

## Vessel Transits Through Olympic Coast National Marine Sanctuary and Area to Be Avoided (ATBA) - 2015 Estimated Compliance

### Introduction

Designated in 1994, Olympic Coast National Marine Sanctuary (OCNMS or sanctuary) is a place of regional, national and global significance. The sanctuary, which is connected to both the Big Eddy Ecosystem and the California Current Large Marine Ecosystem, is the site of one of North America's most productive marine regions and spectacular, undeveloped shorelines. Potential release of oil or other hazardous material from a major marine accident is regarded as the most serious threat to resources within and qualities of the sanctuary. Prevention of spills is therefore one of OCNMS's highest priorities. As a steward of these vitally important natural resources, OCNMS will continue to collaborate with other agencies and user groups to reduce the potential for oil spills and improve contingency planning for spill response. OCNMS's major oil spill prevention initiative is an International Maritime Organization (IMO) designated Area to be Avoided (ATBA). This report is the sanctuary's annual reporting of estimated ATBA compliance rates. Data from Automatic Identification System transceivers received by satellite (S-AIS) is collected, vessel details are added and compliance to the ATBA is evaluated. Our evaluation of the 2015 vessel transits off the Washington coast shows compliance rates virtually identical to 2014

(97.8% in 2014 and 97.7% in 2015). Estimated compliance of the ATBA continues to reflect a high degree of cooperation by the maritime industry.

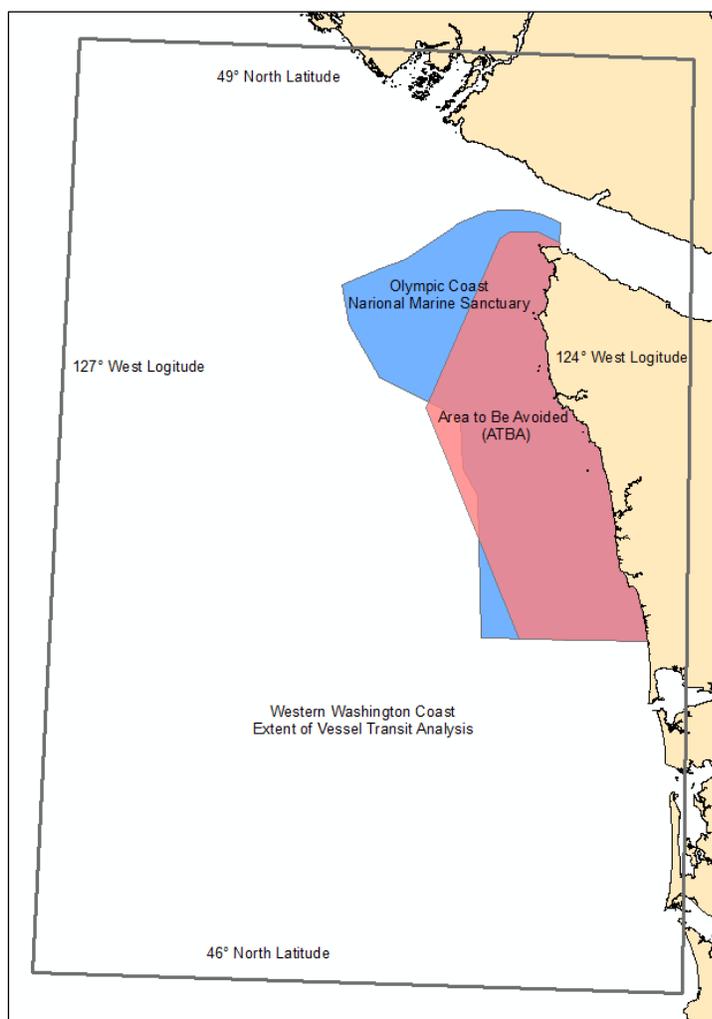


Figure 1: Vessel Transit Analysis Area.

