

Bullies

Native freshwater fish of our region

Our rivers, lakes and wetlands are home to 20 species of native fish, which makes the freshwater fishery of the region one of the most diverse in New Zealand – and the Tasman District Council wants to help keep it that way.

Five of the seven species in New Zealand’s bully family are found in the region’s rivers. They are sometimes referred to as cockabullies but this name is usually reserved for an unrelated common coastal marine species. Bullies live on the bottoms of lakes and rivers and you can usually spot them because of the darting movements they make when they’re disturbed. However, apart from the redfin bully, the bluegill bully, and upland bully (described below), it can be difficult to distinguish a giant bully from a common bully.

Like many other native freshwater fish, four of our bully species spend the early stages of their lives in the sea and migrate back to freshwater as juveniles, where they spend their adult lives. Sometimes the juvenile bullies are unwelcome guests in the whitebait nets on the West Coast and are referred to as “whalefeed” or “Dan Doolan spawn”. The upland bully, has a different life cycle and they spend their entire lives in the rivers and lake margins where they were born.



Redfin bully

With its bright red fins, the **redfin bully** is one of the most attractive of our freshwater fish. Only the males develop this distinctive colouring but the females have the same (uncoloured) diagonal stripes on their cheeks. **Redfin bullies** are the most widespread of the bully family in the Tasman District. They

live in many different types of habitats with cobble bottoms and swift flows – from large rivers like the Aorere, Takaka, Motueka and Waimea to small streams throughout the region. You can also find them in urban streams, such as parts of Reservoir Creek in Richmond and in streams flowing through developed pasture like the Motupipi in Golden Bay. **Redfin bullies** are reasonable climbers and can be found well inland.

Bluegill bullies have a bright blue gill membrane just behind the head that is covered in spots. They prefer swift broken river waters with rapids – similar to the places where torrentfish live. In the Tasman District they are most widespread in the west and around Golden Bay having been observed in the Whanganui Inlet tributaries, Anatori and Onekaka Rivers. **Bluegill bullies** are also known to swim upstream from sea level and can be found in rivers like the Lee and Baton. In the Buller River Catchment we have records of inland penetration almost 150 km from the sea!



Bluegill bully

As its name implies, the **giant bully** is the largest of New Zealand's bully family. Specimens more than 25 centimetres long have been recorded, although the 12 to 15 centimetre is more common. Giant bullies always live within a few kilometres inland and prefer slow moving water with over hanging cover and streambeds containing large logs especially in lowland rivers before they reach the sea. In the Tasman District they are found in and around the Whanganui, Parapara, Moutere and Waimea inlets.

Common bullies live throughout the Tasman District but usually not far inland as they are recognised as having rather average climbing abilities. They are found in small streams and along river margins with cobble and moderate flows such as the Onekaka River, Plumbago Creek, Redwood Valley Stream and the Wai-iti to name a few. **Common bullies** also inhabit lakes and wetland margins but not always close to the sea. The bullies living in and around Lake Rotoiti are likely to be landlocked, which means the young aren't washed out to sea; instead they stay in the lake for the early parts of their lives. This isn't unusual – many of New Zealand's lake systems are home to landlocked common bully populations. As the name suggests the **common bully** is well known because they are often seen out in the open shallows during the daytime.



Redfin bully habitat in the region.

Upland bully are 'non-migratory', which means they don't need to go to sea as part of their life cycles. They can be distinguished from other bullies by their stocky built, blunt snout and orange spots on the head and fins. Upland bullies are found in most habitats from farm drains to ponds, wetlands, lakes, streams and large rivers and at high elevations. They have been found 150 km from sea in the upper Buller River catchment, the Wangapeka River and Cobb Reservoir.



Upland bully

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Banded kokopu

Native freshwater fish of our region

Our rivers, lakes and wetlands are home to 20 species of native fish, which makes the freshwater fishery of the region one of the most diverse in New Zealand – and the Tasman District Council wants to help keep it that way.

