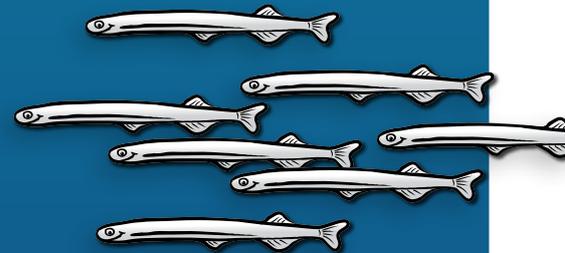


Activities, fun facts & whitebaiting rules inside



Inside you'll find interesting facts & fun activities about NZ whitebait and their lives.

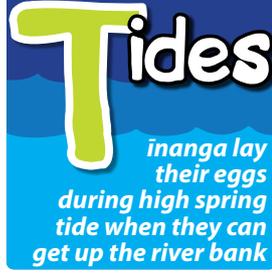
There's also important reminders about how to legally fish for whitebait in NZ.



The National Whitebait Spawning Education Programme is supported by...



# NZ whitebait **A Z A** to **A W A**





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Find lots of info & resources  
online at:

[www.whitebaitconnection.co.nz/what-we-do/education](http://www.whitebaitconnection.co.nz/what-we-do/education)

[www.doc.govt.nz/nature/native-animals/freshwater-fish/whitebait-migratory-galaxiids](http://www.doc.govt.nz/nature/native-animals/freshwater-fish/whitebait-migratory-galaxiids)



# This wordfind puzzle introduces you to some names, words and terms used in this book about whitebait :-)

## Have a go at our Whitebait Wordfind Challenge!

Tick off the words on the left as you find them in the grid. Words are running from top to bottom ↓ or left to right → in the grid

Challenge your friends & family by timing yourselves to see who can find all the whitebait words the fastest!



- adult
- banded
- eggs
- giant
- habitat
- inanga
- juvenile
- koaro
- kokopu
- larvae
- life cycle
- love zone
- native
- protect
- shortjaw
- spawning
- whitebait

w	h	i	t	e	b	a	i	t	k	l	s	i	g	s
z	q	n	a	h	n	i	p	s	c	o	u	e	l	p
e	l	a	r	v	a	e	r	a	y	b	k	i	o	a
d	u	n	f	p	t	x	o	e	u	e	o	d	y	w
a	j	g	m	e	i	a	t	w	g	i	a	n	t	n
t	i	a	h	b	v	a	e	u	i	p	r	e	m	i
o	e	s	r	i	e	v	c	k	o	k	o	p	u	n
l	b	a	n	d	e	d	t	o	u	d	s	e	z	g
o	r	h	i	h	u	l	i	f	e	c	y	c	l	e
v	e	m	l	a	t	e	a	g	r	y	i	e	n	t
e	i	n	r	b	h	i	d	n	t	k	e	h	a	w
z	r	e	y	i	r	j	u	v	e	n	i	l	e	k
o	t	g	a	t	i	e	l	n	g	a	i	q	k	i
n	r	g	e	a	y	n	t	r	e	h	a	e	t	g
e	e	s	r	t	k	i	s	h	o	r	t	j	a	w

Answers are on the back cover. No cheating!

# 1. WHAT are WHITEBAIT

'Whitebait' is the common collective term for the six native fish species that make up the whitebait runs in rivers around Aotearoa. These species are diadromous, which is a great word meaning they live in both freshwater (rivers and streams) and salty water (sea) throughout their life.

The whitebait run is when the juvenile fish head back to the river after being at sea during their larval life stage, and this is when whitebaiters line the riverbanks and try to catch them. They're considered an important mahinga kai species. Five of these species are in the fish family Galaxiidae, and these five galaxiid species are described in this activity book\*.

'Whitebait' is also the name of a life cycle stage of these native fish species. As humans, our life cycle has six main stages = foetus, baby, child, teenager, adult and elderly – but whitebait have a four stage life cycle = egg, larvae, whitebait and adult.

You'll find more information about individual species life cycles on page 11.

\* The sixth whitebait species is called common smelt or 'silveries' (*Retropinna retropinna*). Common smelt lay their eggs in the water – unlike Galaxiidae whitebait. This egg-laying difference sets them apart from the galaxiid whitebait species, so they're not included in this activity book.

