

# Action statement

*Flora & Fauna Guarantee Act 1988*

## Dwarf Galaxias (*Galaxiella pusilla*)

Taxon ID: 4701

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



Dwarf Galaxias. Image by Rhys Coleman.



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

### Conservation Status

#### Endangered

**Listing criteria:** 4.1.2(a),(b)(i,ii,iii,iv,v) of the Flora and Fauna Guarantee Regulations 2020.

This means that:

- The Dwarf Galaxias’ geographic distribution is highly restricted; and
- the distribution of the population or habitat 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
  - its area of occupancy; and
  - the area, extent or quality of habitat; and
  - the number of locations or subpopulations; and
  - the number of mature individuals.

**Corresponding International Union for the Conservation of Nature (IUCN) criteria:** B2ab(i,ii,iii,iv,v).

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

## Species Information

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

## Threats

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

Threat	Description
<b>Altered hydrology</b>	
Altered water regime	<ul style="list-style-type: none"> <li>Changes to flow or water regimes (including natural wetting and drying cycles) which do not align with the Dwarf Galaxias' needs may impact habitat suitability, recruitment and/or mortality, and ultimately site occupancy. Hydrologic connections that permanently inundate habitats may increase the rate and extent of predator and competitor dispersal.</li> </ul>
Altered wetland water regime	<ul style="list-style-type: none"> <li>Changes to wetland hydrology, because of local wetland draining or hydrological changes upstream or in the surrounding landscape, and/or groundwater extraction can lead to habitat loss.</li> </ul>
Changes to groundwater	<ul style="list-style-type: none"> <li>Changes to groundwater height or salinity may impact vegetation health, degrade habitat, and potentially impact populations through changes in recruitment and/or mortality.</li> </ul>
<b>Habitat loss, degradation, or modification</b>	
Degradation of riparian and/or wetland vegetation	<ul style="list-style-type: none"> <li>Degradation of vegetation in riparian and wetland habitats reduces habitat extent and/or condition through erosion and sedimentation, potentially impacting species persistence.</li> <li>The disturbance and removal of riparian vegetation can have significant effects on water temperature because of reduced shading, especially in shallow wetland areas during summer. This can also reduce leaf litter input (required by many invertebrates which in turn are a food source for the Dwarf Galaxias).</li> </ul>
Land use change	<ul style="list-style-type: none"> <li>Damage from livestock trampling or cultivation of wetlands when they are dry can lead to damage or the loss of wetland habitat for the Dwarf Galaxias.</li> </ul>
Livestock	<ul style="list-style-type: none"> <li>Livestock can cause habitat degradation through the combined effects of herbivory, trampling, soil compaction, soil erosion, pugging of wet areas, and excess nutrient loads. Trampling by livestock can damage crayfish burrows which provide refugia for Dwarf Galaxias during the dry summer months.</li> </ul>
Plantation operations	<ul style="list-style-type: none"> <li>Establishment of new plantations and operations in existing plantations may cause run-off from track networks and increase the risk of sedimentation that may damage the species habitat and cause mortality of individuals. Catchment hydrology may be further altered by plantation operations reducing the amount of available habitat for the species. These impacts may be exacerbated by climate change or influenced by other activities in the catchment</li> <li>Pesticide spray drift may damage habitat and result in mortality of individuals.</li> </ul>

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| Reduced wetland area | <ul style="list-style-type: none"> <li>Wetlands act as an important refuge area for the Dwarf Galaxias during dry conditions. These areas may be impacted through changes in land use, groundwater levels, surface flows, and/or rainfall, resulting in reduced habitat extent and/or condition.</li> </ul> |
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### Introduced species

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| Introduced fish | <ul style="list-style-type: none"> <li>Introduced fish can degrade habitat, impact water quality, disrupt ecosystem function, and/or impact directly on individuals through predation (e.g., larvae) or fin nipping of adults, and competition for resources. Dwarf Galaxias are highly susceptible to predation by introduced Redfin Perch (<i>Perca fluviatilis</i>) and the Eastern Gambusia (<i>Gambusia holbrooki</i>).</li> <li>Predation by, and/or competition with other introduced species, such as Brown Trout (<i>Salmo trutta</i>), Rainbow Trout (<i>Oncorhynchus mykiss</i>), Goldfish (<i>Carrasius auratus</i>), and Oriental Weatherloach (<i>Misgurnus anguillicaudatus</i>), might also pose a threat where they have invaded Dwarf Galaxias habitat. The European Carp (<i>Cyprinus carpio</i>) damages aquatic vegetation, reducing suitable habitat for the Dwarf Galaxias.</li> </ul> |
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### Human disturbance

