Strait transits were likely influenced by the new tug escort requirement in Rosario Strait.

One barge from a third company made a transit between the Strait of Juan de Fuca and Vancouver, B.C. Ecology used the series of questions to evaluate this transit, finding:

- VEAT data does not show this company’s barges have a history of using Haro Strait.
- Haro Strait is a reasonable option for transiting between the Strait of Juan de Fuca and Vancouver, B.C., based on the number of vessels using this route.
- This passage did not include a transit through both Rosario and Haro Straits.
- Ecology was not able to make a determination of the vessel’s laden status based on ANT data, as the transfer prior to the transit and transfer after the transit were outside Washington waters.
Because Haro Strait is a reasonable option this transit, and Ecology could not determine whether the barge was laden, the transit did not meet Ecology’s evaluation criteria.

In summary, Ecology determined 11 of the transits through Haro Strait by barges greater than 5,000 DWT in Year 2 may have been influenced by the tug escort requirement:

- Four transits from Vancouver, B.C. to Tacoma
- Two transits from the Strait of Juan de Fuca to a refinery north of Rosario Strait by a second barge, and
- Five transits by a third barge between: Vancouver, B.C. and Tacoma, Seattle and Ferndale, and Ferndale to the Strait of Juan de Fuca.

**Tankers less than 40,000 DWT**

As shown in Table 8, Tankers less than 40,000 DWT had an increase of 11 transits, from 15 to 26, in Rosario Strait in Year 2. This appears to reflect an increase in export of nonene from an Anacortes refinery. In Year 1, there were two nonene transfers compared to nine in Year 2. Haro Strait transits rose by seven transit from seven in Year 1 to fourteen in Year 2.

**Haro Strait**

These smaller tankers tend to be parcel or chemical tankers\(^{38}\) and synopsis data show a significant link between Vancouver, B.C., and refineries in the study area. In Year 1, of the seven transits to refineries in the study area, five also included transits between the study area and Vancouver, B.C. – one of these five transits used Rosario Strait and two of the five included transits in both Haro and Rosario Straits.\(^{39}\) In Year 2, of the eleven transits to refineries in the study area, seven also included transits between the study area and Vancouver, B.C., using both Rosario and Haro Straits. The Rosario and Haro Strait route was used to pick up and drop off the pilots at the Puget Sound Pilot Port Angeles pilot station, and the British Columbia Coast Pilot station off Victoria, B.C., following the closure of the US/Canadian border.

**Tankers between 5,000 and 40,000 DWT Haro Strait transit evaluation Year 2**

Ecology did not identify changes to vessel transit patterns for tankers between 5,000 and 40,000 DWT that appear to be the result of the tug escort requirement in Rosario Strait and connected waters east.

There were 14 Haro Strait transits in Year 2, seven were between the Strait of Juan de Fuca and Vancouver, B.C. and seven were between Vancouver B.C. and the study area. All seven of the transits between Vancouver, B.C. and the study area used both Rosario and Haro Straits.

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\(^{38}\) Parcel chemical tanker – A chemical tanker capable of carrying many kinds of chemical cargoes including petroleum products. Chemical tankers usually range from 5,000 to 59,000 DWT, smaller than the average size of other tankers types. See Appendix G – Maritime Definitions.

\(^{39}\) Two of these transits were between Vancouver, B.C. and the Ferndale Refinery, which did not include either Haro or Rosario Strait.
Ecology concluded that these 14 Haro Strait transits were not affected by the tug escort requirement based on the following:

- Seven transits were between the Strait of Juan de Fuca and Vancouver, B.C. VEAT data show this is the usual route for tanker transits.
- Haro Strait is a reasonable option for transiting between the Strait of Juan de Fuca and Vancouver, B.C.
- Seven transits used both Haro and Rosario Straits, and laden tank vessels would still require an escort through the Rosario Strait portion of the route.
- Ecology could not determine if the seven transits between the Strait of Juan de Fuca and Vancouver, B.C. were ‘likely laden’, based on the logic diagram.

Because Ecology concluded the 14 transits were not affect by the tug escort requirements based on the above, the likely laden or unladen status of the transits were not subjected to additional scrutiny.

Additional data comparing transit data by month for vessel which fell under the new tug escort requirements can be found in Appendix K – Transit Data.

Results for vessels with no additional escort requirements

Tankers greater than 40,000 DWT

Ecology used the crossing line process described in the Data Analysis Methods section to compare route selections and number of transits for tankers greater than 40,000 DWT pre-and post-tug escort implementation.

Tables 13 and 14 provide the number of tankers and number of tanker transits across eight crossing lines. Transit line locations are shown in Figure 30. Transits in any direction are reported for each crossing line. For example, 86 tankers crossed the Rosario Strait N line in Year 1. Transits may have been from south to north across the line, or north to south.

Table 13 Number of tankers greater than 40,000 DWT that transited crossing lines, including change in number of tankers, from Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021)

<table>
<thead>
<tr>
<th>Crossing Line Data: Number of Tankers &gt; 40,000 DWT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crossing Line</td>
</tr>
<tr>
<td>Year 1 # tankers</td>
</tr>
<tr>
<td>Year 2 # tankers</td>
</tr>
<tr>
<td>Change in # tankers</td>
</tr>
</tbody>
</table>
Table 14 Crossing line transit data for tankers greater than 40,000 DWT, including change in number of transits, from Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021)

<table>
<thead>
<tr>
<th>Crossing Line</th>
<th>Bellingham Channel</th>
<th>Boundary Pass</th>
<th>Guemes Channel</th>
<th>Haro Strait</th>
<th>Rosario Strait N</th>
<th>Rosario Strait S</th>
<th>Saddlebag Guemes</th>
<th>Sinclair Lummi</th>
<th>Total Transits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 Transits</td>
<td>51</td>
<td>212</td>
<td>287</td>
<td>212</td>
<td>399</td>
<td>613</td>
<td>31</td>
<td>137</td>
<td>1,942</td>
</tr>
<tr>
<td>Year 2 Transits</td>
<td>38</td>
<td>208</td>
<td>274</td>
<td>208</td>
<td>284</td>
<td>488</td>
<td>18</td>
<td>98</td>
<td>1,616</td>
</tr>
<tr>
<td>Change in transits</td>
<td>-13</td>
<td>-4</td>
<td>-13</td>
<td>-4</td>
<td>-115</td>
<td>-125</td>
<td>-13</td>
<td>-39</td>
<td>-326</td>
</tr>
</tbody>
</table>

Year 1 and Year 2 tankers greater than 40,000 DWT transit data

The highest number of transits for both years occurred at the crossing line located at the southern end of Rosario Strait. Tankers crossed this line when transiting to and from both Washington’s northern refineries and the refineries located in the connected waterways east of Rosario Strait. Vessels can transit over multiple crossing lines in a single leg of its voyage, so the total number of transits over crossing lines is not the same as the total number of tanker arrivals.

Guemes Channel was the usual route for tankers entering the connected waterways east of Rosario while the tankers going to the northern refineries transited to the northern end of Rosario Strait. The Guemes Channel crossing line transits and the northern end of Rosario Strait crossing line transits added together equal a number greater than the Rosario Strait south crossing line. This number accounts for tankers entering Rosario Strait’s southern entrance and additional movement between the northern refineries and the anchorages and refineries in the connected waterways east of Rosario.

The number of tankers transiting the crossing line at Haro Strait equals the number at Boundary Pass, indicating all vessels transited through this area without deviation.

Changes in traffic patterns

Both the number of transits and the number of tankers making Rosario Strait transits decreased from Year 1 to Year 2. The largest change was the number of tankers transiting the crossing line at the southern end of Rosario Strait.

Although VEAT data in Figure 34 shows a decline in tanker traffic to Washington ports over the last ten years, this does not appear to account for the large decrease in tanker traffic in the study area from Year 1 to Year 2.
The overall drop in transits by tankers greater than 40,000 DWT may be due to the effect the pandemic had on oil use and refinery output. According to the U.S. Energy Information Administration the demand for transportation fuels in the United States fell beginning in mid-March 2020 because of the spread of coronavirus and efforts to mitigate it. As the demand for gasoline and jet fuel fell to its lowest level in years, U.S. refineries reduced their operations. Beginning in April 2020, refiners responded to less demand for transportation fuels by decreasing overall refinery runs (Colletti & Ricker, 2020).
The change in tankers and tanker transits in Haro Strait and Boundary pass was negligible from Year 1 to Year 2, indicating Canadian tanker traffic was fairly consistent and matched VEAT data.

Most of the gasoline consumed in British Columbia comes from Alberta, delivered primarily via the Trans Mountain Pipeline. Gasoline is also produced in B.C.’s two refineries. Less than ten percent of the gasoline consumed in British Columbia is imported via ship or barge from the U.S. Pacific Northwest (Canadian Energy Regulator, 2021). The majority of the tankers transiting to Canada are exporting crude oil. Although crude production was cut (Carpenter, S. 2020), the pandemic did not have the same impact on British Columbia tanker traffic as traffic to the refineries in the study area.

**Barges less than 5,000 DWT**

Barges less than 5,000 DWT are exempt from the new escort rules. Table 15 shows a decrease of 150 transits in Rosario Strait between Year 1 and Year 2. There were no transits through Haro Strait by barges of this size in Year 1 or Year 2.

<table>
<thead>
<tr>
<th>Vessel Type / Route Selection</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vessel Type</strong></td>
<td><strong>Barge &lt; 5,000 DWT</strong></td>
<td><strong>Barge &lt; 5,000 DWT</strong></td>
<td><strong>Transits</strong></td>
</tr>
<tr>
<td>Rosario Strait</td>
<td>368</td>
<td>218</td>
<td>-150</td>
</tr>
<tr>
<td>Haro Strait</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Year 1 to Year 2 Transit Data**

In Year 1, seven barges less than 5,000 DWT made 368 transits through Rosario Strait, three were dedicated bunker barges and three were barges transiting between Vancouver, B.C., and terminals in either the study area or Tacoma/Seattle. The other barge transited between Tacoma/Seattle and the study area.

In Year 2, five barges made 218 transits through Rosario Strait. Three were dedicated bunker barges, one barge transited between Vancouver, B.C., and the study area, and one barge transited between Tacoma/Seattle and the study area.

**Changes in Traffic Patterns**

A major change occurred between Year 1 and Year 2 when two small Canadian barges moving bunker oil from Washington refineries to Vancouver, B.C., stopped transiting in May 2020. This may have been due to the loss of cruise ship bunkering opportunities caused by the U.S. Center for Disease Control (CDC) No Sail Order for cruise ships, issued on March 24, 2020 (CDC, 2020). Because these barges stopped transiting in May, 2020, this affected the end of Year 1 and all of Year 2. These two vessels accounted for 30 transits in Year 1.

Synopsis data also show a decrease of 26 bunkering transits in the study area anchorages between Year 1 and Year 2, from 153 to 127. This appears to be a similar to the year-over-year change in as shown in Table 16.
Barges providing bunkering or refueling services

Barges less than 5,000 DWT are exempt from the new escort requirements for all bunkering and cargo transits. Barges greater than 5,000 DWT are exempt from the new escort requirements when ‘engaged in bunkering’, including transits to or from a bunkering operation (Board of Pilotage Commissioner, 2020a). Bunkering operations in the study area occur at the anchorages and in Bellingham. The majority of vessels in the anchorages are tank vessels awaiting transfers at the refineries in the study area.

Table 16 shows the number of Rosario Strait ‘engaged in bunkering’ transits for barges greater than 5,000 DWT and barges less than 5,000 DWT and the change in the number of transits from Year 1 to Year 2.

Table 16 Rosario ‘engaged in bunkering’ transits for Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021) with change in number of transits

<table>
<thead>
<tr>
<th>Vessel Type / Route Selection</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rosario Strait</td>
<td>64</td>
<td>70</td>
<td>+6</td>
</tr>
<tr>
<td>Barge &gt; 5,000 DWT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barge &lt; 5,000 DWT</td>
<td>153</td>
<td>127</td>
<td>-26</td>
</tr>
<tr>
<td>Total bunkering transits</td>
<td>217</td>
<td>197</td>
<td>-20</td>
</tr>
</tbody>
</table>

Engaged in bunkering transits for barges greater than 5,000 DWT increased by 6 transits, from 64 to 70. For barges less than 5,000 DWT the number of engaged in bunkering transits decreased by 26, from 153 to 127 transits.

**Year 1 to Year 2 ‘Engaged in Bunkering’ Transit Data for Barges greater than 5,000 DWT**

Of the 19 barges greater than 5,000 DWT which transited Rosario in Year 1, 10 were engaged in a mix of bunkering and cargo transits. In Year 2, this number decreased to six of 13 barges.

Of the 64 engaged in bunkering transits in Year 1, 33 were transits to a bunker operation in the study area and 31 were transits to a bunker operation outside the study area. Of the 33 bunker operations in the study area, 32 were providing fuel to tankers, and one was bunkering an ATB.

In Year 2, 30 of the 70 engaged in bunkering transits were to a bunkering operation in the study area, and 40 were transits to a bunker operation outside of the study area. Of the 30 bunker operations, 22 were providing fuel to tankers, six were to ATBs, and two were bunkering container ships in Bellingham Bay.

**Year 1 to Year 2 ‘engaged in bunkering’ transit for data barges less than 5,000 DWT**

Of the seven barges less than 5,000 DWT which transited Rosario Strait in Year 1, three were dedicated bunker barges, and in Year 2 three of five barges were dedicated bunker barges.
There were 153 bunkering transits by barges less than 5,000 DWT in Year 1. Of these, 94 transits were for bunkering operations in the study area, and 59 transits for bunkering operations outside. Bunkering operations inside the study area included 39 tankers, 47 ATBs, and 8 fishing vessels in Bellingham.  

There were 127 bunkering transits in Year 2. Of these, 92 transits were for bunkering operations in the study area and 35 for bunkering operations outside. Bunkering operations inside the study area included 29 tankers, 59 ATBs, and 4 fishing vessels.

Changes in Traffic Patterns

Although there was an increase of six bunkering transits for barges greater than 5,000 DWT, there was an overall decrease of 20 transits by barges engaged in bunkering. AIS data show tankers and ATBs usually bunker in Port Angeles or one of the anchorages in the study area. The overall decrease in bunker transits may reflect a change in bunker location, rather than a decrease in overall bunkering in the Puget Sound.

Result for transits of tugs engaged in escort duties

The deliverable for the number of transits for tugs engaged in escorting duties in Rosario Strait and connected waterways east was accomplished using the crossing line method as described in the Data Analysis Methods section.

In the year prior to tug escort implementation, only tugs purpose-built for escort or ship assist duties were observed performing escort services in the study area. In the year after tug escort implementation, several tugs previously observed towing oil barges were also observed performing escort duties. Ecology labeled these ‘multi-purpose tugs’ as they were used for more than one type of job. The list of tugs and their operating companies can be found in Appendix P and Q.

Transits in any direction are reported for each crossing line. For example, 13 purpose-built escort tugs crossed the Rosario Strait N line in Year 1 as shown in Table 17. Transits may have been from south to north across the line, or north to south. Transit line locations are shown in Figure 18.

A tug performing escort duties can transit several crossing lines in one ‘trip’. For this synopsis a trip is defined as the time from when the tug’s dispatch assigned the tug to an escort job until the tug has returned to its station. Tugs performing escort duties may transit crossing lines for a variety of reasons (e.g., while waiting for an assigned vessel, while traveling to meet an assigned vessel or traveling back to their assigned station, or while transiting the area for other business purposes).

Example of crossing line transit count for an escort tug stationed near the Cherry Point refinery:

---
40 These eight fishing vessels were bunkered alongside the dock  
41 These four fishing vessels were bunkered alongside the dock  
42 See Appendix F, Synopsis Terminology
A tug stationed near the northern refinery is assigned an inbound escort for an ATB transiting to the Vendovi anchorage in Anacortes.

The escort tug leaves Cherry Point and transits the Rosario Strait north and south crossing lines to meet the ATB. The tug escorts the ATB to the Vendovi Anchorage, transiting the Rosario Strait south, Guemes Channel, and Saddlebag to Guemes Island crossing lines. After finishing the escort job, the tug transits the Sinclair Island to Lummi Island and the Rosario Strait north crossing lines to return to station near Cherry Point. This trip transited crossing lines seven times.

After this trip the escort tug transited to Seattle and then returned to Cherry Point. The escort tug crossed the Rosario Strait north and south crossing lines twice. Although the tug was not performing escort tug duties, these four crossing line transits are counted using the crossing line method.

**Crossing line data for purpose-built escort tugs**

Tables 17 and 18 provide the number of purpose-built escort tugs and transits across the six crossing lines.

**Table 17 Number of purpose-built escort tugs and change from Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021)**

<table>
<thead>
<tr>
<th>Crossing Lines</th>
<th>Bellingham Channel</th>
<th>Guemes Channel</th>
<th>Rosario Strait N</th>
<th>Rosario Strait S</th>
<th>Saddlebag Guemes</th>
<th>Sinclair Lummi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 # Tugs</td>
<td>10</td>
<td>15</td>
<td>12</td>
<td>13</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Year 2 # Tugs</td>
<td>10</td>
<td>14</td>
<td>13</td>
<td>13</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Change in # of tugs</td>
<td>0</td>
<td>-1</td>
<td>+1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Table 18 Crossing line transits for purpose-built escort tugs, and change from Year 1 to Year 2**

<table>
<thead>
<tr>
<th>Crossing Lines</th>
<th>Bellingham Channel</th>
<th>Guemes Channel</th>
<th>Rosario Strait N</th>
<th>Rosario Strait S</th>
<th>Saddlebag Guemes</th>
<th>Sinclair Lummi</th>
<th>Total Transits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 Transits</td>
<td>186</td>
<td>1,970</td>
<td>1,264</td>
<td>1,209</td>
<td>1,019</td>
<td>343</td>
<td>5,991</td>
</tr>
<tr>
<td>Year 2 Transits</td>
<td>210</td>
<td>2,181</td>
<td>1,471</td>
<td>1,510</td>
<td>966</td>
<td>983</td>
<td>7,321</td>
</tr>
<tr>
<td>Change in # of transits</td>
<td>+24</td>
<td>+211</td>
<td>+207</td>
<td>+301</td>
<td>-53</td>
<td>+640</td>
<td>+1,330</td>
</tr>
</tbody>
</table>

Transits by purpose-built escort tugs over crossing lines in the study area increased by 1,330 from Year 1 to Year 2. Vessels can transit over multiple crossing lines in a single trip, so the total number of transits over crossing lines is not the same as the total number of escort trips.

All crossing line transits increased from Year 1 to Year 2 with the exception of the Saddlebag to Guemes Island line which decreased by 53 transits. The Saddlebag to Guemes Island crossing
line data for tankers greater than 40,000 DWT show six fewer tankers and thirteen fewer transits across this line from Year 1 to Year 2. As indicated in Figure 19, vessels transiting between Guemes Channel or Anacortes and Vendovi or Bellingham anchorages, use the passage between Saddlebag and Guemes Islands. It may be this decrease in large tanker transits through the Saddlebag Guemes passage impacted the number of larger purpose-built escort tug transits across this line.

The greatest increase (640 transits) was the Sinclair-Lummi crossing line. ATBs and oil barges transiting between anchorages and refineries in the waterways east of Rosario and the north end of Rosario Strait, frequently use the passage between Sinclair and Lummi Islands.

**Crossing line data for multi-purpose tugs**

Tables 19 and 20 provide the number of multi-purpose tugs and transits across the six crossing lines.

Table 19 Number of Multi-Purpose tugs, and change, from Year 1 (September 1, 2019, to August 31, 2020) to Year 2 (September 1, 2020, to August 31, 2021)

<table>
<thead>
<tr>
<th>Crossing Lines</th>
<th>Bellingham Channel</th>
<th>Guemes Channel</th>
<th>Rosario Strait N</th>
<th>Rosario Strait S</th>
<th>Saddlebag Guemes</th>
<th>Sinclair Lummi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 # Tugs</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Year 2 # Tugs</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Change in # of tugs</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 20 Multi-purpose crossing line transits, and change, from Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021)

<table>
<thead>
<tr>
<th>Crossing Lines</th>
<th>Bellingham Channel</th>
<th>Guemes Channel</th>
<th>Rosario Strait N</th>
<th>Rosario Strait S</th>
<th>Saddlebag Guemes</th>
<th>Sinclair Lummi</th>
<th>Total Transits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 Transits</td>
<td>11</td>
<td>9</td>
<td>18</td>
<td>27</td>
<td>4</td>
<td>2</td>
<td>71</td>
</tr>
<tr>
<td>Year 2 Transits</td>
<td>164</td>
<td>164</td>
<td>521</td>
<td>519</td>
<td>143</td>
<td>234</td>
<td>1,745</td>
</tr>
<tr>
<td>Change in # of transits</td>
<td>+153</td>
<td>+155</td>
<td>+503</td>
<td>+484</td>
<td>+139</td>
<td>+232</td>
<td>+1,674</td>
</tr>
</tbody>
</table>

Transits by multi-purpose escort tugs over crossing lines in the study area increased by 1,674 from Year 1 to Year 2. Vessels can transit over multiple crossing lines in a single trip, so the total number of transits over crossing lines is not the same as the total number of escort trips.

