
MONARO ACCLIMATISATION SOCIETY
SINCE 1937

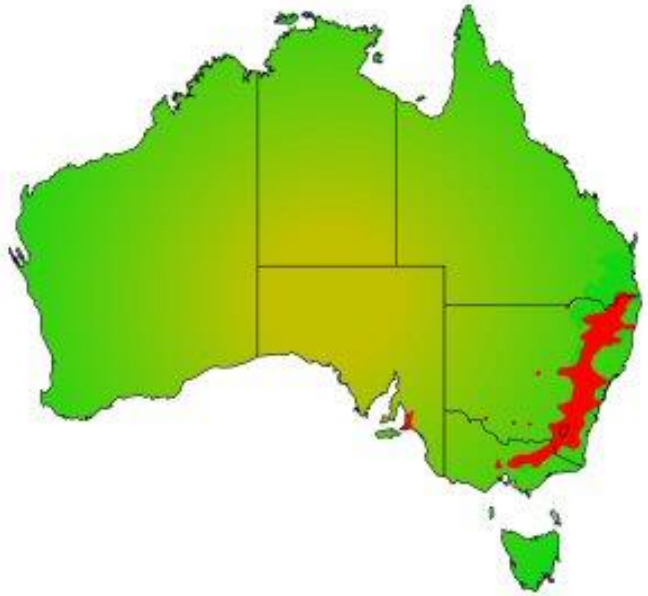
The Galaxiidae

The Galaxiidae is arguably the most widespread freshwater fish family of southern-temperate affinity in terms of geographic spread across continents (South America, South Africa, Australia, New Caledonia and New Zealand) and altitudinal range, occurring from sea level to more than 2000 m above sea level

With 47 valid extant species world-wide, galaxiids have reached a particularly high level of species richness in Australia and New Zealand, with 20 endemic species each. Eight additional species have so far been described from fossil remains in New Zealand.

Galaxias olidus

Commonly called the Mountain Galaxias, Galaxias olidus has a broad distribution on both sides of the Great Dividing Range on mainland Australia, extending from near Toowoomba in southern Queensland, through New South Wales and Victoria, to Kangaroo Island in South Australia. A small species less than 135mm in length, it occupies freshwater streams and larger rivers, commonly in foothill and montane areas and extending into alpine reaches, though it is also found in lowland zones. G. olidus completes its entire life-cycle in freshwater and is the most widespread species of non-diadromous galaxiid in Australia.



Galaxias *olidus* is not just one fish, it is a species complex and in 2014 around 15 individual species were identified and described with three additional species that had been identified and described at earlier dates.

The list of species now includes;

Galaxias aequipinnis	East Gippsland Galaxias	**Endangered Vic.**	Bemm River Catchment
Galaxias Arcanus	Riffle Galaxias	**Not Listed NSW & Vic.**	Upper Murray Catchment
Galaxias brevissimus	Short Tail Galaxias	**Critically Endangered NSW**	Tuross River Catchment
Galaxias fuscus	Barred galaxias	**Critically Endangered Vic.**	Goulburn River Catchment
Galaxias guniakurnai	Shaw Galaxias	**Critically Endangered Vic.**	Yalmi River Catchment
Galaxias lanceolatus	Tapered Galaxias	**Critically Endangered Vic.**	Thompson River Catchment
Galaxias longifundus	West Gippsland Galaxias	**Threatened Vic.**	La Trobe River Catchment
Galaxias Mcdowalli	McDowall's Galaxias	**Critically Endangered Vic.**	Lower Snowy River Catchment
Galaxias mungadhan	Dargo Galaxias	**Critically Endangered Vic.**	Dargo River Catchment
Galaxia oliros	Obscure Galaxias	**Threatened IUCN**	Murray River Catchment
Galaxias ornatus	Ornate Galaxias	**Threatened IUCN**	Coastal Central Victoria
Galaxias supremus	Kosciuszko Galaxias	**Critically Endangered NSW**	Upper Kosciuszko Drainage
Galaxias tantangara	Stocky Galaxias	**Critically Endangered NSW**	Tantangara Creek
Galaxias terenasus	Roundsnout Galaxias	**Endangered IUCN**	Mid Snowy Catchment
Galaxias terenasus	Roundsnout Galaxias	**Critically Endangered Vic.**	Cann & Genoa Rivers

IUCN

International Union for Conservation of Nature

Red List

Dr Tarmo Raadik – Arthur Rylan Institute for Environmental Research

Associate Professor Mark Lintermans – Australian Society for Fish Biology

All Mountain Galaxias listed except *Galaxias Arcanus*. All listed under criteria B (a).