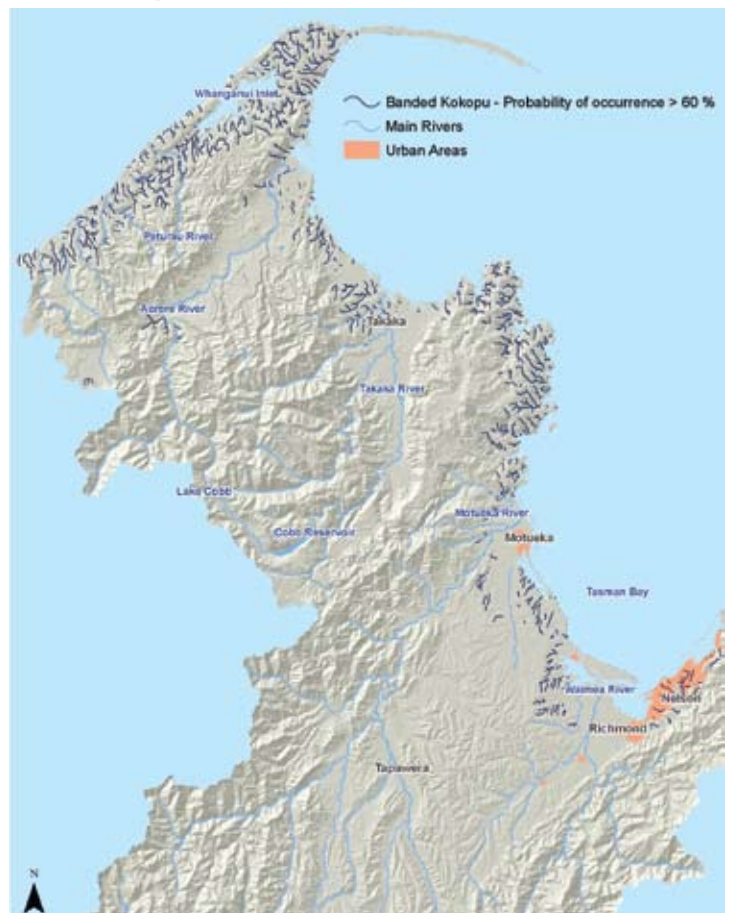
Banded kokopu is one of five native fish whose young (juveniles) are part of the ‘whitebait run’, swimming upstream from the sea to live their adult lives in rivers. It grows up to 26 centimetres long and is easily identified by the thin, pale, vertical bands along its sides and over its back.



Banded kokopu

Where do banded kokopu live?

Banded kokopu are only found in New Zealand, where it likes very small and stony streams with pools and riffle’s and plenty of shade to keep the water temperatures cool. They prefer instream habitats surrounded by podocarp and broadleaf forest but banded kokopu can also be found in rural and urban streams if their habitat criteria can be met.



Banded kokopu habitat in the region.

The life story of banded kokopu

Banded kokopu have a similar life-cycle to other 'whitebait' species, which is described in the information sheet *What Fish Where* that is part of this series. In the Tasman District they are widespread and penetrate well inland. With outstanding climbing ability banded kokopu can negotiate past steep waterfalls. It lays its eggs on the edge of its 'home' stream, which then carries the hatched eggs (larvae) out to sea. The larvae are carried around the coast for several months before the juveniles return to freshwater as whitebait and begin their journey upstream to live their adult lives in rivers.

Laboratory trials by NIWA suggest that juvenile migrating banded kokopu are attracted to the smells of the adult fish – so those migrating from the sea to rivers can choose the streams they swim up. If this is the case, banded kokopu are more likely to find their way up streams containing adults than up streams with no adults. Additional research by NIWA tells us why we aren't likely to find banded kokopu in dirty streams. It appears that the movement of migrating juveniles from the sea is strongly influenced by how turbid the stream is. The juveniles will avoid streams that are dirty and select cleaner streams to swim up and live in as adults.