### Background

During the sanctuary designation process NOAA worked with the U. S. delegation to the IMO to designate an Area to be Avoided (ATBA) off the coast of Washington to reduce the risk of marine casualties including oil spills, and the resulting environmental damage to Olympic Coast National Marine Sanctuary. For more information on the ATBA see the attached informational flyer (Figures 9 and 10) or visit <http://olympiccoast.noaa.gov/protect/incidentresponse/atba.html>. This flyer is also included in the Washington Department of Ecology's (Ecology) Vessel Entries and Transits for Washington Waters (VEAT) publication and U. S. Coast Guard Sector Puget Sound Vessel Traffic Service's (VTS) User's Manual. In addition ATBA boundaries and provisions are included in official navigational products, such as nautical charts and Coast Pilot 7.

## **ATBA Provisions**

All ships and barges that carry oil or hazardous materials as cargo, and all ships 400 gross tons and above, solely in transit are advised to transit outside of this ATBA. OCNMS, in cooperation with the U.S. and Canadian coast guards, monitors vessel compliance under this voluntary program. While the ATBA does not apply to government vessels, the sanctuary, in partnership with the U.S. and Canadian coast guards, seeks to ensure that government vessels comply when in transit. This includes NOAA, U.S. and Canadian Coast Guard vessels and the U.S. Navy.

It is important to understand the implications of the ATBA provision “solely in transit”. The ATBA was not intended to preclude lawful operations of vessels within the ATBA. Examples include fishing, search and rescue, and research vessels that may conduct operations off Washington’s outer coast. When these vessels are moving through the area en route to working grounds beyond the ATBA, or solely in transit, we request their compliance with the ATBA.

While we recognize that there are vessels over 400 gross tons that are legitimately conducting operations in the ATBA, we do not attempt to adjust the estimated compliance numbers to account for this. For that reason some vessel types, such as fishing and research vessels, will likely show an artificially lower compliance rate because all their occurrences in the ATBA are counted as non-compliance. The reason for this approach is the difficulty of determining the nature of some transits. In some cases it is fairly obvious from the nature of the track line that a research or fishing vessel is conducting operations, in other cases it is not as obvious. This challenge is even more pronounced when using S-AIS data. Due to this difficulty and in order to be consistent from one year to the next, OCNMS does not make adjustments to the compliance estimates for individual vessel transits based on perceived operations.

## **ATBA Compliance Reporting**

From 2004 through 2011 Ecology published estimated ATBA compliance rates as part of their annual VEAT publication. VEAT is offered by Ecology in response to public requests for information about commercial vessel traffic in Washington waters. There is considerable overlap between the VEAT report and OCNMS’s vessel monitoring efforts and the reason the two reports were for a time coordinated. When OCNMS made significant changes to their monitoring methods, additional documentation was needed. This led to the need, starting in 2012, for an independent OCNMS report. Both the VEAT (2004-2011) and OCNMS (2012-2015) reports can be downloaded at <http://olympiccoast.noaa.gov/protect/incidentresponse/vesseltraffic.html>. VEAT reports following 2011 can be downloaded at Ecology’s publication page, <https://fortress.wa.gov/ecy/publications/>.

## **Discussion of Data**

In 2012 the sanctuary changed data sources from Canadian Coast Guard radar data to data from vessel’s S-AIS. This change in the data source provides both an improvement in spatial data coverage (the southern part of the sanctuary is now included), as well as a reduced number of positions describing transits (S-AIS data has occasional gaps in coverage), and a loss of some value-added information formerly provided by Canadian Coast Guard vessel traffic operators, such as information on tugs towing oil or chemical barges. For the initial analysis of the S-AIS data, the geographic area from 46° to 49° North Latitude and from 124° to 127° West Longitude was selected, an area covering the entire outer coast of Washington state (see Figure 1). Data from the expanded study area requires significant staff time to process, but provides improved context for understanding vessel traffic patterns. It also has value to the marine spatial planning efforts of the state of Washington, see <http://www.msp.wa.gov/>. The sanctuary continued this level of effort in 2015, but will continue to evaluate the increased processing effort vs. the utility of monitoring the larger area as demands on limited staff resources change. There is

also an ongoing discussion within NOAA on the various benefits of monitoring vessel traffic and seeking improved sources of data for monitoring vessel traffic across wider areas.

