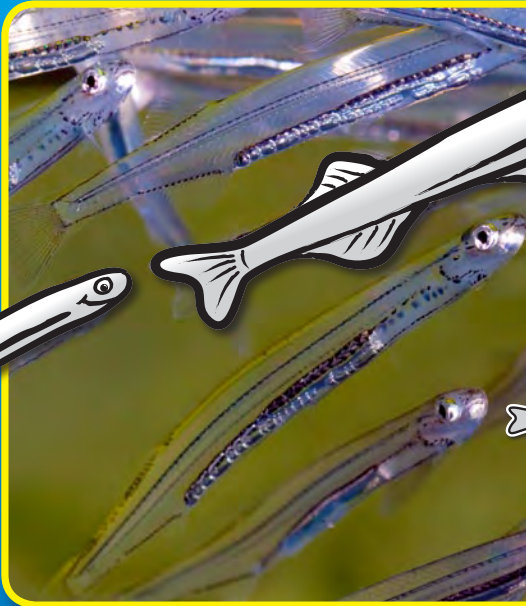


Te Whāriki/Early Childhood Education



Inanga/Whitebait

National Inanga Spawning Education Programme

whitebait
Connection
Xstream about freshwater life



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



AQUATIC SCIENCE &
VISUAL COMMUNICATION



Welcome!

National Īnanga Spawning Education Programme



National Īnanga Spawning Programme (NISP) for Te Whāriki/Early Childhood Curriculum (ECE)

Introduction

Overall, native fish populations in New Zealand are in decline. Part of the problem is the damage we have done to the spawning habitat of Īnanga, the species that makes up over 90% of the whitebait catch. Unfortunately, the habitat needed for their eggs to survive is often damaged or absent. **Less eggs = less Īnanga!** Likewise, introduced predators (particularly trout) eat lots of the adults and change their behaviour, meaning the Īnanga are not so successful at foraging for food. Why do we care? Īnanga is an important food source for many creatures, including us! **High biodiversity = healthy ecosystem = everyone has lots to eat!** Furthermore, many of the simple actions that can be taken to improve things for Īnanga, can also improve the overall quality of the water in our local environments, making it healthier for us to live by them and use them recreationally.

The National Īnanga Spawning Education Programme (NISP) was created in 2016 by the Whitebait Connection (WBC) and offers opportunities for local decision-making, community involvement, freshwater research and monitoring, to give understanding and inspire and empower community into action. The NISP provides a comprehensive set of resources created to support teachers and students to learn more about Īnanga and how to find, monitor and restore their spawning grounds. The NISP was designed to be delivered alongside the Whitebait Connection's Investigating Freshwater Inquiry Framework that has stages of learning and links to suggested teaching and learning experiences which support inquiry into freshwater environments. The NISP is designed to be used in all levels of the curriculum by teachers and environmental educators, but can also be offered as a stand-alone resource for groups wanting to get stuck in and needing expertise advice.

The NISP links to many key aspects of New Zealand's Early Childhood Curriculum Te Whāriki. The curriculum is underpinned by the key message that children are "competent and confident learners and communicators, healthy in mind, body and spirit, secure in their sense of belonging and in the knowledge that they make a valued contribution to society" (p.5) and makes special reference to the importance of tangata whenua in this journey. The four principles of Te Whāriki Empowerment, Holistic Development, Family and Community and Relationships are woven together with the strands Wellbeing, Belonging, Contribution, Communication and Exploration as key areas for learning and development. Te Whāriki is holistic in nature and will vary in practice from centre to centre depending on the context. When teaching in an early childhood setting it is important to understand the philosophy of the centre, the issues relevant to them in their local community and to establish a relationship with kaiako/teacher and tamariki. Te Whāriki values children having 'agency' and building on their interests. Teaching is holistic and considers the 'whole' child e.g., their emotional and spiritual development. Building relationships and involving the wider family and community are also key aspects when delivering the programme. The centre staff will guide this. Caring for and being responsible for the natural world is a key learning outcome and links to a Māori world view as does children developing working theories about how the natural world works. It is important to recognise that infants, toddlers and young children have different learning and developmental needs. Kaiako will work with coordinators in delivering the programme as each centre will differ such as a mixed age centre or a centre that separates age groups.

Background

The main reason for carrying out this project was that students and community members around NZ seemed to be becoming more and more aware that there were issues with their local waterways, but weren't often involved in the on-the-ground practical science that identifies, quantifies and remedies these issues. We saw that as an opportunity lost – an opportunity to engage the community in meaningful field work and involve them in the restoration planning and action. The result would be a more connected, aware and engaged public, improved whitebait spawning habitat and data on where the sites are, improved water quality and biodiversity corridors, and a set of comprehensive new supporting resources for iwi, educators, schools, community groups, Kura Māori and early childhood centres. We saw through delivery of our pilot project in 2016, that there was indeed a real need for this programme of work, due to the interest it sparked, and the demand we were experiencing in mentoring and supporting other groups to get involved.

We acknowledge that in an ideal world we could be mentoring and guiding groups through this whole process, but we (and similar organisations) cannot be everywhere all the time, and if we can develop resources that meet the needs of these groups we can ensure long-term viability of this programme of work across a broader spectrum of community, especially those that are hard to reach and often not involved in science and technology.

This is a truly innovative project that uses best practice ground-breaking scientific techniques that are sure to excite and engage groups who have fewer opportunities to be involved with science and technology. The scope of the project broadens participants' abilities to engage with science and technology in both a local and national level thus promoting the relevance of it within their own lives, as well as others. This empowers them to take part in the societal debates around freshwater management issues facing NZ as well as directly take part in tackling the issues head on and be involved in the technology that will mitigate these issues moving forward.

The development of this resource has involved expert training sessions and collaborative input from and with inanga spawning site experts such as Dr. Michael Hickford, Kim Jones and EOS Ecology.

We have seen that with the correct approach, this programme of work supports the continued learning of students in early childhood environments. Having the ability to engage with ECE centres with this resource adds value and relevance to this mahi/work. We recognise and acknowledge the need to create opportunity to work alongside ECE teaching staff and the wider community in this work and see this opportunity as creating a much wider impact, efficient use of resources and long-term viability.

Vision

A more connected, aware and engaged public, improved whitebait spawning habitat and data on where they are, improved water quality and biodiversity corridors, and a set of comprehensive new supporting resources in for iwi, educators, schools, community groups, Kura Māori and early childhood centres.

Goals

- *Empowered kaitiaki. Connected, aware and engaged public.*
- *Improved whitebait spawning and adult habitat.*
- *Improved water quality and biodiversity corridors*
- *WBC Coordinators will offer scientific vigour throughout the process and training will be provided to them by way of MTSC's national wananga, training/evaluation visits, peer review forms and online training videos.*
- *Upload of all data onto our National Inanga Spawning database (data on where the spawning sites and fish are as well as the groups engaged in the project).*
- *Ensure that a Māori worldview and Te Whāriki approach is incorporated into programme delivery, by working alongside kaiako and iwi/hapu, and that all cultural considerations are addressed.*

Contributors

- Dr. Michael Hickford – Marine Education Research Group (MERG), University of Canterbury (UOC)
- EOS Ecology – Kirsty Brennan, Bronwyn Gay, Shelley McMurtrie
- Mountains to Sea Conservation Trust (MTSCT) – Kim Jones, Soozee McIntyre, Natalie Blandford, Jordan MacDonald, Sophie Tweddle, Jasmine Pirini
- Nga Mahi Te Taiao (NMTT) – Amy-Rose Hardy
- Bayview Early Learning Centre – Tammy Jensen

Acknowledgements

- Department of Conservation (DOC)
- Auckland Council
- Landcare Trust
- Southern Trust
- Foundation North

Feedback

We would love to hear your feedback on how you are using these resources! Please let us know and share your stories with us using the contacts below. It helps us to continually improve what we do and create more of what works!

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Ngā mihi



Kim Jones

WHITEBAIT CONNECTION NATIONAL COORDINATOR

Kei te tautokona te Kaupapa Mātauranga Toene Inanga ā-Motu e...






AQUATIC SCIENCE & VISUAL COMMUNICATION







www.whitebaitconnection.co.nz

TE WHĀRIKI PROGRAMME CONTENTS:

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HOW TO USE THIS PPT:

It is advised that this presentation be delivered in full to ECE centre staff at the initial planning meeting. Then please curate your individual presentations from the slides following so it is appropriate for your group and knowledge base of your audience.

When working with ECE students it is more effective if small parts of this are presented, then followed with relevant hands-on activities from the rest of the resource kit.

There are notes for your info in the 'notes' section.

There are some basic WBC 'master pages' which have been created just for you if you have any local content to add.

Use Myriad bold italic as the font, or Calibri bold italic if you don't have Myriad.

...and of course – remove this slide from the front before presenting :-)

DELETE THIS PAGE BEFORE PRESENTING

Te Whāriki/Early Childhood Education – PART 1a: Information

National Īnanga Spawning Education Programme



Īnanga/Whitebait

Presented by:



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



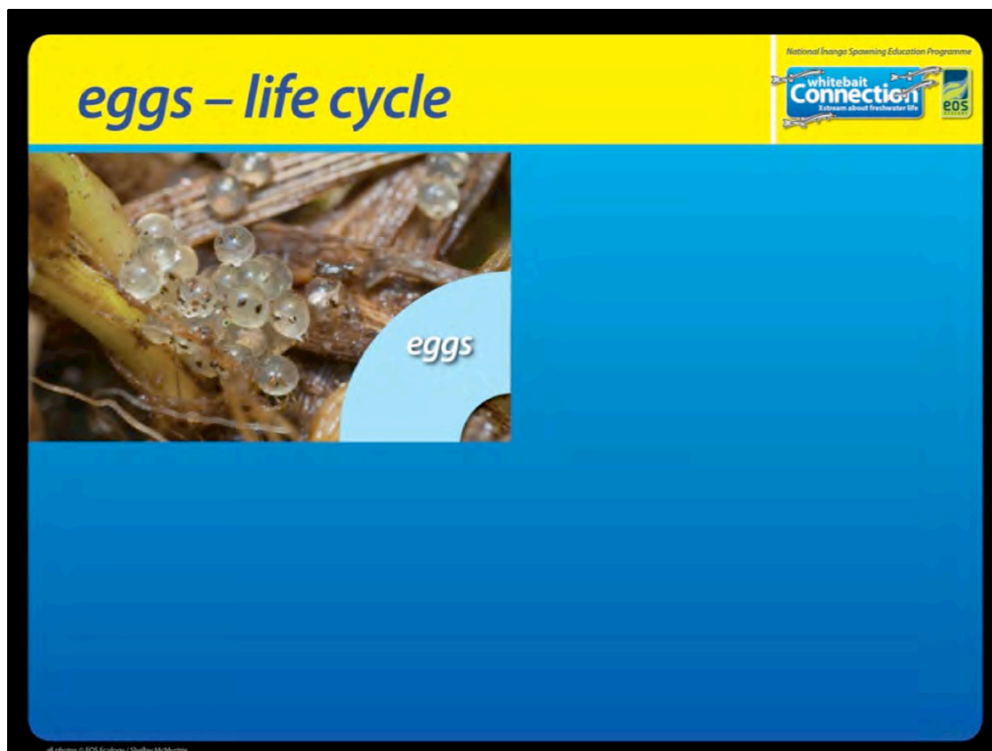
All photos & diagrams in this presentation are the © of EOS Ecology unless otherwise specified & cannot be used by any other party without written consent

Before you start the Powerpoint Presentation...read a story or sing a song about inanga – e.g., ‘Finneus the Whitebait’ as it paints a picture of the concept of the life cycle.....

- **Welcome students to the WBC programme and discuss how great it is that they are learning about inanga and their rivers.**
- **Instill the importance of them learning so they can teach adults about inanga**



- Briefly discuss inanga being one of the whitebait species, they have 5 “cousins” ...
- Ask “What makes them a fish?” “Why aren’t they a bird?” – Give the kids a chance to answer
 - Fins
 - Scales
 - Don’t have arms or legs or feathers or fur
 - Live in the water
 - What kind of water do they live in? Tricky question because these guys are tricky fish and they live in salty water and fresh water – not salty.
- Ask: “How do they become a fish? An adult fish?” “How do fish start out their life cycle?”



- They start out as eggs.
- Eggs are laid in the long grass on the riverbank..... But HOW???
- Ask them about tides..."who knows about the tides?" – provide a brief description of low vs high tide
- We will watch a video about spawning – when they lay and fertilize the eggs

eggs – spawning



While watching the video, describe:

- the long grass and that it is high tide
- the fish are swimming among the long grasses to lay their eggs
- when the tide goes down, the eggs are left in the grass on the bank until the next month.



- Describe the size of an egg so they can visualize it – smaller than your fingernail, small like a freckle.
- The eggs are sticky, and stick together and to the grasses.
- They need to stay out of sunlight or they will get burnt. Need long grasses to shade them.
- Ask “what do you think the black dots are?” – give kids a chance to answer – eyes.
- They are like ninjas, waiting in the dark below the grasses waiting for the next high tide so they can hatch



- The eggs are on the river bank in a very special part of the river. Where the saltwater from the sea meets the freshwater from the river.
- Their favourite place to lay eggs is called their spawning habitat – ‘the Love Zone’
- A habitat is a place where an animal lives.
- Inanga have many different habitats. They live in a big part of the world for such a small fish.
- The eggs are in the long long grasses, hiding from the sun, like ninjas.
- When the tide comes up to cover them.....

larvae – life cycle



eggs

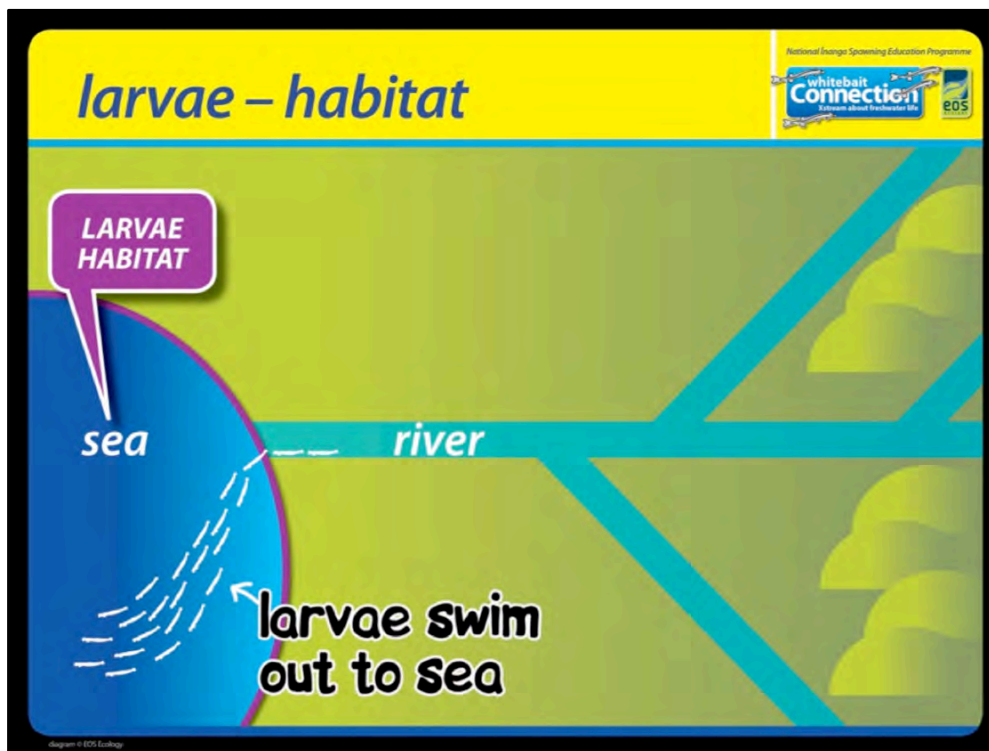
larvae

When the eggs hatch out of the egg they are called larvae.