**This life cycle uses photos of inanga to illustrate the 4-stage life cycle.**



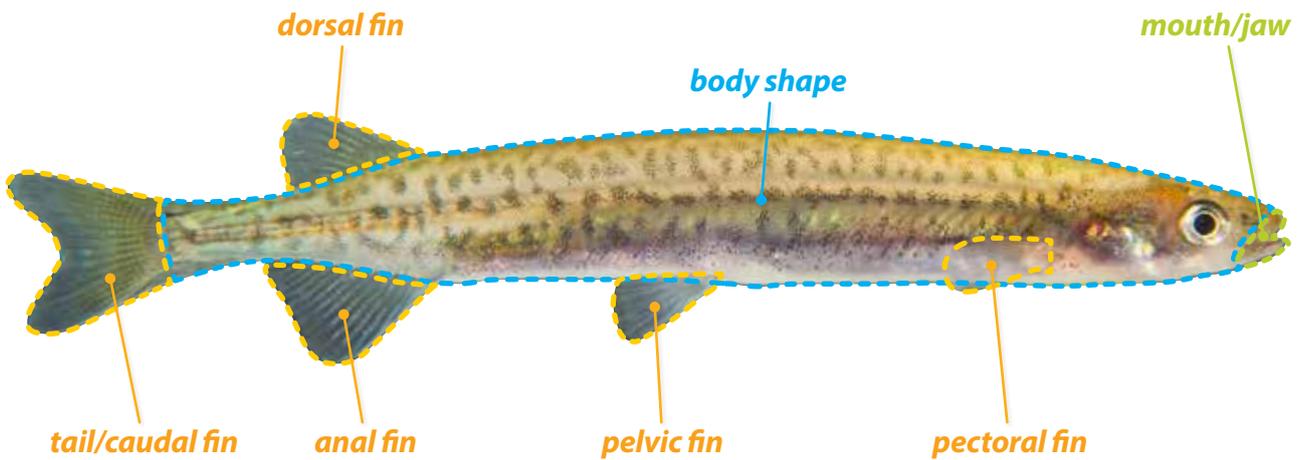
## 2. IDENTIFYING the 5 native galaxiid whitebait species of Aotearoa New Zealand

In this section we'll explain the similarities and differences between the five whitebait species, and explain the different ways you can tell them apart.

To help with identifying the individual species, below is a diagram that illustrates the different parts of whitebait bodies. On each individual species page we'll explain the characteristics of that species, which you can use to help tell each species apart.

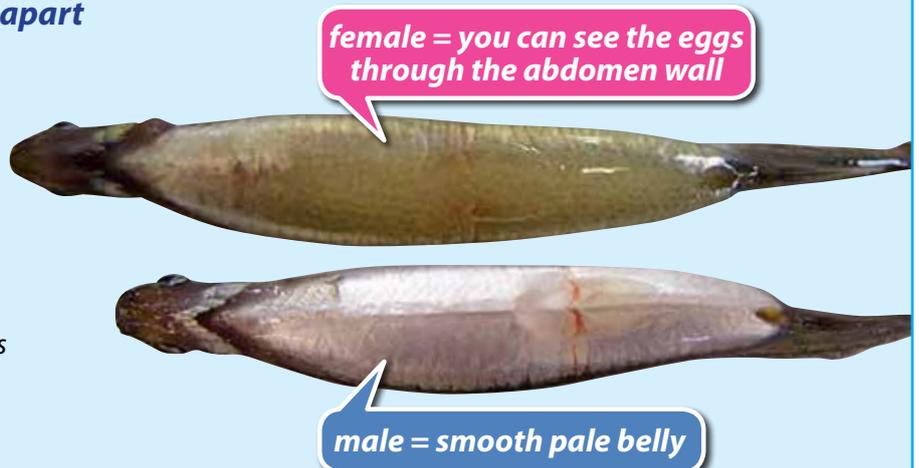
### Physical identification (ID) markers in adults:

This diagram uses *īnanga* to identify and label the different parts of whitebait bodies.



### Telling the *īnanga* sexes apart

Male and female *īnanga* are usually difficult to tell apart externally, but it's easy when they are ready to spawn. You can see the large golden eggs in females through the wall of the abdomen while the males is smooth and pale white.



belly shots © Jess Stevens

# ĪNANGA

Scientific name: Galaxias maculatus

**Threat status:** **Threatened – nationally vulnerable**

Moderate & stable population (+/- 10%), but small area of spawning habitat available.

Life span (how long they live): 1 year

Physical ID of adults:	Size of adults	average = 100 mm / maximum = 190 mm
	Colouring	Cream-white body with greenish-olive spotting on back and sides with a silvery belly.
	Body shape	Slender body with tapered head & forked tail.
	Mouth/jaw shape	Small mouth (reaching back only to the front of the eye) with jaws equal in length.
	Dorsal & anal fin alignment	Dorsal fin starts directly above anal fin.
	Pectoral fins	Small pectoral fins that sit higher on the body than the other whitebait species.

Other interesting info: They are the most common, smallest and shortest living of the five species in this book. It's the only species that can't climb barriers in the river – which means it has a unique set of requirements for survival. Unlike other whitebait, adults swim in shoals and feed during the daytime. They are less sensitive to some water pollution than other whitebait & native fish.

I **CAN'T** climb up barriers in the river...but the other 4 species in this book can.

 **threatened – nationally vulnerable**



 **Most widely distributed native freshwater fish in the world, also found in: Australia, Chile, Argentina, & Falkland Islands**

# KŌARO

Scientific name:

*Galaxias brevipinnis*

Threat status: **At risk – declining**

*Very large population, but low ongoing or predicted decline*

Life span (how long they live):

15+ years

Physical ID of adults:

Size of adults

average = 160–180 mm / maximum = 290 mm

Colouring

Dark greenish or greyish brown with irregular green-brown to olive-gold blotches/stripes, golden speckling in bright light, pale smokey grey to silvery olive belly, with a large blue-black spot above/behind the pectoral fin base.

Body shape

Very elongated/slender/almost tubular body.

Mouth/jaw shape

Large mouth with much smaller lower jaw.

Dorsal & anal fin alignment

Dorsal fin originates much closer to the head vs anal fin.

Pectoral fins

Larger pectoral fins than the other 4 whitebait species, which sit low on the body and are horizontally oriented with grippy ridges on underside.

Other interesting info:

They are good climbers and can climb near-vertical rock faces.



