

# Action statement

*Flora & Fauna Guarantee Act 1988*

## Murray Hardyhead (*Craterocephalus fluviatilis*)

Taxon ID: 4784

Action statements are developed under the *Flora and Fauna Guarantee Act 1988* (FFG Act). Their preparation and implementation complement the FFG Act strategy *Protecting Victoria's Environment – Biodiversity 2037* and its vision that “Victoria’s biodiversity is healthy, valued and actively cared for”.

### Species and Distribution



Murray Hardyhead. Image by Andrew Geschke.



Murray Hardyhead Victorian Biodiversity Atlas (VBA) records since 1970. See [NatureKit](#) for an interactive map. The Murray Hardyhead also occurs outside of Victoria.

### Conservation Status

#### Critically Endangered

**Listing criteria:** 3.1.1, 3.1.2(a), (b)(i,ii,iii,iv,v) of the Flora and Fauna Guarantee Regulations 2020.

This means that:

- it has undergone, is suspected to have undergone, or is likely to undergo in the immediate future, a very severe reduction in population size; and
- its geographic distribution is extremely restricted; and
- the distribution of the population or habitat of the taxon is severely fragmented; and
- it is restricted to a limited number of areas that are subject to the same threat or suite of threats that can impact all individuals present; and
- there is a continuing decline or reduction in:
  - its extent of occurrence; and
  - area of occupancy; and
  - the area, extent or quality of habitat; and
  - the number of locations or subpopulations; and
  - the number of mature individuals; and
- there are extreme fluctuations in the numbers of mature individuals.

**Corresponding International Union for the Conservation of Nature (IUCN) criteria:** A3ce+4ace; B1ab(i,ii,iii,iv,v)c(iv)+2ab(i,ii,iii,iv,v)c(iv)

More information on IUCN listing criteria can be found here: [IUCN Red List of Threatened Species](#)

## Species Information

Species information such as its description, distribution, ecology and references are provided in the [Murray Hardyhead Species Forecast Report](#).

## Threats

Threats listed below have been identified through expert consultation and published literature.

Threat	Description
<b>Climate change</b>	
Altered rainfall regime	<ul style="list-style-type: none"> <li>A reduction in rainfall will reduce the extent of potential habitat and the amount of environmental water available to support the recovery of Murray Hardyhead.</li> </ul>
<b>Habitat loss, degradation or modification</b>	
Barriers to movement	<ul style="list-style-type: none"> <li>As a result of river regulation and barriers to movement, few opportunities exist for dispersal.</li> </ul>
Loss of aquatic macrophytes	<ul style="list-style-type: none"> <li>Aquatic macrophytes (plants) have been lost in many river and wetland systems in the former range of Murray Hardyhead. These plants provide habitat for spawning and shelter.</li> </ul>
<b>Altered hydrology</b>	
Altered flow regimes	<ul style="list-style-type: none"> <li>River regulation has reduced inundation of floodplains (both magnitude and frequency), limited connections between wetlands, and constrained dispersal. This is impairing recolonisation of sites and genetic exchange.</li> </ul>
Altered wetland flows	<ul style="list-style-type: none"> <li>Reduced runoff from irrigation modernisation at several wetlands (Cardross Lakes, Woorinen North Lake and Round Lake, Disher Creek Evaporation Basin and Berri Evaporation Basin), has altered wetland water regimes and reduced the size of subpopulations.</li> </ul>
<b>Water properties</b>	
Changes to salinity	<ul style="list-style-type: none"> <li>At some sites, decreased inflow and water levels have caused inappropriate salinity concentrations at critical times, such as during the breeding season (spring months) when high salinity concentrations can be lethal to eggs and larvae.</li> </ul>
<b>Introduced species</b>	
Introduced freshwater fish	<ul style="list-style-type: none"> <li>An increase in abundance of introduced fish species, including Eastern Gambusia (<i>Gambusia holbrooki</i>), Redfin (<i>Perca fluviatilis</i>), and European Carp (<i>Cyprinus carpio</i>) has occurred at off-channel wetlands where salinity is lower, due to a combination of freshwater inflows and groundwater.</li> <li>Competition from Eastern Gambusia, predation by Redfin, and poorer water quality and habitat decline caused by European Carp, are likely to have led to the decline in abundance and distribution of Murray Hardyhead.</li> </ul>

