

Section 1 Introduction

The 'Action Plan for South Australian Freshwater Fishes' aims to provide information that will help managers and the community alike to better understand the diversity of South Australian freshwater fishes and provide specific information for the protection of threatened species and their habitats. This involves raising awareness of the sorts of things required to improve the status of South Australia's freshwater fish at broad and local scales, to spark ideas of how important actions might be achieved, and importantly identify opportunities for groups or individuals to get involved and make a difference.

The overall objective is to improve the collective status of freshwater fishes in South Australia. This should involve documenting a positive response to actions combined with improved information to enable a downgrading in species status. Specific objectives are to:

- Raise awareness of the presence and plight of freshwater fishes and the need for action.
- Comment on the current state of knowledge and information gaps for threatened fish species.
- Identify priority actions for improving the status of freshwater fishes in South Australia.
- Provide information and options for stakeholders on how they can contribute to conservation.

The targeted users or stakeholders for this document are broad and includes organisations and individuals involved with threatened species, threatened ecological communities, alien species, natural resource management (especially concerning water), habitat protection, and restoration. These stakeholders will be involved in different ways ranging from being decision makers, providing funding and being involved in implementing or undertaking actions (the doers). They will have diverse affiliations ranging from government departments (federal and State), local government, research organisations, educators, funding bodies (government and private sector), non government organisations, community groups and concerned individuals on the land, in business or involved with fish at some level.

The general layout of the document is to firstly provide background information (Section 1), specific reviews of the status and recovery objectives for threatened fishes (Section 2) and an overview of potential threats (Section 3). Section 4 provides a summary and strategic direction for conservation and management options with general supporting information in Section 5.

A "freshwater" fish is defined here as those that spend some or all of their life within inland aquatic habitats (freshwater) as opposed to estuarine or marine environments¹. It is important to note however, that 'fresh water' is often slightly or moderately saline in South Australia. Freshwater fish include species that complete their life cycle inland (obligate freshwater species), diadromous species which move between freshwater and estuarine/marine habitats for one or more lifecycle stages, and select euryhaline species (comfortable in either fresh or salt water) known to complete their lifecycle inland. The correct biological term when referring to more than a few individuals of one fish species or for two or more species, is fishes. However in common use fish and fishes are often used interchangeably. The term 'alien' species is a collective term used to describe species exotic to Australia (*SA Fisheries Management Act 2007*) and Australian native species translocated outside their natural range (can also be referred to as introduced species). A summary of acronyms appearing throughout the text is contained at the start of the document.

1.1. Why be concerned about freshwater fish?

Fishes are one of the most diverse groups of animals on earth and are a key part of aquatic biodiversity. They make up over half the world's vertebrates, and have a huge variation in basic body forms and biology². Around 10,000 known species occur in freshwater which is about 40% of all fishes, a staggering number considering their habitat makes up only a tiny area of the earth's surface (less than 0.01%).

In addition to being species rich, freshwater fish have high levels of genetic diversity³. Most freshwater systems are trapped within small sections of the landscape isolated by physical barriers such as the sea, mountains, waterfalls, and dry areas like deserts. Other biological barriers such as predators and unsuitable habitat also isolate populations to particular areas. Populations isolated for long periods begin to diverge from one another and can become genetically and biologically distinct. Outlying populations at the edge of a species range or in unusual habitat can be quite different (and not easily replaced) and may have accumulated characteristics to help the species adapt to changing conditions in the future.

Being so well represented in aquatic environments, freshwater fishes also have a variety of intrinsic and human related values. For example they are a critical part of conserving aquatic biodiversity, and of complex ecosystems and food chains. Being reliant on underwater habitat for survival they can be indicators of the condition or health of waterways. Some of their roles in the environment are important to humans (e.g. mosquito control) and there is significant cultural value at basic levels such as for food, and more complex interactions (e.g. recreation, mythology). These values combine to make fishes icons for the sustainable use and protection of aquatic habitats.

In addition to their diversity and ecology, a major reason why we should be concerned about freshwater fishes is that they are a group under threat. Around the world they are disappearing at a rapid rate and high numbers are threatened with extinction^{4,5,6,7}. Australia is no exception, with 33 of around 300 species currently listed at risk of extinction under national legislation (*EPBC Act 1999*).

No known species has been recorded as extinct in Australia, but some species may well have disappeared since European settlement without being noticed. There have also been some close calls and many species are now clearly on the verge of extinction. For example the Lake Eacham Rainbowfish disappeared in the 1980s from Lake Eacham on the Atherton Tablelands Queensland (its only known habitat at the time), following the introduction of alien fishes⁸. It was rediscovered in nearby streams but the distinctive lake population has been lost. In Tasmania the Pedder Galaxias rapidly disappeared from its only known habitat of Lake Pedder following threats relating to damming for hydroelectric development and introduced fishes, and is now extinct in the wild^{9,10}. Fortunately the decline was noted in time and a small number of fish were transferred to a habitat outside its natural range where the species does seem to have become established. The Trout Cod, once widespread throughout the southern Murray-Darling Basin, now has only one small natural population remaining on the Murray River near Yarrawonga Victoria¹¹. There are many examples of species clinging to small pockets of ever dwindling habitat especially Barred Galaxias, Redfined Blue-eye, Oxleyan Pygmy Perch and Mary River Cod¹².

