Systems in action: Modelling a muddle
Part 4

Contributors name:
Gina Landor
Colin Bannister

GINA LANDOR: There is another aspect of community law, administered by individual member states. Each country has its own fishing fleet. The overall quota for a country allocated by the community is divided up and then allocated to the individual boats in the national fleet. A boat must tie up and stop fishing when it has filled its quota. Capital is lying idle, and no income is being generated to pay for the boats or offer the fishermen a livelihood. A huge responsibility rests on the shoulders of both the Brussels decision makers and the scientists.

COLIN BANNISTER: It's important to remember that the scientific process is not a perfect one. There are some limitations to the model that we use and there are certainly limitations to the information that we put into it. An example of the limitation in the model is the assumption that even if spawning stock is declining to quite a low level, recruitment will still be constant albeit variable. That may be a very unrealistic assumption.

GINA LANDOR: The problem can be appreciated by looking at 20 years data for one species - in this case, cod. The graph shows the estimated spawning stock biomass in thousands of tons for each year. However, each year's recruitment varies enormously. It's difficult to see a clear relationship between the new recruits and the size of the mature fish population. This relationship varies from species to species.

COLIN BANNISTER: The second type of problem we've got, we can see with the short-term forecasts that we have to put in estimates of recruitment for next year, and we have to measure the current fishing mortality rate and various other parameters. They may very well be quite serious errors on some of those. And these will obviously affect our calculation for next year.

GINA LANDOR: These boats seek flatfish. To scare the fish up from the bottom into the trailing net, they use chains. But the noise of the chains also attracts cod, which the boats aren't allowed to land. Any cod must be thrown back into the sea, unrecorded as fishing mortalities by the scientists who mostly work from the Quayside.

A Scottish boat fishing in the North Sea. The catch is brought in and dropped into the hold for sorting. Amid the swell, the fish are processed by the modern gutting and sorting equipment,

ready for the market when the boat reaches port. Any fish that reached the end of the line are undersized and can't be landed. These are simply shoveled up and thrown straight back into the sea dead. They are fishing mortalities, but they are not registered because they aren't landed. So these undersized fish, the cod, and other species all lead to unquantifiable errors. Assessment of fish populations in the sea must always be estimates. But the reliability of the data collected is called into question because of these unrecorded mortalities. Many fishermen feel that the restrictions on earning their livelihood from what they see as a plentiful supply are unnecessary. Scientific models based on flawed information and bureaucratic decision making are insufficient justification for depriving them of a living.

In the face of these restrictions, many turned their attention to fish species that did not have an imposed quota, like the sand eel, which finds its way into animal feeds. Not a lucrative fish, but some income has been generated. But sand eels too are part of the marine ecosystem. They form the main food source of another species that relies on the sea - the puffin.

During the 1980s, the populations of these birds declined as young chicks failed to mature. The decreasing numbers returning to nest on the North Sea coast of Scotland and the lack of breeding success were the first indications that the sand eel population like the Herring population before it has suffered a catastrophic collapse. So there's a quandary: the need for control is clear. But is the modelling of fish populations the right approach?