

## Background on Columbia River vessel traffic

Each year, approximately 180 oil tankers, tugs towing oil barges, and articulated tug barges (a tug pushing a mechanically attached barge) enter the Columbia River to deliver more than a billion gallons of refined petroleum products such as gasoline and jet fuel to Washington and Oregon. Over 240 tugs with tank barges a year carry refined petroleum products from the Portland, Oregon/Vancouver, Washington area up the river to eastern Washington, Oregon, and Idaho. These tank vessels share the river with recreational boats, fishing vessels, passenger vessels, and around 1,300 cargo ships a year. Cargo ships pick up commodities like grain and logs from Washington and

Oregon ports, and deliver goods such as cement, steel, and chemicals.

A robust set of safety standards is in place to reduce the risks of accidents and oil spills on the Columbia River, and to prepare for an oil spill should one occur. These regulatory and voluntary measures are put in place, monitored, and reviewed by government, industry, and nongovernmental organizations. Notably, all tank vessels operating on the Columbia River have double hulls. There has not been a cargo oil spill on the river since 1984, before double hull standards were implemented.



*Chemical tanker heading to sea from the mouth of the Columbia River. Photo courtesy of Bruce Fingerhood, CC BY 2.0.*

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## Columbia River Vessel Traffic Evaluation and Safety Assessment (CRVTSA)



*Bulk cargo ships at anchor in Astoria. Photo courtesy of Alex Butterfield, CC BY 2.0.*

### CONTACTS AND OTHER INFORMATION

Scott Ferguson, Manager  
 Prevention Section  
 Spill Prevention, Preparedness,  
 and Response Program  
 360-407-7465  
[scott.ferguson@ecy.wa.gov](mailto:scott.ferguson@ecy.wa.gov)

Brian Kirk, Risk Lead  
 Prevention Section  
 Spill Prevention, Preparedness,  
 and Response Program  
 425-649-7292  
[brian.kirk@ecy.wa.gov](mailto:brian.kirk@ecy.wa.gov)

Department of Ecology  
 Spill Prevention, Preparedness,  
 and Response Program  
 PO Box 47600  
 Olympia, WA 98504-7600

[www.ecy.wa.gov/  
 programs/spills/prevention/  
 RiskAssessment.html](http://www.ecy.wa.gov/programs/spills/prevention/RiskAssessment.html)

### Situation

A major oil spill on the Columbia River would have high consequences for both Washington and Oregon. The Washington State Legislature recognizes that vessels transport oil across some of Washington's most special and unique marine environments, which are sources for beauty, recreation, and economic livelihood. The Legislature has identified oil spill prevention as the best method to protect these environments (see [Chapter 90.56.005 of the Revised Code of Washington \[RCW\]](#)).

In 2015, the Oil Transportation Safety Act required the Department of Ecology to evaluate and assess vessel traffic management and vessel traffic safety within and near the mouth of the Columbia River. The Act directed Ecology to consult with tribes and stakeholders and determine:

- The need for tug escorts for vessels transporting oil as cargo
- Tug capabilities to achieve safe escort
- The best achievable protection for vessels transporting oil as cargo

### Evaluation process

Ecology hired DNV GL, an independent maritime vessel safety expert to evaluate cargo oil spill risks on the Columbia River and the Columbia River Bar. Working with DNV GL, Ecology consulted with tribes and stakeholders through a series of workshops and meetings to determine evaluation inputs and to review results. The evaluation identified current safety practices and how these practices influence existing and future risks. Cargo oil spill risks on the Columbia River were modeled quantitatively for current vessel traffic and two potential future traffic cases. Because the Columbia River Bar is a unique and dynamic environment, it was not possible to model risks on the bar. Instead, oil spill risks were considered qualitatively through discussions with workshop participants.

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## Key findings of the evaluation

### 1. The evaluation process generated a framework for understanding oil spill risks.

This evaluation is an important step in protecting Washington and Oregon against future oil spills. The evaluation process generated a common framework for understanding oil spill risks and identifying potential risk reduction measures.

### 2. Oil spills on the Columbia River are low likelihood, high consequence.

The likelihood of a major oil spill occurring today in the river is low, but the consequences of a spill would be high for both Washington and Oregon.