1.2. A South Australian perspective

In South Australia many of the concerns relating to freshwater fishes are even more heightened. The region is reputed to be the driest State on the driest inhabited continent on earth, and thus freshwater habitat is very limited and different systems are quite isolated. At the same time there is a surprising diversity of freshwater fishes and consequently the few aquatic habitats are vital for their survival, particularly during dry periods.

Around 60 freshwater fish species have so far been recorded in South Australia (Table 1)¹. They range in size from the mighty Murray Cod which can reach over one metre in length, to the tiny Dwarf Galaxias which has an adult size of 2-3cm (the majority of native species grow no larger than 10cm). Ongoing genetic research at the SA Museum indicates that additional cryptic species are likely to be uncovered and that distinct genetic populations occur in isolated sections of the State^{13,14,15,16}.

The main interest in freshwater fishes in South Australia has traditionally focused on those species with recreational or commercial value in fisheries. Some smaller species have attracted interest in regard to their natural history (e.g. Southern Purple-spotted Gudgeon^{17,18}) but overall this has been minimal. Efforts to understand and conserve native species have fallen behind that of other animal groups. Much recent energy has gone towards highlighting exotic species, especially Carp^{19,20}, such that this species is perhaps better known by the public and researchers than the majority of native species.

Fortunately a new interest in natural resource management has seen native fish become an increasing focus of conservation and management concern. Community and government organisations are taking more holistic approaches to biodiversity conservation and the sustainability of local waterways, to now include underwater components such as fishes. The notion of biodiversity protection and habitat restoration is also becoming more widely accepted and practiced at a State and national level (e.g. Landcare and Catchment groups, 'SA no species loss strategy', national conservation lists and legislation).

Some native fish species have risen to prominence within local management in South Australia. The Flinders Ranges Purple-spotted Gudgeon occurs only in a small section of stream in the rocky north Gammon Ranges. Its home recently came under threat from a proposal for an open cut mine within a National Park, but the conservation of the gudgeon was one of the factors used to lobby for continued protection of the unique local habitat (Figure 1). The Murray Cod (or Ponde) is without doubt our best known fish, being a long term focus of fishing and indeed culture in South Australia. Its significant decline and recent national listing helps to bring home the message regarding the decline in health of the River Murray system, and the urgent need to improve the situation. A much smaller relative of the Murray Cod, the Southern Pygmy Perch, is becoming an icon for restoration and awareness of fishes and aquatic habitat in the Mount Lofty Ranges^{21,22}.



Size extremes of South Australian freshwater fishes - the tiny Dwarf Galaxias and mighty Murray Cod

Tiny fish blocks park mine

EXCLUSIVE

By Political Reporter HUW MORGAN

A TINY fish and a wallaby have sunk a plan to mine in the Gammon Ranges National Park in the state's Far North.

Concern for the habitats of the purple-spotted gudgeon and the yellow-footed rock wallaby have resulted in the State Government refusing access to a company wanting to mine magnesium from the park.

Environment Minister Iain Evans, who visited the park yesterday, has refused the transfer of a mining lease which lies 1.5km along either side of the environmentally sensitive Weetootla Gorge in the remote park, about 700km north of Adelaide.

Adelaide-based company Manna Hill Resources had applied to have the lease transferred from the current holders, BHP. It wanted to mine the area over a 50-year period.

The company had planned to completely excavate two large hills rich in magnesite, which is used in the production of magnesium.

The company believed there was a 20 million tonne deposit in the area.

Manna Hill Resources had also planned to use Weetootla Gorge as an access road for trucks to haul the magnesite to processing plants.

The gorge is home to a range of aquatic life - including the Flinders Ranges subspecies of the purple-spotted gudgeon which grows to about 90mm in length.

● Continued Page 2

The Advertiser

Adelaide, Wednesday, August 30, 2000

Tiny fish ends park mining plans

● From Page 1

The fish is listed as a vulnerable species.

The yellow-footed rock wallaby is also found in the area and is listed as a vulnerable species at state and national levels.

Mr Evans has power over the lease transfer and was required to have an environmental statement prepared.

He said his decision to block the lease transfer was based on "major environmental concerns" presented by the Department for Environment and Heritage and the Wilderness Advisory Committee.

"I am advised that disruption of the natural drainage pattern by



The purple-spotted gudgeon.

removing large portions of nearby hills and construction of an access road along the creeks would represent an unacceptably high impact, with a real risk that the gudgeon would become locally extinct," Mr Evans said.

"Likewise, a mine would remove habitat and cause disturbance

through noise and activity and may have an impact on the quality and quantity of the water source for the yellow-footed rock wallaby, which would be detrimental to its continued existence.

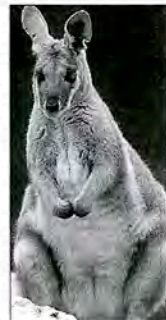
"If you look at all of the environmental values, whether it be the native animal species or

the native vegetation, or just the sheer beauty of the place, in my mind there is no way you can allow mining there."

The news was greeted with elation yesterday by walkers in Weetootla Gorge. One of the walkers, Sue Barker, was director of the South Australian National Parks and Wildlife Service when Weetootla was added to the park in 1982.

"It's tremendous," Ms Barker said. "South Australia would have been a laughing stock if this mine had been allowed to go ahead."

The 128,000ha park attracts more than 20,000 visitors a year.



The yellow-footed rock wallaby.