Due to the use of different data sources, OCNMS vessel classification has varied over the years. The shift from Canadian vessel radar to S-AIS data resulted in some changes in vessel type categorization between 2011 and 2012, and additional minor modifications were made in 2013 and 2014. When possible we are consistent with previous vessel type descriptions, as well as those vessel types that are in common usage, e.g., such as those used by Lloyd’s Register. For certain types of analysis we group similar vessel types into one of six vessel classes (see Table 1).

Table 1: Changes to Vessel Types from 2011-2015

2011 Vessel Types	2012-2013 Vessel Types	2014-2015 Vessel Types	Vessel Classes
Bulk Carrier	Bulk Carrier	Bulk Carrier	CARGO
Ore-Bulk-Oil Vessel (OBO)	Bulk Carrier	Bulk Carrier	CARGO
Cable Layer	Cable Layer	Cable Layer	MISC
General Cargo Ship	Cargo Ship	Cargo Ship	CARGO
Heavy Load Carrier	Cargo Ship	Cargo Ship	CARGO
Non-oil Tanker	Chemical Carrier	Chemical Carrier	CARGO
Chemical Tanker	Chemical Carrier	Chemical Carrier	TANKER
Container Ship	Container Ship	Container Ship	CARGO
	Dredger	Dredger	MISC
	Drill Ship	Drill Ship	MISC
Fishing Vessel	Fishing Vessel	Fishing Vessel	FISHING
(LPG) and (LNG) Carrier <sup>1</sup>	Liquefied Gas Carrier	Liquefied Gas Carrier	TANKER
Oil Tanker	Oil Tanker	Oil Tanker	TANKER
Cruise Ship	Passenger Ship	Passenger Ship	PASSENGER
	Pollution Control	Pollution Control	MISC
	Private Vessel	Private Vessel	MISC
	Public Vessels <sup>2</sup>	Public Vessels	MISC
Refrigerated Ship	Refrigerated Cargo	Refrigerated Cargo	CARGO
	Research Ship	Research Ship	MISC
Roll-on Roll-off Vessel (RoRo)	RoRo Cargo Ship	RoRo Cargo Ship	CARGO
	Supply Ship	Supply Ship	MISC
<i>Tug</i> <sup>3</sup>	Tug	Tug	TUG
Articulated Tank Barge (ATB)	Tug	Articulated Tug Barge <sup>4</sup>	TUG
Tugs with Chemical Barge	Tug	Tug	TUG
Tugs with Oil Barge	Tug	Tug	TUG
Vehicle Carrier	Vehicle Carrier	Vehicle Carrier	CARGO

<sup>1</sup> Liquefied Petroleum Gas (LPG) Liquefied Natural Gas (LNG) are types of Liquefied Gas Carriers.

<sup>2</sup> The ATBA does not apply to Public Vessels and they are not included in the estimated compliance table. OCNMS collects this information and it may be used for different types of analysis.

<sup>3</sup> Only Tugs that were transiting with cargoes of petroleum or hazardous materials were tracked prior to 2012.

<sup>4</sup> From 2012-2013, Articulated Tug Barge (ATB) vessels were included in the vessel type Tug; starting in 2014 ATB vessels were broken out into their own category.

