TINY FISHES

The miniature marvels that slip through the net

Shoal

ABOUT

SHOAL is a global ecosystem of partners and collaborators who work together to safeguard the health of Earth's freshwater habitats and conserve the most threatened freshwater species. As with a shoal of fish, the strength of the SHOAL lies with the number of partners all working together.

Stay up to date with our work or reach out to collaborate:
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Credits and acknowledgements
Lead author: Michael Edmondstone
Co-authors: Nathaniel Ng, Chouly Ou
Design: Georgie Bull
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Further reading
1,000 Fishes Blueprint // New Species Reports // Forgotten Fishes Reports

Cobalt Blue Goby (*Stiphodon semoni*) © Peter Maguire

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Cardinal Tetra (*Paracheirodon axelrodi*) © Peter Maguire

INTRODUCTION
Why Tiny Fishes Matter

Spotted Rasbora (*Boraras maculatus*) © Peter Maguire

When people think about freshwater fishes, tiny species rarely spring to mind. Most of the attention goes to the big, dramatic species: magnificent salmon leaping upriver, huge catfish that excite the imaginations of ambitious anglers, charismatic predators made famous by shows that celebrate extreme fishing. In a group already historically neglected by the conservation sector and the media, tiny fishes barely get a mention.

Yet although they rarely feature in documentaries, they play an outsized role in how rivers, streams, wetlands and springs function.

'Tiny fishes' isn't a technical term; it's simply a way of acknowledging the huge number of species that most of us would instinctively call tiny. They would all comfortably fit in the palm of a child's hand – some of them would fit on the tip of your pinkie finger. For the purposes of this report, we're going no longer than 40 mm Total Length or Standard Length, whichever is used for that species on FishBase (see Annex, p.38).

They spread across continents, families, and habitats. They live in forest pools no bigger than a puddle, in limestone springs, in swamps and fast-flowing tributaries. They are incredibly diverse, frequently restricted to ranges that match their tiny size, and often sit right at the heart of the ecosystems they inhabit.

What makes them so essential is their place in the food web. Small fishes convert algae, plankton, detritus and small invertebrates – in other words, things at the bottom of the food chain – into energy that supports everything above them. Take them away and you remove the foundation that larger fishes, birds, reptiles, amphibians and mammals rely on.

Many also play specific ecological roles: controlling insect populations, grazing vegetation, cycling nutrients, stirring up sediment as they forage. Without them, entire systems become less stable and less resilient.

Evolution has taken some remarkable turns to make these species possible. Miniaturisation has evolved repeatedly across different fish families. Shrinking a vertebrate body requires creative shortcuts: simplified skeletons, compressed organs, altered growth patterns. Studying these species tells us a lot about how evolution works under constraints, how life adapts to small, specialised habitats, and how quickly those adaptations can disappear when conditions change.

Small fishes are often the most sensitive to environmental change. Because of their short lifespans, limited ranges, and reliance on highly specific habitats, they respond quickly to shifts in water quality, flow, and vegetation cover. This makes them excellent bioindicators: where tiny fishes thrive, chances are the water is clean, oxygenated, and structurally complex enough to provide a safe haven.

But that sensitivity also means tiny fishes are among the first species to disappear when freshwater habitats decline. Environmental changes can wipe out entire populations with alarming speed. Many tiny fishes, including 295 from SHOAL's Priority Fishes list (see appendix), are already classified as Endangered or Critically Endangered.

The positive spin though is that their restricted ranges mean very little physical space needs conserving to ensure the species are given the conditions to thrive: if you can save the habitat, you can save the fish.

There is also a human side to this: small fishes have fed communities for generations in many parts of the world. Others hold significance in local stories or traditions: think Sulawesi Ricefishes that are known as “guardian” species of the spring pools in some rural communities. And in the aquarium hobby worldwide, tiny species have long been appreciated for their behaviour, colour and character. Now more than ever, tiny species are making their way into our homes; growing demand and availability of nano species and tanks shows that there is a growing joy for the tiny. Increasingly, aquarists are playing part of the conservation picture, supporting breeding programmes, raising awareness, and helping build a culture in which rare and threatened species are valued rather than ignored.

This offers huge conservation potential for tiny threatened species.

Tiny fishes have swam under the radar, and not just because they compete for attention with larger, more familiar or more charismatic species. Purely on a sampling basis, many standard fish-sampling methods such as nets, traps and electrofishing are biased towards larger species. A two-centimetre fish can easily slip through the net, or be mistaken for a juvenile of something larger.

This report is built around the idea that tiny fishes are doubly neglected: firstly, by being in a species group that has historically received very little attention, and secondly by being often overlooked even within that overlooked and underfunded group.


Rhinohorn Goby, *Rhinogobius balteatus* © Peter Maguire

© Kenneth Chin

> These fishes deserve attention not because they are charming curiosities – though they are! – but because they are central to how freshwater ecosystems function, and because they are disappearing fast.

The aim of this Tiny Fishes report is to shine a light on species that have been sidelined, even within a conservation sector already fighting for attention, and to celebrate them in their small, surprisingly complex glory.

It's about showing their conservation is desperately needed. And that it would be highly effective if it received the resources it needs.

As well as a celebration, Tiny Fishes is a plea for targeted conservation action for some of the world's most threatened species, that also happen to be amongst the most cost effective to save.

The deep-dive profiles that follow highlight species with exceptional stories, unique evolutionary histories, and very real threats. They paint a picture of the fragility of freshwater biodiversity, and how targeted conservation can make a huge difference, often in very little time.

This report will place tiny fishes firmly in the conservation conversation. By documenting their ecological roles, threats, adaptations and cultural connections, it aims to ensure these species are not lost simply because they are small.

Tiny fishes aren't likely to dominate the headlines. But they matter. Paying attention to them isn't a niche concern: it's essential if we're serious about reversing the decline of freshwater biodiversity.

Indonesian Superdwarf Fish
Paedocypris progenetica

Indonesian Superdwarf Fish, *Paedocyprus progenetica* © Lukas Rüber

Maximum Length: 10mm

Red List Status: Near Threatened
SHOAL Priority Fish: Yes
Described: Kottelat, M., Britz, R., Tan, H.H., Witte., K-E. (2006).
Range: Peat swamps of Sumatra and Bintan Island, Indonesia

If you were to scoop a jar of dark, tea-coloured water from a peat swamp in Sumatra and hold it up to the light, you'd be forgiven for thinking it's empty. But if a sliver flashes past the glass – no longer than 10 mm – it could be the Indonesian Superdwarf Fish *Paedocypris progenetica*, the smallest freshwater fish, and arguably the smallest known vertebrate on Earth*. Adults can be shorter than the width of your pinkie's fingernail. Some would disappear entirely behind a grain of rice.

And yet this tiny creature has become something of a scientific celebrity for pushing the limits of what a vertebrate body can be, and what life can tolerate.

A fish that looks unfinished
At first glance, *Paedocypris progenetica* looks almost transparent. You can see the faint curve of its spine and, in good light, even its internal organs. Part of this is due to its size – at under a centimetre long, there's very little space for anything – but part of it is evolutionary adaptation. These fish have simplified skeletons with far fewer bones than most species. Some structures that other fishes develop as they grow simply never appear.

To a biologist, the fish looks almost 'frozen in childhood.' It keeps features that usually vanish as other fishes mature. This is called paedomorphosis: adults retaining the traits of youngsters. It sounds like a compromise, but in reality it's a clever strategy. By truncating development, the species saves energy and remains small enough to exploit the miniature world around it: shallow pools, small animal burrows, even tiny channels in the soil where larger fishes simply cannot go.

Miniaturisation in vertebrates is rare and complex. You can't just make an animal smaller like shrinking a photo – internal organs still need to work, muscles need to contract, and the brain needs to fit somewhere.

Paedocypris progenetica is a masterclass in evolutionary streamlining. Its genome has been pared back to one of most compact known for a vertebrate. Several genes found in nearly all other fishes, including some involved in early development, are missing entirely. And yet the fish thrives.

In the natural world, being tiny often means being overlooked, and *Paedocypris progenetica* has spent most of its evolutionary history in total obscurity. Only in the last two decades have scientists become aware of this miniature marvel. Its formal scientific description in 2006 caused a stir beyond ichthyology journals. Headlines declared it the ‘world’s smallest fish,’ and images of the tiny creature perched on a human fingertip travelled widely. That brief burst of fame was unusual for a species so small.

Males with mystery morphology

One of the most surprising facts about *Paedocypris progenetica* is how different males and females are. The males have pelvic fins that look almost oversized for such small bodies. These fins include a peculiar, hardened pad of skin and muscular attachments more developed than the rest of the fish’s morphology might suggest. Detailed behaviour observations of the full spawning sequence in *Paedocypris progenetica* are lacking in the published literature, but the leading hypothesis is that males use these structures to grip either vegetation or the female in the final moments before she releases her eggs. In a world as tiny as the Indonesian Superdwarf Fish’s, precision matters.

A world made for the small

Paedocypris progenetica’s existence is defined by the extremities and challenges of its surroundings. This species lives in Southeast Asian peat swamps, some of the most chemically unusual freshwater habitats on the planet. The water is dark, soft and highly acidic – in some places with a pH as low as 3, similar to vinegar. Most fish cannot tolerate such conditions. Their eggs fail, their gills struggle, or their bodies cannot regulate salts and acidity. But *Paedocypris progenetica* is unbothered. It has evolved for this place and, in many ways, because of it.

Peat swamps are low-nutrient environments. Food is scarce, oxygen can be low, and the water depth fluctuates wildly across the year. When the dry season comes, large areas shrink to puddles, leaving only soaked forest floors and hidden pockets beneath tangled roots. That is where *Paedocypris progenetica* survives when bigger species perish or retreat. Being tiny isn’t just a quirk; it’s a survival strategy

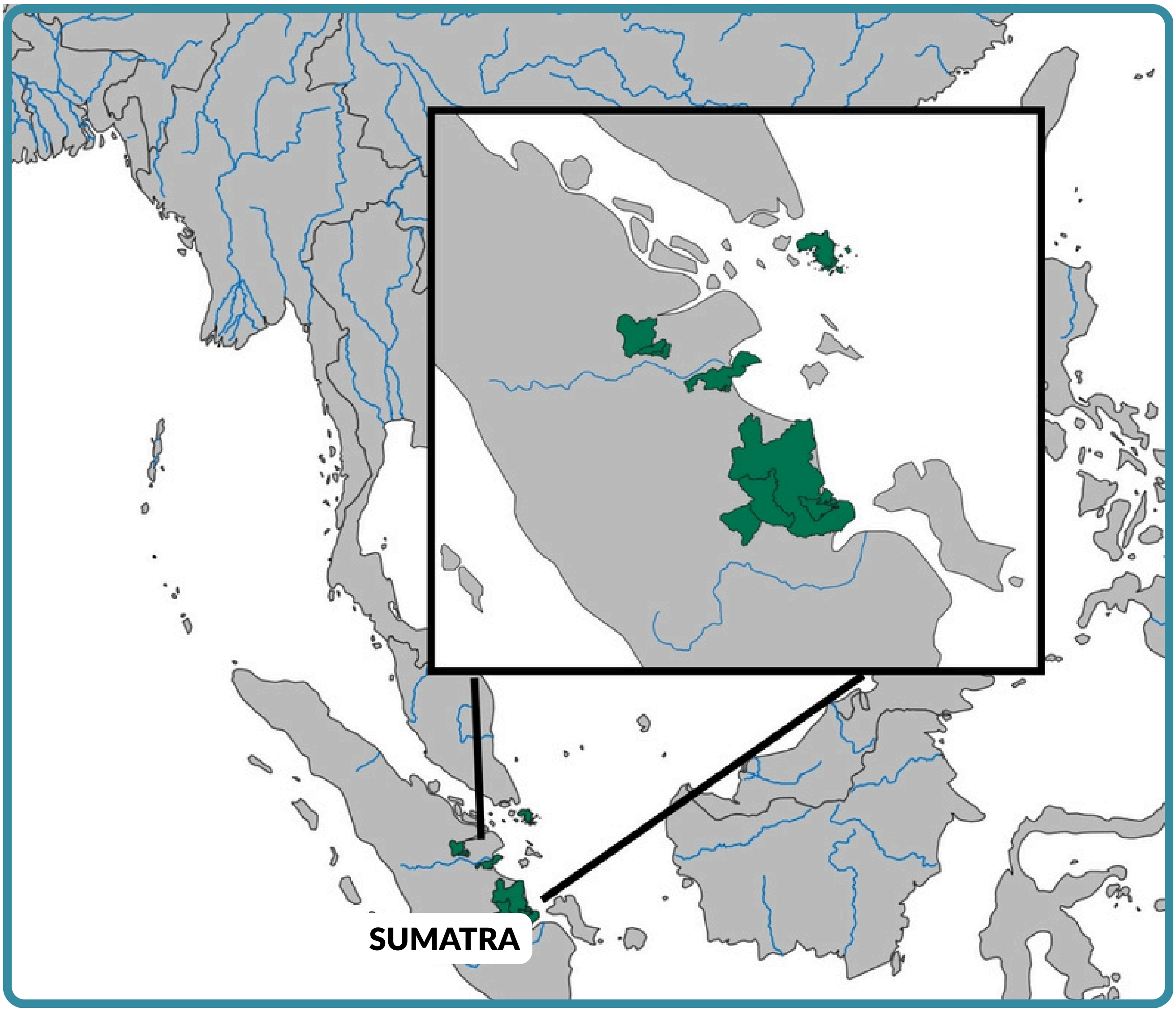
These fish feed on microscopic organisms: tiny crustaceans, protozoans, and organic particles floating in the water column. They need very little to survive, but their entire world depends on the continued existence of the peat swamp’s delicate ecological balance.

Top Right and Bottom Left Image: © Maurice Kottelat
Top Left Image: © Tan Heok Hui

A species discovered at the eleventh hour
When news of *Paedocypris progenetica*'s discovery spread, it symbolised two things: the astonishing biodiversity that remains hidden in the world's freshwater systems, and how rapidly some of these ecosystems are vanishing.

Paedocypris progenetica's home in the peat swamps of Sumatra and Bintan are among the fastest disappearing habitats in Southeast Asia. Converted for agriculture, drained for oil-palm plantations, or ravaged by fires, these landscapes have been shrinking for decades. Many researchers believe the species persisted unnoticed precisely because its environment was considered impenetrable, unproductive, or unimportant. But when parts of those swamps began to disappear, scientists realised not only what had been lost, but what had been hiding in plain sight.

To some extent, this tiny fish is a symbol of the countless tiny species that underpin ecosystem function, their importance masked by their size and obscurity.



Range Map of *Paedocypris progenetica* - Data courtesy of IUCN Red List

WHY THIS TINY FISH MATTERS

From a conservation or ecological standpoint, *Paedocypris progenetica* is important for several reasons:

A sentinel for vanishing ecosystems
Because it's so closely tied to peat swamp conditions, its presence (or absence) can tell scientists a great deal about the health of the swamp. When *Paedocypris progenetica* disappears from an area, it's likely because the hydrology or chemistry has changed beyond the tolerance of this specialist species.

An evolutionary outlier
Its body plan challenges long-held assumptions about the minimum size of a vertebrate. Its genome is pared down to the limits of what is possible, making the species key in understanding developmental limits in vertebrates.

A flagship for the overlooked
The species forces people to reassess the value of small species. Charismatic megafauna often dominate conservation messaging, but biodiversity is just as dependent on the micro-scale world. This fish gives a face – a truly tiny one – to the global crisis of freshwater biodiversity loss.

