DFO's Magic Machine – Science into Practice

By Helen Forsey (May 2021)

"Everything we do is science-based." That's the standard response of the Department of Fisheries and Oceans to doubts or criticisms about how they manage our fisheries.

Well, my B.Sc. degree doesn't make me a scientist, but I do have enough scientific background to know when science is being applied and when it is not. And a lot of what DFO does in fishery management falls into that latter category.

The Department's website, news releases and interviews constantly reiterate their claim that all their policies, plans and regulations are determined by "the science." Of course, calling it "the science" tends to give the impression that fisheries science is one big homogeneous entity with no uncertainties, no disconnects and no disagreements – which if course is nonsense. But even apart from that, their claim is suspect.

Yes, DFO employs highly qualified fishery scientists who do a lot of valid and important work in a complex and challenging field. Their competence and dedication is not in question. The problem is something else entirely – the linkage between the science and the practice. Understanding that linkage – what it is and what it should be – goes a long way toward explaining why crises persist with our fish stocks.

This problem is two-fold. First is the question of how the scientific work gets converted into the management policies that govern fish harvesting. The second is how those policies in turn determine what scientific work the Department will undertake or pay attention to.

On the first question, the process by which DFO translates its science into policy and practice is never explained or even really questioned. How do their scientific studies, stock assessments and computer models metamorphose into management policies, allowable catches, quotas and harvest plans?

Apparently we're supposed to believe that "the science" translates flawlessly into sustainable practice simply because they say it does. Is there some mysterious mechanism that reliably produces coherent and practicable harvest plans out of the scientific raw material fed into it? I can picture DFO functionaries pouring "the science" into a big funnel, through which it passes into some kind of magical machine, and – Presto! – out the other end come the required fishery policies, regulations and harvest plans.

Now that obviously can't be how it happens. There is no magic machine that translates "science" into management plans by some invisible process. Instead, it is the *people* in the management system – the DFO fishery managers – who do that translating. They receive the scientific information, and then analyze and interpret it using the lenses the system provides them with.

Like the imaginary machine, the actual process is also invisible, making it a challenge for critics to zero in on what is wrong. But a closer look shows that DFO's translation of science into practice is based on and bounded by the assumptions inherent in the Department's management system, which revolves around quotas.

As fishery policy analyst Barry Darby explains in his paper, *Changing Course*, quota-based management is a form of output control, setting total allowable catches and quotas for each stock. What's wrong with that? It's unworkable because it imposes a supposed "solution" – TACs and quotas – without first properly identifying and analyzing the problems it's meant to solve. In other words, it puts the cart before the horse.

When you start from the assumption that only a quota system can prevent overfishing, all the science fed into the process is analyzed through that lens and translated on that basis. The only questions asked are how much fish is there, and how much we can harvest. This can lead to massive errors in policy.

For example, if "the science" reveals a scarcity of cod, DFO applies a policy of "keeping removals as low as possible" by reducing TACs and quotas. But if the scarcity is caused by starvation due to an insufficient

food supply, keeping removals low is exactly the wrong thing to do. In fact, reducing the catch will leave more fish competing for the limited food available, leading to an increase in natural mortality and perhaps in total mortality. The result – as we have been seeing in 2J3KL – is continuing stagnation of stock biomass and poor condition of the fish.

What *would* help in that case is the opposite policy: to relieve the pressure on the stock by *increasing the catch, using selective harvest methods to target the middle-sized fish* so as to allow the older, larger, fecund fish to thrive, reproduce prolifically and actually grow the stock.

The second issue is closely related. Not only does science influence policy, but the policies chosen also effectively determine what science will be done. When DFO's overarching policy is focused on controlling the amount of fish caught, the Department will naturally develop and support the types of scientific study and analysis that help them do that. Unfortunately, that policy marginalizes other types of research which are deemed irrelevant to the quota-oriented framework.

The linkage between science and policy is not a one-way flow; it must incorporate the feedback loops that good management and good science provide. Stock assessments and data collection are only part of a whole range of reality-based scientific work. Science for sustainability needs to go well beyond the kind of quantitative material that shapes computer models and reference points; it must prioritize exploratory studies and innovative research and analysis that can inform more workable and sustainable policies.

Freed from the constraints of a policy framework that sees allowable catches and quotas as the only way to achieve sustainability, fisheries scientists could explore a full range of potential causes of a problem like decreasing stock biomass or poor condition of individual fish. The resulting scientific findings could then be used to adjust policies, regulations and harvest plans, which when implemented by harvesters would in turn provide feedback and information for corrections and improvements, and provide the basis for follow-up and related science.

That is the kind of fishery governance we need – a system based on the recognition that ends and means cannot be separated. If our fundamental goal is a sustainable marine environment and a sustainable fishery, then regulating the "whos, hows, whens and wheres" of fishing effort is far more relevant than calculating computer-modeled reference points in order to predetermine allowable harvest numbers.

In the fishery, the means largely determine what the ends will be. Our current system of quota-based management imposes a narrow definition of fishery science – one that limits our ability to see and understand what is really going on in the ocean and what we can do about it. That same quota-based system also demands a narrowing down of goals to fit numerical structures and targets – arbitrary measures of success which have in fact led to decades of failure.

But we can change this. Instead of pretending that "the science" is all-inclusive and that it automatically leads to sustainable fishery management, let's recognize that there is no magic machine. Let's push for a policy framework that supports and uses the whole range of relevant science. Then we will be able to develop and refine practical policies and harvest plans that respect the dynamic nature of the marine ecosystem, and honour our role as human predators in keeping it truly sustainable.

Helen Forsey is a writer based in St. John's, with a background in agriculture, rural issues and public policy.