Table 2. Estimated ATBA Compliance Rates for 2015 (vessels > 400 GT)

Vessel Type	Outer Washington Coast Transits <sup>5</sup>	Transits passing through the Sanctuary <sup>6</sup>	Transits passing through the ATBA within the Sanctuary <sup>7</sup>	Estimated ATBA Compliance Rate <sup>8</sup>
	1	2	3	4
Articulated Tug Barge	361	323	3	99.1%
Bulk Carrier	4,497	1,648	20	98.8%
Cable Layer	13	9	0	100.0%
Cargo Ship	538	227	3	98.7%
Chemical Carrier	246	135	1	99.3%
Container Ship	1,939	991	12	98.8%
Dredger	29	1	0	100.0%
Drill Ship	1	1	0	100.0%
Fishing Vessel	371	119	20	83.2%
Liquefied Gas Carrier	46	17	0	100.0%
Oil Tanker	844	542	5	99.1%
Passenger Ship	439	195	4	97.9%
Pollution Control	19	2	1	50.0%
Private Vessel	26	18	10	44.4%
Refrigerated Cargo	25	14	0	100.0%
Research Ship	49	33	13	60.6%
RoRo Cargo Ship	321	121	2	98.3%
Supply Ship	61	34	4	88.2%
Tug	289	99	7	92.9%
Vehicle Carriers	847	414	7	98.3%
<b>TOTAL</b>	<b>10,961</b>	<b>4,943</b>	<b>112</b>	<b>97.7%</b>

<sup>5</sup> The vessel transits in Column 1 are from S-AIS data and include commercial vessels greater than 400 gross tons. This is a larger geographic area than has been reported on prior to 2012.

<sup>6</sup> Column 2 includes a subset of the S-AIS vessel transits through the sanctuary.

<sup>7</sup> Column 3 includes a subset of the sanctuary vessel transits that also go through the ATBA. These are vessels potentially not complying with the provisions of the ATBA.

<sup>8</sup> Column 4 shows the percentage of vessels transiting through the sanctuary that stayed out of the ATBA. {Column 4 = 1 - (Column3/Column2)}. This is used as an estimate of compliance with ATBA provisions.

## Visual Representation of Data

In 2013, OCNMS introduced annual Traffic Intensity Pattern (TIP) maps. To facilitate ease in analysis, the maps use six vessel classes as opposed to the 20 vessel types shown in Table 1. These density maps represent all vessels with an S-AIS transponder that have transited Washington's outer coast, regardless of tonnage. For this reason, care should be taken in comparing the estimated ATBA compliance rates (Table 2), which only include vessels 400 GT or larger, with the TIP maps (Figures 2-8).

S-AIS data are provided as points along a vessel transit. The point data include vessel identification, vessel location and a date/time stamp for monitoring the vessel movement. The number of points included in any vessel transit is related to the number of satellites that capture the AIS signal from the vessel transponder and the speed of the vessel as it moves through the area of interest. In the current satellite configuration there are occasional data coverage gaps. In the 2013 and 2014 TIP maps, the area of interest was divided into 1 km<sup>2</sup> grid cells, and the number of unique vessel transits, as represented by individual S-AIS points, was counted for each grid. The grid values were then binned by three traffic intensity classes, representing a relative measure of low, medium and heavy traffic use zones.

In the development of a marine spatial plan, Washington State has adopted hexagons (1 mile<sup>2</sup>) as their unit of analysis. In order to have our vessel traffic data be more compatible with Washington's marine spatial planning efforts, we have changed from our original 1 km<sup>2</sup> grid cell to the grid configuration adopted by Washington State. Since 1 mile<sup>2</sup> is approximately equal to 2.6 km<sup>2</sup>, this change results in a coarser resolution TIP analysis, but one that has better application to WA State MSP and other partner needs.

Vessel patterns for the heavy use vessel traffic zones are readily visible in the density maps. The medium and low density zones, however, show the limitation of using intermittent or infrequent S-AIS data as the only source of vessel transit information. Vessel transits have 'gaps' evidenced by cells that do not have a recorded data point. Illustration of transit patterns could be improved by additional satellite coverage or the use of terrestrial AIS stations, which would better represent transits in lower density areas. Denser point data would also allow the creation of line transits for vessel density tracking, further improving compliance estimates and expanding the utility of these products for coast-wide applications.