# BANDED KŌKOPU

Scientific name: *Galaxias fasciatus*

**Threat status:** **At risk – naturally uncommon**

*Naturally small & widely scattered but stable population, & large area of spawning habitat.*

*Life span (how long they live):* 15+ years

*Physical ID of adults:*

*Size of adults*

*average = 200 mm / maximum = 260 mm*

*Colouring*

*Dark greenish olive with obvious thin, pale, vertical stripes across the sides and over the back. Numerous bands in smaller fish, become narrower and restricted toward back end in larger fish. Silvery olive belly, and small blue-black spot just behind the gill opening.*

*Body shape*

*Large & stout (but less so than giant kōkopu).*

*Mouth/jaw shape*

*Large mouth (reaching back to level with the centre of the eye), jaws roughly equal in length.*

*Dorsal & anal fin alignment*

*Dorsal & anal fins in line (distinguishes it from the giant kōkopu).*

*Pectoral fins*

*Pectoral fins sit low on the sides.*

*Other interesting info:*

*They are good climbers, and can climb near-vertical rock faces. Generally they're slow moving unless frightened. They can often be seen during the day in forest pools.*



**at risk – naturally uncommon**



# GIANT KŌKOPU

Scientific name: *Galaxias argenteus*

Threat status: **At risk – declining**

Uncertain population size & low ongoing or predicted decline

Life span (how long they live): **20+ years**

Physical ID of adults:	Size of adults	average = 300–400 mm / maximum = 580 mm
	Colouring	Generally very dark grey-brown (but may range to olive-beige) with broad gold spots/rings on sides, dark bluish-purple spot above/behind pectoral fin base (may not be visible in darker coloured fish).
	Body shape	Stout body with long, broad head.
	Mouth/jaw shape	Large mouth (reaching back behind the eye), jaws roughly equal in length.
	Dorsal & anal fin alignment	Dorsal fin origin very slightly in front of anal fin (distinguishes it from the banded kōkopu).
	Pectoral fins	Pectoral fins sit low on the sides.
Other interesting info:	They are 'skulking predators' that lurk under cover and make speedy dashes to nab their prey. They're poor climbers, and are generally found close to the sea. Largest of all galaxiids globally, but slow growing. They aren't called 'giant' for nothing – the largest ever recorded weighed 2.8 kg!	



**at risk – declining**



# SHORTJAW KŌKOPU

Scientific name: *Galaxias postvectis*

**Threat status:** **Threatened – nationally vulnerable**

Moderate population size & moderate ongoing or predicted decline

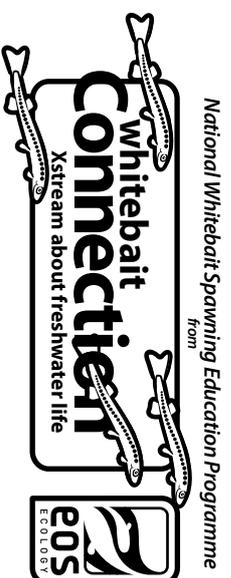
Life span (how long they live): 15+ years

Physical ID of adults:	Size of adults	average = 150–400 mm / maximum = 370 mm
	Colouring	Olive green to dull brown, with indistinct pale marbled or banded pattern. Large/prominent blue-black spot behind the gill opening/above pectoral fin base.
	Body shape	Tapering & rather pointed snout, stout body with rounded trunk.
	Mouth/jaw shape	Large mouth with short lower jaw (possibly a feeding adaptation to scrape insects off rocks in a stream).
	Dorsal & anal fin alignment	Dorsal fin origin slightly in front of anal fin.
	Pectoral fins	Pectoral fins sit low on the sides.
Other interesting info:	Considered a taonga (treasured) species in Aotearoa. They are a rare, secretive, seldom-seen species. In daytime they hide under riverbanks, fallen logs, large rocks and boulders, and in deep fast-flowing pools. At night they feed in pools with a slower flow where they are easier to spot. They can climb, but not as well as banded kōkopu & kōaro.	



# Draw your favourite whitebait species

Use the identifying physical features mentioned in the last few pages to draw your favourite fish...  
or invent your own species!



### 3. LIFE CYCLE stages, habitats & fun facts



In this section we'll explain the similarities and differences between the life cycles of the whitebait species in this book. This will include letting you know which habitats are used by different species at different stages of the life cycle.

## LIFE AS AN EGG

**Facts that apply to all 5 whitebait species:** Whitebait species are relatively unique fish because they lay their eggs in various habitats out of the water. This protects the eggs from aquatic predators – including adult whitebait. YES – they're cannibals!

The embryos inside of the eggs develop for between 3–6 weeks before hatching.

Temperature is important because the warmer the egg, the faster the embryos develop – meaning they're vulnerable for a shorter period of time.

Embryos breathe oxygen, so eggs need to stay moist for oxygen to get inside. Being protected from the sun and shaded by vegetation or canopy cover is important to stop the eggs drying out.

Eggs hatch when submerged by rising water levels (e.g., inanga hatch during high spring tides, other species hatch following large rain events).

Laying eggs (spawning) is a numbers game. Most larvae and whitebait won't survive to become adults, so the more eggs they lay the better the chances that a few survive.