Banded kokopu have been found both below and above this reach of Reservoir Creek at Welsh Place in Richmond. In an effort to improve water quality and fish habitat TDC sponsors Arbour Day plantings with local school groups.

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Photo of banded kokopu
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Photo of Reservoir Creek Tom
Kroos Fish and Wildlife Services

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Eels (tuna)

Native freshwater fish of our region

Our rivers, lakes and wetlands are home to 20 species of native fish, which makes the freshwater fishery of the region one of the most diverse in New Zealand – and the Tasman District Council wants to help keep it that way.

Eels are a familiar sight to many New Zealanders and are our largest freshwater fish. Some people find them revolting because of their snake-like appearance and slimy bodies, while others consider them a delicacy. For Maori, eels have great cultural significance and they are an important food source. Whatever you think, eels are fascinating creatures.

There are about 16 different eel species of freshwater eel in the world, with three in New Zealand. The native shortfin eel and the longfin eel can be found throughout the country, while the Australian spotted eel (whose arrival was confirmed in 1997) has not yet been recorded in our region. The longfin eel is only found in New Zealand while the shortfin eel is more widely distributed and is known in south-eastern Australia, Tasmania, New Caledonia, Lord Howe and Norfolk Islands.



The shortfin and longfin eels look very similar but you can tell them apart by their dorsal fins. The dorsal fin is on the top of the eel's body.

In the top photo, the shortfin eel's dorsal fin is the same length as the ventral fin on the eel's underside



In the bottom photo, the longfin eel's dorsal fin is longer than its ventral fin and extends towards the head. Another easy way to differentiate the two species is that longfin eel's crease in the middle when bent as they have a different muscle structure to the shortfin which maintain smooth sides when bent.



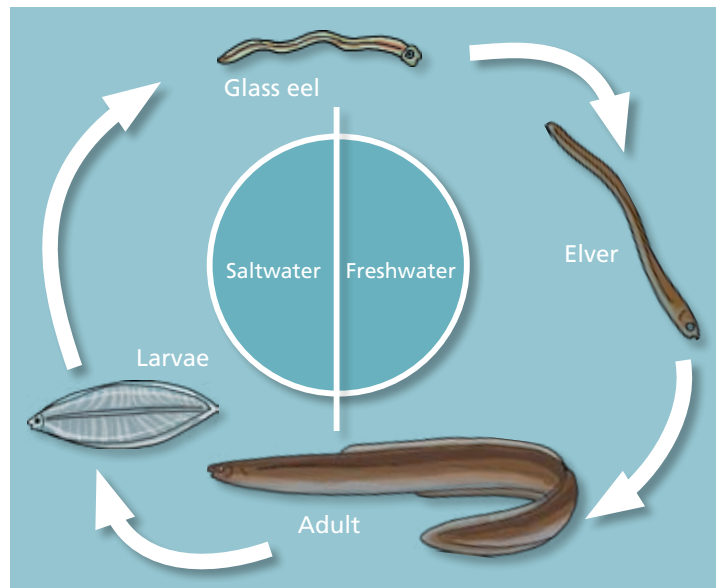
Longfin eel

The life story of eels

Shortfin and longfin eels have a fascinating life cycle. In autumn or early winter male and female eels migrate downstream to the sea to breed. The timing depends on their species and gender– for example, shortfin females are mature and migrate at around 23 years, while longfin females usually don't mature and migrate until they are around 34 years old. The males in both eel species mature much earlier than the females.

When they leave freshwater and enter the sea, eels stop feeding. Nobody knows for sure where they go to spawn (lay their eggs), but it could be as far away as the Tonga Trench between Tonga and New Caledonia. When breeding is over, the adults die. Their fertilised eggs float to the surface at sea and hatch into leaf-shaped larvae, which then drift with the ocean currents, and feed on plankton. When the larvae reach the New Zealand continental shelf, they change into miniature transparent eels (glass eels), which enter New Zealand's rivers, coastal streams and wetlands. At this stage they change again and the elvers (juvenile eels) develop the familiar eel grey colour.