Indonesian Superdwarf Fish, *Paedocyprus progenetica* © Tan Heok Hui

Left: A typical peat swamp forest, home to *Paedocypris spp.* © Lukas Rüber
Right: Drained and destroyed peat swamp forests, home to *Paedocypris spp.* © Lukas Rüber

The Threats
The IUCN currently lists *Paedocypris progenetica* as Near Threatened, but species tied so tightly to a single habitat can decline rapidly if that habitat vanishes.

The greatest threats include:

- Peat-swamp conversion for agriculture, particularly oil palm
- Drainage canals that lower water tables and alter acidity
- Forest fires, often catastrophic in dry years
- Fragmentation of swamp systems, isolating small populations
- Climate change, which affects rainfall patterns and the hydrology that sustains blackwater habitats

Despite the Red List status, it should be noted that the species' full range and threats in that range need to be known before we can infer any specific conservation measures to protect the species. Though, given that the species' known peat swamp habitat is now fragmented and heavily pressured, its long-term survival is likely to depend on protecting or restoring its environment.

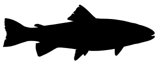
Saving a species small enough to overlook
Conserving *Paedocypris progenetica* comes down to protecting peat-swamp forests.

These ecosystems are biodiversity hotspots. They are also significant carbon stores, capable of locking away enormous amounts of carbon when left intact. Protecting them helps species like *Paedocypris progenetica*, but also migratory birds, rare plants, amphibians, and even local communities who rely on intact forests for water and cultural identity.

Currently, parts of *Paedocypris progenetica*'s range are in protected areas (e.g. Berbak National Park). But, according to the IUCN Red List, 'conservation actions are necessary to protect remaining peat swamp forests and restore degraded blackwater habitats.'

For conservation funders, supporting peat-swamp protection offers a tangible, high-impact way to make a difference, safeguarding a globally important carbon sink, an entire freshwater community, and some of the planet's most extraordinary fish.

* Between 2006 and 2012, when *Paedophryne amauensis* – a miniature frog that measures up at 7.7 mm – was described, *P. progenetica* was considered the smallest vertebrate on Earth. But this ignores that the methods of measuring fish and amphibians differ: Maurice Kottelat, the ichthyologist who discovered *P. progenetica* and, along with Tan Heok Hui, Ralf Britz, and Kai-Erik Witte, described the species in 2006, observed, “There have been reports of smaller vertebrates. But one should compare things that can be compared. *Paedocypris progenetica* has been recorded as the smallest vertebrate species based on unambiguous criteria: the smallest adult female, defined by the presence of ripe eggs. Males smaller than the small females already have sexually dimorphic modification in pelvic fins, but it was not possible to know if they were sexually mature. Also the length of fishes is measured from tip of snout to end of vertebral column (the base of the caudal fin). In amphibians, the length is measured from tip of snout to vent. If a *Paedocypris* were measured from tip of snout to vent, it would be half of the reported 7 mm in *P. progenetica*. Besides, the length of amphibians does not include the legs that trail behind and can be very long. Add the differences in body width and weight. To me the comparison does not make sense. At the end, the important message should not be 'what is the record' but that there is a fantastic overlooked diversity even in tiny vertebrates".



Images to scale.

Paedophryne amauensis. Photo from Rittmeyer EN et al. (2012) Ecological Guild Evolution and the Discovery of the World’s Smallest Vertebrate. PLoS ONE 7(1): e29797.

Translucent Micro Glassfish[1] & Cerebrum Micro Glassfish[2]

Danionella translucida & Danionella cerebrum

1 LEAST CONCERN LC

2 NOT EVALUATED NE

Translucent Micro Glassfish, *Danionella translucida* © Ralf Britz

In the slow-flowing, turbid streams of the southern and eastern slopes of the Bago Yoma mountain range in southern Myanmar, two of the planet's tiniest vertebrates are quietly doing big things. One is the relatively recently described *Danionella cerebrum* (see SHOAL's New Species 2021 report), the other its almost-twin, *Danionella translucida*. Both are nearly fully transparent cyprinids whose adult sizes barely stretch past a centimetre. Behind their delicate exteriors lies a story of evolutionary truncation, biological innovation, and exciting research promise.

Danionella translucida was the first *Danionella* species to be described (Roberts 1986). From a shallow stream among floating roots in the Pegu (now Bago) division of Myanmar, Roberts captured adults no more than ~11–12 mm in standard length. Roberts noted not only the tiny size, but the fish's almost total transparency – some literature refers to them as 'micro-glassfish'.

Fast-forward to 2021, and Britz, Conway & Rüber described *Danionella cerebrum* as a new species. Remarkably, through molecular analyses they showed that many laboratory-held fish thought to be *Danionella translucida* were actually this new species. And surprisingly, considering their near-indistinguishable appearance, they split from each other around 13.3 million years ago.

Maximum Length: 12mm

Red List Status: Near Threatened
SHOAL Priority Fish: No (although *D. cerebrum* may qualify)
Described: T. R. Roberts (1986). Britz, Conway, & Rüber (2021).
Range: Myanmar's Bago Yoma streams

Britz, Conway & Rüber's discovery is made all the more astonishing considering *Danionella cerebrum* had been sitting under the noses of scientists for at least five years before it was discovered as a new species. What was thought to be *Danionella translucida* had been used widely as a research subject into neurological function. With its spreading popularity as a model organism in neuroscience, Britz, Conway & Rüber compared published genetic data and additional genetic samples, as well as the skeleton of preserved lab *Danionella* specimens, with the samples they had in the lab, and found that what neuroscientists had called *D. translucida* was actually an undescribed species.

Translucent Micro Glassfish, *Danionella translucida* © Angry Burmese WikiMedia Commons

> *It swam unrecognised in tanks in several labs in the US and Europe*
>
> -Ralf Britz

Model subjects for neurology
Danionella have proven fascinating to scientists as research models due to their idiosyncratic physiology. According to Britz, “They combine characteristics that you would not find in any other vertebrates: They are tiny and transparent and have the anatomical condition of a larval fish in some parts of their body, and the condition of an adult fish in others. They do not have a skull roof and their brain, as in larval fish, is only covered by skin. This makes it optically accessible in the live animal without much problem.

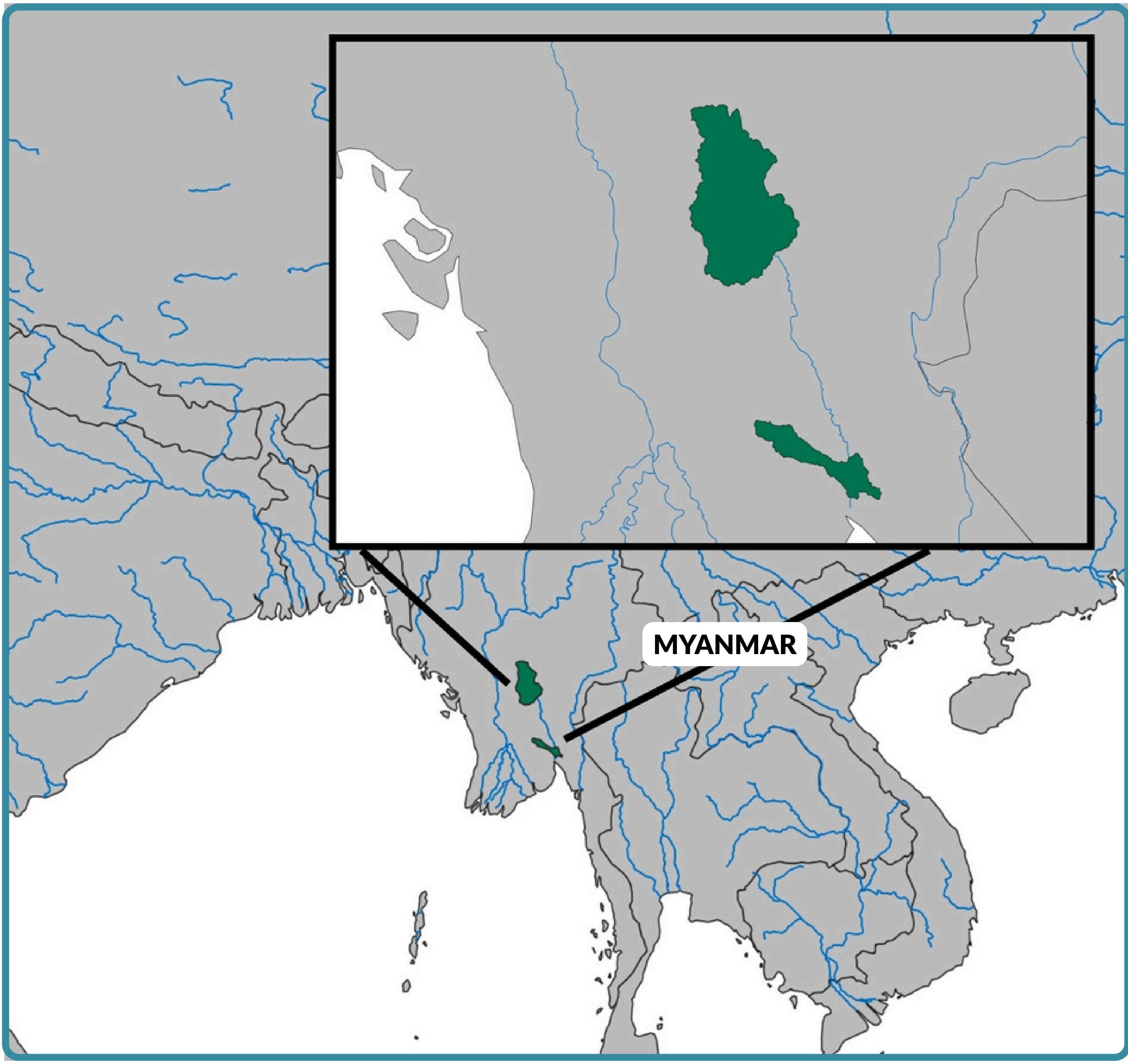
But there’s more. *Danionella cerebrum* males are known for making loud drumming sounds generated by a specialised drumming muscle attached to the swim bladder. The sounds are over 140 decibels measured at a very short distance and are so loud that researchers have reported hearing it from across the room. Extraordinary for such a tiny fish.

Why is this big sound needed for such a tiny fish? According to Britz, “These sounds are important for their intraspecific communication, which results in quite a complex behavioural repertoire. You would not find this in a larval fish.” He adds that, this “characteristic is ideal for a vertebrate animal whose brain function you want to study. If you had to invent a vertebrate model animal, it would be very much like *Danionella*.”

Conservation & context
With *Danionella translucida* listed as Least Concern and *Danionella cerebrum* as Not Evaluated, neither species is a SHOAL Priority Species, and there are currently no conservation measures in place for either, with little urgency for any in the near future.

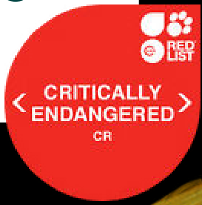
However, given their small size and confined known ranges, any changes in hydrology, turbidity, or pollution may have an outsized effect. More survey work is needed to assess population trends and any potential threats.

Range Map of *Danionella translucida* - Data courtesy of IUCN Red List * *D.cerebrum* data was not available



Banded Neolebias

Neolebias lozii



Banded Neolebias, *Neolebias lozii* © Illustration by Georgie Bull

The Banded Neolebias is a miniature tetra, barely reaching two centimeters, known only from a few vegetated channels on the Barotse floodplain of the upper Zambezi in Zambia. It lives among dense stands of submerged and emergent plants, feeding on tiny invertebrates in a habitat that is highly vulnerable to drainage, channelisation and changes in flooding. Its precarious status as a Critically Endangered species (and a SHOAL Priority Species) underlines how entire worlds of tiny, specialised fishes can be lost when we overlook seemingly insignificant backwaters and ditches.

The species was first described in 1993, by Kirk O. Winemiller and Leslie C. Kelso-Winemiller. Winemiller told SHOAL that the fish is, “very tiny and easily overlooked,” adding that, “They fell through the mesh of my dipnet, and I had to cup my hand under the net to collect them.”

The species name ‘lozii’ pays tribute to the Lozi people from the Barotse Floodplains, where the species is found. The Lozi people, or Barotse, are a language group of approximately 3,575,000 people, from more than 46 different ethnic groups primarily of western Zambia, inhabiting the region of Barotseland. It is not a tribe. Lozi are also found in Zambia, Namibia, Angola, Botswana, Mozambique, and Zimbabwe.

Maximum Length: 18mm

Red List Status: Critically Endangered
SHOAL Priority Fish: Yes
Described: Winemiller & Kelso-Winemiller (1993)
Range: A few tributaries and small streams within the Barotse Floodplains in western Zambia, Africa

The naming is a small nod to the longstanding interdependence between people and the river and its natural resources in this region.

The fish’s range is likely to be restricted to the Kataba River and its tributary, the Sianda stream, a small tributary system of the Upper Zambezi, which it joins on the eastern side of the Barotse Floodplain. Thorough sampling in other streams in the area, including another site on the Kataba River and targeting the known habitat, did not yield any specimens.

In 2007 Denis Tweddle, fisheries biologist at the South African Institute for Aquatic Biodiversity, assessed the species as facing critical threats from drainage, intensification of agriculture, deforestation of woodland bordering the species' range, and possible pollution by fertiliser and herbicides.

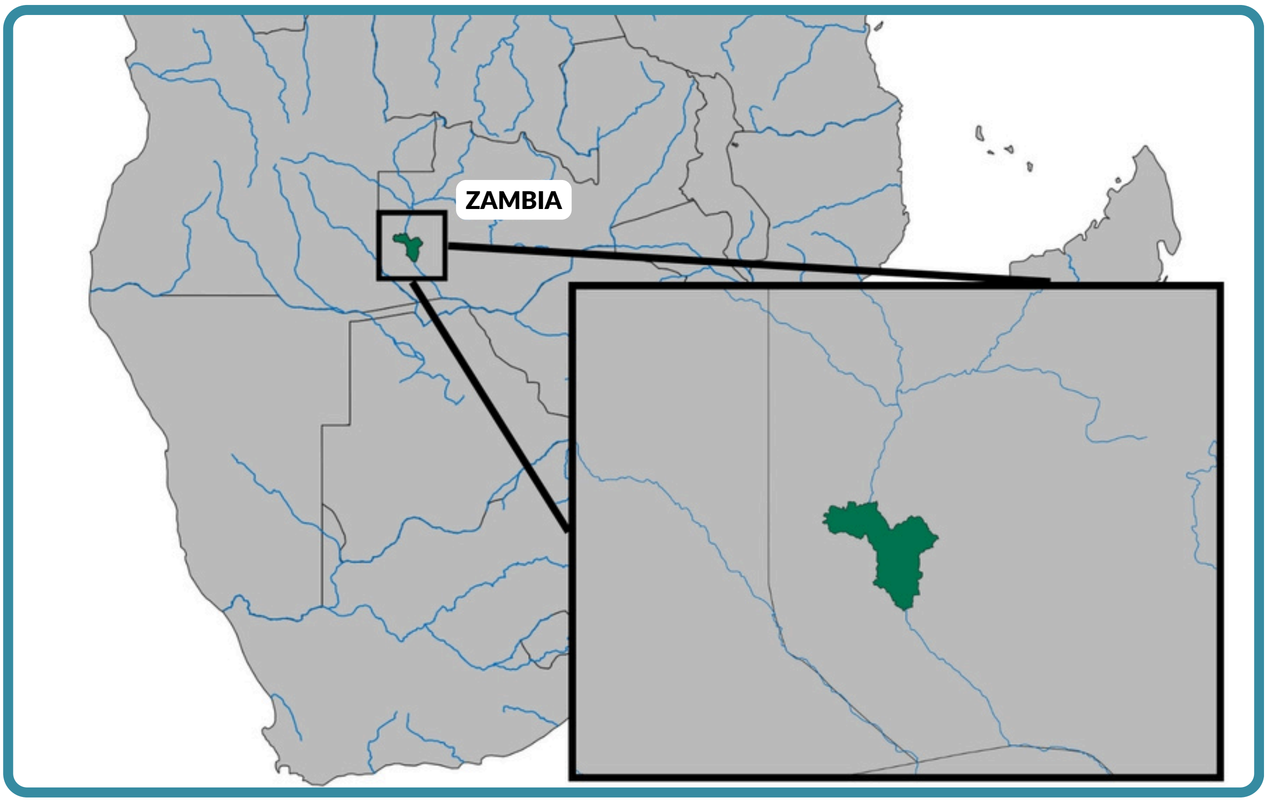
According to Tweddle, "the short stretch of occupied stream and low numbers found in suitable habitat suggests it has a low population, [and] the restricted range, single location, and continuing decline in area of occupancy and habitat quality lead to an assessment that the species is Critically Endangered."

