Action statement No.134

Flora and Fauna Guarantee Act 1988

Yarra Pygmy Perch *Nannoperca obscura*

Department of Environment, Land, Water & Planning

State Government Victoria

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Yarra Pygmy Perch *Nannoperca obscura*

Description

The Yarra Pygmy Perch (*Nannoperca obscura*) is a small perch-like member of the family Percichthyidae that attains a total length of 75 mm (Allen *et al*. 2002). It has an oblong, compressed body, a single deeply-notched dorsal fin and a lateral line that is divided into two parts. The dorsal head profile is relatively straight and the snout pointed. The eye is of moderate size and is situated high on the head, near the dorsal profile. The mouth is small (the maxilla and supplemental bones reaching back to the anterior border of the eye), terminal and oblique. The colour is generally olive-green above, greenish-brown laterally and yellowish-white underneath with several anteriorly pointing, chevron shaped markings on the posterior half of the body. The fins are normally clear to translucent fawn and may have dark margins. At the onset of spawning, the male's pelvic fins become black, the leading edge of the anal fin darkens and the dorsal and anal fins intensify to a brownish-orange colour (McDowall 1980; Cadwallader & Backhouse 1983). Unlike other members of the genus, the Yarra Pygmy Perch has a pre-orbital bone that is not completely covered by skin, exposing its serrated lower edge (Kuiter & Allen 1986).

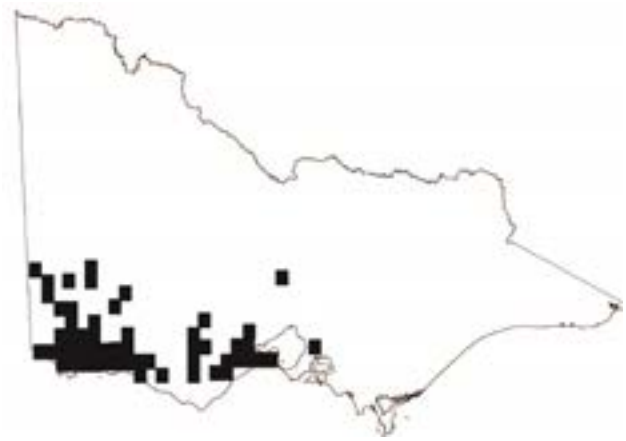
Distribution

The Yarra Pygmy Perch was first described from the lower Yarra River at Melbourne (Klunzinger 1872). It is at present known from 42 locations, extending from Dandenong Creek in Victoria, to Lake Alexandrina in South Australia (Hammer 2001; Saddlier *et al*. 2013). Despite the considerable range, populations are patchy and highly fragmented and characterised by moderate levels of genetic differentiation between sites, implying poor dispersal ability (Hammer *et al*. 2010). Four diagnosable linages have been defined as Evolutionary Significant Units based on genetic criteria: 1. Murray Darling Basin; 2. Glenelg River Basin, Millicent Coast and Mount Emu Creek; 3. Rivers including and immediately surrounding the Merri Catchment, and; 4. Eastern range populations (Hammer *et al.* 2010). As few populations in Victoria have been recently surveyed, current population status and trends are unknown (Saddlier *et al.* 2013). Population monitoring within an extremely restricted range of the species in South Australia during 1999, 2006 and 2008 suggested ongoing declines in the area of occupancy and relative abundance, corresponding to deterioration in spring-flow discharge and habitat (Hammer 2009).

Habitat

The Yarra Pygmy Perch typically occurs in slow-flowing or still waters that possess large amounts of aquatic vegetation (particularly emergent vegetation) such as lakes, ponds and slow-flowing rivers (Kuiter *et al*. 1996; Woodward & Malone 2002). Yarra Pygmy Perch are usually found in small groups and often co-occur with the southern pygmy perch (*Nannoperca australis*), although the former appears to prefer slightly stronger flows (Kuiter *et al*. 1996). Where cohabitation occurs, Yarra Pygmy Perch are often restricted to shallow habitat adjacent to the stream margins due to competition with southern pygmy perch for habitat and space (Woodward and Malone 2002).