The life cycle of eels.



Short fin eel distribution



Long fin eel distribution

These two maps show where you can expect to see shortfin and longfin eels in our region. Shortfin eels usually live in wetlands, lakes and rivers at low elevations. They are more common in urban areas as they appear to tolerate poor water quality conditions. Longfin eels live in rivers, wetlands and lakes at all elevations. Longfin eels are particularly good climbers when they are juveniles (elvers), with a legendary ability to get past natural barriers or structures. There are a few rivers with large waterfalls or torrent flow conditions in the Tasman District that can not be negotiated.

Commercial fishing

Eels are fished commercially, and some people are concerned that commercial catches are depleting eel numbers too drastically. Shortfin eel is the main species targeted, but the longfin eel is the greater problem. There are now legitimate concerns about sustainability of the commercial harvest as longfin eel are now considered a nationally threatened species, in gradual decline.

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Brown mudfish

Native freshwater fish of our region

Our rivers, lakes and wetlands are home to 20 species of native fish, which makes the freshwater fishery of the region one of the most diverse in New Zealand – and the Tasman District Council wants to help keep it that way.

New Zealand has 5 mudfish species: Northland mudfish, Black mudfish, Brown mudfish, Canterbury mudfish and the Chatham Island mudfish. All species are considered threatened and in decline. Only the brown mudfish occurs in the Tasman region and while once widespread and common it is now the regions most threatened fish species as a result of drainage and degradation of lowland wetland habitats.



The brown mudfish reaches about 175mm long and is quite eel like in appearance.

Where do brown mudfish live?

Brown mudfish have a non-migratory life-history and are restricted to wetlands, swampy streams and drains. While occurring in many wetlands further south on the West Coast and also in the lower North Island, the Tasman brown mudfish has only been found in just 3 small wetland habitats near Mangarakau in Northwest Nelson and only a few fish have been found in each habitat. DNA analysis has shown that these mudfish are different from West Coast brown mudfish populations to the south making them a genetically distinct group. Conservation of the populations near Mangarakau is therefore of high importance.



Brown mudfish habitat in the region.

The life story of brown mudfish

Like the other mudfish species the brown mudfish can occupy habitats that become seasonally dry often in the summer, during which individuals often undergo an aestivation period (dormancy) of varying duration from weeks to months. This ability to aestivate relieves competition, and even predation, due to the inability of other fish species to survive such prolonged periods of drought. Although fry can sometimes be seen during the day, adults are largely nocturnal. Spawning can occur from autumn after a dry period, and eggs are laid within old root holes when the water returns. Mudfish are thought to live until around 8 years old and have a diet of mainly aquatic insects and crustaceans with some terrestrial species also taken.

The Department of Conservation is undertaking monitoring and survey work on brown mudfish populations. If you make a sighting of fish resembling brown mudfish please report it to your nearest DOC office and the Tasman District Council.



This is the brown mudfish wetland habitat in Northwest Nelson, it's just a few square metres where you can see a small amount of open water.

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Photo of brown mudfish
Stephen Moore, Landcare
Research.

Photo of brown mudfish habitat
Mike Ogle, Department of
Conservation.

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Giant kokopu

Native freshwater fish of our region

Our rivers, lakes and wetlands are home to 20 species of native fish, which makes the freshwater fishery of the region one of the most diverse in New Zealand – and the Tasman District Council wants to help keep it that way.