The Banded Neolebias occupies shallow, slow-moving habitats in the upper Zambezi River basin. These waters are typically clear and shaded, with sandy or leaf-littered substrates and dense marginal vegetation. In ecological terms, this fish sits within the micro-world of forest streams and floodplain pools – places defined by twisted roots, submerged leaves, and the perfect kind of structural complexity for a tiny fish to hide in. These environments function as nurseries, corridors, and refuge areas for a wide range of small-bodied species.

Everything we know about the Banded Neolebias has been studied only briefly. Almost all the information comes from its original description by Winemiller and Kelso-Winemiller (1993), later summarised by FishBase and regional overviews.
The original description was based on just six specimens (one holotype and five paratypes) collected in 1989. Later surveys referenced in IUCN's continental freshwater assessment likewise treat the species as rare and highly localised. There are no robust estimates of population size or trend, only the inference from low capture rates and extremely limited distribution that the population is small and vulnerable.

The specific threat highlighted is the canalisation of the Sianda River for agricultural drainage, which alters channel structure and adjacent vegetation and is cited as the primary reason the species is considered Critically Endangered.

It does not appear there are any site-specific actions already in place for the Banded Neolebias (such as protected reaches of the Sianda/Kataba system or dedicated monitoring programmes).

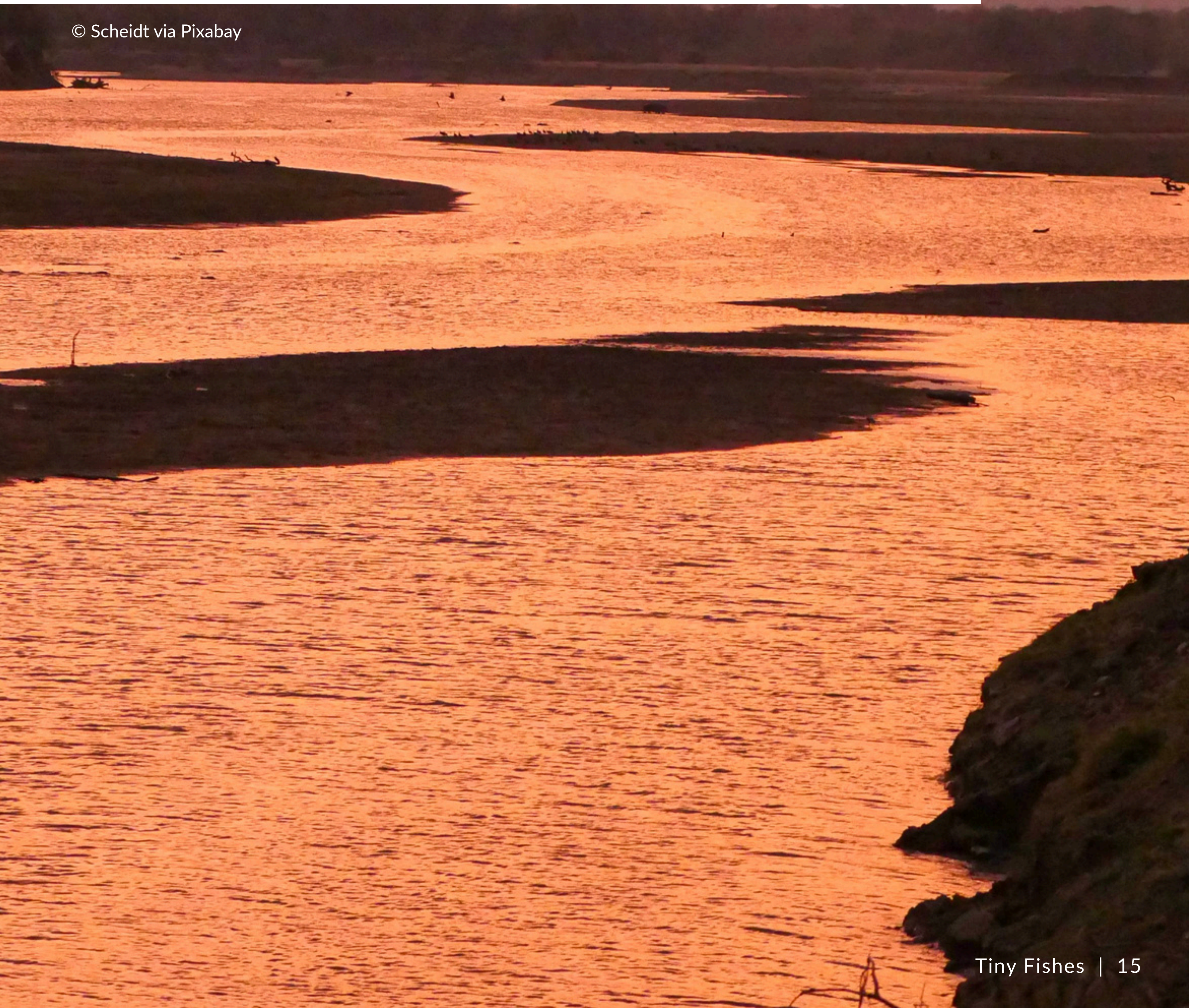


Range Map of *Neolebias lozii* - Data courtesy of IUCN Red List

WOULD YOU LIKE TO WORK ON THE BANDED NEOLEBIAS?

The broader IUCN freshwater synthesis for Africa recommends, for Critically Endangered, restricted-range floodplain fishes like this one, the protection of remaining natural river stretches, avoidance of further canalisation and drainage for agriculture, and the maintenance of natural floodplain dynamics as key priorities.

Beyond that, there is currently no published evidence of targeted recovery plans or population monitoring for this species, with that knowledge gap itself one of the issues flagged by the regional assessments. If you are able to propose a conservation project to conserve the Banded Neolebias, we would love to hear from you.



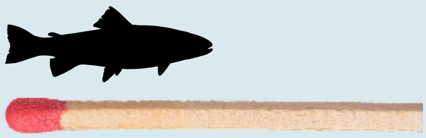
© Scheidt via Pixabay

Red-finned Blue-Eye

Scaturiginichthys vermeilipinnis

Red-finned Blue-eye, *Scaturiginichthys vermeilipinnis* © Dean Gilligan

Maximum Length: 25mm



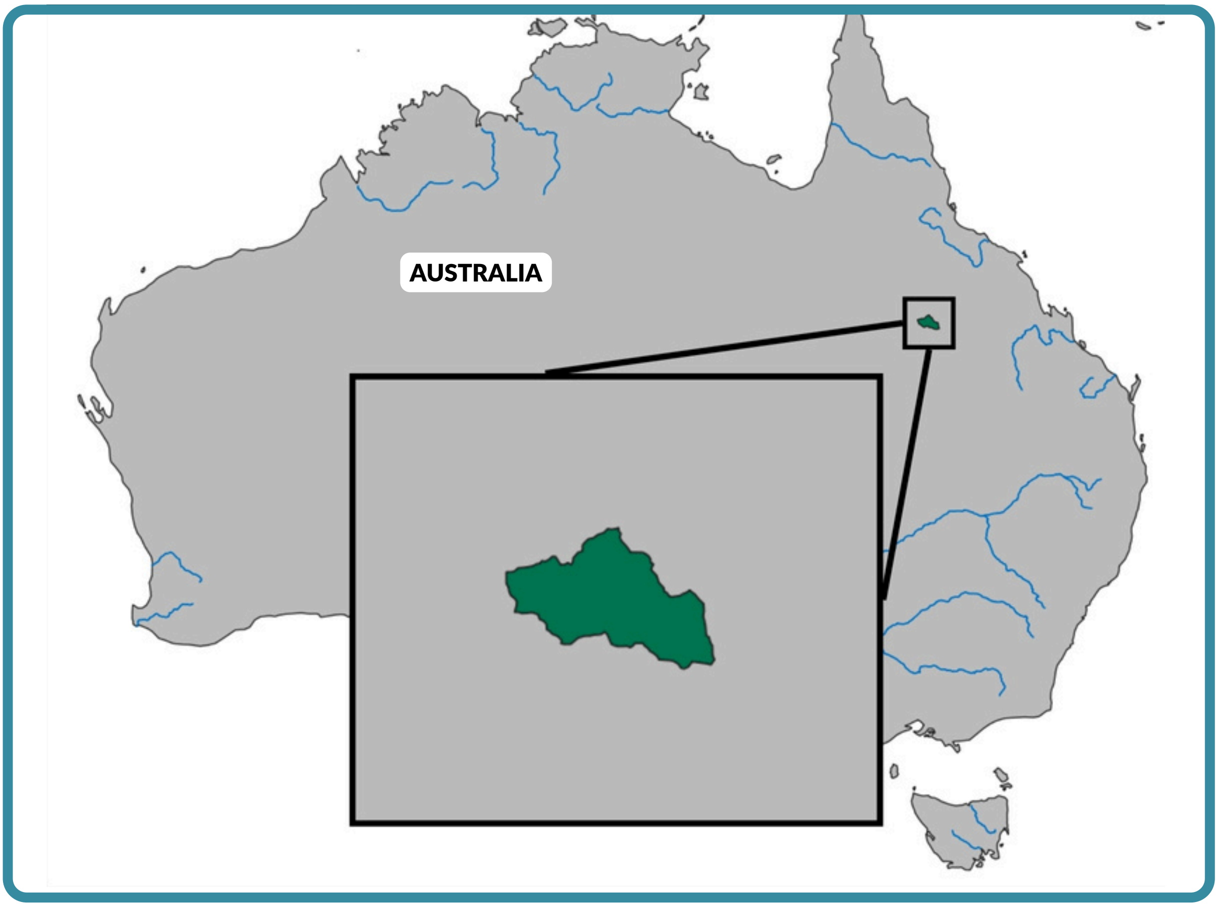
Red List Status: Critically Endangered
SHOAL Priority Fish: Yes
Described: Ivantsoff, W., Unmack, P., Saeed, B., & Crowley, L E. L. M. (1991)
Range: A single complex of springs associated with the Great Artesian Basin, located on Edgbaston Reserve, central-western Queensland, Australia

The Red-finned Blue-eye is a paradox of a fish: one of Australia's smallest vertebrates, yet burdened with some of the continent's most disproportionate conservation challenges. Endemic to just a handful of artesian springs on the remote western edge of Queensland's Lake Eyre Basin, it survives in an environment so geographically restricted and hydrologically singular, that any disturbance can drastically affect the population. Its story has become one of Australia's flagship examples of how freshwater species can tip towards extinction, and how painstaking, often unconventional conservation work can pull them back.

The species – *Scaturiginichthys vermeilipinnis* literally means the 'spring fish with red fins' – was formally described in 1991. It is the sole species in its genus and the smallest Australian freshwater fish, with adults growing only to a maximum of 25 mm in length. The males develop bright red fins, particularly during breeding season, while females maintain a silvery-yellow olive colour. Both have a brilliant metallic blue ring around the eye, and iridescent spangles along the sides.

Distribution and habitat

The Red-finned Blue-eye's world, like the fish, is tiny. Its range is restricted to just a few Great Artesian Basin springs on the Edgbaston Reserve in central-western Queensland. It was originally found in seven springs, but by 2012 survived in just three of these, although another three translocated populations existed in the reserve.



Range Map of *Scaturiginichthys vermeilipinnis* - Data courtesy of IUCN Red List

The species has very specific habitat requirements, occupying sparsely vegetated shallow wetlands that are less than 80 mm deep, and often only 5 mm deep.

The Great Artesian springs are themselves listed as a nationally endangered ecological community in Australia, and the total area currently supporting the Red-finned Blue-eye in the wild is less than half a hectare.

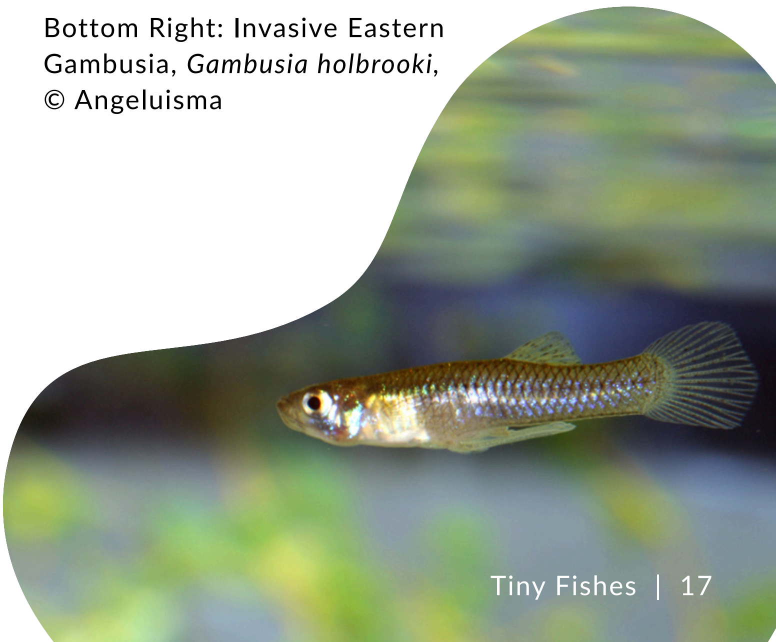
Threats

This micro-endemism puts the species – and many other endemics there – in a precarious situation. In 1996, the species was listed as Critically Endangered, and in September 2012, it was placed on the International Union for Conservation of Nature list of 100 most endangered species on the planet.

Any changes in the already tiny habitat could wipe out the entire wild population. The species has most likely also been affected by habitat degradation caused by cattle and feral pigs that trample plants, increase turbidity, and degrade water quality to an intolerable level for the fish.

Add to this the highly invasive Eastern Gambusia (*Gambusia holbrooki*), introduced from the USA in the early nineties in a shortsighted and disastrous bid to control the mosquito population, and you have a serious problem for the species' future. The Eastern Gambusia, also known as the Mosquitofish, compete with the Red-finned Blue-eye for food and habitat, display aggressive behaviour such as fin-nipping. They also probably eat the eggs and newborn Red-finned Blue-eye (and other native fish).

Bottom Right: Invasive Eastern Gambusia, *Gambusia holbrooki*, © Angeluisma



CONSERVATION

The conservation response to the species' decline is one of the most detailed and labour-intensive freshwater fish recovery efforts in Australia, and it involves some surprising tactics – poisonous dust, shade cloth, and drainage of the springs.