Threat	Description
	<ul style="list-style-type: none"> <li>In saline wetlands however, Murray Hardyhead can outcompete/out survive impacts from introduced fish, as the species is more tolerant to salinity than the introduced fish.</li> </ul>
Population dynamics	
Loss of genetic diversity	<ul style="list-style-type: none"> <li>Subpopulations are at risk of decline in genetic diversity, especially following drought when the size of subpopulations is small.</li> </ul>

## Conservation Objectives

Conservation objectives are informed by the conservation status and criteria (derived from IUCN) in which the species was listed under the FFG Act. This provides a framework to understand how we can work towards recovery and improve the species' conservation status over time as per the objectives of the FFG Act.

The key objectives of this action statement are:

- Mitigate threats to populations and habitat to increase resilience, increase genetic diversity and minimise future population decline.
- Establish at least two new viable populations within its historic range.
- Increase knowledge of biology, ecology, distribution, demography, emerging threats, and conservation requirements.
- Support community participation and improve awareness of the Murray Hardyhead and conservation of wetland environments.

## Conservation Actions

The actions below have been identified through expert consultation, published literature and spatial analysis. Actions are listed in alphabetical order to allow all interested parties to prioritise based on their context, capacity and capability. Landscape scale actions may mitigate threats for other species. For more information on where to undertake actions that benefit multiple species and identify the most beneficial locations to undertake actions for this species, please refer to [NatureKit](#).

Action	Description
Community engagement	<ul style="list-style-type: none"> <li>Promote awareness of the Murray Hardyhead, including the importance of environmental water for the persistence and recovery of Murray Hardyhead (and other wetland species), and identify opportunities for community involvement in their conservation.</li> <li>Engage with catchment managers and landholders to identify potential refuge sites on private land.</li> <li>Publicise results of Murray Hardyhead investigations.</li> </ul>
Maintain genetic diversity	<ul style="list-style-type: none"> <li>Supplement subpopulations by natural stocking among wetlands, to maintain genetic diversity.</li> </ul>
Monitor and survey	<ul style="list-style-type: none"> <li>Undertake population, habitat and threat monitoring every two years.</li> <li>Undertake monthly water quality monitoring, particularly at saline sites.</li> <li>Use eDNA survey methods to identify new populations.</li> </ul>

Action	Description
Provide environmental flows	<ul style="list-style-type: none"> <li>• Ensure Murray Hardyhead ecological requirements are considered in Environmental Water Management Plans and Seasonal Watering Plans.</li> <li>• Where possible, provide environmental water to maintain optimal water regimes for Murray Hardyhead at existing populations. Such a regime includes filling wetlands in spring, followed by natural drawdown over summer, and maintaining a salinity concentration of ~12 parts per thousand (PPT) in the breeding period (spring), and 30–40 PPT at other times.</li> <li>• Provide environmental water delivery to identified translocation sites where possible.</li> </ul>
Research	<ul style="list-style-type: none"> <li>• Investigate interactions between introduced Eastern Gambusia and Redfin and Murray Hardyhead, to inform management actions.</li> <li>• Investigate the extent to which the presence and abundance of aquatic plants provide refuge for Murray Hardyhead from introduced fish species.</li> </ul>
Translocation	<ul style="list-style-type: none"> <li>• Prepare and implement a translocation plan to establish at least two subpopulations in Victoria. The plan should consider translocations from interstate to previously important sites in Victoria, and potential new sites.</li> <li>• Identify, establish, and maintain critical insurance populations through surrogate refuge sites (including farm dams and natural sites on lower floodplains), to supplement at-risk subpopulations when required.</li> </ul>

## Past Actions

The key conservation management actions listed below have been delivered in the past 10 years.

