

# Oil Spill Risk Model: Our Modeling Approach



## More information

[Visit our webpage](#)

## How you can help:

We are looking for feedback on all aspects of our modeling approach.

Please consider attending one of our discussion sessions on specific module components:

- [Register for upcoming events](#)

## Contact information

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## Special accommodations

To request ADA accommodation including materials in a format for the visually impaired, call Ecology at 360-407-7668 or visit <http://ecology.wa.gov/accessibility>. People with impaired hearing may call Washington Relay Service at 711. People with speech disability may call TTY at 877-833-6341.

## Model development

We are developing a quantitative model to assess current and potential future risks of oil spills in Washington waters. This model is part of [a package of measures passed by the Legislature in 2019](#) to reduce the risk of oil spills and protect Southern Resident Killer Whales.

The model will be a long-term asset for Ecology to analyze oil spill risks and the potential effectiveness of oil spill prevention, preparedness, and response strategies. As part of this work, we are consulting with tribes and stakeholders to develop modeling assumptions and scenarios, and periodically update the model.

## Outreach and feedback opportunities

Through conversations and presentations, we hope to build a shared understanding of the mathematical and analytical backbone of the model. We are also providing feedback opportunities via regular discussion sessions, webinars, and an eComments portal.

As we establish the various components of the model, we will need your input to assure that the model is successfully reflecting the functioning of the waterway. We will produce focus sheets like this one to support robust dialogue and informed feedback.

## Modeling approach

Our foundational oil spill risk model is made up of a series of modules. By foundational, we mean to emphasize that we are building a model that can meet our near term requirements, but also one that is organized broadly enough that it can be expanded to meet additional needs. Each module will deal with an element needed for evaluating oil spill risk:

- Vessel Movement Module will model vessel movements.
- Vessel Encounter Module will measure and evaluate relationships between each vessel and shore and other vessels
- Vessel Accident Module will evaluate situations for their potential for accidents
- Oil Outflow Module will estimate spills from simulated accidents.

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## Vessel Movement Module (VMM)

The VMM relies on historical AIS data but includes additional information as well. The VMM will generate simulated AIS data with macro and micro characteristics similar to the observed AIS data used in the development of the VMM.

Through simulation, the VMM will move vessels through a specific geographic area, on tracks that we will derive from historical AIS data. Vessels will be populated on those routes based on their distribution in the AIS data and moved along them at a specified time step.

The VMM is built from a number of components and we are planning public discussion sessions to gather feedback for a selection of these module components.

## Vessel Encounter Module

As part of the analysis of oil spill risk, our model needs to be able to represent the probability of a given vessel colliding with another vessel. The calculation of that probability should only take place when another vessel is nearby. The Vessel Encounter Module identifies how nearby is nearby enough to represent the possibility of a collision.

The Vessel Encounter Module also examines situations that could lead to powered groundings and powered allisions.

## Vessel Accident Module

The Vessel Accident Module will select which vessel encounters are more likely to result in an accident based on analytically-derived risk factors and the outputs from the Vessel Movement Module. Specifically, it needs to be able to provide quantified results for the following incident types:

- Drift and powered groundings
- Collisions and allisions
- Spills that don't require vessels interacting, like transfer spills, fire and explosions, and sinkings

## Oil Outflow Module

Once the model has simulated an accident occurrence, the Oil Outflow Module generates the oil type and volume of the resulting spill.

## How to provide input

We welcome feedback and input on Model Development related topics at our upcoming technical discussion sessions as well as in writing.

[Register for upcoming events](#)