The giant kokopu is sometimes known as the ‘native trout’. It’s one of our larger native fish and can grow up to 40 centimetres long – but it’s more common to find them half that size. The giant kokopu is one of five native freshwater fish species whose juveniles (young) make up the ‘whitebait run’, swimming upstream from the sea to spend their adult lives in rivers. However, don’t expect to catch too many if you’re whitebaiting, because they’re hard to find! Their numbers are gradually declining and they are considered ‘threatened’ throughout New Zealand. This decline is most likely to be the result of small stream and wetland drainage.



Giant kokopu

Where do giant kokopu live?



This giant kokopu was captured in a fyke net set (centre) at the inlet of a disused irrigation pond near Ruby Bay.

You’ll only find giant kokopu in New Zealand, usually in slow-flowing weedy streams and sometimes in lowland wetlands and lake margins. They’ve been recorded on the Northwest Coast, in rivers around the Ruataniwha Inlet and Golden Bay, Abel Tasman National Park and in the streams and wetlands feeding the Moutere and Waimea Inlets. Giant kokopu don’t usually migrate very far inland and are not good climbers, so barriers like weirs can prevent them moving upstream. They like to hide in places with in-stream cover, like overhanging plants or logs.

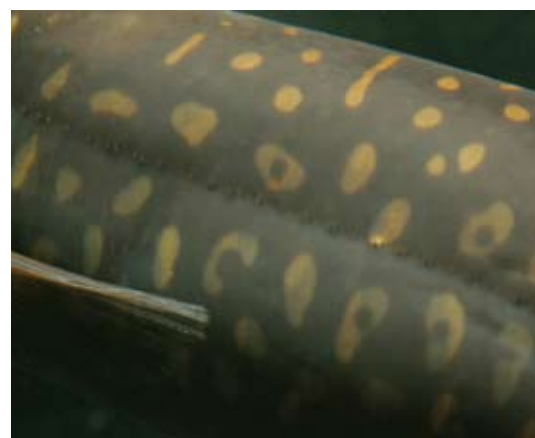


Giant kokopu habitat in the region.

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The life story of giant kokopu

The giant kokopu has a similar life-cycle to other 'whitebait' species, which is described in the information sheet *What Fish Where* that is part of this series. Eggs have not yet been observed in their natural habitat, so we can't say for sure exactly where they breed. When giant kokopu are found, it's usually only in small numbers, so we still have a lot to learn about this elusive species.



The adult giant kokopu has a distinctive profusion of golden lines, spots, crescents and rings on its skin. It was the first fish in the Galaxiidae family to be discovered; so its colour pattern led scientists to call its genus (a classification grouping) 'Galaxias', referring to the stars in the galaxy. All the other native species in the 'whitebait' run are members of the Galaxiidae family.

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Photo of child with giant kokopu near Ruby Bay Tom Kroos Fish and Wildlife Services.
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Inanga - more than just a fritter

Native freshwater fish of our region



Inanga

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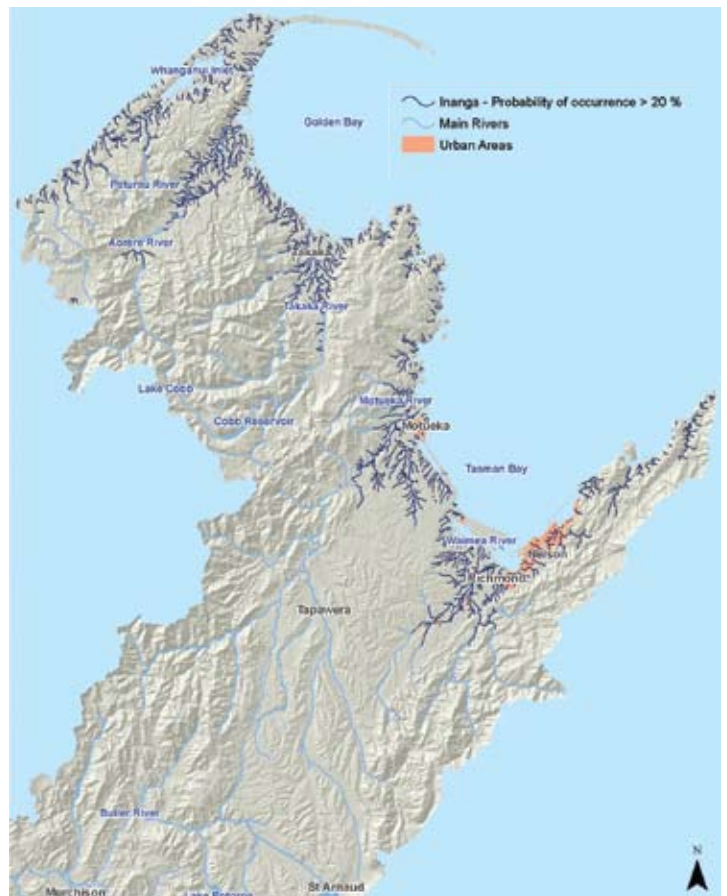
The inanga is well known to New Zealanders