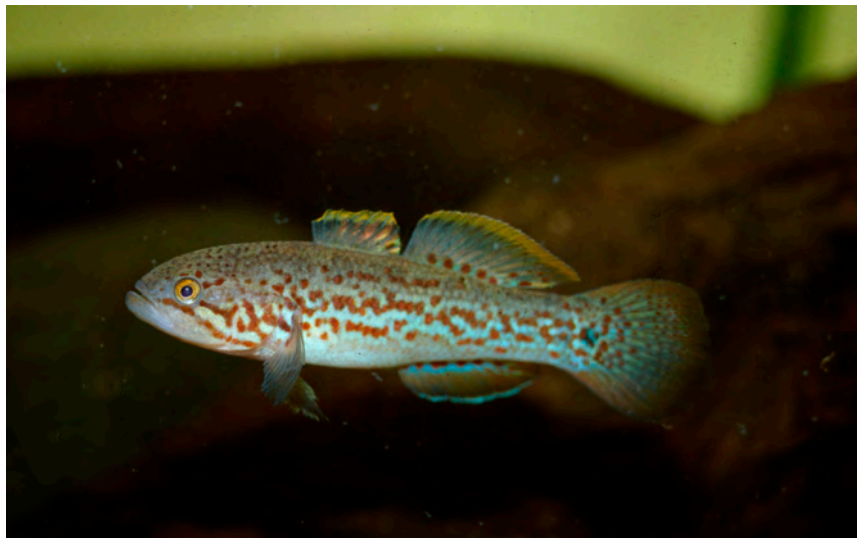
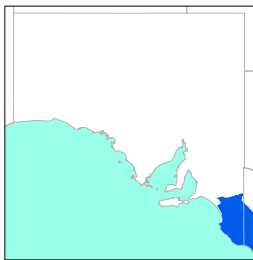


Figure 1. Freshwater fish as icons for sustainable development and ecosystem protection. Newspaper cutting from "the Advertiser" 30th August 2000, with added colour photograph of the Flinders Ranges Purple-spotted Gudgeon.

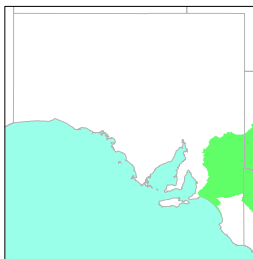
1.3. Fish habitat in South Australia

South Australia is an expansive area (close to one million km²) with considerable variation in climate, geology, hydrology (processes involving water) and human landuse across different sections of the State. For the most part, surface water is generally rare due to low rainfall and a lack of significant mountains (see Figure 2), so any habitats present are important refuge. In fact many people are surprised to learn of the presence of native fish in their local waterway and of the highly varied places native fishes can be found. From tiny mound springs in flat, hot desert landscapes, to small local streams or wetlands, through to urban rivers flowing through Adelaide like the Torrens - most places with permanent water have fish. Some species are even able to colonise some temporary or seasonal habitats.

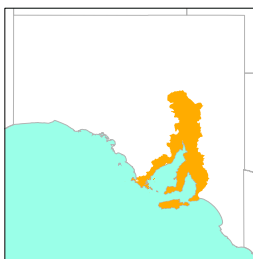
The principal organisation of aquatic habitats in SA is defined by five major Drainage Divisions, each containing different habitats and fishes (Appendix 1 and Appendix 2):



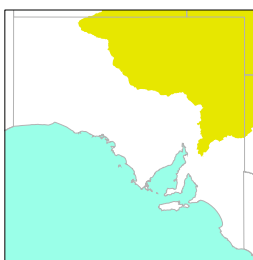
South East Coast - a naturally wetter region of the State containing a diversity of habitats²³. The most significant is spring pools and creeks of the Lower South East especially Ewens Ponds. Mosquito Creek and Henry Creek are important stream refuges. The majority of natural wetland habitat in the region has been drained since European settlement; however remaining habitats include Bool Lagoon, coastal wetlands, and the Dismal Swamp corridor. Drains, while artificial, are the only alternate habitat in many areas (e.g. Drain L and Millicent area) and thus have refuge value.



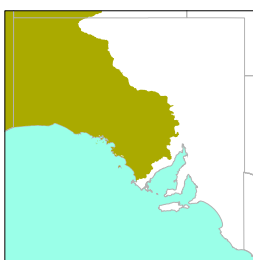
Murray-Darling Basin - the iconic River Murray flows across a third of Australia and ends its journey through South Australia. The main channel itself provides habitat for many species, and is interlinked with wetland and anabranch habitat, including the Chowilla system. Wetland areas of the Lower Lakes are particularly important with high species diversity and many threatened species²⁴. The Eastern Mount Lofty Ranges draining into the Murray and Lower Lakes also contains a variety of streams between Currency Creek to Burra Creek which are important refuges^{22,25}.



South Australian Gulf - a region with several distinct subsections including (a) coastal streams on Kangaroo Island²⁶, (b) the southern Fleurieu Peninsula²⁷, (c) the western Mount Lofty Ranges including larger streams such as the Onkaparinga, Torrens, Gawler and Broughton rivers²⁸, (d) Lake Torrens catchment including Willochra Creek and the western Flinders Ranges and (e) Yorke and Eyre peninsulas (e.g. Tod River, coastal lakes).



Lake Eyre Basin - the desert region in the northeast of the State contain highly unpredictable but unregulated inland waterways such as the Cooper Creek, Diamantina River and Neales River feeding to the core of Lake Eyre, with a surprising variety of fish species for such a harsh environment^{1,29}. Artesian mound springs serve as oases in otherwise desolate landscapes and are hot spots for uniquely adapted fauna, especially Dalhousie Springs^{30,31}. The rugged north Flinders Ranges also has pockets of permanent habitat³².



