

Summing up

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I speak to you today as someone who started his career 35 years ago as a zoologist interested in marine science. During the intervening period I studied parasites of seals, whales and north sea cod, then prawn fisheries, animal communities of seagrasses, coral reefs, sex-changing fish, and scallops. More recently, I spent 6 years as a science administrator, was a Director of the Australian Fisheries Management Authority, was the Chairman of the interim Board of the Cooperative Research Centre for Aquaculture, and am now a member of the Tasmanian Marine Farming Planning Review Panel.

I struggled in these jobs, as we have this past week, with the interaction between science and management. Science, the theoretical, the objective and the precise, *versus* management, the practical, the political and the pragmatic. Over the years, the roles of both have become muddled, and as short cuts have been made, science has tended to become less objective, and management less clear. Today we stand in a nexus. Are scientists to become proselytes for green conservation or for exploitation? Are managers to become messengers for their political masters and the most raucous or politically influential of their stakeholders? If these paths are followed,

scientists and managers will inevitably lose the respect that each had started to develop for the other.

We have heard this week of the cleverness of science in stock discrimination. Genetic techniques can now discriminate between species, subspecies, populations, subpopulations, families and even individuals. Looking deeper into the analysis reveals, however, that deep in the proliferation of numbers emanating from the genetic jargon, lie assumptions and theories that have not been adequately tested with *empiricism*. Has the technology overrun the theory that must underpin its application to wild populations?

At the same time we have seen the increased sophistication in the theory and modelling of the population dynamics of animal populations. This has highlighted the intrinsic uncertainties of predicting the outcome of fishing wild populations, and the ever-increasing need for better and higher quality data. In this case the theory has overrun the data available, and because of uncertainty in the results (duly and mathematically specified), those of a green tinge argue the precautionary principle precludes us from doing anything except to close the fishery.

Protection is clearly needed for the "animals of the commons" but the degree of uncertainty in the results of management action that is acceptable and the level of protection afforded wild populations, is critically dependant on the purposes for which it is used. If the management objective is more clearly defined then the acceptable level of uncertainty will become more apparent. Different stakeholders have different needs, the rules for conservation management may be widely divergent from those for resource utilization — the most important point is what level of risk are you willing to take?

We have heard of the political corruption of the assessment process. However corruption of the process can come from both ends of the spectrum — from exploitation at one end, and from preservation and stasis at the other. The scientist must never act as an advocate, but predict fearlessly the outcomes of activities that have been determined by the political process. To do this, an academy of scientific modellers free to make stock assessments apart from political interference has been proposed. This is not a model that I would espouse. Those of us who have been in science for a while are fully aware of the belief system that often riddles the scientific establishment, and this with the frequent reliance on authority and precedence, shockingly documented in Koestler's book "The Ghost in the Machine" gives me grave doubts as to this model's capability for objectivity of the sort that I espouse.

In my view the solution lies in the hands of the profession, and has been used for generations — transparency and reviews. If one group of scientists provides an assessment, it is critical that another independent group

evaluate it. Moreover, if we are to become truly professional, and I have grave doubts that we have yet reached the status, it is critical that all analyses, all models, all assumptions become an open book.

What of the Managers, what are they to do? Their's is the unenviable task of determining for the players their share of the resource. Their's is the role of the decision-maker. They must ensure that the political process is separate from the assessment process. They must identify and involve all the stakeholders. In times past, the managers were, by tradition, all-powerful, making the rules, deciding what to give and what to take back. But times have changed; not only has the political process changed, but the traditional power-sharing role between the three arms of government — the Judiciary, the Administration, and the Parliament — has also changed. The actions of managers are now scrutinized by the courts and have at times been found invalid under their judgement.

So where does this leave the manager now? How, to use the jargon of business management, is the continuous improvement process in fisheries management going to recreate the Fisheries Manager? This Workshop has shown that the process is already under way. Managers now recognize that they must involve all stakeholders, they are not autocrats, they must become negotiators. Dealing with the process of negotiation has become the most critical part of fisheries management, and as land rights, conservation management, recreational fishing, aquaculture, ITQs, Law of the Sea, and a multiplicity of other issues begin to bite, the fisheries manager of the future must surely develop capabilities for acting as a "convenor of concerns" as much as the "teller of truth",

and to do so, must recognize that the only characteristic that will allow this to happen is trust.

So where are we now? I believe that the crossroad is passed, there is always the chance for recidivism, but with persistence, vigilance

and goodwill we will make the conceptual leap towards real fisheries management. The message from the Workshop is that it is now, more than ever, vital to negotiate equitable sharing procedures for the wise and sustained use of our fisheries resources and their associated ecosystems.