Technical Session Notes
Vessel Movement Module: Modeling vessels that do not transmit AIS data
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Jennifer Wladichuk, *JASCO Applied Sciences*	Tom Ehrlichman, *Swinomish Indian Tribal Community*
John Wright, *Polar Tankers*	Valerie Chu, *US Fish and Wildlife Service*

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.

Discussion of vessels that operate without transmitting AIS

The key vessel type to consider is barges. This is a fundamental question for all the risk assessments that have been conducted to date and also for yours. In addition to determining the presence or absence of barges there is also the question whether the barge is laden. We're frustrated with how this question is being addressed for the Vessel Trend Synopsis and how Ecology isn't using the data that's available. How are you going to handle this challenge? Specifically, how can you verify whether a tug has a barge and whether the barge is laden? (Fred Felleman)

JD Leahy: Determining a strategy for handling the presence or absence of barges, and also the laden status of tank vessels are both important parts of this project. However, neither are linked to the discussion we have planned for today, where we are focusing on self-propelled vessels that don't transmit AIS. Towed barges are always linked to a vessel when they are underway, and the vessel engaged in towing will show an AIS signal.

Alex Suchar: Our current focus is to make sure we can model how vessels are moving in the system. We have AIS information coming from the towing vessels, which allows us to model routes. You are right that there is a need to figure out how to model whether a barge is there or not, and that is on our list, but we haven't dug into it yet. I'm sure we'll have future discussions on this. We want to model it in a way that makes sense based on the data available.

There are various types of government vessels that don't transmit AIS or do so at their discretion. (Blair Bouma)

JD Leahy: My understanding is that a few years ago the US Navy undertook a policy change where they would transmit AIS in coastal waters. Have you noticed a change in Navy vessels using AIS more than they used to?

They do transmit more, but you can't assume they transmit all the time. Same with the Coast Guard, Customs and Border Patrol and a few others. (Blair Bouma)

I'd just note that military vessels are usually able to be identified by numbers displayed, not names. Canadian military boats are more likely named. It is also my understanding is the new WDFW regulations will require all whale watching vessels to have AIS. (Fred Felleman)

JD Leahy: I did see that in the draft rules as well. It's a couple years out but it could be an interesting opportunity to validate some assumptions that we put into place.

Another vessel type to look at is passenger vessels, in particular whale watching vessels. In Canada we have a bunch of small inflatable ones that are under 8 meters long. Some of them may voluntarily carry AIS. I think similar rules exist in the US, but Canadian regulations are weight and passenger dependent. (Norma Serra)

JD Leahy: That's an interesting one because there are a fair number of small whale watch vessels that do transmit and others that do not. I'm interested to hear from others about the US whale watching fleets and what percentage don't use AIS.

I'm with the Fish and Wildlife Service, and I don't know too much about whale watching but I do know about toxicology. What biological or ecological impacts are you considering in your model? (Valerie Chu)

JD Leahy: More information on this topic is available in previous presentations, as this isn't our focus today. We are tasked with assessing oil spill risk, and we are focusing on oil type, location, and consequence.

Supplementary information: The output of this model will be the quantity, type, and location of simulated oil spills generated by the model. Those outputs could be used for deeper analysis as appropriate. Additional information on this topic can be found in this 4 minute clip from our July presentation on modeling approach.

Are the ships that pull log booms regularly AIS-reporting ships? (Tom Ehrlichman)

JD Leahy: Tugs over 26 feet in the US are required to transmit AIS. I think there are some smaller tugs that move log booms around in areas that you may be concerned with, but I'm not positive about that. There may be smaller tugs out there that aren't transmitting.

Blair Bouma: With the log towing, just about always in our areas, they do transmit AIS. An exception is the small "log broncs" that put together the rafts. The tugs that pull logs around are almost always transmitting AIS.