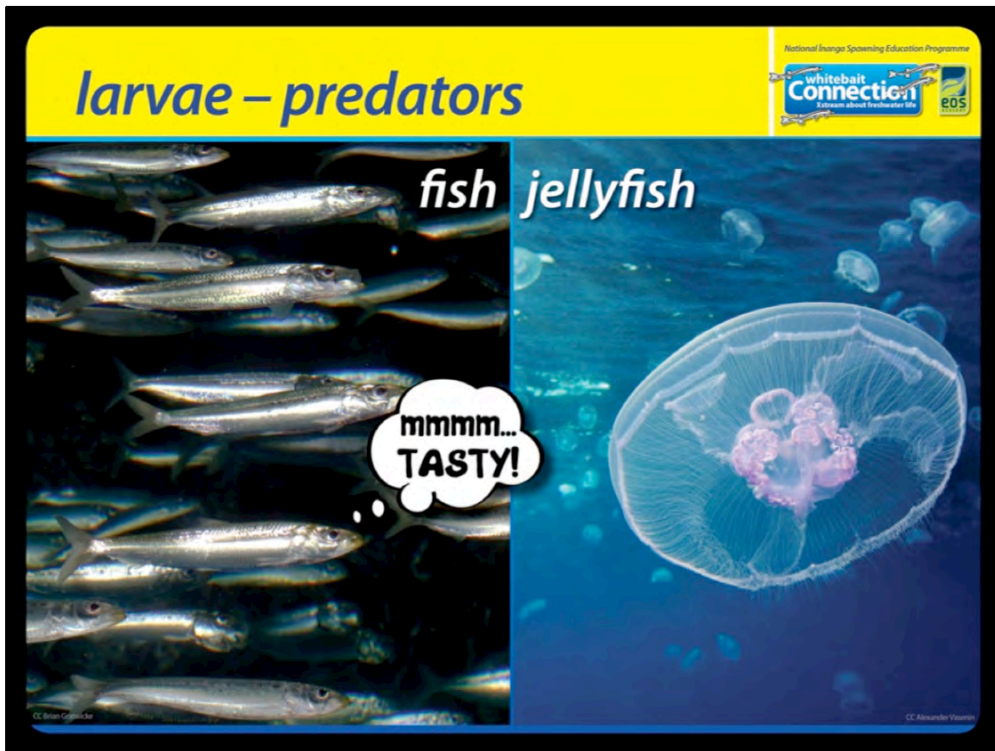
larvae



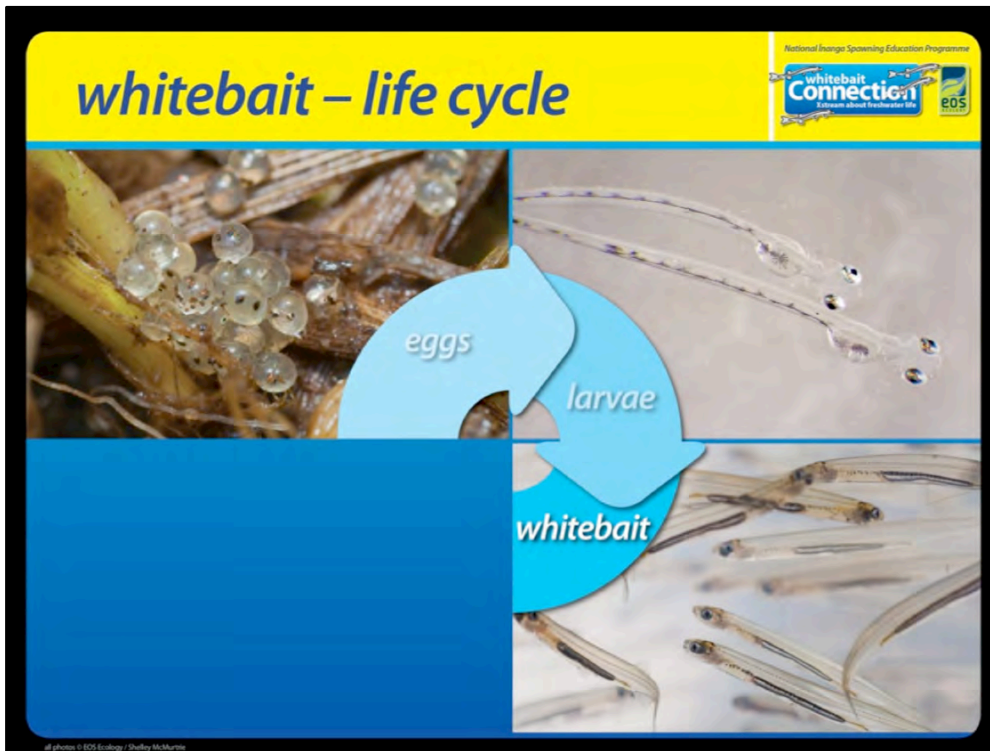
- The larvae are tiny, smaller than your thumb,
- When they first hatch their mouth isn't very big and they can't swim very well.
- So they have some food stored in the yolk sac (point to it on the slide) until they get bigger and can catch bugs to eat
- Ask "What colour are they?" "Why?" – give the kids a chance to answer...it's a trick! They are see through so they are harder for predators to see.



- They hatch from their eggs and get washed out to sea with the tides.
- The ocean is their habitat for the winter.
- They want to do 3 things when they are larvae:
 - find food
 - get big
 - go fast (to try and escape being eaten)
- They also find lots of other larvae to swim with because it's safer to swim in groups (to try and avoid being eaten).



Lots of animals want to eat them in the ocean.



The larvae have now grown into whitebait by eating lots of tiny bugs and plants in the ocean.



- They start swimming through the waves together to try to make it past the whitebaiters on the river – to where the water is fresh.
- One of the special things about – they are diadromous – meaning they can live in saltwater and freshwater, not all fish can do this.



- When the weather gets a bit warmer the whitebait smell freshwater and swim into a river.
- They head up the river where there is no salt in the water
- Continue to feed and grow.

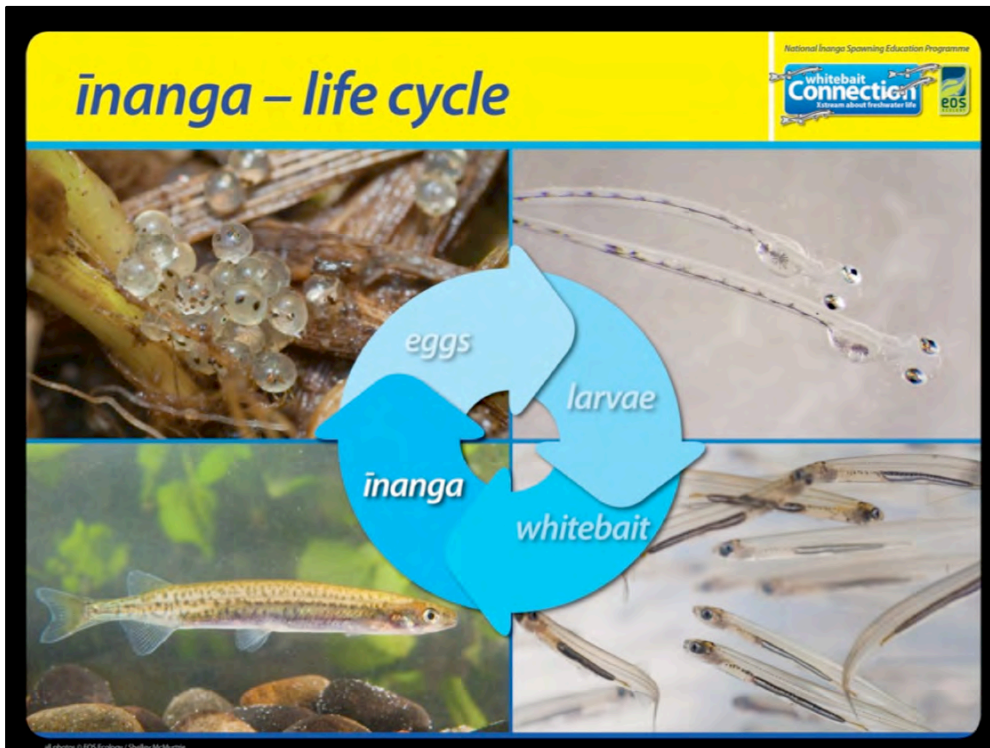
whitebait – predators



A number of these fish get caught by whitebaiters and end up in our tummies as whitebait patties.



Lots of other animals like to eat whitebait too – like fish and birds.

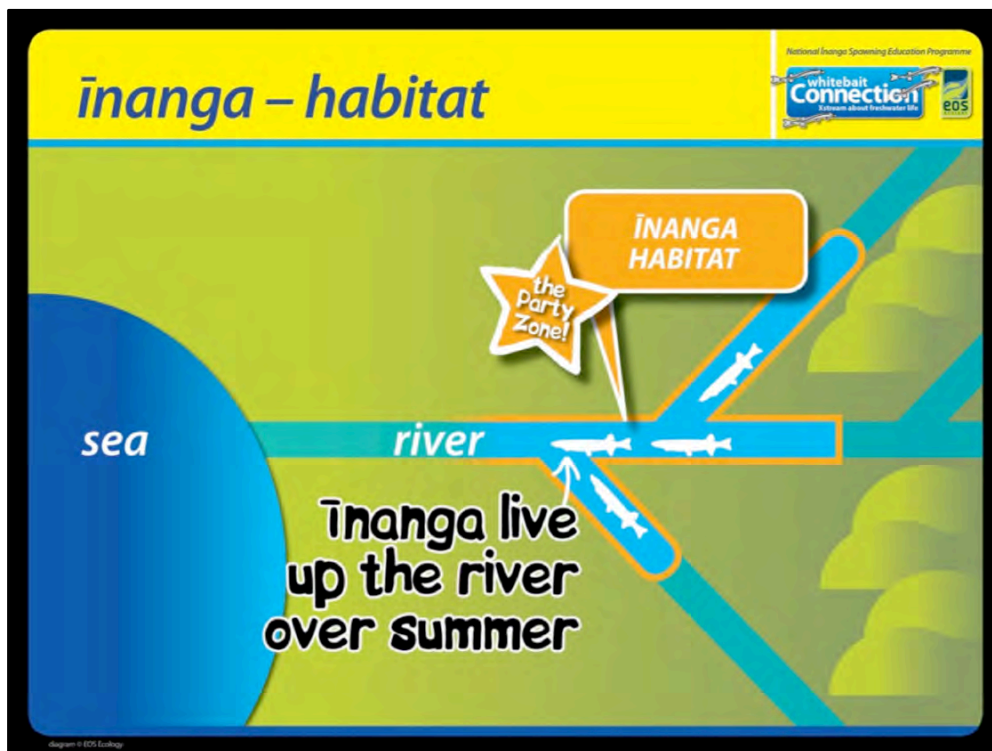


- The whitebait now grow into an adult – called ‘inanga’.
- They all hang out for the summer up the river in ‘the PARTY ZONE’ where they spend lots of time with their friends.
- They want their habitat to have lots of shade and overhanging plants and lots of bugs for them to eat...party food.

inanga



- Ask: “How old do you think an adult inanga is?” – give kids a chance to answer...
 - an inanga is an adult when they are 1
 - they have a very short lifespan...they only live to be 3 years old.
- What happens now when they’re an adult?
 - they need to have babies (lay eggs...back to the start of the life cycle)

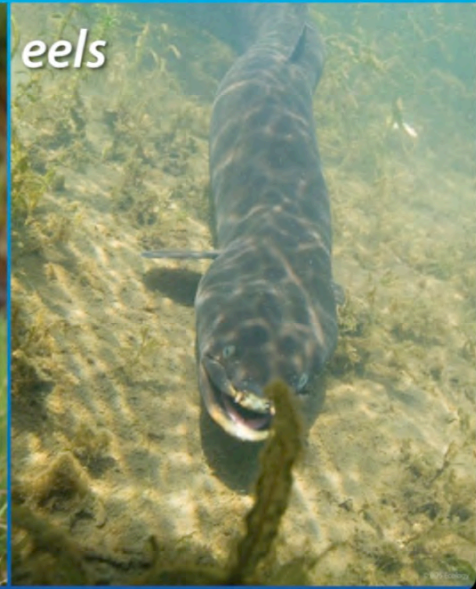


- At the end of summer inanga swim down the river to where the saltwater meets the freshwater.
- The mummy inanga has thousands of eggs inside
- Female inanga are bigger than the male inanga.
- They hang about in the habitat at ‘the Love Zone’ until the spring high tides allow them to get further up the banks.
- Ask: “What kind of habitat are they looking for?”:
 - long grasses on the bank and that overhang the river
 - banks that aren’t too steep
 - the right kind of grasses to keep their eggs shaded from the sun
- Discuss the importance of good ‘Love Zone’ habitat.

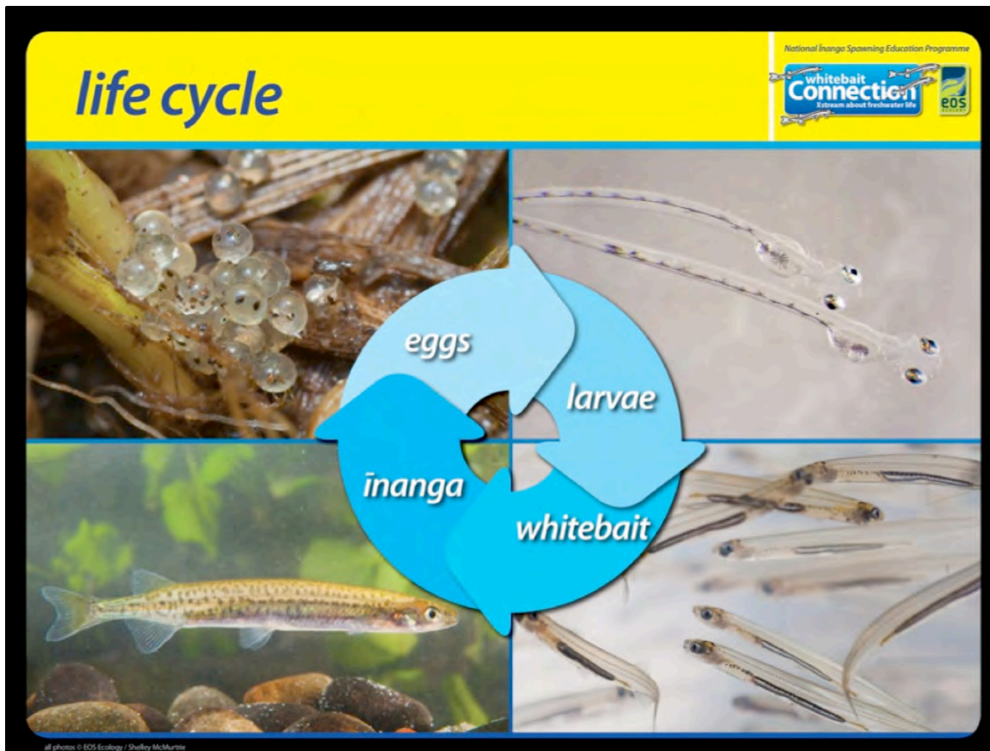
īnanga – predator



birds eels



Inanga need to be big and fast to get escape the birds and fish that like to eat them



The inanga then swim downstream to 'the Love Zone' to lay their eggs – and the cycle starts again.

