Historical Indigenous use of aquatic resources in Australia’s Murray-Darling Basin, and its implications for river management

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Summary

Indigenous people demonstrably lived along rivers and around lakes and wetlands of Australia’s Murray-Darling Basin in pre-European times. Waterways were, and continue to be, of major significance to the society and culture of Aboriginal peoples throughout Australia. Historically, they exploited most of the fauna – from mussels and crayfish, to fish and birds – and either ate, or used for other purposes, many species of aquatic plants. Such practices placed them in the role of environmental modifiers, a role played by all human groups from both past and present. They built sophisticated fish traps, cut gaps in river banks to allow fish to move on to floodplains, and there is evidence that they practised a form of fish culture by creating small impoundments in which small fish could live and grow in normally ephemeral tributary streams away from predatory larger fish. Knowledge of the numbers of Aboriginal people inhabiting the riverine regions of the Murray-Darling Basin are sketchy, but at times large groups congregated for cultural reasons, facilitating fishing with extensively engineered fish traps, such as that at Brewarrina, on the Barwon River in New South Wales. At other times, densities may have been about 0.5 person per river kilometre, although this was certainly not evenly distributed and the calculation postdated deaths from smallpox. From archaeological and ethnological evidence, aquatic fauna and flora would have constituted between 30% and 100% of the diets of Indigenous people historically, depending on season and location. As such, Indigenous people were very much a part of the ecology of aquatic ecosystems and their effects may have been profound. Despite this, their role in influencing these ecosystems has largely been ignored by contemporary freshwater ecologists and managers. Current management practices do not seem to have considered the loss of this component of riverine ecosystems, and there is little debate about how the historical part that Indigenous people played in shaping these systems and their biota might be incorporated into management generally.

Key words: Aboriginal people, aquatic plants, Australia, fish, food, rivers.

Introduction

Aquatic systems have been, and continue to be, important environments in the economies of Indigenous peoples throughout the world (Bandler 1995a; Jackson 2005; Toussaint et al. 2005). Oceanic mammals, birds, fish, molluscs, crustaceans and plants have contributed to the sustainability of most societies at one time or another and have allowed many of these to prosper and colonize other continents (Kurlansky 1998). For inland-dwelling peoples, rivers and lakes have served a similar function (Bandler 1995a; Hoffman 1996; Russel-Smith et al. 1997). The association of humans with rivers and lakes is obvious, since freshwater is indispensable to life, but the use of rivers and lakes goes far beyond simply for drinking water. Aquatic systems supply food, clothing, cooking utensils, carrying implements, ornaments and, of course, their fauna and flora loom large in Indigenous culture and mythology (Jackson 2005).

Indigenous Australians have occupied Australia for about 50 000 years (Bowler et al. 2003; Flood 2004). During that time, there is good evidence that they have been associated with rivers and lakes and exploited a vast range of their resources (see Bandler 1995a; Bandler 1995a; Bowler et al. 2003; Flood 2004; Russel-Smith et al. 2004). Examples of early Aboriginal association with freshwater environments include fossils (Bowler et al. 2003), middens (Balme 1995) and the sophisticated rock shoots and tunnels of the Brewarrina Fisheries (Mathews 1903; Dargin 1976). More recent examples of the association of Indigenous people with rivers and lakes, include European explorers’ and anthropologists’ accounts of the ubiquity of people around water bodies and the exploitation of animals, plants and minerals (see, e.g. Mitchell 1839; Krefft 1865; Taplin 1879; Beveridge 1882, 1889; Mathews 1903; Sturt 1982). Virtually all rivers in the Murray-Darling Basin have evidence of Aboriginal occupation, either through the presence of middens, scar trees or artefacts.

Humans should not, however, simply be considered as exploiters of resources, but as, themselves, components of an ecosystem (Berkes et al. 2000). In the case of Aboriginal Australians and freshwater ecosystems, as I will argue below, their exploitation of aquatic resources was so wide that the breadth of their impact would have likely been more significant than other species: they were not just top predators, like eagles or Murray Cod (Maccullochella peeli) (Mitchell), they used most components of the fauna and flora in one way or another.