Protection of Edgbaston

A major turning point came in 2008, when Bush Heritage Australia purchased the Edgbaston property – a former cattle station – with the specific intent of protecting the springs and their 26 endemic species. They soon removed the livestock and established programmes to control the feral pigs, as well as removing various invasive plants and establishing boundary fences. They relocated Red-finned Blue-eye to new springs, expanding their range and established insurance populations – both onsite in artificial springs and at a secure offsite location. Crucially, they also figured out how to breed the fish in captivity – something that had never been done before.

> ***250-500 captive-bred Red-finned Blue-eye fish on Edgbaston Reserve continue to breed, with the population having approximately doubled since the programme's inception in 2018 with 180 fish.***
>
> **Bush Heritage Australia**

© Matthew Taylor

Gambusia exclusion and control
So aggressive are the results of the Gambusia introduction, that in all but one of the eight springs where the Red-finned Blue-eye was originally found in the wild, it was wiped out within a few seasons of the invasive's arrival.

Controlling the Mosquitofish has proven to be the most urgent – and most challenging – side of the programme. A rehabilitating water table in the springs led to them doubling in size in just a few years, with the rising waterline enabling the Gambusia to breach the foot high shade cloth fences designed to keep the Gambusia out and the Red-finned Blue-eyes in, which caused chaos among the endemic's population.

"They're bullies," says Dr Renee Rossini, a Bush Heritage freshwater and wetlands ecologist. Without intervention, within 12 to 18 months of a breach the Red-finned Blue-eye will disappear.

To save what remains of the compromised endemics, ecologists capture the surviving fish and move them to holding tanks at their field camp, eliminate the Gambusia using a light application of vegetable-based derris dust, strengthen the fencing, drain the spring, allow it to recharge, and then return the native species to the site.

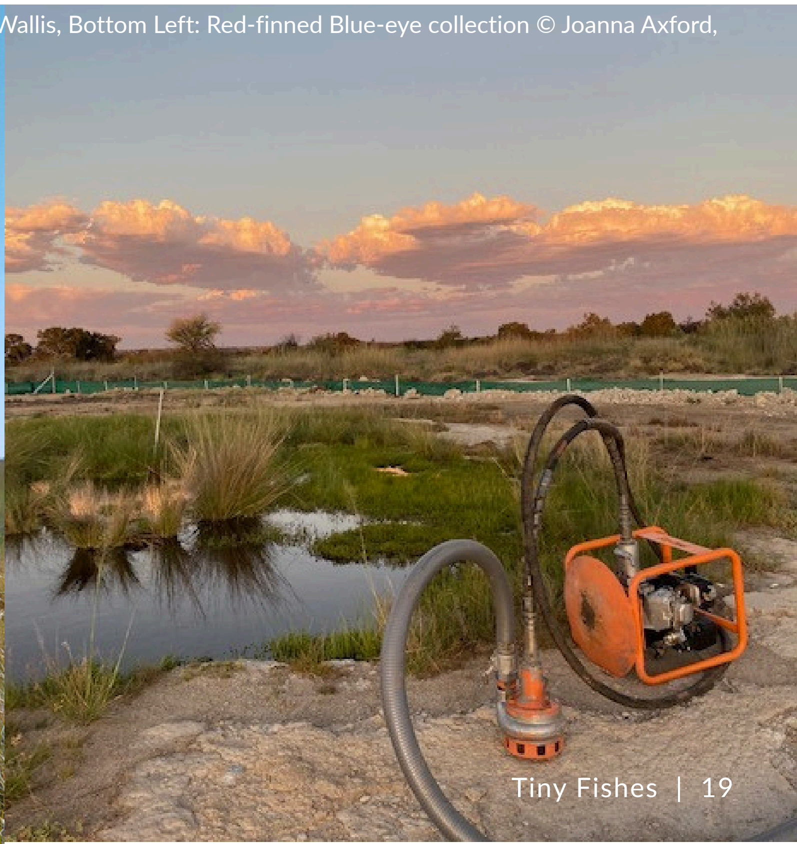
For the larger springs, this process can take more than a year.

The good news is the plan is working. Dr Dean Gilligan, a Bush Heritage Australia ecologist, estimated in 2024 that there are now more than 5,000 Red-finned Blue-eyes in Edgbaston – a big increase on the fewer than 1,000 in 2017. And it appears, thanks to all the hard work, the species is no longer Australia's most threatened freshwater fish (though it is still close).

The conservation process can be likened to scooping out infilling water from a leaky boat: so long as the conservationists continue to care and keep working to protect the Red-finned Blue-eye's future, there is every chance of winning. But pause the conservation management for just a few seasons, the fish's numbers would plummet.

As Gilligan says, "It's a constant battle," adding, "we're doing the best we can."

Top Right: Red-finned Blue-eye, *Scaturiginichthys vermeilipinnis*, © Peter Wallis, Bottom Left: Red-finned Blue-eye collection © Joanna Axford, Bottom Right: Spring drainage © Renee Rossini.



Trichonida Dwarf Goby

Economidichthys trichonis

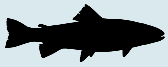
Trichonis Dwarf Goby, *Economidichthys trichonis* © Jörg Freyhof

If you want to meet Europe's smallest freshwater fish, you'll have to visit a little-known river system in Western Greece. Among the reeds and clear shallows of Lakes Trichonida and Lysimachia, lives *Economidichthys trichonis* – a goby so tiny that females can be mature at just 18 mm in length. Its larvae, at around 2.1 mm, are thought to be the smallest free-living European vertebrates.

First described in 1990 by Economidis and Miller, the Trichonida Dwarf Goby belongs to a distinctive group of freshwater gobies whose distribution mirrors the fragmented geological history of Western Greece. Its entire known range lies within the lower Achelous River basin, including Lakes Trichonida and Lysimachia – both among the clearest and deepest lakes in Greece – where it finds refuge in their shallow, vegetated shorelines. It's a sociable little species and tends to be most common where submerged vegetation is thickest.

The goby is a bottom-dweller and lives in areas packed with aquatic plants, reedbeds, and sheltered bays down to around 15 metres. It also turns up at stream mouths and sometimes forms small shoals near the surface over gravel and stones. The shallow, plant-rich microhabitats it relies on provide cover from predators and support the zooplankton the species feeds on.

Maximum Length: 18mm



Red List Status: Endangered
SHOAL Priority Fish: Yes
Described: Economidis, P. S.; Miller, P. J. (1990)
Range: The lower Achelous River system in southwestern Greece, including Lakes Trichonida and Lysimachia

Its closest relatives include the Western Greece Goby (*Economidichthys pygmaeus*), another tiny Greek endemic.

According to the IUCN Red List, as of the latest assessment in November 2023 we still don't have solid estimates of its population size or trend, and we don't even know how many subpopulations exist. Because its range is so small – just 252 km², with the species known from only three locations – and because the quality of its habitat is thought to be declining, it has been listed as Endangered since 2006.

Threats

For a species that depends on clean, plant-rich shallows, the past few decades haven't been kind. Since the mid-20th century, Lakes Trichonida and Lysimachia – naturally nutrient-poor systems – have been steadily loaded with fertilisers and organic pollution. As the lakes have shifted towards eutrophication, the zooplankton communities the goby relies on have changed too, weakening a vital food source.

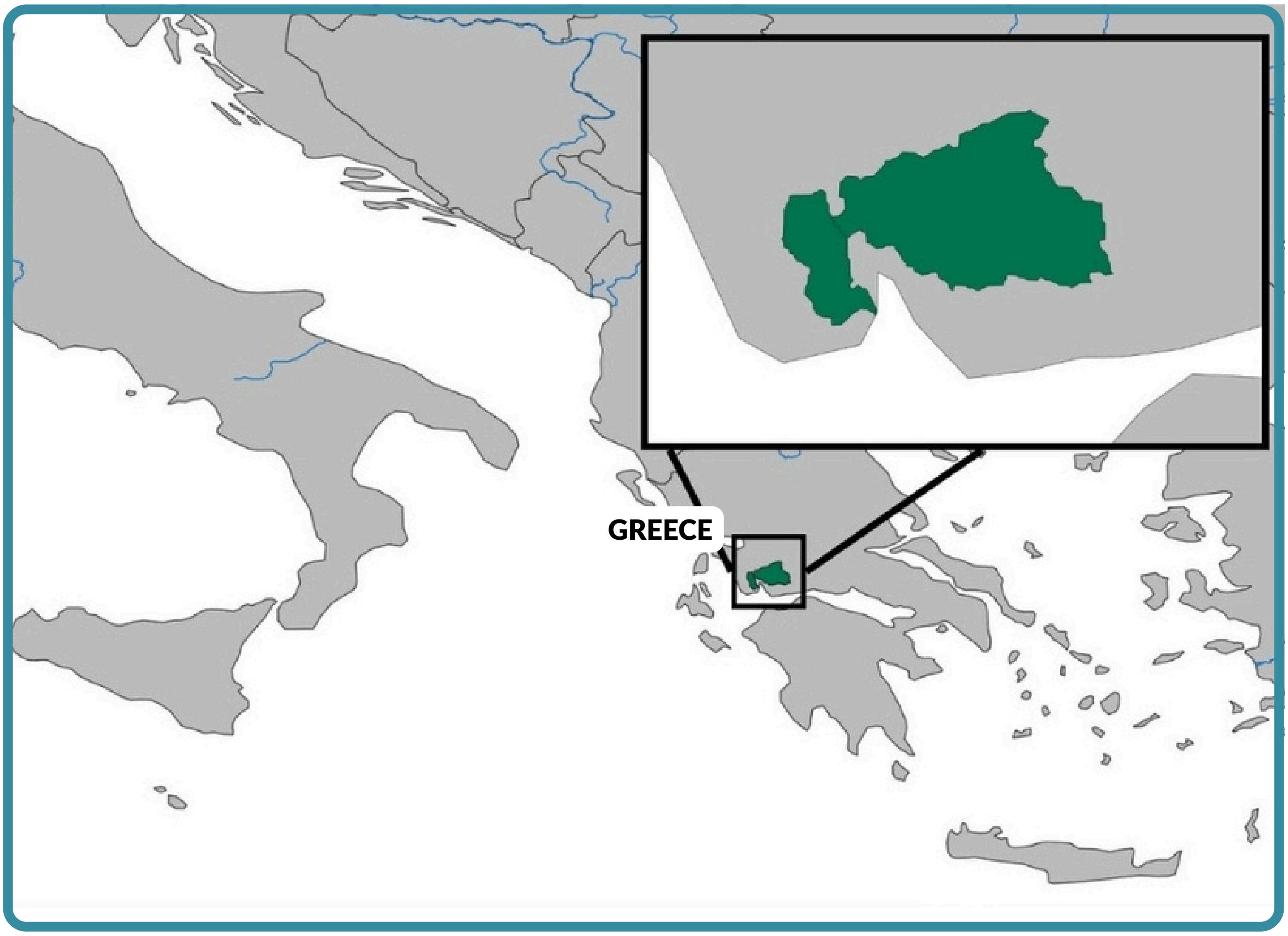
Lake Trichonida is in better shape than Lysimachia, but even there the trend is clear: nutrient levels are creeping up. Runoff from agriculture, olive oil mills, livestock farms and untreated domestic wastewater all play a part. Even something as simple as fly-tipping along the shore contributes to the gradual decline in water quality.

Lake Lysimachia has been eutrophic for decades. Until 2000 it received untreated sewage from the nearby city of Agrinio. Although this discharge has stopped, the effects linger on in the form of high phosphorus and other nutrients, with agricultural runoff still flowing in.

Another quiet but significant threat is the loss of reedbeds. Land reclamation around the lake margins has reduced the shallow, vegetated zones where the goby lays its eggs.

Fishing practices add yet another pressure. On Lake Trichonida, fishers often use bright lights at night to attract Big-Scale Sand-Smelt (*Atherina boyeri*). Unfortunately, the lights also draw in goby larvae, making them much easier for predators to pick off. Beyond the lakes, the lower Achelous basin has been reshaped by intensive irrigated agriculture. Over-extraction of groundwater, drained wetlands, and engineered flood-control channels have altered natural water flows. Runoff from farms continues to feed eutrophication in springs and floodplain habitats, while increased silt from soil and bank erosion has smothered aquatic vegetation – the very habitat this miniature fish depends on.

Range Map of *Economidichthys trichonis* - Data courtesy of IUCN Red List

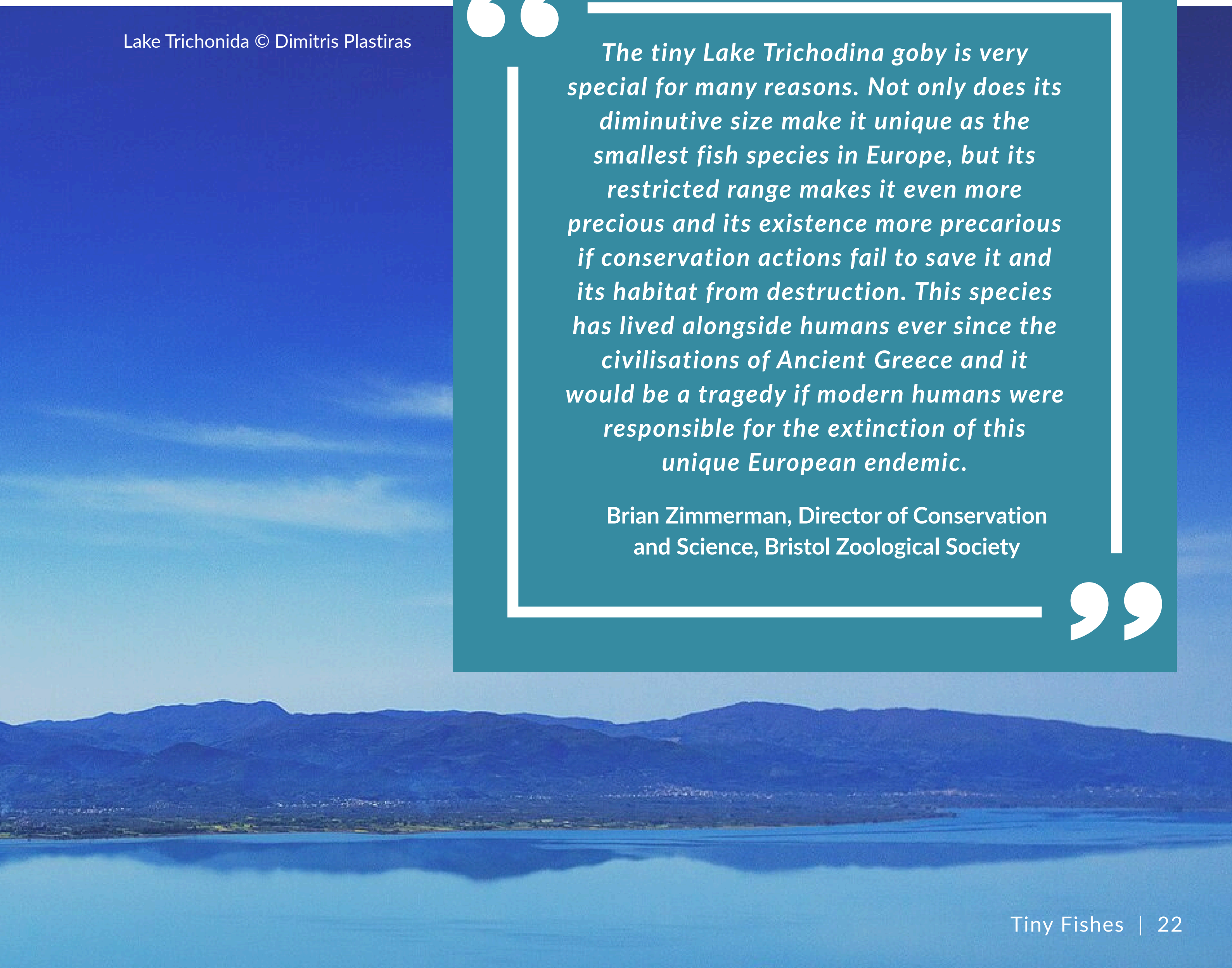


CONSERVATION

Despite being confined to very vulnerable lake systems, there's currently no species-specific legal protection or dedicated management plan for the Trichonida Dwarf Goby. Lakes Trichonida and Lysimachia are part of the European Union's Natura 2000 network, which does offer some site-level protection, but, according to the IUCN, broader management plans haven't been finalised and existing protections aren't actively enforced.