Yarra Pygmy Perch (DELWP)



Yarra Pygmy Perch Distribution in Victoria (DELWP 2015)

Life History and Ecology

The Yarra Pygmy Perch is a demersal species that completes its entire life cycle in freshwater (Cadwallader & Backhouse 1983). Little is known about the maximum age of individuals in a population, however, individuals of the species are assumed to be short lived (i.e. <5 yrs). Its diet consists primarily of insects, insect larvae and planktonic crustaceans (Allen 1989). Yarra Pygmy Perch spawn during spring (September to October) at water temperatures of 16 – 24 ºC (Kuiter *et al.* 1996). Very little is known of the breeding biology of this species, although it is assumed that breeding behaviour is similar to the closely related southern pygmy perch, which lays demersal, non-adhesive eggs over aquatic vegetation and the substrate (Llewellyn 1974; Humphries 1995).

Conservation status

National conservation status

Nannoperca obscura is listed as vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Victorian conservation status

Nannoperca obscura is listed as threatened under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act).

Nannoperca obscura is considered vulnerable in Victoria according the Department of Environment, Land, Water and Planning (DELWP)'s *Advisory List of Threatened Vertebrate Fauna* (DSE 2013).

Threats

The Yarra Pygmy Perch has declined in distribution and abundance since European settlement, with the most eastern populations in the lower Yarra River and Dandenong Creek now presumed extinct (Saddlier & Hammer 2010). The majority of extant populations occur at sites that have little or no formal protection from threats, and those that do are exposed to broader threats affecting freshwater habitats and catchments (e.g. extraction of groundwater) (Saddlier et al. 2013). Remaining populations have almost certainly been substantially fragmented and depleted by habitat loss and modification, interactions with introduced species, drought impacts and altered hydrology (Wager & Jackson 1993; Kuiter et al. 1996; Saddlier et al. 2013). The likely short life, poor dispersal ability, and currently fragmented, patchy and variable nature of remaining habitat makes the species extremely vulnerable to localised extinction. In addition, reduced flooding and loss of habitat linkages greatly reduce the species ability to recolonise habitats. The major current and suspected threats are detailed as follows.

Standard threat	Source of threat	Explanation
Habitat damage or loss	Water – level/ flow changes	Considerable areas of freshwater wetlands have/are being lost to agriculture, urban and industrial development through drainage and infilling.
	Animal – domestic stock	Damage from unrestricted stock access has a major impact on shallow wetlands through disturbance, infilling and siltation, increased turbidity, and removal and destruction of instream and riparian habitat.
Surface water - quantity/regime	Water – level/ flow changes	Direct extraction of water for stock and agricultural practices is a common problem. So too is damming of feeder tributaries for the same purpose. Resulting reduction of flows may impact not only the amount of water available (particularly during summer months), but may reduce the level of flushing flows that are required to clear sedimentation from the stream bed.
Competition	Animals – other species	The presence of eastern gambusia (*Gambusia holbrooki*) at a number of sites is of concern. Eastern gambusia are known to predate and be aggressive toward native species, to compete for food resources and habitat, and are implicated in the decline of more than 30 fish species worldwide, at least nine of which are found in Australia (Macdonald and Tonkin 2008).

Carnivory	Animals – other species	Predation by redfin perch (*Perca fluviatilis*) and brown trout (*Salmo trutta*) has been implicated as contributing to the decline of a number of native species.
Surface water - quality	Agricultural chemicals/ effluent	Agricultural run-off can directly affect water quality via increased input of sediment and contaminants such as pesticides and herbicides. It may also increase the risk of algal blooms through increased water nutrient levels and sedimentation.
	Animals – domestic stock	Destruction of instream vegetation results in decreases in water quality through increased nutrient run-off, sedimentation, summer water temperatures, a reduction in bank stability, and erosion and sedimentation.
	Water - turbidity	Instability of steam banks and bed caused by unrestricted stock access has a direct effect on turbidity levels, particularly during rainfall events. Elevated turbidity levels have both short-term and long-term impacts upon habitat and breeding success of many species of freshwater fish species.