	When they lay eggs:	Habitat eggs are laid in:	the Love Zone!	Other species-specific facts:
INANGA	Jan–July (Depends on latitude – earlier in the southern regions, later in the northern regions.)	Riparian (streamside) vegetation root mat near the upper limit of the spring tide at the saltwater wedge (where the fresh river water meets the salty sea water).		Use the same spawning sites each year.
KŌARO	Mar–May	Eggs laid 1–2 layers deep directly on rocky banks (not among bankside debris or vegetation) during a big rain event. Need forest cover to keep eggs damp (as they sit exposed on rocks until a rain event lifts the river level).		First spawning site recorded in 2000.
BANDED KŌKOPU	Mar–May	Gravel/bankside grasses at high water line, close to adult habitat.		Use the same spawning sites each year.
GIANT KŌKOPU	Late Apr–Aug	Riparian vegetation on low gradient banks, close to adult habitat.		Use the same spawning sites each year. Only 2 sites found in NZ to date.
SHORTJAW KŌKOPU	Apr–July	Moist leaf litter & gravel on stream banks when water levels are higher after rain.		

## 'The Love Zone'

Whitebait are unique fish – they lay their eggs on the riverbank at the very highest water level of the river. Each whitebait species has their own spawning habitat as we've described on the previous page – we call it 'the Love Zone'. It requires a delicate balance of a number of factors. Below are just some of the factors that need to align for successful whitebait spawning...

right  
water levels

right bank  
conditions

the Love  
Zone!

right time  
of year

right  
vegetation



What eggs look like  
through a microscope.  
Yes, they are  
staring back at you!

# LIFE AS A LARVAE



Facts that apply to all 5 whitebait species:

The eggs hatch into approximately 7 mm long larvae. River flows wash the larvae out to sea where they find reliable food sources (microscopic algae and zooplankton) and disperse. We don't know exactly where they go, but they use ocean currents to move off the coast.

It is a dangerous life at sea as a larvae – they run the risk of starving, getting lost or eaten by fish, eels, jellyfish etc.

Approximately how long each species larvae spend at sea, estuary, or in some cases lakes:

ĪNANGA 3–6 months

KŌARO 3–6 months

BANDED KŌKOPU 3–6 months

GIANT KŌKOPU 3–5 months

SHORTJAW KŌKOPU 4–6 months



This is the yolk sac that larvae feed on for the first week, then they eat small plants & animals (phytoplankton & zooplankton)



## LIFE AS A WHITEBAIT

*Facts that apply to all whitebait species in this book:*

*After surviving their time at sea, larvae grow into juvenile whitebait and migrate back into the river. Moving from saltwater to freshwater is very hard on a whitebait – all the salts that have built up in their body tissues need to be removed and replaced by freshwater.*

*Some species return to a different river than they hatched from, while others return to the same river their egg was laid in (which is pretty amazing without the aid of GPS or maps!)*

*Some species (like kōaro and banded kōkopu) use scent to find rivers with existing populations of adults from their own species. This is thought to be so they can find rivers with suitable habitats. This makes sense as these species have to go further inland and to higher elevations than other species, so they want to make sure they're picking rivers with no insurmountable obstacles to reaching their habitat! Some species can climb more difficult barriers in the river than others.*

*This is the stage of their life when they have to try and avoid being caught by whitebaiters in big nets during the whitebaiting season while heading for their adult habitat upstream.*

	<i>Peak months they migrate back to the river:</i>	<i>General whitebait size of each species:</i>	<i>Other species-specific facts:</i>
<i>ĪNANGA</i>	<i>Around Aug–Nov</i>	<i>50–65 mm</i>	<i>Being NZ's most commonly caught whitebait species, they make up 70–100% of the whitebait fishing catch.</i>
<i>KŌARO</i>	<i>Around Sept–Oct</i>	<i>45–55 mm</i>	<i>Research suggests they return to the same area where they hatched, and that they use scent to find rivers with populations of adult kōaro.</i>
<i>BANDED KŌKOPU</i>	<i>Around Sept–Oct</i>	<i>30–45 mm</i>	<i>Use scent to find rivers with existing populations of adults. At the whitebait stage they are generally smaller than the other 4 species here.</i>
<i>GIANT KŌKOPU</i>	<i>Around Nov</i>	<i>45–50 mm</i>	
<i>SHORTJAW KŌKOPU</i>	<i>Around Sept–Nov</i>	<i>50–55 mm</i>	



## LIFE AS AN ADULT

**Facts that apply to all whitebait species in this book:** Adult whitebait eat bugs in the river. They also have specialised sensors in their head that can detect bugs that fall into the water from overhanging plants. Vegetation around the rivers is also important as it provides them with hiding places from other fish and birds (their natural predators), and keeps the water cooler. Once they've matured to egg-laying age their whole mission in life is to make it to their spawning area ('the Love Zone') and lay eggs.