One company elected to use their tugs for escort duty rather than hiring purpose-built escort tugs. Prior to the tug escort requirement going into effect, these tugs were used to tow oil barges, therefore none of the transits in the Year 1 crossing line data were tugs performing escort duties. The transit data for Year 2 does not indicate if the vessel was performing tug...
escort duties, transiting without a barge, or towing an oil barge. However, the large increase in transits between Year 1 and Year 2 suggests that many of the additional transits were likely related to the tugs performing escort duties.

**Combined crossing line data for purpose-built escort and multi-purpose tugs**

Table 21 shows the combined crossing line data for both purpose-built and multi-purpose tugs for Year 1 and Year 2 with the change in transit numbers between years.

Table 21 Crossing line transits all tugs for Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021) with change in number of crossing transits

<table>
<thead>
<tr>
<th>Crossing Lines</th>
<th>Bellingham Channel</th>
<th>Guemes Channel</th>
<th>Rosario Strait N</th>
<th>Rosario Strait S</th>
<th>Saddlebag Guemes</th>
<th>Sinclair Lummi</th>
<th>Total Transits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 Transits</td>
<td>197</td>
<td>1,979</td>
<td>1,282</td>
<td>1,236</td>
<td>1,023</td>
<td>345</td>
<td>6,062</td>
</tr>
<tr>
<td>Year 2 Transits</td>
<td>374</td>
<td>2,345</td>
<td>1,992</td>
<td>2,029</td>
<td>1,109</td>
<td>1,217</td>
<td>9,066</td>
</tr>
<tr>
<td>Change in # of transits</td>
<td>+177</td>
<td>+366</td>
<td>+710</td>
<td>+785</td>
<td>+86</td>
<td>+872</td>
<td>+3,004</td>
</tr>
</tbody>
</table>

For Year 1 there was a total of 6,062 crossing line transits across all six crossing line in the study area. For Year 2, the total number of crossing line transits across all six lines in the study area was 9,066, an increase of 3,004 transits. The largest increase was 872 transits across the Sinclair to Lummi Island crossing line, and the smallest increase was 86 transits across the Saddlebag to Guemes Island crossing line.

**Results for number of oil transfers at facilities & anchorages**

Ecology reviewed ANT data to address the scope of work deliverable for the number of oil transfers per refinery and per anchorage pre- and post-bill implementation. Results are shown in Tables 22 and 23. Appendix H has additional information on facilities in the study area and Appendix I has information on anchorages.

**Facilities**

Table 22 shows an overall decrease of 141 transfers at facilities in the study area. This may be a result of the effect the pandemic had on oil use and refinery output. According to the U.S. Energy Information Administration the demand for transportation fuels in the United States fell beginning in mid-March 2020 because of the spread of coronavirus and efforts to mitigate it. As the demand for gasoline and jet fuel fell to its lowest level in years, U.S. refineries reduced their operations. Beginning in April 2020, refiners responded to less demand for transportation fuels by decreasing overall refinery runs (Colletti & Ricker, 2020).
Table 22 Number of oil transfers at facilities in the study area and change from Year 1 (September 1, 2019 to August 31, 2020) and Year 2 (September 1, 2020 to August 31, 2021)

<table>
<thead>
<tr>
<th>Facility</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Change in Number of Transfers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shell Anacortes†</td>
<td>242</td>
<td>199</td>
<td>-43</td>
</tr>
<tr>
<td>Tesoro Marketing &amp; Refining Company</td>
<td>184</td>
<td>248</td>
<td>+64</td>
</tr>
<tr>
<td>Phillips 66 Ferndale</td>
<td>330</td>
<td>217</td>
<td>-113</td>
</tr>
<tr>
<td>BP Cherry Point</td>
<td>328</td>
<td>279</td>
<td>-49</td>
</tr>
<tr>
<td>Total Transfers</td>
<td>1,084</td>
<td>943</td>
<td>-141</td>
</tr>
</tbody>
</table>

† Shell Puget Sound refinery was sold to HollyFrontier Corporation (Shell US, 2021)

### Anchorages

Table 23 shows oil transfers conducted at anchorages within the study area. Anchorage locations are shown on Figure 36

Table 23 Number of oil transfers in study area anchorages and change from Year 1 (September 1, 2019 to August 31, 2020) and Year 2 (September 1, 2020 to August 31, 2021)

<table>
<thead>
<tr>
<th>Anchorage</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Change in Number of Transfers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anacortes</td>
<td>30</td>
<td>52</td>
<td>+22</td>
</tr>
<tr>
<td>Bellingham Bay</td>
<td>1</td>
<td>3</td>
<td>+2</td>
</tr>
<tr>
<td>March Point</td>
<td>17</td>
<td>19</td>
<td>+2</td>
</tr>
<tr>
<td>Vendovi Island</td>
<td>63</td>
<td>46</td>
<td>-17</td>
</tr>
<tr>
<td>Total Oil Transfers</td>
<td>111</td>
<td>120</td>
<td>+9</td>
</tr>
</tbody>
</table>

![Figure 36 Map of anchorages in study area](image-url)
Transfers increased from Year 1 to Year 2 by 22 transfers in Anacortes anchorage, 2 each in the Bellingham and March Point anchorages, and decreased by 17 in the Vendovi Island anchorage. Overall the number of oil transfer in all anchorages increased by 9 transfers.

**Changes in bunkering patterns**

In Year 1 of the 111 bunkers at anchorages in the study area, ATBs bunkered 46 times, foreign flag vessels bunkered 44 times, U.S. flagged tankers bunkered 20 times, and one fishing vessel bunkered at dock in Bellingham Bay.

In Year 2, of the 121 bunkers at anchorages in the study area, ATBs bunkered 66 times, foreign flag tankers bunkered 30 times, U.S. flag tankers bunkered 23 times, and two containerships bunkered in Bellingham Bay anchorage.

There were zero lightering operations (cargo oil transfers between tankers and oil barges) at anchor in Year 1. In Year 2 there were three lightering operations, two in the Vendovi anchorage and one in the Anacortes anchorage.

**Review of the last five years of vessel entry data**

**Effect of global crises in maritime trade**

The COVID-19 pandemic had a profound effect on international shipping as well as traffic trends in the Puget Sound and Salish Sea. The United Nations Conference on Trade and Development (UNCTAD) in a November 2020 article (UNCTAD, 2020) describes the unprecedented disruptions. As shown by a chart from the article (Figure 37) the steep downturn in seaborne trade from the pandemic was similar to the disruptions caused by the 2008 global economic crisis.

![Graph of international maritime trade and global output, 2006–2020](UNCTAD, 2020)

Figure 37 Development of international maritime trade and global output, 2006 – 2020 (UNCTAD, 2020)
VEAT data overview

VEAT is an annual report counting vessel entering transit data, and ATB and barge movements within Washington waters. The Marine Exchange of Puget Sound and the Chamber of Shipping of British Columbia provide Strait of Juan de Fuca entry data for tankers, and Ecology uses the Advanced Notice of Oil Transfer (ANT) database to count ATB and oil barge movements.

Ecology used the VEAT data to compare year-over-year changes in tank vessel transit numbers to the change in transit numbers, from the year prior to the tug escort requirement to the year after the requirement went into effect, in order to provide context for changes in the number of transits.

Synopsis data does not match VEAT transit numbers, as synopsis data for Year 1 starts in September 2019 and ends in August 2020, and Year 2 starts in September of 2020 and ends in August of 2021. VEAT data is for all Washington ports, including those outside the study area and does not segregate oil barges by deadweight tonnage.

Table 24 shows VEAT entering transits for tankers, ATBs, and oil barges\(^{43}\) for the last five years.

Table 24 Vessel entering and transit report (VEAT) entering transit data from 2016 to 2020

<table>
<thead>
<tr>
<th>Entering transits by VEAT vessel type</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanker bound for Washington ports</td>
<td>382</td>
<td>392</td>
<td>436</td>
<td>381</td>
<td>350</td>
</tr>
<tr>
<td>Tanker bound for Canadian ports</td>
<td>192</td>
<td>195</td>
<td>235</td>
<td>177</td>
<td>196</td>
</tr>
<tr>
<td>ATB bound for Washington ports</td>
<td>283</td>
<td>266</td>
<td>250</td>
<td>296</td>
<td>285</td>
</tr>
<tr>
<td>ATB bound for Canadian ports (Haro)</td>
<td>2</td>
<td>8</td>
<td>1</td>
<td>5</td>
<td>36</td>
</tr>
<tr>
<td>Oil barge bound for Washington ports</td>
<td>249</td>
<td>234</td>
<td>193</td>
<td>195</td>
<td>151</td>
</tr>
<tr>
<td>Oil barge bound for Canadian ports (Haro)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>11</td>
</tr>
</tbody>
</table>

Vessel entering and transit report (VEAT) tanker data

The number of tanker entering transits to Washington and Canadian ports for the past ten years is shown in Figure 38 (Ecology, n.d. -a).

\(^{43}\) VEAT does not differentiate barges by deadweight tonnage
Tanker entering transits for Washington ports

Over the past ten years the number of individual tankers bound for Washington ports has stayed fairly consistent, as the majority of these tankers are U.S. flag Jones Act vessels transiting between Alaska, or west coast ports, and Washington refineries (Ecology, n.d.-a). However, the number of entering transits for tankers has been declining, from 464 in 2011, to 350 in 2020. Part of this decline can be attributed to a decreased in the supply of North Slope crude and an increase in crude by rail (Ecology, 2019). Washington refineries operate at close to maximum output and, without upgrades to improve or expand product types, tanker entering transits are not expected to rise (Ecology, 2019). The synopsis results for tanker crossing line transits coincide with the general downward trend in tanker traffic.

Tanker entering transits to Canadian ports

Tanker entering transits to Vancouver, B.C., rose between 2006 and 2007 as the Transmountain pipeline increased capacity from 260,000 to 300,000 barrels per day (bpd). Since 2007 the number of entering transits has remained relatively stable (Ecology, 2019). The additional expansion project for the pipeline is expected to raise the capacity from 300,000 to 890,000 bpd (Transmountain, n.d.). This expansion is expected to be completed in December 2022, and is anticipated to increase the number of tanker entering transits to that facility to 52 a month (Ecology, 2019)(Transmountain, n.d.). Synopsis crossing line results for tankers using Haro Strait

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44 The Jones Act (46 U.S.C. § 55102), is a section of the 1920 Merchant Marine Act that applies to cargo being transported by water between U.S. points. The law requires this cargo is to be shipped aboard vessels that are U.S.-built, U.S.-citizen owned, registered in the U.S., and crewed by Americans. This encourages a strong U.S. Merchant Marine for both economic security and national defense by fostering a U.S.-flag fleet that contributes to our financial wellbeing, and acts as a sealift resource for the transportation of supplies in time of contingency (Department of Transportation, Maritime Administration, 2021).
and Boundary pass show a negligible change in transit numbers, this is consistent with VEAT data.

**Vessel entering and transit report (VEAT) ATB data**

VEAT data tracks ATB and barge transits\(^\text{45}\) within Washington waters using Ecology’s ANT system. VEAT tracks ATB entering transits into Washington waters as a subset of the total transits.

Figure 39 shows the annual number of ATB transits in the Puget Sound for the last ten years and the number of entering transits, a subset of the total number of transits (Ecology, n.d. -a).

![Figure 39 Vessel entering and transit report (VEAT) data showing ATB transits and entering transits in Puget Sound for the last 10 years](image)

The first four ATBs began operating on the west coast in 2002 (Buchanan, 2014). Ecology began counting ATBs separately from towed oil barges in the 2011 VEAT report. In 2011 there were three companies with a total of nine ATBs transiting in the Puget Sound, one company had seven ATBs and two companies had one ATB. These ATBs made 311 transits in the Puget Sound in 2011. In 2020, 1,006 transits were made by 16 ATBs, operated by five companies. This is an increase of 45 percent in the number of ATBs and 69 percent in the number of transits.

The synopsis data show an increase of 54 transits from Year 1 to Year 2 in Rosario Strait. This change appears to be well within the VEAT year-over-year Rosario Strait change in ATB transits.

\(^{45}\) For VEAT, an ATB or tank barge transit is defined as any significant move between two locations in Washington state waters, while transporting oil.
The synopsis data for ATB transits in Haro showed an increase of 31 transits from Year 1 to Year 2, this was above the VEAT year-over-year change in ATB transits and indicated a change in ATB traffic trends for Haro Strait and Boundary Pass. This change can be attributed in large part to the change in pilotage routes due to the pandemic border closure.

**Vessel entering and transit report (VEAT) tank barge data**

VEAT data tracks barge transits within Washington waters using Ecology’s ANT system. Figure 40 shows the annual number of transits made by oil barges in the Puget Sound for the last ten years, and the number of entering transits made by these barges as a subset of the total number of transits.

![Puget Sound Barge Transits](image)

**Figure 40 Puget Sound barge transits and entering transits for Puget Sound**

VEAT data show significant fluctuations in the number of barge transits between years, from an increase of 308 between 2015 and 2016 to a decrease of 868 between 2019 and 2020.

Synopsis transits for the sum of barges greater than 5,000 DWT and less than 5,000 DWT in the study area from Year 1 to Year 2 show a decrease of 150 transits in Rosario Strait, and an increase of five transits in Haro Strait. This appears to be within the year-over-year changes in the number of transits within the Puget Sound.

Answers to Research Questions

Ecology re-ordered the research questions for clarity.

- How does the overall number of transits (by vessel type) change pre- and post-bill implementation?
  - In Year 2, transits by tank vessel subject to the new tug escort requirements increased in both Rosario and Haro Straits.
  - Most of these changes were not related to the tug escort requirement. Some were likely the result of business decisions by companies, the year-to-year variation in the market for crude oil and refined product, and the effects of the global pandemic.

- What changing vessel traffic trends do we see for vessels that newly fall under an escort requirement?
  - The new tug escort requirement did not appear to have affected the route selection of tankers between 5,000 and 40,000 DWT from Year 1 to Year 2.
  - Ecology identified 16 transits through Haro Strait in Year 2 by ATBs and barges greater than 5,000 DWT where the tug escort requirements may have been a factor in deciding the route.
    - ATBs: five of 79 Haro Strait transits may have been affected by the tug escort requirement. These five transits represent 6 percent of the 79 Year 2 Haro Strait transits, and 0.5 percent of the 920 Year 2 total transits through Rosario and Haro Straits.
    - Barges greater than 5,000 DWT: 11 of 16 transits may have been affected by the tug escort requirement. These 11 transits represent 69 percent of the total 16 Year 2 transits, and 3 percent of 349 Year 2 total transits through both Rosario and Haro Straits.

- What changing vessel traffic trends do we see for deep draft and tug traffic that have no additional escort requirements?
  - For tankers greater than 40,000 DWT, crossing line transits decreased between Year 1 and Year 2 in Rosario Strait, both in the number of transits and the number of tankers making transits. In Haro Strait and Boundary pass, the change in tankers and crossing line transit numbers was negligible from Year 1 to Year 2.
  - For barges less than 5,000 DWT, there was a decrease in Rosario Strait transits between Year 1 and Year 2. There were no transits through Haro Strait by barges less than 5,000 DWT in Year 1 or Year 2.
  - For barges engaged in bunkering within the study area, there was an overall decrease in transits: an increase of six transits by barges greater than 5,000 DWT and a decrease of 26 transits by barges less than 5,000 DWT. The overall 20 transit decrease may reflect vessels receiving fuel at a location outside of the study area, rather than a decrease in bunkering in the Puget Sound.

- What changing vessel traffic trends do we see for tug escorts?
  - Tug escort movements in the study area increased significantly following the implementation of the new escort requirements, especially for a few tugs that were observed performed escort duties as well as towing oil barges (termed ‘multi-purpose’ tugs for this synopsis).
Summary of Findings

Key findings are summarized below. Detailed responses for each deliverable identified in the scope of work are provided in the Results section of the synopsis.

Changes in traffic patterns for vessels newly subject to escort tug requirements

Transits in both Rosario and Haro Strait increased from Year 1 to Year 2 for ATBs and oil barges greater than 5,000 DWT and tankers between 5,000 and 40,000 DWT.

ATBs

- Rosario Strait transits increased by 54 transits (7 percent), from 787 in Year 1 to 841 in Year 2.
- Haro Strait transits increased by 31 transits (65 percent), from 48 in Year 1 to 79 in Year 2.
- In Year 2, five of 79 transits through Haro Strait may have been affected by the tug escort requirement. These five transits represent 6 percent of the 79 Haro Strait in Year 2, and 0.5 percent of the 920 total transits through both Rosario and Haro Straits in Year 2.
- Transits using both Rosario and Haro Straits increased after May, 2020 as a result of changes in embarkation and disembarkation locations for Canadian maritime pilots due to the pandemic border closure (PPA, 2020). In Year 1 there were 17 transits between Vancouver, B.C., and the study area using both Rosario and Haro Straits, there were 36 in Year 2.
- Transits in Haro Strait between Vancouver, B.C., and Tacoma or Seattle increased from four in Year 1 to 11 in Year 2.

Barges greater than 5,000 DWT

- Rosario Strait transits increased by 18 transits (6 percent), from 315 in Year 1 to 333 in Year 2.
- Haro Strait transits increased by five transits (45 percent), from 11 in Year 1 to 16 in Year 2.
- In Year 2, 11 of 16 transits through Haro Strait may have been affected by the tug escort requirement. These 11 transits represent 69 percent of the 16 Haro Strait in Year 2, and 3 percent of the 333 total transits through both Rosario and Haro Straits in Year 2.

Tankers less than 40,000 DWT

- Rosario Strait transits increased by 73 percent, from 15 in Year 1 to 26 in Year 2.
- Haro Strait transits increased by 14 percent, from seven in Year 1 to eight in Year 2.
- In Year 2, zero of the eight transits through Haro Strait were identified where the tug escort requirement may have been a factor in deciding the route.
Changes in traffic patterns for vessels not subject to the new tug escort requirements

Transits in both Rosario and Haro Strait decreased from Year 1 to Year 2

**Tankers greater than 40,000 DWT**

- The number of crossing line transits through the south end of Rosario Strait decreased for both the number of tankers and number of transits. In Year 1, 108 tankers made 613 transits across the Rosario Strait south crossing line. In Year 2, 85 tankers made 488 transits across the Rosario Strait south crossing line, a decrease of 23 tankers and 125 transits.
- Haro Strait and Boundary Pass crossing line transits decreased for both the number of tankers and number of tanker transits, from 92 tankers and 212 transits in Year 1 to 80 tankers and 208 transits in Year 2. This was a decrease of 12 tankers and four transits.

**Barges less than 5,000 DWT**

- Rosario Strait transits decreased from 368 in Year 1, to 215 in Year 2, a decrease of 150 transits, or 41 percent. Some of this decrease was due to the interruption in cruise ship bunkering caused by the pandemic. Two small bunker barges transiting between Vancouver, B.C., and Washington refineries ceased transits after the Center for Disease Control (CDC) No Sail order in March of 2020.
- Haro Strait - there were no transits in Year 1 or Year 2.

**Barges engaged in bunkering**

- Transits in Rosario Strait by barges engaged in bunkering decreased overall by 20 transits.
  - Barges greater than 5,000 DWT: transits increased by six, from 64 in Year 1 to 70 in Year 2, a nine percent increase.
  - Barges less than 5,000 DWT: transits decreased by 26, from 153 in Year 1 to 127 in Year 2, 17 percent decrease.

**Changes in traffic patterns for tugs engaged in escort duties**

Crossing line transit numbers increased from Year 1 to Year 2, both for the number of tugs performing escort duties and the number of crossing line transits.