On a more positive note, the species has benefitted from ex situ conservation. Under the AG Levantis Foundation-funded AFRESH project, a 2023 paper in Oryx reported successful establishment of captive "safety-stock" populations.

So, while the goby occurs entirely within a protected site and now has captive backup populations, there are still major challenges – especially when it comes to enforcement and habitat quality on the ground. More active, better-resourced conservation action is urgently needed if this tiny fish is to have a secure future.



Lake Trichonida © Dimitris Plastiras

> *The tiny Lake Trichodina goby is very special for many reasons. Not only does its diminutive size make it unique as the smallest fish species in Europe, but its restricted range makes it even more precious and its existence more precarious if conservation actions fail to save it and its habitat from destruction. This species has lived alongside humans ever since the civilisations of Ancient Greece and it would be a tragedy if modern humans were responsible for the extinction of this unique European endemic.*
>
> **Brian Zimmerman, Director of Conservation and Science, Bristol Zoological Society**

Least Killifish

Heterandria formosa

Least Killi, *Heterandria formosa* © Dornenwolf

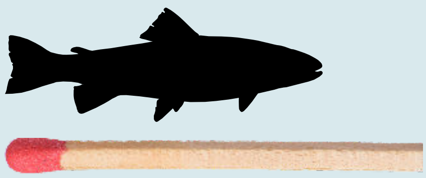
The least killifish, *Heterandria formosa*, deserves the spotlight in any discussion of tiny fishes not just for its size, but for what its biology, ecology and distribution reveal about the subtle complexity of North America's freshwater and brackish-water habitats.

The species is a livebearer fish in the family Poeciliidae (the same family as guppies and mollies). Though its common name might suggest a relationship with "true" killifishes, taxonomically, it is not a killifish.

Its native distribution lies entirely within the United States, spanning the Lower Coastal Plain from the Cape Fear River drainage in North Carolina, south through Georgia and Florida, and west to southern Louisiana. Within that region, the species inhabits shallow, heavily vegetated margins of slow-moving or still water bodies, such as marshes, swamps, ponds, sluggish streams and sometimes slightly brackish lagoons or estuaries.

This ecological niche suggests the species thrives in what might be considered transitional zones between open water and marsh vegetation. In doing so, they link aquatic and semi-aquatic systems, playing an understated but potentially important ecological role.

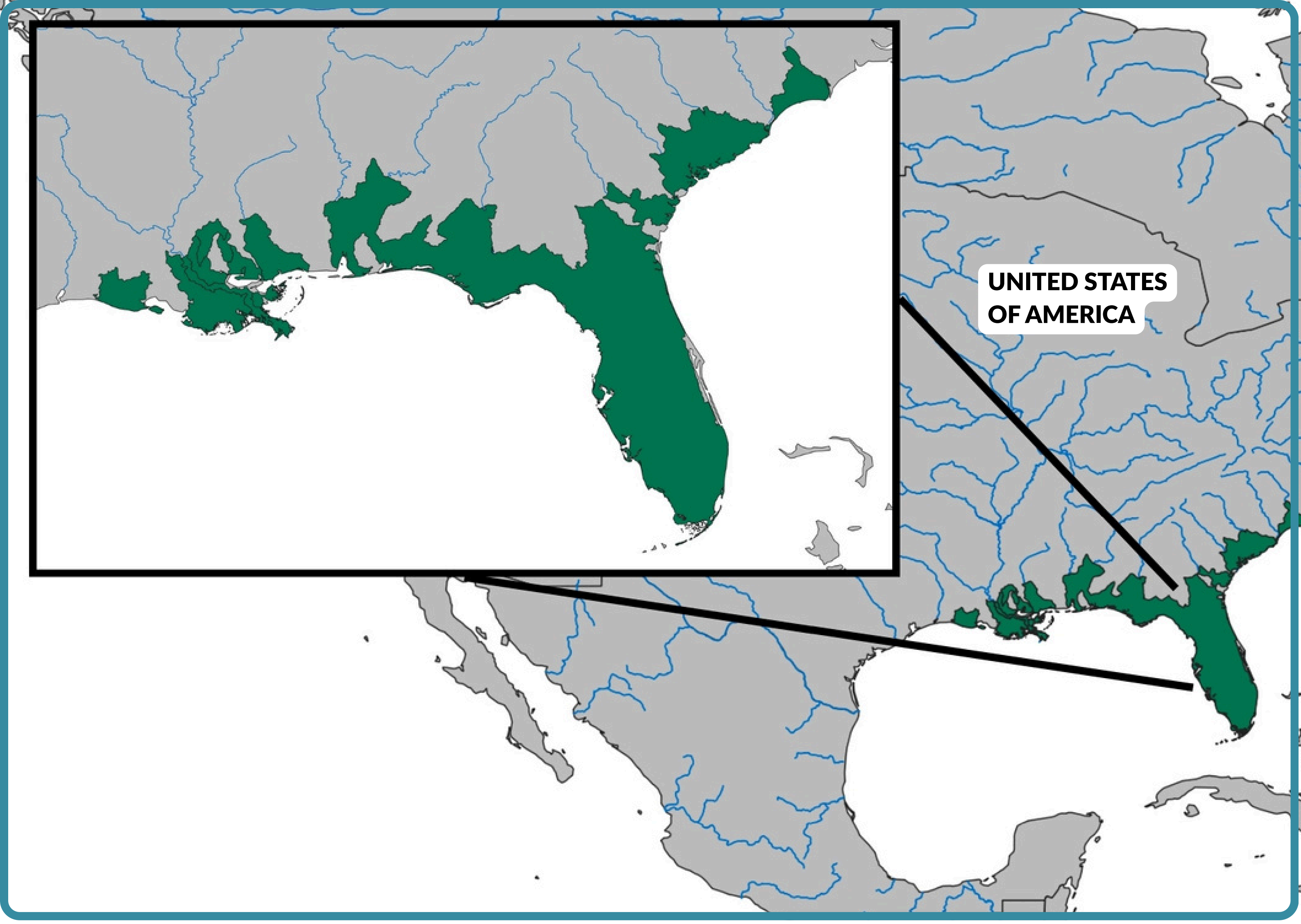
Maximum Length: 36mm



Red List Status: Least Concern
SHOAL Priority Fish: No
Described: Girard (1859)
Range: The lower southeastern North American Coastal Plain from the Cape Fear River drainage in extreme southeastern North Carolina to southeastern Texas.

Size, biology and lifestyle
The species is thought to be one of the smallest freshwater fishes in North America. Males commonly reach a total length of around 20 mm; females are slightly larger, often up to about 30–36 mm.

It is viviparous, with the female carrying developing embryos internally, nourishing them directly until she gives birth to free-swimming juveniles.



Range Map of *Heterandria formosa* - Data courtesy of IUCN Red List

Interestingly, rather than bearing a single large brood at once (as many livebearers do), females of this species often release a few fry at a time over a prolonged period, potentially producing dozens of offspring across many days. This strategy, known as superfetation, means there is almost always a mixture of young in various developmental stages – a tactic that may buffer the population against fluctuations in survival.

The species is omnivorous, and feeds on small aquatic invertebrates and plant material.

Conservation status and ecological variation

Although the Least Killifish is listed as Least Concern on the IUCN Red List, it shows notable morphological and ecological variation among populations, depending on local conditions. A study on shape variation among different populations demonstrated how environmental factors, particularly the nature of water flow, vegetation and habitat structure, influence body shape and traits.

Such variation indicates that while the species persists across a broad range, local populations might be finely tuned to their microhabitats. In degraded or altered wetlands, where vegetation is removed, water flow is changed, or water quality deteriorates, those specialised local forms might be at risk, even if the species as a whole remains common.

Potential threats

Humans have long taken advantage of the fish's appetite for mosquito larvae: as early as 1905, about 10,000 individuals (alongside a related livebearer, Gambusia) were stocked into ponds in New Jersey for mosquito control. However, the population did not persist, with the translocated fish apparently failing to establish long-term survival.

The failure to establish suggests that the Least Killifish depends on specific habitat conditions – i.e. dense vegetation, slow-moving water, suitable temperature and water chemistry – which may not have been provided in sufficient measure in New Jersey.

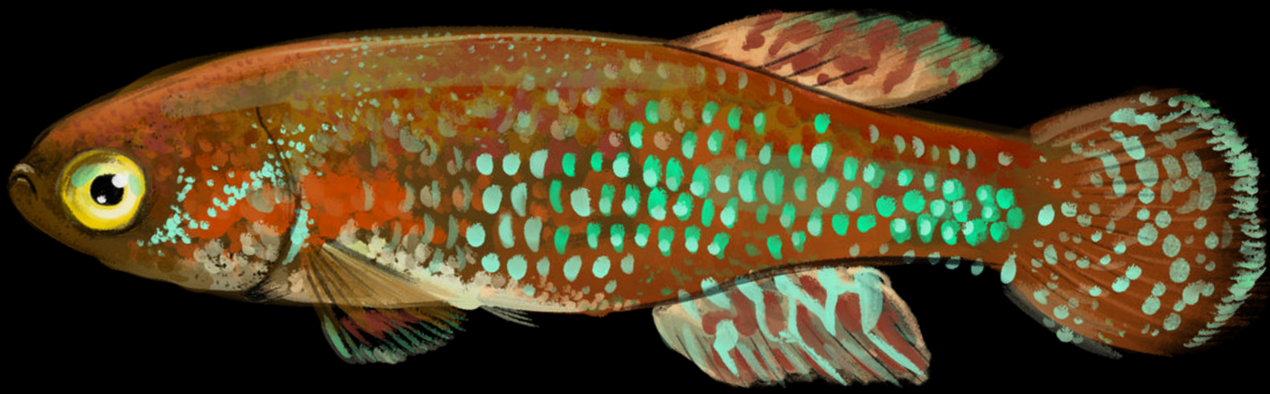
Because much of its habitat lies within coastal plains and wetlands that are vulnerable to land-use change, drainage, urbanisation, pollution, and hydrological alteration, it stands to reason that habitat loss may pose the greatest threat to this species, especially for isolated or morphologically distinct local populations. For now though, it has been assessed as Least Concern on the IUCN Red List.

Least Killifish contribute to insect, particularly mosquito, control, and form part of the diet of larger fish, amphibians and birds. Because the species thrives in shallow, vegetation-rich, slow-moving water, the species' presence may signal the health of marshy wetlands, floodplain ponds and estuarine fringe zones. Their loss or decline could hint at ecological degradation long before larger, more conspicuous species disappear.

Least Killi, *Heterandria formosa* © Brian Gratwicke

Bamileke Killi

Aphyosemion bamilekorum



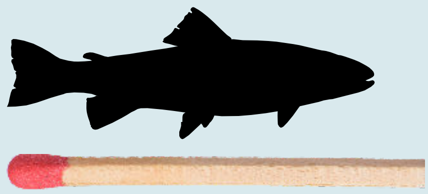
Bamileke Killi, *Aphyosemion bamilekorum* © Illustration by Georgie Bull

The Bamileke Killi is a small, stream-dwelling freshwater fish endemic to the upper Sanaga River system in western Cameroon, occurring only within a restricted area of highland savannas and mountainous brooks. Its range includes fast-flowing streams and headwaters, where waters are cool, clear, and well-oxygenated.

Because of its very small geographic range, with an area of occupancy of less than 500 km², and the fragmented nature of upland stream systems, the species likely occurs in small, isolated subpopulations. It has only ever been recorded from two locations. Its reliance on intact headwater habitats makes it particularly sensitive to disturbance.

Adults reach around 40 mm in length – the maximum size that qualifies for this report – and belong to the diverse African killifish assemblage. Killifish are well known for their vibrant colouration, small size, and highly localised distributions. Many African killifishes are adapted to seasonal pools, but the Bamileke Killi is not a seasonal species: it inhabits permanent or semi-permanent streams rather than temporary wetlands.

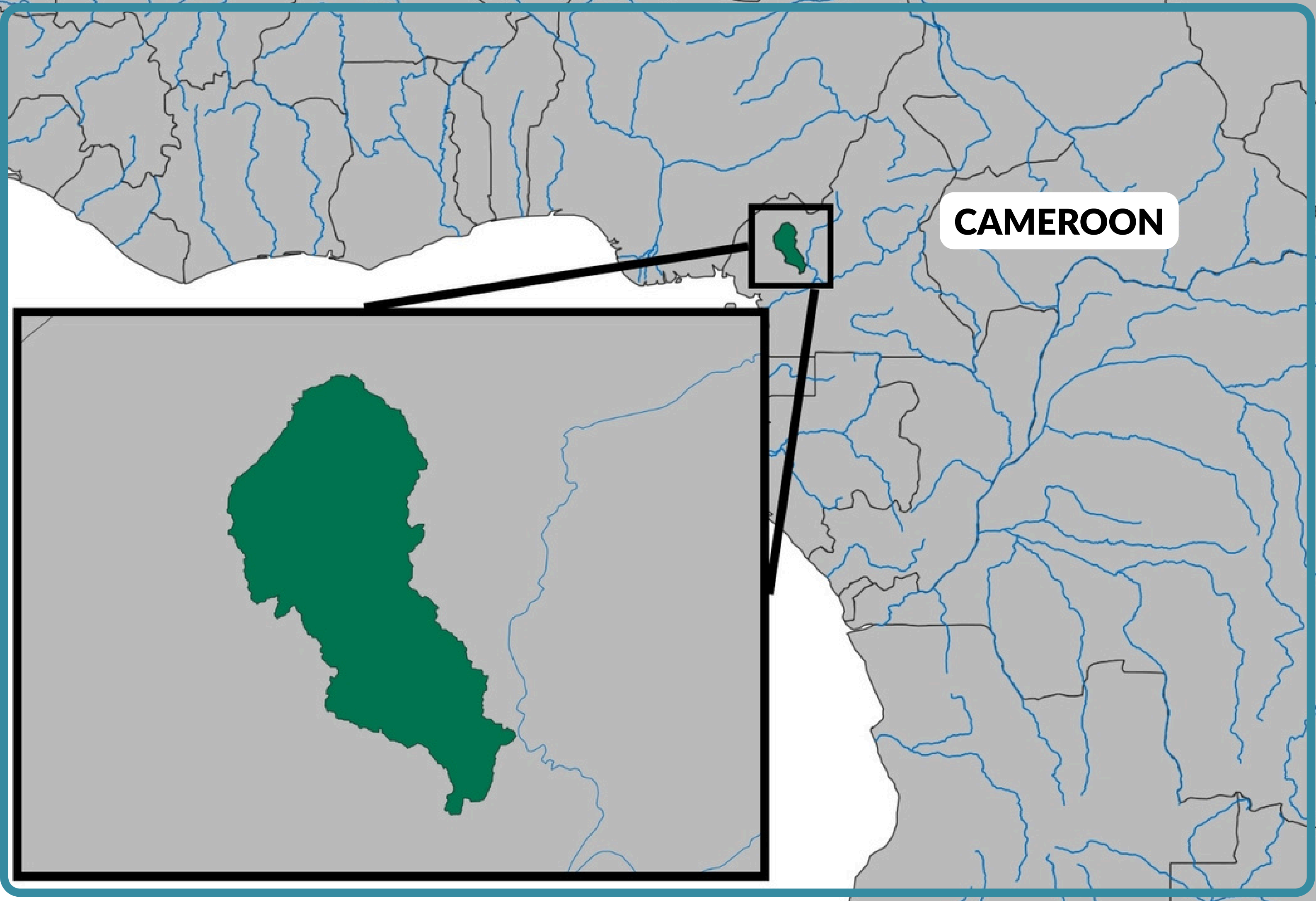
Maximum Length: 40mm



Red List Status: Endangered
SHOAL Priority Fish: Yes
Described: A.C. Radda (1971)
Range: Bafoussam area in Western Highlands of Cameroon

Physiologically, the species is a bottom spawner, depositing eggs on or near the substrate. The incubation period is reported to be roughly one month.