as one of five native freshwater fish species whose juveniles (young) make the ‘whitebait run’, swimming upstream from the sea to spend their adult lives in gently flowing and still waters. Inanga comprise over 90% of the total whitebait catch. The adult grows to around 8-10 centimetres long and can be easily distinguished from the adults of other fish found as juveniles in the whitebait run by its silver belly, colourless fins and forked tail.

Where do inanga live?

You can find inanga throughout New Zealand and its offshore islands, and in South America and Australia. They live in open rivers, streams, lakes and wetlands and can often be seen shoaling in open water, especially at breeding time.

We’ve found inanga in larger rivers like the Aorere, Takaka, Motueka and Waimea. They are poor climbers, which is why they don’t travel too far inland unless the river has a gradual slope – to date the greatest distance inland we’ve found them is near the village of Upper Moutere and in the Aorere tributaries above Devils Boots in Golden Bay. They’re also found in most of the smaller rivers and streams along the coast from the Anaweka River on the West Coast to Port Pungonga in Golden Bay to Reservior Creek that drains into the Waimea Inlet.



Inanga habitat in the region.

The life story of inanga

Inanga has a similar life-cycle to other 'whitebait' species, which is described in the information sheet *What Fish Where* that is part of this series. However, we know more about its breeding habitats than other native freshwater fish because we see it more often. In late summer and autumn inanga swim downstream to estuaries, where they spawn (lay eggs) during high tides and high river flows. They prefer areas upstream of the tidal salt wedge (you'll recognise this as the area of the waterway where the tidal influence peters out), and can be seen squirming onto the wet river banks where they lay their eggs among the riverside vegetation. You can sometimes tell inanga are spawning by the milky colour in the water near the river bank.

Surveys have identified some inanga spawning areas that include the Puremahaia, Wainui, Pariwhakaoho, Marahau, Moutere, Riwaka and Motueka Rivers. We need to recognise the significance of these waterways and the riparian (stream side) vegetation if we want to maintain a good whitebait fishery. Tasman District Council also work with and support landowners, Streamcare groups and local communities throughout our region to help maintain healthy waterways and re-establish suitable habitat for inanga spawning.



The milky colour of this West Coast stream provides evidence of inanga spawning".



Inanga eggs developing out of water in the humid air.

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Photo of inanga copyright Angus McIntosh, Natural Science Images Library.

Photo of inanga spawning Henk Stengs Department of Conservation.

Photo of inanga eggs Department of Conservation Images Library.

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Koaro

Native freshwater fish of our region

Our rivers, lakes and wetlands are home to 20 species of native fish, which makes the freshwater fishery of the region one of the most diverse in New Zealand – and the Tasman District Council wants to help keep it that way.

The koaro is one of five native freshwater fish species whose juveniles (young) are part of the ‘whitebait run’, swimming upstream from the sea to spend their adult lives in our rivers. The adult koaro, like the one in the photograph, can live for more than six years and grow to 25 centimetres long. Its sides and back are covered in a mixed pattern of golden blotches and bands that gleam and glitter in the sun, making the koaro a very attractive fish.