Past action	Description
Environmental watering	<ul style="list-style-type: none"> <li>• Environmental water has been delivered to wetlands with suitable habitat and known locations, to manage water and salinity regimes for the recovery of the species.</li> </ul>
Recovery plan	<ul style="list-style-type: none"> <li>• A National Recovery Plan was published in 2008, and a revised plan was in draft at the time of preparing this action statement (2023).</li> </ul>
Research	<ul style="list-style-type: none"> <li>• Research into the salinity tolerance in the early development stages of Murray Hardyhead (eggs, larvae and juveniles), was undertaken in 2020.</li> <li>• A genetic assessment of the population structure throughout the range of Murray Hardyhead was undertaken to determine the evolutionarily significant limits of the species.</li> </ul>
Survey and monitoring	<ul style="list-style-type: none"> <li>• Monitoring of water quality has been undertaken irregularly/at low frequency at most sites, and more frequently (~monthly) at a small number of sites.</li> <li>• Monitoring of fish, habitat and zooplankton in extant populations has been undertaken irregularly/at low frequency, but more frequently since 2017.</li> </ul>
Translocation	<ul style="list-style-type: none"> <li>• Translocations have occurred into some extant locations and wetlands identified as suitable habitat.</li> </ul>

## Decision Support Tools

Decision making for conservation actions is supported through the following Victorian Government tools which may be of assistance in choosing the most appropriate or beneficial actions for biodiversity:

- [Choosing actions for nature: NatureKit](#)
- [Biodiversity Knowledge Framework](#)

## Further Information

- [Murray Hardyhead Species Forecast Report](#)
- [Threatened Species Assessment report – Murray Hardyhead \(\*Craterocephalus fluviatilis\*\)](#)
- [Victoria's changing climate – understanding the impacts of climate change in Victoria](#)
- [Commonwealth Species Profile and Threats database](#)
- [Flora and Fauna Guarantee Regulations 2020](#)
- [IUCN Red List criteria descriptions](#)

## Get Involved and Take Action

If you are interested in supporting this species' recovery, there are some important things you need to consider.

The Department of Energy, Environment and Climate Action (DEECA) is committed to engaging and partnering with Traditional Owners on how they wish to be involved in the planning and implementation of actions for this species. Steps must be taken to avoid harm and where appropriate ensure actions can deliver cultural benefits.

You can find advice about required approvals, land manager / owner permissions, options and incentives for private land conservation, and engagement with Traditional Owners and public land managers here: [Action statements \(environment.vic.gov.au\)](#)

To identify the relevant Traditional Owners, use the [Aboriginal Cultural Heritage Register and Information System \(ACHRIS\) Welcome to Country and Acknowledgements Map](#).

Interested parties are encouraged to work together across community, government, private and public land managers and Traditional Owners to undertake these actions and secure funding for their implementation.

You can also register your interest in taking action so we can connect you to other people or organisations working to help us secure the future for this species at [threatened.species@deeca.vic.gov.au](mailto:threatened.species@deeca.vic.gov.au)

## Reporting Actions

Activity data is critical to monitoring the implementation and progress of actions and evaluating action statements. These data are also used to:

- Determine progress towards achieving the contributing targets for [Protecting Victoria's Environment – Biodiversity 2037](#).
- Inform the five-yearly State of the Environment Report.

For guidance on reporting actions undertaken on this species, refer to [Activity Data](#).

## Submitting Monitoring Data

The Victorian Biodiversity Atlas (VBA) provides a foundational dataset showing where biodiversity occurs across the Victorian landscape and how it may have changed over time. As a core input for decision support tools that inform conservation action, public land management, research activities and reporting, we encourage all participants in the delivery of on-ground actions to submit species records, including for weeds and introduced animals, as they carry out their projects.

For further information see: Victorian Biodiversity Atlas ([environment.vic.gov.au](http://environment.vic.gov.au))

Sign up and begin submitting your data today at: <https://vba.biodiversity.vic.gov.au/>

### Acknowledgment

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partner, and meaningfully engage, with Victoria's Traditional Owners and Aboriginal communities to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations in the 21st century and beyond.



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