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| Construction, development and/or infrastructure | <ul style="list-style-type: none"> <li>Construction and development may result in direct removal of habitat, or indirect impacts to habitat through changes to water regime. The fragmented nature of remaining habitat across the landscape and variability between seasons and years, makes the Dwarf Galaxias vulnerable to local extinctions.</li> <li>Changes to natural flood and drying cycles, particularly in wetlands and shallow creeks, through activities such as construction of dams, levees, channels and pipes and direct abstraction of water, pose threats to Dwarf Galaxias habitat.</li> </ul> |
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### Climate Change

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| Altered rainfall and temperature regimes      | <ul style="list-style-type: none"> <li>Reduced annual rainfall and increased maximum temperatures will reduce the availability of refuge habitat during warmer months.</li> </ul>   |
| Changes in seasonal weather cues              | <ul style="list-style-type: none"> <li>Long-term changes to temperature and rainfall patterns may impact seasonal reproduction and recruitment events.</li> </ul>   |
| Extreme weather events                        | <ul style="list-style-type: none"> <li>Climate change may increase the frequency and intensity of storms and flooding, increasing erosion, impacting habitat condition, and potentially reducing the frequency of off-stream habitat watering events (e.g., billabongs).</li> </ul>   |
| Increased frequency and/or length of droughts | <ul style="list-style-type: none"> <li>Drying and warming of the environment, including droughts, will impact on flow regimes and may lead to habitat changes, and impact recruitment and/or mortality rates. The availability and quality of shallow freshwater habitats is expected to decline under these climate change conditions, adding pressure to the remaining Dwarf Galaxias populations.</li> </ul> |

### Fire

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| Altered fire regimes | <ul style="list-style-type: none"> <li>Frequent or intense fire and resultant loss of vegetation in the catchment and riparian zone can increase sediment inflows from catchments and change water properties. This can include altered water chemistry, increased water temperature and reduced dissolved oxygen – which can degrade habitat and cause mortality. Post-fire debris flows may create new barriers to movement.</li> <li>Fires can alter catchment hydrology, affecting habitat condition and extent.</li> </ul> |
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- Instream barriers can prevent natural recolonisation after fires.
- A hotter, drier climate may increase the likelihood or frequency of fire impacting habitat, with the potential to reduce habitat extent and/or condition.

Emergency response	<ul style="list-style-type: none"> <li>• Some emergency response activities (e.g., vegetation clearance and/or earthworks) can inadvertently lead to alterations in habitat, vegetation structure, flows or erosion, and mortality of individuals.</li> <li>• Fire retardant (including foams) can release chemicals into Dwarf Galaxias habitat which may be toxic to the species.</li> </ul>
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### Pollutants and toxicants

Pesticide use	<ul style="list-style-type: none"> <li>• Pesticides (including chemicals used to control plants, fungi, invertebrates, and vertebrates) can impact invertebrate populations, having flow-on effects to species that rely on invertebrates as a food source. Pesticides may also be a threat to burrowing crayfish and further reduce refuge habitat for Dwarf Galaxias.</li> <li>• Spray drift from herbicide application adjacent to streams and wetlands to control introduced plants may lead to loss of or damage to habitat and may impact recruitment and cause mortality of the Dwarf Galaxias.</li> </ul>
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Pollution from terrestrial sources	<ul style="list-style-type: none"> <li>• Land-based runoff and pollutants pose a threat to aquatic species and ecosystems, either through direct impacts on health, recruitment and/or mortality, or indirectly by affecting food availability and/or habitat condition. Illegal discharge, dumping or accidental spills of chemicals directly into stormwater or waterways (e.g., heavy metals, hydrocarbons, pesticides, surfactants) may directly or indirectly threaten Dwarf Galaxias populations.</li> </ul>
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### Population dynamics

