

Vessel Movement Module: Factors Associated with Track Selection
Technical Session
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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.

Vessel Type Discussion

Can you describe what's included in your vessel category? Does it include commercial whale watching vessels? (Todd Hass)

JD Leahy: These are smaller passenger vessels that only carry passengers (no vehicles) and run a round trip out of single port. This would include whale watch vessels but not ferries.

What's the description for fishing vessels smaller than 40 meters? (Tom Ehrlichman)

JD Leahy: These are local fishing vessels that fish within the Salish Sea or transit to or from. Large fishing vessels are ships that fish in ocean waters and they are transiting, not usually fishing within the Salish Sea. They will behave more like ships and less like a fishing boat.

I assume you are only listing vessel types that have AIS? And is there something qualitatively different about certain types of fishing vessels, like treaty tribe fishing vessels, where it would make sense to break that out as a different category? If you are going non-AIS, it seems like you would have an easier time getting tracks of treaty fishing vessels because they are more frequent and tend to be in a certain geographic location. (Tom Ehrlichman)

JD Leahy: Our list of vessel types is meant to be inclusive of all vessel types we are going to be modeling, including non-AIS vessels. We are oriented toward AIS data right now however, so a lot of these are built with that in mind. Regarding your comment on treaty fishing vessels, that is one of the reasons we are hoping to have these discussions. We are interested in identifying distinct differences between vessels that behave differently in the Sound. We are attempting to break out vessel types based on 1) those we are interested in in terms of spill risk and 2) those that have distinguishable differences in their behaviors. Feedback from you and others on the call will be key to figure out if we can break tribal vessels into a separate category.

Regarding the recreational vessel category, for calculating risk to navigation, recreational fishing vessels can be a significant factor when a fishery opens. A hundred boats may come for an opener, like for example around Port Townsend. And this can prohibit transit of larger vessels. This is a big issue on the Columbia River with sturgeon fishing. None of these smaller vessels have AIS, but seems like including these vessels would be important for assessing risk to navigation. (Don Noviello)

Yachts and sailboats behave differently than those engaged in recreational fishing, which seem to cluster around fishing areas, like the south side of places like San Juan Island, Commencement Bay, and Alki Point. I suggest you take note of concentrations at certain times of the year, though I'm not sure how best to do that. (Don Noviello)

JD Leahy: When we are looking at AIS data, it's hard to know what vessels are up to. In this instance, we might be released from that burden because a large portion won't be carrying AIS, so we need to represent them another way.

Coast Guard VTS may have radar data on this, because they try to track it if it interferes with the shipping lanes. (Don Noviello)

JD Leahy: Thanks for that suggestion.

If we are looking at predictors and trying to assess behaviors and risk, I think you need to qualify this risk in terms of: 1) is this vessel under pilotage or not, and 2) whether or not the vessel is a Jones Act vessel or sailing under a foreign flag. These factors can have an impact on risk. (Rick LaBlond)

JD Leahy: The vessel types we are discussing are one way to organize vessels to allow us to populate our vessel movement module with reasonable approximation of vessels that are moving in certain areas. Each specific vessel that we simulate will have its own characteristics that would include these factors. These factors will be available to us, and some could be relevant to track selection. Some could, as you suggest, also be relevant to accident potential, so we'll be looking at those down the road.

I'm impressed by the degree to which these categories are broken down, but I'm not clear on how they are able to be distinguished on AIS. How do you get to this level of resolution? How do you account for disparities between US and Canadian practices? In the last VTRA, we established the timeframe and location of regattas, and also the patterns behind the presence of certain recreational vessels. For track line estimation, I've been looking at Haro Strait, and the same vessel will have different track lines based on if it has leading or overtaking traffic going on. Track selection is not only route specific but also transit specific. (Fred Felleman)

JD Leahy: That is one of the main challenges we see around this type of project. For many of these categories, there is a lot of info out there. For non-tug type vessels, we are looking at AIS vessel info and cross-referencing it with different databases: Marine Exchange, Lloyd's database, CG vessel database. From there we are creating a series of rules that merges, evaluates, and compares the info that exists for those vessels. For tug type vessels, we are going through by hand and identifying the tugs based on their configuration, who they work for, their area of operation, and assigning them one of these categories. We should be able to get most, but not all vessels through this approach.

Adam Byrd: We are creating a discrete list of vessels and manually assigning type based on what we know about their operation. We use different databases to do this. In addition to the ones that JD mentioned, we are also using BC Chamber of Shipping, and Canadian databases as well as internal Ecology databases.

JD Leahy: Regarding the question about how tracks may be dynamically affected by the presence of another vessel, right now we don't have a clear strategy for addressing that. Those tracks that are closer to land would still be represented in the simulation but it's not necessarily clear on how to relate that closer to shore track to the presence of another vessel.

I'm based in Victoria and work for University of Victoria, and we have been looking at collecting data on recreational fishing, particularly in the Strait of Juan de Fuca on the Canadian side. It's interesting how concentrated the vessels can be. Just something to be aware of with things like fishing openings. They can hang around in concentrations. We are collecting the data using counters and trying to see how many vessels are carrying AIS. (Norma Serra)

JD Leahy: Norma has been doing some really interesting research on vessels in the Salish Sea and looking at which vessels are transmitting AIS and which aren't. Thanks for being on the call and look forward to staying in touch on these topics.