Indigenous Australians, like Indigenous peoples throughout the world (Denevan 1992; Newson 1996; Gott 2005), were also...
environmental modifiers. They manipulated the physical environment to aid in the collection of components of the fauna (Angas 1846; Morey 1952) including altering the physical environment to enhance the survival and growth of fish (Gilmore 1934); therefore carrying out a form of aquaculture (Bundler 1995b). Thus, the aquatic environment encountered by Europeans was not in stasis; rather, it was dynamic and under the influence of, among other influences, the dominant humans of the time. The potential for Aboriginal people to modify aquatic environments in a substantial way through active manipulation has received much less attention than that of terrestrial environments (see, e.g. Mulvaney & Kamminga 1999). Indeed, this factor – along with the question of whether there have been any effects of their removal as primary participants in aquatic environments – is rarely discussed.

Loss of any species from an ecosystem would normally elicit concern from scientists, whether it be for its intrinsic significance or for the effects its loss would have on other components of the ecosystem. Wholesale displacement and removal of Aboriginal Australians from their land associated with rivers and lakes in inland Australia began early in European settlement history, yet aquatic scientists have lagged well behind their terrestrial counterparts in asking pertinent questions such as: ‘What role did Aboriginal people play in aquatic ecosystem?’ ‘What effect has their removal had on the biotic and abiotic components of those systems?’ These are important questions for researchers and managers trying to understand how and why freshwater ecosystems have changed, how best to restore them and what conditions ultimately are desirable. It is especially pertinent, considering Indigenous groups continue to utilize and modify the freshwater environment in many parts of Australia and want to be, and in some cases are, actively involved in the management of freshwater resources (Jackson et al. 2005).

This paper stems from a fellowship in 2005 at the National Library of Australia, where I researched historical accounts of fish in the Murray-Darling Basin. It was during this study that I came across many references to Aboriginal use of the fauna and flora in the rivers and wetlands of the Murray-Darling Basin, the extent of which I was totally unaware. I consider that my ‘blind spot’ concerning the role that Aboriginal people played in the Murray-Darling Basin is shared by many others working in freshwater ecology. Thus, in this paper, I aim to highlight the historical association of Aboriginal people with the rivers, lakes and wetlands of the Murray-Darling Basin in pre-European times, describe their exploitation of the associated fauna and flora and the types of modification that they imposed on the biotic and abiotic environment. I then consider the replacement of Aboriginal people by Europeans as primary participants in the ecology of these rivers (specifically in terms of exploitation of fish), and discuss (i) whether this has been considered in assessing European impacts, and (ii) how it is integrated into current ideas on management.

Aboriginal occupation of rivers and wetlands

Aboriginal association with rivers, lakes and wetlands of the Murray-Darling Basin is proved by the existence of shell middens, which also contain many other animal remains of aquatic origin (Mulvaney & Golson 1971; Balme & Hope 1990; Balme 1995), and by the Brewarrina and other fisheries constructions (Mathews 1903; Parker 1905; Dargin 1976). Aboriginal mythology is also full of reference to rivers and fish (see, e.g. Smith 1970; Berndt et al. 1993; Jackson 2005; Toussaint et al. 2005) and Australian rivers, creeks and lakes all bore Aboriginal names when Europeans first arrived. Although some names were changed, many that remain bear witness to the significance of water bodies and their inhabitants to Aboriginal people.

Much more recently, written material from explorers, natural history writers, settlers, government officials, missionaries, anthropologists and newspapers, as well as paintings and early photographs all attest to the prevalence of Aboriginal people along rivers, and around lakes and wetlands. These accounts are too numerous to detail here, but a few examples will illustrate the point. Rene-Primavera Lesson testified that the people ‘for the most part follow the banks of rivers and streams’, with fishing supplying ‘… them with their principal sustenance.’ (Lesson 1824, p. 162). Charles Sturt noted the presence of scaffolding and weirs for catching fish in the Macquarie Marshes and on the Darling River and stated that the Aborigines’ ‘main … food is fish, of which they have great supplies in the river; still they have their seasons for hunting their emus and kangaroos’ (Sturt 1882, p. 106). Hawdon and Bonney encountered many Aborigines on the Murray River in 1838 and documented their numbers, behaviour and fishing methods:

Fish is their principle article of food and they procure it in great abundance. They also catch the Emu and different species of kangaroo, from the large-sized one, weighing 100 pounds, to the small Kangaroo rat. … The food of their women and children consists chiefly of roots of different kinds, wild Yams, freshwater muscles [sic], and the Tortoise. … The men sometimes catch ducks with a net, which, as they ascend from the lagoon, come into contact with the net, and get entangled in its meshes. (Hawdon 1952, pp. 41–42)