īnanga
numbers are
DECLINING!



why do we care?



less inanga eggs = less whitebait = less fritters



- If there are no more whitebait, we can't eat whitebait patties.
- The birds and fish that like to eat them in the ocean and in the rivers won't have any food.

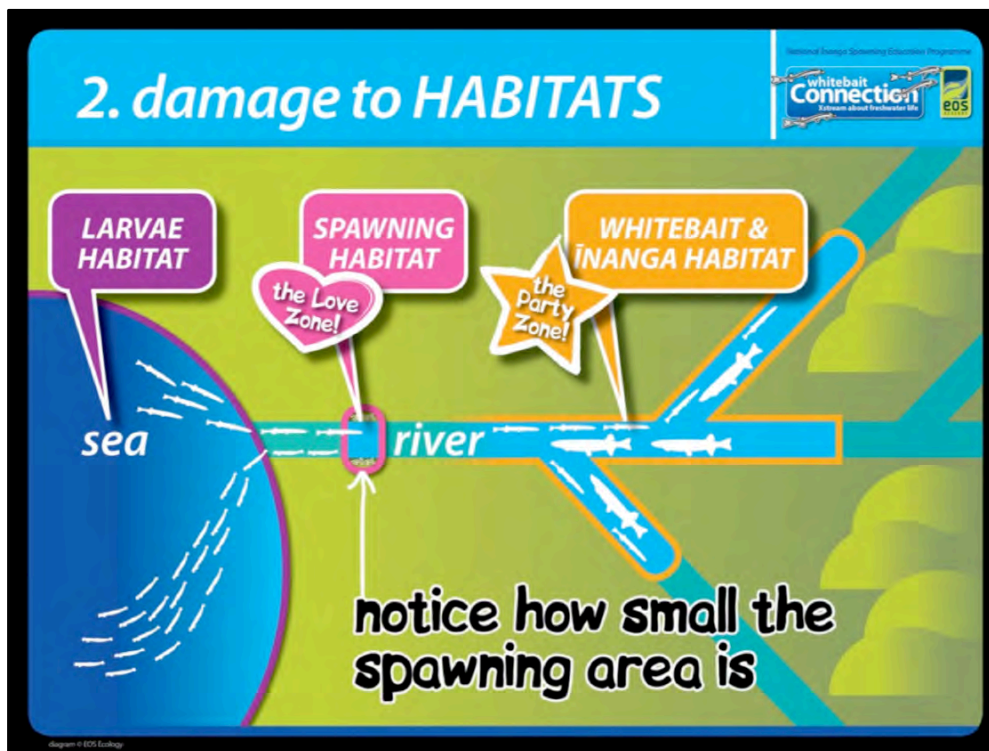
why numbers declining



1. more introduced PREDATORS



Discuss the threat of pests to inanga.

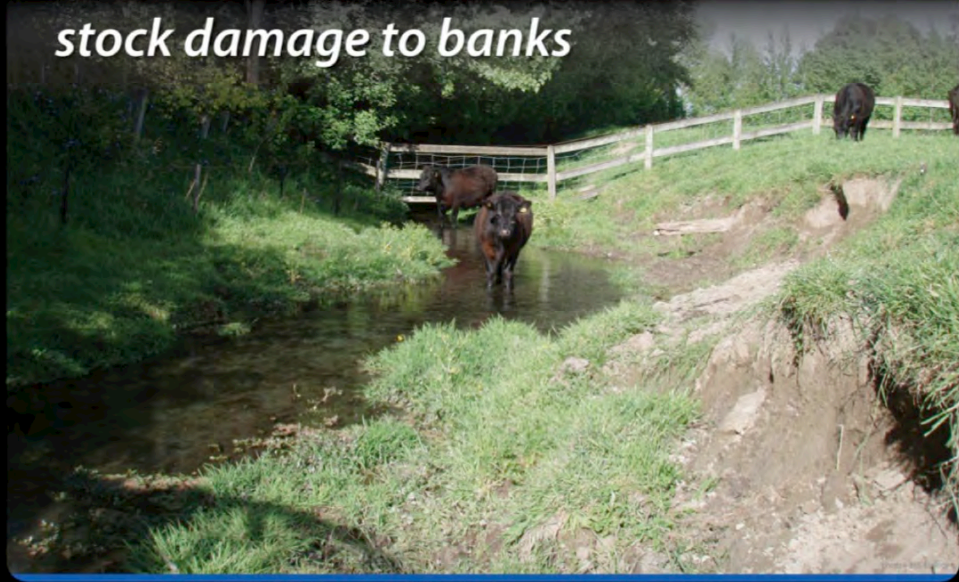


Discuss habitat degradation – especially in 'the Love Zone'.

LOVE ZONE changes



stock damage to banks



Ask:

“do you think it’s OK to have cows in the river?”

“Why?”

LOVE ZONE changes



*man-made changes to
natural banks*



Ask:

“what happens if we put big steep banks along the river?”



Ask:

“what would happen to eggs in the long grass if it was cut really short?”

LOVE ZONE changes



excessive sediment on banks



Excessive dirt and mud on the banks where there should be grass smothers the eggs and the grasses.

LOVE ZONE changes



barriers to inanga entering spawning areas



This is a tide gate and inanga can't get through it.

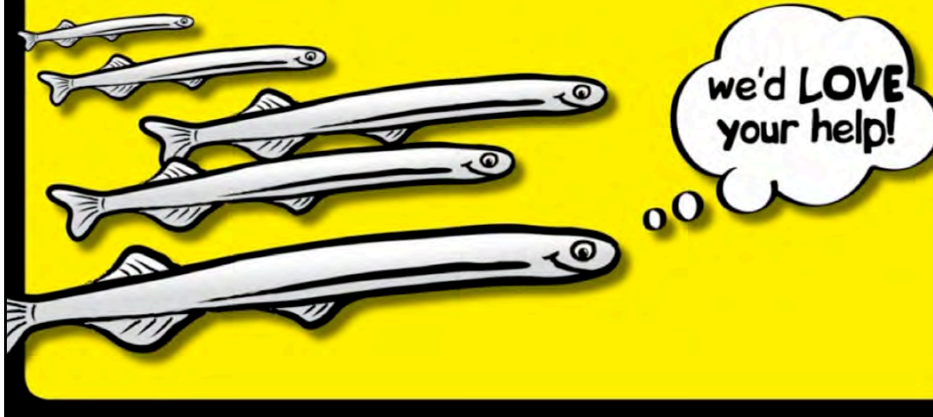
Imagine seeing a locked door and you can't get through. These gates are barriers to inanga – they stop them from getting to 'the Love Zone' or 'the Party Zone'.



Inanga are not good at climbing (although some of their cousins are [i.e., other whitebait species]).

Weirs stop inanga from getting to 'the Party Zone'.

how we can HELP the īnanga!



- Re-iterate the importance of them being scientists/investigators.
- Tell them they now know lots more about inanga than some adults – so it's important they tell their families about what they've learnt.
- Encourage them to create artworks or make up songs to share.

National Īnanga Spawning Education Programme



Īnanga/Whitebait

Presented by:



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





You can add this slide in earlier if you want to discuss that there are a total of 5 different species of whitebait in NZ.

These other 4 can all climb barriers...unlike inanga.

Īnanga/Whitebait



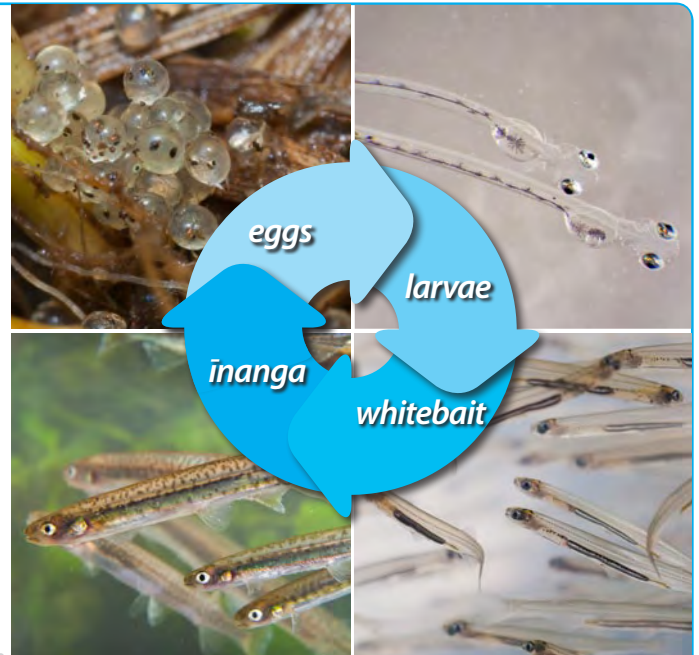
WHAT are Īnanga:

'Whitebait' is a collective term for the juvenile stage of the five New Zealand species of the fish family Galaxiidae. 'Īnanga' is the name for the adult stage of one of these five whitebait species – *Galaxias maculatus*.

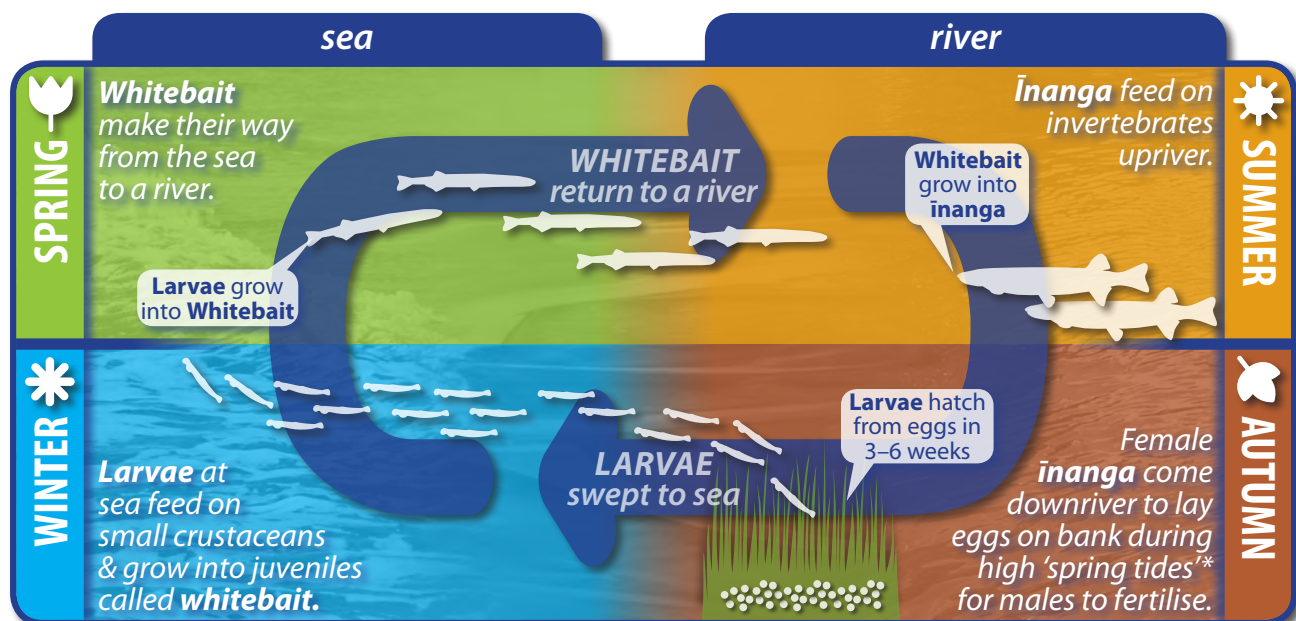
Īnanga is the smallest of our whitebait species, growing no longer than 110 mm.

It's the only species that can't climb barriers – which means it has a unique set of requirements for survival.

They are diadromous – meaning they live in marine and freshwater environments.



Īnanga life cycle



* SPRING TIDE – a tide just after a new or full moon, when there is the greatest difference between high & low water

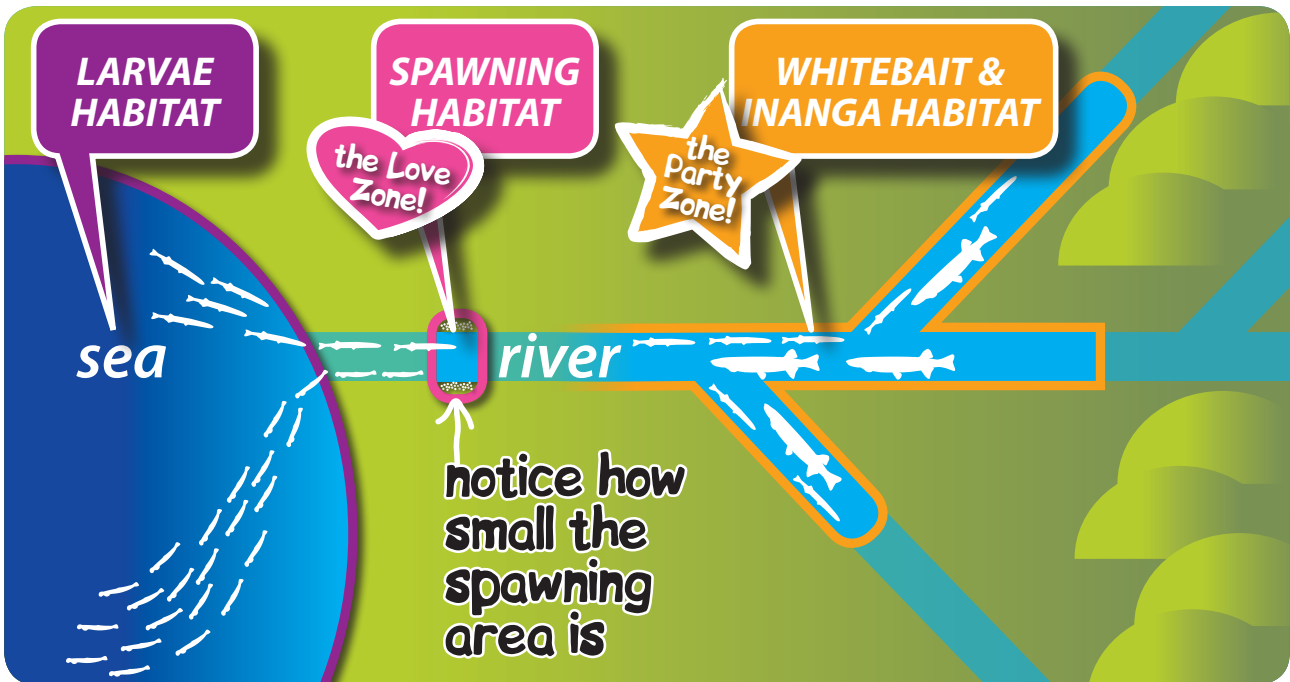
During their spawning season in late summer/autumn female Īnanga will lay 1,500–3,000 eggs. They are tiny – each egg being just 0.8–1.25 mm in size.