Loss of genetic diversity	<ul style="list-style-type: none"> <li>• Small, greatly reduced, and/or isolated populations are at increased risk of loss of genetic diversity, which leads to a heightened risk of reduced recruitment and/or increased mortality rates.</li> </ul>
Population fragmentation	<ul style="list-style-type: none"> <li>• Fragmentation of once connected populations into smaller, isolated populations increases the risk of extinction following dry years or other disturbance events such as bushfires.</li> </ul>
Small population size	<ul style="list-style-type: none"> <li>• Small populations have lower resilience to the risk of stochastic events and increased risk of genetic decline.</li> </ul>

## Conservation Objectives

Conservation objectives are informed by the conservation status and criteria under 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 and minimise future population decline.
- Increase the Dwarf Galaxias range and/or extent, by providing opportunities for natural movement.
- Increase knowledge of biology, ecology, distribution, demography, emerging threats, and conservation requirements.
- Support community participation and improve awareness of the Dwarf Galaxias and conservation of its habitat.

## 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 and awareness	<ul style="list-style-type: none"> <li>• Continue to raise land manager and broader community awareness of the importance of protecting habitat and managing threats.</li> <li>• Work with key stakeholders to reduce threats and encourage behaviours that support a healthy environment.</li> <li>• Increase landholder awareness of the Dwarf Galaxias and the impacts of livestock grazing and pesticide use near waterways to the species and its habitat. Provide guidance on the changes to grazing that may be required to support the recovery of the species, such as exclusion from riparian areas and wetlands.</li> <li>• Continue to identify, promote and support opportunities for community involvement in conservation efforts.</li> </ul>
Conservation management planning	<ul style="list-style-type: none"> <li>• Review and update, or develop, relevant plans or planning tools to support conservation management of Dwarf Galaxias.</li> </ul>
Control introduced fish	<ul style="list-style-type: none"> <li>• Implement and maintain effective management and control of introduced fish in priority areas. Prevent any further release of invasive predatory fish into catchments where Dwarf Galaxias currently occur and where reintroductions are prioritised.</li> </ul>
Develop, update and apply forestry protections	<ul style="list-style-type: none"> <li>• Incorporate measures to protect relevant environmental values into timber harvesting plans for plantations.</li> </ul>
Ex-situ management	<ul style="list-style-type: none"> <li>• Establish and maintain ex-situ populations (with appropriate genetic management practices) in suitable secure sites, to service the conservation objectives of the Dwarf Galaxias.</li> </ul>
Genetic rescue	<ul style="list-style-type: none"> <li>• Investigate options for improving resilience through enhancing genetic exchange via physically linking populations, translocation, or genetic management in an ex-situ setting.</li> </ul>
Identify and protect refuges	<ul style="list-style-type: none"> <li>• Identify and protect habitat areas that provide important refugia from disturbance events (e.g., fire), significant weather events (e.g., drought) and invasive fish (e.g., Eastern Gambusia).</li> </ul>
Improve habitat connectivity	<ul style="list-style-type: none"> <li>• Restore habitat and/or provide appropriate engineering solutions to improve connectivity between habitat patches where feasible.</li> </ul>
Manage built infrastructure	<ul style="list-style-type: none"> <li>• Consider the Dwarf Galaxias requirements in the placement and design of built infrastructure near key habitat (including irrigation channel design, dams and levees). Include planning for appropriate buffers to limit off-site impacts of infrastructure.</li> </ul>