Western Plateau - very little permanent water exists in the expansive region, nevertheless some coastal lakes contain fishes and there are odd reports from more inland areas^{1,33}.

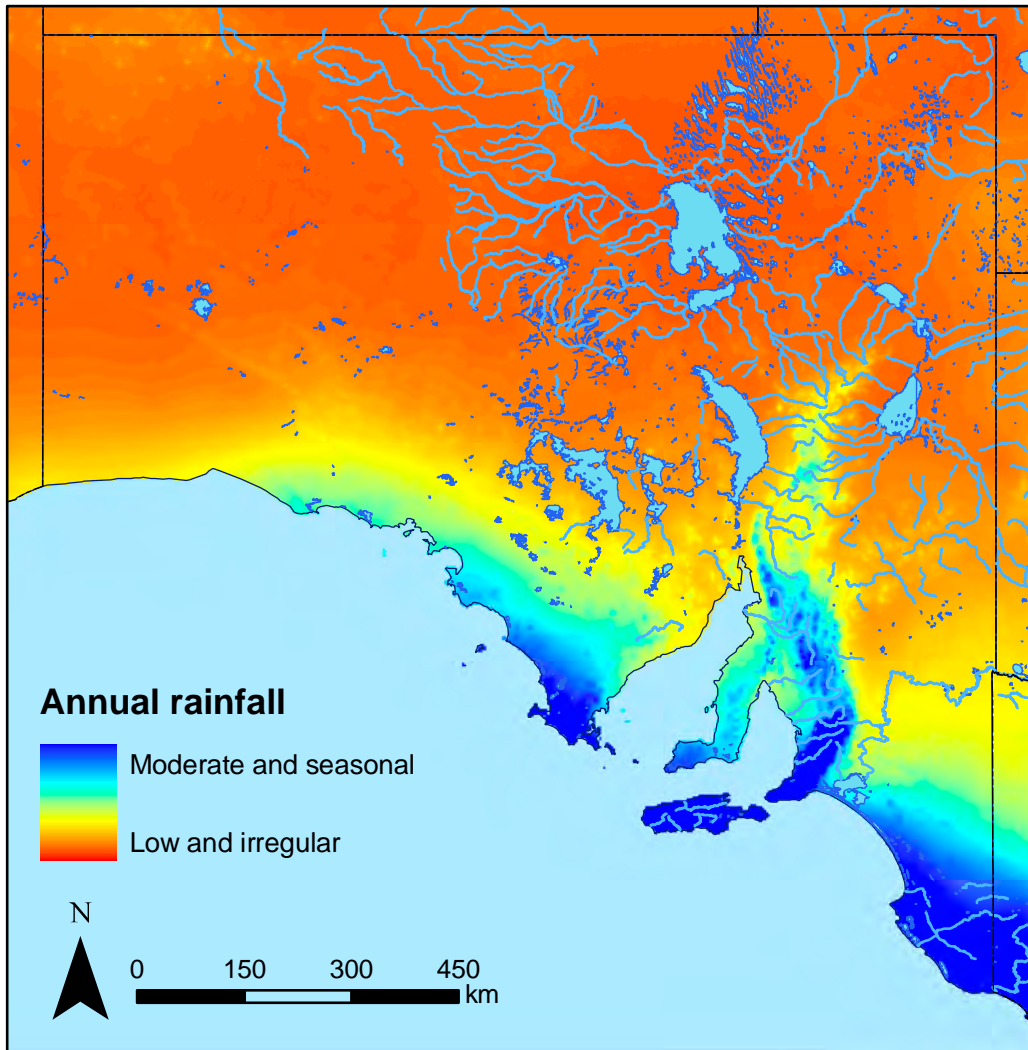


Figure 2. Map showing annual rainfall patterns in South Australia.



Extremes of aquatic habitat in South Australia (Drought and Flood)

1.4. Recognising South Australia's threatened fishes

Threatened species lists are useful in explaining the importance of recovery or loss of species, and can provide a clear social and political mandate for action. Lists can span different levels of management and are normally applied on political boundaries, but should come with particular background information and instructions or cautions on their use (see below). There is an increasing focus on conservation of ecological communities and bioregions rather than isolated species, however broadly-focused projects can overlook more specialised requirements of rare and threatened species and a combined top down and bottom-up approach will likely work best. Species are also more recognisable units within conservation and recovery planning, particularly for the broader community.

There has been an historic lack of information regarding the plight of native freshwater fishes in South Australia which has acted as a severe impediment to their conservation. Species without direct commercial (fishery) value have essentially been left unmanaged. The first indications of concern for some species appeared in the mid-1980s^{34,35}, later followed by a list of eight State 'endangered' species, including several species already presumed locally extinct³⁶. The endangered eight received the official status of 'protected' under State based fisheries legislation (*Fisheries Management Act 2007*). However, no formal plans for action were ever designed or implemented, with the exception of a local recovery outline recently developed for the threatened Southern Pygmy Perch in the Mount Lofty Ranges²². Freshwater and marine fishes are the only vertebrates that do not currently have official conservation status in South Australia. This Action Plan and a separate review for marine species³⁷ aim to address this deficiency.