Traffic Intensity Patterns: Cargo Ships 2015

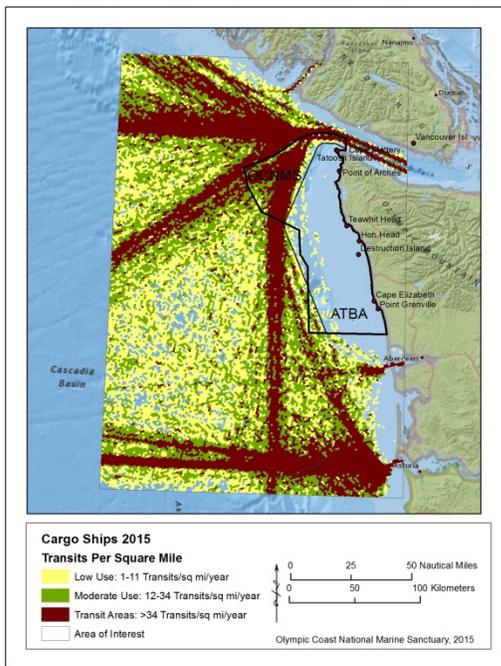


Figure 2: Traffic Intensity Patterns for Cargo Ships, 2015

Traffic Intensity Patterns: Tugs 2015

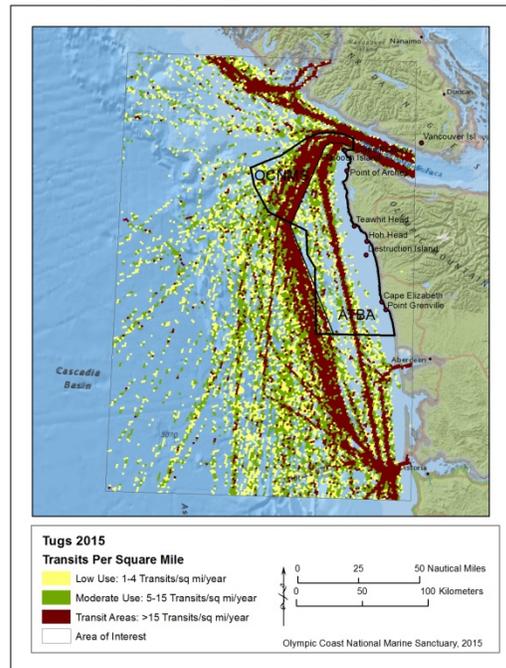


Figure 3: Traffic Intensity Patterns for Tugs, 2015

