Understanding the science behind the super-trawler's quota

Jon Sumby, Hobart, September 2012.

I recently had the opportunity to interview a high-level source about fisheries management. At the time of interview he was the Director of a major Australian Commonwealth scientific research and policy organisation with a marine focus, and this is what he had to say about the management process:

"… in the fisheries area, ah well, I think that it's really hard for policymakers to understand what the scientists mean when they say:

'Well the total allowable catch or the total sustained yield for this population is a figure somewhere between three tonnes and eleven and a half tonnes'.

[policymaker] 'Well you know, why can't you just give me a number?'

'Well I can't give you a number because the statistics show that's the range of figures that you get every time you run the models of it. Somewhere between three and eleven tonnes.'

And then that's, that's also treated as being:

'Why can't they give me a better answer than that? So let's pick a number right in the middle'."

If we apply the above to the super-trawler quota, this is how it works out:
Using one method (the NLS) a scientist (Francisco Neira) worked out the jack mackerel biomass as being somewhere between 114,943 and 168,817 tonnes. The halfway point between these numbers is 141,880 tonnes and it just so happens that the biomass estimate used in determining the super-trawler quota was set at 141,500 tonnes. And that is it. That is the science behind the quota for the super-trawler.

What has been missing from the debate is that Neira also ran a different analysis method (the GLM), and this model estimated that the jack mackerel biomass was somewhere between 130,082 and 134,218 tonnes. The highest value in this analysis is less than the final figure used. A prudent manager would realise this and, perhaps, set the assessed biomass as closer to the halfway value of the GLM figures as a more precautionary approach. This, of course, would reduce the quota and threaten the business viability of the super-trawler project for Seafish Tasmania. However, as I show below, a prudent manager would not have set any quota at all.

'Data, data, data, I can't make bricks without clay!'
I have read Neira's 2011 report and I consider it well researched, good science. However, as Sherlock Holmes said, one cannot make bricks without clay and Neira's report is seriously flawed - but not by his hand. As an honest scientist Neira very clearly noted the problems with the data, the analysis, and the results. The first, to my mind, is the fact that the data was a by-product of another research project. Now this may seem a trivial point but as every scientist should know, having a proper experimental design to investigate the question being asked is a fundamental part of the scientific method.

Using by-product data is problematic and from this flows the fact that the data used in the report came from fish eggs collected in the wrong place (off the coast of NSW) and at the wrong time of year, outside of the peak spawning season for jack mackerel. Another serious flaw is that the two statistical models used were missing at least two key parameters, because there was no data available for those parameters. It is very difficult to run a statistical model and get a valid result if key variables needed for the model are missing. These are just two of several major problems with the research used to derive the biomass that set the quota for the super-trawler.
The GIGO Principle applies: Garbage In – Garbage Out.

A prudent manager would see this and recognize that Neira's report could only be, at best, a scoping study; a provisional analysis; a 'first guess' report. A prudent manager would set Neira's report aside and order a research project to specifically study jack mackerel. Research like this would take about two years to complete. A prudent manager would set no quota for the super-trawler until this research was done. However, doing this would delay Seafish Tasmania's business plans until at least 2015.

I hear that the Ombudsman is investigating the circumstances around the super-trawler quota. A key question, and one that I hope will be investigated, is why and how the Neira report came to be ordered. Someone wanted a result quick and dirty. Someone found old (2002) research data that included some jack mackerel eggs and successfully arranged it so that this data would be analysed and used to support the super-trawler's quota. Who was behind the scenes in this process and what their purpose was is worth investigating. This is because in order to get a quota the super-trawler needed a Number.

A fact with a capital F

Let's go back in time to 2004. The super-trawler, *Veronica*, is off the coast of NSW and looking to get a quota to take small pelagic fish, like jack mackerel. The public outcry and political actions are the same as today. The Australian Fisheries Management Authority (AFMA) denies the ship a quota on the basis that information about the biomass of the fishery does not exist; there is no Number. The *Veronica* departs in a huff to fish elsewhere, leaving behind dire warnings of business investment being scared off; jobs lost, and lost Government revenue that could help fund schools and hospitals, etc.

Someone learned this lesson well and knew that Seafish Tasmania needed a Number, however poorly derived and rubbery, in order to get a quota for the super-trawler through AFMA. How this happened is, again, something that the Ombudsman is (hopefully) investigating. You can be sure there was no science involved. Neira's report gave a hook that supporters of the super-trawler could hang their arguments from; even though everyone knew it meant nothing in the real world.

What AFMA needed was a scientific result, a Fact, a Number, that it could use in its decision-making process to set a quota that would be 'sustainable' (whatever that means inside AFMA).