Important populations

Catchment	Location name	Land manager	Bioregion
CORANGAMITE	Curdies River, Scotts Creek and tributaries	DELWP	Warrnambool Plain
	Fitzroy River and Darlot Creek, Portland Coast	DELWP	Warrnambool Plain
	Gnarkeet Creek	DELWP	Victorian Volcanic Plain
	Hospital Swamp, Barwon River	DELWP	Otway Plain
	Moorabool River	DELWP	Victorian Vocanic Plain
	Pennyroyal Creek	DELWP	Otway Plain
	Reedy Lake, Barwon River	DELWP	Otway Plain
	Thompsons Creek	DELWP	Otway Plain
	Waurn Ponds Creek, Barwon River	DELWP	Victorian Volcanic Plain
	Woady Yallock River	DELWP	Victorian Volcanic Plain
GLENELG HOPKINS	Long Swamp	DELWP	Bridgewater
	McRae Creek, Glenelg River	DELWP	Dundas Tablelands

GLENELG HOPKINS	Merino Creek, Glenelg River	DELWP	Dundas Tablelands
	Miakite Creek, Glenelg River	DELWP	Dundas Tablelands
	Mount Emu Creek, Hopkins River	DELWP	Victorian Volcanic Plain
	Spring Creek and Merri River, Hopkins River	DELWP	Victorian Volcanic Plain
	Wannon River	DELWP	Dundas Tablelands
PORT PHILLIP & WESTERNPORT	Deep Creek, Maribyrnong River	DELWP	Central Victorian Uplands
WIMMERA	Mosquito Creek, Millicent Coast	DELWP	Wimmera

Past management actions

Action	Result explanation
Determine distribution and abundance	Distributional data for Victoria has been collected from ad hoc surveys, with the extent and abundance of many populations not being fully quantified (Saddlier *et al*. 2013). In 2014 a population model was developed by DELWP for the Deep Creek population (Actions for Biodiversity Conservation, 2015).
Determine habitat characteristics and requirements	A study of the relationship between fish communities and condition of the Glenelg River between Rocklands Reservoir and Casterton undertaken in early 2000s (ARI 2003).
Threat identification	Threats to individual populations and recommended actions were identified in isolated studies of Waurn Ponds Creek (Close et al. 2002) and Thompsons Creek (Zampatti 2001, McKinnon and Ryan 2008). In 2008 a number of sites on the Barwon River, Waurn Ponds, Pennyroyal Creek, Gnarkeet Chain of Ponds, Woady Yaloak River, Thompson Creek, Curdies River and Merrigig Creek were surveyed with the aim of determining the current state of the populations during a known drought period, documenting potential threats and identifying remedial actions A study on the management of a range of threatened fish species (including Yarra Pygmy Perch) was conducted for the Curdies River, Sutherland Creek, Woady Yallock Creek, Thompsons Creek, Pennyroyal Creek, Waurn Ponds Creek and the Barwon River (Saddlier *et al.* 2009).
Recreational fish stocking	Decision made to not stock golden perch (*Macquaria ambigua*), outside the species natural range into catchments with pygmy perch populations present (Saddlier *et al.* 2013).

Protection and revegetation	In 2010/11 a large scale river restoration project was commenced by Glenelg Hopkins Catchment Management Authority in the upper Glenelg. This project encompassed several streams identified as important as Yarra Pygmy Perch sites. The project is part of the four year large scale river restoration project. Habitat works, including fencing, revegetation and weed control have been undertaken along the Crawford River from the Crawford River Regional Park to the confluence of the Glenelg River with the aim to protect and reinstate Yarra and variegated pygmy perch habitat. An extensive stretch of Deep Creek (Maribyrnong River) immediately downstream of Doggett's Bridge on the Lancefield-Kilmore Road has been fenced off to stop cattle access. Sections of Curdies River have been fenced under Landcare and Swamp Scrub projects.
Genetics investigation	Phylogeographic structure of Yarra Pygmy Perch investigated in 2010 (see Hammer *et al.* 2010). Broader level systematics confirmed Yarra Pygmy Perch as a single well defined species (Unmack *et al.* 2011). Fine-scale landscape genetics (gene flow) and individual genotyping (including paternity) have been initiated (Carvalho *et al.* 2011) Investigation as to freshwater phylogeographic patterns in south-east Australian pygmy perches suggest hybridisation has historically occurred between Yarra Pygmy Perch and Southern Pygmy perch in at least one catchment (Unmack *et al.* 2013).
National Recovery Plan	A National Recovery Plan was developed for the species in 2010.

Conservation objectives

Long term objective

To ensure the Yarra Pygmy Perch can survive, flourish and retain its potential for evolutionary development in the wild.

Objectives of this Action Statement

- To increase knowledge of biology, ecology or management requirements
- To secure populations or habitat from potentially incompatible land use or catastrophic loss
- To increase the number of populations or individuals
- To increase community awareness and support

Intended management actions

The intended management actions listed below are further elaborated in DELWP's Actions for Biodiversity Conservation (ABC) system. Detailed information about the actions and locations, including priorities, is held in this system and will be provided annually to land managers and other authorities.