After a month they will hatch into 7 mm long larvae. For the first week they feed on their attached yolk sac, then they start to feed on small plants and animals. They head out to sea for up to six months. Having lots of larvae and sending them out to sea is the Īnanga version of "not putting all your eggs in one basket" i.e., if bad things happen then they won't all be lost.

The six-month old juveniles (now called 'whitebait') find their way to rivers in large groups/shoals by smelling the freshwater. They swim upriver, but are weak swimmers and can't climb up barriers e.g., rapids, waterfalls/weirs/culverts etc. Most of the whitebait don't survive this journey as they starve, get eaten by predators or are caught by whitebaiters.

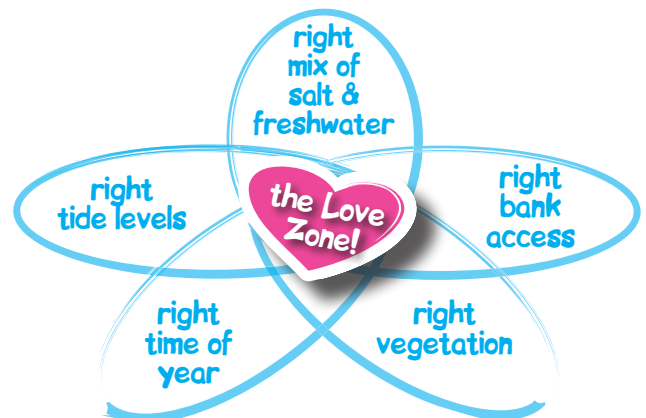
They mature into adults in the river for about six months. They are ready to head back downstream and lay their own eggs (spawn) after a year.

WHERE inanga live & like to lay their eggs:



Getting the right spawning habitat – ‘the Love Zone’ – is a delicate balance of a number of conditions.

Issues include adult inanga being vulnerable to predators when they swim into the shallow water to spawn – so emergent vegetation gives them some protection from hungry eels and wading birds. Inanga eggs need to stay cool and damp while they are out of the water. Canopy and bankside vegetation covering the eggs act like an umbrella during the day and a blanket at night.



IDEAL ĪNANGA SPAWNING HABITAT

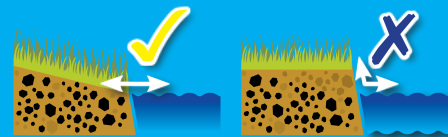
Right distance from estuary/sea



Some stretches of this waterway are optimal for inanga spawning due to their location in relation to the sea. Spawning occurs in areas where high spring tides can reach, but the water isn't too salty. During spring tides inanga can lay their eggs in vegetation high up the riverbanks, above the normal river flow height.

Gently sloping bank

Ideally the riverbank will be a gentle slope rather than a steep edge. This means there is more accessible bank area for inanga to lay their eggs on during the high spring tide.

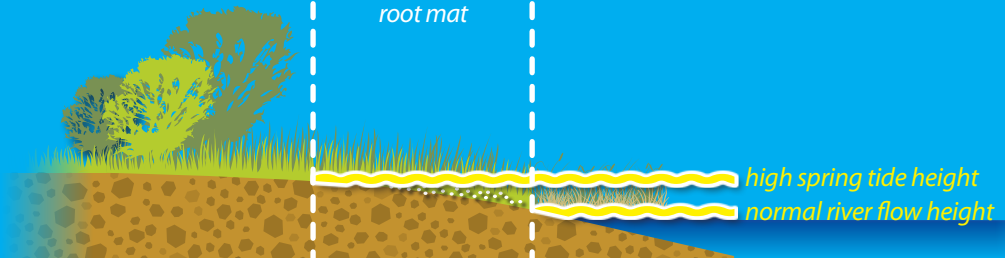


Good bank vegetation

Canopy of native trees/shrubs
– provide shade for eggs while not dropping lots of leaves on them

Tall thick grass
– so inanga eggs can be laid in the root mat

Plants rising from water
– for inanga to hide in until high tide takes them up the bank



WHY inanga numbers are declining, & why we care:

where's everyone gone?



Overall native fish populations in New Zealand are in decline.

Inanga are doing better than most because they are generalists i.e., they are flexible in where they live and what they eat. Part of the problem is the damage we have done to the spawning habitat of the species that makes up over 90% of the whitebait catch.

Unfortunately, the habitat needed for the eggs to survive is often damaged or absent.

Less eggs = less inanga!

Also, introduced predators (particularly trout) eat lots of adults and change their behaviour meaning the inanga are not so successful at foraging for food.

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



Damage to inanga habitats includes (but is not limited to)...

Spawning habitat = 'the Love Zone':

the Love Zone!

- Farm stock damage.
- Man-made changes to natural bank structures.
- Mowing of the long vegetation on banks during spawning season.
- Excessive sediment on banks, smothering vegetation.
- Construction of barriers that prevent inanga entering spawning areas e.g., tide gates.

Adult habitat = 'the Party Zone':

- Construction of barriers that prevent inanga swimming upriver to feed e.g., tide gates, weirs, culverts etc.

HOW we can help:

Riverbank vegetation and inanga spawning habitat can be slow to recover from damage.

Inanga always come back to the same spot in the river to spawn, so they will come back to damaged areas and try to spawn...but their eggs will die. Therefore it is imperative that we look after their remaining good spawning areas, and look to improve/restore those already damaged.

- Fence out stock.
- Implement riparian planting plan.
- Encourage authorities to review maintenance strategies for banks.
- Remove tide gates and other barriers to inanga getting upriver.
- Inanga eggs are very vulnerable. The only protection they have from being eaten by predators is the vegetation they are developing in. Tall, dense, vegetation hides the eggs and makes access difficult for predators. If you can maintain or restore the vegetation then pests will become less of a problem.

The 5 whitebait species in New Zealand

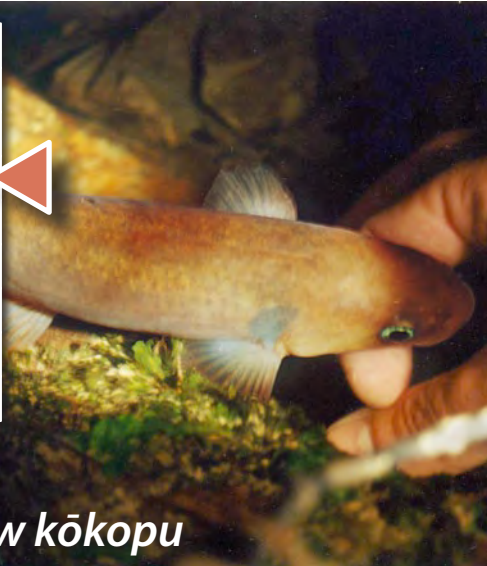
Inanga **CAN'T** climb barriers... unlike the other 4 species

extinct	
nationally threatened	critical
	endangered
	vulnerable
at risk	declining
	recovering
	relict
	naturally uncommon
not threatened	



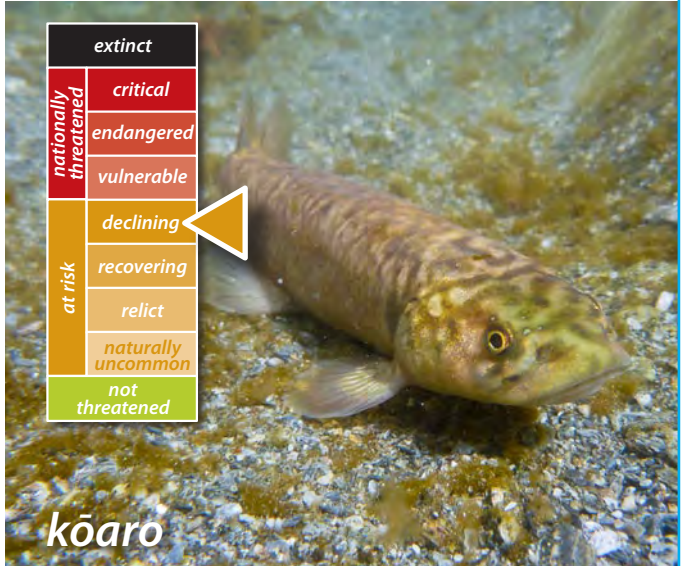
inanga

extinct	
nationally threatened	critical
	endangered
	vulnerable
at risk	declining
	recovering
	relict
	naturally uncommon
not threatened	



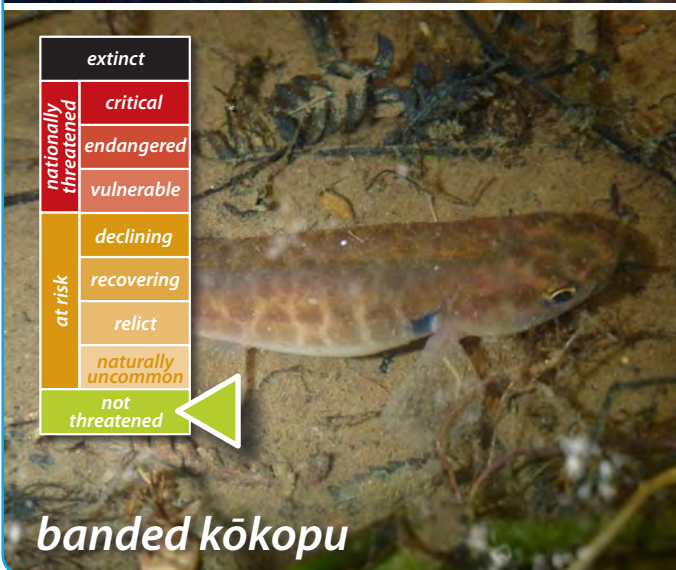
shortjaw kōkopu

extinct	
nationally threatened	critical
	endangered
	vulnerable
at risk	declining
	recovering
	relict
	naturally uncommon
not threatened	



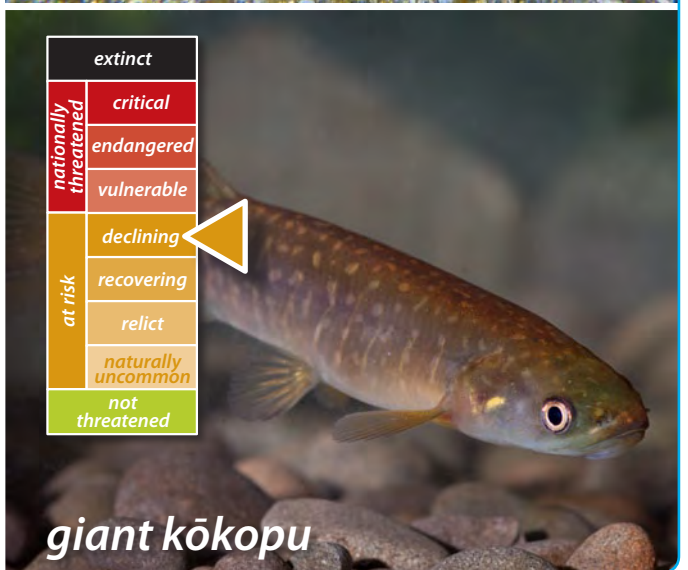
kōaro

extinct	
nationally threatened	critical
	endangered
	vulnerable
at risk	declining
	recovering
	relict
	naturally uncommon
not threatened	



banded kōkopu

extinct	
nationally threatened	critical
	endangered
	vulnerable
at risk	declining
	recovering
	relict
	naturally uncommon
not threatened	



giant kōkopu

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



Inanga/Whitebait



Awa
Māori word for river

Banks
need to be just right for inanga to successfully lay eggs

Caudal fin
also called the TAIL

Diadromous
lives in BOTH salty & fresh water

Eggs
when eggs are laid it's called SPAWNING

Food
inanga eat BUGS in the river

Galaxias maculatus
scientific name for INANGA

Habitat
where inanga like to LIVE

Inanga

Juveniles
teenagers of the inanga life cycle

Knowledge
the more you know about inanga the more you can help!

L the Love Zone!
where inanga lay their EGGS

Migration
inanga move to different habitats

New moon
when the tides are highest

Obstacles
barriers in the river & predators make inanga life hard

P the Party Zone!
where whitebait grow into inanga

Quiet!
Shhhhhh!
inanga don't like to be disturbed

River
one of the habitats inanga like to live in

Sea
one of the habitats inanga like to live in

Tides
inanga lay their eggs during the high spring tide when they can get up the river bank

Upstream
where the whitebait swim to reach 'the Party Zone'

Vegetation
protects inanga eggs

Whitebait
swim from the sea to river to grow into adults

Xmas
when inanga leave 'the Party Zone' for 'the Love Zone'

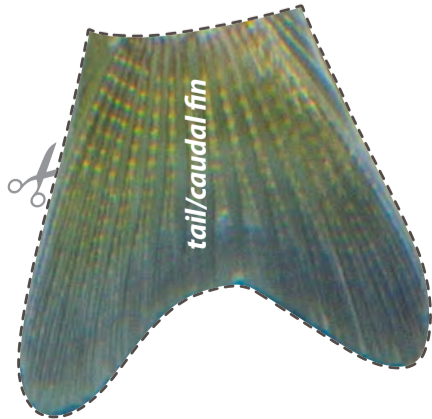
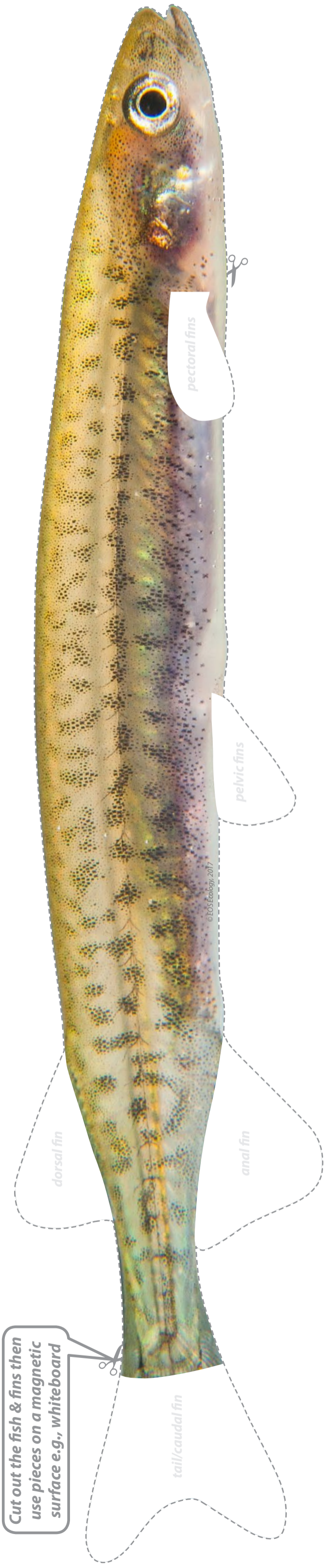
You
the kid that can HELP!