Koaro

Where do koaro live?

You can find koaro throughout New Zealand and its outlying islands, and in Australia. They prefer to live in clear, fast-flowing, rocky streams surrounded by native bush. Koaro travel further upstream than other ‘whitebait’. We’ve found them in the tributaries of Lake Rotoiti so they must have migrated more than 170 kilometres up the Buller River from the sea!

In our region, koaro can be spotted throughout the National Parks and bush clad high country rivers, lakes and streams.



Koaro habitat in the region.

We've also found them in good numbers close to sea-level in the small streams surrounding Golden Bay, such as the Puremahaia and Onekaka Streams. In a small unnamed stream at the Awaroa Inlet they have been observed as close as 100 metres from the sea!

Koaro are affected by human activities and you won't usually find them in places that have been stripped of native bush. You're also not likely to find koaro in streams muddied by a lot of silt run-off from the land, especially if it settles on the stream bed. They prefer clean streams.

The life story of koaro

Some koaro have a similar life-cycle to other 'whitebait' species, which is described in the information sheet *What Fish Where* that is part of this series. During the autumn and early winter, when the streams are flowing strongly, koaro deposit their eggs along the stream edges. When the water flow slows down, the eggs are left stranded. There they develop over the next few weeks, until the water flows are once again high enough to cover them, when they hatch into larvae and are carried out to sea. They live in the sea for several months before returning as juvenile whitebait to freshwater, and beginning their journey upstream for their adult residency. But some koaro populations are 'non-migratory', which means they don't need to go to sea as part of their life cycles. These "landlocked" koaro spend their entire lives in the rivers and lake margins where they were born.



In bright sunlight the koaro head and body have a beautiful golden iridescence, and a snake-like movement in the hand!



Koaro are usually found in clear, fast-flowing, rocky streams, surrounded by native bush like this reach on the Puremahaia in Golden Bay.

The climber

Koaro have a legendary ability to climb! They can climb waterfalls and are found in large numbers above the highest obstacles in rivers and lakes throughout the Tasman District. Koaro usually leave the main water flows and use surface water tension on wet rocks to attach and slither upwards, with surprising ease. People with aquaria know, or soon find out, that koaro can easily scale the glass walls and, without a secure top on the aquarium, would soon escape and die on the floor outside.

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Photo of koaro copyright Angus McIntosh, Natural Sciences Image Library

Photos koaro habitat and koaro-in-hand Tom Kroos Fish and Wildlife Services.

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Shortjaw kokopu

Native freshwater fish of our region

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Shortjaw kokopu is a nationally threatened species and one of the rarest of the five native fish whose juveniles are part of the whitebait run. Its most distinguishing feature is its undercut jaw – the lower jaw is shorter than the upper one. Sometimes its fins appear reddish-brown and it has a distinctive dark patch behind its gill openings.

Where do shortjaw kokopu live?

Shortjaw kokopu are found in New Zealand's North and South Islands. They travel successfully inland and live in rocky streams surrounded by native bush. Secretive, elusive and seldom seen, they live under boulders and in the gravel on the stream beds and only come out at night to feed. The best way to find a shortjaw kokopu is to go spotlighting at night.

In the Tasman District shortjaw kokopu are concentrated in the northwest such as the West Coast rivers and tributaries of the Anatori and Paturau. Shortjaw kokopu are found in many places throughout Golden Bay such as the Aorere tributaries (Doctor, Kaituna) and smaller streams along the coast like Billy King, Gorge Creek and Onahau. The protected bush clad streams of Abel Tasman National Park (Awaroa, Torrent, Marahau) also contains good numbers of shortjaws. Numbers are very low however near urban and intensive agricultural areas with Eves Valley Stream being a notable exception.

