

## Fish on Australian saltmarshes

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### Introduction

Saltmarshes provide important habitat for fish on all inhabited continents. Fish are a very important aspect of the biodiversity of marsh systems, and the role of saltmarsh in the provision of fish habitat is one of the main reasons why humans value saltmarsh at all. Fish living on marshes or visiting the inundated habitat at high tide are abundant and diverse. Swimming crustaceans such as shrimp and prawns (which together with fish are collectively known as nekton) also occur on saltmarsh, and are included in this Chapter because of the similarities in aspects of their behaviour.

This Chapter focuses on Australian saltmarshes as fish habitat, but our early understanding of fish use of saltmarsh came from studies done elsewhere. A review of all saltmarsh nekton research prior to 2000 (Connolly 1999) found the literature to be overwhelmingly North American (90% of the 113 studies), with surprisingly few papers from Europe (7%) given the large number of botanical studies undertaken there (Adam 1990). Only 3% of papers were from southern hemisphere marshes, all from Australia (see Table 6.1).

Patterns in the use of saltmarsh by nekton are thus best described for North American marshes (Kneib 1997a). Large numbers of certain small species such as killifish (*Fundulus* spp.) and grass shrimp (*Palaemonetes* spp.) are resident on marshes. Numerous other fish and crustacean species visit the inundated marsh as transients (Kneib 1997a). Species using the marsh flat are mainly resident on or near the saltmarsh for their entire lifecycle, while fish congregating around the edge of the saltmarsh are juveniles of species that spawn elsewhere in the estuary or in oceanic waters (Peterson and Turner 1994). A review of the value of saltmarsh as nursery habitat, taking into consideration abundances, growth rates and survival, found that nursery value was greatest for vegetated marsh, particularly at the marsh edge, and lower for unvegetated marsh (Minello *et al.* 2003).

Encroaching human development is resulting in the fragmentation of saltmarshes in many parts of the world (Adam 2002). Where saltmarsh supports major fisheries, the consequences of habitat fragmentation are likely to be large. The marshes of the Gulf coast of the USA, for example, are considered critical nursery habitat for brown shrimp, *Penaeus aztecus*. A combination of empirical data and numerical modelling of survival rates demonstrates that, initially, brown shrimp productivity increases as saltmarshes decline in extent and fragment into smaller units (Browder *et al.* 1989; Haas *et al.* 2004). For a time, these smaller units increase the length of the interface between marsh and water, increasing the linear extent of the marsh edge, the habitat preferred by prawns. However, modelling shows that, ultimately, the amount