EPBC Act

Environment Protection and Biodiversity Conservation Act

Australian Government Canberra

Conservation Advice released 2023 for *Galaxias terenasus*.

Listed as endangered

Fisheries Management Act

New South Wales Government

Dr Dean Gilligan – Was Senior research scientist, NSW Department of Primary Industries – Now with Bush Heritage Australia,Freshwater & Wetland Ecologist.

Galaxias terenasus not listed in NSW

SUMMARY OF THE FIVE CRITERIA (A-E) USED TO EVALUATE IF A TAXON BELONGS IN AN IUCN RED LIST THREATENED CATEGORY (CRITICALLY ENDANGERED, ENDANGERED OR VULNERABLE).[1]

A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3 & A4	≥ 80%	≥ 50%	≥ 30%

A1 Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased.

A2 Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

A3 Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years) *[(a) cannot be used for A3]*.

A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

based on any of the following:

(a) direct observation *(except A3)*
(b) an index of abundance appropriate to the taxon
(c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality
(d) actual or potential levels of exploitation
(e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)

	Critically Endangered	Endangered	Vulnerable
B1. Extent of occurrence (EOO)	< 100 km²	< 5,000 km²	< 20,000 km²
B2. Area of occupancy (AOO)	< 10 km²	< 500 km²	< 2,000 km²
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented **OR** Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: **(i)** extent of occurrence; **(ii)** area of occupancy; **(iii)** area, extent and/or quality of habitat; **(iv)** number of locations or subpopulations; **(v)** number of mature individuals			
(c) Extreme fluctuations in any of: **(i)** extent of occurrence; **(ii)** area of occupancy; **(iii)** number of locations or subpopulations; **(iv)** number of mature individuals			

C. Small population size and decline

	Critically Endangered	Endangered	Vulnerable
Number of mature individuals	< 250	< 2,500	< 10,000
AND at least one of C1 or C2			
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2. An observed, estimated, projected or inferred continuing decline AND at least 1 of the following 3 conditions:			
(a) (i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(ii) % of mature individuals in one subpopulation =	90–100%	95–100%	100%
(b) Extreme fluctuations in the number of mature individuals			

D. Very small or restricted population

	Critically Endangered	Endangered	Vulnerable
D. Number of mature individuals	< 50	< 250	D1. < 1,000
D2. *Only applies to the VU category* Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.	-	-	D2. typically: AOO < 20 km² or number of locations ≤ 5