- Ecology observed only tugs built for the purpose of ship assist and escort duties performing escort duties in the study area in Year 1.
- Ecology observed three tugs that towed oil barges in Year 1 performing tug escort duties in Year 2. As these were not purpose-built ship assist and escort tugs, Ecology labeled these ‘multi-purpose tugs’.
  Multi-purpose tugs were used for both oil barge towing and escort tug duties in Year 2.
- There were 12 purpose-built escort tugs performing escort duties in the study area in both Year 1 and Year 2.

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46 See Appendix F Synopsis Terminology
• There were three multi-purpose tugs that performed escort tug duties in Year 2. Ecology observed these tugs towing oil barges in Year 1 and Year 2.
• Purpose-built escort tug crossing lines transits in the study area increased from 5,991 in Year 1 to 7,321 in Year 2, an increase of 1,330 transits or 22 percent.
• Multi-purpose tug crossing lines transits in the study area increased from 71 in Year 1 to 1,745 in Year 2, an increase of 1,674 transits or over 2,000 percent.
• Total tugs crossing line transits in the study area increased from 6,062 in Year 1 to 9,066 in Year 2, an increase of 3,004 transits or 50 percent.
• Vessels can transit over multiple crossing lines in a single trip\(^47\), so the total number of transits over crossing lines does not represent the number of escort trips.

**Change in the number of oil transfers in study area**

Transfers at facilities in the study area decreased from Year 1 to Year 2. Transfers at anchorages in the study area increased from Year 1 to Year 2.

**Oil transfers at refineries**

Oil transfers at the four refineries in the study area decreased from 1,084 in Year 1 to 943 in Year 2, a decrease of 141 transfers

**Oil transfers at anchorages**

Oil transfers at anchorages in the study area increased from 111 in Year 1 to 120 in Year 2, an increase of nine transfers.

There were zero lightering operations (cargo oil transfers between tankers and oil barges) at anchor in Year 1. In Year 2 there were three lightering operations, two in the Vendovi anchorage and one in the Anacortes anchorage.

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\(^47\) See Appendix F Synopsis terminology for a definition of ‘trip’ as it pertains to escort tug crossing line transits in this synopsis
Conclusions

The purpose of this synopsis was to review vessel transits to identify changes after tug escort requirements were implemented on September 1, 2020 for laden ATBs and oil barges greater than 5,000 DWT, and tankers between 5,000 and 40,000 DWT transiting in Rosario Strait and connected waterways to the east. Unladen tank vessels and barges engaged in bunkering are excluded from the new tug escort requirements.

The most significant findings were:

- The new tug escort requirements did not significantly change tank vessel traffic. Most transits in the study area by tank vessels subject to the tug escort requirement were through Rosario Strait both before and after the tug escort requirement took effect.
  - 94 percent of transits by these tank vessels in Year 1 were through Rosario Strait (1,117 of the 1,183 total transits in Rosario and Haro Straits).
  - 92 percent of transits by these tank vessels in Year 2 were through Rosario Strait (1,200 of the 1,309 total transits in Rosario and Haro Straits).
- In Year 2, five of the 79 Haro Strait transits by ATBs, and 11 of the 16 Haro Strait transits by barges greater than 5,000 DWT were identified where the new tug escort requirements may have been a factor in deciding the route.
- Unrelated to the new tug escort requirement, the border closure between Washington and Canada caused by the pandemic produced a change in traffic patterns for ATBs using pilots.
  - Prior to the pandemic there were no transits by ATBs between Vancouver, B.C., and the study area which used both Rosario and Haro Straits in one passage.
  - After the border closure, the pilots embarked and disembarked in Port Angeles and Victoria, B.C., requiring a transit in both Rosario and Haro Straits if transiting between the study area and Vancouver, B.C. (PPA, 2020).
  - There were 53 of these transits, 17 in Year 1 and 36 in Year 2.
- Escort tug transits increased significantly following the implementation of the new requirements.
  - This was especially notable for multi-purpose tugs, or tugs that performed escort duties as well as towed oil barges.
  - Transits by purpose-built escort tugs over crossing lines in the study area increased by 1,330 transits, from 5,991 in Year 1 to 7,321 in Year 2, an increase of 22 percent.
  - Transits by multi-purpose escort tugs over crossing lines in the study area increased by 1,674 transits, from 71 in Year 1 to 1,745 in Year 2, an increase of over 2,000 percent.
  - The total of transits by all tugs performing escort duties over crossing lines in the study area increased by 3,004 transits, from 6,062 in Year 1 to 9,066 transits in Year 2, an increase of 50 percent.
  - Vessels can transit over multiple crossing lines in a single trip, so the total number of transits over crossing lines does not represent the number of escort trips.
References


33 CFR § 156.205 Definitions (b) Lightering or Lightering operation. Retrieved from: https://www.ecfr.gov/cgi-bin/text-idx?node=pt33.2.156&rgn=div5#se33.2.156_1205


Vessel Traffic Trend Synopsis
December 2021
Page 86
crude-oil-production-fell-20-in-first-half-of-2020/?sh=48d428484369 on September 29, 2021


October 12, 2021


July 28, 2021


July 29, 2021


August 26, 2021


November 29, 2021


July 28, 2021


July 28, 2021

1:25K, Puerto Rico 1:20K) and from U.S. Board on Geographic Names files. In some instances, from 1:62,500 scale or 1:250,000 scale maps.


Appendix A
Improving the Safety of Oil Transportation Act Sections 1, 2, and 3

NEW SECTION. Sec. 1. The legislature finds that a variety of existing policies designed to reduce the risk of oil spills have helped contribute to a relatively strong safety record for oil moved by water, pipeline, and train in recent years in Washington state. Nevertheless, gaps exist in our safety regimen, especially deriving from shifts in the modes of overwater transportation of oil and the increased transport of oils that may submerge or sink, contributing to an unacceptable threat to Washington waters, where a catastrophic spill would inflict potentially irreversible damage on the endangered southern resident killer whales. In addition to the unique marine and cultural resources in Puget Sound that would be damaged by an oil spill, the geographic, bathometric, and other environmental peculiarities of Puget Sound present navigational challenges that heighten the risk of an oil spill incident occurring. Therefore, it is the intent of the legislature to enact certain new safety requirements designed to reduce the current, acute risk from existing infrastructure and activities of an oil spill that could eradicate our whales, violate the treaty interests and fishing rights of potentially affected federally recognized Indian tribes, damage commercial fishing prospects, undercut many aspects of the economy that depend on the Salish Sea, and otherwise harm the health and well-being of Washington residents. In enacting such measures, however, it is not the intent of the legislature to mitigate, offset, or otherwise encourage additional projects or activities that would increase the frequency or severity of oil spills in the Salish Sea. Furthermore, it is the intent of the legislature for this act to assist in coordinating enhanced international discussions among federal, state, provincial, first nation, federally recognized Indian tribe, and industry leaders in the United States and Canada to develop an agreement for an additional emergency rescue tug available to vessels in distress in the narrow Straits of the San Juan Islands and other boundary waters, which would lessen oil spill risks to the marine environment in both the United States and Canada.

Sec. 2. RCW 88.16.190 and 1994 c 52 s 1 are each amended to read as follows:

(1) Any oil tanker, whether enrolled or registered, of greater than one hundred twenty-five thousand deadweight tons shall be prohibited from proceeding beyond a point east of a line extending from Discovery Island light south to New Dungeness light, unless authorized by the United States coast guard, pursuant to 33 C.F.R. Sec. 165.1303.26

(2) An oil tanker, whether enrolled or registered, of forty to one hundred and twenty-five thousand deadweight tons may proceed beyond the points enumerated in subsection (1) if such tanker possesses all of the following standard safety features:

(a) Shaft horsepower in the ratio of one horsepower to each two and one-half deadweight tons; and
(b) Twin screws; and
(c) Double bottoms, underneath all oil and liquid cargo compartments; and
(d) Two radars in working order and operating, one of which must be collision avoidance radar; and
Such other navigational position location systems as may be prescribed from time to time by the board of pilotage commissioners:

PROVIDED, That, if such forty to one hundred and twenty-five thousand deadweight ton tanker is in ballast or is under escort of a tug or tugs with an aggregate shaft horsepower equivalent to five percent of the deadweight tons of that tanker, subsection (2) of this section shall not apply:

PROVIDED FURTHER, That additional tug shaft horsepower equivalencies may be required under certain conditions as established by rule and regulation of the Washington utilities and transportation commission pursuant to chapter 34.05 RCW.

(a)(i) An oil tanker of forty to one hundred twenty-five thousand deadweight tons may operate in the waters east of a line extending from Discovery Island light south to New Dungeness light and all points in the Puget Sound area, including but not limited to the San Juan Islands and connected waterways and the waters south of Admiralty Inlet, to the extent that these waters are within the territorial boundaries of Washington, only if the oil tanker is under the escort of a tug or tugs that have an aggregate shaft horsepower equivalent to at least five percent of the deadweight tons of the escorted oil tanker.

(ii) Effective September 1, 2020, the following may operate in Rosario Strait and connected waterways to the east only if under the escort of a tug or tugs that have an aggregate shaft horsepower equivalent to at least five percent of the deadweight tons of a forty thousand deadweight ton oil tanker: (A) Oil tankers of between five thousand and forty thousand deadweight tons; and (B) both articulated tug barges and towed waterborne vessels or barges that are: (I) Designed to transport oil in bulk internal to the hull; and (II) greater than five thousand deadweight tons.

(iii) The requirements of (a)(ii) of this subsection: (A) Do not apply to vessels providing bunkering or refueling services; (B) do not apply to a towed general cargo deck barge; and (C) may be adjusted or suspended by rule by the board of pilotage commissioners, consistent with section 3(1)(c) of this act.

(b) An oil tanker, articulated tug barge, or towed waterborne vessel or barge in ballast or when unladen is not required to be under the escort of a tug.

(c) A tanker assigned a deadweight of less than forty thousand deadweight tons at the time of construction or reconstruction as reported in Lloyd's Register of Ships is not subject to the provisions of RCW 88.16.170 (through 88.16.190) and 88.16.180.

(3) The definitions in this subsection apply throughout this section unless the context clearly requires otherwise.

(a) "Articulated tug barge" means a tank barge and a towing vessel joined by hinged or articulated fixed mechanical equipment affixed or connecting to the stern of the tank barge.

(b) "Oil tanker" means a self-propelled deep draft tank vessel designed to transport oil in bulk. "Oil tanker" does not include an articulated tug barge tank vessel.

(c) "Towed general cargo deck barge" means a waterborne vessel or barge designed to carry cargo on deck.
(d) "Waterborne vessel or barge" means any ship, barge, or other watercraft capable of traveling on the navigable waters of this state and capable of transporting any crude oil or petroleum product in quantities of ten thousand gallons or more for purposes other than providing fuel for its motor or engine.

NEW SECTION. Sec. 3. A new section is added to chapter 88.16 RCW to read as follows:

(1)(a) By December 31, 2025, the board of pilotage commissioners, in consultation with the department of ecology, must adopt rules regarding tug escorts to address the peculiarities of Puget Sound for the following:

(i) Oil tankers of between 5,000 and 40,000 deadweight tons; and

(ii) Both articulated tug barges and towed waterborne vessels or barges that are: (A) Designed to transport oil in bulk internal to the hull; and (B) greater than five thousand deadweight tons.

(b) The requirements of this section do not apply to:

(i) A towed general cargo deck barge; or

(ii) A vessel providing bunkering or refueling services.

(c) The rule making pursuant to (a) of this subsection must be for operating in the waters east of the line extending from Discovery Island light south to New Dungeness light and all points in the Puget Sound area. This rule making must address the tug escort requirements applicable to Rosario Strait and connected waterways to the east established in RCW 88.16.190(2)(a)(ii), and may adjust or suspend those requirements based on expertise developed under subsection (5) of this section.

(d) To achieve the rule adoption deadline in (a) of this subsection, the board of pilotage commissioners must adhere to the following interim milestones:

(i) By September 1, 2020, identify and define the zones, specified in subsection (3) (a) of this section, to inform the analysis required under subsection (5) of this section;

(ii) By December 31, 2021, complete a synopsis of changing vessel traffic trends; and

(iii) By September 1, 2023, consult with potentially affected federally recognized Indian treaty fishing tribes, other federally recognized treaty tribes with potentially affected interests, and stakeholders as required under subsection (6) of this section and complete the analysis required under subsection (5) of this section. By September 1, 2023, the department of ecology must submit a summary of the results of the analysis required under subsection (5) of this section to the legislature consistent with RCW 43.01.036.

(2) When developing rules, the board of pilotage commissioners must consider recommendations from potentially affected federally recognized Indian treaty fishing tribes, other federally recognized treaty tribes with potentially affected interests, and:

(a) The results of the most recently completed vessel traffic risk assessments;

(b) The report developed by the department of ecology as required under section 206, chapter 262, Laws of 2018;
(c) The recommendations included in the southern resident orca task force report, November 2018, and any subsequent research or reports on related topics;

(d) Changing vessel traffic trends, including the synopsis required under subsection (1) (d)(ii) of this section; and

(e) For any formally proposed draft rules or adopted rules, identified estimates of expected costs and benefits of the rule to:

(i) State government agencies to administer and enforce the rule; and

(ii) Private persons or businesses, by category of type of person or business affected.

(3) In the rules adopted under this section, the board of pilotage commissioners must:

(a) Base decisions for risk protection on geographic zones in the waters specified in subsection (1)(c) of this section. As the initial foci of the rules, the board of pilotage commissioners must equally prioritize geographic zones encompassing:

(i) Rosario Strait and 2 connected waterways to the east; and

(ii) Haro Strait and Boundary Pass

(b) Specify operational requirements, such as tethering, for tug escorts;

(c) Include functionality requirements for tug escorts, such as aggregate shaft horsepower for tethered tug escorts;

(d) Be designed to achieve best achievable protection, as defined in RCW 88.46.010, as informed by consideration of:

(i) Accident records in British Columbia and Washington waters;

(ii) Existing propulsion and design standards for covered tank vessels; and

(iii) The characteristics of the waterways; and

(e) Publish a document that identifies the sources of information that it relied upon in developing the rules, including any sources of peer-reviewed science and information submitted by tribes.

(4) The rules adopted under this section may not require oil tankers, articulated tug barges, or towed waterborne vessels or barges to be under the escort of a tug when these vessels are in ballast or are unladen.

(5) To inform rule making, the board of pilotage commissioners must conduct an analysis of tug escorts using the model developed by the department of ecology under section 4 of this act. The board of pilotage commissioners may:

(a) Develop scenarios and subsets of oil tankers, articulated tug barges, and towed waterborne vessels or barges that could preclude requirements from being imposed under the rule making for a given zone or vessel

(b) Consider the benefits of vessel safety measures that are newly in effect on or after July 1, 2019, and prior to the adoption of rules under this section; and
(c) Enter into an interagency agreement with the department of ecology to assist with conducting the analysis and developing the rules, subject to each of the requirements of this section.

(6) The board of pilotage commissioners must consult with the United States coast guard, the Puget Sound harbor safety committee, potentially affected federally recognized Indian treaty fishing tribes, other federally recognized treaty tribes with potentially affected interests, ports, local governments, state agencies, and other appropriate entities before adopting tug escort rules applicable to any portion of Puget Sound. Considering relevant information elicited during the consultations required under this subsection, the board of pilotage commissioners must also design the rules with a goal of avoiding or minimizing additional underwater noise from vessels in the Salish Sea, focusing vessel traffic into established shipping lanes, protecting and minimizing vessel traffic impacts to established treaty fishing areas, and respecting and preserving the treaty-protected interests and fishing rights of potentially affected federally recognized Indian tribes.

(7) Rules adopted under this section must be periodically updated consistent with section 5 of this act.

(8) The definitions in this subsection apply throughout this section unless the context clearly requires otherwise.

(a) "Articulated tug barge" means a tank barge and a towing vessel joined by hinged or articulated fixed mechanical equipment affixed or connecting to the stern of the tank barge.

(b) "Oil tanker" means a self-propelled deep draft tank vessel designed to transport oil in bulk. "Oil tanker" does not include an articulated tug barge tank vessel.

(c) "Towed general cargo deck barge" means a waterborne vessel or barge designed to carry cargo on deck.

(d) "Waterborne vessels or barges" means any ship, barge, or other watercraft capable of traveling on the navigable waters of this state and capable of transporting any crude oil or petroleum product in quantities of ten thousand gallons or more for purposes other than providing fuel for its motor or engine.
Appendix B
Interagency Agreement between the
State of Washington, Department of Ecology and
Washington Board of Pilotage Commissioners

THIS INTERAGENCY AGREEMENT ("Agreement" or "IAA") is made and entered into by and between the state of Washington, Department of Ecology, hereinafter referred to as “ECOLOGY,” and the Washington State Board of Pilotage Commissioners, hereinafter referred to as “BPC,” pursuant to the authority granted by Chapter 39.34 RCW and RCW 88.16.260.

THE PURPOSE OF THIS AGREEMENT is to establish guidelines, roles, and responsibilities for collaboration between ECOLOGY and BPC in the effective implementation of Sections 2, 3, 4, and 5 of Reducing Threats to Southern Resident Killer Whales by Improving the Safety of Oil Transportation Act, ESHB 1578 (Laws of 2019, ch. 289) (hereinafter referred to as the “Act”).

WHEREAS, the Act authorized ECOLOGY and BPC to enter into an Interagency Agreement allowing ECOLOGY to assist BPC with modeling and rulemaking activities authorized by the Act.

WHEREAS, close coordination and consultation between ECOLOGY and BPC is essential to ensure successful and effective implementation of these activities given legislative direction for consultation and interdependence of outcomes.

WHEREAS, the Legislature provided funding to ECOLOGY in the 2019-21 Operating Budget to support activities required by the Act.

THEREFORE, IT IS MUTUALLY AGREED THAT:

1) RESPONSIBILITIES AND COORDINATION OF WORK

ECOLOGY and BPC will work together to:

- Develop project plans to accomplish the requirements of the Act Sections 2, 3, and 5, including projects to help inform the requirements of the Act.
- Coordinate on communication, consultation and outreach activities.
- Provide technical assistance to plan and prepare for activities.

ECOLOGY and BPC Meetings:

ECOLOGY and BPC will meet in-person quarterly and via conference call monthly, or as needed to accomplish these related projects. ECOLOGY and BPC may change the meeting schedule by mutual agreement. Each organization is responsible for keeping their respective leadership (e.g., the full Board of Pilotage Commissioners) apprised about the status of the projects and associated meetings, as appropriate. Meeting topics will include:

- project planning
- status updates
- monitoring and evaluation of outcomes
**Decision-making:**

a) **Coordination and project details decision**: decided by consensus of the portfolio management team and documented in meeting notes.
   a. The portfolio management team: will consist at a minimum of BPC Executive Director, ECOLOGY Spills Program Prevention and Statewide Resources Section Managers, and the ECOLOGY BPC representative.

b) **Policy decisions**: made by ECOLOGY Spills Program Manager and/or a formal Board of Pilotage Commissioners vote. Decision-makers may elevate decisions within their organizations when appropriate.