Published ecological information is limited, but closely related *Aphyosemion* species typically feed on small aquatic invertebrates. The Bamileke Killi is recorded as inhabiting fast-flowing brooks where such prey are abundant. Beyond this, there is little species-specific diet or behaviour data in the available literature.



Range Map of *Aphyosemion bamilekorum* - Data courtesy of IUCN Red List

Biological & Ecological Notes

Though small and visually understated compared with some *Aphyosemion* relatives, the Bamileke Killi has traits that make it ecologically distinctive.

As a non-seasonal, stream-dwelling killifish, it diverges from the well-known annual killifish model found elsewhere in Africa. Rather than relying on drought-resistant eggs and ephemeral pools, it persists in flowing, permanent waters, making it more dependent on hydrological stability and sediment integrity.

The fact that it is a bottom spawner, laying eggs on the substrate, suggests that its reproductive success depends closely on good substrate quality and stable streambed conditions. Disturbances to the riverbed (e.g., siltation, sedimentation, disturbance from human activity) could thus directly harm reproduction, providing insight into why habitat modification is such a high-impact threat.

Its very small body size and extremely restricted geographic range also make it inherently vulnerable to rapid environmental change. As we have seen with other species in this report, Small fishes with restricted ranges and specialised habitat requirements can decline rapidly when conditions change, and such species often disappear long before they are formally studied, which adds urgency to recent survey efforts.

Conservation Efforts

Until recently, the species had received no known formal conservation attention, and there was a lack of systematic conservation data. That began to change in 2025, when a field project was launched via funding from The Rufford Foundation to assess the species' distribution, population, habitat conditions and conservation status.

The project is gathering baseline information using standardised survey techniques such as dip-net sampling and visual encounter surveys.

Its goals include:

- Identifying remaining strongholds.
- Documenting habitat characteristics and threats.
- Generating the first rigorous dataset for long-term monitoring.
- Providing evidence to guide future conservation actions.

This recent effort to assess its population and habitat is an encouraging sign that this species might stand a chance of bouncing back, provided sufficient scientific, conservation and perhaps community support.

Knowledge gaps

Despite what is known, there remain significant gaps about this fish. For example:

- Long-term population trends are not well documented. Because systematic monitoring only recently began in 2025, we lack robust data on whether populations are stable, declining, or perhaps shrinking rapidly.
- The full extent of its habitat – whether there are populations in unsurveyed streams or highland brooks – is uncertain. Without comprehensive surveying, the "area of occupancy" could be larger, but equally, there could be extirpated populations we aren't aware of.
- There is limited published information on its ecology beyond basic reproduction and habitat preferences; details like life history under natural conditions (growth rate in the wild, seasonal patterns, diet in situ) are sparse.
- There is no documented large-scale conservation programme or protected-area status specific to the streams where it lives.

These gaps highlight how important it is to support continued field work, habitat protection, and – where needed – captive-breeding or ex-situ conservation plans.

The Bamileke Killi illustrates the conservation challenges facing Africa's small headwater fishes. Its decline reflects broader pressures on highland freshwater ecosystems – systems that receive far less attention than large river basins but often hold exceptional local endemism.
Because it is confined to such a narrow range, any improvement or deterioration in habitat quality has immediate consequences. Protecting species like *A. bamilekorum* therefore helps safeguard entire micro-ecosystems that support unique biodiversity.
Ultimately, the fish's survival depends on the integrity of Cameroon's upland streams. Habitat degradation, pollution, and collection pressures threaten its already small populations, while long-standing knowledge gaps have hindered conservation. The recent 2025 field project represents a pivotal first step towards understanding and protecting this magnificent miniature marvel.

Bottom Image: Lake Baleng
© Mekem Z. Prosper

Coral Red Pencilfish

Nannostomus mortenthaleri

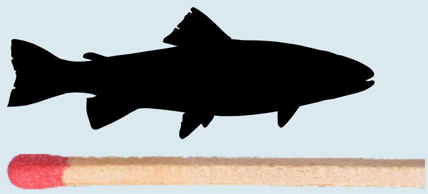
Coral Red Pencilfish, *Nannostomus mortenthaleri* © Peter Maguire

The Coral Red Pencilfish is a vividly coloured fish from deep in the Peruvian Amazon. Its maximum length is 35 mm. Its outstanding red and black stripes and generally peaceable nature have made the species highly sought after for the aquarium trade. The overcollection that has resulted from this has put immense pressure on wild populations and has become the fish's biggest threat. Populations crashed catastrophically due to intense fishing, leading assessors in 2016 to categorise it as Critically Endangered.

The fish was described in 2001, originally as a sub-species of *Nannostomus marginatus* but soon elevated to full species status. The name honours the Peruvian aquarium-fish exporter Martin Mortenthaler (1961–2018), the owner of Aquarium Rio Momon SRL in Iquitos, Peru, who collected the type specimen.

The natural distribution of the Coral Red Pencilfish appears extremely restricted. It has only ever been recorded from a small tributary of the Nanay River in Peru, with possible, but less certain, occurrence in the nearby Tigre River system.

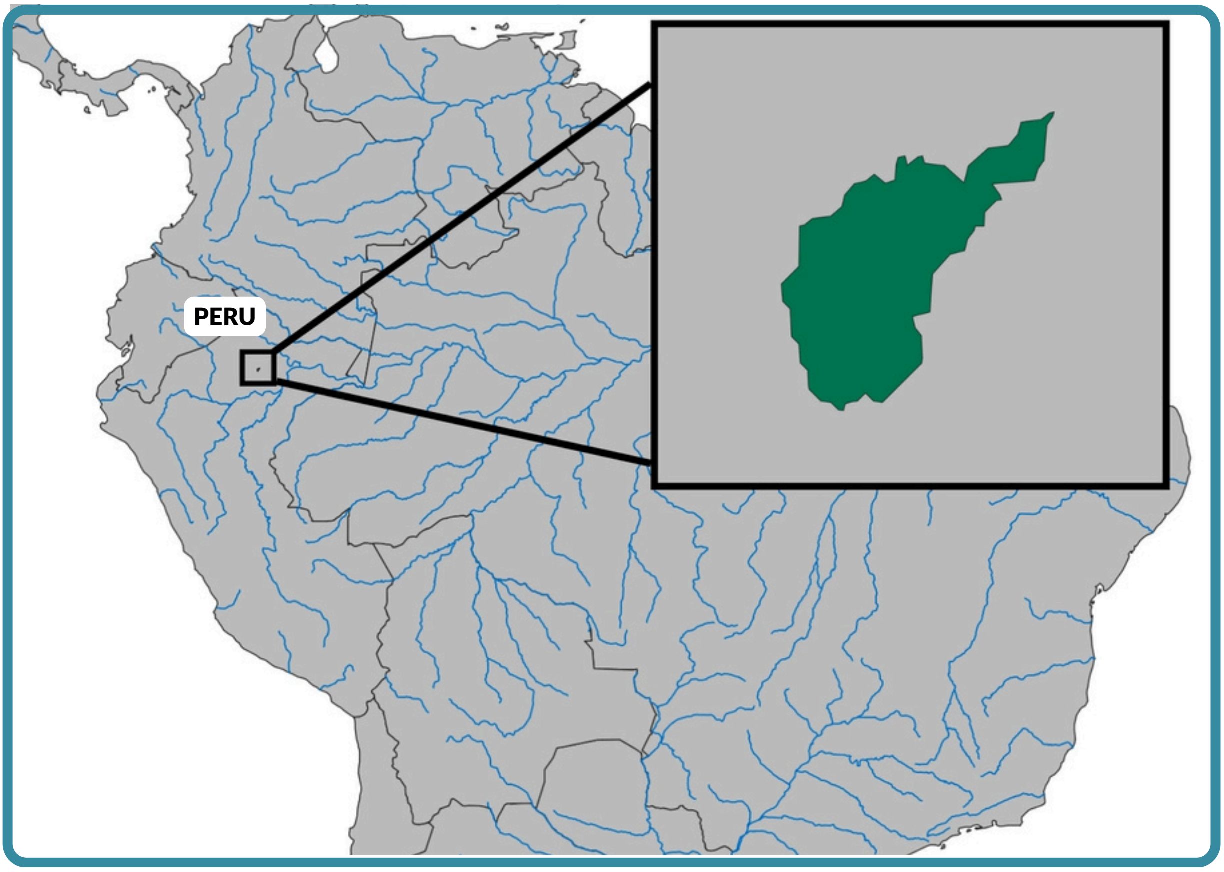
Maximum Length: 35mm



Red List Status: Critically Endangered
SHOAL Priority Fish: Yes
Described: Paepke & Arendt, (2001)
Range: Peru

The species' natural habitat is tannin-rich, slow-moving or nearly still streams, with soft, acidic water and dense vegetation, submerged wood and leaf litter that offer plenty of hiding places for the tiny fish.

As a small characin in the family Lebiasinidae, the species is a micropredator, feeding on tiny invertebrates and zooplankton. Its modest, narrow mouth, reflected in the genus name *Nannostomus*, meaning "small mouth", is well suited to capturing small prey.



Range Map of *Nannostomus mortenthaleri*- Data courtesy of IUCN Red List

In both nature and captivity, Coral Red Pencilfish are inherently social, and described as shoaling rather than tightly schooling. In an aquarium setting, where they have been studied, they appear more at ease and display more natural behaviour when kept in groups, ideally of eight to ten or more individuals.

Despite the species' Critically Endangered status, there is good news: it is now bred in captivity, which has lessened the demand for wild-caught individuals. Although there has been no formal assessment since 2014, it is hoped that the increased supply of captive bred individuals has eased the pressure on wild populations.

The fish remains in a perilous situation, however. With its tiny range – which isn't in a protected area – any disturbance to the habitat could have disastrous effects. It is also not known how often the species is extracted from its natural habitat. IUCN Red List assessors Ortega Torres, H. and Cortijo Villaverde, A.M. recommend that research is needed to better determine the species' distribution, population size and trends, particularly to regulate and monitor the extraction.

The Coral Red Pencilfish represents one of the most spectacular examples of colouration among pencilfishes, yet its natural distribution is tiny, and its existence in the wild teeters on a knife-edge. Its story underscores a pattern found across tropical freshwater fishes: that some of the most beautiful, sought-after species are also among the most vulnerable.

Efforts to breed Coral Red Pencilfish in captivity offer hope. If those efforts are supported and expanded, they may relieve wild-collection pressure and give wild populations a better chance to survive, especially if their fragile habitat in the Amazon basin can be protected from habitat loss or degradation.

In addition, studying species such as Coral Red Pencilfish can teach us about the ecological dynamics of blackwater stream systems in Peru – ecosystems that are themselves often overlooked, but rich in unique biodiversity.

There is presently an ongoing conservation project to save this species, led by Amazon Research Center for Ornamental Fishes (ARCOF) in Peru.

Conway's Miniature Tetra *Priocharax conwayi*
Miniature Ghost Tetra *Priocharax phasma*
Miniature King Tetra *Priocharax rex*

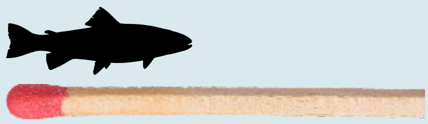
NOT EVALUATED
NE

Miniature Ghosts Tetra, *Priocharax phasma* © George Mattox

Miniature fishes can often reveal the Amazon's secrets in ways larger species cannot. Conway's Miniature Tetra, the Miniature Ghost Tetra and the recently described Miniature King Tetra are perfect examples: all so small that an adult can rest comfortably on the tip of a pencil, yet each helping reshape scientists' understanding of how tetras evolve when size is reduced to an absolute minimum. The genus *Priocharax* now contains twelve described species, most of them endemic to Brazil, with new ones still emerging from remote tributaries and floodplain lakes. The common thread binding them together is extreme progenetic paedomorphy, similar to the aforementioned *Paedocyris progenetica*.

In many vertebrates, developmental milestones are marked by the gradual formation and strengthening of bone, the fusion of skull plates, and the appearance of fully formed fins and sensory structures. *Priocharax* rewrites this script. Their lateral-line system – normally a well-developed sensory array used to detect water movement – never fully matures. Their pectoral fins lack the bony rays that would normally appear as a fish transitions out of the larval stage. Parts of the skull remain only partially ossified.

Maximum Length: 19, 14, 20mm respectively



Red List Status: Not yet assessed
SHOAL Priority Fish: Not yet
Described: Mattox GMT, Lima FCT, Britz R, Souza CS, Oliveira C (2024), Britz, Conway, & Rüber (2021).
Range: Rio Tapajós, Igarapé do Henrique, Rio Maró, affluent of Rio Arapiuns, and Lago Santana, Ilha de Marimarituba, Santarém, PA, Brazil. P. rex: Río Putumayo, Colombia.

These characteristics are not signs of immaturity but the defining morphology of the adult fish. This developmental truncation, described in detail by Mattox and colleagues in their 2024 and 2025 taxonomic papers, makes *Priocharax* one of the most anatomically reduced genera within the American tetras.


P. conwayi © George Mattox

Because of their size and skeletal simplicity, species in this genus are notoriously difficult to study. Mattox has noted that specimens have almost certainly been collected in the past but left undescribed because their diagnostic features cannot be clearly seen without painstaking dissection. SHOAL's New Species 2024 report recounts how specialist support from miniature-fish anatomist Ralf Britz was crucial: dissecting a fish this small requires fine surgical skill and, more importantly, the patience to interpret structures that in larger fishes are obvious but in *Priocharax* are nearly vestigial.

Fieldwork can be equally demanding. During the survey that led to the description of Conway's Miniature Tetra, Mattox and Flávio Lima travelled for nearly 14 hours by boat up a remote Tapajós tributary, then entered the water to seine for fish barely visible against dark, vegetation-rich shallows.

The Tapajós specialist: *Priocharax conwayi*
Described in 2024, Conway's Miniature Tetra is known from the upper Rio Arapiuns in the Tapajós basin near Santarém. It reaches around 19 mm standard length, making it one of the larger members of the genus (though still firmly a miniature species). FishBase lists it as a benthopelagic freshwater fish occurring in blackwater streams and shallow channels shaded by forest vegetation. The type locality and an additional collection site both fall within the Tapajós system, a region known for clear–blackwater habitats with dense marginal vegetation.

Its name honours ichthyologist Kevin Conway for his contributions to fish morphology. The species displays the typical *Priocharax* suite of reduced fin rays, simplified dentition and larval-like pectoral girdle.

A 14-hour boat ride to their destination: the type locality of the newly described *P. conwayi* © George Mattox

P. phasma © George Mattox

The ghost tetra: *Priocharax phasma*
In contrast, the Miniature Ghost Tetra comes from floodplain waters where the Tapajós meets the Amazon near Santarém, including Ilha de Marimarituba and Ilha Nazareth. Adults are around 14 mm and almost entirely transparent, giving rise to the name *phasma*, meaning "ghost". According to Mattox et al. (2024), this is one of the few *Priocharax* species identifiable by sight alone because of its striking translucence. Like other congeners, it lacks an adipose fin and shows extreme skeletal reduction.

