Vessel Accident Module
Outstanding Topics & Follow Up
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Ecology Staff

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Attendees

Ahren Stroming, *Puget Sound Partnership*
Ann Stafford, *Clallam County Marine Resources*
Bettina Maki, *WA Board of Pilotage*
David Bain, *Orca Conservancy*
Eleanor Kirtley, *Green Marine*
Fred Felleman, *WAVE Consulting*
Gary Greene, *Tombolo Mapping Lab*
Hans Kahl, *Skagit Dept. of Emergency Mgmt.*
Jaimie Bever, *WA Board of Pilotage*
Jeff Pelton, *Transport Canada*
John Doucette, *Renewable Energy Group*
Joycelyn Blue, *Snohomish County*
Laird Hail, *US Coast Guard*
Liz Wainwright, *Maritime Fire and Safety Assoc*
Lovel Pratt, *Friends of the San Juans*
Marta Green, *San Juan County*
Martin Teachout, *Trident Seafoods*
Mike Doherty, *local gov't. (retired)*
Phillip Nelson, *Council of Marine Carriers*
Randy Lewis, *Port of Grays Harbor*
Rick LaBlond, *Shell Trading NA*
Robert Poole, *Western States Petroleum Assoc*
Ross McDonald, *Sause Bros.*
Sheri Tonn, *WA State Board of Pilotage*
Todd Hass, *Puget Sound Partnership*
Tom Ehrlichman, *Swinomish Indian Tribal Comm.*

The following summary notes are not intended to be a transcript but rather a review of the discussion session. Participant questions and comments are shown in bold text followed by Ecology responses. Ecology responses that have been added after the conclusion of the event are preceded by the text "Supplementary answer."

When discussing probability or likelihood you identified 133 incidents that were looked at. Are those 133 events from 2007-2021 used to calculate accident probabilities? How will the volume of traffic be taken into account when weighting probabilities? (Rick LaBlond)

JD Leahy – Those 133 events were only used for identifying timing information about the duration of loss of propulsion events for self-repair and for identifying potential helm actions for our model. So no, we won't be using that data set for the overall probability of a loss of propulsion incident. We have not yet decided on the populations of interest for determining accident probabilities. We would like to use more than one population of interest for calculating probabilities to get an idea of uncertainty.

When you talked about the loss of propulsion events are those catastrophic losses? Is that the loss of one main or are you considering redundant systems? (Rick LaBlond)

JD Leahy – We only looked at total loss of propulsion events. There are a lot of events noted as loss of propulsion that consist only of reductions of propulsion capacity, particularly around maneuvering or docking. In our review of the data, we only counted full losses of propulsion, and only for vessels that were underway when the loss occurred.

Can you also sum up the primary outputs of the model, is it ultimately going to result in more tugs on standby or increased tethered escorts? I'm just curious where this is all leading. (Rick LaBlond)

JD Leahy – There are two analyses currently slated for evaluation with the model. One is the tug escort analysis. For that analysis, the Washington Board of Pilotage Commissioners will use the model analysis to inform potential changes to tug escort rules. The second analysis relates to the potential placement of an emergency response towing vessel and asks the question "will an ERTV stationed to serve the San Juan Islands reduce oil spill risk." In early 2022 we'll be looking at how to use the model to answer those questions.

How will your input of the parameters for external forces (Velocity Vector) account for seasonal variations from year to year, and the increasing intensity of storms due to climate change in the Northwest? Wouldn't a risk analysis of future events need to factor in more intense winds and tidal conditions during typical storm seasons? (Tom Ehrlichman)

Adam Byrd – The model will use historical data which will include recent weather conditions. To the extent these are influenced by climate change, that will be included. Forecasting changes to regional weather patterns is out of scope for this work.

Are you including dropping an anchor as a crew intervention to prevent grounding? (Laird Hail)

JD Leahy – The crew action in the momentum and drift model is only a course change. However, we will be incorporating emergency anchoring as an intervention.