George French Angas’ accounts are full of references to Aboriginal encampments along the Murray River, from Lake Alexandrina and upstream, and provide detailed descriptions of how the people lived and used the resources of the river and wetlands (Angas 1846, 1847). Peter Beveridge documented the customs of the lower Murray, Darling, Lachlan and Murrumbidgee tribes noting that: ‘As a rule the food of the aborigines consists of fish principally, of which, for 8 months in the year they have a superfluous abundance; so much so indeed is their supply during those months, that they cannot nearly consume it all, consequently quite a moiety [sic] is absolutely wasted. To supplement the fish they have kangaroo, emu, opossum, and wallaby. …’ (Beveridge 1882, p. 18). He also describes the scenes during floods, when the people camped on mounds – the only dry spots – created by centuries of oven building, and feasted on fish, crayfish, water birds and eggs.

Assessment of the numbers of Aboriginal people associated with rivers, lakes and wetlands is problematic for many reasons. Lawrence (1971) makes the point that numbers were very much...
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dependent on season and location, and density estimates are necessarily vague. However, he quotes one person per 25 km² and one person per 8 km² in riverine areas (from Boomey 1983 and Carr 1887) and Eyre (1845) estimated that in the lower Murray, there was a permanent population of about three to four people per mile of river, which would mean about 0.5 people per kilometre. The last estimate is comparable with that of coastal densities (Lawrence 1971; Lourandos 1980), and is about the same as has been estimated for populations of Ecuadorian Indians living in interfluvial forest before 1492 (Newson 1996). Population size estimates during non-postulated times, however, would have been considerably lower than before the two major epidemics of smallpox (Campbell 2002). Larger congregations of people undoubtedly occurred at times to take advantage of a seasonal abundance of fish and other resources and to strengthen important relationships (Mathews 1903; Gilmore 1934). Sturt noted 600 people at Lake Victoria in the early 1850s (Sturt 1982), but he also mentioned about 70 permanent huts at Brewarrina, each capable of holding a dozen or more people, although this does not mean that they were occupied all the time. There were also accounts of 5000 or more people at Brewarrina, Bourke, Wilcannia and Menindee (Mitchell 1839; Gilmore 1934), although these numbers may be exaggerated.

Exploitation of aquatic resources

Historically, Aboriginal people harvested most moderate to large faunal species in the rivers, lakes and wetlands of the Murray-Darling Basin. They not only had names for the individual species of fish – large and small – but even for different life stages of some of the larger species (Blandowski 1857). There are numerous first-hand accounts of fishing practices (see, e.g. Eyre 1845), of catching birds in nets (Fountain & Ward 1907), of gathering huge numbers of bird eggs (Beveridge 1882), of fishing for crayfish by women (Wyndham 1890) and collecting mussels using the toes (Mitchell 1839; Sturt 1882). Anthropological work carried out in the late 1930s and early 1940s documented the culture, economy and hunting and fishing practices of the Ngarrindjeri of the Lower Murray and its lakes (Bernth 1993). These people captured and ate a large range of fish and other aquatic fauna and flora.

Methods for catching aquatic fauna were many and varied (Lawrence 1971). Fish were speared from the bank, within the water or from canoes (Eyre 1845; Angas 1847); nets were strung across smaller rivers to catch birds disturbed by members of the hunting party downstream (Beveridge 1882; Morey 1952); brush weirs were constructed to trap fish that had swum on to floodplains during high flows (Angas 1847; Kirby 1895; Gilmore 1934); rock chutes – such as at Brewarrina – funnelled fish to places that could be speared easily (Mathews 1903; Dargun 1976); poison or tannins from plants were introduced into the water to bring fish to the surface (Lawrence 1971); and, hooks were used to catch large fish (Gerritsen 2001).

Aquatic plants were also eaten in large quantities. The main species consumed was Cumbungi (Typha sp) (Gott 1999). Indeed, Gott argues that this species could lay claim to being a staple food for Aborigines in southern Australia. The main part of this plant eaten was the fibrous rhizome, but young shoots and young flowers were also consumed (Beveridge 1882; Morey 1952; Lawrence 1971; Gott 1999). Other aquatic plants were also eaten or used in other ways (see below), and include Juncus spp., Phragmites australis (Cav.), Ribbon Weed (Triglochin and/or Vallisneria) and Narrow-leaved Marsilea (Marsilea drummondii [A. Braun]) (Stone 1911). Reports suggest that Typha and other plants were eaten all year round, but that spring and early summer, when floods had receded and starch was greatest in the rhizomes, was the best time for harvesting (Gott 1999).

