GENERAL DISCUSSION

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Session Panellists:	J.D. Prince
	A.D. M. Smith
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Recorded by G.M. Newton

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Chairperson Derek Staples introduced the general discussion by saying that in April 1992, the Bureau of Resource Sciences (formerly Bureau of Rural Resources) held a workshop to examine the process and methods used to provide stock assessment and scientific advice in Australia. The main approach was to compare how Australian fisheries scientists conduct stock assessments in comparison with several other countries including New Zealand, Europe, Canada and the United States of America.

Several factors were found to have a profound influence on how stock assessment is carried out in Australia. These were:

- Offshore Constitutional Settlement (OCS) arrangements
- Developmental stage of the fishery (available data)
- Value of the fishery
- Management strategy (input vs output).

As a result of these factors, the stock assessment process ranges from the "single scientist" analysis in fisheries which come under a single jurisdiction, to complex committee structures in larger fisheries which are either shared across several jurisdictions or managed under joint authorities.

Given the wide range of fisheries and agencies involved in stock assessment, a more formal structure for stock assessment as used by several other countries was not relevant at a national level. However, several issues of major national significance were recognised. These included:

- Complex jurisdictional arrangements
- Lack of skills
- Lack of high quality data
- Poor communication and consultation
- Lack of an adequate review process
- *Ad hoc* nature of stock assessments.

Recognising these deficiencies, the Australian Society for Fish Biology formed a subcommittee to improve the quality and relevance of stock assessment for fisheries management. The Australian Fisheries Management Authority has also introduced a more formal process for conducting and reporting on stock assessments in Commonwealth fisheries. This involves the formation of Research Groups and Stock Assessment Groups who report to the Management Advisory Committee.

Other issues are also being addressed. These include discussion of a new post-graduate school for population dynamics, the development of a better analytical framework for stock assessment, and the provision of scientific advice for fisheries management.

Most progress appears to be in the area of data and data collection. Most major fisheries have comprehensive systems for collecting catch

and effort data from the commercial sector. The collection of recreational catch data is being addressed.

In this final session I would like to focus the discussion on addressing the question of "Where to from here?", especially from the viewpoint of the Society.

The present workshop has presented a unique opportunity to review the progress we have made. I am pleased to report considerable progress in several areas.

The meeting was then opened for general discussion. Richard Tilzey made the first comment that it is heartening that we have progressed in getting stock assessment groups up and running, despite the difficulties involved; although most fisheries have taken two to three years.

David Smith also shared this optimistic view but pointed out that over the last ten years it has been stressed that a time-series of data is needed for the stock assessment process, and that more cost effective data are needed. He hoped that in five years time we are not still saying this.

Nick Caputi reiterated that we are making advances—in the past, even basic catch levels out of the various States were unknown for many fisheries. Now we have good catch and effort information from the States and this is a good base to start off with. He also stressed that we shouldn't stop there, as there is still the recreational fishing issue to build upon. Nevertheless, very good progress has been made over the past five years.

Derek Staples conveyed that Fisheries Research and Development Corporation (FRDC) has supported a previous plea to have more stock assessment training in Australia; he saw this as a sign of encouragement.

Terry Walker talked about maintaining the data and the physical database. We should not underestimate the difficulty of keeping old catch and effort data alive, accessible, and well documented. He also pointed out potential problems with technological change of computers and the ability to read old data.

Kay Allen provided the example that there is no computer in Australia that can read the tape of the first steam trawler data taken off the east coast of Australia in the 1920s. This has had to be repunched. He further posed the question with regard to setting up monitoring programmes, of how frequently do you need to collect data? For example, catch and effort data are needed every year, but for age structures of the population, how much do you need to get every year. He suggested that length data should be collected every year, but that age data needed to be collected only every two to three years, and other types of data should be collected as necessary. He stressed the need for flexibility, quick response to data collection needs, and for routine long-term data collection.

Chris Chubb cautioned that we need to be careful regarding what information is collected and in documenting what has happened. Indicators need to be chosen carefully.

Derek Staples agreed with Kay Allen's comments and pointed out that the stock assessment groups are charged with assessing data needs and suggested we set up a flow chart of data needs e.g. logbooks, and information from fishers and industry. He asked the question, what is the role of the models in driving data collection?

Jim Penn commented that it is easier to justify the continuation of data collection if the data are used in models, even if the models are simplistic. There is something to show for your work each year, as the model is built up. This approach also makes it easier to obtain renewal of annual funding. He also cautioned that longrunning databases take longer to become useful, so workers are reluctant to get involved in them. Thus there is a need to be using the data immediately.

Derek Staples added that models can be built so as to indicate what information is needed.

But, he stressed, what happens if say Norm Hall gets run over by bus? How transferable is the model and the encapsulation of that information?

Nick Caputi thought that there is no magic formula for identifying what information should be collected. He stressed that it comes down to the individual fishery and its value - then set up the database accordingly. All fisheries cannot have the same standards.

Frank Prokop wanted clarification on how we place that value. Is it commercial or social? He suggested that, apart from commercial value, if the resource had high social value, for example as in the giant bailer shells of Western Australia, it might be more worthy of study.

Vicki Wadley made the point that traditionally the interface of the data collection process has brought multiple users of the data together (e.g. scientists and industry). But, as we get better at transferring data (e.g. electronic media, satellites) the need to go on boats etc, is diminished and there is a danger of losing out on communication and data quality. The loss of data quality in particular is an important issue.

