

10 Assemblages

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INTRODUCTION

What controls ‘who is where’ in freshwater fish communities? Fishers often claim to know, and probably do most of the time (or often enough for fishing to be fun). Fish ecologists are also keen to know which species tend to occur together in wetlands, lakes and rivers, and why some groups, or assemblages, occur in some places and not others. In this chapter, we review the physical, chemical and biological factors that govern the structure of assemblages (the member species, their relative abundances, ecological attributes and interrelationships). We consider how and why they vary in space and time, the threats they face and their future prospects.

In Australia, as in other countries, freshwater fishes are affected by human activities in catchments, by impoundments, water diversions and altered flow regimes, by pollution, overfishing, alien species and other habitat changes (Boulton and Brock 1999; Arthington and Pusey 2003; Lintermans 2004). As the global climate becomes warmer and drier, we can expect changes to affect many, perhaps most, fish assemblages (Bond *et al.* 2008; Murphy and Timbal 2008). Ecologists and resource managers will be asked to develop practical solutions to problems of diminishing water resources, changes in the distribu-

tion of species and local extinctions. To underwrite those solutions we want to understand how environmental factors and processes affect fishes and the ecosystems that support them (Dudgeon *et al.* 2006; Palmer *et al.* 2008).

How do abiotic and biotic processes influence fish assemblages? Do their effects vary in space and time and among ecosystems, and if so how might we apply this knowledge? These questions have occupied many ecologists (Gido and Jackson 2010), and we now seek answers from the literature on fish assemblages in Australian inland waters. For ease of reference, Figure 10.1 shows the lakes, rivers and major drainage basins mentioned in this chapter.

WHAT IS AN ASSEMBLAGE?

The term ‘assemblage’ is used widely in fish ecology, but a rigorous definition is elusive. We accept the view of Matthews (1998), who regarded an assemblage as a group of species that occurs together in a single locality, where individuals have a reasonable opportunity for daily contact with each other. Matthews (1998) avoided the term ‘community’ because it may wrongly imply predictable interactions among species. Further, community is often used broadly to refer to all