Aquatic plants and animals contributed to Aboriginal economies much more than just as food. The roots and stems of various plants were chewed and the fibre used to construct bags and nets. Nets were highly prized, as they took a long time to make and were mostly made from aquatic plants (Angas 1847; Taplin 1879; Beveridge 1882, 1889; Fraser 1892; Fountain & Ward 1907; Morey 1952; Gott 1999). Mitchell noted that the nets: ‘... are very well worked, much resembling our own in structure, and they are made of the wild flax, which grows in tufts near the river...' (Mitchell 1839, p. 305). Several types of nets were made, including bag nets to ensnare large fish, drag or seine nets for small fish and crayfish, and even larger nets, as mentioned above, for catching birds. Light spears were made from reeds, which were used to catch fish (Beveridge 1889; Fraser 1892). Plant and animal parts, particularly crayfish antennae and fish bones, were also used for decoration (Angas 1847; Beveridge 1882; Stone 1911). There were also reports of people anointing their bodies with fat taken from Murray Cod for decoration or insulation (Beveridge 1882). The bark of River Red Gums (Eucalyptus camaldulensis Dehn.), was cut to make canoes, shields and carrying devices.

Few studies have attempted to determine the relative importance of food derived from the freshwater environment for Aboriginal people in relatively recent pre-European times. A stable isotope study of bones from Roonka Flat, near Blanchetown, however, has suggested that 40–50% of dietary protein was of terrestrial herbivore origin, 10–15% of terrestrial carnivore origin and 30–40% from freshwater fish and shellfish (Pate 2000). Balme (1995), in a comprehensive analysis of 216 open midden sites along the Darling River and associated lakes in western New South Wales, showed that mussels were the most common item in remains. Fish – mostly Golden Perch (Macquaria ambigua Richardson), River Catfish (Tandanus tandanus Mitchell) – and the Yabby (Cherax destructor Clark) were also common, with mammals and reptiles apparently being less so. More studies of the diet of pre-European Aboriginal people, especially using stable isotope analysis, are possible and desirable.

Modification of the biotic and abiotic environment

Considering that riverine regions were more heavily populated than the arid zones of Australia (Lawrence 1971), that the diversity of types of animals and plants exploited by Indigenous people before European intervention was high and that fishing,
gathering and harvesting were widespread, it is worth asking what impact these practices had on the flora and fauna of river systems. In relation to quantities of resources harvested, at low population densities (e.g. 0.5 people per river kilometre), the pressure on rivers would likely have been relatively slight. Most people, however, lived in bands, which would have meant greater intensity of exploitation for a given stretch of river. When large congregations took place, intensity of exploitation could have been very high, with thousands of fish extracted if the festivals lasted even a few days (Mathews 1903; Dargin 1976). But the more long-term impact on the aquatic resources would have related to the selection processes that Aborigines employed in their harvesting. Fisheries research has shown that targeting particular species, if harvesting intensity is sufficient, will have cascading effects through the food web (Jackson et al. 2001; Frank et al. 2005). Selecting particular size classes of a species will tend to affect population dynamics and influence the evolution of that species. However, the relative influences on the fauna of consistent, low-intensity fishing for the majority of the time (which may have been broader in terms of species selection) versus 'pulsed', high-intensity fishing (which may have been highly selective for particular species) is unknown and warrants consideration.

To elucidate selection of aquatic species or size ranges, appropriate analyses of Murray-Darling Basin middens would be a fruitful area of research. Such analyses are currently virtually non-existent (see, however, Balme 1995). The nature of the geographical distribution of fishing effort by Aboriginal people (i.e. whether fishing pressure was evenly distributed along rivers or limited to popular and productive sites) would also provide insight into likely effects on the fauna. In addition, knowledge of the cultural rules of Aboriginal people, in relation to aquatic animals and plants, would provide insight into how or whether moderation of harvesting practices prevented resources from being exhausted.