Will the Crew Action model representing the avoidance of immediate grounding hazards also include scenarios where the crew is non-responsive, due to fatigue, injury, preoccupation with engineering or mechanical corrections, etc.? Will the rules for crew action factor in a reduction in the overall effect of crew action (longer delay times) due to these real world circumstances? Undoubtedly alert and well trained crews will avert some disasters, but not all; and not all crews are alert, well trained or knowledgeable about local hazards. The state of the crew in the Exxon Valdez disaster comes to mind. In future Webinars, please provide an update as to whether you have decided to factor in this reduction of crew action expectation, if you are now going to reduce risk of groundings and collisions based on Crew Actions (something we thought you said you were not going to do at the outset of this process). (Tom Ehrlichman)

JD Leahy – We're not planning to include the possibility that the crew doesn't perform these actions in the momentum and drift model. The possibility of a crew not-taking helm action is included in the probabilities calculated for powered grounding. We have to include some type of helm action in the momentum and drift model because of our inclusion of momentum. Including momentum increases the realism of the modeled incident and allows us to assess subsequent interventions. If we include momentum without course correction, we risk unrealistically grounding a ship immediately after loss of propulsion.

As to mechanical self-repair, can you please be more descriptive of how many of the reports you are citing include cases where self-repair did not occur during the years you mentioned (2007- 2014?). What is the ratio of successful self-repairs to total incidents you reviewed in those studies? Perhaps you mentioned this but if so, please repeat. (Tom Ehrlichman)

JD Leahy – When we produce a distribution based on our ultimate dataset and methodology we'll absolutely provide that information.

I was taught that a vessel should never run aground with both anchors in the pipe and I think that's a good axiom for today. In fact, both anchors should be run out to minimize momentum when approaching the shore. Even though this may not actually avoid a grounding, it will without a doubt reduce the impact when running aground thus reducing the amount of damage and therefore the possibility of pollution. Also, having anchors run astern when grounding will help stabilize the vessel when on the beach and ultimately assist in salvage of the vessel. (Phillip Nelson)

JD Leahy – We will be including emergency anchoring as an intervention. The model will not be able to account for potential reduction in grounding force or potential for salvage, that might come from slowed momentum, due to the complexity of simulating those effects.

Here in San Juan county we did not include momentum in our drift analysis. What I'm hearing is that the momentum increases the time to ground and allows for crew actions? Also, were there simultaneous loss of steering and propulsion incidents in the data you looked at? Will that be addressed? (Marta Green)

Alex Suchar – Mathematically speaking, the momentum will decrease very fast so we are really talking about the effect for a few minutes after the loss of propulsion. After that, the wind and current are the primary forces acting on the ship. What we're trying to do is to make as realistic of a simulation as possible in the context of narrow inland waterways.

JD Leahy – Also, it's not necessarily the case that momentum will increase the time to ground. That may be the case in wide open areas, but in more narrow areas the momentum will create a challenge for crew action. So the nature of the impact of including momentum on time to ground is not known.

Loss of steering and loss of propulsion do sometimes occur simultaneously, but we aren't looking specifically at both items happening together as a unique hazard type.

Is current taken into account since it is very applicable in places like Rosario strait? (Laird Hail)

JD Leahy – Yes, current values from the Salish Sea model will be included as an external force in the Momentum and Drift model.

Don't all of these interventions (crew action, self-repair, tug intervention) come into play at the end of the model in the analysis/risk parameters part of this process rather than as elements in the data set for the momentum and drift module? In other words, you first build the modules to determine probability of occurrence, then later, during analysis of risk, you run the model different ways: (a) no intervention; and (b) with varying levels of intervention? Introducing these reductions in risk as part of the foundational set seems to predetermine the outcome of the risk analysis at the end, when you run different scenarios. Thus, what you are describing today seems a fundamental departure from the architecture you described to us all along up until this meeting! (Tom Ehrlichman)

You responded to my question about crew actions that you'll apply it for 100% of cases and won't take into account factors like crew being unprepared or asleep etc. I appreciate you considering the idea of reducing the 100% crew action by some factor to account for human failings. Because you're not going to get crew action in 100% of those cases. You can't assume that the crew is going to be alert and able to steer the ship away from grounding 100% of the time. We'd ask you to reconsider that and find an appropriate reduction to say 75%. The same goes for loss of steering. (Tom Ehrlichman)

Can you explain better to me where we're at in this process? I understood that you'd only factor in different scenarios in the analysis phase, not in the model itself? When people suggested modifications based on variations, I heard that those would be dealt with later in the analysis. But today, I'm hearing that you're factoring in other variables such as training practices. If the appropriate place to introduce the variables is now, then let's have that conversation. When do you want our input on the variables that affect the risk? (Tom Ehrlichman)

JD Leahy – We don't see crew helm actions in the momentum and drift model as risk interventions. The same applies to self-repair. Because we are modeling loss of propulsion events in an mechanistic fashion, that means that we need to account, in a simplified fashion, and where possible, the major aspects of what happens after a vessel loses propulsion. External forces like wind and current are included in this, and non-external forces, like ship's momentum, helm actions, and potential for self-repair are all part of that equation.