Traffic Intensity Patterns: Tankers 2015

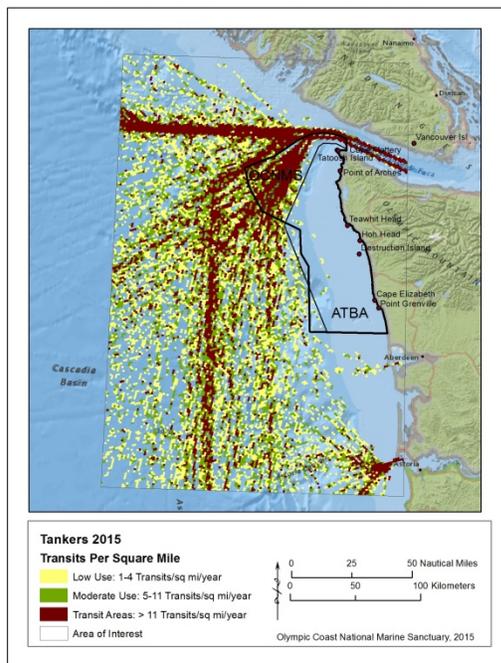


Figure 4: Traffic Intensity Patterns for Tankers, 2015

Traffic Intensity Patterns: Fishing Vessels 2015

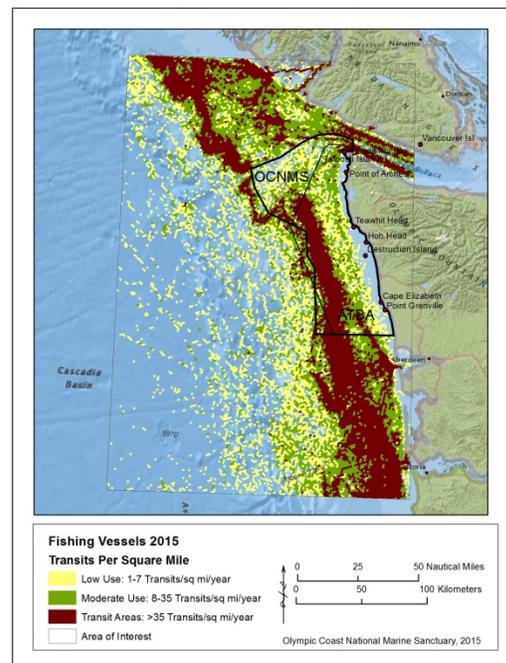
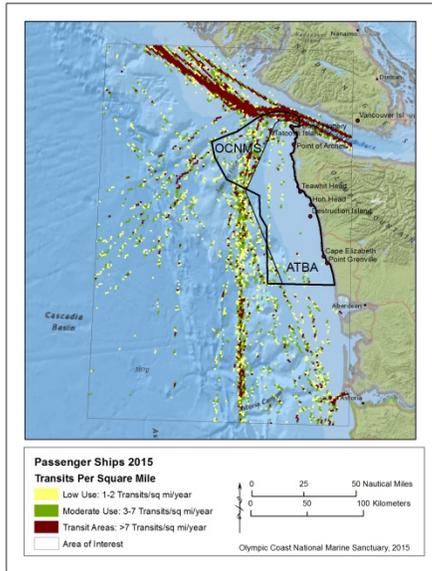