Direct extraction of plants and animals was one type of modification of the environment, but Aboriginal people also modified their environment to enhance the capture of food and, in some cases, to enhance the production of food. An example already mentioned is the rock fisheries at Brewarrina, but there were, it seems, many more of these in the Darling River and tributaries (Gilmore 1934, p. 191). The presence of fish in places which would not normally be expected (rock traps like at Brewarrina tended to be more common in the large rivers) to allow fish to move upstream, but to hold them and the water back when the flow in the streams, mostly ephemeral, falling with rain. The death and displacement of the Aborigines, argues that the use of these balks, together with the transport of water back when the flow in the streams, mostly ephemeral, large rivers) to allow fish to move upstream, but to hold them and the water back when the flow in the streams, mostly ephemeral, subsided (Gilmore 1934). Gilmore reported that the once highly abundant balks were destroyed by settlers or replaced with permanent, and much larger dams and claims that ‘... the conservation of fish in streams depended on them [the balks]; and that (as the aborigines taught) without them the great fish would devour the smaller varieties and the end would be loss – a loss that the years since have proved fact’ (Gilmore 1934, p. 194). She also argues that the use of these balks, together with the transport of fish (using hollow logs, baskets and ‘coolamons’) resulted in the presence of fish in places which would not normally be expected to hold fish and gave rise to early settler’s theories about fish falling with rain. The death and displacement of the Aborigines, Gilmore asserts, resulted in the loss of fish, as there: ‘... were no sanctuaries [sic] areas; no close [sic] season for breeding; no selection in netting fish; and, as I said before, the 70 pounders ate the smaller fish, and the once plentiful breeding diminished’ (Gilmore 1934, p. 195).

**Removal of Aboriginal fishing practices and replacement by early commercial fishing practices**

Although many Aboriginal people remain in the districts and continue to have relationships with rivers and their biota, between the late 1830s to the mid-1870s a large number of Murray-Darling Aboriginal people were displaced, forcibly removed to missions or died as a result of settlement of the productive river districts (see, e.g. Matthews 1873, 1893; Curr 1887; Barwick 1971; Jenkin 1979; Robinson 2000). Thus, in a relatively short space of time, Aboriginal people had gone from playing a major role in the ecology of rivers, wetlands and lakes, to playing a very minor role (Curr 1893; Robinson 2000). They were, however, replaced by Europeans who related to the rivers and their biota quite differently.

European commercial fishing of Murray Cod and other species in the Murray River began in 1859 near Echuca, supplying fish to local towns, the goldfields and later to Adelaide, Sydney and Melbourne (Dannevig 1903; Dakin & Kesteven 1938; Rowland 1989). Aboriginal people were recruited to help in this enterprise. Fishing was intense and widespread. The fishermen typically used bag...
were expressed at the state of the fish in the river (any concept of sustainability. It took only 4 years before concerns about the habitat or breeding requirements of the fish, nor that there was any ‘moderation’ of fishing practices occurred that took into account the size and age and ignored spawning times and nursery habitats (The Argus 4 July 1863, 27 May 1864; Macleay et al. 1880; Dannevig 1903; Dakin & Kesteven 1938; Rowland 1989; Royal Commission on Fisheries 1894–96). There was no evidence that Dannevig 1903; Dakin & Kesteven 1938; Rowland 1989; Royal Commission on Fisheries 1894–96). The commercial fishing industry, as documented in commissions of the time, articles in newspapers and later analyses, was intense, exhaustive, took fish regardless of size and age and ignored spawning times and nursery habitats (The Argus 4 July 1863, 27 May 1864), and Royal Commissions into the state of New South Wales fisheries highlighted major concerns about the sustainability of the fish stocks and lack of effective fishing regulations (Royal Commission on Fisheries 1894–96). It appears that in only a few decades, the rivers went from supplying Aboriginal people with a bountiful resource to one which was severely depleted.

What might have been the ecological effects of the removal of Aboriginal people and their replacement by Europeans in the riverine environment?

The following is necessarily speculative, since data do not exist on many aspects of Indigenous and European exploitation of aquatic resources in general, and fish in particular. But it is, I think, worthwhile constructing hypotheses relating to the changing influences and pressures on the fauna and flora of the rivers and wetlands of the Murray-Darling Basin, so that future research has some basis on which to work.

Aboriginal people, as I have described, had lived in the Murray-Darling Basin, exploiting aquatic resources for tens of thousands of years. By definition, this demonstrates that sustainable exploitation occurred. To some extent this is likely to be due to relatively small populations of people; but if evidence from explorers and early anthropological workers can be relied upon, this may also be partly due to cultural rules, taboos and accumulated knowledge; (see, e.g. Krefft 1865; Beveridge 1882; Berndt et al. 1993). Many cases exist of Indigenous peoples from around the world modifying their hunting and fishing practices to avoid the decline of important resources (Berkes et al. 2000). It is logical therefore to conclude that Aboriginal peoples in the Murray-Darling Basin would have been aware of their own potential impact on aquatic flora and fauna and may have modified their management to ensure it did not result in resource decline. Despite our relatively poor knowledge of densities of Indigenous people along rivers and of levels of exploitation, there appears to be enough documentary evidence to suggest that the substituted fishing practices of the early settler commercial fishing industry was immediately qualitatively different and became, in only a few years, quantitatively much greater than those previously employed.