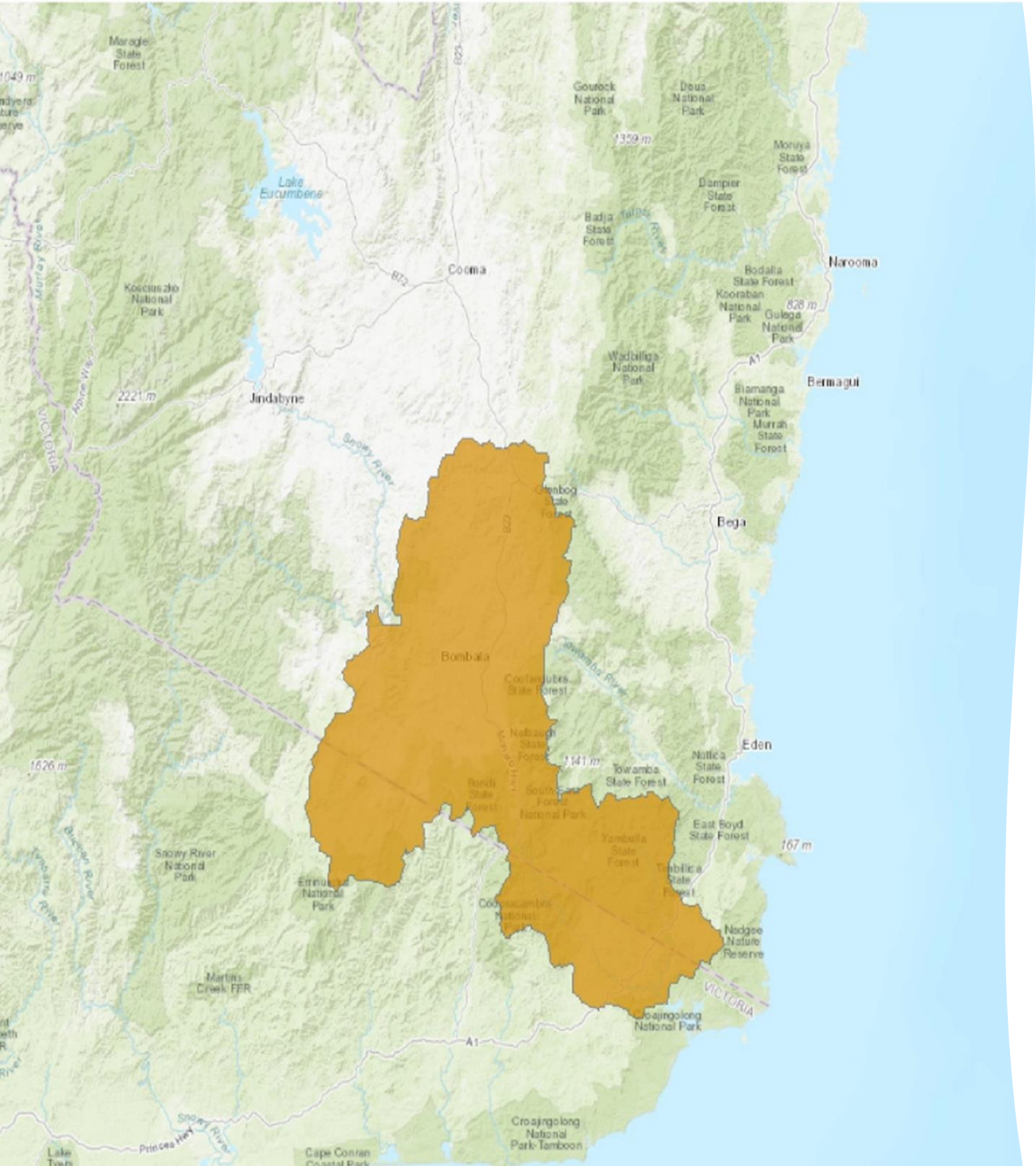
E. Quantitative Analysis

	Critically Endangered	Endangered	Vulnerable
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in

1 Use of this summary sheet requires full understanding of the *IUCN Red List Categories and Criteria* and *Guidelines for Using the IUCN Red List Categorie*
Please refer to both documents for explanations of terms and concepts used here.

Galaxias *olidus* 15 from 1

- Evolved in wet rainforest millions of years ago
- Became isolated as landscape changed from wet to dry sclerophyll
- Adapted in isolation as river interconnectivity changed with the dryer environment
- DNA and genetics becoming fragile through isolation
- Prone to disease and parasites
- Physical differences within the group of 15 is very small
- Populations generally in decline and in need of protection



Galaxias *terenasus (roundsnout)*

- **Roundsnout Galaxias**

Found;

- **Cann River, Genoa River, Wallagaraugh River.**

- **Snowy River, Maclaughlin River, Delegate River**
- **Bobundara Creek, Cambalong Creek.**

- **Likely to exist in every stream small and large within the shaded area**

- **Habitat.** Typically recorded from clear water in slow to moderately flowing creeks to large rivers (1.0–12.0 m average width and 0.1–0.6 m average depth), flowing through light to heavily forested (and shaded) catchments, consisting predominantly of pools, glides and riffles with smaller areas of still backwaters. Also recorded from modified streams in areas almost completely cleared for grazing. Substrate usually consists of bedrock, boulder, cobble and coarse sand with smaller amounts of pebble, gravel and silt and instream cover is typically provided predominantly by rock, timber debris, and smaller amounts of aquatic vegetation, leaf litter and bank and vegetation overhang.

Redfin Perch

- **Galaxias *terenasus*** are able to survive amongst populations of trout in the Genoa and Cann river systems. Within the Snowy river complex, the Bombala, Cambalong, Delegate and Little Plains rivers G. terenasus survives amongst both Redfin perch and trout though the mechanisms of predator-avoidance are unknown but may include occupying habitat marginal to these preditor threats; the majority of G. terenasus collected from the Maclaughlin River were located in shallow riffle areas about 0.1m or less in depth (and not in pools). Areas of the Genoa River may be marginal for trout due to degradation and higher water temperatures. Additional sampling in the mid Snowy River system, the upper Cann River catchment, and the Wallagaraugh and upper Genoa River systems, is required to more accurately define the specific distribution of this species

Quoted from the EPBC Act Conservation Advice

- In NSW, the majority of sampling for the roundsnout galaxias occurred between 2011–15 (D Gilligan 2021. pers comm 15 June). Over this period, surveys counted 762 individuals and over **100 additional observations** were made from the Delegate, Snowy, Maclaughlin and Genoa rivers, and Cambalong Creek (D Gilligan 2021. pers comm 15 June). Sampling data was standardised to account for catch per unit effort (CPUE), which indicated that the NSW subpopulation was stable or increasing in abundance (D Gilligan 2021. pers comm 15 June).