Figure 5: Traffic Intensity Patterns for Fishing Vessels, 2015

Traffic Intensity Patterns: Passenger Ships 2015



Traffic Intensity Patterns: Miscellaneous Ships 2015

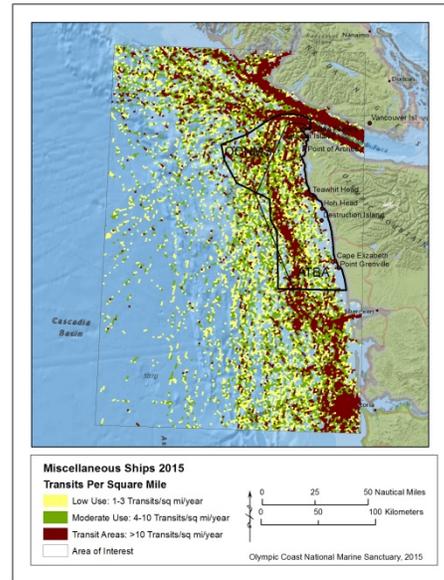


Figure 6: Traffic Intensity patterns for Passenger Ships, 2015

Figure 7: Traffic Intensity Patterns for Misc. Ships, 2015

Traffic Intensity Patterns: All Vessel Types 2015

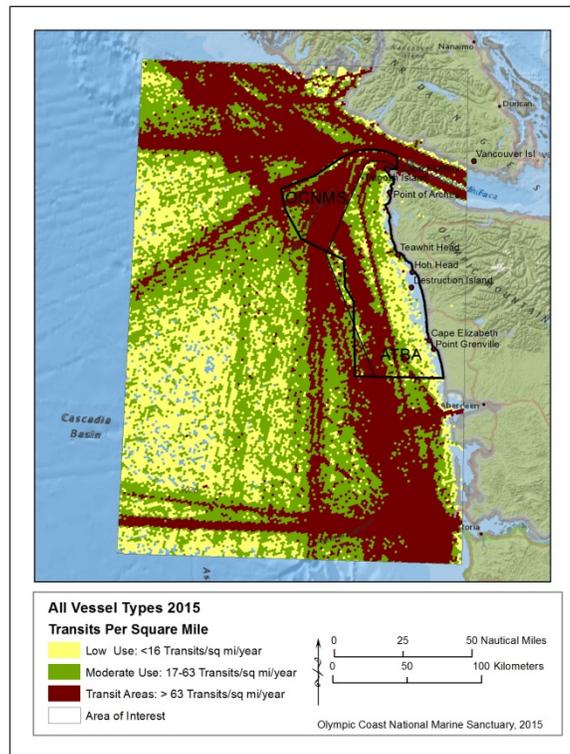


Figure 8: Cumulative Traffic Intensity Patterns: All Vessel Types, 2015

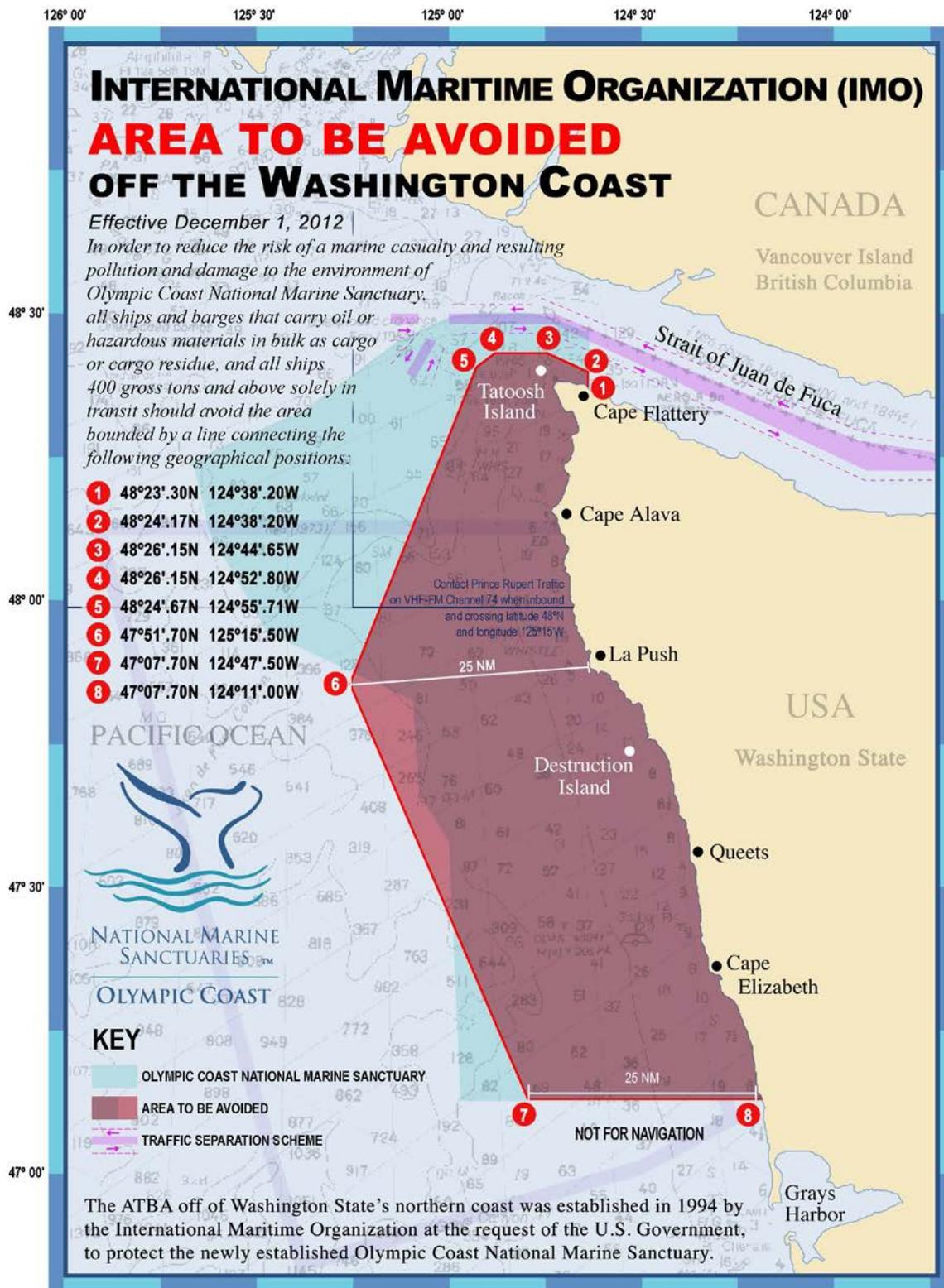


Figure 9: ATBA Information Flyer – Page 1; shows boundary and explains to which vessels it applies.

**Why does the IMO establish ATBAs?**

- The IMO establishes ATBAs in defined areas where navigation is very hazardous or where it is important to avoid casualties.

**Why is it important for vessels to remain offshore and avoid this area?**

- Reduces risk of vessel grounding on shore
- Reduces risk of collision with small vessels traveling close to shore
- Allows more time for assistance to arrive to help a disabled vessel
- Increases protection of coastal resources
- In the event of an oil spill:
  - Allows more time for spill cleanup and containment crews to arrive
  - Decreases the chance of spill impacts on the shoreline
  - Increases spill evaporation and degradation time

**How were the boundaries of the ATBA chosen?**

- The boundaries were chosen to protect sanctuary resources most at risk from vessel casualties.
- The boundaries are compatible with the Traffic Separation Scheme

**How was the vessel applicability chosen for the ATBA?**

- Vessels greater than 400 gross tons were selected because of the substantial amount of bunker fuel that they carry and the risk that a spill would pose to sanctuary resources