The significance of the above analysis is not merely to note that European commercial fishing had a greater impact on fish populations compared with previous Aboriginal impacts. More importantly, it is to draw attention to potential for the absence of Aboriginal impacts and management practices to have a bearing on subsequent fish populations, particularly in the very early period after Aboriginal displacement. This in turn may have implications for our understanding of what may have been ‘baseline’ populations in the Murray-Darling Basin and raises questions about whether we are considering the full range of river management options in our planning for the future.

To detail one hypothesis, for example, it is possible that before commercial fishing took off, highly palatable species such as Murray Cod, River Catfish, Golden Perch and Silver Perch (Bledius bledius, Mitchell) may have bloomed as fishing pressure on these species cased with declines in Indigenous populations. If this bloom occurred, it may have resulted in reductions in the prey of these larger fish that is small-bodied species such as gudgeons, Australian Smelt (Retropinna semoni (Weber)), rainbowfish and juveniles of larger fish, and crayfish and mussels. Were this the case, cascading effects are likely to have occurred right through the food web. An alternative hypothesis might be that, if Aboriginal use of baits and fish-culture practices had played a significant part in maintaining abundant populations of various fish species, as Gilmore and others have suggested, then it is possible that numbers of those species could have, instead, declined following Aboriginal population decline.

Testing these hypotheses would be very difficult, because of our lack of knowledge of past abundances, distributions and assemblage composition both in time and space. Only about half of the Murray-Darling Basin species had been described by the time commercial fishing started and about a quarter were still to be described when large-scale river regulation operations took off. Nonetheless, such questions need to be asked, and any possible cross-disciplinary research facilitated to gain insight into how fish assemblages and populations responded to such dramatic changes in exploitation by humans. Until such research is conducted, it is reasonable to suggest that scientists need to acknowledge uncertainty not only about estimates of population and assemblage structure but also about which species even existed during this period of rapid change.

How has the role of Aboriginal people and their removal been considered in current ideas on management?

Current management strategies for Murray-Darling Basin rivers in general have pre-European conditions as targets for restoration (MDBC 2003a, 2003b). The goal of the Murray-Darling Basin Commission Native Fish Strategy is to ‘rehabilitate native fish communities in the Murray-Darling Basin to 60% or better of their estimated pre-European settlement levels after 50 years of
Many Indigenous peoples around the world have had sophisticated methods for ensuring the sustainability of their natural resources, and Berkes et al. (2000) argue cogently that there are important lessons that contemporary managers can learn from this Indigenous ecological knowledge. Although we may never have a complete understanding of the exact historical role of Indigenous people in our riverine ecosystems, acknowledging their influence and asking the right questions related to their practices may give greater substance to our attempts at management and restoration.

Concluding remarks

Ecosystems in time can be thought of as a river in space (Fig. 1): the river rises somewhere a long way upstream from an observer on the bank; it exists for enormous distances before it reaches the observer, what he or she sees at this particular spot on the river is a result of everything that has occurred upstream, the processes, inputs, outputs, species, interactions, life and death; some of these will be happening at the observer’s spot on the river, it is true, but many may not even reach there. To describe a river and its components based solely from one spot on it would be naive and intrinsically flawed. As scientists, we need always to be mindful of what has occurred in the past and to learn from it. Yet we, as freshwater ecologists and managers, have largely ignored the role that Indigenous people have played in the ecology of freshwater ecosystems in the Murray-Darling Basin before European settlement. This has been compounded by not considering their removal, and replacement by Europeans, as primary participants in decision-making processes, and the spiritual and cultural significance of rivers and their biota to these groups (Morgan et al. 2004). Although clearly, displacement of large numbers of Aboriginal people from rivers is not a current threat to fish communities – it happened mostly more than 100 years ago - there needs to be some debate relating to how this may have affected fish and whether there is a need to include historical Indigenous exploitation modification or management practices in current management strategies, as they are in some terrestrial environments in northern Australia.

Many Indigenous peoples around the world have had sophisticated methods for ensuring the sustainability of their natural ecosystems. Following consideration of the potential contributions of Indigenous groups, I believe this highlights a blind spot in our thinking and, at least for ecologists, but not necessarily managers, a disregard of history as providing context to our work.

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