Zero
the number of inanga we'll have left if we don't protect them

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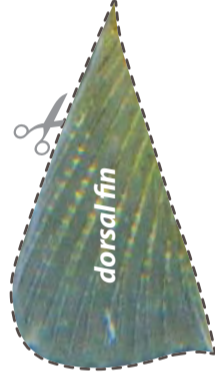
Inanga/Whitebait – ‘Pin the fin on the inanga’ activity



tail or caudal fin
 Located at the end of the body.



anal fin
 The anal fin is directly below the dorsal fin.



dorsal fin
 The dorsal fin starts directly above the anal fin.



2x pelvic fins
 There is one on each side of the inanga.



2x pectoral fins
 These are quite hard to see. There is one on each side of the inanga.



‘Pin the fin on the inanga’ activities...

ACTIVITY ONE:

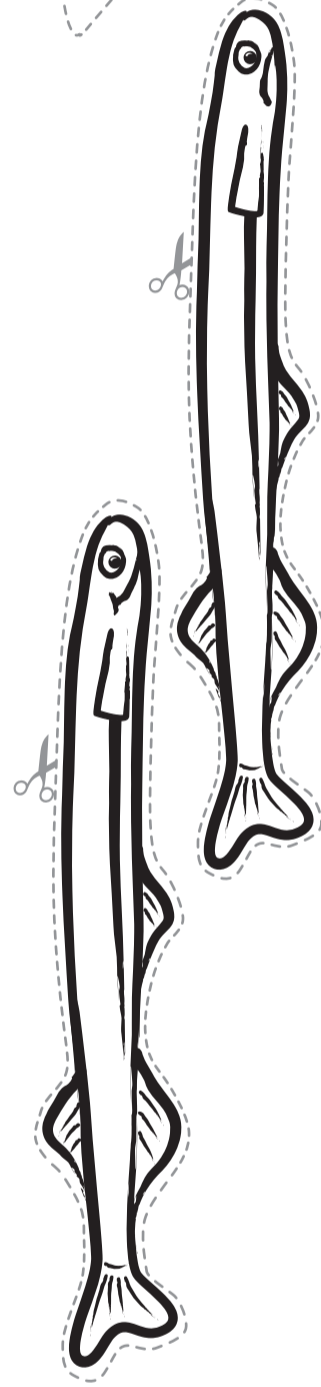
- Get children to guess where the fin fits on the inanga via its shape and name e.g., “This is the pectoral fin. On our bodies our pectoral muscles are up here on our chest...where do you think the inanga’s pectoral fins will go?”

ACTIVITY TWO:

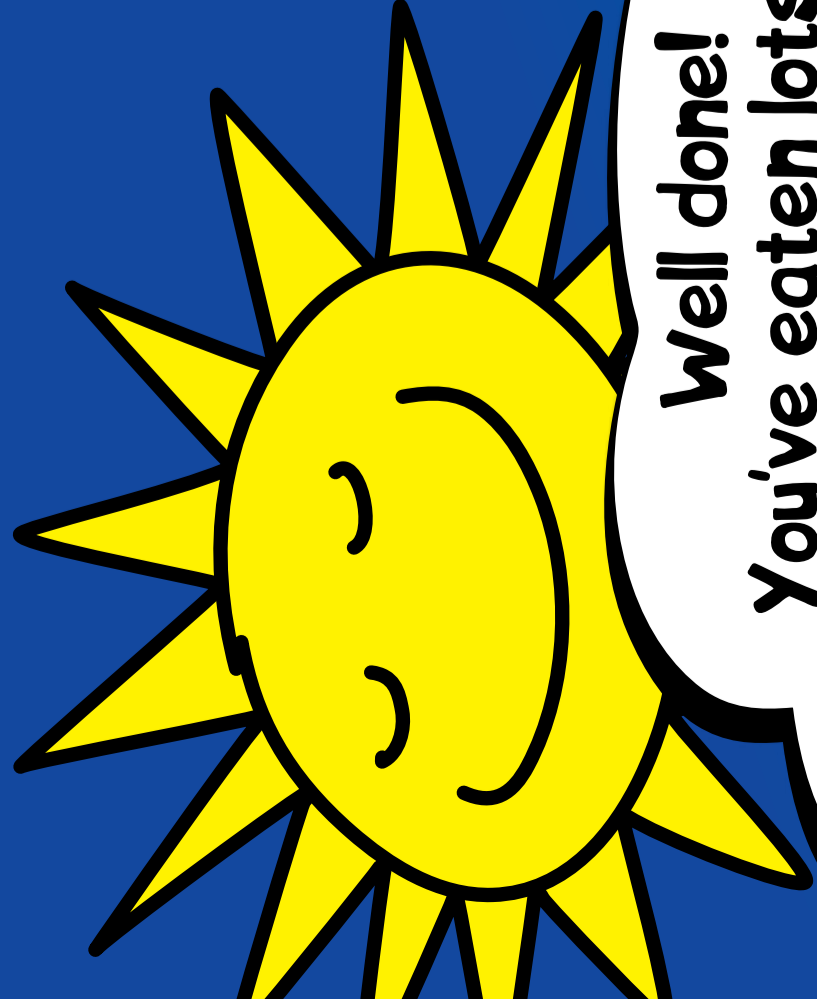
- ‘Pin the fin on the inanga...our version of ‘pin the tail on the donkey’. Cover the students eyes, turn them in a couple of circles, then see how close they place the tail fin to the right spot. Mark eachs students attempt. The closest pinned tail wins!



Other fun magnets for you to cut out and use in your teaching scenarios...



INANGA QUEST



Well done!
You've eaten lots and
grown into an adult, it's
time to swim downstream to
'the Love Zone!'

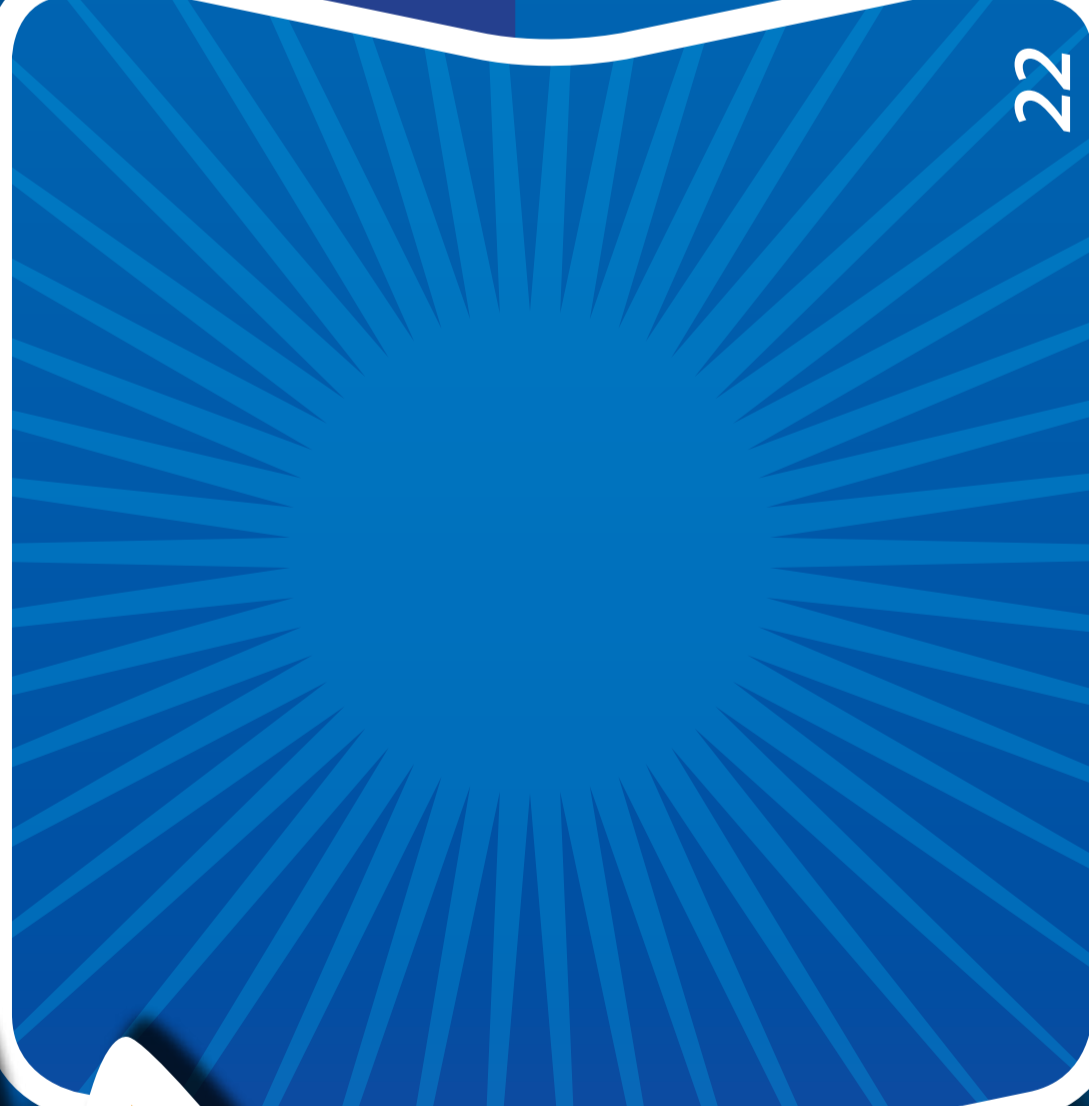


**move FORWARD
2 spaces**

23



24



22



25

you've found lots of lovely
vegetation to hide in
**move FORWARD
2 spaces**

26



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

28

nearly there!
it's the new moon
and you've only
ONE roll to go...

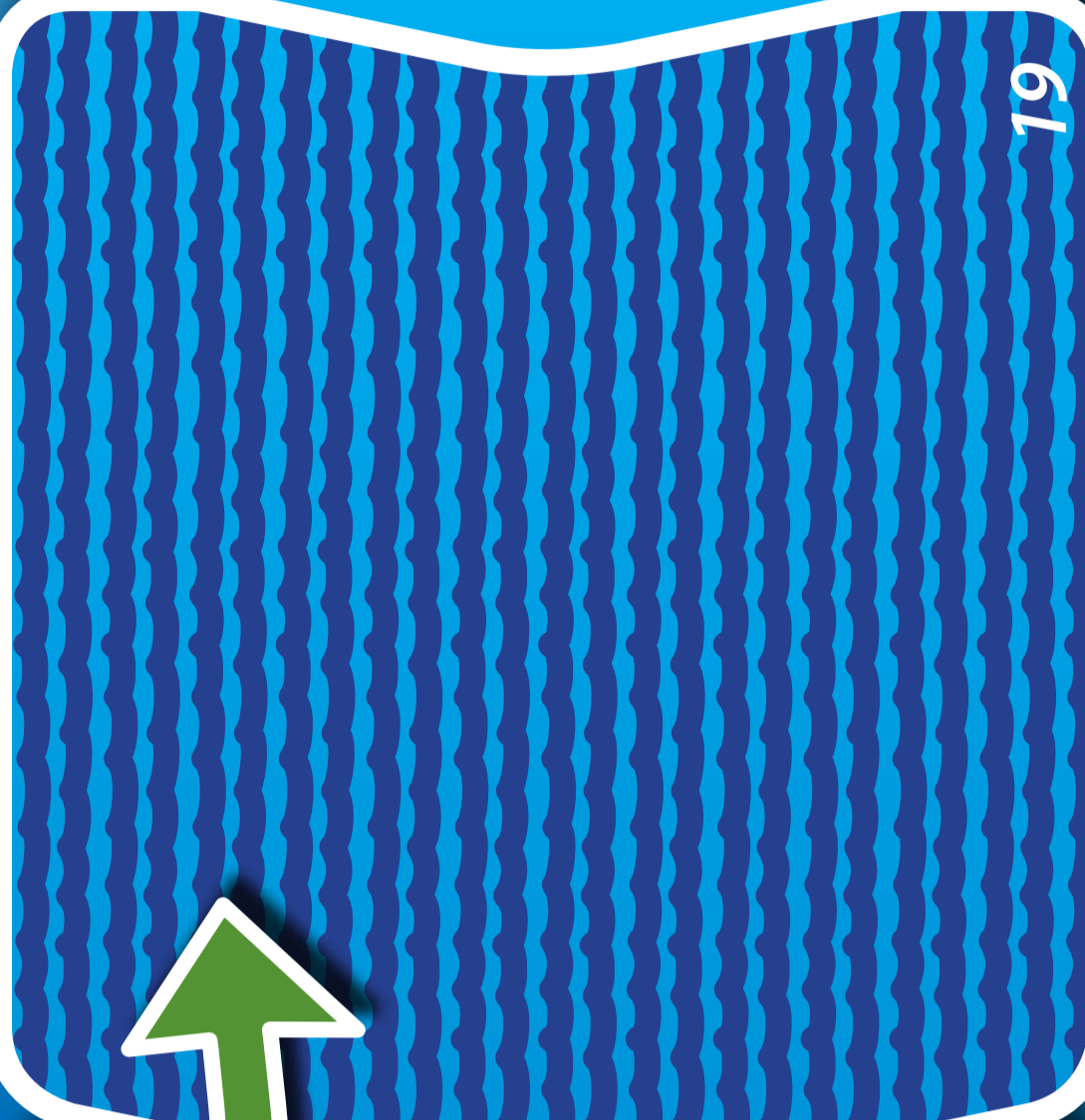
**the Love
Zone!**

congratulations!
you're back to...