**Project-specific responsibilities:**

In this section ‘BPC’ refers to BPC staff and ‘Board’ refers to the full Board of Pilotage Commissioners. Additional responsibilities will be assigned through mutually agreed upon project plans.

a) **BPC to Implement Rosario Tug Escort Requirements** (due September 1, 2020)
   Act Sec.2.(1)(a)(ii)
   • Roles:
     o BPC: Outreach to and inform tribes and stakeholders about tug escort requirements; determine monitoring and enforcement procedures; implement tug escort requirements.
     o Board: Vote on decisions including interpretive and policy statements.
     o ECOLOGY: Provide technical assistance to BPC.

b) **BPC to Identify and define geographic waterway zones** (due September 1, 2020)
   Act Sec.3.(1)(d)(i)
   • Roles:
     o BPC: Lead a process to define geographic regions, or zones, encompassing these waters.
     o Board: Make final decision on identifying and defining zones.
     o ECOLOGY: Provide technical assistance to BPC.

c) **ECOLOGY to Develop and maintain risk model**
   Act Sec.4.(1)
   • Roles:
     o ECOLOGY: Develop and maintain a vessel traffic risk model in consultation with the parties listed in 88.46.250. Consult with tribes and stakeholders.
     o BPC: Provide technical assistance to ECOLOGY as requested.
d) **ECOLOGY to Report to the Legislature on the quantitative assessment of the Emergency Response Towing Vessel** (due September 1, 2023)
Act Sec.4.(2)
- Roles:
  - ECOLOGY: Quantitatively assess whether an emergency response towing vessel serving Haro Strait, Boundary Pass, Rosario Strait, and connected navigable waterways will reduce oil spill risk; report findings to the Legislature (due September 1, 2023).
  - BPC: Provide technical assistance to ECOLOGY.

e) **BPC to conduct an analysis of tug escorts using the model developed by ECOLOGY** (due September 1, 2023)
Act Sec.3.(1)(d)(iii)
- Roles:
  - BPC: Develop scope of tug escort analysis using the model developed by ECOLOGY. Scope should include related outreach activities.
  - ECOLOGY: Provide technical assistance to BPC in the development of the scope. Perform tug escort analysis and related outreach activities based on the scope with input from BPC. Write and submit a summary of the tug escort analysis to the legislature by September 1, 2023.
  - Board: Vote to approve the analysis scope.

f) **BPC to complete a synopsis of changing vessel traffic trends** (due December 2021)
Act Sec.3.(1)(d)(ii)
- Roles:
  - BPC: Develop scope of changing vessel traffic trends synopsis and submit final synopsis to the legislature.
  - ECOLOGY: Provide technical assistance to BPC in the development of the scope. Develop report of Synopsis of changing vessel traffic trends.
  - Board: Vote to approve scope. Review and approve the Synopsis of changing vessel traffic trends.

g) **BPC to conduct Tug escort rulemaking** (due December 2025)
Act Sec.3.(1)(a)
- Roles:
  - Board: Make final decisions regarding tug escort requirements and adopt rules.
  - ECOLOGY: Lead rulemaking process and outreach efforts for BPC. Conduct regulatory analyses required by the Administrative Procedure Act, State Environmental Policy Act and the Regulatory Fairness Act.
  - BPC: Provide technical assistance to ECOLOGY as needed related to rulemaking process, outreach, and technical expertise.
External Communications:
ECOLOGY and BPC will create a joint Communications plan. External communications (e.g., emails, presentations and letters) will align with the joint Communications plan and will be coordinated between ECOLOGY and BPC. Whenever possible and appropriate, communications products will be joint messages from both ECOLOGY and BPC.

Consultation responsibilities:
The Act directs ECOLOGY and BPC to consult with tribes and stakeholders during model development, risk analysis, and rulemaking. Consultation requirements will be incorporated into the joint Communications plan and project plans.

2) PERIOD OF PERFORMANCE
The period of performance of this IAA shall commence on December 1, 2019, (or the date of final signature, whichever comes later,) and be completed by December 31, 2025, unless terminated sooner as provided herein. Amendments extending the period of performance, if any, shall be mutually agreed upon in writing by ECOLOGY and BPC.

3) ALTERATIONS AND AMENDMENTS
This Agreement may be amended by mutual agreement of the parties. Such amendments shall not be binding unless they are in writing and signed by personnel authorized to bind each of the parties. This agreement may be continually renewed via amendment for time periods that are mutually agreed upon.

4) FUNDING AVAILABILITY
ECOLOGY’s and BPC’s ability to perform work pursuant to the agreement is contingent on availability of funding. In the event funding from state, federal, or other sources is withdrawn, reduced, or limited in any way after the effective date and prior to completion or expiration date of this Agreement, ECOLOGY or BPC, at their sole discretion, may elect to terminate the Agreement, in whole or part, for convenience or to renegotiate the Agreement subject to new funding limitations and conditions. ECOLOGY or BPC may also elect to suspend performance of the Agreement until ECOLOGY or BPC determines the funding insufficiency is resolved. ECOLOGY or BPC may exercise any of these options with no notification restrictions, although ECOLOGY or BPC may make a reasonable attempt to provide notice.

5) ORDER OF PRECEDENCE
In the event of an inconsistency in the terms of this Agreement, or between its terms and any applicable statute or rule, the inconsistency shall be resolved by giving precedence in the following order:

a. Applicable federal and state of Washington statutes, regulations, and rules.
b. Mutually agreed upon written amendments to this Agreement.
c. This Agreement, number C2000090.
d. Any other provisions or term of this Agreement, including materials incorporated by reference or otherwise incorporated.
6) RECORDS MAINTENANCE

The parties to this Agreement shall each maintain books, records, and other documents, related to the activities covered by this agreement consistent with the records retentions requirements and procedures of their agency. Each party will utilize reasonable security procedures and protections for all materials related to this Agreement. All materials are subject to state public disclosure laws.

7) RESPONSIBILITIES OF THE PARTIES

Each party of this Agreement hereby assumes responsibility for claims and/or damages to persons and/or property resulting from any act or omissions on the part of itself, its employees, its officers, and its agents. Neither party will be considered the agent of the other party to this Agreement.

8) RIGHTS IN DATA

Unless otherwise provided, data which originates from this Agreement shall be owned by state of Washington, ECOLOGY. Data shall include, but not be limited to, reports, documents, pamphlets, advertisements, books magazines, surveys, studies, computer programs, films, tapes, and/or sound reproductions. Ownership includes the right to copyright, patent, register, and the ability to transfer these rights.

9) SEVERABILITY

If any provision of this Agreement or any provision of any document incorporated by reference shall be held invalid, such invalidity shall not affect the other provisions of this Agreement which can be given effect without the invalid provision, if such remainder conforms to the requirements of applicable law and the fundamental purpose of this Agreement, and to this end the provisions of this Agreement are declared to be severable.

10) TERMINATION FOR CAUSE

If for any cause, either party does not fulfill in a timely and proper manner its obligations under this Agreement, or if either party violates any of these terms and conditions, the aggrieved party will give the other party written notice of such failure or violation. The responsible party will be given the opportunity to correct the violation or failure within fifteen (15) business days. If failure or violation is not corrected, this Agreement may be terminated immediately by written notice of the aggrieved party to the other.

11) WAIVER

A failure by either party to exercise its rights under this Agreement shall not preclude that party from subsequent exercise of such rights and shall not constitute a waiver of any other rights under this Agreement unless stated to be such in a written amendment to this Agreement signed by an authorized representative of the parties.
12) AGREEMENT MANAGEMENT

The representative for each of the parties shall be responsible for and shall be the contact person for all communications, notifications, and billings questions regarding the performance of this Agreement. The parties agree that if there is a change in representatives that they will promptly notify the other party in writing of such change, such changes do not need an amendment.

13) ALL WRITINGS CONTAINED HEREIN

This Agreement contains all the terms and conditions agreed upon by the parties. No other understandings, oral or otherwise, regarding the subject matter of this Agreement shall be deemed to exist or to bind any of the parties hereto.

The signatories to this Agreement represent that they have the authority to bind their respective organizations to this Agreement.

IN WITNESS WHEREOF, the parties below, having read this Agreement in its entirety, including all attachments, do agree in each and every particular as indicated by their signatures below.

<table>
<thead>
<tr>
<th>The ECOLOGY Representative is:</th>
<th>BPC Representative is:</th>
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</thead>
<tbody>
<tr>
<td>Name: Brian Kirk, Prevention Section</td>
<td></td>
</tr>
<tr>
<td>Manager Address: 3190 160th Ave SE, Bellevue WA 98008-5452</td>
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<td>Email: <a href="mailto:brian.kirk@ecy.wa.gov">brian.kirk@ecy.wa.gov</a></td>
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<tr>
<td>Fax: 425-649-7098</td>
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<tr>
<td>Name: Jaimie C. Bever, Executive Director</td>
<td></td>
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<td>Address: 2901 3rd Avenue, Suite 500 Seattle, WA 98121</td>
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<td>Phone: (206) 515-3887</td>
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<td>Email: <a href="mailto:BeverJ@wsdot.wa.gov">BeverJ@wsdot.wa.gov</a></td>
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<td>Fax: (206) 515-3906</td>
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Appendix C
Oil Transportation Safety Committee Charter

STATE OF WASHINGTON
BOARD OF PILOTAGE COMMISSIONERS
2901 Third Avenue, Suite 500 | Seattle, Washington 98121 | (206) 515-3904 | www.pilotage.wa.gov

OIL TRANSPORTATION SAFETY COMMITTEE
CHARTER

I. Statement of Purpose
The purpose of the Board of Pilotage Commissioners' (Board or BPC) Oil Transportation Safety Committee (Committee or OTSC) is to conduct analysis and provide recommendations for the Board concerning the responsibilities outlined in the 2019 legislation The Reducing Threats to Southern Resident Killer Whales by Improving the Transportation of Oil Act (The Act).

II. Membership
The OTSC shall consist of:

- one (1) Chair, who is affiliated with the Board of Pilotage Commissioners;
- three (3) members of the Board of Pilotage Commissioners including:
  - the Department of Ecology the representative; and
  - the marine environment representative
- one (1) Puget Sound Pilot representative;
- one (1) oil industry representative;
- one (1) tug industry representative;
- one (1) environmental community representative; and
- at least one (1) tribal representative

Committee members may identify one (1) specific alternate, representing the same or similar organization. If a committee member is unavailable to attend a scheduled meeting, the alternate shall attend in their place.

The OTSC Chair, members and alternates shall be appointed by the Board for an initial term of one (1) year and may be re-appointed by the Board annually. The Committee will ensure that committee members and considerations represent the diverse maritime interests in the Salish Sea. The Committee may consult with additional subject matter experts as needed.
III. The Role of Chair

The Chair of the OTSC will preside at meetings and work with BPC and Department of Ecology staff to prepare committee materials. The Chair will provide monthly updates of OTSC activities, coordinate and communicate with committee members and outside interests, and deliver recommendations to the Board.

IV. Authority

The OTSC is an advisory committee to the Board. It will not make policy decisions. Committee recommendations will be agreed upon by consensus.

V. Guidelines & Responsibilities:

Committee members will commit to the following:

- For Rosario Strait and connected waterways east tug escort requirement implementation and geographic zone identification, meet at a minimum, monthly for two (2) hours between February 2020 and May 2020. Time and frequency of meetings for other responsibilities outlined in The Act will be determined on a case-by-case basis and updated in the Charter as needed.
- Meetings start and end on time
- All meeting attendees come prepared to meetings.
- Be productive at each meeting
- One person talks at a time. Express your point of view and then let others speak (i.e. don't talk over other people and no side discussions at the table).
- Disagreements are understandable, but be solution focused.
- Be open to new ideas and ways of doing things.
- Everyone's contributions are valued. Be respectful and support each other's role.
- Provide, via consensus, recommendations to the Board for the responsibilities outlined in The Act.

VI. Activities & Duties

The OTSC will analyze and make recommendations to the Board on the following directives and deadlines from The Act:

1. September 1, 2020 — Rosario Strait and connected waterways east tug escort implementation (Section 2(2)(a)(ii))
2. September 1, 2020 — Development of geographic zones (Section 3(1)(d)(i))
3. December 31, 2021 — Preparation of synopsis of changing vessel traffic trends (Section 3(1)(d)(ii))
4. September 1, 2023 — Analysis of tug escorts using the model developed by the Department of Ecology (Section 3(1)(d)(iii))
5. December 31, 2025 — Tug Escort Rulemaking (Section 3 (l)(a))
6. October 1, 2028 — Consider updating tug escort rules (Section 5(1))
In order to meet the first two legislative deadlines, the Committee should present recommendations to the Board at the May 21, 2020 meeting of the BPC, to allow the Board to adopt interpretive statements and identify geographic zones at their June 18, 2020 meeting. Committee work will be project-based in concert with the directives outlined in The Act. As a result, membership may change at the Board's discretion as the Committee works through the multiyear initiatives laid out in The Act.

VII. Meetings/Time Commitment

The work of the OTSC is associated with The Act, which directs the Board of Pilotage Commissioners to adopt tug escort rules for Puget Sound by December 31, 2025. Meetings will occur bi-weekly, monthly, bi-monthly, or quarterly, as needed, and will last up to two (2) hours. Locations may vary.

Meeting summaries will be reviewed and accepted by the Committee, and will be available on the BPC website. The first meeting of the Committee will be scheduled for early February 2020. The OTSC will review its charter at least annually and recommend any proposed changes to the Board for review.

This charter was adopted by the Board of Pilotage Commissioners on December 16, 2019.
Appendix D
Synopsis of Changing Vessel Traffic Trends Scope of Work

Background: ESHB 1578 requires vessel trends synopsis

ESHB 1578 requires tug escorts for laden tankers between 5,000 – 40,000 DWT, and laden ATBs and oil barges greater than 5,000 DWT operating in Rosario Strait and connected waterways to the east, starting September 1, 2020.

ESHB 1578 Section 3(ii) requires that “By December 31, 2021, [Board of Pilotage Commissioners] complete a synopsis of changing vessel trends.” The intent of the synopsis is to look at how vessel traffic patterns change following the implementation of the Rosario tug escort requirement.

BPC and Ecology roles and responsibilities

BPC and Ecology signed an interagency agreement (IAA) for work related to ESHB 1578. For the vessel trends synopsis, the IAA includes the following responsibilities:

- BPC Staff will develop the scope.
- Ecology will provide technical assistance to BPC by producing a draft of the scope.
- BPC Board will vote to approve the scope.
- Ecology will draft the synopsis.
- BPC Board will review and approve the synopsis.
- BPC Staff will submit the final synopsis to the legislature.

Purpose

The intent of the synopsis is to review vessel transits pre- and post-bill implementation to identify changes after Section 2 of the bill is implemented. The synopsis will report on vessel trends for Washington waters east of a line extending from Discovery Island light south to New Dungeness light. It will also include vessel trends for the transboundary waters of Haro Strait, Boundary Pass, and the southern Strait of Georgia.

Research questions

- What changing vessel traffic trends do we see for vessels that newly fall under an escort requirement?
- What changing vessel traffic trends do we see for deep draft and tug traffic that have no additional escort requirements?
- What changing vessel traffic trends do we see for tug escorts?
- How does the overall number of transits (by vessel type) change pre- and post-bill implementation?

Methods

Use Geographic Information System analysis of Automatic Identification System (AIS) data to determine the routes and number of transits of vessels.
Combine Advance Notice of Transfer (ANT) reports, AIS data, and known tug-barge pairings to estimate the routes and number of transits of laden tank vessels (towed oil barges, Articulated Tug Barges, and tank ships). Compare number of vessels acting as escort tugs pre-and post-bill implementation.

**Data sources**

**Advance Notice of Transfer (ANT)**
- Under WAC 173-184-100, delivering vessels involved in an oil transfer of more than one hundred gallons must provide prior notice of the oil transfer to ecology.

**Automatic Identification System (AIS) Data**
- AIS transceivers on vessels transmit basic information like location, course, destination, and other vessel characteristics. The data can be requested from the USCG.

**Vessel characteristics and deadweight tonnage**
- Deadweight tonnage is specified in the WAC to be “the maximum summer deadweight tonnage that was assigned to the vessel at the time of construction as reported in Lloyd's Register of Ships.” WAC 363-116-500
- For some vessels and barges deadweight tonnage can be identified using commercially available databases. Deadweight tonnage may be available from vessel operating companies. Where deadweight tonnage data is not available, Ecology will attempt to determine whether vessels require escorts based on information such as gross tonnage, ANT data, and observations of vessel transits (i.e., did the vessel travel with an escort?).

**Marine Exchange Crossing Line Data**
- The Marine Exchange compiles data on vessel counts for specific crossing lines, organized by vessel type, for the passage of vessels past a series of geographic “gates.” Ecology will consider whether this data could inform the synopsis.

**Data Challenges**

ANTs use barge names and AIS uses vessel names. Towed oil barges are not always towed by the same vessel. Linking vessel routes to ANTs could be prohibitively time consuming if not automated. Marine Exchange crossing line data does not provide route information, or information on laden or unladen status.

**Data Timeline**

The synopsis will compare a year of pre-bill implementation data (September 1, 2019 – August 31, 2020) to a year of post-bill implementation data (September 1, 2020 – August 31, 2021).

**Deliverables**

The synopsis will comprise a report describing:

- Route selection and number of vessel transits for pre-and post-bill implementation for the following vessel types. Ecology will explore ways to compare transits on a common scale.
vessels that newly fall under an escort requirement
- deep draft and tug traffic that have no additional escort requirement
- vessels that are providing bunkering or refueling services

- Routes compared will include, but will not be limited to transits of Rosario Strait and Haro Strait/Boundary Pass.
- Review of tugs engaged in escorting tank vessels in Rosario and connected waterways east, including but not limited to number of transits, names of vessels, and operating companies.
- Number of oil transfers per refinery and per anchorage pre- and post-bill implementation.
- A review of the last 5 years of existing vessel transit data, to provide context as to the overall trend in vessel movements, based on vessel types. Determining the laden/unladen status of tank vessels, deadweight tonnage of vessels, and details on vessel occupation (i.e., bunkering) would require a manual evaluation of each transit, and is outside the scope of this review.

**Opportunities for Review and Comment**

Ecology will be available to provide updates to the BPC as requested. Potential updates include:

- Progress report after 6 months of post implementation data collection
- Presentation after post implementation data collection is complete

Ecology will address one set of comments from the BPC after submitting the draft report. Comments will be incorporated to the extent possible and will be included in the final report to the Board. No new data collection or analysis will result from review comments.

**Amendments**

The BPC board must approve by vote any additions or other changes to this scope of work. Any changes approved by the BPC will be attached to this scope of work.

**Timeline**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 1, 2019</td>
<td>Start of pre-implementation data collection timeframe</td>
</tr>
<tr>
<td>August 31, 2020</td>
<td>End of pre-implementation data collection timeframe</td>
</tr>
<tr>
<td>September 1, 2020</td>
<td>Implementation of new tug escort requirements</td>
</tr>
<tr>
<td>September 1, 2020</td>
<td>Start of post-implementation data collection timeframe</td>
</tr>
<tr>
<td>August 31, 2021</td>
<td>Data collection complete</td>
</tr>
<tr>
<td>October 14, 2021</td>
<td>Submitted for internal Spills Program review</td>
</tr>
<tr>
<td>November 4, 2021</td>
<td>Ecology delivers initial draft synopsis to BPC</td>
</tr>
<tr>
<td>November 11, 2021</td>
<td>BPC Board Meeting</td>
</tr>
<tr>
<td>December 2, 2021</td>
<td>Ecology delivers final draft to BPC</td>
</tr>
<tr>
<td>December 9, 2021</td>
<td>BPC Board Meeting</td>
</tr>
<tr>
<td>December 31, 2021</td>
<td>BPC publishes the Synopsis and submits to the legislature</td>
</tr>
</tbody>
</table>
Appendix E
Board of Pilotage Commissioners Interpretive Statement Regarding ESHB 1578

Adopted in regular session on September 17, 2020 by the State of Washington Board of Pilotage Commissioners.

STATE OF WASHINGTON BOARD OF PILOTAGE COMMISSIONERS INTERPRETIVE STATEMENT
(Revised 17 September 2020) REGARDING: ESHB 1578 Terms

It is the policy of the Board to use the following definitions when interpreting terms as they relate to ESHB 1578 Reducing threats to southern resident killer whales by improving the safety of oil transportation and RCW 88.16.190. For the sake of consistency, justification, and efficiency; the Board sought and relied on published references to inform, adapt, or adopt definitions for this specific interpretation of RCW 88.16.190, Section 2, Rosario Strait and Connected Waterways East Tug Escort Implementation.

1. Under the Escort of a Tug or Tugs

It is the interpretation of the Board that, as per 33 CFR 168.05 “escort vessel means any tug that is assigned and dedicated to a tank vessel during the escort transit”. It is further the interpretation of the Board that, as per the Puget Sound Harbor Safety Plan Tanker Escort Section B3, “all escorts must be in close proximity for timely and effective response taking into consideration” the proximity to hazards, “ambient sea and weather conditions, escort configuration, maneuvering characteristics of the vessels, emergency connection procedures, surrounding vessel traffic and other factors that may affect response capability”.

2. Rosario Strait

It is the interpretation of the Board that “Rosario Strait” is defined as the waters connecting the Strait of Juan de Fuca and the Strait of Georgia bounded on the West by Lopez Island, Decatur Island, Blakeley Island and Orcas Island, and on the East by Fidalgo Island, Cypress Island, Sinclair Island and Lummi Island. The northern entrance to Rosario Strait, as defined by the USGS4, is bounded by a line from Pt. Thompson on Orcas Island to Puffin Island light and then to Point Migley on Lummi Island. The southern entrance to Rosario Strait is bounded by a line from Davidson Rock light, southeast to position Lat. 48° 24.0’N, Long. 122° 47.15’W then East to the shore of Whidbey Island at Lat. 48° 24.0’N, Long. 122° 39.9’W (near W. Point).