At a national level a broad framework for protecting fishes is provided in the "Action Plan for Australian Freshwater Fishes"¹². This serves as a useful information source and recovery document for some species which occur wholly or partially within South Australia (although it is now a bit dated). More recently a handful of species have been listed under national legislation (*EPBC Act 1999*) with national recovery plans developed or in progress. Species that are considered common across broader ranges in south eastern Australia, but which are threatened in South Australia, are not considered in national recovery, and regional populations of those species nationally listed may not receive adequate attention to prevent local disappearance from the State.

The first attempt to provide an official State list of threatened freshwater fishes, based on defined criteria, was undertaken from available information at the time (2002) by a panel of experts guided by the Threatened Species Schedule Subcommittee (TSSS) with the intent of listing under the threatened species legislation of the *National Parks and Wildlife Act 1972*^{12,38}. The Draft of this document provided a 2007 update of this list and included extensive supporting material on species status and ways for protecting and conserving South Australia's freshwater fishes. The 2009 final version of the Action Plan includes review to incorporate the latest information on status updates.

1.5. Development of the Action Plan

The initial list of South Australian threatened freshwater fishes revealed that over half the State's native species were threatened. In addition, a large proportion of the listed species were considered highly threatened, requiring urgent attention to prevent their loss from the State. The seriousness of the situation resulted in the TSSS investigating strategies to increase awareness about the plight of freshwater fish in SA. The preparation of an Action Plan was considered one of the most appropriate ways to address the varied and often specific issues relating to freshwater fish conservation, particularly as such a plan would provide valuable background information and also strategies for the recovery of each taxon. Native Fish Australia (SA) has prepared this Action Plan with considerable financial and in-kind support from a number of organisations.

Phase 1 in development of this Action Plan, initiated in 2002, was designed to collect distributional information and literature as background to compiling the 'Action Plan' document. A large component of this involved a review of South Australian Museum specimens to verify identification and any other specimen details to provide an accurate database for faunal mapping and reference. This stage of the review also highlighted some important field survey requirements for gaps in distributional coverage and these were targeted as part of NFA(SA)'s 'Fish Inventory' program^{23,25,27,28}. Phase 1 was undertaken with financial grants from the Nature Foundation (SA) and the Wildlife Conservation Fund, with support of DENR and the SA Museum. Phase 2, completed in 2006, drew on the previous work by collating and interpreting species information (distribution and literature) within the production of species based Recovery Outlines, and an overarching structure (e.g. background to fish and aquatic habitats, threatening processes, regional and species priorities). Funding was obtained through a Threatened Species Network Community Grant from WWF Australia, with GIS and document support provided by DENR. A third phase involving review and production of this document to the 2009 final version involved funding from Department of the Environment, Heritage and the Arts along with numerous parties who are mentioned in the acknowledgements.

1.6. Data sources

The process for obtaining information for assessing species status and informing Recovery Outlines involved three key steps to provide the necessary information:

- A review of historic fish specimens housed in Museums, including a detailed examination of those at the South Australian Museum, Adelaide.
- A literature review to collate survey locations, past and present species distribution records, and biological or management information (with a focus on local sources).
- Mapping the records obtained using GIS software to firstly verify the spatial location of points, and to then map past and present distributions.

Historic records are defined as those before 1990. The main source of historic records for South Australia is with specimens lodged at museums, with a few published studies and other miscellaneous literature reports.



Example of an historic record from the South Australian Museum

Museum data

the majority of records are maintained in the South Australian Museum with smaller but useful data sets at the Australian Museum, Sydney and Victorian Museum, Melbourne, and with a few records from overseas institutions (e.g. Staatliches Museum für Naturkunde, Stuttgart Germany). Databases of museums were searched by direct enquiries with the three main museums mentioned, and by searching online internet catalogues for other records. Museum specimens have the advantage of being able to be inspected to verify identification in the majority of cases.

For the South Australian Museum, a more in-depth examination was made through the physical examination of historic specimens applying current taxonomic keys and checking specimen details. This process generated a wealth of information such as (a) the identification of two new species for South Australia, (b) over 200 updates in identification including for threatened species previously confused with more common ones, (c) lodgement of previously unregistered material to provide additional records, and (d) the addition of information on location, date and insightful notes from original collection details.

Generally museum records are patchy in space and time and are not reliable as a fine scale assessment of distribution and species status. For example, fish specimens deposited at the South Australian Museum often overlook local areas for more exotic locations, or favour unusual or interesting finds rather than being representative for a site or from systematic sampling. They also tend to be biased against larger angling species (these apparently tended to be eaten rather than deposited!). That said the overall coverage is extremely valuable with almost 3000 records extending from as early as the 1860s (Appendix 3). Thus museum records are best used as comparison data for recent surveys, and can help provide indication of fish declines when used in such a way.

Literature reports

records from literature sources need to be carefully assessed as to the reliability of identification (e.g. if voucher specimens or photographs were retained for certain species). Very few published articles with a suitable level of information appeared prior to 1990, and these covered only certain areas of South Australia. A seminal study investigated the distribution of small fishes of the River Murray region in the early 1980s^{35,39}, and a small investigation was undertaken on the Marcollat Watercourse of the South East⁴⁰. Some more extensive and representative sampling for areas around Lake Eyre, Kangaroo Island and the South East between the 1970s and mid-1980s, form part of the collection at the SA Museum. Other information sources include articles mentioning specific locations for species of interest for aquarists in the early 1900s^{41,42}, general accounts of species or regions^{29,32,43,44,45,46,47,48}, carefully scrutinised oral history records in more recent surveys²⁵, and long-term data from commercial fisheries (see later). Although not mapped here, fine scale data has been collected for fishes at Dalhousie Springs in the North East of the State^{30,49}.