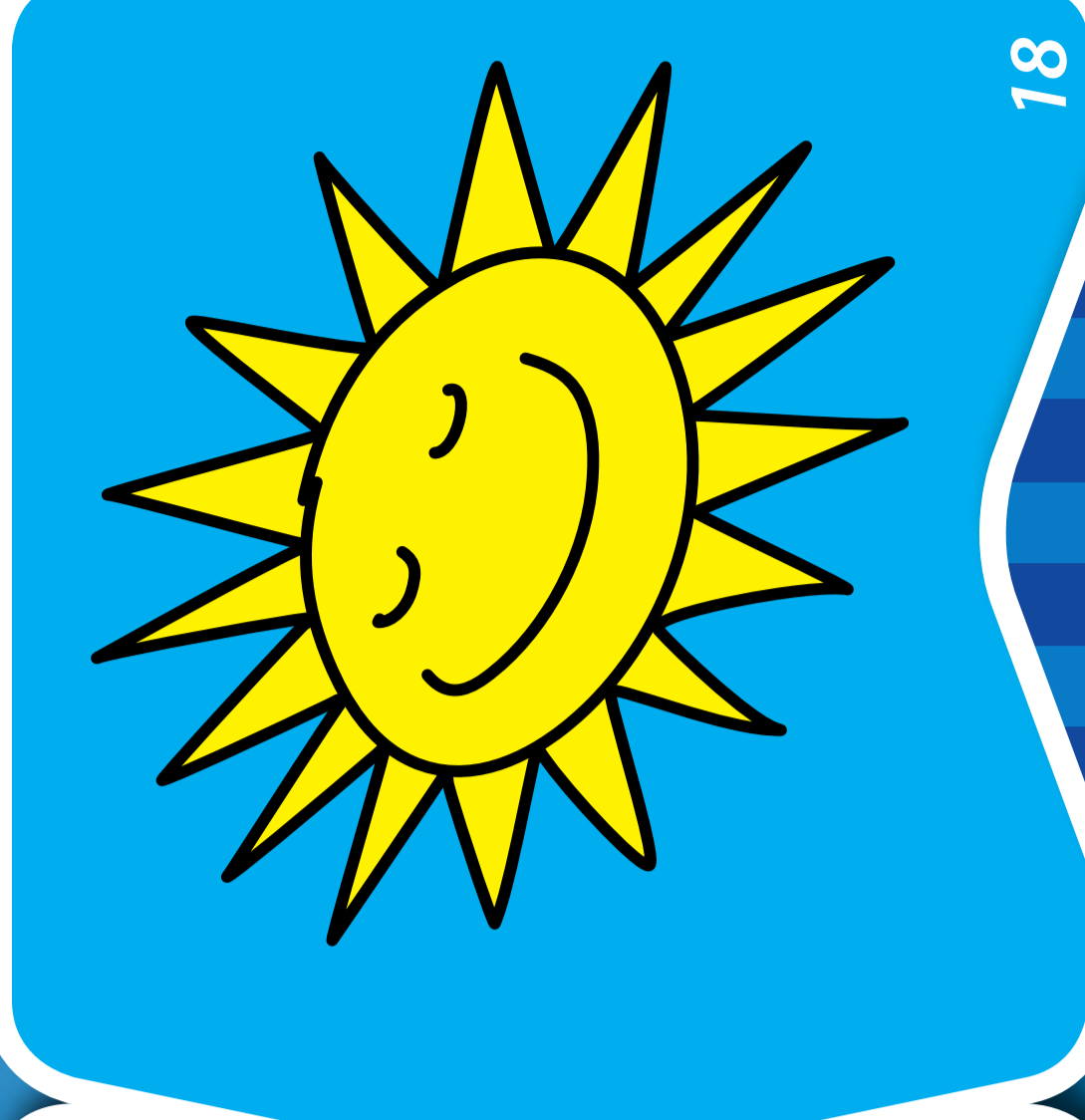


mmm, you've
lots of lovely
bugs to eat!

20



19



18



sadly, you were caught by
a fisherman and became
a tasty whitebait patty
go BACK 3 spaces

12



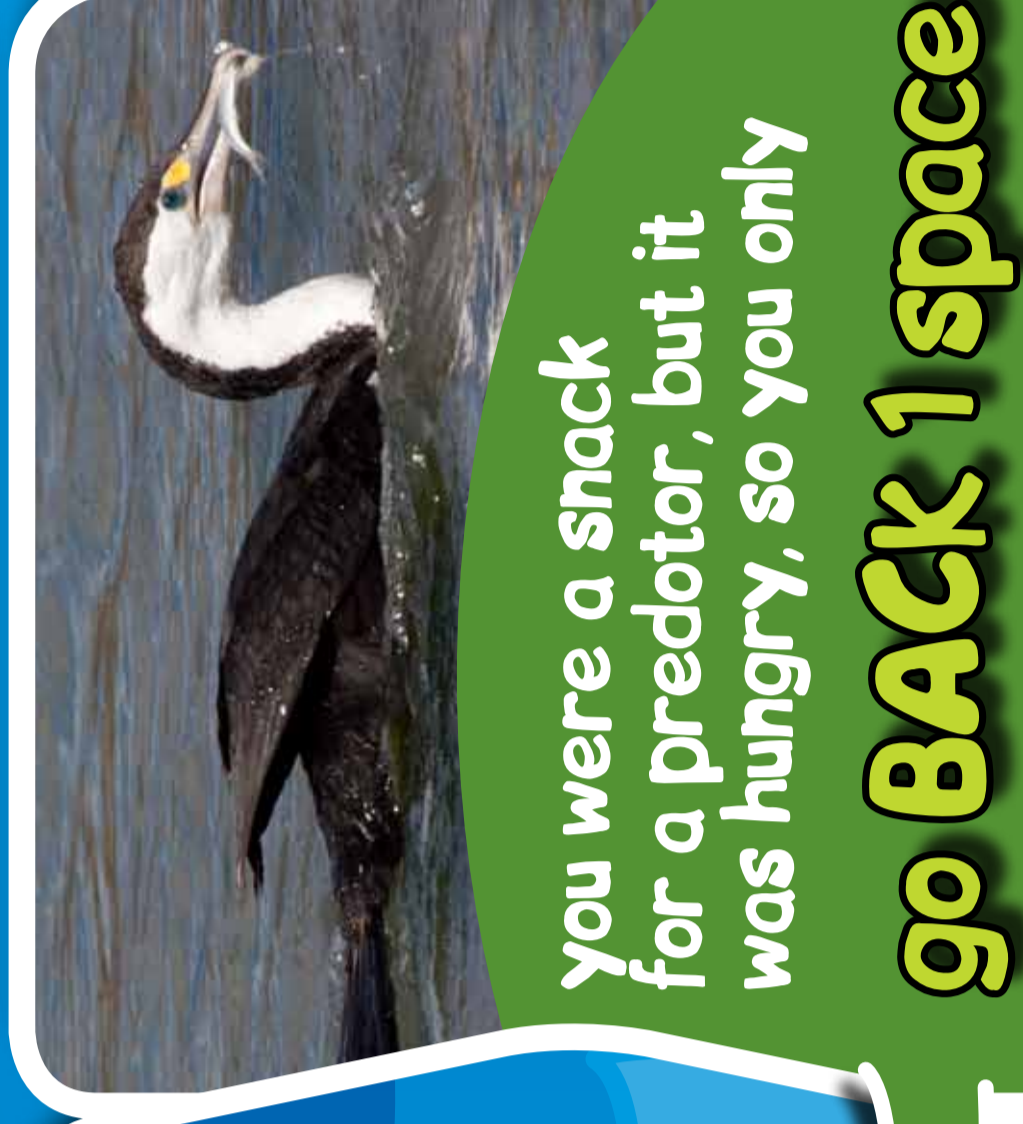
there was a barrier
stopping you
swimming upstream
**move BACK
3 spaces**

14



you were a snack
for a predator, but it
was hungry, so you only
go BACK 1 space

15



16



17



you've made it
back to the river

11

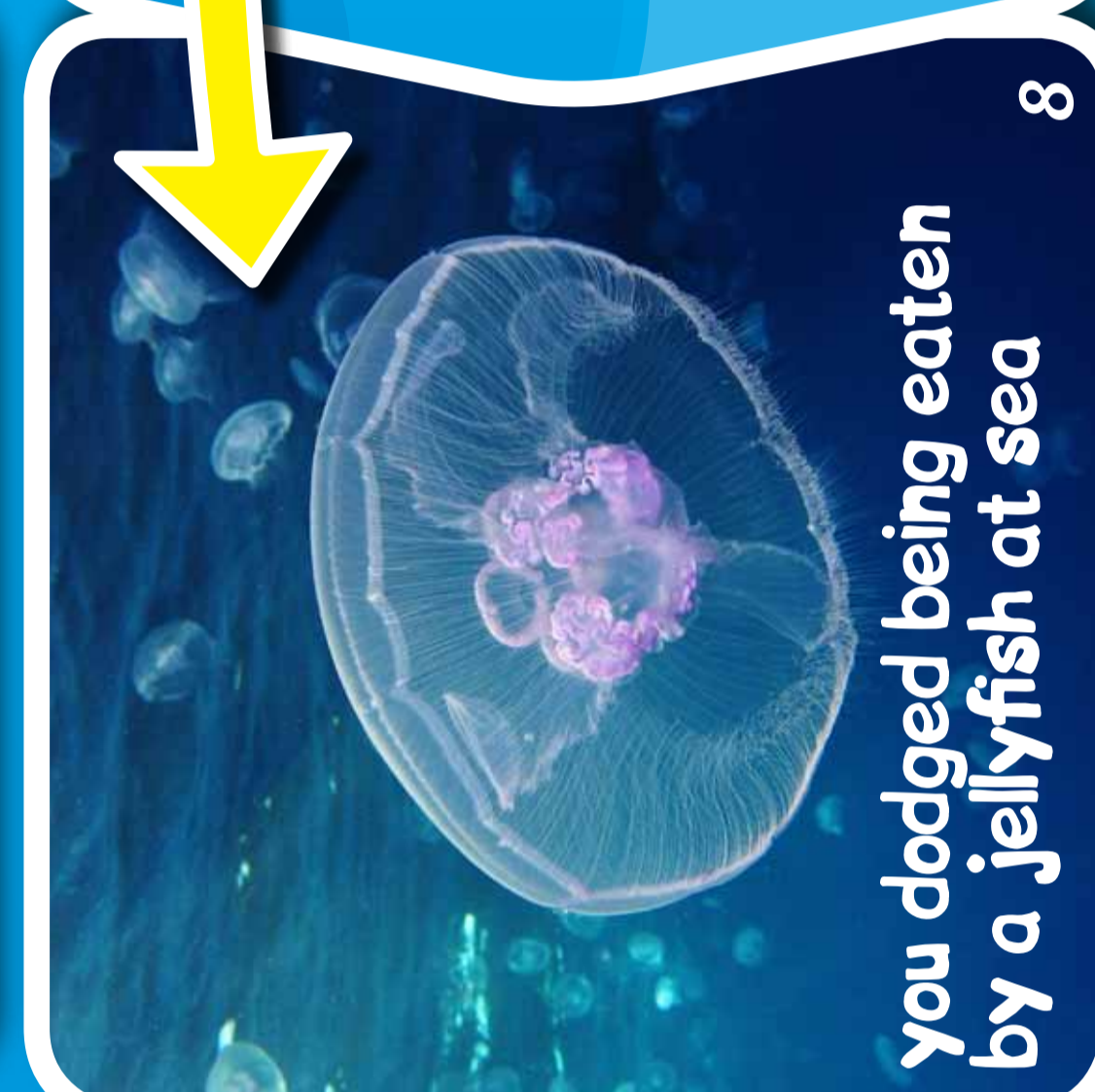


you avoided being
eaten by a fish at sea

10



9



you dodged being eaten
by a jellyfish at sea

8



7

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

6



you're a happy
little egg :-)

1



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

2



3



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

4



5



What the game's about...

This game is based around the life cycle of inanga. You start as an egg, hatch, swim out to sea, come back to the river, grow into an adult, then head back to 'the Love Zone' - and hopefully lay your own eggs.

How to play...

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

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short jaw kōkopu

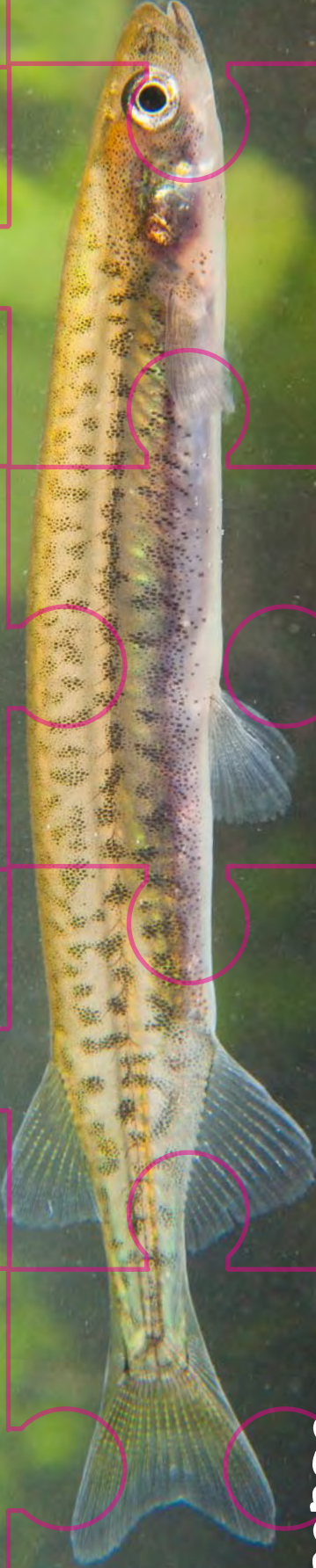


kōaro



Meet the **5** whitebait species of New Zealand

National Inanga Spawning Education Programme from



īnanga

banded kōkopu



giant kōkopu



Īnanga/Whitebait

Spawning habitat maze activity teachers guide



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

Simple activity conversation starter...

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



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

Pests which eat Īnanga 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.

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

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Īnanga/Whitebait

A-mazing Īnanga!