Note: this definition is different from the VTS Special Area as defined in 33 CFR 161.55.

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1 Pilotage Act, 88.16. R.C.W § 190 (2019)
2 33 C.F.R. § 168.05 (2013)
3. Connected Waterways East

It is the interpretation of the Board that “connected waterways east” is defined as all connected channels, waterways, bays and anchorages East of Rosario Strait and north of 48° 30.0’ N Latitude. These waters include but are not limited to Guemes Channel, Bellingham Channel, the channels around Sinclair, Vendovi and Saddlebag islands as well as Bellingham Bay, Samish Bay, Padilla Bay and Fidalgo Bay.

Note: this definition is different from the VTS Special Area as defined in 33 CFR 161.5³.

4. Oil

It is the interpretation of the Board that, as per RCW 90.56.010 (19)⁶, the definition of “oil” or “oils” means oil of any kind that is liquid at twenty-five degrees Celsius and one atmosphere of pressure and any fractionation thereof, including, but not limited to, crude oil, bitumen, synthetic crude oil, natural gas well condensate, petroleum, gasoline, fuel oil, diesel oil, biological oils (see note 2 below) and blends, oil sludge, oil refuse, and oil mixed with wastes other than dredged spoil. Oil does not include any substance listed in Table 302.4 of 40 CFR 302 adopted August 14, 1989, under section 102(a) of the federal comprehensive environmental response, compensation, and liability act of 1980, as amended by P.L. 99-499."

Notes: (1) The Board considers diluted bitumen to be a part of this definition; (2) The Board considers biological oils to include: “fats, oils, or greases of animal, fish, or marine mammal origin; vegetable oils, including oils from seeds, nuts, fruits, or kernels” in alignment with Federal Regulations.⁷

5. Laden/Unladen (In Ballast)

It is the interpretation of the Board that, as per the Board’s existing Statement of Policy⁸, “any tank vessels 40,000 deadweights tons or more whose clingage, residue, or other applicable cargo onboard is greater than 0.5 percent of the vessel’s maximum cargo carrying capacity or 3,000 barrels, whichever figure is less, shall be considered laden and therefore not in ballast. The term “Tank Vessel” in this interpretation refers to oil tankers, articulated tug and barge units and towed barges designed to carry oil in bulk”.

It is further the interpretation of the Board that any tank vessels below 40,000 deadweight tons whose clingage, residue, or other applicable cargo onboard is greater than 2 percent of the vessel’s maximum cargo carrying capacity or 3,000 barrels, whichever figure is less, shall be considered laden and therefore not in ballast.

Note: This interpretation was developed to acknowledge most tank vessels are capable of pumping their tanker down to 0.5 percent of their capacity. However, some 5,000 – 40,000

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³ 33 C.F.R. § 161.55 (2019)
⁶ Oil and Hazardous Substance Spill Prevention and Response, 90.56, R.C.W. § 010 (2015)
⁷ 40 C.F.R § 112.2 (2020)
deadweight ton bunker barges to not have the pumping capacity to reach the 0.5 percent threshold in order to be considered unladen.

In addition, that “for the purpose of interpreting the above referenced RCW and WAC section, “in ballast” is defined when an LPG carrier is deemed to be in a ballast condition if the vessel has retained on board only the minimum cargo necessary plus a safety factor to arrive at its next load port in a cold condition. This quantity is not to exceed 1.5 percent of the cargo carrying capacity”.  

6. Vessels Providing Bunkering or Refueling Services

It is the interpretation of the Board that bunkering means an oil transfer operation to replenish a self-propelled vessel with fuel or bunkers used for ship services or propulsion of the vessel. It is further the interpretation of the Board that “vessels providing bunkering or refueling services” means tank vessels that are conducting bunkering, which includes the transit of the tank vessel to the bunker location, the oil transfer operation, and the return transit of the tank vessel.


Appendix F
Synopsis Terminology

Appendix F contains terminology which is specific to the synopsis. Some terms are defined by the BPC’s Interpretive Statement Regarding the Act (Appendix E). Ecology developed some terms to define synopsis locations, dates, and methods. In some cases synopsis terminology differs from standard maritime definitions.

Escort Vessel
Any tug that is assigned and dedicated to a tank vessel during the escort transit.

It is further the interpretation of the Board that, as per the Puget Sound Harbor Safety Plan Tanker Escort Section B\(^1\), “all escorts must be in close proximity for timely and effective response taking into consideration” the proximity to hazards, “ambient sea and weather conditions, escort configuration, maneuvering characteristics of the vessels, emergency connection procedures, surrounding vessel traffic and other factors that may affect response capability” (Board of Pilotage Commissioners, 2020a).

Full Capacity Load
A measure of volume, 95 percent of the maximum cargo carrying capacity of the barge, ATB, or tanker.

Multi-Purpose Tug
A tug designed for a singular purpose but used for several different ones, e.g., a coastal tug used as a ship assist or escort tug. (BC Shipping News & Allen, R., 2012)

Study area
Figure F-1 shows the boundaries of the study area, which includes Washington waters east of a line extending from Discovery Island lighthouse south to New Dungeness lighthouse and the transboundary waters of Haro Strait, Boundary Pass, and the southern Strait of Georgia (Board of Pilotage Commissioners, 2020b).

Figure F - 1 Map of study area

**Synopsis Period**

The synopsis period covers two years.

Year 1 - year prior to tug escort implementation, September 1, 2019 thru August 31, 2020

Year 2 - year after tug escort implementation September 1, 2020 thru August 31, 2021

**Transit**

A significant movement by a vessel between two locations in Washington waters.

**Transit Types**


**‘Likely laden’ transit:** A transit by a vessel of interest carrying oil as cargo.

It is the interpretation of the Board that, as per the Board’s existing Statement of Policy\(^2\), “any tank vessels 40,000 deadweights tons or more whose clingage, residue, or other applicable cargo onboard is greater than 0.5 percent of the vessel's maximum cargo carrying capacity or 3,000 barrels, whichever figure is less, shall be considered laden and therefore not in ballast (Board of Pilotage Commissioners, 2020).

It is further the interpretation of the Board that any tank vessels below 40,000 deadweight tons whose clingage, residue, or other applicable cargo onboard is greater than 2 percent of the vessel’s maximum cargo carrying capacity or 3,000 barrels, whichever figure is less, shall be considered laden and therefore not in ballast (Board of Pilotage Commissioners, 2020).

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\(^2\) Statement of Policy Regarding Interpretation of the Term “In Ballast” used in RCW 88.16.190 and WAC 363-116-500. BOARD OF PILOTAGE COMMISSIONERS, (May 1, 2020) [https://pilotage.wa.gov/policystatements.html](https://pilotage.wa.gov/policystatements.html)
barrels, whichever figure is less, shall be considered laden and therefore not in ballast (Board of Pilotage Commissioners, 2020).

Note: Criteria for categorizing a transit as ‘likely laden’ in this analysis were (Figure F-2):

- Vessel received less than a full load from the facility - transit leaving the facility is categorized as likely laden (as stated below, transit arriving would be unknown)
- Vessel received a full capacity load - transit leaving the facility is categorized as likely laden, transit arriving categorized as likely unladen
- Vessel discharged less than a full load to the facility - transit arriving at the facility is categorized as likely laden (as stated below, transit departing would be unknown)

‘Likely unladen’ transit: A transit by a vessel of interest without oil as cargo. See the BPC above interpretation of laden.

Note: Criteria for categorizing a transit as ‘likely unladen’ in this analysis were (Figure F-2):

- Vessel discharged a full capacity load to the facility - transit leaving the facility is categorized as likely unladen
- Vessel received a full capacity load from the facility - transit arriving at the facility is categorized as likely unladen

Unknown transit: A transit where there was not enough information available to determine whether it was ‘likely laden’ or ‘likely unladen’.

Note: Criteria for categorizing a transit as ‘unknown’ in this analysis were (Figure F-2):

- Vessel received less than a full load from the facility – transit arriving at the facility is unknown (as stated above, transit departing facility would be likely laden)
- Vessel discharged less than a full load to the facility - transit leaving the facility is unknown (as stated above, transit arriving at the facility would be likely laden)

Engaged in bunkering transit: A transit by a vessel of interest for the purpose of bunkering or refueling another vessel. See Vessels Engaged in Bunkering for BPC interpretation of engaged in bunkering.

Note: Criteria for categorizing a transit as ‘engaged in bunkering’ in this analysis were (Figure F-2):

- Vessel is enroute to the bunker location
- Vessel is returning from the bunker location
Trip
A movement by an escort tug from start of job to return to standby station. One trip by an escort tug can cross multiple crossing lines.

Vessels engaged in bunkering
A tank vessels engaged in bunkering includes the transit of the tank vessel to the bunker location, the oil transfer operation, and the return transit of the tank vessel.

It is the interpretation of the Board that bunkering means an oil transfer operation to replenish a self-propelled vessel with fuel or bunkers used for ship services or propulsion of the vessel.³ (Board of Pilotage Commissioners, 2020a)

Vessels of Interest
The vessel types that were evaluated in the synopsis. They include the vessels that newly fall under escort requirements and vessels with no additional escort requirements.

• **Vessels that newly fall under escort requirement:** Laden oil tankers between 5,000 and 40,000 DWT, Articulated Tug and Barge (ATB) units and oil barges over 5,000 DWT.

• **Vessels with no additional escort requirement:**
  - **ATB:** Oil carrying ATBs less than 5,000 DWT
  - **Barges:** Oil carrying barges less than 5,000 DWT
  - **Barges:** Oil carrying barges greater than 5,000 DWT engaged in bunkering
  - **Deep draft vessels:** Tankers greater than 40,000 DWT
Appendix G Maritime Definitions

Appendix G contains definitions and maritime terminology used in the synopsis

Automatic Identification System (AIS)

The Automatic Identification System (AIS) is broadcast system which transmits vessel data for maritime navigational safety and communications. All of the vessels of interest in this synopsis are required to have a properly functioning AIS (33 C.F.R. §164.46) with the exception of towed oil barges. Ecology tracked the movement of oil barges by combining AIS data from tugs, and oil transfer data from ANT as described in Synopsis Step 3: Record of vessel transits and determination of transit type.

Articulated Tug Barge

A tank barge and a towing vessel joined by hinged or articulated fixed mechanical equipment affixed or connecting to the stern of the tank barge. (RCW 88.16.190)

Ballast

Material, usually seawater, placed in a vessel not carrying cargo to obtain or maintain proper stability, trim or draft. A ship so laden with ballast is determined to be ‘in ballast’ and the voyage is described as ‘in ballast’. The term can also be used as a verb, as “The vessel will be ‘ballasting’ at the next port”. (Maritime Industry Foundation, n.d.)

Board of Pilotage Commissioners (the), Washington State –

The Board of Pilotage Commissioners was created by the 1935 Legislature and includes members who are appointed by the Governor, confirmed by the Senate and serve staggered four-year terms. The members include a designee of the Director of Washington State Ferries, who is the chairperson, (2) public members, (1) American shipping representative, (1) foreign shipping representative, (2) licensed Pilots, (1) environmental member, and (1) Department of Ecology member (Board of Pilotage Commissioners, n.d.).

The mission of the Board is to ensure against the loss of lives, loss of or damage to property and vessels, and to protect the marine environment by maintaining efficient and competent pilotage service on our State’s inland waters (Board of Pilotage Commissioners, n.d.).

The Board develops and proposes statutory language for legislative adoption to ensure safe and compulsory pilotage, adopts rules to administer State pilotage laws, and enforces pilot and public adherence to the Pilotage Act, which may include discipline and/or prosecution of violators. The Board also administers testing, training and licensing of marine pilots, and establishes standards for reporting and investigating incidents involving state-piloted vessels (Board of Pilotage Commissioners, n.d.)
**Bunkering or fueling**

An oil transfer operation to replenish a self-propelled vessel with fuel or bunkers used for ship services or propulsion of the vessel. (Ecology, n.d. -f)

**Chemical Tanker**

A tanker constructed to carry a cargo of noxious liquid substances in bulk. There are two kinds of chemical tankers: one is an exclusive chemical tanker for carriage of an exclusive cargo, and the other one is a parcel chemical tanker capable of carrying many kinds of chemical cargoes. Chemical tankers usually range from 5,000 to 59,000 DWT (Wartsila, n.d.).

**Coastal Tug**

A tug designed for towing barges between coastal ports. Coastal tugs are generally single or twin screw, have less fendering, and can handle more weather than a harbor tug. (BC Shipping News & Allen, R., 2012)

**Department of Ecology, Washington State (Ecology)**

Ecology is Washington state’s environmental regulatory agency created to carry out and coordinate the state’s pollution control and water management programs.

Note: Enhanced Substitute House Bill 1578 gave the BPC authority to partner with the Department of Ecology on Rosario Strait tug escort requirements.

**Deadweight Tons**

Is a measure of how much weight a ship can carry and is the sum of the weights of cargo, fuel, fresh water, ballast water, provisions, passengers, and crew. (Department of Transportation, 2008)

Note: Also known as deadweight; abbreviated to DWT, D.W.T., d.w.t., or dwt

**Escort Tug**

A tug purpose-built for ship assist and escort service. These tugs generally have Z-drive\(^1\) or Voith\(^2\) propulsion and unique hull forms designed to maximize indirect steering and braking forces. (BC Shipping News & Allen, R., 2012)

**Lightering**

Lightering or Lightering operation means the transfer of a cargo of oil in bulk from one oil tanker less than 150 gross tons to another oil tanker less than 150 gross tons, or a cargo of hazardous material in bulk from one vessel to another, including all phases of the operation.

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1 Z-drive is short for an azimuth thruster marine drive, propellers placed in pods that can be rotated to any horizontal angle (azimuth), making a rudder unnecessary. The pod can rotate 360 degrees allowing for rapid changes in thrust direction and thus vessel direction.

2 VSP generates thrust by profiled blades that project from the bottom of the ship mounted in a rotor casing.
from the beginning of the mooring operation to the departure of the service vessel from
the vessel to be lightered, except when that cargo is intended only for use as fuel or lubricant
aboard the receiving vessel (33CFR156.205(b)).

**MMSI Number**

Maritime Mobile Service Identities (MMSIs) are nine digit numbers used by maritime digital
selective calling (DSC), automatic identification systems (AIS), and certain other equipment to
uniquely identify a ship or a coast radio station. (Coast Guard, 2021a)

**Multi-Purpose Tug**

A tug designed for a singular purpose but used for several different ones, e.g., a coastal tug
used as a ship assist or escort tug. (BC Shipping News & Allen, R., 2012)

**Oil Tanker**

A self-propelled deep draft tank vessel designed to transport oil in bulk. "Oil tanker" does not
include an articulated tug barge (ATB) tank vessel. (RCW 88.16.260)

The global crude oil and refined product tanker fleet uses a classification system to standardize
contract terms, costs, port/canal and strait access. This system is known as the Average Freight
Rate Assessment (AFRA) system, and was established by Royal Dutch Shell six decades ago.

AFRA uses a scale that classifies tanker vessels according to deadweight tons, a measure of a
ship’s capacity to carry cargo. The approximate capacity of a ship in barrels is determined by
using an estimated 90 percent of a ship’s deadweight tonnage, and multiplying that by a barrel
to metric ton conversion factor specific to each type of petroleum product and crude oil, as
liquid fuel densities vary by type and grade (U.S. Energy Information Administration, 2014).

Figure G-1 Shows the Average Freight Rate Assessment (AFRA) tanker scale.
### Ship Assist or Harbor Tug

A tug designed for assisting large ships onto and off of a berth by pushing and pulling as required. These tugs are very maneuverable and generally have Z-drive or Voith propulsion. (BC Shipping & Allen, R., 2012)
Appendix H Refineries in Study Area

Washington’s refineries provide energy that fuels the regional economy (Smith, 2015). The facilities’ location allows them to source crude from the Bakken shale in North Dakota, Alberta’s oil sands, and Alaska’s North Slope, as well as foreign crude, and to supply to markets along the West Coast and Asia (Smith, 2015).

There are 5 major oil refineries in Washington, 4 of which are located in the study area.

Note: Shell Puget Sound refinery was sold to HollyFrontier Corporation in 2021 (Shell US, 2021).

Figure H 1 Map showing refinery locations in study area.

Table H 1 Refineries in study area including common name, year constructed and capacity in barrels per day

<table>
<thead>
<tr>
<th>Refinery Name</th>
<th>Common name</th>
<th>Year constructed</th>
<th>Current Capacity (bbls/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tesoro Refining &amp; Marketing Company</td>
<td>Anacortes Refinery</td>
<td>1955</td>
<td>119,000</td>
</tr>
<tr>
<td>BP Cherry Point</td>
<td>BP Cherry Point</td>
<td>1971</td>
<td>225,000</td>
</tr>
<tr>
<td>Phillips 66 Ferndale Refinery</td>
<td>Ferndale</td>
<td>1954</td>
<td>100,000</td>
</tr>
<tr>
<td>Shell Puget Sound Refinery¹</td>
<td>SPSR or Shell March Point</td>
<td>1957</td>
<td>145,000</td>
</tr>
</tbody>
</table>

¹ Shell Puget Sound refinery was sold to HollyFrontier Corporation (Shell US, 2021)
Tesoro Refining and Marketing Company\(^1\) (Anacortes Refinery) is located in Skagit County on March Point near Anacortes. The refinery has a total crude oil processing capacity of approximately 119,000 barrels per day. The refinery processes Canadian crude, domestic crude from North Dakota and Alaska North Slope, and international crudes to manufacture gasoline, distillates, heavy fuel oil and propane. The refinery distributes products through pipeline connected refineries terminals and MPC’s marine terminal via ships and barges (Marathon, n.d.).

- Over the last 5 years, Tesoro had an average of 72 tanker visits (Ecology, n.d.-a).
- Over the last 5 years, Tesoro had an average of 119 barge visits (Ecology, n.d.-a).

Cherry Point Refinery\(^2\) (BP Cherry Point) is located in Whatcom County near Bellingham. The refinery can process approximately 250,000 barrels of crude oil per day and supplies a broad range of fuels, including gasoline, diesel and jet fuel, and other specialty products. Most of Cherry Point’s crude oil is from the Alaska North Slope and is brought in by oil tankers (BP Cherry Point, n.d.).

- Over the last 5 years, Cherry Point had an average of 194 tanker visits (Ecology, n.d.-a).
- Over the last 5 years, Cherry Point had an average of 112 barge visits (Ecology, n.d.-a).

Phillips 66 Ferndale Refinery\(^3\) (Ferndale) is located in Whatcom County, in Ferndale, about 20 miles south of the U.S.-Canada border. The refinery can process approximately 100,000 barrels of crude per day from a variety of domestic and foreign crude oils, including Alaskan North Slope, Canadian and U.S. shale crudes.

The refinery produces gasoline and diesel. Other products include residual fuel oil, which supplies the northwest marine transportation market. Most of Ferndale’s refined products are distributed by pipeline and barge to major markets in the northwest United States (Phillips 66, n.d.).

- Over the last 5 years, Ferndale had an average of 43 tanker visits (Ecology, n.d.-a).
- Over the last 5 years, Ferndale had an average of 343 barge visits (Ecology, n.d.-a).

Shell Puget Sound Refinery\(^4\) (Shell Puget Sound or Shell March Point) is located in Skagit County on March Point near Anacortes. The refinery has an average annual processing rate of approximately 145,000 barrels of crude oil per day. When the refinery first began operating, most of its crude oil came from Canada via pipeline. Although it continues to receive crude from central and western Canada, feedstock also arrives by tanker from oilfields on Alaska’s North Slope.

On an annual basis, the refinery produces multiple types of gasoline in addition to fuel oil, diesel fuel, propane, jet fuel, butane, and petroleum coke. It also produces two chemicals – nonene and tetramer – that are used in a variety of plastic products (Shell, n.d.).