Current records include museum records after the start of 1990 (presence only) and records from a hive of activity on the research front, mostly since 2000 covering around 1400 sites. Research data was included as a specific data subset for mapping (i.e. survey sites) to provide a basic assessment of presence and absence of a species from a site. However, this may not necessarily be reliable as it depends on the objectives of the research, types of sampling equipment used, skills of the researchers and time period of investigations, and should be considered as a guide only. Only records that could be validated were included (e.g. where vouchers or photographs provided proof of identify for certain species groups or outlying records). The data sources used for mapping are described below.

Native Fish Australia (SA) has undertaken a series of surveys in the State since 1999 providing baseline information at close to 1000 sites for many regions including: the South East²³, Hindmarsh Island and Lower Lakes^{24,50}, Eastern Mount Lofty Ranges^{25,51,52}, Kangaroo Island²⁶, Adelaide Hills (Torrens and Patawalonga catchments)^{28,53}, parts of the Southern Fleurieu Peninsula^{27,54} and miscellaneous locations across the State^{55,56,57} (see Figure 3).

The Inland Waters branch of SARDI Aquatic Sciences has had an increasing involvement with freshwater fish research in recent times, principally associated with the River Murray region (Appendix 3).

SARDI data sources available for the Action Plan included:

- Sustainable Rivers Audit – part of a Basin wide initiative of the MDBA to monitor river health (pilot phase and first implementation period data).
- Fishway assessments – data from the vicinity of locks 1, 2 and 3.
- Drought monitoring and threatened species monitoring on Hindmarsh Island^{58,59}.
- Wetland baseline survey (see below).
- Commercial Fisheries data – summary catch data for 32 River Reaches from 1990 onwards.

Various other research projects with documented data points (Appendix 3) include:

- Students from the University of Adelaide have undertaken several studies documenting species distribution in the SAMDB^{13,60,61,62,63}.
- ARIDFLO – sites in the Neales, Diamantina and Cooper catchments as part of a long term ecological investigation overseen by DWLBC (2000-2003)⁶⁴.
- Mid North ecology reports – broad scale surveys of fishes in the Gawler, Wakefield, Light, and Broughton river catchments in 1998 and 1999 as part of Department for Environment and Heritage healthy rivers assessments^{65,66,67,68}.
- River Murray Wetlands baseline survey – surveys in wetland habitat along the River Murray (2004 & 2005) conducted for the SAMDB NRM Board^{69,70}.
- AWQC reports - surveys in the Western Mount Lofty region below reservoirs for stream condition assessments and environmental flows^{71,72,73}.

