

## QUESTIONS & ANSWERS

\* Transcribed

### *How protecting salmon diversity promotes healthy returns*

#### **Michael Webster**

Senior Program Officer, Gordon and Betty Moore Foundation

**Question:** (24:38) I'd like to know how ocean warming is going to affect all the work that you have done?

**Answer:** (24:49, Webster) The honest answer is, I've got no idea. I've got no idea how precipitation is going to affect it. I've got no idea how terrestrial warming, or changes in ocean predators is going to affect this. But what I think the data here and data from other sources show us is that if you want to have the best chance of getting through that with continued strong, healthy populations, you need to have as many lottery tickets as you can get. And if all these individual stocks are lottery tickets, you want those to be highly diverse, thriving populations so that when they get hit by changes that we haven't anticipated, they've got the best chance possible of getting through the other side with us still having strong salmon runs.

**Answer:** (25:34, Brian Riddell) When Dave Peacock and I, a couple of years ago, were talking, I think one of the things about climate change— We thought that coming further north up to the Skeena, we had a few more years to sort of prepare and, you know, how quickly is ocean warming and climate change going to affect the Skeena? Well, I think a couple of years ago we got quite a shock when it was hit as hard as many of the southern stocks. So, I think the concern about ocean warming and climate change is very real up here right now. So, it's a good question.

**Answer:** (26:07, Webster) It's also worth mentioning [inaudible] is having a lot of problems with climate change, which is one of our northern most salmon systems. So, it's not going to be a simple pattern of south suffers from climate, north doesn't.

**Question:** (26:23) Thank you. That was an excellent presentation, Michael. Very informative. I'm curious, there's a thought in my mind that maintaining this diversity could actually, with climate change and different oceanic conditions, favour populations that are not necessarily producing a lot of salmon today. But the environmental conditions change over time to boost those populations. I was just wondering your thoughts on that.

**Answer:** (26:52, Webster) It's certainly possible. From the Bristol Bay example, what you see is the composition does change over time. There have been environmental changes over that time as well, so in a different suite of environmental conditions, you would expect potentially a different suite of populations. Some to do better, some to do worse. I think in general, I agree with that. There's also real limits to these populations. There's a certain extent to how much raw material you have to work with. You can't take a tiny stream and have absolutely enormous populations. There's going to be some constraints within that for sure.

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**Question:** (27:27) This question is for Jack [Stanford] as well. This summer we had, look at my toes—they're tanned. Not very often we get a great summer like we had here in the Bulkley Valley. A lot of people enjoyed it, but speaking with the pilots and some of the guide outfitters that have flown around a lot of the mountains, and looking at the various glaciers—and I spend a lot of time on mountains and glaciers—is that we probably had as much ice loss this summer than we had in the last five years. What I noticed with the salmon returning, we had hot weather, the fact that the rivers here actually increased in volume. I'm not too sure about the temperature. It probably dropped a little bit, which was good from the salmon point of view. So, we have this very interesting healthy set of systems because we have ice in the mountains. I think we lose ice, we lose our fish. So, our future here in the long term is not looking very good. At least lose a significant population of the fish anyway. They're always going to be around, but probably not at a level that we enjoy today. You mentioned about the Yukon and I'm very interested in that. I noticed that summers there are, the effects of climate change are actually exponentially exaggerated more up north than they are here. I was just wondering what you see in the future with regards to the rapid decrease of our ice fields and implications it has on our wild stock here.

**Answer:** (28:55, Webster) Your initial intuition is exactly right, that is a much better question for Jack. And his talk is actually going to look exactly at these kinds of questions about what are some of the predictions about climate change in the Skeena system and how might that affect salmon populations. One, I don't think I could do the question justice and, two, I think in a few hours we're going to get something of an answer to that, so I guess I would encourage you to hold off on that and see what Jack has to say, because I think he'll be much more illuminating than I would be.

**Question:** (29:30) Michael, prior to the Babine enhancement facilities going in, the fishery was fairly robust and depended upon dozens of sockeye stocks, as well as all of the different species. And this year's devastating sockeye returns impact community and everything else. This is sort of being on the wrong side of that knife blade and wouldn't that show that if we really wanted to understand what our options are as a community and a watershed that we would have to do the analysis of these risk factors that you just outlined as far as diversity, and to the same scale as was done to Bristol Bay? That we really need to do that research about diversity over long time periods and we do have some long time set information here, it's probably not as good as Bristol Bay, but maybe you or Brian can answer that question. Aren't we seeing the affects of that loss of diversity already on the Skeena? What can we do about it? Do we need to do that kind of research to understand what our options aren't?

**Answer:** (30:49, Webster) I just want to reiterate the caveat I gave before. I'm no expert on the Skeena system, so I can't go too far towards answering your question or I'll be getting well out of my depth. I think generally the way you described things is consistent with how I think about them. And I think as you move towards, what we've seen in California for example, moving toward an optimization simplification of salmon systems towards single large populations rather than many small populations. I think that over time we've seen the same kind of brittleness or high variability in those salmon systems, and to the extent that has happened with the Babine enhancement within the

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Skeena, I think you may well be right there. And I guess I would encourage you to think about whether that might be true to look at the data and to think through, are there implications there for how you want to think about long term resilience within the system in terms of how you would want to manage those different stocks? I think Mark [Saunders] talked yesterday about shifting the priorities of management towards, I think he used the term, weak stock management or management for some of the small stocks. Actually, I guess I would argue what you might be looking for is something slightly different than that. Just thinking about weak stocks, and I think this is probably what Mark meant, just looking at those that are most productive, I think what the Bristol Bay example points us towards is thinking about a complex of different populations and trying to understand how they are interacting with each other and what kind of emergent properties you're getting. From the perspective of trying to promote healthy salmon returns and a healthy salmon watershed, it's at that emergent property level where hopefully some of your hardest decisions are being made and thinking through how you want those emergent properties to last through the future.