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\(^1\) https://www.marathonpetroleum.com/Operations/Refining/Anacortes-Refinery/
\(^2\) https://www.bp.com/en_us/united-states/home/where-we-operate/washington/cherry-point-refinery.html
\(^3\) https://www.phillips66.com/refining/ferndale-refinery
- Over the last 5 years, SPSR had an average of 120 tanker visits.
- Over the last 5 years, SPSR had an average of 119 barge visits (Ecology, n.d.-a).

A May 4, 2021 announcement on Shell, US website⁵ (2021) was made indicating Equilon Enterprises LLC, Shell Oil Products U.S. (Shell), a subsidiary of Royal Dutch Shell plc, reached an agreement for the sale of its Puget Sound Refinery near Anacortes, Washington to a subsidiary of HollyFrontier Corporation, an independent refiner headquartered in Texas (Shell US, 2021).

⁵ https://www.shell.us/media/2021-media-releases/shell-sells-washington-puget-sound-refinery-to-hollyfrontier.html
Appendix I Anchorages in Study area

Anchorage areas in the Puget Sound are established in 33 C.F.R. Parts 109-110\(^1\) and specific regulations applicable to each anchorage are contained in 33 C.F.R. 110.230, Subpart B\(^2\). The General Anchorages in Puget Sound are intended for the use of commercial deep draft vessels greater than 200 feet in length, including Articulated and Integrated Tug Barge (ATB) combinations (Puget Sound Harbor Safety Committee, 2017).

In 2017, the Coast Guard issued a Notice of Proposed Rulemaking for the creation of new anchorage areas (Regulations.gov., 2017). The Coast Guard withdrew the proposed rulemaking in 2018 in response to public comments and to better analyze potential impacts to tribal treaty rights, especially treaty fishing rights (Regulations.gov., 2018).

The Puget Sound Harbor Safety Plan\(^3\) includes a section on anchoring in the Standards of Care portion of the plan with a table of anchorages available for use in Puget Sound. Several of the anchorages identified in the Coast Guard 2017 Notice of Proposed Rulemaking are listed in the Harbor Safety Plan table, as non-designated anchorages.

Figure I-1 and Table I-1 show anchorages commonly used in the study area for tankers, ATBs, and tug and barge units.

![Figure I-1 Map showing anchorages in the study area](https://www.ecfr.gov/current/title-33/chapter-I/subchapter-I/part-109)

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\(^1\) [https://www.ecfr.gov/current/title-33/chapter-I/subchapter-I/part-109](https://www.ecfr.gov/current/title-33/chapter-I/subchapter-I/part-109)


\(^3\) [https://static1.squarespace.com/static/59356b2ce3df280bc208d88b6/t/596ee7365016e13e3f335456/1500440374598/zHSP+Sec+C+-+Anchoring.pdf](https://static1.squarespace.com/static/59356b2ce3df280bc208d88b6/t/596ee7365016e13e3f335456/1500440374598/zHSP+Sec+C+-+Anchoring.pdf)
Table I 1 Anchorages in study area, with abbreviation, number of vessels allowed, and maximum number of days allowed

<table>
<thead>
<tr>
<th>General Anchorages</th>
<th>Abbreviations</th>
<th>Number of Vessels</th>
<th>Max Stay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bellingham Bay</td>
<td>BB</td>
<td>4</td>
<td>30 days</td>
</tr>
<tr>
<td>Cherry Point</td>
<td>CP</td>
<td>1</td>
<td>30 days</td>
</tr>
<tr>
<td>Anacortes West</td>
<td>ANW</td>
<td>1</td>
<td>6 days</td>
</tr>
<tr>
<td>Anacortes Central</td>
<td>ANC</td>
<td>1</td>
<td>10 days</td>
</tr>
<tr>
<td>Anacortes East</td>
<td>ANE</td>
<td>1</td>
<td>10 days</td>
</tr>
<tr>
<td><strong>Non-Designated Anchorages</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vendovi Island East</td>
<td>VIE</td>
<td>4</td>
<td>10 days</td>
</tr>
<tr>
<td>Vendovi Island South</td>
<td>VIS</td>
<td>1</td>
<td>10 days</td>
</tr>
<tr>
<td>William Point (ATBs only)</td>
<td>WP</td>
<td>2</td>
<td>10 days</td>
</tr>
<tr>
<td><strong>Additional ATB Anchorages</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neptune Beach</td>
<td>NB</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Additional Barge Anchorages</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jack Island North</td>
<td>JIN</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Jack Island South</td>
<td>JIS</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Cap Sante</td>
<td>CS</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Hat Island</td>
<td>HI</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* These anchorages are not listed in the Harbor Safety Plan but can be found on Nautical Charts (NOAA chart 18421) and 33CFR110.230

CRF 33 110.230, Anchorages, Captain of the Port Puget Sound Zone, WA, describe the anchorages by latitude and longitude.

**General Anchorages**

- **Bellingham Bay**: The waters of Bellingham Bay within a circular area with a radius of 2,000 yards, having its center at latitude 48°44′14.39″, longitude 122°32′26.62″.

- **Cherry Point**: The waters within a circular area with a radius of 1600 yards, having its center at latitude 48°48′29.39″ N, longitude 122°46′04.66″ W.

- **Anacortes** -
  - Anacortes East (ANE) Anchorage. The waters within a circular area with a radius of 600 yards, having its center at 48°31′27″ N., 122°33′45″ W.
  - Anacortes Center (ANC) Anchorage. The waters within a circular area with a radius of 600 yards, having its center at 48°30′54″ N, 122°34′06″ W.
  - Anacortes West (ANW) Anchorage. The waters within a circular area with a radius of 600 yards, having its center at 48°31′09″ N, 122°34′55″ W.

- **Cap Sante Tug and Barge**: All waters enclosed by a line connecting the following points: 48°31′16″ N, 122°36′00″ W, which is approximately the northeast tip of Cap Sante; then southeast to 48°30′53″ N, 122°35′28″ W; then west southwest to 48°30′45″ N, 122°35′52″ W, approximately the south tip of Cap Sante; then north along the shoreline to the point of origin.

Appendix I 2
• **Hat Island Tug and Barge**: All waters enclosed by a line connecting the following points: 48°31′19″ N, 122°33′04″ W, near the west side of Hat Island; then southwest to 48°30′37″ N, 122°33′38″ W; then east to 48°30′37″ N, 122°32′00″ W; then northwest to the point of origin.

For the purposes of this synopsis the following describes the non-designated anchorages

**Non-Designated Anchorages**

• **Vendovi Island East**: The waters between Vendovi Island and Sinclair Island.
• **Vendovi Island South**: The waters between Vendovi Island and Guemes Island.
• **William Point**: The waters north of Samish Island

**Additional Anchorages in Study area**

• **Jack Island**: Waters around Jack Island to the east of Guemes Island
• **Neptune Beach**: Waters off Neptune Beach south of the Ferndale Refinery

**Bunkering at Anchorages in Puget Sound**

The [Puget Sound Harbor Safety Plan](#) section on bunkering: *Bunkering Operations within the Waters of Puget Sound and the Strait of Juan de Fuca* includes a standard of care for bunkering at anchor.

Bunkering operations are normally permitted in Anacortes, Port Angeles, Elliott Bay and Commencement Bay. Bunkering operations at Vendovi Island, Anacortes East, and Smith Cove West anchorages will only be allowed on a case-by-case basis depending on current or forecasted weather conditions. Requests to bunker in other locations should be submitted to Sector Puget Sound at least 72 hours in advance. In Port Angeles, vessels receiving bunkers will be required to be well into the harbor, west of the line drawn from the ITT Rainier Dock north to the red buoy off the tip of Ediz Hook.
Appendix J
Data Challenges and Mitigation Results

Ecology used a variety of methods to manage data challenges. In the majority of cases Ecology was able overcome the challenge and the synopsis results were not impacted.

Once data collection was complete, Ecology used a series of questions to set a criteria for evaluating if a Haro Strait transit was influenced by the new tug escort requirements. See additional discussion in the Results section.

Of 109 Haro Strait transits by vessels newly subject to the tug escort requirements, 38 were between the Strait of Juan de Fuca and Vancouver, B.C., and two between Victoria, B.C., and Vancouver, B.C. This is the usual and accustomed route for these vessels. 44 transits used both Haro and Rosario Straits, and because a laden tank vessels would still require an escort through the Rosario Strait portion of the route, these transits were not counted as influenced by the escort tug requirements. Altogether, 84 of the 109 Haro Strait transits did not meet the criteria for likely influenced by the new tug escort requirements and were not counted as such.

Ecology used the logic diagram (Figure 14) to assess whether a transit was likely laden or unladen for the remaining 25 transits. Ecology found the available information allowed a determination of the likely laden or unladen status for 16 of the 25 transits.

For the other nine transits, Ecology could not determine whether the tank vessel was likely laden or unladen using the logic diagram. In these cases, Ecology reviewed ANT data for the oil transfers before or after the transit to see if the amount loaded was reasonably close to 95 percent of the vessels cargo capacity. Ecology identified four transits where a reasonable assumption could be made based on this expanded review. In the remaining five cases, Ecology could not determine whether the vessel was laden or unladen. Four of these transits were by ATBs, and one was by a barge greater than 5,000 DWT.

The data challenges did not impact Ecology’s ability to identify a vessel’s selection of a Rosario Strait or Haro route. The final impact of all data challenges was the inability to determine the likely laden or unladen status of five Haro Strait transits, limiting Ecology’s ability to make a determination on whether these five transits were affected by the new tug escort requirements when making route selection.

Data Challenges and Mitigation Methods

AIS uses Very High Frequency (VHF) wavelengths

This data challenge did not affect synopsis results.

AIS transmissions are line-of-sight and can be blocked or lost (Campbell 2016).

Some loss of signal in the northern part of the Strait of Georgia, British Columbia’s Vancouver Harbor, and, infrequently, at refineries in the study area was noted. Ecology successfully tracked the vessel by using the AIS history function to move forward or backward through time in one hour increments until the signal was reestablished.
AIS data received is only as accurate as the information transmitted

This data challenge did not affect synopsis results.

Some AIS transponder data is self-reported by the AIS operator (e.g., type of vessel, destination, navigational status). Data accuracy can be affected if this information is missing, inaccurate, or in a code known only to the operator.

Ecology overcame this data challenge by using the vessel’s MMSI number\(^1\) when creating filters or performing a vessel search. Further inaccuracies were overcome by using the AIS history function to determine information such as ‘destination’ or ‘navigational status’.

**ANTs use barge transfer data, AIS uses tug transit data &**

**Towed oil barges are not always towed by the same vessel**

This data challenge did not affect synopsis results.

To determine the transit routes between transfers, Ecology used SiiTech AIS history function to track the vessel. This presented a challenge as oil barges are not required by regulations to carry AIS transponders. (CFR 33.164.46)

To overcome this challenge, Ecology used the AIS history for the tug assigned to the barge for route tracking. Many tug/barge combinations were stable, for instance many of the ATBs did not switch tug and barge units, and for these tug/barge combinations Ecology used the known tug AIS data.

For tug/barge combinations which changed based on company needs, Ecology matched AIS signals for tugs used by the company to the barge ANT information at a specific time and location. This method generally produced good results. Occasionally determining tug/barge combinations was difficult due to inaccuracies in the projected ANT date and time versus the actual date and time of the transfer combined with the number of tugs arriving and departing from the anchorage or facility; however, in all instances Ecology was able to match a barge with its attending tug.

In the first year synopsis data:
- ATB – 14 total, 2 switched tugs
- Barges greater than 5,000 DWT – 19 total, 5 switched tugs
- Barges less than 5,000 DWT – 7 total, 2 switched tugs

In the second year synopsis data:
- ATB – 19 total, 2 switched tugs
- Barges greater than 5,000 DWT – 13 total, 8 switched tugs
- Barges less than 5,000 DWT – 5 total, 3 switched tugs

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\(^1\) The MMSI (Maritime Mobile Service Identity) number is used by an AIS system to uniquely identify a vessel.
Linking vessel routes to ANTs could be prohibitively time consuming if not automated

This data challenge did not affect synopsis results.

Because crossing line data does not provide route information, using this data to link vessel routes to ANTs was not feasible without an automated system. The manual method devised by Ecology made linking AIS data to ANT data manageable for this synopsis.

Marine Exchange crossing line data does not provide route information on laden or unladen status

This data challenge did not affect synopsis results.

The data challenge did result in the determination of ‘unknown’ for transit types when Ecology was unable to determine if a transit was likely laden or likely unladen using ANT transfer data. Ecology’s success in determining transit type varied by vessel type, due in part to the success in determining if a vessel’s transit was engaged in bunkering, and how frequently different vessel types were engaged in bunkering activities\(^2\). Table J 1 demonstrates how the percent of unknown transits increases or decrease in inverse correlation to the percent of engaged in bunkering transits.

Table J 1 Engaged in bunkering and unknown transits as a percent of total transits

<table>
<thead>
<tr>
<th>Oil Barges</th>
<th>Total Transits</th>
<th>Percent Engaged in Bunkering Transit</th>
<th>Percent Unknown Transit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 5,000 Year 1</td>
<td>326</td>
<td>19</td>
<td>36</td>
</tr>
<tr>
<td>Greater than 5,000 Year 2</td>
<td>349</td>
<td>21</td>
<td>43</td>
</tr>
<tr>
<td>Less than 5,000 Year 1</td>
<td>367</td>
<td>42</td>
<td>27</td>
</tr>
<tr>
<td>Less than 5,000 Year 2</td>
<td>218</td>
<td>58</td>
<td>21</td>
</tr>
</tbody>
</table>

Ecology’s ANT system only includes oil transfers that take place in Washington waters

This data challenge did not affect synopsis results.

This data challenge impacted Ecology’s ability to determine if a transit was likely laden or likely unladen, and increased the number of transit type unknown. In Year 1 this data challenge resulted in an increase of 32 percent in unknown transits for ATBs, an increase of four percent for barges greater than 5,000 DWT, and an increase of three percent for barges less than 5,000 DWT. In Year 2 this data challenge resulted in an increase of 21 percent for ATBs, 0.04 percent for barges greater than 5,000 DWT, and 0.5 percent for barges less than 5,000 DWT.

Because the ANT system does not include data from transfers which occur outside of Washington, data was not available for transfers which occurred prior to a vessel’s entry

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\(^2\) ATB units do not provide bunkering or fueling to other vessels
transit. In some cases this resulted in the entering transit being assigned the transit type ‘unknown.’

To determine how the lack of ANT data for transfers outside of Washington waters affected the number of ‘unknown’ transit, Ecology counted the number of entering transits which resulted in transit type ‘unknown.’

**Year 1**
- ATB: 184 ‘unknown’ entering transits
- Barges > 5,000 DWT: 14 ‘unknown’ entering transits
- Barges < 5,000 DWT: 11 ‘unknown’ entering transits

**Year 2**
- ATB: 196 ‘unknown’ entering transits
- Barges > 5,000 DWT: 14 ‘unknown’ entering transits
- Barges < 5,000 DWT: 11 ‘unknown’ entering transits

Ecology then determined the number of entering transits labeled ‘unknown’ as a percent of:
- Total of all entering transits
- Total of all ‘unknown’ transit
- Total of all transits

Table J 2 shows the ‘unknown’ entering transits as a percent of the total number of entering transits, all ‘unknown’ entering transits, and all transit types.

Table J 2 Number of unknown entering transits as a percentage of all entering transits, all unknown transits, and total number of all transit types by vessel type for year 1 and year 2

<table>
<thead>
<tr>
<th>Vessel Type</th>
<th>Percent ‘unknown’ Entering Transits / All Entering Transits</th>
<th>Percent ‘unknown’ Entering Transits / All ‘unknown’ Transits</th>
<th>Percent ‘unknown’ Entering Transit / All Transit Types</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATB</td>
<td>74</td>
<td>45</td>
<td>32</td>
</tr>
<tr>
<td>Barges &gt; 5,000 DWT</td>
<td>54</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>Barges &lt; 5,000 DWT</td>
<td>61</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td><strong>Year 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATB</td>
<td>89</td>
<td>39</td>
<td>21</td>
</tr>
<tr>
<td>Barges &gt; 5,000 DWT</td>
<td>74</td>
<td>1</td>
<td>.04</td>
</tr>
<tr>
<td>Barges &lt; 5,000 DWT</td>
<td>9</td>
<td>2</td>
<td>.5</td>
</tr>
</tbody>
</table>

Table J 2 shows a greater percent of entering transits for ATBs are categorized as ‘unknown’ compared to the barges. In Year 1, for ATBs 74 percent of all entering were ‘unknown’ compared to 54 percent for barges greater than 5,000 DWT and 61 percent for barges less than 5,000 DWT.
This combined with the greater number of entering transits for ATBs, enlarges the percent of ‘unknown’ entering transits to the total number of ‘unknown’ transits and total number of all transit types. In Year 1 for ATBs, 45 percent of all unknown transits were entering transits compared to 15 percent for barges greater than 5,000 DWT and 11 percent for barges less than 5,000 DWT. And in Year 1, for ATBs 32 percent of transits types were ‘unknown’ entering transits compared to 4 percent for barges greater than 5,000 DWT and 3 percent for barges less than 5,000 DWT.

Because the ANT system does not include transfer data for transfers occurring outside of Washington waters, the number of ‘unknown’ entering transits and thus the total number of ‘unknown’ transits increased more for ATBs than for barges.

**Inaccuracies in ANT data**

This data challenge did not affect synopsis results.

Ecology uses a quality assurance process to ensure ANT data which is incomplete, duplicated, or inaccurate is corrected or removed as appropriate (Ecology n.d.-b). This mitigates the issues of incorrect or incomplete data as detailed below.

ANT data reliability is dependent on entries typically made by the delivering vessel or facility involved in a transfer. ANT data can be entered incorrectly, it can be entered twice if both the deliverer and receiver enter the transfer information, or the advanced notice of oil transfer information may differ from the actual transfer date, time, and product types and quantities.

Errors that remain in the ANT data after the vetting process are likely due to inaccuracies in the projected date and time of the transfer versus the date and time of the actual transfer. Changes in the day or time of a transfer may be due to operational reasons on the part of one of the companies involved, or may be due to environmental factors (e.g., weather, tide). This inaccurate data may remain in the ANT database unless the deliverer edits the ANT data or an Ecology employee³ visually confirms the date and time of the transfer and corrects the ANT entry. This challenge in the ANT data did not directly affect the synopsis results, as the estimated date and time of the transfer was sufficient to create the spreadsheet.

**The ANT database uses volume (gallons) to express the quantity of cargo transferred.**

This data challenge did not affect synopsis results.

This data challenge impacted Ecology’s ability to determine if a transit was likely laden or likely unladen, and resulted in additional unknown transits. Ecology cannot determine how many transfers may have been affected by this.

One method Ecology used for determining a transit was ‘likely unladen’ was to compare oil transfer data to the full capacity load⁴ for the vessel. If a vessel loaded a full capacity load Ecology counted the vessel transit preceding the transfer as ‘likely unladen’. If a vessel

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³ Ecology Oil Transfer Inspectors visit transfer sites to ensure compliance with Washington state transfer rules.

⁴ For the synopsis, a full capacity load is the volume of cargo which fills the vessel to 95 percent of its maximum loaded capacity.
discharged a full capacity load, Ecology counted the vessel transit following the transfer as ‘likely unladen’.

To identify when a vessel transferred a ‘full capacity load’ Ecology identified transfers where the ANT data ‘quantity transfer’\(^5\) met or exceeded the vessel’s full capacity load.

However, in reality, a tank vessel is fully loaded when either the volume of its tanks are filled to a preset maximum of its total capacity\(^6\), or when the weight of the cargo brings the vessel down to its load lines\(^7\). The method of determining a full capacity load based only on the volume of the cargo did not account for transfers where the cargo’s weight brought the tank vessel to its maximum loaded capacity prior to the cargo volume reaching the vessel’s volumetric capacity. Any transfers that did transfer less than the volumetric amount Ecology used to determine full capacity would have been labeled ‘unknown’ instead of ‘likely unladen’. Ecology cannot determine how many transfers may have been affected by this.

However, once data collection was complete, Ecology used a series of questions to set a criteria for evaluating if a Haro Strait transit was influenced by the new tug escort requirements. See additional discussion in the Results section. Of 109 Haro Strait transits by vessels newly subject to the tug escort requirements, Ecology was able to determine 84 did not meet the criteria.

Ecology used the logic diagram (Figure 14) to assess whether a transit was likely laden or unladen for the remaining 25 transits. Ecology found the available information allowed a determination of the likely laden or unladen status for 16 of the 25 transits.

