A Fisherman's Tale

Michael Park, Chairman,
The Scottish White Fish Producers Association Ltd

I first entered into the fray of fisheries politics as a youthful, cynic-free soul of thirty-four, some ten years ago now, and although it doesn't exactly feel like a decade has passed since my starry-eyed inception into the murky world of politics I'm afraid the well worn battle scars which are usually synonymous with defeat would none the less belay the reality. It would be fair to say that the law of averages would promote a belief that through that decade I should have witnessed some good, fairly good and of course some downright awful times. However, in reality I've witnessed some bad, worse and extremely grim times but at no time have I ever witnessed a Council of Ministers settlement or indeed any other settlement which has been heralded by the Scottish Fleet as a success.

For the last twenty years the system and the players in the system have engaged in a world of make-believe, conspiring together to camouflage the shortfalls in the science by constructing a plan of creative inertia. It beggars belief, although not surprisingly to the industry, that throughout these turbulent years we haven't even succeeded in creating a time series of actual stock abundance calculations, a series which would actually give some hope to the industry. Creating such a series and moving away from calculating trends onto actual abundances would allow the industry to believe that, just like any other form of science, fisheries science is evolving.

The area IV Anglerfish stock on the west coast of Scotland is a prime example to show the reasons behind the loss of credibility of the fisheries scientific community. For the last four years the Total Allowable Catch (TAC) has been reduced by 60% from 8,000 tons to a figure agreed in December of 2003 for this year of 3,180 tons. The demographics of this stock clearly makes it a by-catch fishery for most if not all of the fleet at some time, and the physical characteristics of the fish clearly dictate that facilitating its escape while fishing is almost impossible, they have a large head and small tail which leaves technical adjustments to gear futile.

The quota management system, which is run by the producers' organisations, sets monthly catch figures for individual vessels and while some vessels do hold private entitlement to quota which they can utilise at will, the majority of the fleet lives to a pre-defined catch level each month. As a result of the stock abundance, coupled with the restrictive quotas, our fleets have been forced to discard substantial amounts of Anglerfish back to the sea, a practice that makes a mockery of the quota system but also makes a mockery of the scientific community. Here we are, catching a species, which can't be avoided, and which on the admission of the scientists is in relative abundance, yet the system is incapable of delivering a remedy. Having said that, the Minister, Ben Bradshaw, did manage to deliver an in-year increase in the same stock for the fishermen in the south west last year, However, that would imply that politics can achieve solutions which the scientists as yet have been unable to, and I'm not entirely convinced that the assumption would be fair.

In the Faeroe Islands and other successful world fisheries, partnerships have been created between fishermen and the scientists in the pursuit of credible fisheries data. Trawl surveys using research vessels and commercial vessels working in tandem help not only to build trust but also allow for a degree of day-to-day self-audit. We must move away from this insane preoccupation that the models and systems that were created by our scientific forefathers hold some form of iconic status and deserve to be in place for perpetuity as a testimony to their greatness.

Fishermen are more responsible now; we realise that we are dealing with a fragile resource, a resource that if treated with respect will nourish our communities for generations. As responsible adults we deserve to be dealt in on the hand with regards to fisheries science and the correlation of data, but until that time arises the preoccupation by fishermen that the scientists remain firmly in the pocket of those that pay their wages will remain.

I'm convinced that some of the main players in the Fisheries Research Services both north and south of the border accept that the structures and systems in place are outdated and require change. If change does happen then the ability of the scientific community to involve fishermen in its renewed construction, but more importantly to allow for the provision of peer review by the worldly and wise, would be the real indicator of change.

Science and Fisheries

Professor J R Beddington CMG FRS
Professor of Applied Population Biology and Head of Department of Environmental Science and Technology, Imperial College

It is well recognised that fisheries are in a bad state, the FAO and others have documented on a global scale the high and increasing proportion of stocks that are overfished. Locally, the white fish stocks around the UK are in some cases at the lowest levels ever observed. The fishing industry in parallel is in a poor state with large operating losses and a level of overcapacity that at a global level is breathtaking (some $50 billion of subsidies are believed to be operating). This is mirrored locally, a recent Cabinet Office Strategy Unit Study estimated that some £40-50 million of decommissioning would be required to reduce the white fish fleet to levels appropriate to the productivity of the stocks.