JD Leahy - In regards to inclusion of variables, when we do the analysis, that will be the time to include different variables to compare between them. That is essentially what the analysis consists of: comparing different versions of model runs with different variables included. Those scenarios could conceivably include what the effects of ships never anchoring or self-repairing looked like. However, those things are part of our best approximation of loss of propulsion events so we feel it's reasonable to include them as a baseline.

There are a number of crew actions that can be taken in an anchor dragging event. In the last seven years only 1 anchor dragging resulted in a grounding. (Laird Hail)

If we are mistaken, and you are at the stage in your model development where you are building in a range of possible behaviors that affect probability of grounding or accident, then this would be the time to factor in the presence of heavily populated fishing areas, which for example would limit the choices of crew to steer in some directions, to avoid major injury or loss of life to smaller boats in a concentrated fishery event. These occur seasonally and periodically throughout your study area. Please clarify when you will be factoring in the non-AIS vessel interactions into the modules you described today. (Tom Ehrlichman)

JD Leahy – We are currently coding the vessel types in the vessel movement module now. At the moment we are working on dependent vessels, and we will be working on non-AIS vessels later in that process.

I don't think we're concerned about including the momentum factor, we understand the statement of the crew action being what actually happens as does engine repair, our request is that you reduce

that factor to reflect real world. You need to reduce it to reflect what actually happens on the water because you don't get crew action in those areas every time. (Tom Ehrlichman)

JD Leahy –The challenge with adjustment factors is to determine an appropriate percentage and to have some support for that percentage in the data. We feel comfortable around self-repair times for example, the data show that not all ships repair themselves. For the crew actions part, we can discuss and think about ways to incorporate a reduction factor but it's not clear where that data would come from to support that or that it would be appropriate.

Will vessel collision definition include two vessels at anchor? (Lovel Pratt)

JD Leahy – Yes, we'll adjust the definition accordingly.

Will use of the 2014 data include climate change related changes in weather patterns? (Lovel Pratt)

JD Leahy – Estimating future changes in weather patterns is out of scope, we plan use the data from the Salish Sea Model. We are using 2014 as a placeholder for building the model but the date range used in the analyses will be determined during each analysis projects.

Will indirect hazards include human error? (Lovel Pratt)

JD Leahy –Probabilities are based on real accidents, some of which had human error as a contributing factor. However, we will not be assigning a model value to human error to modify probabilities.

Are recent regulatory changes to reduce risk, such as Subchapter M, taken into account? (Laird Hail)

JD Leahy – They are not going to be taken into account in an individual fashion. Unlike human error, regulatory changes like Subchapter M have an implementation date. When we look at the geographic and temporal range of accident data to create accident probabilities, those types of changes will be considered. Subchapter M itself is a recent domestic change so we won't be able to narrow our accident data set to only include US incidents post Subchapter M.

Regarding the scope for the 2 analyses -- the scope for the tug escort analysis will be reviewed and approved by the Pilotage Commission. There is no "peer review" identified for the ERTV effectiveness analysis (only an internal review of public comments). Recommend that Ecology identify a peer review for the draft scope of the ERTV effectiveness analysis. (Lovel Pratt)

In regards to the previous question on weather data, one suggestion is to conduct a comparative analysis of 2014 to 2021 to see if there are any significant changes in weather patterns. If there are, it would be helpful to at least define what that difference is. (Lovel Pratt)

There was an incident involving the coal carrier Continental Spirit that lost power when trying to make turn to west when southbound at Eastpoint. It continued straight as was suggested is common, but in this case would have grounded on reef off Patos Island if not for emergency deployment of anchor. The idea of self-correcting in the middle of a turn is challenging. There are some limitations of good faith efforts by the master to avoid grounding. The recent Clear Seas report on incidents in Canada found bulkers to have the highest number of incidents amongst deep drafts. I'd like to see laden and unladen bulkers be included in this model in that they can be 2x DWT of tanker limitations. (Fred Felleman)

JD Leahy – If a loss of propulsion occurs during a turn, that can be very bad timing for the vessel. Unfortunately, the model is only able to look at course information, and not heading so we aren't able to capture all of that complexity.

I also want to point out that different types of vessel actions can have unintended consequences. The crew action we're discussing with a course change is not necessarily a risk reduction, it may or may not reduce risk. Also, we are definitely including bulkers in the model.