Quoted from the EPBC Act Conservation Advice

- However, as surveys have not occurred since 2015, there is still uncertainty on the true extent of the NSW subpopulation as the roundsnout galaxias population continues to be impacted by the presence of salmonids and redfin, and likely the 2019–20 bushfires.

Trout Stocking Bans

The Snowy River

Between junction with Bulgundara and Bobundara Creek including tribs

The Maclaughlin River

Between Allan Caldwell Bridge and junction with Spring Flat Creek including tribs

The Cambalong Creek

Between Gunningrach Road crossing and junction with the Bombala River including tribs

The Delegate River

Between junction with Riverview and Church Creeks including tribs


Climate change means
• Warmer water
• More Droughts
• More prevalent bush fires with greater intensity

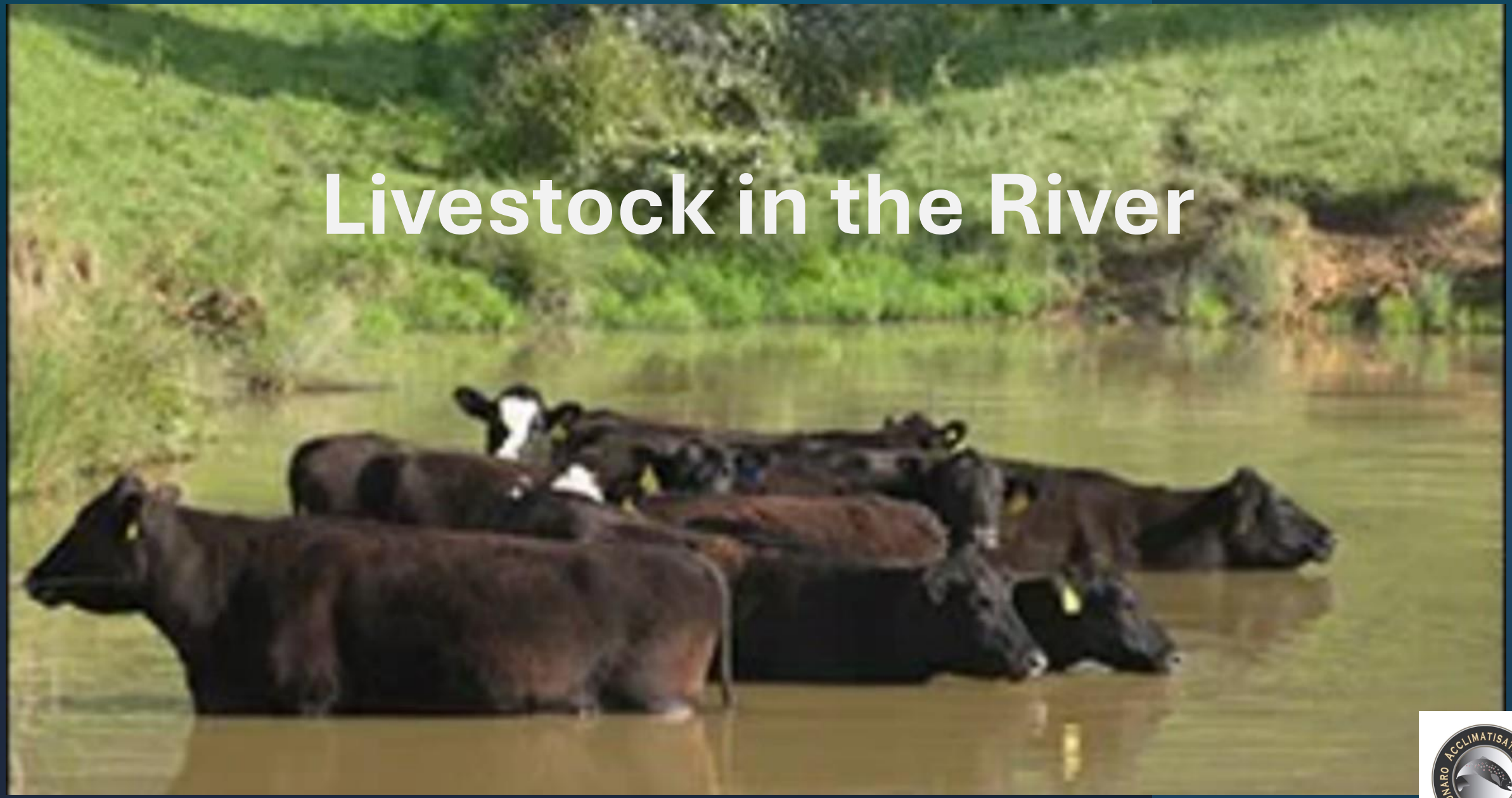
Changes within the riverine environment are threatening all the freshwater biota