	Habitat they need:	the Party Zone!	How far/high inland they live:	When/how often they lay eggs:	Other species-specific facts:
INANGA	Coastal rivers, streams, lakes, swamps with good riparian habitat.		Lowland areas only, as they can't climb.	As they generally only live a year they spawn just once, but will lay 1,500–3,000 eggs. Very occasionally an individual may survive longer & spawn at 2 years old.	
KŌARO	Cool, fast-flowing, forested mountain streams with a high proportion of boulders making it a tumbling rocky stream.		Found up to 400 km inland at elevations up to 1300 m, the highest of all 5 species.	Generally lay eggs at 2–3 years old, & can reproduce every year from then on.	
BANDED KŌKOPU	Shallow, slow flowing streams with shaded gravel-bottomed pools, overhanging banks, logs, and boulders.		Found up to 180 km inland at elevations up to 550 m.	Generally lay eggs at 2–3 years old. It's likely they spawn multiple times throughout their life span.	As they're sensitive to suspended sediment they're generally less abundant in turbid (murky) rivers.
GIANT KŌKOPU	Usually slow flowing pools, undercut banks, or within a log jam in wetlands, coastal lakes, & small–medium forest streams.		Mainly found close to the sea, less than 20 km inland.	Generally lay eggs at 2–3 year old, although some individuals may not mature until 10 years old. It's likely they spawn multiple times throughout their life span.	Rely on good riparian vegetation to provide bugs for food.
SHORTJAW KŌKOPU	Small–medium size coastal or forested streams, rivers, & tributaries with a rocky bottom.		Found up to 200 km inland at low–moderate elevations (up to 500 m).	Generally lay eggs at 2–3 years old, & likely spawn multiple times throughout their lives.	

# WHITEBAIT QUEST



the Party Zone!



Well done! You've eaten lots & grown into an adult. It's time to swim towards the Love Zone!

**move FORWARD 2 spaces**  
23



You've made it back to the river  
11

**START HERE**



you're a happy little whitebait egg on the riverbank :-)



you avoided being eaten by a fish at sea  
10



there was a barrier stopping you swimming upstream  
**move BACK 3 spaces**  
14



yuck! you swam into pollution in the river  
**go BACK 2 spaces**  
21



you've found lots of cosy spaces to hide  
**move FORWARD 2 spaces**  
25



oh no! pests ate your egg :-)  
**go BACK to START**  
2



you dodged being eaten by jellyfish while a larvae at sea  
8



a fish passage barrier has been removed  
**move FORWARD 1 space**  
16



mimi, you've lots of lovely bugs to eat!  
20



the bank habitat wasn't suitable for spawning  
**go BACK 2 spaces**  
26



good work - you hatched!  
**move FORWARD 3 spaces**  
4



you dodged being eaten by jellyfish while a larvae at sea  
8



nearly there! the water levels are rising so you can swim to "the love zone" & you've only ONE roll to go...  
28



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



congratulations! you're back to...  
**the Love Zone!**  
& can lay your own eggs on the riverbank!



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



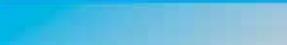
well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



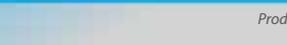
well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



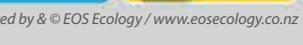
well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



well done, you made it out to sea  
**move FORWARD 2 spaces**  
6



**How to play...**  
-you'll need dice  
-make/find a game counter  
-place your counters on the 'start here' button  
-roll the dice & move your counter forward that number of spaces  
-follow any instructions in the square you land on  
-take turns & keep going until the first person gets back to the 'Love Zone' & wins!

**What the game's about...**  
This game is based around the life cycle of whitebait. You start as an egg, hatch, go out to sea as a larvae, swim back to the river as whitebait, grow into an adult, then swim back to the Love Zone - to lay your own eggs & start the cycle again!



# A-mazing Whitebait!

Once whitebait have matured to egg-laying age, their single mission in life is to make it to their spawning area ('the Love Zone') and lay eggs.  
Can you identify the obstacles for them to overcome on their way there?  
(Answers over the page.)

National Whitebait Spawning Education Programme  
from



Find your way safely to 'the Love Zone'...



What the maze is showing you...

Whitebait have to survive a range of threats and obstacles to get to 'the Love Zone' and spawn successfully. See if you can identify these in the maze.

### Simple activity conversation starter...

- What threats or obstacles can you see for whitebait in the maze on their journey to 'the Love Zone'?

**A-mazing Whitebait!**  
Once whitebait have matured to egg-laying age, their single mission in life is to make it to their spawning area ('the Love Zone') and lay eggs.  
Can you identify the obstacles for them to overcome on their way there?  
*(Answers over the page.)*

**whitebait Connection**  
Xtream about freshwater life

**EOS**  
Ecology

**Find your way safely to 'the Love Zone'...**

Getting eaten by other fish. This is an important role whitebait play in the food chain.

Pests which eat whitebait eggs on the river bank.

Barriers to getting up/down stream e.g., high culverts, weirs etc.

Getting caught by whitebaiters in their fishing nets to become whitebait patties (or fritters... depending on where in NZ you live).

Pollution from toxic stormwater entering streams, and other pollution like rubbish etc.

the Love Zone!