The life story of shortjaw kokopu

The shortjaw kokopu life cycle is similar to that of other 'whitebait' species and is described in the information sheet *What Fish Where* that is part of this series. When the flows are high in the streams where they live, shortjaw kokopu deposit their eggs along the inundated edges. When flows drop the eggs are left stranded along the stream margins. They develop there and hatch when water flows are high enough to cover them again. The stream carries the hatched larvae out to sea where they reside for several months.



Shortjaw kokopu

They then return to freshwater as whitebait and begin their journey upstream, where they live as adults.

Shortjaw kokopu are known to be good climbers – probably not quite as good as koaro, but they have been found above some daunting obstacles. For example, they've been spotted very far inland with one specimen captured in Doctor Creek, a tributary of the Buller River over 100 km from the sea!



These children are searching for shortjaw kokopu behind large boulders in the Kaituna River Golden Bay. Inset-The mid-upper reaches of Gorge Creek (Golden Bay) provides ideal habitat with overhanging bank vegetation, in-stream cover and pools-riffles.



Shortjaw kokopu habitat in the region.

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Shortjaw kokopu fish photo
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Torrentfish

Native freshwater fish of our region

Our rivers, lakes and wetlands are home to 20 species of native fish, which makes the freshwater fishery of the region one of the most diverse in New Zealand – and the Tasman District Council wants to help keep it that way.

The closest living relative of torrentfish is the blue cod – a marine species familiar to many people. With this lineage, it's not surprisingly that they look quite different from our other native freshwater species. They're easy to identify because of their flattened head, large pectoral fins, and dark bands along their sides.



Torrentfish

Where do torrentfish live?

Torrentfish are only found in New Zealand. They live in the swift white rapids of stony rivers and streams, where even humans would find it hard to stand. With the help of their aerodynamic shape, they can anchor themselves to the river beds, clinging on with their fins.

Although torrentfish are one of the most common fish in New Zealand's open-bedded rivers, they can be very difficult to capture in their fast water habitat! We've found them in rivers and streams such as the Onekaka, Tukurua, Parapara, Takaka, Anatoki, Riwaka, Motueka and Waimea with the furthest inland sighting in the Matakītaki River, which is a tributary of the Buller River near Murchison.

The life story of torrentfish

Like many of New Zealand's freshwater fish, torrentfish migrate between the sea and freshwater as part of their life cycle. Looking like tiny replicas of the adults, juvenile torrentfish enter freshwater in spring and autumn, and after a few weeks in the estuaries begin moving upstream to the river habitats where they will live as adults. We know little about their breeding habits, except that the females tend to live upstream and the males downstream. How and when they breed is a mystery still to be solved.

Despite their ability to live in swift water, torrentfish are poor climbers and only go inland where the river bed has a low gradient. Weirs, perched culverts, flood gates and fords can prevent them moving upstream. In Tasman there are many structures that present barriers to our native fish. The good news is that most of them are easily fixed.

In the two photos below a ford across the outlet of Templemore Pond provided a fish passage obstruction for all but banded kokopu and eels. In a combined Tasman District Council and Waimaori Streamcare project the ford was removed. Rock was then employed to fill-in the drop created by the ford. The rock ramp now provides native fish access to habitat upstream and is being monitored by local school and Streamcare groups. For drops that are not as easily fixed as the one shown below the use of ramps made of wood or installing low rock weirs to pool the water are both effective and inexpensive solutions to the problem. Check out the culvert brochure contained with this leaflet or you'll find it on our website to give you some other ideas to assist fish passage.



The original ford below Templemore Pond.



The rock ramp as it is now.



Torrentfish habitat in the region.

Our native fish are among the hidden treasures of New Zealand's animal life because they are seldom seen and we know very little about most of them. This information sheet is one of a series about freshwater fish living in the region. To find out more, visit our website at www.tasman.govt.nz/environment/water/river and stream life or the National Institute of Water and Atmospheric Research website at www.niwa.cri.nz.

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