For the other nine transits, Ecology could not determine whether the tank vessel was likely laden or unladen using the logic diagram. In these cases, Ecology reviewed ANT data for the oil transfers before or after the transit to see if the amount loaded was reasonably close to 95 percent of the vessels cargo capacity. Ecology identified four transits where a reasonable assumption could be made based on this expanded review.

At the end of the data analysis there were five cases where Ecology could not determine whether the vessel was laden or unladen. Four of these transits were by ATBs, and one was by a barge greater than 5,000 DWT.

**SPIIS arrival information applies to vessels visiting Washington ports**

This data challenge did not affect synopsis results.

Vessel arrivals are not entered into SPIIS for vessels transiting to Canadian ports without visiting Washington ports.

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\(^5\) In the ANT system the quantity transferred is measured as a volume (gallons)

\(^6\) Usually determined by the company’s policies

\(^7\) A ship’s waterline is the line where its hull meets the surface of the water. A load line is a marking on the vessel’s hull indicating the extent to which the weight of a load may safely submerge a ship, also known as the ‘permissible draft’. The load line is calculated to ensure that a ship has sufficient freeboard (the height from the waterline to the main deck) and thus sufficient reserve buoyancy (volume of ship above the waterline). It should also ensure adequate stability and avoid excessive stress on the ship’s hull as a result of overloading. (Load lines, 2013)
SPIIS reports were run to identify tankers arriving at Washington ports in the study area, tankers transiting exclusively to Canadian ports were not part of the data set. For data collected in Haro Strait and Boundary Pass, AIS crossing lines were used.

**SPIIS vessel arrival information is only as accurate as the Marine Exchange of Puget Sound arrival information**

This data challenge did not affect synopsis results.

SPIIS arrival data is purchased from the Marine Exchange of Puget Sound. SPIIS data can be affected by incomplete, inaccurate, or incorrectly entered Marine Exchange data.

Ecology ensures SPIIS data which is incomplete, duplicated, or inaccurate is corrected or removed as appropriate. Reports run in SPIIS for vessel entries were reviewed for accuracy.

**VEAT data was not available for the beginning of 2021**

This data challenge did not affect synopsis results.

A gap in VEAT data resulted from 2021 data unavailability for this synopsis. VEAT data is collected at the end of each year and VEAT 2021 data is not available until March 2022.

Ecology overcame this data gap by reviewing ANT vessel transfers for the 2021 period and determined there were two additional ATBs and one barge greater than 5,000 DWT to add to the vessel lists.
Appendix K  Transit Data for ATB, Barges > 5,000 DWT and Tankers less than 40,000 DWT

Combined Tank Vessel Data

The manual method was used to count the number of transits made through Rosario Strait and connected waterways east, and Haro Strait. Figure K 1 compares the number of Rosario Strait transits per month in Year 1 to Year 2. Figure K 2 compares the number of Haro Strait transits per month for Year 1 to Year 2. This data does not reflect the laden or unladen status of tank vessels at the time of the transit.

Figure K 1 Rosario Strait transits by vessels newly subject to tug escort requirements, comparing Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021) by month
Figure K 2 Haro Strait transits by vessels newly subject to tug escort requirements, comparing Year 1 (September 1, 2019 to August 31, 2020) to Year 2 (September 1, 2020 to August 31, 2021) by month

**ATB Data**

The manual method was used to count the number of transits ATBs made through Rosario Strait and connected waterways east, and Haro Strait. Figure K 1 compares the number of Rosario Strait transits per month in Year 1 to Year 2. Figure K 2 compares the number of Haro Strait transits per month for Year 1 to Year 2. This data does not reflect the laden or unladen status of the ATB at the time of the transit.
Figure K 3 ATB transits Rosario Strait and connected waterways east Year 1 and Year 2

Figure K 4 ATB transits Haro Strait Year 1 and Year 2
Barges greater than 5,000 DWT

The manual method was used to count the number of transits barges greater than 5,000 DWT made through Rosario Strait and connected waterways east, and Haro Strait. Figure K 3 compares the number of Rosario transits by month for Year 1 to the number of transits per month for Year 2. And K 4 compares Haro Strait transits by month for Year 1 and Year 2. This data does not reflect the laden or unladen status of the barge during the transit.

Figure K 5 Barges greater than 5,000 DWT transits in Rosario Strait and connected waterways to the east year 1 and year 2

Figure K 6 Barges greater than 5,000 DWT transits Haro Strait Year 1 and Year 2

Appendix K 4
Tankers less than 40,000 DWT

Ecology’s SPIIS and ANT databases were used to count the number of transits for tankers less than 40,000 DWT in Rosario Strait and Haro Strait.

Figure K 7 Tankers less than 40,000 DWT transits Rosario Strait and connected waterways east Year 1 and Year 2

Figure K 8 Tankers less than 40,000 DWT transits in Haro Strait Year 1 and Year 2

Appendix K
## Appendix L  Articulated Tug/Barge (ATB)

Table L 1 Articulated Tug/Barge (ATB) which operate on the west coast

<table>
<thead>
<tr>
<th>ATB Barge Name</th>
<th>ATB Tug Name</th>
<th>Operating Company</th>
<th>Barge DWT(^1)</th>
<th>Capacity 100% (bbls)(^2)</th>
<th>Capacity 95% (gal)</th>
<th>Tug Call Sign</th>
<th>Tug MMSI(^3)</th>
<th>Operating Area</th>
<th>Information Source</th>
</tr>
</thead>
</table>

\(^1\) Deadweight tonnage  \(^2\) Barrels  \(^3\) Maritime Mobile Service Identity number
<table>
<thead>
<tr>
<th>ATB Barge Name</th>
<th>ATB Tug Name</th>
<th>Operating Company</th>
<th>Barge DWT(^1)</th>
<th>Capacity 100% (bbls)(^2)</th>
<th>Capacity 95% (gal)</th>
<th>Tug Call Sign</th>
<th>Tug MMSI(^3)</th>
<th>Operating Area</th>
<th>Information Source</th>
</tr>
</thead>
</table>

\(^1\) Deadweight tonnage  \(^2\) Barrels  \(^3\) Maritime Mobile Service Identity number
Table L-1 Articulated Tug/Barge (ATB) operate on the west coast, continued

<table>
<thead>
<tr>
<th>ATB Barge Name</th>
<th>ATB Tug Name</th>
<th>Operating Company</th>
<th>Barge DWT</th>
<th>Capacity 100% (bbls)</th>
<th>Capacity 95% (gal)</th>
<th>Tug Call Sign</th>
<th>Tug MMSI</th>
<th>Operating Area</th>
<th>Information Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petro Mariner</td>
<td>Dale R Lindsey</td>
<td>Centerline</td>
<td>5226</td>
<td>29,945</td>
<td>1,194,816</td>
<td>WDI8650</td>
<td>367740740</td>
<td>S.E. AK</td>
<td><a href="http://files.centerlinelogistics.com">http://files.centerlinelogistics.com</a> vessels/spec_sheets/PetroMariner.pdf</td>
</tr>
<tr>
<td>ITB Island Trader</td>
<td>Island Monarch</td>
<td>ITB-Canada</td>
<td>9,250</td>
<td>69,518</td>
<td>2,773,806</td>
<td>CFL4938</td>
<td>316001223</td>
<td>Puget Sound</td>
<td><a href="http://www.islandtug.com/island-trader-barge">http://www.islandtug.com/island-trader-barge</a></td>
</tr>
<tr>
<td>ITB Reliant*</td>
<td>Island Regent</td>
<td>ITB-Canada</td>
<td>3,700</td>
<td>27,895</td>
<td>1,113,000</td>
<td>CFA2943</td>
<td>316039153</td>
<td>Puget Sound</td>
<td><a href="https://2d7d6843-3813-411c-9fe6-ef910df44c81.filesusr.com/ugd/0642f9_c1c39a777f8d45c4ad1457ac7d44a4a.pdf">https://2d7d6843-3813-411c-9fe6-ef910df44c81.filesusr.com/ugd/0642f9_c1c39a777f8d45c4ad1457ac7d44a4a.pdf</a></td>
</tr>
<tr>
<td>ITB Resolution*</td>
<td>Island Raider</td>
<td>ITB-Canada</td>
<td>3,700</td>
<td>27,895</td>
<td>1,113,000</td>
<td>CFA2784</td>
<td>316038089</td>
<td>Puget Sound</td>
<td><a href="https://2d7d6843-3813-411c-9fe6-ef910df44c81.filesusr.com/ugd/0642f9_d1de90587bccc4d969535e5bb0394bece.pdf">https://2d7d6843-3813-411c-9fe6-ef910df44c81.filesusr.com/ugd/0642f9_d1de90587bccc4d969535e5bb0394bece.pdf</a></td>
</tr>
<tr>
<td>DBL 55</td>
<td>various</td>
<td>Kirby</td>
<td>9167.12</td>
<td>52,000</td>
<td>2,074.80</td>
<td>WDJ8731</td>
<td>369322000</td>
<td>W. Coast</td>
<td><a href="https://www.bstb.gc.ca/eng/reports/reports/marine/2016/m16p0378/m16p0378.html">https://www.bstb.gc.ca/eng/reports/reports/marine/2016/m16p0378/m16p0378.html</a></td>
</tr>
<tr>
<td>DBL 78</td>
<td>Cape Ann</td>
<td>Kirby</td>
<td>12,525</td>
<td>82,000</td>
<td>3,271,800</td>
<td>WDE9779</td>
<td>338616000</td>
<td>W. Coast</td>
<td>Pete Pauliky – Kirby Offshore Marine</td>
</tr>
<tr>
<td>DBL 185</td>
<td>Dublin Sea</td>
<td>Kirby</td>
<td>27,083</td>
<td>185,000</td>
<td>7,381,500</td>
<td>WDI2121</td>
<td>338134000</td>
<td>W. Coast</td>
<td>Pete Pauliky – Kirby Offshore Marine</td>
</tr>
<tr>
<td>DBL 185-01</td>
<td>Nancy Peterkin</td>
<td>Kirby</td>
<td>26,655</td>
<td>185,000</td>
<td>7,381,500</td>
<td>WDI2121</td>
<td>338134000</td>
<td>W. Coast</td>
<td>Pete Pauliky – Kirby Offshore Marine</td>
</tr>
<tr>
<td>OSG 204</td>
<td>OSG Endurance</td>
<td>OSG</td>
<td>27,091</td>
<td>204,000</td>
<td>8,139,600</td>
<td>WDF9078</td>
<td>367501540</td>
<td>W. Coast</td>
<td><a href="https://www.q88.com/ViewShip.aspx?id=799984CB38B87B3254A8F70A57A84F9C&amp;vessel=OsH204">https://www.q88.com/ViewShip.aspx?id=799984CB38B87B3254A8F70A57A84F9C&amp;vessel=OsH204</a></td>
</tr>
</tbody>
</table>

1 Deadweight tonnage 2 Barrels 3 Maritime Mobile Service Identity number
* ITB Reliant and ITB Resolution did not enter Washington waters in Year 1 or Year 2
## Appendix M  Oil Barges Greater Than 5,000 DWT

Table M 1 Oil barges greater than 5,000 DWT which operate on the west coast

<table>
<thead>
<tr>
<th>Barge Name</th>
<th>Operating Company</th>
<th>DWT(^1)</th>
<th>Official # / IMO(^2)</th>
<th>Capacity 100% (bbls)(^3)</th>
<th>Capacity 95% (gal)</th>
<th>Operating Area</th>
<th>Information Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antares</td>
<td>Kirby</td>
<td>11,934</td>
<td>1153165</td>
<td>83,958</td>
<td>3,349,924</td>
<td>Puget Sound</td>
<td><a href="https://intelligence.marinelink.com/vessels/vessel/antares-331674">https://intelligence.marinelink.com/vessels/vessel/antares-331674</a></td>
</tr>
<tr>
<td>Commencement Bay</td>
<td>Sause</td>
<td>13,454</td>
<td>1127878</td>
<td>82,000</td>
<td>3,271,800</td>
<td>W. Coast</td>
<td>Ross McDonald, Sause Bros</td>
</tr>
<tr>
<td>DBL 77</td>
<td>Kirby</td>
<td>11,447</td>
<td>1209866</td>
<td>82,000</td>
<td>3,271,800</td>
<td>Puget Sound</td>
<td>Pete Pauliky, Kirby Offshore Marine</td>
</tr>
<tr>
<td>DBL 79</td>
<td>Kirby</td>
<td>12,102</td>
<td>1209849</td>
<td>82,000</td>
<td>3,271,800</td>
<td>Puget Sound</td>
<td>Pete Pauliky, Kirby Offshore Marine</td>
</tr>
</tbody>
</table>

\(^1\) Deadweight tonnage  \(^2\) International Maritime Organization  \(^3\) Barrels
### Table M-1 Oil barges greater than 5,000 DWT continued

<table>
<thead>
<tr>
<th>Barge Name</th>
<th>Operating Company</th>
<th>DWT(^1)</th>
<th>Official # / IMO(^2)</th>
<th>Capacity 100% (bbls)(^3)</th>
<th>Capacity 95% (gal)</th>
<th>Operating Area</th>
<th>Information Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double Skin 311 (DS 311)</td>
<td>Vane Brothers</td>
<td>4,694*</td>
<td>1252170</td>
<td>34,768</td>
<td>1,387,243</td>
<td>Puget Sound</td>
<td><a href="http://www.vanebrothers.com/Barges">http://www.vanebrothers.com/Barges</a></td>
</tr>
<tr>
<td>Double Skin 313 (DS 313)</td>
<td>Vane Brothers</td>
<td>4,973*</td>
<td>1252171</td>
<td>34,851</td>
<td>1,390,555</td>
<td>Puget Sound</td>
<td><a href="http://www.vanebrothers.com/Barges">http://www.vanebrothers.com/Barges</a></td>
</tr>
<tr>
<td>Double Skin 505 (DS 505)</td>
<td>Vane Brothers</td>
<td>5,696</td>
<td>1214462</td>
<td>56,297</td>
<td>2,246,250</td>
<td>Puget Sound</td>
<td><a href="http://www.vanebrothers.com/Barges">http://www.vanebrothers.com/Barges</a></td>
</tr>
<tr>
<td>Double Skin 501 (DS 501)</td>
<td>Vane Brothers</td>
<td>8,838</td>
<td>1251823</td>
<td>56,263</td>
<td>2,244,894</td>
<td>Puget Sound</td>
<td><a href="http://www.vanebrothers.com/Barges">http://www.vanebrothers.com/Barges</a></td>
</tr>
<tr>
<td>Drakes Bay</td>
<td>Sause</td>
<td>14,333</td>
<td>1180901</td>
<td>89,000</td>
<td>3,551,100</td>
<td>W. Coast</td>
<td><a href="http://files.centerlinelogistics.com/vessels/spec_sheets/DrakesBay.pdf">http://files.centerlinelogistics.com/vessels/spec_sheets/DrakesBay.pdf</a></td>
</tr>
<tr>
<td>Kays Point</td>
<td>Kirby</td>
<td>9,964</td>
<td>1088088</td>
<td>65,000</td>
<td>2,593,500</td>
<td>Puget Sound</td>
<td><a href="https://intelligence.marinelink.com/vessels/vessel/kays-point-331703">https://intelligence.marinelink.com/vessels/vessel/kays-point-331703</a></td>
</tr>
<tr>
<td>SEASSPAN 880 (ex.Leo)</td>
<td>SEASSPAN</td>
<td>12,196</td>
<td>1136725</td>
<td>70,830</td>
<td>2,826,117</td>
<td>Puget Sound</td>
<td><a href="https://intelligence.marinelink.com/vessels/vessel/leo-330354">https://intelligence.marinelink.com/vessels/vessel/leo-330354</a></td>
</tr>
</tbody>
</table>

1 Deadweight tonnage  
2 International Maritime Organization  
3 Barrels

*The DS 311 & 313 DWT are just below 5,000 DWT using a medium density cargo with a specific gravity of 0.85. Using a higher density cargo such as bunker C with a specific gravity of .99 the DWT is 5,480 MT. Because the capacity in barrels is similar to Betsey Arntz, Dr. Bonnie W. Ramsey, Nathan Schmidt, PB 32 and PB 34, Petrobulker and Vijay Sea, DS 313 and 311 were included as barges greater than 5,000 DWT in the synopsis data.*
Table M-1 Oil barges greater than 5,000 DWT continued

<table>
<thead>
<tr>
<th>Barge Name</th>
<th>Operating Company</th>
<th>DWT$^1$</th>
<th>Official # / IMO$^2$</th>
<th>Capacity 100% (bbls)$^3$</th>
<th>Capacity 95% (gal)</th>
<th>Operating Area</th>
<th>Information Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nathan Schmidt</td>
<td>Centerline</td>
<td>5310</td>
<td>1219418</td>
<td>34,157</td>
<td>1,362,858</td>
<td>Puget Sound</td>
<td><a href="http://files.centerlinelogistics.com/vessels/specific_sheets/NathanSchmidt.pdf">http://files.centerlinelogistics.com/vessels/specific_sheets/NathanSchmidt.pdf</a></td>
</tr>
<tr>
<td>Pb-32</td>
<td>Marine Petrobulk</td>
<td>5,437</td>
<td>8646068</td>
<td>32,000</td>
<td>1,340,000</td>
<td>Puget Sound</td>
<td><a href="https://www.marinepetrobulk.com/barge-pb32/">https://www.marinepetrobulk.com/barge-pb32/</a></td>
</tr>
<tr>
<td>Pb-34</td>
<td>Marine Petrobulk</td>
<td>5,437</td>
<td>833507</td>
<td>32,000</td>
<td>1,340,000</td>
<td>Puget Sound</td>
<td><a href="https://www.marinepetrobulk.com/barge-pb34/">https://www.marinepetrobulk.com/barge-pb34/</a></td>
</tr>
<tr>
<td>Petrobulker</td>
<td>Marine Petrobulk</td>
<td>5,437</td>
<td>836095</td>
<td>32,000</td>
<td>1,340,000</td>
<td>Puget Sound</td>
<td><a href="https://www.marinepetrobulk.com/barge-petrobulker/">https://www.marinepetrobulk.com/barge-petrobulker/</a></td>
</tr>
<tr>
<td>Sasanoa</td>
<td>Kirby</td>
<td>12,000</td>
<td>1110781</td>
<td>80,000</td>
<td>3,192,000</td>
<td>W. Coast</td>
<td>Pete Paulikey, Kirby Offshore Marine</td>
</tr>
<tr>
<td>Vijay Sea</td>
<td>Centerline</td>
<td>&gt;5000</td>
<td>1203469</td>
<td>37,141</td>
<td>1,481,928</td>
<td>Puget Sound</td>
<td><a href="http://files.centerlinelogistics.com/vessels/specific_sheets/VijaySea.pdf">http://files.centerlinelogistics.com/vessels/specific_sheets/VijaySea.pdf</a></td>
</tr>
</tbody>
</table>

1 Deadweight tonnage  
2 International Maritime Organization  
3 Barrels

Note: Sasanoa was sold in 2020 and did not transit the study area in 2021
# Appendix N  Oil Barges Less Than 5,000 DWT

Table N 1 List of oil barges less than 5,000 DWT which operate in Washington waters

<table>
<thead>
<tr>
<th>Barge Name</th>
<th>Company</th>
<th>DWT(^1)</th>
<th>Official # / IMO(^2)</th>
<th>Capacity 100% (bbls)(^3)</th>
<th>Capacity 95% (gal)</th>
<th>Operating Area</th>
<th>Information source</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITB Supplier</td>
<td>Island Tug and Barge</td>
<td>3,550</td>
<td>828529</td>
<td>26,682</td>
<td>1,064,616</td>
<td>Canada/Puget Sound</td>
<td><a href="https://2d7d6843-3813-411c-9fe6-ef910df44c81.filesusr.com/ugd/0642f9_2cc1284db5814230b6f1fc677bee13d5.pdf">https://2d7d6843-3813-411c-9fe6-ef910df44c81.filesusr.com/ugd/0642f9_2cc1284db5814230b6f1fc677bee13d5.pdf</a></td>
</tr>
<tr>
<td>ITB Vancouver</td>
<td>Island Tug and Barge</td>
<td>3,450</td>
<td>820184</td>
<td>26,650</td>
<td>1,056,678</td>
<td>Canada/Puget Sound</td>
<td><a href="https://2d7d6843-3813-411c-9fe6-ef910df44c81.filesusr.com/ugd/0642f9_d553e685e6423895d0e269058353fd.pdf">https://2d7d6843-3813-411c-9fe6-ef910df44c81.filesusr.com/ugd/0642f9_d553e685e6423895d0e269058353fd.pdf</a></td>
</tr>
<tr>
<td>SEASPAN 827</td>
<td>Seaspan</td>
<td>4,201</td>
<td>833151</td>
<td>27,551</td>
<td>1,099,287</td>
<td>Canada/Puget Sound</td>
<td><a href="https://www.seaspan.com/fleet-listing">https://www.seaspan.com/fleet-listing</a></td>
</tr>
<tr>
<td>Global Provider</td>
<td>Global</td>
<td>&lt;5,000</td>
<td>N/A</td>
<td>3,681</td>
<td>151,500</td>
<td>Puget Sound</td>
<td><a href="https://www.workboat.com/shipbuilding/jesse-engineering-delivers-bunker-vessel-maxum-petroleum">https://www.workboat.com/shipbuilding/jesse-engineering-delivers-bunker-vessel-maxum-petroleum</a></td>
</tr>
</tbody>
</table>