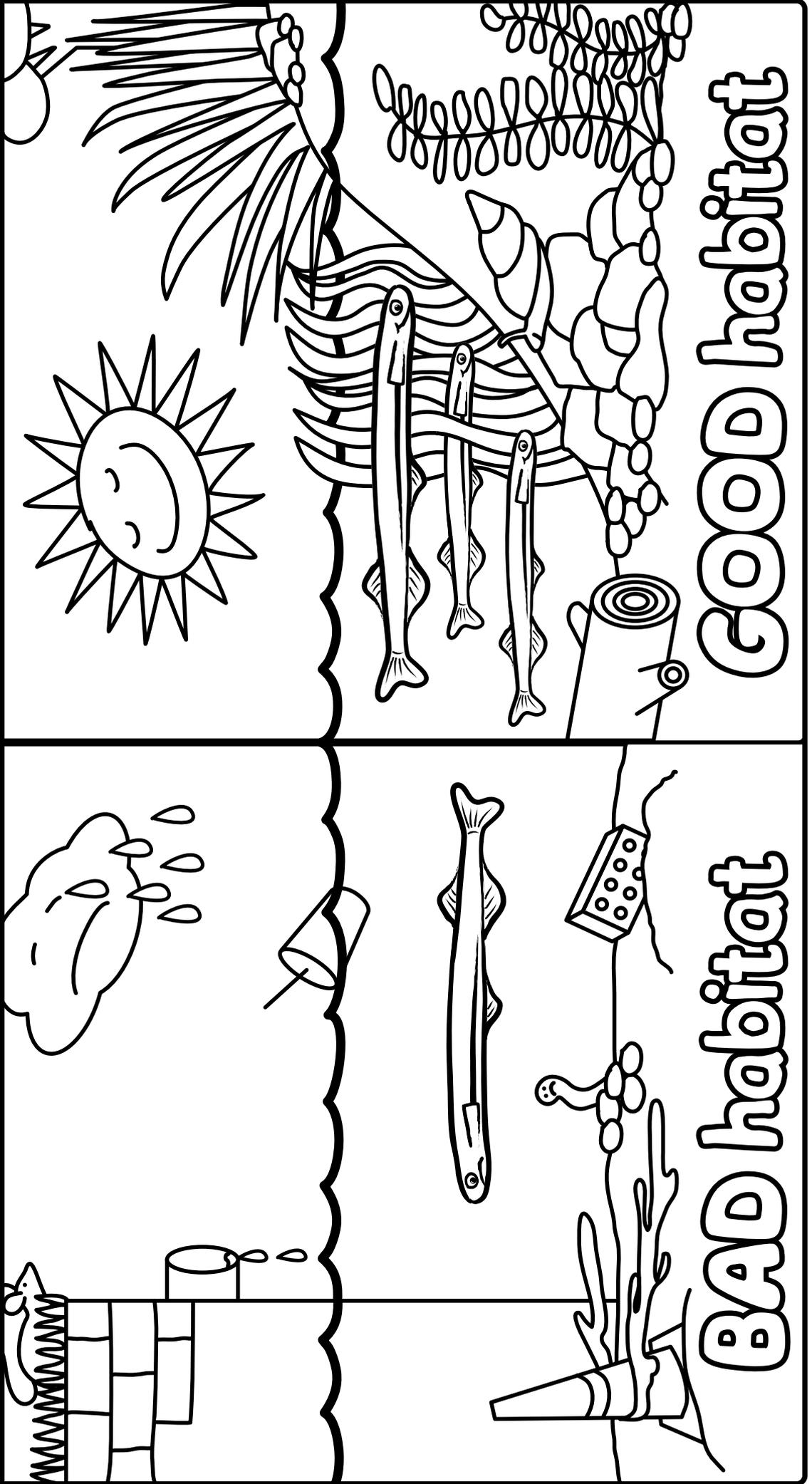
Produced by: & all photos/diagrams/activities © 2023, EOS Ecology / www.eosecology.co.nz

15

# Where whitebait like to live...

Colour in the pictures and use colour to express how you feel about the different habitats.