A miniature king: *Priocharax rex*
In 2025, Mattox and collaborators expanded the genus again with the Miniature King Tetra, described from the Río Putumayo drainage in Colombia. Although smaller in body length than most aquarium tetras, *P. rex* is comparatively robust for the genus – hence the slightly tongue-in-cheek species name "rex", or "king". The discovery extended the known distribution of *Priocharax* beyond Brazil and highlighted how under-surveyed many Amazonian tributaries remain. The species retains the hallmark paedomorphic features of the genus and further reinforces that miniaturisation in South American tetras has evolved multiple times across different river systems.

Type locality for *P. phasma (left)*, and *P. rex* (right) © George Mattox

Conservation status and emerging concerns

None of these three species has yet been evaluated by the IUCN Red List. Mattox has suggested that if formally assessed, many *Priocharax* species could prove highly threatened simply because of their extreme endemism: several are known from only a single stream, lake or tributary. SHOAL's New Species 2024 report stresses that discoveries so far indicate each species occupies a very restricted range, leaving them vulnerable to habitat alteration.

Although no threat assessments exist for these species individually, the broader Amazon basin faces well-documented pressures including sedimentation from deforestation, hydropower development, mining, pollution and climate-driven changes to hydrology. Large-scale reviews of Amazon freshwater systems have shown how these stressors interact cumulatively, undermining the integrity of both clearwater and blackwater habitats. For tiny fishes with limited dispersal, any alteration to local water quality or flow could be consequential, but formal studies are still needed. One cautiously positive note is that several *Priocharax* species, including Conway's Miniature Tetra, have been found in or near protected areas, suggesting that Brazil's network of reserves may incidentally safeguard some populations.

Still, the genus remains poorly known, and basic information such as population size, ecological role and tolerance to environmental change has yet to be established.

Priocharax species are reminders that some of the Amazon's most distinctive vertebrates are also its smallest. They show how evolution can compress anatomy to its bare essentials, stripping back structures that almost all other fishes rely on. They highlight how much taxonomic work remains unfinished in Amazonia and how easily unique species can go unnoticed when they are literally transparent.
Most importantly, they illustrate a core theme of this report: safeguarding freshwater diversity means paying attention not just to the iconic giants but also to the species so reduced and delicate that an entire fish fits onto your fingernail.

The miniature worlds of *Priocharax* are only beginning to be documented. Protecting them will mean understanding them, and understanding them begins with recognising their extraordinary existence.

Range Map of *Priocharax genus*- Data courtesy of IUCN Red List

Priocharax toledopizae © George Mattox

P. conwayi © George Mattox

"Miniature fishes are small wonders of evolution – and there are still a few *Priocharax* waiting to be discovered!"
– George Mattox

P. nanus © George Mattox

P. britzi © George Mattox

Comb-bearing Priapum Fish

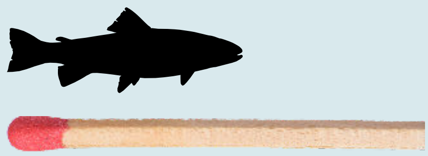
Neostethus ctenophorus

Neostethus lankesteri (similar to *N. ctenophorus*) © Mike Noren

In the waters of the Laguna de Bay in the Philippines, *Neostethus ctenophorus* was collected and described in 1937: a small member of the atheriniform family Phallostethidae, an intriguing family of fascinating, understudied tiny fishes from Southeast Asia. While the diminutive *N. ctenophorus* may be fairly unremarkable at first glance, the family name "Phallostethidae" may give readers familiar with Latin and Greek pause: "penis-chested"! How on earth did that name come about?

The reason lies in a singular striking feature found in male fish: the priapium, a unique organ found on the underside of the fish's throats and used for reproduction. It is a highly complex structure consisting of both bony and muscular components, derived from the fish's modified pelvic fins, pectoral girdle, and pleural ribs. It is a bilaterally asymmetrical organ, and males can either be sinistral or dextral (left or right-sided respectively), corresponding with the position of the fish's seminal papilla). Different tribes and species within the family exhibit different priapium morphologies, rendering it a critical taxonomic feature.

Maximum Length: 24mm



Red List Status: Critically Endangered
SHOAL Priority Fish: Yes
Described: Aurich 1937 (as *Solenophallus ctenophorus*)
Range: Laguna de Bay, Luzon, Philippines

Bony elements include the ctenactinium (modified anal fin spines that can be straight, or hook-like and serrated) and the papillary bone. Fleshy elements include the seminal papilla and the pulvinulus. Members of the genus *Neostethus*, including *N. ctenophorus*, differ from other phallostethids in lacking the hook-shaped toxactinium but possessing an inner pulvinular bone.

Phallostethids mate in an unusual head-aligned mating embrace during which males use their priapia to clasp onto females, bringing the male's genital pore into close proximity to the female's. This allows the passing of a sperm package between the mating pair in an act of internal fertilisation, in contrast to the external fertilisation observed in the vast majority of fishes. After copulation, females proceed to deposit filamented eggs on plants or other suitable substrate, giving rise to the next generation of ichthyological penis-chested wonders.

Threats

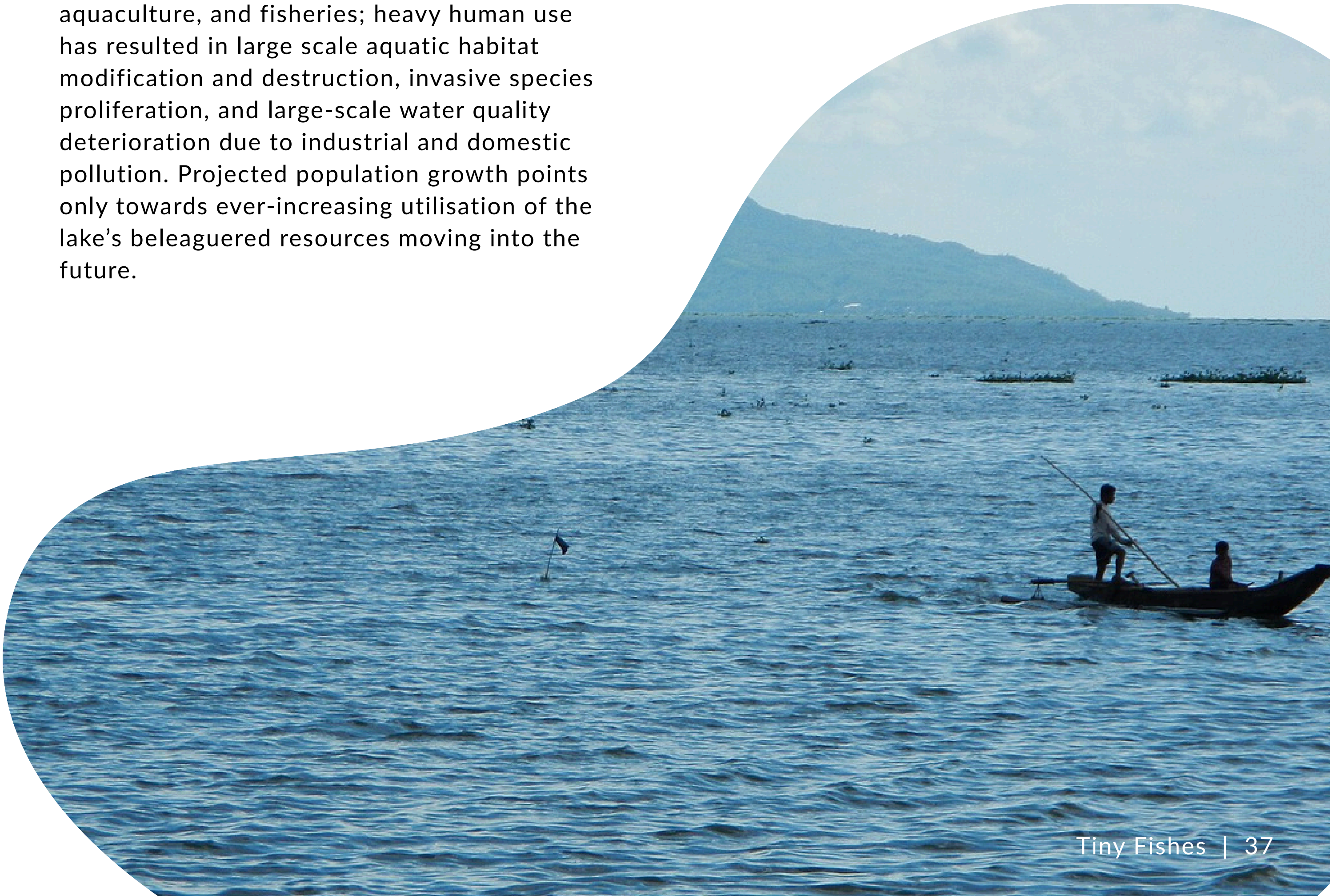
Fascinating as these fishes' morphologies and behaviour are, they unfortunately face the same existential threats as so many other tiny fishes: understudied, overlooked, and ignored. While Laguna de Bay holds the distinction of being the largest freshwater lake in the Philippines, with a surface area of more than 900 km², its large size is insufficient to provide *N. ctenophorus* and other native fish species with the shelter and security they need to withstand the tidal wave of anthropogenic threats. The lake is one of the most important freshwater resources in the Philippines, utilised by millions of people for everything from freshwater extraction, waste removal, aquaculture, and fisheries; heavy human use has resulted in large scale aquatic habitat modification and destruction, invasive species proliferation, and large-scale water quality deterioration due to industrial and domestic pollution. Projected population growth points only towards ever-increasing utilisation of the lake's beleaguered resources moving into the future.

Conservation

Since it was described almost 90 years ago, *N. ctenophorus* has not been recorded from the lake, despite multiple ichthyological surveys in the past decades. Coupled with the critical conditions in Laguna de Bay, the chance that the species persists are slim, though assessors are still unsure if it is well and truly extinct. Comprehensive searches may yet give researchers the confidence to update on the status of this fascinating little fish; regardless, the restoration of the embattled Laguna de Bay remains a goal well worth fighting for, both for the native aquatic fauna that still survives, and the millions of people that call its shores and basin home.

In the meantime, other threatened species from the genus have been identified as being in need of urgent protection, including *N. robertsi* (CR), *N. thessa* (EN), and *N. geminus* (EN); targeted conservation efforts may yet reverse the trajectory for these intrepid little "penis-chests", even as they careen towards the extinction parapet.

Bottom Right: Laguna de Bay, native habitat of *N. ctenophoprus.* © Ramon F. Velasquez



ANNEX
SHOAL Priority Fishes <40mm*

* All sizes have been taken from FiseBase. Some are Total Length (TL), others are Standard Length (SL) – specified below. We recognise that some SL fishes will therefore have a TL of more than 40 mm.

Scientific Name	Common Name	Max Length (nearest whole mm)	Length Type	Red List Category
Acanthobunocephalus scruggsi	NA	22	SL	Vulnerable
Allomogurnda multicincta	NA	35	SL	Critically Endangered
Allotoca zacapuensis	Zacapu allotoca	30	SL	Critically Endangered
Anablepsoides lineasoppilatae	NA	37	SL	Vulnerable
Anablepsoides luitalimae	NA	37	SL	Endangered
Anablepsoides parlettei	NA	38	SL	Vulnerable
Anablepsoides roraima	NA	32	SL	Endangered
Anablepsoides speciosus	NA	35	TL	Critically Endangered
Aphanius almiriensis	NA	28	SL	Critically Endangered
Aphyosemion abacinum	NA	35	TL	Vulnerable
Aphyosemion bamilekorum	Bamileke killi	40	TL	Endangered
Aphyosemion fulgens	NA	35	TL	Endangered
Aphyosemion tirbaki	NA	38	SL	Endangered
Apistogramma lineata	NA	31	SL	Endangered
Apistogramma psammophila	NA	26	SL	Endangered
Apricaphanius baeticus	NA	33	SL	Endangered
Apricaphanius saourensis	Sahara aphanius	32	SL	Critically Endangered
Atlantirivulus maricensis	NA	38	SL	Critically Endangered
Atlantirivulus simplicis	NA	35	SL	Endangered
Austrolebias ephemerus	NA	32	SL	Critically Endangered
Austrolebias queguay	NA	40	SL	Critically Endangered
Austrolebias univentripinnis	NA	36	SL	Endangered
Betta albimarginata	NA	28	SL	Endangered
Betta burdigala	NA	25	SL	Critically Endangered
Betta channoides	NA	20	SL	Endangered
Betta livida	NA	36	SL	Endangered
Betta miniopinna	NA	24	SL	Critically Endangered
Betta persephone	NA	26	SL	Endangered
Betta rutilans	NA	35	TL	Critically Endangered
Betta tussyae	NA	37	SL	Endangered
Brevibora dorsiocellata	Eyespot rasbora	23	SL	Endangered
Campellolebias dorsimaculatus	NA	40	TL	Critically Endangered
Characodon lateralis	Rainbow characodon	40	TL	Critically Endangered
Cheirodon kiliani	NA	30	SL	Endangered
Chela macrolepis	NA	38	SL	Endangered
Chiloglanis kolente	NA	26	SL	Endangered
Chiloglanis loffabrevum	NA	38	SL	Endangered
Chiloglanis mongoensis	NA	35	SL	Endangered
Chiloglanis niger	NA	35	SL	Endangered
Chlamydogobius micropterus	Elizabeth springs goby	30	SL	Vulnerable
Cnesterodon hypselurus	Cilida toothcarp	30	SL	Endangered
Cnesterodon iguape	Iporanga tooth carp	22	SL	Critically Endangered
Cnesterodon omorgmatos	Torres toothcarp	30	SL	Critically Endangered
Cnesterodon pirai	Almeida toothcarp	28	SL	Critically Endangered