Thank you for including tribal fishing vessels (non-AIS) as a vessel type in your study. These vessels are perhaps best regarded as distinct types or groups of vessels based on the tribal origin; vessels of one particular tribe will tend to originate and end their trips from specific locations (tribal docks or particular marinas) on a repeat basis. Thus, breaking out "tribal fishing vessels" into subgroups identified by tribe should help you plot origin and return home base for particular sets of those vessels. As to destinations and routes, tribal data and fish tickets will be a good way to review and make judgments about cyclical or seasonal patterns of destinations, and also likely congregations of tribal vessels during fishery openings. (Tom Ehrlichman)

Can you provide a recap of what you do after each of these webinars? When you take in this info, how is it synthesized or addressed? (Tom Ehrlichman)

JD Leahy: After these sessions we talk through what happened and the suggestions made. Some of these are things we revisit again when we dig deeper into a given topic, and some are things we mark for further investigation. We also take notes so we have a record of these conversations, and those will be posted for people to come back to. The November 19th webinar, on Vessel Movement Module Updates, will include an update and summary of these conversations and comments. In addition, we are writing everything into a comprehensive document so that people can see how we are addressing things.

Is there an opportunity after these webinars to have further discussion about some of these topics? You are going to have to make some choices and get creative within your resources to put together a picture of non-AIS vessels. You are going to make decisions about how much time you spend on this and we have an interest in seeing an accurate portrayal of our fishery. At what point will you have a decision on if you are portraying Swinomish fishing vessels, and when can we provide input on that decision? What's your plan on when you are making those preliminary decisions? (Tom Ehrlichman)

JD Leahy: All those details will be provided in that summary documentation which will be available for people to provide feedback on. Some topics we will also cover at the upcoming vessel movement presentation, and there will be time to provide feedback after those. As you mention, we have to balance the workload and be careful with how deep we dig into specific components that could be research projects in their own right. Our framework-based approach to this project gives us the flexibility to create placeholders within the model, and wait to take the time to flesh it out until later. This is going to be an iterative process.

Adam Byrd: One of the advantages of this effort is that we are developing a living product, so throughout the years we are going to be refining and making changes. We are trying to maintain flexibility in how we are designing and implementing everything.

Charter or recreational vessels are also on the water, and they can have pretty routine movements. Not sure if they have AIS though. (Jennifer Wladichuk)

JD Leahy: I do think sport fishing vessels are an interesting part of the puzzle. Right now they are lumped into recreational fishing vessels. It will be interesting for us to keep our eye out for different patterns.

Discussion of strategies for identifying data sources for non-AIS vessels, and ways to present their movements in our movement module

It may be worthwhile to think about how these things were done before we had the luxury of dots on screens. I think developing a small questionnaire with the type of data you are looking for like vessel size and frequency, that could get you data that could help. Wouldn't give you as much info as dots on the screen, but would be helpful. Could do it when people register their boats or register for fishing licenses. (Sol Kohlhaas)

Perhaps requiring commercial charter fishing vessels to transmit AIS could at least identify "pleasure" fishing vessel movements and timing of year. While I was on the water this past summer for research, the majority of vessels in the vicinity were small recreational/sports/charter vessels. (Jennifer Wladichuk)

JD Leahy: Does anyone on the modeling team want to discuss this how we might go about modeling vessel behavior in the absence of AIS? Tom mentioned mapping locations of home ports and operational areas as one strategy.

Alex Suchar: There are many possible ways, and the suggestions we have heard today have opened the door to some new approaches. We have considered representing these non-AIS vessels not with specific tracks but with density on the water. We could estimate a certain number of vessels in a location, and go from there. This was our initial thought. Other ideas we are considering include using the number of fishing vessels with AIS to estimate how many are not carrying AIS and extrapolate these numbers to compensate for the non AIS vessels. There are a number of different approaches here, but it will be important to acknowledge that we might not be able to do it perfectly. Norma mentioned an interesting study with non AIS data in Canadian waters, so another idea was to extrapolate from her results.

Norma Serra: Here is a publication where they use on the water questionnaires to collect recreational boating in Gulf Islands (Grey, et al, 2010): Spatial characterization of marine recreational boating: Exploring the use of an on-the-water questionnaire for a case study in the Pacific Northwest (doi:10.1016/j.marpol.2010.10.005)

Regattas are scheduled and have known routes which were used in previous VTRAs. (Fred Felleman)

For recreational fishing boats, one possible tool is a map that's published by Evergreen Pacific called Fishing Guide to Washington Waters. It shows by tidal cycle where fish concentrations are and where you might likely encounter recreational fishing vessels. That might be some kind of a guide for untracked vessels in these locations. (Don Noviello)