- Safety systems in place for the Columbia River consisting of international, federal, state, local, and industry standards have had a significant effect in reducing the risk of cargo oil spills from vessels.
- However, spills are toxic and threaten public health, the environment, and cultural resources. Based on 2006 numbers, a large spill could cost our state \$10.8 billion and 165,147 jobs.
- Proposed projects could increase the number of oil tankers transiting the Columbia River.

### 3. Tug escorts would provide protection.

Tug escorts for oil tankers would offer a significant level of protection, especially if oil tanker traffic increases in the future.

- Based on modeling and qualitative analysis, tug escorts would be more effective at reducing oil spill risks with additional tanker traffic than they would today.

- Escort tug capabilities need to be aligned with the vessels they would be escorting, and guidelines should be established for escort procedures.
- Tug escorts for articulated tug barges (ATBs) would offer a relatively small reduction in risk in the study area, because ATBs have partially redundant steering and propulsion systems, and they have shallow drafts that allow them to safely navigate outside of the ship channel.
- Towed oil barges on the Columbia River that can carry more than 25,000 barrels already use assist tugs, called tag tugs, which help control the barge and keep it behind the towing tug.
- Tug escorts may not be safe while crossing the Columbia River Bar. This would need to be evaluated separately.

### 4. Multiple stakeholders play an important role in keeping vessels safe when crossing the Columbia River Bar.

A key risk control for all vessels is the decision about whether or not it is safe to cross the bar. Each vessel master has the ultimate responsibility for their crew, vessel, and cargo. The Columbia River Bar Pilots conduct vessel traffic management, and determine whether it is safe to bring each vessel across the bar, for every transit they conduct. The U.S. Coast Guard coordinates closely with the Columbia River Bar Pilots and can issue restrictions, or close the bar to vessel traffic entirely. A collaborative approach with the Bar Pilots, Coast Guard, other federal agencies, and the states of Oregon and Washington could identify tools to enhance the decision making process.

## Ecology's recommendations

Ecology recommends the following safety measures be implemented. Neither require a change to legislation.

### 1. Continue to support existing collaborative maritime safety programs.

Existing, collaborative maritime safety programs represent the best opportunity to prevent cargo oil spills on the Columbia River and Bar.

Ecology will continue to support these programs through participation as a member of the Lower Columbia Region Harbor Safety Committee, Northwest Area Committee, and the Sector Columbia River Area Maritime Security Committee; attendance at Oregon Board of Maritime Pilots meetings; and participation in U.S. Coast Guard waterways management studies.

Through participation in these programs, Ecology will encourage practices and technologies to meet best achievable protection. These could include:

- Regular discussions through the Harbor Safety Committee and other forums as appropriate of current practices, evolving risks, and opportunities for improvement for the movement of cargo oil.
- Tools to enhance the safe navigation and piloting of vessels on the Columbia River and Bar.

### 2. Seek tethered tug escort of laden tankers when tanker traffic increases.

Ecology will work with the Lower Columbia Region Harbor Safety Committee to develop a Harbor Safety Plan Standard of Care, to be considered for implementation when a newly constructed or expanded facility to move oil on

the Columbia River becomes operational and increases tanker traffic.

This standard will address tethered tug escort of laden oil tankers on the Columbia River, and considerations for laden oil tankers crossing the Columbia River Bar.

The Standard of Care should also:

- Include tug and tanker equipment capabilities.
- Consider exemption from tug escort requirement for tankers with double hulls, when the tanker also has fully redundant steering and propulsion (for example, independent systems that can maintain propulsion/steering with any single failure).

#### WHAT IS MODELING?

A *model* is a numeric representation of risk. For the CRVTSA, modeling was done by DNV GL's proprietary software. This software performed complex calculations based on:

- Characteristics of the Columbia River
- Characteristics of vessels on the river (34 different types)
- Time the vessels spend on the river
- Local practices and measures that reduce spill risks
- Global data for marine casualties

The software also allowed DNV GL to see what happens to risk when different factors change, like the introduction of tug escorts, or the use of redundant propulsion.

DNV GL's modeling software is used for work they do all over the world. It is based on international standards for conducting safety assessments.