I was also impressed by the resolution of the vessel types. Would these vessel types be put into larger categories for the analysis, or will they all be at this more detailed level? Will the risk be modeled together or separately? (Salma Abdel-Raheem)

JD Leahy: We are looking at this level of resolution so that we can accurately distribute vessels around the waterway in our simulation. We have been directed to assess risk of oil spill for covered vessels, which is a smaller list of categories. At a minimum, we'll need to be able to report our results as they relate to covered vessels. We will also be assuring that our categories can be reported out in terms of the categories established by BC Pacific States, via their data dictionary, which is used to compare incidents across jurisdictions.

I want to thank JD and the rest of your team for the degree of thoughtfulness and thoroughness, and the time you are spending in the outreach when talking to all of us. I want to reference the earlier comment that I made. Do recreational boats create conditions that larger vessels are going to react to? Yes. Our tribal fisherman have to make decisions about leaving behind a net as a vessel approaches or pulling in a net and getting out of the way. We have concentrations of recreational fishing, so I'm furthering my argument that you need to look at tribal vessels as a separate category. Each tribe has its own fishery department that gives licenses to each vessel. You could determine when they go out and when that occurs, particularly during crab or shrimp season. You should add to your list of sources the WDFW fish tickets, and tribal fishery departments themselves. You can contact those fishery managers and they can give you that info. Even if tribes won't give you that info, we ask that you create the category anyways. (Tom Ehrlichman)

I wanted to point out the unique behavior of whale watch vessels and their somewhat predictable concentration levels. They don't make a typical transit, and there is often an overlap with the behavior of sports fishing vessels. I think whale watching should be considered a separate category from tour vessels. When these vessels follow the whales, that can bring them to the shipping lanes, particularly near Turn Point. There seems to be a value in representing this since they are often clustered with vessels that do have AIS. (Fred Felleman)

JD Leahy: The thinking around this category was that there are a large number of commercial passenger vessels that are engaged in tourism, and a large number of those that are engaged in whale watching. Our working definition for this category is commercial passenger vessels that leave port and do something not generally typical or patterned, and then return to the same port they departed out of. We are wary of creating a category that relies on an occupation like whale watching, as vessels we that sometimes whale watch may also do other things at other times of year.

I understand that you are working within the box that you've got. The transit to and from the whales is much more orderly than the behavior once they get to the whales. I don't think it's too dissimilar from the tribal fishing where you have known concentrations transiting to and from. I'm impressed by the level of breakdown that you are doing, but there is a big difference between Argosy Cruises and Western Prince. One does a harbor tour and the other is chasing whales. (Fred Felleman)

Similar question to Fred, was interested in how vessels that don't have a set route are accounted for? (Rein Attemann)

JD Leahy: We are still working on how to best approach that. We have been considering breaking down vessel types into those that have more set routes, and those that don't, but we don't have a fleshed out strategy in mind yet for how to represent the vessels that don't tend to have set routes.

Other Track Selection Factors

In another session you talked about dependent vessels (like tug escorts) because they aren't used until something else happens, like the arrival and departure of other vessels. Not sure if this impacts track selection or not. (Tom Ehrlichman)

JD Leahy: We have a specific discussion event planned to talk about dependent vessels ([register here](#)). For today's discussion, are thinking about things like when it's dark out, are vessels operating at different speeds? Or other factors that align with different behaviors. One suggestion we received on this is whether they are under escort or not, because ships may take a different approach or slow down based on being under escort.

Cargo ships will often slow down in dense fog, but I haven't noticed a lot else in terms of external factors that affect vessels. But recreational and whale watch vessels are more weather dependent. Every day is not the same, and based on my observations, there seems to be an increase in traffic on the weekends. You might want to look at that, but I'm pretty confident that occurs. One of the things that has struck me is that by averaging vessel traffic over the course of a year, you really miss the times where you might have an accident. Further, by creating an idealized or averaged track, you are missing the extremes, which are most relevant to spill risk. (Fred Felleman)

Alex Suchar: We saw this approach of averaging tracks in previous studies, and we decided we didn't want to follow suit. In our vessel movement module, each vessel will have its own unique track. Instead of one line describing the average track that all the vessels take, we'll have multiple separate unique tracks. We won't use an average value. If we can identify a difference in the day of the week in the AIS data, it will exist in our simulation. We will definitely look into that.

I would like to suggest two factors to be considered as potentially meaningful: 1. Whale sightings in real time through WRAS (Whale Report Alert System) 2). Vessel incidents in which an accident was averted for whatever reason but recorded as an incident. (Rein Attemann)

JD Leahy: The whale sightings one is an interesting idea. A challenge may be access to the data and the lack of a long history associated with that data collection effort. With regard to looking at vessel incidents, we will look at these as part of the accident module. Right now we are focused on vessel movement factors.

Fisheries openings, especially in tribal context. Areas like near Vendovi and Samish Bay that have a very intensive series of non-AIS fishing vessels that could influence decisions about which anchorage to use and what route to take. We are seeing a willingness to take into account fisheries openings in certain areas by other agencies. I encourage you to look at the data. Some of these fishery openings occur in spring, summer, or early fall, which might have an influence on track behavior. All of this information can be known by talking to our tribal fishery managers. (Tom Ehrlichman)

JD Leahy: Thanks, seems like fishery openings could be an important piece.

DFO and other organizations in Canada have quite a network of hydrophones. There could be activity around these, when they have to be checked every 3 months or so. Some of the ones in Canada are in the shipping lanes. For whale watching, there are some known hot spots like Race Rocks, which is a very well-known area for the whale watchers. Might be helpful to approach the whale watching community to see if they would share these locations. There are areas in the Gulf Islands and south of Victoria where deep draft vessels anchor, and there might be movement of supporting vessels as well. (Norma Serra)

JD Leahy: Thanks for these comments.