Corumbataia britskii	NA	27	SL	Vulnerable
Corumbataia lucianoi	NA	24	SL	Endangered
Corydoras gladysae	Gladys' cory	35	SL	Critically Endangered
Corydoras hephaestus	NA	33	SL	Vulnerable
Creagrutus nigrostigmatus	NA	23	SL	Endangered
Creagrutus yudja	NA	30	SL	Endangered
Cryptotora thamicola	Cave angel fish	28	SL	Vulnerable
Cynolebias elegans	NA	38	SL	Critically Endangered
Cynopoecilus intimus	NA	27	SL	Vulnerable
Cyprinodon atrorus	Bolson pupfish	40	TL	Endangered
Cyprinodon bobmilleri	San Ignacio pupfish	35	SL	Vulnerable
Cyprinodon diabolis	Devils Hole pupfish	34	TL	Critically Endangered
Cyprinodon eremus	Sonoyta pupfish	40	SL	Endangered
Cyprinodon esconditus	Hidden pupfish	39	SL	Vulnerable
Cyprinodon higuey	NA	40	TL	Critically Endangered
Cyprinodon radiosus	Owens pupfish	40	TL	Endangered
Cyprinodon verecundus	Largefin pupfish	40	TL	Vulnerable
Devario apopyris	NA	38	SL	Vulnerable
Devario horai	NA	28	SL	Endangered
Economidichthys trichonis	Trichonis dwarf goby	30	TL	Endangered
Elassoma okatie	Bluebarred pygmy sunfish	34	TL	Vulnerable
Enteromius clauseni	NA	30	SL	Critically Endangered
Enteromius collarti	NA	35	TL	Vulnerable
Enteromius nigroluteus	NA	26	SL	Endangered
Enteromius subinensis	NA	34	SL	Endangered
Etheostoma lugoi	Tufa darter	35	SL	Critically Endangered
Fundulopanchax powelli	NA	28	SL	Critically Endangered
Gambusia beebei	Miragoane gambusia	33	SL	Critically Endangered
Gambusia eurystoma	Widemouth gambusia	35	TL	Critically Endangered
Gambusia hurtadoi	Crescent gambusia	25	TL	Critically Endangered
Gambusia krumholzi	Spotfin gambusia	40	TL	Vulnerable
Gambusia melapleura	Striped gambusia	34	SL	Vulnerable
Gambusia pseudopunctata	Tiburon Peninsula gambusia	32	SL	Endangered
Gambusia xanthosoma	Cayman gambusia	34	SL	Endangered
Gambusia zarskei	Chihuahua mosquitofish	23	SL	Vulnerable
Girardinichthys multiradiatus	Darkedged splitfin	35	TL	Endangered
Gulaphallus bikolanus	NA	20	SL	Endangered
Gymnochanda verae	NA	26	SL	Endangered
Harttiella intermedia	NA	35	SL	Critically Endangered
Harttiella parva	NA	31	SL	Critically Endangered
Hasemania maxillaris	NA	29	TL	Critically Endangered
Hoplomyzon cardosoi	NA	19	SL	Endangered
Horaglanis abdulkalami	NA	38	TL	Endangered
Hyalobagrus ornatus	NA	30	SL	Critically Endangered
Hyphessobrycon arianae	NA	24	SL	Vulnerable
Hyphessobrycon coelestinus	NA	33	SL	Endangered
Hyphessobrycon flammeus	Flame tetra	26	SL	Endangered
Hyphessobrycon hildae	NA	19	SL	Vulnerable
Hyphessobrycon paucilepis	NA	29	SL	Endangered
Hyphessobrycon procerus	NA	33	SL	Endangered
Hyphessobrycon pytai	NA	38	SL	Vulnerable
Hyphessobrycon tuyensis	NA	31	SL	Endangered
Hypsolebias brunoi	NA	30	SL	Vulnerable
Hypsolebias gardneri	NA	37	SL	Vulnerable
Hypsolebias gilbertobrasili	NA	37	SL	Critically Endangered
Hypsolebias guanambi	NA	39	SL	Vulnerable

Hypsolebias hamadryades	NA	27	SL	Critically Endangered
Hypsolebias janaubensis	NA	39	SL	Critically Endangered
Hypsolebias longignatus	NA	29	SL	Vulnerable
Hypsolebias macaubensis	NA	39	SL	Endangered
Hypsolebias martinsi	NA	34	SL	Endangered
Hypsolebias shibattai	NA	34	SL	Critically Endangered
Indostomus crocodilus	NA	24	SL	Vulnerable
Ituglanis epikarsticus	NA	34	SL	Critically Endangered
Ituglanis ramiroi	NA	31	SL	Vulnerable
Jenynsia sanctaecatarinae	Meleiro livebearer	37	SL	Endangered
Jenynsia sulfurica	NA	32	SL	Critically Endangered
Kiunga ballochi	Glass blue-eye	30	SL	Endangered
Knipowitschia cameliae	Danube delta dwarf goby	32	SL	Critically Endangered
Knipowitschia milleri	Acheron spring goby	26	SL	Critically Endangered
Knipowitschia mrakovcici	NA	32	SL	Critically Endangered
Knipowitschia radovici	Norin goby	28	SL	Vulnerable
Knodus shinahota	NA	37	SL	Critically Endangered
Kolpotocheirodon figueiredoi	NA	30	SL	Critically Endangered
Kottelatlimia pristes	NA	40	SL	Vulnerable
Kryptolebias gracilis	NA	28	SL	Critically Endangered
Lacustricola matthesi	Saisi lampeye	39	TL	Endangered
Lacustricola petnehazyi	NA	19	SL	Endangered
Ladigesia roloffi	Sierra leone dwarf characin	31	SL	Critically Endangered
Laubuka latens	NA	36	SL	Endangered
Lentipes dimetrodon	NA	23	SL	Vulnerable
Lepidocephalichthys lorentzi	NA	33	SL	Endangered
Lepidocharax diamantina	NA	39	SL	Endangered
Leptolebias marmoratus	Marbled pearlfish	30	TL	Critically Endangered
Limia garnieri	Garnier's limia	26	SL	Critically Endangered
Limia grossidens	Largetooth limia	39	SL	Critically Endangered
Limia immaculata	Plain limia	21	SL	Critically Endangered
Limia miragoanensis	Miragoane limia	30	SL	Critically Endangered
Limia ornata	Ornate limia	40	SL	Critically Endangered
Limia rivasi	Rivas's limia	31	SL	Critically Endangered
Limia sulphurophila	Sulfur limia	39	SL	Critically Endangered
Limia yaguajali	Yaguajal limia	36	SL	Endangered
Listrura costai	NA	34	SL	Critically Endangered
Listrura nematopteryx	NA	37	SL	Critically Endangered
Lophiobrycon weitzmani	NA	29	SL	Endangered
Lucania interioris	Cuatrocienegas killifish	40	TL	Endangered
Malpulutta kretseri	Spotted gourami	40	TL	Endangered
Maratecoara splendida	NA	32	SL	Vulnerable
Melanorivulus crixas	NA	27	SL	Vulnerable
Melanorivulus illuminatus	NA	29	SL	Vulnerable
Melanorivulus imperatrizensis	NA	32	SL	Critically Endangered
Melanorivulus ivinhemensis	NA	30	SL	Endangered
Melanorivulus karaja	NA	30	SL	Vulnerable
Melanorivulus kunzei	NA	33	SL	Vulnerable
Melanorivulus pinima	NA	30	SL	Endangered
Melanorivulus rubromarginatus	NA	28	SL	Vulnerable
Melanorivulus salmonicaudus	NA	25	SL	Vulnerable
Melanorivulus ubirajarai	NA	30	SL	Vulnerable
Melanotaenia wilsoni	Little rainbowfish	33	SL	Vulnerable
Microglanis robustus	NA	23	SL	Critically Endangered
Micropanchax bracheti	NA	40	TL	Endangered
Microrasbora rubescens	NA	30	SL	Endangered

Millerichthys robustus	Mexican rivulus	40	TL	Endangered
Milyeringa justitia	NA	23	SL	Critically Endangered
Mimagoniates sylvicola	NA	30	SL	Endangered
Mixobrycon ribeiroi	NA	35	SL	Vulnerable
Nannoperca pygmaea	Little Pygmy Perch	39	SL	Endangered
Nannostomus mortenthaleri	NA	29	SL	Critically Endangered
Nannothrissa stewarti	Mai-ndombe dwarf sprat	23	SL	Endangered
Nanobagrus immaculatus	NA	29	SL	Vulnerable
Nanochromis minor	NA	24	SL	Vulnerable
Nanochromis transvestitus	NA	34	SL	Endangered
Nemacheilus petrubanarescui	NA	35	SL	Endangered
Neolebias axelrodi	NA	18	SL	Endangered
Neolebias kerguennae	NA	27	SL	Endangered
Neolebias lozii	Banded neolebias	18	SL	Critically Endangered
Neolebias powelli	NA	16	SL	Endangered
Neolebias spilotaenia	NA	33	TL	Vulnerable
Neostethus ctenophorus	NA	24	SL	Critically Endangered
Neostethus geminus	NA	26	SL	Endangered
Neostethus robertsi	NA	23	SL	Critically Endangered
Nothobranchius albimarginatus	NA	33	SL	Endangered
Nothobranchius balamaensis	NA	30	SL	Endangered
Nothobranchius chochamandai	NA	35	SL	Vulnerable
Nothobranchius derhami	NA	38	SL	Endangered
Nothobranchius flagrans	NA	39	SL	Endangered
Nothobranchius fuscotaeniatus	NA	33	SL	Critically Endangered
Nothobranchius guentheri	Redtail notho	35	SL	Endangered
Nothobranchius milvertzi	NA	37	SL	Endangered
Nothobranchius mkuziensis	NA	34	SL	Critically Endangered
Nothobranchius oestergaardi	NA	32	SL	Endangered
Nothobranchius rubripinnis	NA	36	SL	Endangered
Nothobranchius sagittae	NA	39	SL	Endangered
Nothobranchius willerti	Mnanzini nothobranch	40	TL	Vulnerable
Notholebias cruzi	NA	40	TL	Critically Endangered
Notholebias fractifasciatus	NA	40	TL	Critically Endangered
Notholebias minimus	Barredtail pearlfish	40	TL	Endangered
Notropis calabazas	Calabazas shiner	27	SL	Critically Endangered
Odontostilbe mitoptera	NA	37	SL	Vulnerable
Oreichthys incognito	NA	31	SL	Endangered
Oreonectes anophthalmus	NA	37	SL	Vulnerable
Orestias taquiri	NA	35	TL	Endangered
Oryzias asinua	NA	27	SL	Endangered
Oryzias luzonensis	NA	40	TL	Endangered
Oryzias soerotoi	NA	29	SL	Critically Endangered
Oryzias timorensis	NA	40	TL	Critically Endangered
Oryzias woworae	NA	28	SL	Endangered
Otothyris juquiae	NA	32	SL	Critically Endangered
Pamphorichthys pertapeh	Jungle toothcarp	17	SL	Critically Endangered
Pangio alternans	NA	36	SL	Endangered
Pangio bhujia	NA	26	SL	Endangered
Parakysis anomalopteryx	NA	34	SL	Endangered
Parakysis hystriculus	NA	29	SL	Endangered
Parakysis notialis	NA	20	SL	Critically Endangered
Paraschistura chrysicristinae	Batman loach	36	SL	Critically Endangered
Parosphromenus alfredi	NA	26	SL	Critically Endangered
Parosphromenus anjunganensis	NA	26	SL	Endangered
Parosphromenus deissneri	Licorice gourami	30	SL	Endangered

Parosphromenus filamentosus	Spiketail gourami	40	TL	Endangered
Parosphromenus gunawani	NA	28	SL	Critically Endangered
Parosphromenus linkei	NA	28	SL	Endangered
Parosphromenus opallios	NA	26	SL	Endangered
Parosphromenus ornaticauda	NA	18	SL	Critically Endangered
Parosphromenus pahuensis	NA	22	SL	Endangered
Parosphromenus paludicola	NA	37	TL	Endangered
Parosphromenus phoenicurus	NA	29	SL	Critically Endangered
Parosphromenus quindecim	NA	29	SL	Critically Endangered
Parosphromenus rubrimontis	NA	25	SL	Endangered
Parosphromenus tweediei	NA	25	SL	Endangered
Parotocinclus spilurus	NA	40	SL	Endangered
Pethia reval	Red fin barb	34	SL	Endangered
Pethia sanjaymoluri	NA	33	SL	Endangered
Pethia sharmai	NA	27	SL	Endangered
Pethia striata	NA	33	SL	Endangered
Phallichthys quadripunctatus	Fourspotted toothcarp	35	SL	Endangered
Phalloptychus eigenmanni	Eigenmann's toothcarp	25	SL	Critically Endangered
Phallotorynus dispilos	Two spot toothcarp	18	SL	Endangered
Phallotorynus fasciolatus	Thinstribed toothcarp	25	SL	Critically Endangered
Phallotorynus jucundus	Antler toothcarp	25	SL	Endangered
Pituna brevirostrata	NA	26	SL	Vulnerable
Plataplochilus chalcopyrus	Flame lampeye	31	SL	Endangered
Plesiolebias canabravensis	NA	20	SL	Vulnerable
Poeciliopsis catemaco	Catemaco livebearer	40	TL	Endangered
Poeciliopsis jackschultzi	NA	20	SL	Endangered
Poeciliopsis paucimaculata	Few-spotted toothcarp	35	TL	Endangered
Priapichthys puetzi	Pütz's toothcarp	26	SL	Critically Endangered
Pronothobranchius seymouri	NA	34	SL	Endangered
Protocobitis polylepis	NA	26	SL	Critically Endangered
Pseudomugil ivantsoffi	NA	28	SL	Endangered
Pseudomugil luminatus	Red neon blue-eye	19	SL	Endangered
Pseudomugil mellis	Honey blue eye	35	SL	Endangered
Pseudomugil paskai	Paska's blue-eye	30	SL	Critically Endangered
Pseudomugil reticulatus	Vogelkop blue-eye	28	SL	Critically Endangered
Pseudotocinclus juquiae	NA	32	SL	Critically Endangered
Pterobrycon myrnae	Semaphore tetra	39	SL	Endangered
Puntius deccanensis	Deccan barb	37	SL	Critically Endangered
Quintana atrizona	Barred topminnow	20	SL	Critically Endangered
Rasboroides pallidus	Pallidus rasbora	35	SL	Endangered
Rasboroides vaterifloris	Pearly rasbora	40	TL	Endangered
Rhamdella montana	NA	37	SL	Critically Endangered
Rhinogobius lineatus	NA	38	SL	Endangered
Rhinogobius zhoui	NA	36	SL	Endangered
Scaturiginichthys vermeilipinnis	Redfin blue eye	25	SL	Critically Endangered
Schistura bairdi	NA	32	SL	Endangered
Schistura nagodiensis	NA	28	SL	Endangered
Schistura pridii	NA	38	SL	Endangered
Schistura sharavathiensis	NA	29	SL	Vulnerable
Scolichthys iota	Dashed toothcarp	25	TL	Vulnerable
Silhouettea sibayi	Barebreast goby	40	SL	Endangered
Silvinichthys bortayro	NA	28	SL	Endangered
Simpsonichthys nigromaculatus	NA	26	SL	Vulnerable
Simpsonichthys parallelus	NA	23	SL	Endangered
Simpsonichthys punctulatus	NA	29	SL	Vulnerable
Simpsonichthys santanae	NA	30	TL	Endangered

Spectrolebias gracilis	NA	21	SL	Vulnerable
Spectrolebias pilleti	NA	30	SL	Vulnerable
Sphaerichthys vaillanti	NA	39	SL	Endangered
Spintherobolus broccae	NA	26	SL	Endangered
Spintherobolus leptoura	NA	28	SL	Endangered
Stiphodon discotorquatus	NA	26	SL	Critically Endangered
Stiphodon martenstyni	NA	36	SL	Critically Endangered
Stiphodon rubromaculatus	NA	30	SL	Critically Endangered
Stygichthys typhlops	Blind tetra	24	SL	Endangered
Sundadanio atomus	NA	16	SL	Endangered
Sundadanio goblinus	NA	19	SL	Endangered
Teramulus waterloti	NA	32	SL	Endangered
Triplophysa parvus	NA	32	SL	Critically Endangered
Troglocyclocheilus khammouanensis	NA	40	SL	Vulnerable
Typhlobelus auriculatus	NA	30	SL	Critically Endangered
Valencia robertae	NA	31	SL	Critically Endangered
Xenocyprioides parvulus	NA	25	SL	Endangered
Xenotoca doadrioi	NA	37	SL	Critically Endangered
Xiphophorus couchianus	Monterrey platyfish	40	TL	Extinct in the Wild
Xiphophorus gordoni	Northern platyfish	35	TL	Endangered
Xiphophorus meyeri	Marbled swordtail	30	TL	Extinct in the Wild
Yunnanilus bailianensis	NA	40	SL	Endangered
Zaireichthys wamiensis	NA	25	SL	Vulnerable
Zoogoneticus quitzeoensis	Picotee goodeid	35	TL	Endangered

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Synchronicity Earth, 5th Floor, 1 Chancery Lane, London, WC2A 1LF