National Īnanga Spawning Education Programme from



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



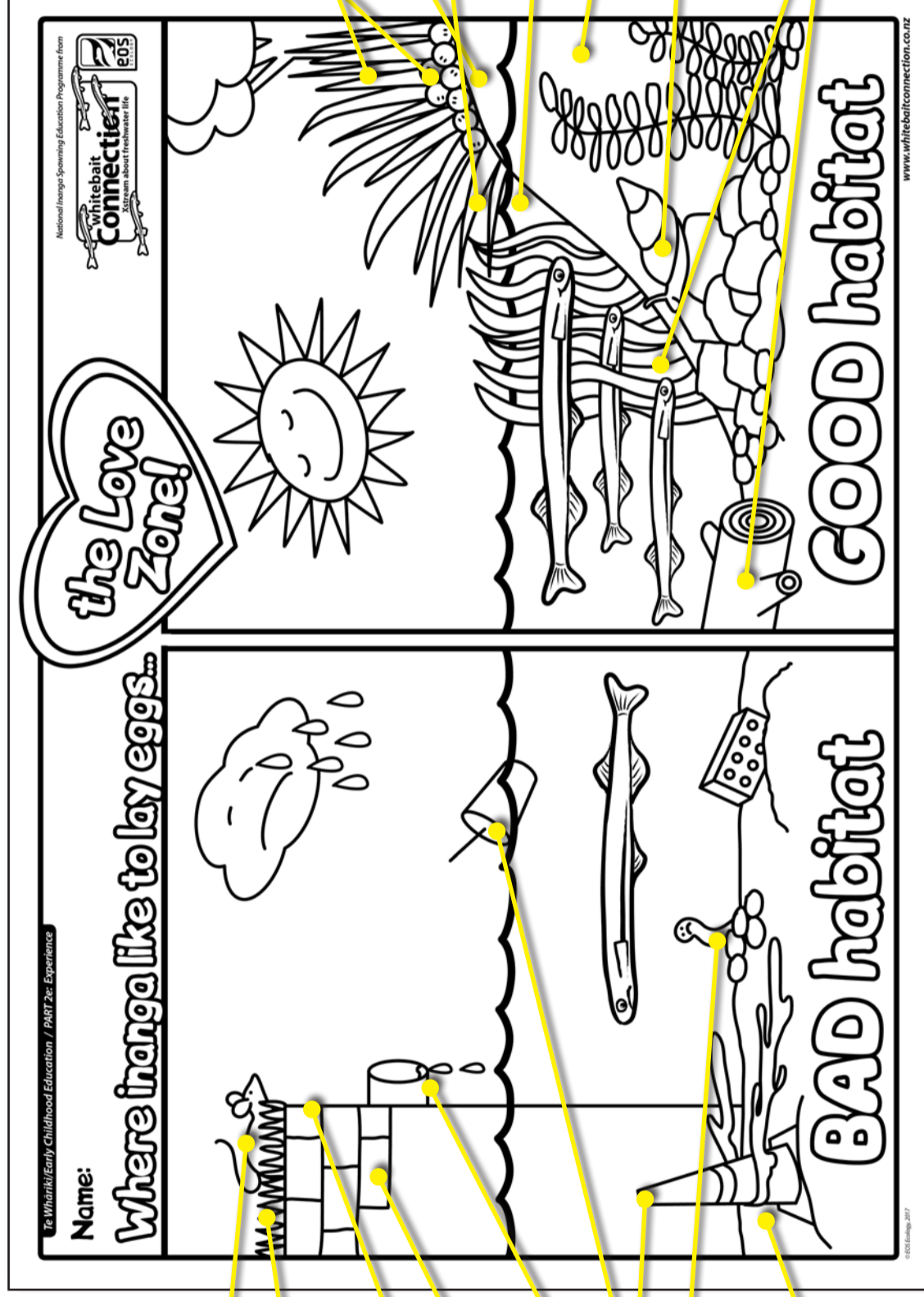
Inanga/Whitebait – Spawning habitat colouring-in activity teachers guide



The success of an inanga 'Love Zone' depends on the health of the habitat (environment they like to lay their eggs in). This colouring-in activity shows what makes a good 'Love Zone' for inanga to spawn 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 inanga to lay eggs in? What do you think makes a 'GOOD habitat' for inanga to lay eggs in?
- How many types of whitebait do we have in New Zealand? (answer is in introductory material, and the jigsaw activity = 5)



What makes 'BAD habitat':

Pests present on banks as they can eat eggs. What pests eat eggs?

Short grass that as been mowed, or banks made of bricks/concrete etc., that inanga can't lay their eggs in as they don't provide any protection.

Steep banks that river can't reach at spring high tide.

No overhanging vegetation on the rivers edge to provide shade and protection for inanga 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 inanga waiting to spawn.

No aquatic plants or logs in the water for inanga to seek shelter in/under while waiting to head onto the bank to spawn.

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.

Lots of overhanging vegetation on the rivers edge to provide shade and protection for inanga in the water.

No polluted stormwater draining into river.

No other pollution in the river e.g. rubbish.

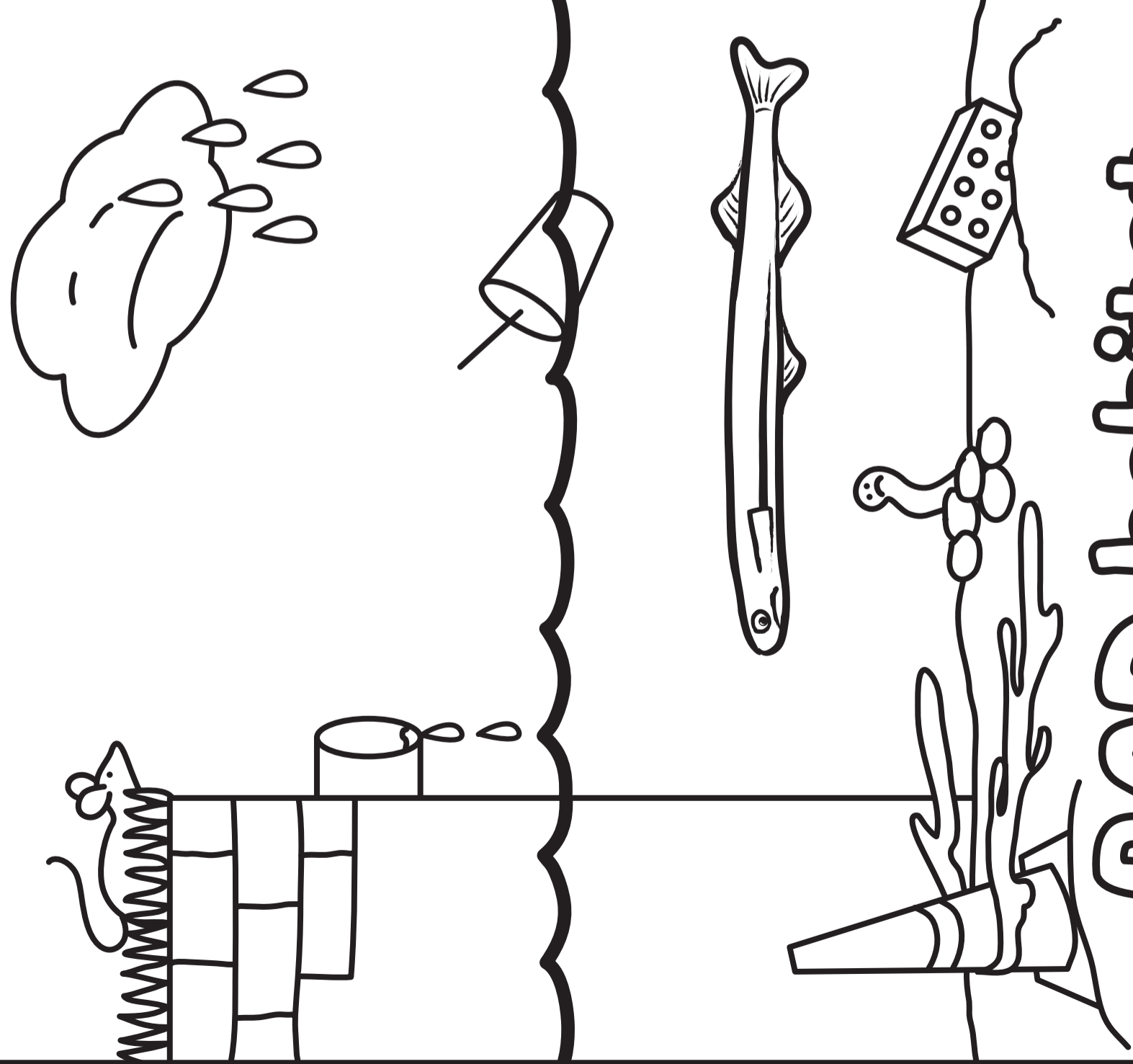
Lots of species and numbers of invertebrates (yummy bugs) in the area. This indicates that the local habitat is healthy, and there's lots of food for inanga waiting to spawn.

Lots of aquatic plants and logs in the water for inanga to seek shelter in/under while waiting to head onto the bank to spawn.



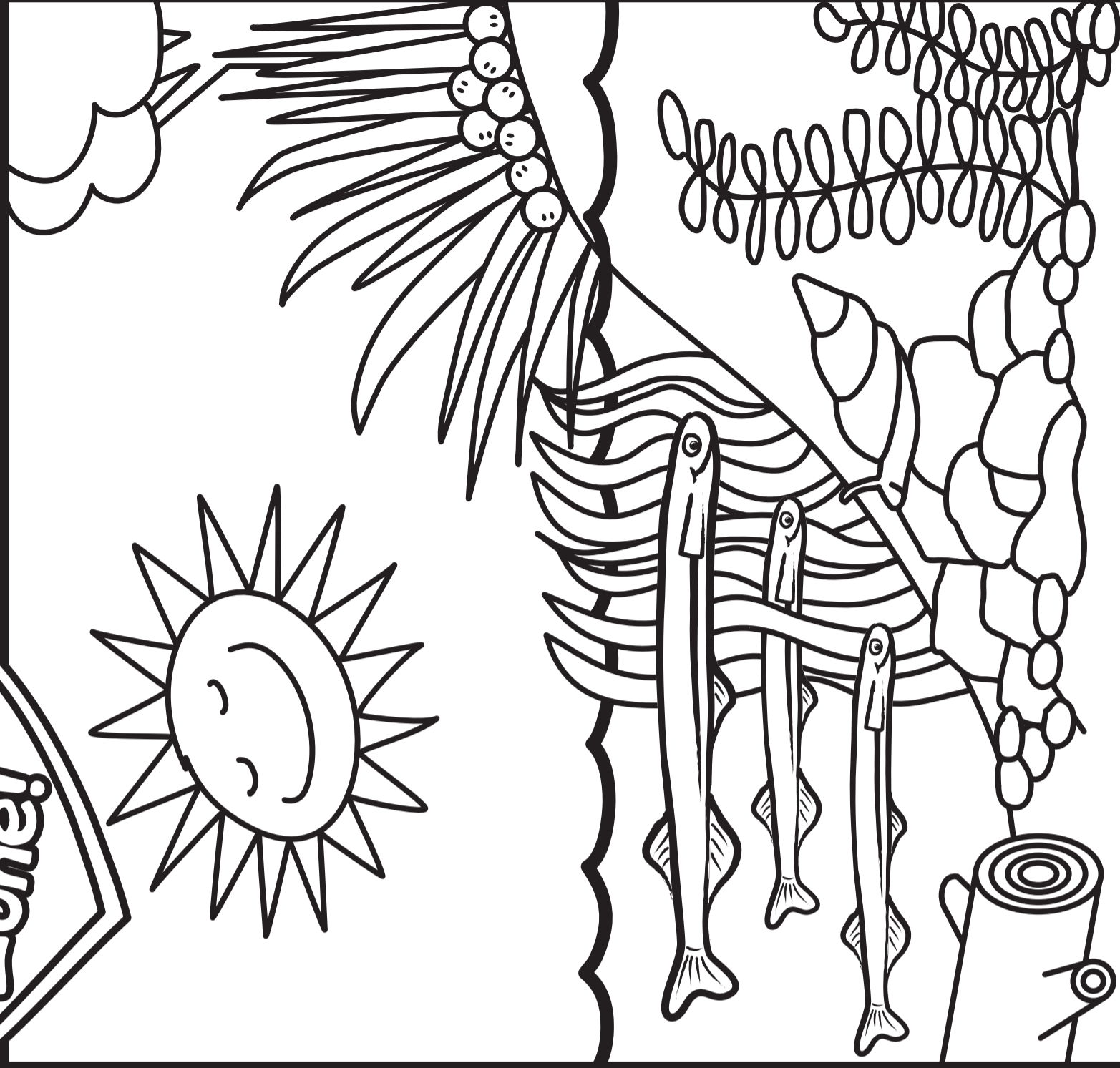
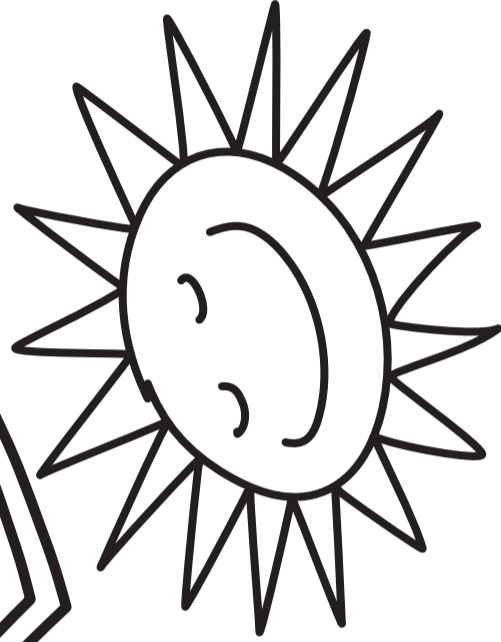
Name: _____

Where tūnanga like to lay eggs...



BAD habitat

the Love Zone!



GOOD habitat

Who dirtied the water?



Task:

For students to investigate how the water quality in our rivers, harbours and oceans has deteriorated through human impacts.

This interactive story asks students to take on the roles of different historical and modern characters who have had a role in the pollution of their local waterways. As the story is read, each character in turn adds a small container full of pollutants to a bowl of clean water representing the ocean.

Learning intention:

This activity should evoke a mood. Though it contains a lot of specific information on sources of pollution, and much material for discussion, primarily it is a dramatic look at the plight of our natural waterways.

Students should develop a greater concern for local waters and an understanding that we are all partially responsible for water pollution. Solutions will require many groups working together.

Equipment:

- clear glass or plastic wide-mouth jar/bowl.
- 15 film canisters (or other small container)
- permanent marker pen
- stirring stick
- substances to fill canisters up with (listed below)
- sieve
- rubbish bag

Setup before session:

Label each film canister with the 'label' name. Setting up this activity can take some time as you need to collect the various "pollutants". Most, however, should be available in your home. Feel free to substitute problematic items. Label and fill each canister as follows:

LABEL	FILL WITH
rivers & streams	sand
salt marshes	dry grass
shellfish	crushed seashells
māori	crushed seashells
settlers	organic garbage
farmers	potting soil
houses	toilet paper
sewage	potting soil & water
run off	potting soil
fishermen	nylon line
boaters	plastic pieces
campgrounds	dishwashing detergent
factories	vinegar
roads	cooking oil, water & cigarette butts
people washing cars	dishwashing detergent & water

Instructions:

SETTING THE SCENE

Ask the students to sit in a circle and place the bowl of water in the centre where everyone can see it and easily walk over to it. Distribute all the containers to students/pairs of students, with instructions not to open the canisters. Explain that they have all become characters in the story. You will be telling the story, and when their character is mentioned they come forward and pour the contents of their container into the jar. It also helps if students tell the class what they are pouring into the water. Since some film canisters contain less toxic substitutes for the real thing, in these cases students should say what the contents stands for, i.e., "cleanser", not "baking soda".

Character names are coloured **RED** in the story below – to help you prompt students while reading. After each character adds their pollutants, stir the water with the stirring stick and continue telling the story. The story should be read slowly, allowing each character to come forward. The repeating questions form a sort of a chorus, and should be read one by one, with pauses for the group to answer.

The Story:

Once upon a time there was a beautiful country called New Zealand. Many clean rivers and streams flowed from the hills, across the land and into the sea. [point to the bowl]

Fish lived in the water, and the land was covered with trees.

Discussion:

- **Would you want to drink this water?**
- **Would you like to swim in this water?**

RIVERS AND STREAMS ran from the land, carrying a little bit of mud to the ocean. Shellfish filtered the mud out of the water.

A small group of people lived on the land. The people called themselves **MĀORI**. The people ate shellfish and fish and they dumped some of their waste nearby.