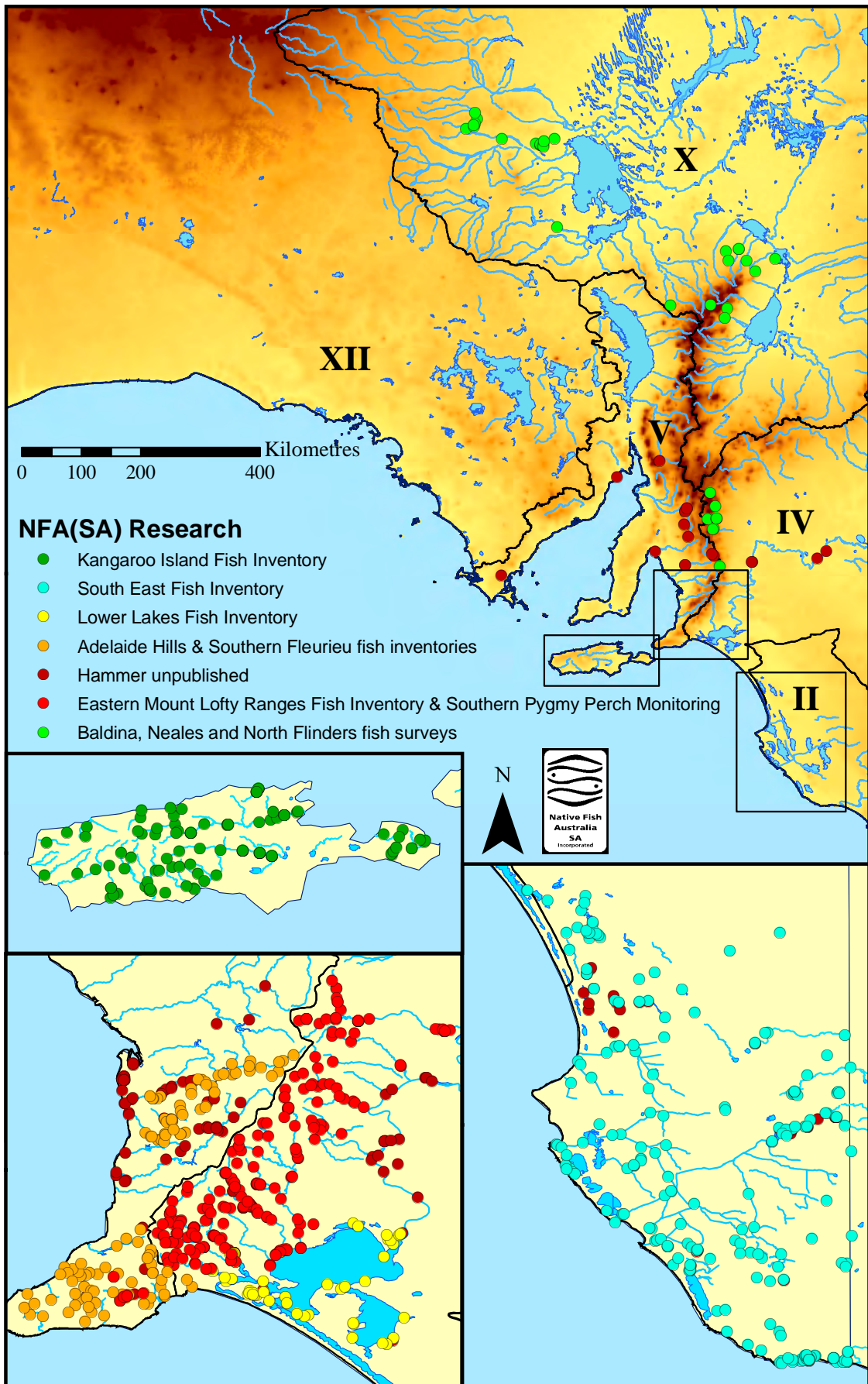


Figure 3. Location of NFA (SA) sampling sites from recent regional surveys in the State (2001-2007).

1.7. Conservation criteria and 2009 list

The criteria used to define threatened fish species here are the same as those applied to other animal and plant groups in South Australia³⁸ and are based on categories and definitions from the internationally accepted IUCN red list process⁶. There are five categories for different levels of extinction risk (listed starting with the highest): Extinct in the wild (EX), Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and Rare (RA). Each category has a set of criteria that need to be met based on information such as the area of habitat the species occupies and recent or inferred declines - all are explained in Appendix 4. The emphasis in this process is on preserving all species known to occur in South Australia and can include protecting species that occasionally move into the State, but that may not necessarily have permanent or sustaining populations.

The assessment process covered the 58 known species in South Australia, 32 of which were considered threatened (Table 1). Hence 55% of the State's species are at risk, with several others close to qualification (see Section 2.4). Many species also occur in habitats which could undergo further deterioration, especially the River Murray, thus rapidly elevating species to higher categories of extinction risk. The breakdown of current risk of extinction by category is:

- Extinct in South Australia – 3 species (5%)
- Critically Endangered – 8 species (14 %)
- Endangered - 9 species (16 %)
- Vulnerable – 9 species (16%)
- Rare – 3 species (5 %)
- Not Listed – 26 species (45 %)

Examining different families, the perches (Percichthyidae) stand out as a highly threatened group having the highest number of threatened species - 8 species or 80% of the family listed (Figure 4). Galaxias (Galaxiidae) also have both high numbers (6) and a high percentage of species listed (85%), followed by hardyheads (Atherinidae) – 4 species (60%) and catfishes (Plotosidae) – 3 species (60%). Several families are represented by single threatened species (100% of State representation) – the lampreys (Geotriidae and Mordaciidae), eels (Anguillidae) and Congolli (Pseudaphritidae).

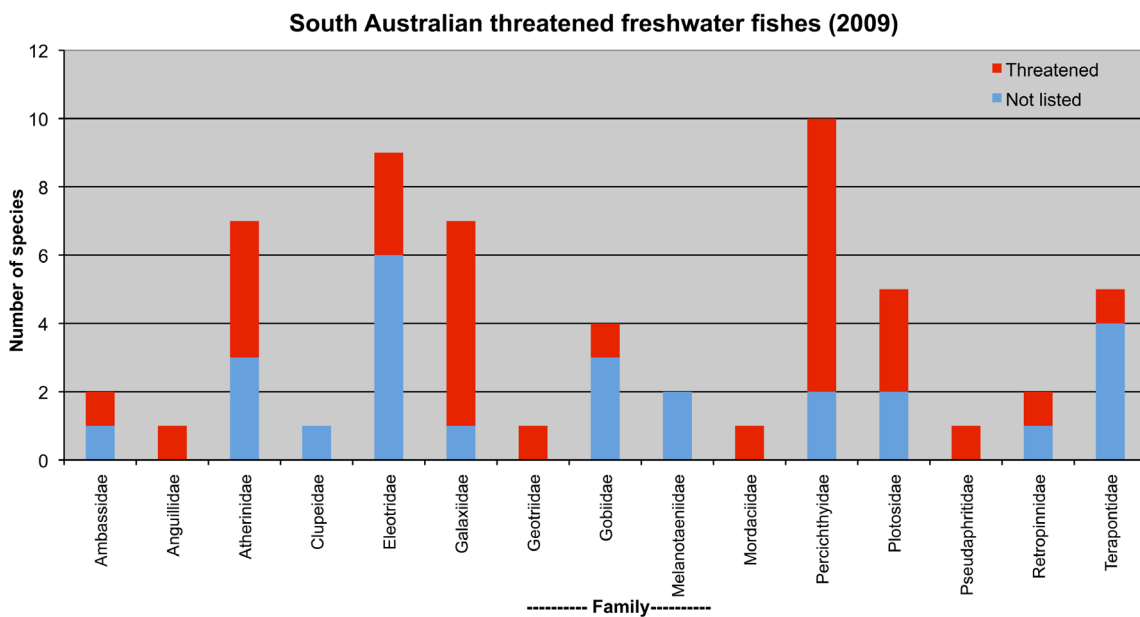


Figure 4. SA threatened fishes by family (2009 Action Plan status).