Patrick Coutin followed on from the data quality issue and made the point that fish bioligists should work in more closely with other disciplines such as oceanographers, meteorologists and other user groups. In this way we could bring together large and long-term databases, which include monitoring of the environment. He stressed how in Australia at present we are missing out on good long-term data on environmental factors, and saw this area as the way of the future.

Chris Francis commenting on Nick Caputi's point of gathering data only on important fisheries, referred to the example of the Woods Hole Institute (USA) which has a policy of choosing species based not on commercial importance but rather on the abundance of the species. This may be an important way to go, to look to what might be important in future.

Chris Chubb reiterated Vicki Wadley's point that we are forgetting the people factor in data monitoring, and how the interface of people on the boat is often just as important as the data.

David Smith also stressed that in many fisheries, for example the South East Trawl fishery, data collection has been largely personality driven (e.g. Kevin Rowling - gemfish, Jeremy Lyle - orange roughy).

John Glaister looked back to Nick Caputi's presentation, in which he highlighted growth overfishing versus recuitment overfishing and stressed that we should investigate just what kind of information the manager is asking for, particularly in these times of output control management. The manager needs to tell us what is needed.

Phillip Sluczanowki's view was that one of the most important things he had heard at the workshop was Tony Smith's comment on the stability of fisheries management and the need to establish collaborative relationships. These are personality driven, as with Terry Walker for southern shark. In any one fishery there is a long-term development of trust, and different issues will become prominent in different fisheries. These people are the ones who will work out what the issues are - it's a sort of 'touchy feely' stuff approach.

Derek Staples emphasised that it is important to recognise the degree of specialist knowledge there is around the country. This was highlighted by the production of the Fisheries Resources Atlas and the difficulty there was getting together the widespread specialist contributions by individuals from the whole scene. Two important issues are getting the information together, and determining what information the manager needs. These issues need some structure with which to work, and this needs to be cost effective.

Richard Tilzey reiterated that logbook data are still extremely relevant. However in the

South East Fishery (SEF), logbook data have only been collected since late 1985. The first six years of data are of very good quality, but now with the shift to Individual Transferable Quotas (ITQs), the database has become corrupted. For example, highgrading (discarding of lesser-valued sizes of a commercial species to maximise profit) into State waters is occurring as well as other misreporting practices. Richard Tilzey maintained that a good logbook system with catch composition and age data is one of the best ways to approach the stock assessment process. He admitted that the logbook data need ground truthing with fishery independent data, but stressed that it is a very expensive exercise.

Frank Prokop commented on the New Zealand situation as told by Chris Francis, regarding Current Annual Yields (CAYs) and the legislative framework—that it has to be proven beyond doubt there has been a decline. He stressed that this may preclude the adoption of adaptive management. Also, given that Australian States are reviewing their Acts, how important is an unworkable Act to the ultimate management of the fishery.

Chris Francis responded by stating that a tradition of an unworkable Act was not implied. It is just the jargon used. The issue relates more to how the Act is interpreted rather than what is in it. He shared Frank Prokop's idea of the applicability of adaptive management. The fishing industry often contend that you often hit stock hard to see how it reacts, in order to get information—the managers initially like that. But, can we measure the changes and can we bring stocks back? Minor stocks have not survived this process.

Frank Prokop then suggested that, in situations where there has been a demonstrated high level of catch, it then has to be proven that catch needs to be lowered.

Chris Francis agreed with this, and indicated that industry had got around them on that one. Adaptive management can only happen if we have mechanisms that allow you to monitor the situation.

Derek Staples, as Chairperson, moved the discussion along from data onto the possibility of the common toolbox for modelling in Australia. Many institutions are involved in the stock assessment process and we are geographically very spread out, we therefore need to be able to exchange and standardise information.

Norm Hall commented that he thought one of the main things lacking was communication of the ideas behind the processes used to model. For example, while one person is on the learning curve, others have already got there. He stressed the need for us to make more use of the packages and tools already available (e.g. personal computers). We should use common examples and show people how to use the tools and the models. We need to communicate the methodology simply. For example, Neil Klaer and CSIRO have a pile of exciting programs, but we need to educate others on how to use them. Also the interaction with industry needs to be clear and effective.

Peter Doherty said that there seemed to be a difference in opinion in the purpose of the model—as an aid and a developmental tool—but managers want something more sophisticated and final than that. Even if the model is not very good you can still sell it. The model should not be handed over to managers until it is a mature product. He made another point—the utility of models to the management process, e.g. Kevin Rowling's gemfish—it's nice to see the model feeding into the management process. But it seems that the TAC is not the leading indicator as it is simply following catch down. So the process of the model needs to be fully documented.

Jeremy Prince in drawing on the SharkSim example again, suggested that we were fortunate to have that packaging of the model, i.e. an interactive product. If managers only had the older non-interactive information tools (e.g. lists, tables, graphs), then industry would not have been able to see the limits of the model. That is because from its packaging one can intuitively see what the model is about, so that when the

fisher found a fault in the model, there was the immediacy with the package to ask the question and get the answer. In fact, the fisher would not have been heard in the process if it were not for SharkSim.

Phillip Sluczanowski reiterated that it took SharkSim to enable industry to reveal the assumptions of the model were wrong. So, with this type of product, industry consciousness has gone to a higher stage of development. He was disappointed with Geoff Rohan's comment that it didn't serve the management process. Rather it resulted in a very close industry/government cooperation in the shark fishery, which certainly did not exist before the SharkSim model. Our mandate was to convince industry and managers of the need for urgent action in the fishery, and that is what happened.

Derek Staples closed the general discussion, and reiterated that some of the important issues raised were the need for communication in the use of models, and the need for training so that mathematicians do not dominate the modelling scene.