\(^1\) Deadweight tonnage  \(^2\) International Maritime Organization  \(^3\) Barrels

**Note:** Global Provider is a very small self-propelled vessel; however, Ecology considers it a barge for regulations and enforcement and VEAT barge counts.
### Appendix O  Tankers between 5,000 and 40,000 DWT

Table O 1 List of tankers between 5,000 and 40,000 DWT which operated in the Study Area

<table>
<thead>
<tr>
<th>TANKER</th>
<th>IMO</th>
<th>Flag</th>
<th>Summer DWT</th>
<th>95% Capacity (bbls)</th>
<th>Information Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argent Gerbera</td>
<td>9424596</td>
<td>Marshall Island</td>
<td>35,332</td>
<td>244,692</td>
<td>Marine Traffic</td>
</tr>
<tr>
<td>Ensemble</td>
<td>9749453</td>
<td>Singapore</td>
<td>35,058</td>
<td>242,794</td>
<td>Marine Traffic</td>
</tr>
<tr>
<td>Fanfare</td>
<td>9760562</td>
<td>Singapore</td>
<td>37,256</td>
<td>258,016</td>
<td>Marine Traffic</td>
</tr>
<tr>
<td>Fuji Galaxy</td>
<td>9490301</td>
<td>Marshall Island</td>
<td>26,198</td>
<td>181,434</td>
<td>Marine Traffic</td>
</tr>
<tr>
<td>Harbour Pioneer</td>
<td>9572757</td>
<td>Portugal</td>
<td>19,122</td>
<td>132,429</td>
<td>Marine Traffic</td>
</tr>
<tr>
<td>Hodaka Galaxy</td>
<td>9791157</td>
<td>Singapore</td>
<td>26,198</td>
<td>181,434</td>
<td>Marine Traffic</td>
</tr>
<tr>
<td>Jazz</td>
<td>9804849</td>
<td>Singapore</td>
<td>37,361</td>
<td>258,744</td>
<td>Marine Traffic</td>
</tr>
<tr>
<td>Kiso</td>
<td>9379894</td>
<td>Panama</td>
<td>33,641</td>
<td>232,981</td>
<td>Marine Traffic</td>
</tr>
<tr>
<td>Naeba Galaxy</td>
<td>9791169</td>
<td>Singapore</td>
<td>16,196</td>
<td>112,165</td>
<td>Marine Traffic</td>
</tr>
<tr>
<td>Tsukuba Galaxy</td>
<td>9796834</td>
<td>Panama</td>
<td>26,175</td>
<td>181,275</td>
<td>Marine Traffic</td>
</tr>
</tbody>
</table>

1 International Maritime Organization  
2 Flag State  
3 Deadweight tonnage  
4 Barrels  

**Note:** 95 percent Capacity = 95 percent of the vessel’s maximum cargo carrying capacity
# Appendix P  Purpose-built Escort and Ship Assist Tugs

Table P.1 List of purpose-built escort and ship assist tugs in Pacific Northwest

<table>
<thead>
<tr>
<th>Tug Name</th>
<th>Company</th>
<th>Bollard Pull (lbs)</th>
<th>HP&lt;sup&gt;1&lt;/sup&gt;</th>
<th>MMSI&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Call Sign</th>
<th>Tug Type</th>
<th>Operating Area</th>
<th>Information Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guard</td>
<td>Crowley</td>
<td>120,000</td>
<td>5,500</td>
<td>366887300</td>
<td>WCY2823</td>
<td>Assist</td>
<td>PNW</td>
<td><a href="https://www.crowley.com/shipping/sae/fleet/#pacific-northwest">https://www.crowley.com/shipping/sae/fleet/#pacific-northwest</a></td>
</tr>
<tr>
<td>Protector</td>
<td>Crowley</td>
<td>120,000</td>
<td>5,500</td>
<td>366887970</td>
<td>WCY2824</td>
<td>Assist</td>
<td>PNW</td>
<td><a href="https://www.crowley.com/shipping/sae/fleet/#pacific-northwest">https://www.crowley.com/shipping/sae/fleet/#pacific-northwest</a></td>
</tr>
<tr>
<td>Aware</td>
<td>Crowley</td>
<td>200,000</td>
<td>10,000</td>
<td>366779430</td>
<td>WCZ7336</td>
<td>Assist</td>
<td>PNW</td>
<td><a href="https://www.crowley.com/shipping/sae/fleet/#pacific-northwest">https://www.crowley.com/shipping/sae/fleet/#pacific-northwest</a></td>
</tr>
<tr>
<td>Arthur Foss</td>
<td>Foss</td>
<td>97,680</td>
<td>4,000</td>
<td>366979360</td>
<td>WRB5693</td>
<td>Assist</td>
<td>PNW</td>
<td><a href="https://www.foss.com/fleet/">https://www.foss.com/fleet/</a></td>
</tr>
<tr>
<td>Garth Foss</td>
<td>Foss</td>
<td>174,000</td>
<td>8,000</td>
<td>366767140</td>
<td>WCE4732</td>
<td>Escort</td>
<td>PNW</td>
<td><a href="https://www.foss.com/fleet/">https://www.foss.com/fleet/</a></td>
</tr>
<tr>
<td>Henry Foss</td>
<td>Foss</td>
<td>102,540</td>
<td>5,000</td>
<td>366976870</td>
<td>WRB5165</td>
<td>Assist</td>
<td>PNW</td>
<td><a href="https://www.foss.com/fleet/">https://www.foss.com/fleet/</a></td>
</tr>
<tr>
<td>Marshall Foss</td>
<td>Foss</td>
<td>167,710</td>
<td>6,250</td>
<td>366982320</td>
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<sup>1</sup> Horse Power  <sup>2</sup> Maritime Mobile Service Identity number
## Appendix Q  Multi-Purpose Tugs

Table Q 1 List of multi-purpose tugs which operated in the Study Area

<table>
<thead>
<tr>
<th>Tug Name</th>
<th>Company</th>
<th>Bollard Pull (lbs)$^1$</th>
<th>HP$^2$</th>
<th>MMSI$^3$</th>
<th>CALL SIGN</th>
<th>Operating Area</th>
<th>Information Source</th>
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</table>

$^1$Pounds  $^2$Horse Power  $^3$Maritime Mobile Service Identity number
Analysis of Tug Escorts – Scope of Work

Background
The Pilotage Act (RCW 88.16) requires an analysis of tug escorts. RCW 88.16.260 Subsection (1)(a) requires the Board of Pilotage Commissioners, in consultation with Ecology, to adopt rules regarding tug escorts for certain tank vessels by December 31, 2025.

Interim Milestones
To achieve the rule adoption deadline, RCW 88.16.260 Subsection (1)(d) directs a series of interim milestones.

RCW 88.16.260 Subsection (1)(d)(iii) states “By September 1, 2023, consult with potentially affected federally recognized Indian treaty fishing tribes, other federally recognized treaty tribes with potentially affected interests, and stakeholders as required under subsection (6) of this section and complete the analysis required under subsection (5) of this section. By September 1, 2023, the department of ecology must submit a summary of the results of the analysis required under subsection (5) of this section to the legislature consistent with RCW 43.01.036.”

Analysis Requirements
RCW 88.16.260 Subsection (5) states: “To inform rule making, the board of pilotage commissioners must conduct an analysis of tug escorts using the model developed by the department of ecology under RCW 88.46.250. The board of pilotage commissioners may:
(a) Develop scenarios and subsets of oil tankers, articulated tug barges, and towed waterborne vessels or barges that could preclude requirements from being imposed under the rule making for a given zone or vessel;
(b) Consider the benefits of vessel safety measures that are newly in effect on or after July 1, 2019, and prior to the adoption of rules under this section; and
(c) Enter into an interagency agreement with the department of ecology to assist with conducting the analysis and developing the rules, subject to each of the requirements of this section.”

Oil Spill Risk Model
RCW 88.46.250 Subsection (1) states: “The department must develop and maintain a model to quantitatively assess current and potential future risks of oil spills from covered vessels in Washington waters, as it conducts ongoing oil spill risk assessments.”

BPC and Ecology roles and responsibilities
BPC and Ecology signed an Interagency Agreement (IAA) for work related to RCW 88.16.260. For the analysis of tug escorts, the IAA includes the following responsibilities:

- BPC Staff will develop scope of work for the tug escort analysis.
- Ecology will provide technical assistance to BPC by producing a draft of the scope of work.
- Board of Pilotage Commissioners will vote to approve the scope of work.
- Ecology will perform tug escort analysis and related outreach activities based on the scope with input from BPC.
Ecology will write and submit a summary of the tug escort analysis to the legislature by September 1, 2023.

**Analysis Objective**
Evaluate the potential change in oil spill risk from covered vessels resulting from the use of tug escorts by specified tank vessels in waters east of New Dungeness Light and Discovery Island Light.

**Research questions**
- The following research questions will be assessed within analysis scenarios:
  - How is oil spill risk distributed geographically? How does the use of tug escorts change the way that oil spill risk is distributed geographically?
  - How is oil spill risk distributed across covered vessel types? How does the use of tug escorts change the way that oil spill risk is distributed across covered vessel types?
  - How does the 2020 expansion of tug escorts in Rosario Strait and connected waters to the east change oil spill risk from covered vessels?
- How does tethering affect oil spill risk?
- How do key design characteristics for escort tugs affect oil spill risk?
- Are there new safety measures adopted since July 1, 2019? If so, what are the benefits of these measures?

Qualitative analysis may be used to answer and provide context for research questions which cannot be adequately assessed quantitatively.

**Study Area**
The study area for this analysis consists of all connected marine waters east of a line from Discovery Island light to New Dungeness light in the Strait of Juan de Fuca and south of the 49th Parallel in the Strait of Georgia. The BPC has divided this area into 13 geographic zones. Waterways within the study area that are not explicitly contained in the BPC zones will be included.

**Out of Scope**
This analysis focuses on the effects on oil spill risks resulting from the use of tug escorts for specified tank vessels. The summary of the results of analysis will be one input to the rulemaking process described in RCW 88.16.260. Other requirements of RCW 88.16.260 are out of scope for this analysis, including:
- Consideration of underwater noise
- Vessel traffic impacts to established treaty fishing areas
- Estimates of expected costs and benefits of draft rules

Additional topics that are out of scope for this analysis include:
- Consideration of air emissions from tug escorts
- Analysis of the potential fate and effects of oil spill scenarios generated by the model
- Tug escorts for vessels specifically excluded in RCW 88.16.260.

**Data Inputs**
Primary data sources are listed below. Other sources of data may be identified during the analysis.
Outreach
Ecology will seek the participation of tribes and stakeholders throughout the project. Outreach events will include a mixture of webinars, meetings, informational briefings, technical discussions, and informal discussions. Ecology will offer consultation to potentially affected Indian treaty tribes.

Ecology will announce project outreach events on our website, and using the Ecology Spills Program electronic mailing list, the Ecology Oil Spill Model Development project electronic mailing list, and the BPC Oil Transportation Safety Committee electronic mailing list.

Definitions
Ecology will use the following definitions for the purposes of this analysis:

Geographic Zones
The Washington Board of Pilotage Commissioners (BPC) has defined 13 geographical zones related to RCW 88.16.190, Oil Tankers-Restricted Waters-Requirements. The summary report describes analysis results in the context of these geographic zones.

Covered Vessel
Covered vessel means a tank vessel, cargo vessel or passenger vessel according to paragraph 5 of RCW 88.46.010. The expanded definitions quoted below are contained in WAC 173-182-030 paragraphs 7, 42, and 63.

_**Tank Vessel**_
“Tank vessel means a ship that is constructed or adapted to carry, or that carries, oil in bulk as cargo or cargo residue...”

_**Cargo Vessel**_
“Cargo vessel means a self-propelled ship in commerce, other than a tank vessel or a passenger vessel, three hundred or more gross tons including, but not limited to, commercial fish processing vessels and freighters.”

_**Passenger Vessel**_
“Passenger vessel means a ship of greater than three hundred gross tons with a fuel capacity of at least six thousand gallons carrying passengers for compensation.”

Risk
Risk is the combination of the likelihood of an event and the consequence if the event occurs (DNV GL, 2017, p. E3). For the tug escort analysis, we define events as oil spills from covered vessels and consequence as the volume of oil spilled to water. This representation of consequence allows the
analysis to focus on quantifying the effectiveness of tug escorts for tank vessels. It will not include analysis of the potential fate and effects of oil spill scenarios generated by the model.

Additional Definitions
The BPC has developed an Interpretive Statement for Oil Transportation Safety Act of 2019 terms (Washington Board of Pilotage Commissioners, 2020). We will use these definitions in our analysis summary report.

References


State of Washington Board of Pilotage Commissioners. (2020). Geographic Zones Per the Directives of ESHB 1578 Reducing the threat to southern resident killer whales by improving the safety of oil transportation and Chapter 88.16 RCW Pilotage Act. Retrieved from the Washington Board of Pilotage Commissioners website: https://nebula.wsimg.com/a0c4bc354f3ca9d89232d290d537fcf8?AccessKeyId=F86D0A1E7A0091C2061F&disposition=0&alloworigin=1

State of Washington Board of Pilotage Commissioners. (2020). Interpretive Statement Regarding ESHB 1578 Terms as adopted by the BPC. Retrieved from the Washington Board of Pilotage Commissioners website: https://nebula.wsimg.com/2e0c94a21d0285c4ed21a3d5eb31280a?AccessKeyId=F86D0A1E7A0091C2061F&disposition=0&alloworigin=1


THE 4TH-ANNUAL WOMEN OFFSHORE CONFERENCE

We met virtually, November 5th & 12th, 2021!

The Women Offshore Foundation is an online organization and resource center supporting a diverse workforce on the water. As a 501(c)(3), non-profit private operating foundation, our mission is to propel women into meaningful careers through access to a worldwide community and professional development resources, while raising awareness amongst industry leaders and decision makers about issues affecting women on the water.

For the past 4 years, we have united women from around the globe to support one another in navigating careers on the water. This year, we hosted a virtual conference on November 5th and 12th. Over two days, attendees from around the world heard from keynote speakers and panel discussions that focused on resilience. Through our interactive, virtual platform they attended sessions and workshops. They also networked with others to share their ideas! Thank you to everyone who attended!

THANK YOU SPONSORS

Special thanks to all of the 2021 conference sponsors. Without their support, this conference would not have been possible.

Special Thanks to James Spear
EVENT ANALYTICS

Individual Attendees 354
Watch Party Attendees* 50
Total Attendees 404
Attendees Logged In 75%
Speakers 53
Sessions 19
Attendees in Lounge 86
Lounge Meetings 36
Message Exchanges 1664
Total Views 2620

Event Feed
Feed Word Cloud shows the most commonly used words in the event feed and represents the buzz of the feed.
Posts 109  Likes 864
Comments 129

*Watch parties were held at California Maritime Academy, Maine Maritime Academy, and Texas A&M Galveston
COMMUNITY FEEDBACK
WHAT THE ATTENDEES ARE SAYING POST-CONFERENCE...

What a fantastic platform for this year’s conference and THANK YOU for this awesome conference. It gets better and better every year.

I give it a 12/10 !!!
i love WO and the community it's built!

Ally, you and your team are doing a fantastic job! Keep up all your hard work. You will never know how many women you have helped by your willing to say YES to what is in your heart. You go girl!!!

Fantastic event-again!!
I really enjoyed the conference, it was amazing. Thank you so much for the amazing talks.

This was the first time I’ve ever felt included in this industry overall. Thank you!
Conference was GREAT! I loved it,
OPENING KEYNOTE, CEO LISA LUTOFF-PERLO
Taking the helm as President and CEO at Celebrity Cruises in 2014, Lisa Lutoff-Perlo is a recognized trailblazer in the global hospitality industry. A purpose-driven leader, Lutoff-Perlo has catalyzed cultural progress in the 200-year-old cruise industry by appointing the first American female Captain, the first West-African woman to work on the bridge of a cruise ship and, ultimately, increasing Celebrity Cruise’s percentage of women on the bridge to 27%, where the industry average is 2%.

OPENING KEYNOTE, CEO IRENE WAAGE BASILI
Before being part of establishing Shearwater GeoServices in 2016, Irene Waage Basili held the position as CEO in GC Rieber Shipping for six years. Prior to this Irene was VP of Marine Strategy with PGS, following PGS’ acquisition of Arrow Seismic in 2007 where Irene served as CEO. Irene has more than 25 years of experience from the maritime industry both within offshore service and conventional shipping. She serves as Director of the Board for Pacific Basin Ltd. (Hong Kong Stock Exchange)

PRESENTATION SPEAKER, VERONICA CANALDA, RECRUITER AT TRANSOCEAN
Veronica is a Sr. Military Offshore Recruiter at Transocean, a deepwater drilling contractor. Veronica is a seasoned recruiter with over 20 years of experience in recruiting. She is known for her professionalism, dedication and rapport with candidates and clients. With great attention to detail, she meets the specific needs of both the hiring organization and candidate. Veronica’s mission and passion is to cultivate talent with meaningful and rewarding employment opportunities.
SESSION HIGHLIGHTS

SEXUAL ASSAULT AND HARASSMENT PREVENTION PANEL
This was the conversation for taking action to prevent sexual assault and sexual harassment (SASH). Representatives from CGIS, Safer Waves, Seacode, and the Ship Operations Cooperative Program (SOCP) came together to share best practices in preventing SASH and maintaining a safe culture for everyone on board.

BLACK MARINERS PANEL DISCUSSION
While conversations around allyship and Black experiences have come to the forefront over the past year or so, more must be done and the voices of Black mariners should be elevated and heard. On this panel, Black mariners shared their perspectives of working on the water.

MARITIME STARTUPS PANEL DISCUSSION
Have you ever thought about starting your own business in the maritime industry? Perhaps you have an idea or vision for a new product. This panel was full of female business leaders. Attendees gained inspiration to grow ideas into business entities and walked away with lessons that have shaped how the panelists run their businesses today.

MOMS OFFSHORE
Do you have a baby on board or a baby at home? This panel of working offshore mothers shared their experiences on how to balance work with family. They shared their lessons learned in raising a family and progressing their careers.

NAVIGATE YOUR CAREER WITH INTENTION
Women often struggle with self-promotion, wait for promotions instead of asking for them, and volunteer for tasks that don’t lead to promotion. Other women aren’t interested in climbing the ladder and are uncertain how to achieve a rewarding career outside of the promotional path. Managing Director of YouMap LLC and best selling author Kristin Sherry offered practical steps to discover your HOW, WHY, WHAT, and WHO to build confidence, maximize your potential, and career satisfaction.
Sponsoring companies hosted virtual booths to show their opportunities in the industry. Attendees could meet and chat with representatives, upload their contact details to the booths, and view product images and videos. Brochures and information could be downloaded from the booths as well.

### VIRTUAL BOOTHS

Total Booths 12
Team Members 30
Total Connections 53
Total Visits 1151
Total Bookmarks 65

### Popular Booths

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EMPOWERED IN RESILIENCE
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<td>Making Waves with Community Members</td>
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<td>Navigate Your Career With Intention, by Kristin Sherry</td>
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<td>The Power of Resilience with Erica D’Eramo, Two Piers Consulting</td>
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<td>Closing Remarks with Cassi Laskowski &amp; Ally Cedeno</td>
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