Demography of fish populations reveals new challenges in appraising juvenile habitat values.

Author Ismael Kimirei, Ivan Nagelkerken, N. Slooter, E. T. Gonzalez, Yunus D. Mgaya, Chantal Huijbers, Andrew Rypel

Abstract

Understanding the 'value' of nursery habitats is increasingly perceived as essential to conservation management of marine ecosystems globally. Yet, most work on this topic has assumed that population dynamics are temporally and spatially static, which clearly oversimplifies some highly complex and integral ecological processes. We used size-frequency data of fish species from mangrove and seagrass habitats collected at various locations over a >2 yr period to explore demographic structure and variability along with potential factors (such as growth, food abundance, and relative predation risk) that might encourage such variability. While demographics were skewed predominantly towards juveniles, older fish (up to 13 yr) were regularly observed in some mangroves or seagrass beds, indicating relatively complex population demographics. Juvenile habitats varied substantially in both prey abundance and relative predation

risk—an effect that appeared to give rise to habitat-specific differences in somatic growth rates and fish densities. Fish population size structure was further related to position within the seascape, suggesting complex spatial dynamics in the production of fish biomass. Our results demonstrate that effectively appraising juvenile habitats will be a more convoluted process than previously thought, as greater integration is needed between basic ecological processes (e.g. predation risk and food availability) and population demography. Whereas current approaches often identify and manage single, complete nursery habitats based on those that contribute most individuals to adult populations, our study shows that a more dynamic and spatially-explicit management approach is needed, as nurseries have divergent benefits for separate life stages, species, and

locations.

Key Word Demography, juvenile

,