National Whitebait Spawning Education Programme

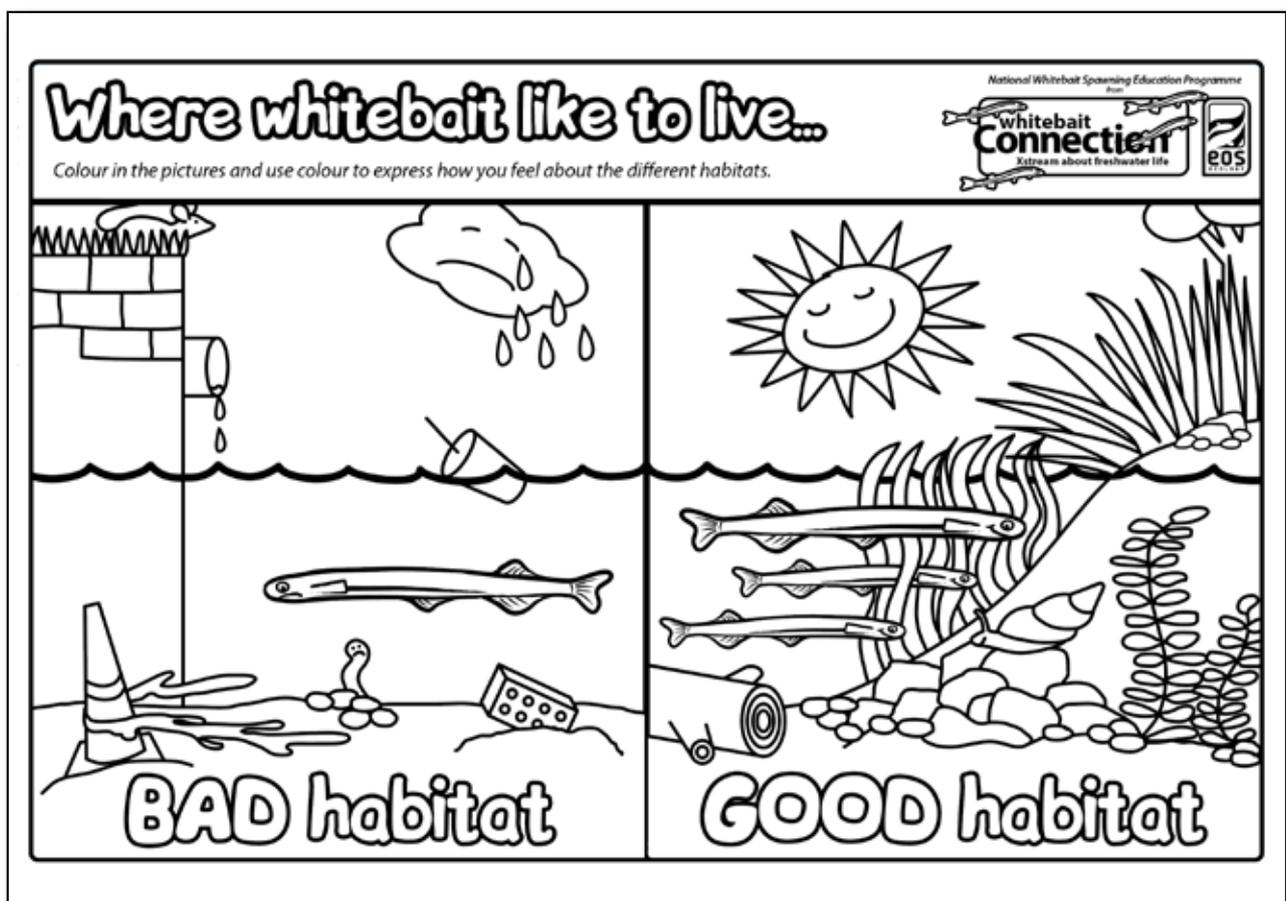


What the 2 different habitat pictures are showing you...

The success of whitebait survival depends on the health of their habitat (environment they like to live in). This activity shows what makes a good habitat for whitebait to live in.

### Simple activity conversation starters...

- What can you see in the 'BAD habitat' picture? What can you see in the 'GOOD habitat' picture?
- What do you think makes a 'BAD habitat' for whitebait to live in? What do you think makes a 'GOOD habitat' for whitebait to live in?
- How many types of whitebait do we have in NZ?



### What makes 'BAD habitat':

- Pests present on banks can eat eggs.
- Short grass that has been mowed, or banks made of bricks/ concrete etc., that whitebait can't lay their eggs in as they don't provide any protection.
- Steep banks that river can't reach at their highest levels.
- No overhanging vegetation on the river's edge to provide shade and protection for whitebait in the water.
- Polluted stormwater draining into river.
- Other pollution in the river e.g. rubbish.
- Not many species or numbers of invertebrates (yummy bugs) in the area. This indicates that the local habitat is generally unhealthy, and there's not much food for whitebait to eat.
- No aquatic plants or logs in the water for whitebait to seek shelter in/under.

### What makes 'GOOD habitat':

- No pests on the banks so eggs don't get eaten.
- Long grasses on the banks providing protection for eggs.
- Nice sloping banks that river can reach at spring high tide or after big rain event.
- Lots of overhanging vegetation on the river's edge to provide shade and protection for whitebait in the water.
- No polluted stormwater draining into river.
- No other pollution in the river e.g. rubbish.
- Lots of species and numbers of invertebrates in the area. This indicates that the local habitat is healthy, and there's lots of food for whitebait to eat.
- Lots of aquatic plants and logs in the water for whitebait to seek shelter in/under..

## 4. WHY whitebait numbers are declining & why you should care



where's everyone gone?

### Overall native fish populations in NZ are in decline...

Protecting whitebait habitats is the most important action to help with declining numbers.

In many rivers around NZ, *īnanga* spawning habitat is damaged or gone completely. Without good spawning habitat, *īnanga* populations can quickly decline (as they live for one year and only spawn once). Because they make up most of the whitebait catch, a decline in *īnanga* numbers can greatly affect how many fish whitebaiters can catch.

Banded *kōkopu* are very sensitive to sediment in the water, and their spawning habitat is at risk in streams and rivers with a lot of sedimentation.

*Kōaro* and giant *kōkopu* are not as adaptable as *īnanga* when it comes to the habitat conditions they can survive in, so their survival is more perilous when their habitats disappear.

*īnanga* and shortjaw *kōkopu* are already classified as 'threatened – nationally vulnerable', so immediate help is needed to protect their spawning habitat to make sure they survive into the future.

### less spawning habitat = less eggs = less whitebait!



#### Damage to whitebait spawning habitats includes (but not limited to):

- Farm stock damage.
- Damage to banks and riparian habitats from land use change, modification, degradation or loss.
- Man-made changes to natural bank structures.
- Mowing on banks during spawning season.
- Excessive sediment on banks can smother vegetation/eggs.
- Construction of barriers (e.g., tide gates) that might prevent whitebait species from accessing their spawning areas, or preventing larvae being washed out to sea (e.g., dams).
- Climate change effects can impact water levels in rivers and streams (e.g., increased flood and droughts events, sea level rise).

It's not just spawning habitat that needs to be preserved. If there is no habitat left for juveniles to go to so they can grow into egg-laying adults, this will also lead to species decline.