What Neira's report did was give AFMA the opportunity to get that Number; a Number that supporters of the super-trawler could point to and say, 'This is scientific' (but, as we know, this Number is just halfway between the lowest and highest numbers derived from seriously flawed research).

Inside the process, this Number was a political tool used to steer the AFMA management protocols toward a favourable result for Seafish Tasmania.

In whose interest?

The super-trawler is an expensive ship to run. Seafish Tasmania already had quota and said it needed a further quota of no less than 10,000 tonnes to make the super-trawler turn a profit. Luckily for Seafish Tasmania, under the allocation rules in AFMA, the quota calculated from the estimated biomass of 141,500 tonnes turns out to be 10,600 tonnes. This amount made the super-trawler a working business venture, anything less than 10,000 tonnes and the super-trawler would not have come to Australia.

What Seafish Tasmania needed was for those numbers to go through the AFMA process and become a real quota allocation. How that process unfolded, or was influenced, is now, hopefully, the subject of the Ombudsman's investigation; or perhaps the subject of a future enquiry.

For the moment, let's speculate about the 141,500 tonne biomass estimate. This number happens to be halfway between the lowest and highest biomass estimates and so is a convenient number

for policymakers to choose but, crucially, it is also the number that gave the 10,000 tonnes of quota that Seafish Tasmania needed to make the super-trawler financially viable.

Again, the question is about who drove the process to derive this biomass estimate and how the relevant committee was convinced to accept that number when at least two people involved were deeply concerned about the size of the quota, how it was derived, and the potential for overfishing. We know that Seafish Tasmania made it clear to the members of the relevant committees that 10,000 tonnes was the minimum amount they needed in order to proceed with their super-trawler plan, so it didn't really matter if Seafish Tasmania was in the room or not when the decision was made.

Is this number (141,500 tonnes) scientific? Is it precautionary? Does it conform to the practise of Ecologically Sustainable Development that AFMA says it is committed to following? Or is it simply a Number chosen to give Seafish Tasmania the 10,000 tonnes of quota it said it needed to bring the super-trawler into the fishery?

To be blunt; AFMA is a compromised organisation. For decades, since it changed from the Australian Fisheries Service to AFMA, there has been disquiet about many of the decisions AFMA has made. The disquiet is twofold: Firstly that the main interest, the policymakers culture, within AFMA is primarily to support fishing industry interests rather than its legislated policy goals of precautionary principle management and the ecologically sustainable development of Australia's living marine resources. Secondly, the concern is that AFMA has become captive to the business interests of the fishing industry.

As the legal scholar, Holly Doremus, noted in 2008:

'The second challenge arises primarily at the back end of the process, when the agency must translate information into action. This process requires that agency personnel measure the available information against applicable statutory and regulatory standards and decide what action, if any, to take. The concern here is one familiar to observers of the politics of the regulatory state – that the agency will undermine a statutory scheme by responding more to political pressures or the personal biases of agency personnel than to the evidence and the goals articulated by the legislature.'

The 'political pressures or the personal biases of agency personnel' within AFMA lie in the committees that advise the AFMA Commissioners on catch quota. These committees are primarily made up of fishing industry representatives, who represent their business interests. As well, there may be one or two other members; perhaps a 'conservation representative' or a 'recreational fishing representative', but these are in the minority.

I have heard of one management committee that had 17 fishing industry representatives and one conservation representative. For myself, I once sat on a fisheries management committee (in a different jurisdiction) as the 'conservation representative'; around me sat 11 fishing industry people deciding on the management and quota for their own fishery which, essentially, were rubber-stamped by the relevant authority.

On its public face, AFMA is strong on 'precautionary management' and 'ecologically sustainable' fisheries management based on the 'best available science'; but at the 'back end of the process' business interests can be more important than the lofty policy goals that AFMA says it holds.

This may be a clue as to why the committees involved with the super-trawler quota, mainly made up by fishing industry people, found the Number that gave Seafish Tasmania exactly the quota it needed; and perhaps why Senator Ludwig has announced a 'root and branch' review of how AFMA operates in managing Australia's fisheries.

To scientifically sum up
The biomass estimate used to allocate the super-trawler's quota is halfway between the highest and lowest estimates. It is the Number that got Seafish Tasmania exactly the quota it needed to make the super-trawler business plan profitable. There was science done by a scientist who wrote a report; that is something that super-trawler supporters can point at and say, 'There is science!' But the biomass estimate used in allocating the super-trawler its quota is not a result of science.

A prudent manager would have recognised the flaws within the biomass estimate research and following AFMA's stated policies of precautionary decision-making and ecologically based management should have, using best practise, allocated no quota until further research was done. This was not done (but it is being done now) and the question is; 'Why did AFMA not do this?'