Table 1. Conservation status of South Australian freshwater fishes (2009).

EX – Extinct in South Australia, CR - Critically Endangered, EN - Endangered, VU – Vulnerable, RA – Rare (IUCN criteria, Appendix 4), P – Protected (*Fisheries Management Act 2007*)
 (*) = SA endemic species.

Taxon	Common name	International <i>IUCN Red List</i>	National <i>EPBC Act 1999</i>	State Fisheries <i>FM Act 2007</i>	Action Plan 2009
<i>Geotria australis</i>	Pouched Lamprey				EN
<i>Mordacia mordax</i>	Shortheaded Lamprey				EN
<i>Anguilla australis australis</i>	Shortfinned Eel				RA
<i>Neosiluroides cooperensis</i>	Cooper Catfish				RA
<i>Neosilurus gloveri</i>	Dalhousie Catfish				VU
<i>Neosilurus hyrtlilii</i>	Hyrtl's Catfish				
<i>Porochilus argenteus</i>	Silver Tandan				
<i>Tandanus tandanus</i>	Freshwater Catfish			P	EN
<i>Nematalosa erebi</i>	Bony Herring				
<i>Prototroctes maraena</i>	Australian Grayling	VU	VU		EN
<i>Retropinna semoni</i>	Smelt				
<i>Galaxias brevipinnis</i>	Climbing Galaxias				RA
<i>Galaxias maculatus</i>	Common Galaxias				
<i>Galaxias olidus</i>	Mountain Galaxias				VU
<i>Galaxias rostratus</i>	Flathead Galaxias	VU			EX
<i>Galaxias truttaceus</i>	Spotted Galaxias				EN
<i>Galaxiella pusilla</i>	Dwarf Galaxias	VU	VU		VU
<i>Neochanna cleaveri</i>	Tasmanian Mudfish				CR
<i>Melanotaenia fluviatilis</i>	Murray Rainbowfish				
<i>Melanotaenia splendida tatei</i>	Desert Rainbowfish				
<i>Atherinosoma microstoma</i>	Smallmouthed Hardyhead				
<i>Craterocephalus dalhousiensis</i>	Dalhousie Hardyhead*	VU			VU
<i>Craterocephalus eyresii</i>	Lake Eyre Hardyhead*				
<i>Craterocephalus fluviatilis</i>	Murray Hardyhead	EN	VU		CR
<i>Craterocephalus gloveri</i>	Glover's Hardyhead*	VU			VU

Table 1. Continued...

<i>Craterocephalus stercusmuscarum fulvus</i>	Unspecked Hardyhead				
<i>Craterocephalus stercusmuscarum ?stercusmuscarum</i>	Flyspecked Hardyhead				VU
<i>Ambassis agassizii</i>	Agassiz's glassfish			P	CR
<i>Ambassis</i> sp.	Northwest glassfish			P	
<i>Gadopsis marmoratus</i>	River Blackfish			P	EN
<i>Maccullochella macquariensis</i>	Trout Cod	EN	EN	P	EX
<i>Maccullochella peelii peelii</i>	Murray Cod		VU		EN
<i>Macquaria ambigua ambigua</i>	Murray-Darling Golden Perch				
<i>Macquaria australasica</i>	Macquarie Perch		EN		EX
<i>Macquaria colonorum</i>	Estuary Perch				EN
<i>Macquaria</i> sp.	Lake Eyre Golden Perch				
<i>Nannoperca australis</i>	Southern Pygmy Perch			P	EN
<i>Nannoperca obscura</i>	Yarra Pygmy Perch	VU	VU	P	CR
<i>Nannoperca variegata</i>	Variiegated Pygmy Perch	VU	VU	P	CR
<i>Amniataba percoides</i>	Banded Grunter				
<i>Bidyanus bidyanus</i>	Silver Perch	VU		P	EN
<i>Bidyanus welchi</i>	Welch's Grunter				
<i>Leiopotherapon unicolor</i>	Spangled Grunter				
<i>Scortum barcoo</i>	Barcoo Grunter				
<i>Pseudaphritis urvillii</i>	Congolli				VU
<i>Hypseleotris klunzingeri</i>	Western Carp Gudgeon				
<i>Hypseleotris</i> sp. 1	Midgley's Carp Gudgeon				
<i>Hypseleotris</i> sp. 3	Murray-Darling Carp Gudgeon				
<i>Hypseleotris</i> spp.	Hybrid forms (e.g. Lake's Carp Gudgeon)				
<i>Mogurnda adspersa</i>	Southern Purple-spotted Gudgeon			P	CR
<i>Mogurnda clivicola</i>	Flinders Ranges Purple-spotted Gudgeon		VU	P	CR

Table 1. Continued...

<i>Mogurnda thermophila</i>	Dalhousie Purple-spotted Gudgeon*			P	VU
<i>Philypnodon grandiceps</i>	Flathead Gudgeon				
<i>Philypnodon macrostomus</i>	Dwarf Flathead Gudgeon				
<i>Chlamydogobius eremius</i>	Desert Goby*				
<i>Chlamydogobius gloveri</i>	Dalhousie Goby*	VU			VU
<i>Pseudogobius olorum</i>	Western Bluespot Goby				
<i>Tasmanogobius lasti</i>	Lagoon Goby				