#### Damage to whitebait adult habitat includes (but not limited to):

- Damage to waterways, banks and riparian habitats from land use change and human activities.
- Construction of barriers (e.g., tide gates, culverts with a drop, dams etc.) that prevent whitebait swimming upriver to find their adult habitat.
- Storms and floods washing large amounts of sediment into waterways

**Other threats to whitebait include (but not limited to):**

- Non-native fish species like trout like to eat lots of whitebait and force them to change their behaviour, which means whitebait species are less successful at foraging for food.
- Exposed eggs on the bank may be eaten by land-based predators like mice and slugs.
- Rising temperatures and more frequent/severe storms and droughts impact on spawning and egg survival.
- Low biodiversity

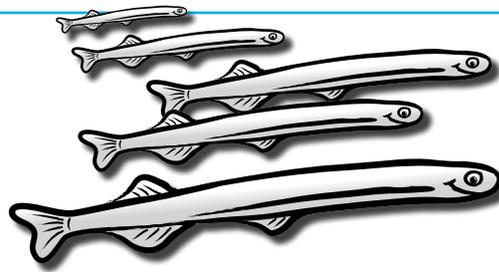
high biodiversity = healthy ecosystem  
...everyone has lots to EAT!



**Some of the predators whitebait need to avoid over their life cycle**



## 5. HOW YOU can help



we'd LOVE your help!

*As some whitebait species always go back to the same spot in the river to spawn, they will come back to damaged areas every year...and their eggs may die. Therefore it's really important that we look after their remaining good spawning areas, and look to improve/restore those already damaged.*

### You can help increase whitebait populations by...

- Fencing off waterways to keep farm animals out.
- Replanting stream edges on your property with natives.
- Keeping streams free from pest plants and fish.
- Reporting dams or overhanging culverts to your local DOC or regional council office.
- Ensuring culverts, weirs, dams, and floodgates on your land are fish-friendly.
- Getting involved in a community project to fence and plant local streams.
- Limiting the sediment and nutrients leaving your property.
- Following the whitebait fishing regulations – see page 24 for more details.
- Keeping your whitebait catch small and only taking what you need.



if you want us around in the future you'd better look after us NOW!



## Keep up with & follow current whitebait fishing regulations

It's important all whitebaiters comply with the whitebait fishing regulations as this will help sustainably manage this precious taonga. These regulations are reviewed as new research lets us know how the species are doing, and helps us find the best ways to look after these species.

### A few important things you need to remember about how to legally fish for whitebait in NZ:



#### WHITEBAITING SEASON DATES & TIMES:

All NZ (except Chatham Islands) = 1 Sept–30 Oct (inclusive)  
Chatham Islands = 1 Dec–last day of Feb (inclusive)

...between 5am–8pm (or 6am–9pm NZ Daylight Saving time)

Taking whitebait at all other times is prohibited.

- Only juveniles ('whitebait' life cycle stage) are allowed to be fished.
- Each person can only fish one net at a time.
- You must always stay within 10 m of your net, and if you stop fishing or want to go away from your net for any reason you must take it out of the water.
- A minimum distance of 20 m between fixed fishing gear must be maintained at all times (except when used from stands). There is no minimum distance between scoop or drag nets.
- When whitebait fishing using a net or screens, do not block off more than  $\frac{1}{4}$  the width of the waterway.
- You cannot fish within 20 m of structures including a tide/flood gate, confluence, culvert, weir, groyne, outfall structure, or unlawful diversion. You cannot fish from any bridge or boat.
- Make sure any bycatch survives.
- Do not alter or modify the natural bed or banks of any river, stream, estuary or channel.

Find all you need to know about legally fishing for whitebait in NZ at: [www.doc.govt.nz/whitebaiting](http://www.doc.govt.nz/whitebaiting)



Department of Conservation  
Te Papa Atawhai



Now you know lots more about whitebait do your own A-Z!



**A** is for...

**B** is for...

**C** is for...

**D** is for...

**E** is for...

**F** is for...

**G** is for...

**H** is for...

**I** is for...

**J** is for...

**K** is for...

**L** is for...

**M** is for...

**N** is for...

**O** is for...

**P** is for...

**Q** is for...

**R** is for...

**S** is for...

**T** is for...

**U** is for...

**V** is for...

**W** is for...

**X** is for...

**Y** is for...

**Z** is for...

Answers to the Whitebait  
Wordfind Challenge:

w	h	i	t	e	b	a	i	t	k	l	s	i	g	s
z	q	n	a	h	n	i	p	s	c	o	u	e	l	p
e	l	a	r	v	a	e	r	a	y	b	k	i	o	a
d	u	n	f	p	t	x	o	e	u	e	o	d	y	w
a	j	g	m	e	i	a	t	w	g	i	a	n	t	n
t	i	a	h	b	v	a	e	u	i	p	r	e	m	i
o	e	s	r	i	e	v	c	k	o	k	o	p	u	n
l	b	a	n	d	e	d	t	o	u	d	s	e	z	g
o	r	h	i	h	u	l	i	f	e	c	y	c	l	e
v	e	m	l	a	t	e	a	g	r	y	i	e	n	t
e	i	e	r	b	h	i	d	n	t	k	e	h	a	w
z	r	e	y	i	r	j	u	v	e	n	i	l	e	k
o	t	g	a	t	i	e	l	n	g	a	i	q	k	i
n	r	g	e	a	y	n	t	r	e	h	a	e	t	g
e	e	s	r	t	k	i	s	h	o	r	t	j	a	w