- Traditional agriculture was grazing sheep for wool
- Economic pressures has changed the agricultural enterprise mix
  - Cultivating to improve pastures
  - Cultivating to grow cereals, silage and hay
  - Fat lamb production
  - Beef cattle breeding and backgrounding

Bobundara Creek September 2020

Sediment Slugs

Livestock in the River




Gambusia (mosquito fish)

- The population of Little Black Cormorant and Great Cormorant have increased markedly over the last few years
- This is probably because Gambusia (Mosquito Fish) are becoming abundant within the Snowy system

Economic and Social Contribution That Recreational Trout Fishing Makes to Snowy Monaro Region

- Economic contribution when the rivers and lakes are fishing well amounts to between 70 and 90 million dollars per year
- Economic contribution in times of drought falls to as little as 12 million dollars per year
- Following drought, the MAS has traditionally been able to re-establish good fishing within our rivers and streams within 12 months of droughts breaking
- By the second year the fishing is back to being excellent
- The trout stocking bans will slow this recovery within our rivers substantially
- This will lead to substantial economic loss
- The social contribution that recreational trout fishing makes to the Snowy Monaro region is incalculable

To Summarize

- The Mountain Galaxias complex is generally under threat with many being listed as critically endangered
- The decline within the Mountain Galaxias complex has mostly occurred over the last 20 years
- The science and scientists have accused Brown and Rainbow Trout as the major culprits
- There is prejudice and bias against trout and trout fishers within the scientific community
- Evidence would indicate that there are significantly more threats to galaxias than trout, these include;
  - Climate change
  - The lack of understanding about riparian vegetation and shading of waterways
  - Sediment slugs and water turbidity
  - Urban and agricultural pollution including chemicals and nutrients
  - Livestock in rivers causing turbidity and destroying riparian and aquatic vegetation
  - New predators such as cormorants and redfin perch

• Where Do We Go From Here

- Fishers would like to become partners in river restoration projects
- The scientific fraternity needs to understand that they need all the partners they can get
- Fishers understand that trout are predators
- Fishers understand that any river restoration works will not just benefit native species
- Rivers need to be loved and the whole community needs to value clean potable water running within them
- To achieve these things the following needs to occur;
    - An intensive media campaign aimed at farmers and urban dwellers who live and work adjacent to rivers outlining the value that the riverine environment contributes to their wellbeing
    - A legislative framework to discourage activities that degrade the river system
    - Investment by government to provide incentive programs to enable riparian fencing and native vegetation planting
    - Consultation with partners to establish suitable sanctuary sites for threatened fish with built-in resilience
    - Captive breeding projects that ensure the survival of threatened and endangered fish

What can you do to ensure a future for recreational trout fishing

Governments within Australia reinvent natural resource management plans and investment therein every 10 years or so. There is a big announcement – funds are allocated – the government changes – priorities shift – the plan is shelved - and the funds are reallocated.

How do we change this destructive cycle

- To achieve meaningful outcomes for our natural environment we need sustained investment over time
- Politicians respond to their electorates, the people that vote them in and out of power
- Every opportunity that presents itself to discuss these issues with politicians needs to be taken
- The discussion topics are simple but require investment;
  - Consultation within the regions regarding the value of our rivers and streams
  - Incentives to assist farmers and others to fence off waterways and provide off stream watering points
  - Development of a legislative framework that discourages inappropriate practices that puts at-risk water quality and ensures compliance, with sufficient compliance officers
  - Empower landcare groups and farmers, with coordinators and project funding to revegetate the riparian corridors

- **To achieve the above within our democracy we need to Lobby**

  - **The people we need to engage are Board members of regional Local Land Services organisations (they administer the regional NRM plans) The NSW Government politicians (they administer the Local Land Services) the Federal Government politicians (they provide the NRM funds)**
  - **If you know media people you could also try and instigate media releases**
  - **If you know environmental scientists convince them that you are interested in being part of the solution**