Standard objective	Objective explanation
To increase knowledge of biology, ecology or management requirements	To increase knowledge of biology, ecology and management requirements to better achieve conservation goals

Standard action	Details	Responsible agents
Develop detailed population monitoring protocols	Develop standardised monitoring protocol.	DELWP
Conduct survey to confirm existing records	Conduct survey to confirm existing records and define current condition.	DELWP
Conduct survey to locate additional populations	Conduct surveys in areas not previously targeted to identify unknown populations of Yarra Pygmy Perch.	DELWP
Undertake detailed population monitoring and collect demographic information	Establish a network of monitoring sites. Conduct population monitoring and determine population viability.	DELWP
Undertake genetic research	Determine implications of population partitioning.	DELWP
Identify core habitat	Investigate habitat requirements of life stages. Develop and test a predictive habitat model.	DELWP
Conduct priority research projects as specified	Determine maximum water salinity and dissolved oxygen limits. Determine specifics of negative interactions with introduced Eastern gambusia (*Gambusia holbrooki*) and Redfin perch (*Perca fluviatilus*). Identify location and extent of potential drought refugia at sites which contain important populations. Develop a broad-scale drought contingency plan.	DELWP

Standard objective	Objective explanation
To secure populations or habitat from potentially incompatible land use or catastrophic loss	Secure populations or habitat from potentially incompatible land use or catastrophic loss to improve conservation outcomes

Standard action	Details	Responsible agents
Assess threats	Identify current and potential threats to populations. Prepare threat management approaches for all priority sites in consultation with all relevant stakeholders.	DELWP
Restore habitat	Prioritise the protection and restoration of habitat at sites supporting Yarra Pygmy Perch populations.	DELWP, CMAs, Melbourne Water

Erect/maintain fence to exclude domestic stock	Fence waterways which contain Yarra Pygmy Perch populations to allow either natural regeneration or replanting of riparian zone.	DELWP, CMAs, Melbourne Water
Liaise with private landholders	Protect populations on private land / waters by private-land management agreements, where possible. Liaise with adjacent landholders to encourage protection and raise awareness of species requirements.	DELWP, CMAs
Negotiate a formal management agreement with a public authority	Protect populations on public land by negotiating agreements and land covenants.	DELWP, CMAs
Liaise with government agencies	Liaise with water management agencies to ensure Yarra Pygmy Perch are included in planning requirements for works and environmental flow management and regional waterway strategies.	DELWP
Control introduced animals	Apply agreed risk assessment protocols such as those under the Protocol for the Translocation of Fish in Victorian Inland Public Waters, to proposals to stock non-native or non-indigenous fish into waters supporting populations of Yarra Pygmy Perch.	DELWP
Determine environmental flow requirements and develop detailed plan	Investigate minimum water levels required to support self-sustaining Yarra Pygmy Perch populations. This data will be valuable in determining flows necessary to maintain viable populations, and will be particularly important in determining the effects of climate change on populations.	DELWP, Melbourne Water
Salvage populations/ individuals	Where a population is under immediate threat of extinction, translocate a suitable number of individuals to either a site containing suitable habitat and water security in the wild, or to a captive breeding facility. Once conditions improve, re-establish the population at site of origin.	DELWP

Standard objective	**Objective explanation**	
To increase number of populations or individuals	To increase number of Yarra Pygmy Perch populations	
Standard action	**Details**	**Responsible agents**
Identify potential sites for reintroduction/translocation	Evaluate and select suitable translocation sites.	DELWP

Undertake captive breeding for reintroduction or enforcement	Investigate the feasibility of establishing captive breeding populations with a view to re-establishing populations in the wild from their most appropriate genetic stock.	DELWP
Prepare a plan for reintroduction/ reinforcement/translocation	Prepare a translocation plan and protocols.	DELWP

Standard objective	**Objective explanation**	
To increase community awareness and support	To increase community awareness and support of Yarra Pygmy Perch populations	
Standard action	**Details**	**Responsible agents**
Develop, publish and distribute educational, technical or publicity material and/or displays	Provide information to land and water managers, stakeholders and the public.	DELWP, CMAs, Melbourne Water
Involve community groups and volunteers in recovery activities.	Identify opportunities for community involvement in the conservation of the Yarra Pygmy Perch. Advocate the species as an icon for communities.	DELWP, CMAs

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