Is this a failure of fisheries science, governance or political will? In this article I will briefly look at some of the issues that can go towards answering this question.

From a scientific perspective, fisheries science is a subset of population biology, scientists aim at understanding the population dynamics of harvested species and how they respond to exploitation.

Traditionally, fisheries science has posed questions about what levels of catch are sustainable, or have investigated by manipulating the size at which fish can first be caught and the level of fishing, how yields can be maximised.

The dynamics of fish stocks are driven by the same demographic processes of birth, growth and death that govern all populations, but in most fish species the key to their dynamics is the recruitment of young fish spawned by the adult stock. This recruitment is variable, often highly variable and largely unpredictable as it is driven by a plethora of environmental factors as well as the size of the adult stock. This natural variability has implications for the industry as the higher the level of exploitation the more the fishery is dependent on the recruitment of young fish. In a relatively lightly exploited population the cohorts of older fish are available for exploitation, in a heavily fished population they are not. This means that the variability of the stock size and catches increase with the level of exploitation. Hence, over-exploitation leads not just to lower catch levels, but to highly variable ones as well.

Central to the practical application of such theories, is the estimation of the abundance of targeted fish stocks, either by direct methods such as research surveys and tagging experiments, or statistical procedures which use the catch information from commercial vessels.

It is in this last practical application of the science that some of the major problems for fish stock assessment arise. The methods are dependant on good and reliable data and when this is not available, then major problems occur. This is not just another example of the garbage in garbage out criticism of modelling procedures, but is more subtle and involves a key problem of fisheries management, that of compliance. Many fisheries, including the most important around the UK, are regulated by catch quotas (ie vessels are limited to a fixed level of catch), but the absence of effective control means there is an incentive to catch more than is reported.

The problem is that some of the key methods of estimating fish stock abundance depend on observing how the stock responds to the catch. If the stock appears to be significantly affected by a moderate catch, then the methods infer that the stock abundance is low. If reported catch levels are lower than the true ones, then the methods will predict the stock is lower than its true size. The fishing industry will thus view the scientific assessment as overly pessimistic and mistrust of the science prevails.

These and other more complicated problems of fisheries management have been the subject of study in more recent years. Pioneered ironically by the International Whaling Commission (not an example of historic sustainable management) techniques have been developed which model the whole process of fishery management. They include methods of data collection, the estimation of population models and parameters, the level of exploitation and methods of regulation including the level of compliance. All these procedures are explored by computer simulation to investigate how different management procedures perform in achieving the goals of sustainable stock levels and sustainable fisheries.

A variety of lessons can be learnt from such analysis, some obvious, others less so. For example, it is obvious that effort control (regulating the number of vessels or the time at sea) is more efficient than regulating by catch quantities where monitoring is inefficient and expensive. However, more subtly, effort control has a natural feedback in the face of stock variation: if stock levels are lower than expected, catch levels under effort

control will also be lower (catch rates vary with stock size) and sustainability is enhanced.

These methods have the potential to significantly improve fisheries management, but only in situations where the capacity of the fleet is broadly in line with the potential of the stocks to sustain catches. Where excess capacity is present, the industry will operate for sound economic reasons in unpredictable ways which can influence the fisheries management process. The capacity problem is one of governance, not one amenable to scientific study except that science can clearly demonstrate the degree of overcapacity.

If the problems of compliance and capacity could be successfully addressed there would be a major improvement in fisheries management, but some scientific issues would still remain.

The population dynamics of individual stocks are determined by the ecosystem in which they operate, which itself is driven by environmental factors. Hence it is important to know how exploitation will affect not only the target species, but other species in the ecosystem. Similarly, the implications of changing environmental conditions on the components of the ecosystem need to be explored. Such results will not come quickly as even simple analysis will depend on extensive spatial and time series data.

In the face of such uncertainties, other management measures of a precautionary nature have been explored. One that has much support is the closure of areas to all fishing, the creation of reserves. Such methods face formidable problems of compliance and cannot be universally applied, but the exploration of similar ideas clearly has merit.

Perhaps the most important need for the future is the development of a community of interest between the industry and the scientific and management communities. That this is recognised, and attempts are being made to develop this in various parts of the world, give some limited optimism that the future of fisheries may be better than its past.