

New methodology for tracking fish, mammal and sea bird behaviour and migrations (P)

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To be more consistent with the ecosystem approach to management, fishery stock assessment models are increasingly becoming spatially explicit in terms of growth, reproduction and fishing mortality. An important element of such modelling efforts is the correct specification of the biomass flow between spatial compartments due to the seasonal migration of fish, marine mammals and birds. Migration rates have traditionally been estimated using mark and recapture studies, but the accuracy of such information was largely dependent upon the spatial distribution of the tag recovery effort. Recently, however, a variety of electronic tagging methods have allowed the determination of detailed migration routes of individual animals in ways that are independent of the tag recovery pattern. Among the recent innovations to obtain geographic positions are acoustic tags and PIT tags using large scale receiver arrays, pressure-based archival tags using tidal drift or tidal matching models and light-based archival tags. New methods for linking geo-positions into migration trajectories that better incorporate positioning errors include Kalman filters, particle filters and calibrated smoothing algorithms. Collectively these methods are providing individual-based migration information that will not only allow better parameterization of fishery management models but also provide the data needed to better understand the influence of environmental factors on the timing and extent of marine animal migration.

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