- Vessels that carry oil or hazardous materials in bulk as cargo or cargo residue were selected due to the risk that a spill would pose to sanctuary resources
- The ATBA applies to vessels solely in transit and does not apply to vessels engaged in activities otherwise allowed in the sanctuary, such as fishing and research. The ATBA also does not apply to government vessels, although they are encouraged to avoid the area when solely in transit.

**Natural characteristics of Olympic Coast National Marine Sanctuary:**

- 128 species of seabirds within the sanctuary
- 29 species of whales, dolphins, and other marine mammals reside or visit the area
- Washington State's only sea otter population
- Many species of fish and shellfish harvested for commercial, subsistence or recreational purposes
- Over 300 species of resident intertidal invertebrates, aquatic plants, and fish
- Diverse habitat types supporting complex food chains, including kelp communities, rocky intertidal zones, sand beaches, and offshore rocks
- Within the usual and accustomed fishing grounds of the Hoh, Makah, Quileute tribes and the Quinault Indian Nation
- Adjacent to Olympic National Park, Washington Islands National Wildlife Refuges, and Washington State Seashore Conservation Area

**FOR MORE VESSEL TRAFFIC INFORMATION:**

U.S.C.G. Sector Puget Sound, Waterways Management Division  
1519 Alaskan Way S, Seattle, WA 98134  
Phone: 206-217-6051  
e-mail: SectorPugetSoundWWM@uscg.mil  
<http://www.uscg.mil/d13/cvts/>

**FOR MORE SANCTUARY INFORMATION OR COPIES OF THIS PUBLICATION:**

Olympic Coast National Marine Sanctuary  
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<http://olympiccoast.noaa.gov/protect/incidentresponse/atba.html>



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Figure 10: ATBA Information Flyer – Page 2; provides rationale for ATBA and information on OCNMS.