

BIOLOGGING AND FISHERIES STOCK ASSESSMENT

Taylor, N.¹, McAllister, M.¹, Block, B.A.² and Lawson, G.²

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Abstract:

We use computer simulations to explore the use of conventional, pop-up and archival tag data types in fisheries stock assessment using Atlantic bluefin tuna as a test case. In particular we explore how the number of tags used; the position of their deployment, (where applicable) reporting rates; and the inclusion of supplementary data from otolith microchemistry affect estimates of fishing mortality and stock-size. Several important points emerge. The Atlantic bluefin example is a particularly challenging case because two stocks are mixed over a significant proportion of their ranges. Without genetic determination, the stock of origin of each marked fish is unknown, meaning that its movements must be modeled as being on either stock type and introducing big uncertainties into movement rates themselves, and also what stock-specific fishing mortalities are. With respect to both fish-marking and reporting-rates, the basic lesson is that it is necessary to have as much representative coverage spatially – fish marked and recovered over as much of the stock distribution as possible. For the purpose of stock assessment the single most important parameter of interest is fishing mortality in the assessment. Failure to recover or mark fish in particular areas mean that significant fishing mortality events go unaccounted for in the model's assessment of the stock numbers and fishing mortality rates. While the Atlantic bluefin tuna case is a difficult one, if the intention is to use tagging in fisheries assessments representative sampling and recovery rates must receive considerable attention.

Contact : Nathan Taylor, n.taylor@fisheries.ubc.ca

(1) Fisheries Center, The University of British Columbia

(2) Hopkins Marine Station, Stanford University