Action	Description
Manage environmental water	<ul style="list-style-type: none"> <li>Manage water regimes and water quality to support retention, restoration and/or creation of habitat and/or population persistence.</li> </ul>
Manage impacts from natural disaster events	<ul style="list-style-type: none"> <li>Identify and implement recovery actions for vulnerable populations impacted by natural disaster events (e.g., significant bushfire, flood events or extreme drought). Undertake salvage translocation by removing a proportion of individuals for ex-situ management in aquaculture facilities or natural refuges (appropriate farm dams) until the risk abates and fish can be returned or translocated.</li> </ul>
Protect key habitat	<ul style="list-style-type: none"> <li>Minimise alterations to hydrological regimes upstream or in surrounding landscapes.</li> </ul>
Research	<ul style="list-style-type: none"> <li>Investigate barriers to translocation success to inform management.</li> <li>Investigate the impacts of known threats and potential management actions to mitigate them.</li> <li>Improve understanding of reproductive requirements and factors influencing recruitment success (including impacts from introduced fish). Also quantify links between river and wetland flows, survival and recruitment dynamics to guide flow management.</li> <li>Improve understanding of the Dwarf Galaxias' movements and/or dispersal and habitat requirements to inform habitat restoration guidelines.</li> <li>Undertake habitat assessments in priority catchments to further identify habitat critical to the survival of the Dwarf Galaxias.</li> <li>Further investigate the ability of Dwarf Galaxias to survive in dry conditions i.e., aestivate.</li> </ul>
Restoration and/or revegetation *	<ul style="list-style-type: none"> <li>Undertake restoration and/or revegetation to increase habitat suitability and/or create new habitat areas.</li> <li>Restore vegetated buffers along the stream drainage network (wet or dry, stream channel to headwater drainage lines), within catchment(s) where the Dwarf Galaxias occurs.</li> </ul>
Survey and monitoring	<ul style="list-style-type: none"> <li>Monitor populations at known sites and other suitable locations to assess distribution, population trends and habitat condition.</li> <li>Monitor the impact of threats to inform management interventions.</li> <li>Undertake targeted field surveys to confirm the extent of all known populations and seek to discover previously undetected populations based on predicted habitat and ecological information.</li> <li>Monitor representative populations to determine trends and management needs.</li> </ul>
Translocation	<ul style="list-style-type: none"> <li>Investigate the need, and if required, design and implement, translocation programs to meet the objectives of the action statement and ensure prioritised waterways are within the species historical range.</li> </ul>

\*Indicates landscape-scale actions that may deliver benefits to multiple species

## Past Actions

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

Past action	Description
Develop, update and apply forestry protections	<ul style="list-style-type: none"> <li>The risk of forestry operations was considered for the Dwarf Galaxias in 2020 under the Victorian Government Threatened Species and Communities Risk Assessment. Additional protections were not found to be required.</li> </ul>
Research	<ul style="list-style-type: none"> <li>Population genetic studies across the entire range of the species were completed in 2013.</li> <li>The taxonomic status of the Dwarf Galaxias was reviewed, the geographic distribution of the species revised, and habitat characteristics detailed in 2015.</li> <li>Parasites in some populations of the Dwarf Galaxias were identified in 2016.</li> <li>Persistence of Dwarf Galaxias in habitats prone to drying was investigated in 2017 and compared to <i>Gambusia</i> drying tolerance to identify habitat drying a management tool for control of <i>Gambusia</i>.</li> <li>Dandenong Creek Habitat restoration paper completed in 2018.</li> <li>A study on the potential threat of urban stormwater wetlands to Dwarf Galaxias was completed in 2018.</li> <li>The impacts of Eastern <i>Gambusia</i> on various life stages of Dwarf Galaxias were investigated and the benefits of habitat drying regimes were modelled in 2020.</li> <li>A study of the use of eDNA to establish the presence of the Dwarf Galaxias was completed in 2020.</li> </ul>
Survey and monitoring	<ul style="list-style-type: none"> <li>Surveys of known Dwarf Galaxias populations across the species entire range were undertaken as part of genetic studies in 2010 and 2013.</li> <li>Targeted surveys are conducted at least annually at Melbourne Water's Dwarf Galaxias habitat wetland in the Dandenong Creek catchment.</li> <li>Environmental DNA (eDNA) surveys have been undertaken across Greater Melbourne as part of Melbourne Water's Healthy Waterways Strategy Monitoring, Evaluation, Reporting and Improvement Framework.</li> </ul>
Translocation	<ul style="list-style-type: none"> <li>A population in the Dandenong Creek catchment has been established by Melbourne Water to service the conservation objectives of the Dwarf Galaxias in Greater Melbourne with translocations currently underway. A captive breeding program is also underway led by a private operator in the Gippsland region.</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

- [Dwarf Galaxias Species Forecast Report](#)
- [Threatened Species Assessment report – Dwarf Galaxias \(\*Galaxiella pusilla\*\)](#)
- [Commonwealth Species Profile and Threats database](#)
- [Victoria's changing climate – understanding the impacts of climate change in Victoria](#)
- [Commonwealth Threat Abatement Plans](#)
- [Code of Practice for Timber Production 2014](#)
- [Genetic Risk Index](#)
- [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 and/or 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](#).

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 and observations, including for introduced plants and animals, as they carry out their projects.

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

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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ISSN 1448-9902 (online)

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