

5 Movements and migration

John D. Koehn and David A. Crook

INTRODUCTION

Movement is integral to the ecology of fishes, enabling them to access resources such as food, shelter and potential mates and to avoid threats. Their movements range from lightning ‘bursts’, for ambushing prey or escaping predators, to sustained migrations that cover hundreds, even thousands, of kilometres up and down rivers. The patterns of movement reflect the diversity of behaviour, physiology, trophic roles and life history strategies.

The migrations of Australian freshwater fishes may be less conspicuous than the famous spawning runs of Northern Hemisphere salmonids, but they too are impressive and spectacular. For example, juvenile climbing galaxias (*Galaxias brevipinnis*) return from the sea to travel upstream, using their pectoral fins to climb waterfalls and other barriers and colonise inland habitats (McDowall 1988). Golden perch (*Macquaria ambigua*) move over distances up to 2300 km along inland rivers (Reynolds 1983). Southern shortfin and longfin eels (*Anguilla australis*, *A. reinhardtii*) spend five to 20 years in fresh water before metamorphosis and migration *en masse* more than 2000 km to deep-sea spawning grounds (Beumer 1996). These events are most obvious when there are aggregations of migrating fishes at natural or artificial instream

barriers. They often are predictable, and render the fishes vulnerable to exploitation (Deap *et al.* 2003). In Australia, Aboriginal people over millennia developed an intimate knowledge of migrating fishes and gathered them as food (Humphries 2007). Stone fish-traps on the Barwon River near Brewarrina, New South Wales, were used for more than 40 000 years to harvest golden perch, Murray cod (*Maccullochella peelii*) and other fishes (Mathews 1903; Dargin 1976). At Lake Condah in south-western Victoria, Gunditjmara people used channels and traps to capture southern shortfin eels (Builth 2004; Box 5.1; Fig. 5.1). Migrations like these have also been exploited by commercial and recreational fishermen (McDowall 1988; Mallen-Cooper *et al.* 1996). For example, there was a commercial fishery based on spawning aggregations of Tasmanian whitebait (*Lovettia sealii*) from the 1930s to the 1970s (Fulton and Pavuk 1988). Commercial operations ceased in 1973 following population declines, but there is still a recreational fishery. Our understanding of the adaptive significance of these movements is poor, especially for smaller, non-commercial or recreational species (Koehn and O’Connor 1990b; Allen *et al.* 2002; Pusey *et al.* 2004). Most studies concern large-scale movements, but small-scale movements are also ecologically important.