Patterns in ichthyoplankton community assemblage of eastern Australia

Hinchliffe, Charles¹, James A. Smith¹,², Jason D. Everett*, Ana Lara-Lopez³, Anthony G. Miskiewicz¹, Anthony J. Richardson⁴,⁵, Iain M. Suthers¹

¹ School of Biological, Earth, and Environmental Sciences, University of New South Wales, Sydney, NSW, 2052
² University of California Santa Cruz, Cooperative Institute for Marine Ecosystems and Climate (CIMEC), La Jolla, CA 92037, USA
³ Integrated Marine Observing System, University of Tasmania, Private Bag 110, Hobart TAS 7001 Australia
⁴ CSIRO Oceans and Atmosphere, Queensland BioSciences Precinct (QBP), St Lucia, Brisbane, Qld, Australia, 4072
⁵ Centre for Applications in Natural Resource Mathematics, School of Mathematics and Physics, The University of Queensland, St Lucia, QLD, 4072

c.hinchliffe@unsw.edu.au

Long-term monitoring of ichthyoplankton offers an effective fishery-independent tool for managing marine fishes, providing an understanding of trophic dynamics, recruitment processes, influence of environmental fluctuations and productivity. Despite this, continuous monitoring of ichthyoplankton across Australia only began in 2014. We investigated patterns in larval fish community assemblage at three IMOS National Reference Stations (NRS) on the east-coast of Australia: Maria Island (-42.76), Port Hacking (-34.06) and North Stradbroke Island (-27.47). These assemblages were compared with historical data collected from 8 surveys spanning 1983-2015. Consistent differences in the larval fish assemblage were detected over large spatial scales, with latitudinal changes in community structure evident in samples collected on and off the continental shelf. There is evidence of a shift in community structure across latitudes through time. In particular, communities sampled at Maria Island have become more similar to Port Hacking and North Stradbroke Island, than communities sampled at the same latitudes in historical surveys. Due to large variation inherent in ichthyoplankton abundance, measuring similar trends in individual taxa will require a longer time-series. However, the appearance of larval sardine and wrasse previously absent from historical samples, and an increased abundance of anchovy, at Maria Island could be evidence of a southward shift in some temperate-spawning taxa. Seasonal patterns in spawning were detected, and analysis of phenology conducted on historical data was used to identify spawning ‘modes’. Effectiveness of NRS ichthyoplankton monitoring would be greatly improved with increased sampling effort, however, combining taxa into spawning modes may increase the power of future analysis of phenology in the NRS time-series.