



*Question & Answer Session at the ICES Advice Presentation
– Thursday 28 May 2021*

Katrine Kærsgaard (Denmark (in respect of the Faroe Islands and Greenland)): I was just wondering whether ICES has looked into other factors affecting the salmon stock. Because in your previous advice, you always said that considering the reduced fisheries, and there haven't been any changes in the stock, that there should be other factors affecting the salmon stock, and whether you can assess those other factors' impacts versus fisheries. Thank you.

Dennis Ensing (WGNAS Chair): It's a very pertinent question, and you're absolutely right, other factors are impacting on Atlantic salmon abundance. You would probably be talking about predation, climate change barriers. The thing is, it's quite difficult to model on a large scale, but what is interesting in this respect, is that we are moving into a new full-lifecycle model for Atlantic salmon, and we will be doing the exercise with that.

So, in time, we will have a completely new assessment framework, and that will allow us a lot more flexibility of what data we use. That would mean that if we have good data on things like predation, you can then bring it into that model, and you can build that model up and feed that in and use it.

As it stands, as you have seen, for instance, we assume a natural mortality value of 3% per month at sea. But that is a constant. It's based on something. It's not that we just decided to pull that out of a hat. It's based on research. But models do not allow us that flexibility yet, but they will shortly. So, I have created a few models because of their flexibility, and we can then really start to bring all those factors in. Of course, it depends on good data.

And of course, there is a lot of research happening. I know that a lot of Parties here spend a lot of money on looking into marine survival issues. What is it? What are the factors? Where do they happen? And the new model will allow us to put that into our advice in the future, hopefully.

Maria Strandgård Rasmussen (Denmark (in respect of the Faroe Islands and Greenland)): I just had a question regarding the PFA model. I'm looking at table seven for the Atlantic salmon at West Greenland. It's the output from the PFA model. I was just wondering about whether the input data is regionally summed. If it's based on regionally summed data, how can that account for variability within the region?

Dennis Ensing (WGNAS Chair): Yes, but this is from the PFA model. The input for that, it would be river returns, yes. Every jurisdiction will have its index rivers, and that's where that data comes from, and that is input in the model, and this is then what you get as an output.

Maria Strandgård Rasmussen (Denmark (in respect of the Faroe Islands and Greenland)): I can try to clarify a bit further. If the output is summed by region, then you bypass the variability that's within one region. For example, if the predation picture is higher for one area within the region than the other, then you cannot get the sum value for the output saying that it's way below the...

Dennis Ensing (WGNAS Chair): No, I see what you mean. We know that there is variability. Unfortunately, the model is not allowing us to account for that, and this is probably the reason for wanting to move into this full-lifecycle model, because it will give us a lot of flexibility to bring those things in. So, yes, we know the constraints of the model. There are different things in the model as well that we have as constant, or questions, and this is just the evolution of

modelling. We've been using this model for a couple of years now, and it's not ideal, and I absolutely agree with that. This is why we want to improve it. This is why we're very keen to move to a new model which allows us a lot of flexibility to look at those. There're so many things we can do in the new model, that we can't with this one, so I hope that answers your question. Even the new model will be suboptimal. That's the caveat with the model, it never truly reflects what is happening, it just tries to be as close as possible. And the new model should get us closer to that and allow us a lot more flexibility.

Maria Strandgård Rasmussen (Denmark (in respect of the Faroe Islands and Greenland)): Yes, thank you so much for your reply.

Tim Sheehan (United States): Thank you very much for the presentation. I just wanted to clarify, I was a little confused by the last question and the last answer. I was wondering if you could provide a little commentary on how the model works, where the model as I understand it, is a summation.

You have regional inputs that are the summation of river returns, spawning returns, that are lumped together for the U.S., and then that goes up and is added with the, say, rest of North America, and those are the primary inputs for the model. So, I didn't understand the question and the answer about individual rivers not really being averaged or summed across a region, where they're all contributing to the region totals.

I think that individual rivers, where we have information, it is informing the model, and it is providing a picture of what's going on for that region. So, I was wondering if you could talk about that, how individual rivers play into the model, and how the regional estimates of, say, spawning as an input are used within the modelling.

Dennis Ensing (WGNAS Chair): I think you've pretty much already given the answer here yourself. Different regions are represented. Every region will have multiple rivers, or hopefully at least one, of where the returners, where the spawners are. And we derive a lot of our information for the model from those rivers as well, so we know about smolt age, the migration, the average of that, the midpoint of that, spawners, marine survival we know for those rivers.

And they are then indicative of those regions that they represent. Now, that means that not every region is as well represented as we want. In an ideal world, you would have every river assessed, but that is just not feasible, that is impossible to do. The cost alone and the infrastructure alone would be prohibitive. But all that information is used in the data.

In terms of variability, there will be variability between years, but certainly if I look at our own river here, that is hard data. I know that's not the case on some rivers. Some rivers are estimates. There will be spawner estimates because it's done, for instance, using catch statistics, angling data. In Ireland, we have an index river which has a full trapping facility, so we literally get everything that ascends the river. So, we can be pretty happy with that input.

In some regions, it has to be a subset of the rivers in a region that are used in the model, and I think that when we move model, we're going to be dependent on rivers, but we can take other data as well, that has more of a regional signal.

Serge Doucet (NASCO President): I would like to thank Dennis for his presentations, and I thank you for the questions. And with that, I believe that I will bring this webinar to a close. Thank you, everyone.