Discussion:

- **Would you want to drink this water?**
- **Would you want to swim in this water?**

After many years, lots more people (**SETTLERS**) came to live on the land. They dumped some of their rubbish in the water.

FARMERS and Woodmen cut down trees to clear land and animals like cows and sheep were allowed to graze near the rivers and streams. Wet areas of land (wetlands) were drained for growing food. Without trees and wetlands, rain washed soil into the water.

Discussion:

- **Would you want to drink this water?**
- **Would you want to swim in this water?**

More and more **HOUSES** were built and sometimes people from these houses dropped rubbish into the water.

Sometime toilet water spilt into the water (**SEWAGE**).

Because there were no trees, rain washed off the streets and washed oil and rubbish into the water (**RUN OFF**).

FISHERMEN found that nets made of nylon were stronger than those made of rope. Sometimes these nets, along with other rubbish, blew overboard or got lost in the water.

Other **BOATERS** sometimes threw rubbish overboard or emptied their boat toilets into the sea.

Discussion:

- **Would you drink this water?**
- **Would you want to swim in this water?**

People wanted to stay at the beach because it's pretty and so **CAMPGROUNDS** were built. Campers used kitchens and laundries to wash their clothes and dishes. Sometimes dirty water went straight into the water.

ROADS were built and rain washed off these hard surfaces, carrying oil, chemicals, cigarette butts and rubbish into stormwater pipes, and out to sea. **FACTORIES** were built close to the water. Sometimes, chemicals would spill from these factories into nearby water. People **WASHING CARS** let the soapy water run down the drain, which leads directly to the sea.

Discussion:

- **Would you want to drink this water?**
- **Would you want to swim in this water?**



Debrief/question ideas:

- How did you feel at the beginning of this story?
- How did you feel at the end?
- Have you ever seen pollution in the ocean or river?
- Are all 'pollutants' as bad as each other (think back to sand/shells and compare to oil/sewage)?
- What can we do to clean up the water?
- How can you help every day (not dropping litter, picking litter up and putting it in the bin, washing the car on the grass, etc.)?

Safety considerations:

Students need to be in a flat area.

Location & time:

Centre grounds or suitable area near the waterway being studied. 30 minutes.

Links to Te Whāriki:

- Encourages children to think about and discuss their impact on the rivers and their role in caring for it (Belonging Goal 1 & 2).
- Children make sense of their world by testing practical theories, which helps them think of solutions for problems (e.g., what causes pollution and how they can help)(Exploration Goal 3 & 4).
- Children hear stories relevant to current issues in their communities and others (Communication, Goal 3).
- Children work alongside each other/together as they contribute to the process and answer questions/problem solve/research and reflect (Contribution, Goal 3).

Adapted from "Coasts and Us: A Teachers' Resource. The Waikato Coastline. www.govt.nz/PageFiles/5925/waikato_coastline.pdf

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“We’re going on an egg hunt” song

Learning intention:

Students learn more about ‘the Love Zone’ habitat through song and movement.
Find video of song here: <https://youtu.be/na2myBRZm-U>



Lyrics:

We’re going on an egg hunt [x2]
Gonna find ‘the Love Zone’ [x2]
We’re not scared [x2]

Uh oh, there’s a big river
Can’t go over it [x2]
Can’t go under it [x2]
Gonna have to swim it [x2]
Splash splash splash splash

We’re going on an egg hunt [x2]
Gonna find ‘the Love Zone’ [x2]
We’re not scared [x2]

Ugh, look at all that mud, so muddy
Can’t go over it [x2]
Can’t go under it [x2]
Gonna have to go through it
Squish squish squish squish

We’re going on an egg hunt [x2]
Gonna find ‘the Love Zone’ [x2]
We’re not scared [x2]

Let’s tiptoe out of ‘the Love Zone’
Step step step step

Through the long grass
Swish swish swish swish

Quickly back through the mud
Squish squish squish squish

Let’s cross the river
Splash splash splash splash

Let’s tell everyone [x2]
Found eggs in ‘the Love Zone’ [x2]
Let’s look after it [x2]
Yaaay!!

Equipment:

Lyrics and sound recording. Guitar and guitar player if available!

Safety considerations:

Students need to be in a flat area if standing and doing movements with song.

Location & time:

Centre grounds or suitable area near the waterway being studied. 20 minutes.

Student reflection:

What they learnt about habitat in ‘the Love Zone’.
Ask “would we like to go on an egg hunt?” “how? where?”

Links to Te Whāriki:

- Children learn how to move their bodies in time to music and how to carry out actions of the song, developing their motor skills (Wellbeing, Goal 1, Communication Goals 1 & 2, Exploration, Goal 2)
- Children learn to work together as they sing, listen to and respond to each other and the music (Belonging, Goal 1, Contribution, Goal 3)
- Children learn about the whitebait habitat through the enjoyment of music and actions (Wellbeing, Goal 2)
- Tamariki express themselves physically and emotionally as they learn to express themselves creatively through the music (Contribution, Goal 1, Communication Goals 1 & 4 and Exploration Goals 1, 3 & 4).
- Advocates for ‘caring for this place’ – taking care of ‘the Love Zone’ (Belonging Goal 1 & 2).



Īnanga life cycle role-play

Learning intention:

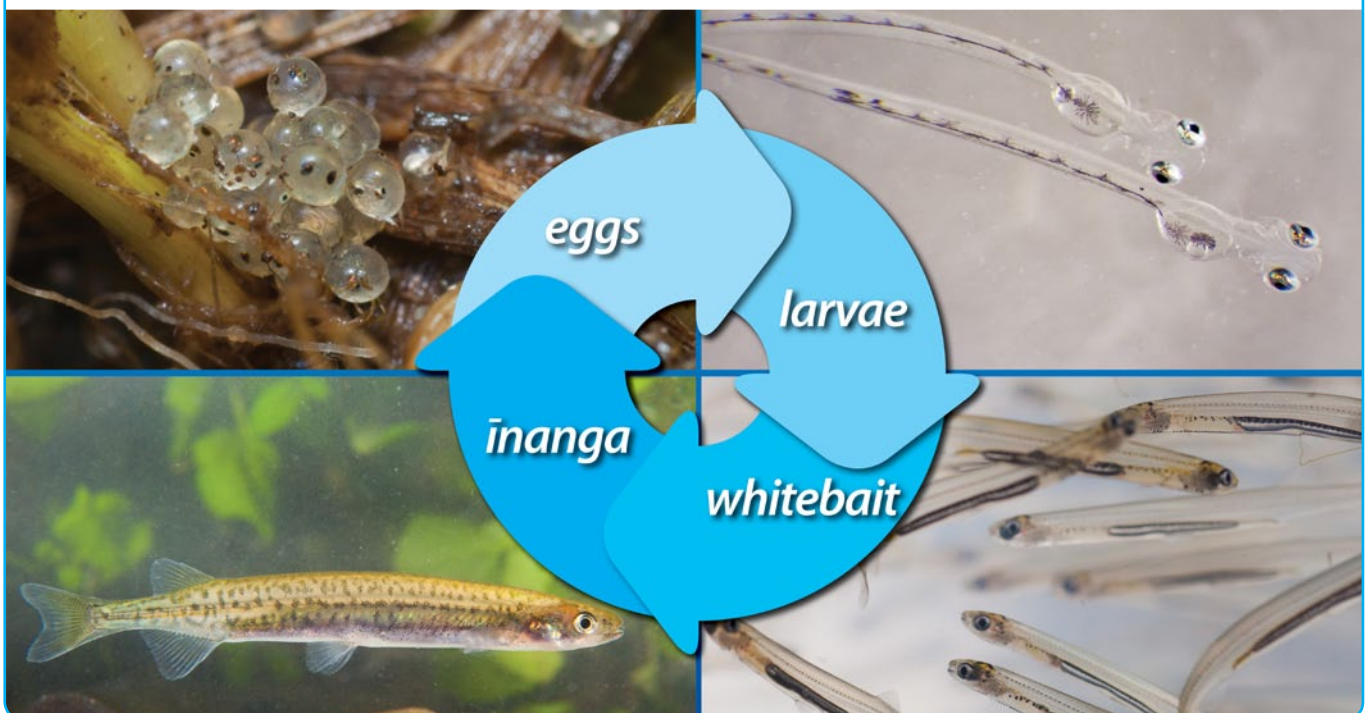
Students learn more about the Īnanga life cycle through story and movement.
Find video of activity here: <https://youtu.be/kevBI-kGBvM>

Key parts of the life cycle:

1. Start life as a little egg on the riverbank.
2. Then we hatch and get swept out to sea as a larvae with our packed lunch where we live for 6 months.
3. After 6 months we smell freshwater with our "noses" and then...
4. ...we wriggle up into the river as a whitebait.
5. We've reach 'the Party Zone' as an adult Īnanga and then...



6. Then it's time to swim back down to 'the Love Zone' where we started life as an egg.



Equipment: Lesson plan and video

Safety considerations: Students need to be in a flat area if standing and doing movements with story.

Location & time: Centre grounds or suitable area near the waterway being studied. 20 minutes.

Student processing/reflection:

- Ask “what they learnt about the īnanga life cycle?”
- Ask “would they like to try to act out the life cycle?” again with one of them leading the story?
“What questions do they have about the life cycle?”
- Print out the image of the īnanga life cycle from the PowerPoint presentation and laminate it, then cut it into the four parts of the life cycle and get students to put it back together in order.

Links to Te Whāriki:

- Children come to understand the stages of the īnanga life cycle through role-playing ‘being’ an īnanga (Contribution Goal 3, Communication, Goal 1, 2 & 4, Exploration Goal 1, 2 & 4).
- Children develop their imagination through the process of role-play (Contribution Goal 2, Communication Goal 2 & 4 and Exploration Goal 1).
- Older children can pass on this knowledge and teach younger children about the life cycle through role-play. Children can be both teacher or learner (Contribution Goals 1, 2 & 3).

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Inanga/Whitebait

Ideas for action – teachers guide



“Competent and confident learners and communicators, healthy in mind, body and spirit, secure in their sense of belonging and in the knowledge that they make a valued contribution to society”

– Te Whāriki – Early Childhood Curriculum

Through the journey of learning about – and experiencing – inanga through the National Inanga Spawning Education Programme (NISP), children have gained knowledge and awareness about habitat, lifecycle and threats. This resource is to provide assistance in taking the next step, encouraging children to use their knowledge to take action on behalf of their local environment. Action can be taken in many ways, from small displays like creating posters, to bigger displays such as presenting to Councillors/local MPs etc. Whatever action is taken, the aim is to instill in children the confidence that they have a voice in society and can contribute to bigger conservations.

WHERE TO BEGIN

- Review information you have covered in the NISP and identify areas of particular interest to the children (habitat/life cycle/threats/spawning).
- You may wish to use a focus theme by choosing a topic of interest within the NISP. Collate information and review the focus theme with kids. Get them to come up with ideas for action and note them down, no matter how crazy they might sound.
- Use the worksheet at the end of this guide to do an analysis of the focus theme – develop your ideas and a support network.
- Look at the action ideas listed in this guide as a starting point to provide opportunities for children to take action for their local environment.
- Contact your local Whitebait Connection (WBC) coordinator if you have any questions.

TAKING ACTION

1. Identify your local ‘Love Zone’

Write up some facts about your local ‘Love Zone’ to give your ideas some relevance and context for the children. If you don’t know where it is, ask your local WBC coordinator. Invite children to take a trip with their parents to visit and take photos of it. Together you can work up a fact sheet about ‘the Love Zone’ including information such as:

- Where is ‘the Love Zone’?
- What else lives there (plants and animals)?
- Are there long grasses along the riverbank?
- What can you see around ‘the Love Zone’ on the land – are there lots of houses/farms?
- Do people in the community know that there is a ‘Love Zone’ in their neighbourhood?
- What could be done to improve your local ‘Love Zone’?

Develop the fact sheet with quotes and drawings from the children. Use it to provide information for whānau, community and local councils. It could be used to communicate the importance of a good ‘Love Zone’ to the community, and gain support for taking action on the ground.



2. What makes a good love zone

Create artwork about what makes a good 'Love Zone'. Get the children to come up with ideas and explain why. Review NISP item 1b (Summary) for ideas. Create artwork using paints, crayons or do a montage/collage to represent what 'the Love Zone' should look like. Display artwork in public with children's quotes pinned around it to provide context. Photograph artwork and email it to your local WBC coordinator so they can help promote your good work.

3. Tell us a story

Get creative! Get children to illustrate their own version of "Finneus the Whitebait". Let them tell you their version of the story so it can be written underneath their illustration to build their own book.

4. Īnanga experts

Take a video of the children telling you what they know about Īnanga. You can either let them tell you what they want, or can prompt them with questions such as "where do Īnanga lay their eggs?", "what might stop Īnanga from getting to 'the Love Zone'?"

Work with the local school and invite classes to your centre where your children can act like scientists and teach the older kids what they know about Īnanga.

Create an information pamphlet (designed by the children) to highlight what they know, and how they think Īnanga could be protected. Send this to your local council ecologist or MP (as well as your WBC coordinator!)

5. Show and tell

Get the kids to help you create a play about the life of Īnanga. Invite the local school/whānau/community group/local MP to come and watch the performance.

6. Songs

Get the kids to help you create a song about Īnanga, and share with your local school/whānau/community group/local MP and WBC coordinator.

7. Rubbish clean up

Organise a rubbish clean up day where the children help to clean up a section of your local river/bank. Make contact with a local community group or with the local council to help facilitate this. Contact your local WBC coordinator for assistance.

8. Get media savvy

Contact your local newspaper/radio/television station to invite them to hear your student's thoughts about Īnanga, and what they would like to see changed so there are still Īnanga for them in the future. Include photos of the children's work and quotes from the children.

9. Get online

If you have a class web page or blog put all your stories and artwork on there so we can share them with as many people as possible.



ACTION WORKSHEET

Use this form to help you list areas of interest, and people within your community that can assist with taking action.

Your local WBC coordinator can help you answer these questions:



1. What aspects of the Te Whāriki NISP were the children most interested in?

2. Do you have enough information about the focus theme to feel confident in pursuing it as an action idea?

3. What ideas for action did the children come up with themselves?

4. Any whānau that might have knowledge/expertise on this focus theme? List them.

5. Any contacts within the community that might have knowledge/expertise on this focus theme? List them.

6. What things have the children learnt about which the wider public might not know about?

7. Do you know where your local 'Love Zone' is? If 'yes', is it on private or public land? If 'no', ask your WBC Coordinator.



8. What schools are you associated with?

9. Who is the local MP and what are their environmental values?

10. What local community groups are involved in looking after your local rivers?

11. Identify regional/district/local council staff that may be able to assist you in facilitating action projects (such as Council Ecologists, DOC Park Rangers, etc.)

12. Which action projects are you considering?

13. What skills, experience or extra equipment are needed? Identify which you CAN source and what may be difficult.

14. Are there any barriers stopping you from taking action? If so, contact your local WBC coordinator and let us help!



To register your school's interest & arrange an initial meeting contact your friendly local Whitebait Connection coordinator email info@whitebaitconnection.co.nz or visit www.whitebaitconnection.co.nz

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