

Report on the AARMS Special Session at SSC 2007

AARMS sponsored the Special Session, 'Controversies over Fish Stocks' held at the 2007 Statistical Society of Canada Annual Meeting in St. John's last June. Dr. Peter Shelton of Fisheries and Oceans Canada gave a talk titled 'From Science-based to Ad Hoc Fisheries Management Off the East Coast of Canada'. Dr. Shelton illustrated the weakening role of science in the management of some fisheries over the last 15 years. Dr. Shelton suggested two reasons for this: low credibility of scientific advice and the perceived need for substantial flexibility in the decision-making process.

The northern cod stock off the northeast coast of Newfoundland and Labrador was used for illustration. Catch quotas were introduced in 1973, based on theoretical maximum sustainable yield (MSY). However, by 1975 it was recognized that the quotas were not preventing severe stock declines because of variability in recruitment, under-reporting of catches and errors in the assessment. Extension of Canadian jurisdiction out to 200 n. miles in 1977 limited foreign fishing effort and, combined with the implementation of a new more conservative harvest control rule termed "F0.1", elicited a partial recovery of the stock. F0.1 equates to harvesting about 20% of the biomass in the case of northern cod. Fishing at F0.1 should allow the population to rebuild to above the biomass that gives MSY, which is generally considered to be a healthy or safe state for a stock.

However, we now know that we consistently over-estimated population size during this period and, unbeknownst to us at the time, fishing mortality steadily increased above the F0.1 level. The cause of the over-estimation has not been definitively determined; however, the consequences of over-estimating stock size and the delayed reaction by decision makers to reduce fishing effort has been devastating to the economy of Newfoundland and Labrador. By the spring of 1992 the stock was commercially extinct and only then was the fishery closed. The fallout was that the credibility in DFO science was largely destroyed and also public trust in the ability of government to manage fisheries evaporated.

Dramatic stock collapses in many other east coast fisheries have also occurred. Some of the cod fisheries have reopened, but they are unsustainable and are impeding further recovery.

Dr. Shelton suggests there are two main lessons – the need to account for the uncertainty in the scientific advice, and the need for fisheries managers to use a structured decision-making approach that sets objectives, provides performance measures, and takes risk or uncertainty into account. However, the opposite has occurred. Fisheries management decisions have become increasingly ad hoc, seemingly because of changing social, economic and political pressures. This has considerably weakened the role of fisheries science in the process.

Sustainable fisheries are possible, but they require a sound scientific basis and a precautionary approach framework that is robust to uncertainty, and keeps fishing

mortality moderate and results in reduced fishing mortality when a stock decreases. Moreover, a societal will must exist to have fisheries managed sustainably.