

Questions to David McDonald

Kevin Rowling (NSW Fisheries) was interested in the two catch projections from the two areas and wondered if the sensitivity of the results had been examined or whether there are any misrecordings between the areas.

David McDonald said he had not, but Andre Punt (CSIRO Marine Research) added that catch projections had been based on the official catch statistics, including the 1993 event and the slight increase in catches. There is no traditional annual reporting other than the normal fisheries returns, so the same adjustments are made in the assessments.

Kevin Rowling continued that the analysis is hinged on the difference between the two areas and his concern was that the quotas came from the eastern area but a lot of fish suddenly started being caught in the southern area.

David McDonald replied that there is a *timing difference*; most of the fishing activity occurs at the spawning period in winter off St Helens whereas the southern zones tend to be fished at other times. Other issues such as stochastic recruitment *versus* deterministic have been looked at, but they don't seem to *make much difference*.

Peter Young (University of Queensland) believed that Kevin Rowling was referring to the situation that Carl Walters was talking about. How much do you believe your data before you do a sophisticated analysis?

John Caddy (FAO Rome) was concerned about the proliferation of fisheries for people with resources. In the recent past there has been fishing for orange roughy in the Atlantic and now starting to fish the Atlantic ridge. He thought we are going to see a lot of deep-water fishing in the future. But, what are the stock units?

David McDonald responded that the New Zealanders are making new discoveries all the time and seem to be ahead of Australia in that respect. Recent information suggests there is not a separate stock structure there, but it is more likely to be migration across the pinnacles. Genetically there seems to be little in the way of difference either, and it has been suggested privately that we are likely to *find more orange roughy off Tasmania* — it's just that we haven't looked in the right places.

Malcolm Haddon (University of Sydney) suggested that the notion of mining a fish stock is very much an economist's point of view. It tends to assume the fact that the fish are going to come back but forgetting what each fish is doing in an ecological sense. If, say, 95% or more of the standard crop is removed, the community dynamics must be *totally disrupted*. Is this being ignored in a single species testing? What about single species *versus* multiple species analysis?

David McDonald trusted his CSIRO colleagues for the dynamic model for the fish. He took the point that the ecology

would be important, but it is not simply an economic argument as far as mining is concerned — it depends how the sustainability is expressed. If you require the sustainability constraint not to be violated every year, then you won't have a capacity for mining. Whereas if you say at the end of 100 years, for the generation that is coming up to enjoy whatever is to be enjoyed, then it is not just an economic argument. The fact is that you have sustained the resource at the level you've claimed you wanted to. He therefore did not accept the argument that it is purely economic, though obviously it is within an economic framework. The interesting thing about this is that the positive discount rates when you have a constant catch strategy do not encourage mining. It is the zero discount rate that does, which he found rather interesting, but that is because of the particular objective function we have here. We have a penalty for violating the constraint as we run through each of the sample points of the distribution.

Carl Walters commented that these kind of calculations are going to be a lot more important as fishing industries are asked to meet the bill for the information gathered. It seems to be a really critical issue to examine exactly what the discount rate really is. Carl asked David McDonald for his view, as an economist, on the appropriate rate that the

public could insist on being used in this kind of planning.

David McDonald's view was that if you don't have a sustainability constraint expressed as he had, and not all fisheries do (this is the only one he was aware of that does), is that you should use a rate of either zero or next to zero. This is because the notion of sustainability is consistent with the idea that future generations should have access to the resource; you cannot have this unless you have a zero discount rate or even a negative one, for that matter. It doesn't take many years, especially with a fish like this which has a 100-year life. You can have a minuscule discount rate and in 100 years its worth nothing. You wouldn't sustain it unless you have an explicit rate like this. From the point of view of this particular model he did not think it matters. You can have a private discount rate in there for evaluating the expected returns from the fishery, given that it is private return we are talking about, as long as that constraint is expressed as he had expressed it. You are guaranteeing the sustainability part of it although you are not guaranteeing the ecological damage that might be done as a result of treating it that way. So he thought there is a trade-off there, between using high discount rates and having a constraint expressed as he had.