

Evaluating Land River and Sea Connectivity through the Ecology of Small Diadromous Fishes

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Migration patterns and mechanisms of diadromy in fishes are poorly known, especially for amphidromous goby taxa. We assess factors that influence migration patterns by comparison among multiple watersheds. Goby migration from the sea into rivers is significantly negatively associated with environmental conditions around the river mouth, such as water temperature, gradients, and the extent of river-mouth closure. Conversely, establishment of gobies in rivers is affected by proportions of concrete river bed and the distance from the river mouth to a barrier that may prevent fish movement. We also showed establishment of gobies in rivers to be significantly positively related to their body size when entering that river, which, for the first time, identifies a carryover effect from dwelling in sea and/or brackish environments on subsequent goby growth and establishment. A new approach is developed to estimate larval goby duration in oceanic and brackish environments using Sr stable isotope ratios in otoliths. With this new approach we demonstrate that the length of time that larval *Gymnogobius petschiliensis* spend in brackish waters is significantly associated with river water temperature.