Activity 8 — Collage/Mobile Making

Arts *Developing ideas in visual art; Communicating and interpreting meaning*

Make a mobile of different native freshwater fish
Using a large piece of paper make a collage of a river/stream scene. Include plants, trees, fish, invertebrates.

Activity 9 — Food chain

Science *Making sense of the living world*

Make a pictorial diagram of a food chain for a native freshwater fish. Compare it to a food chain of an introduced fish.

Activity 10 — Local knowledge

Mathematics *Statistics*
English *Listening and Speaking*

Conduct a survey of people around you (adults and students) to find out their knowledge about native freshwater fish. Write at least five questions you can ask to check their knowledge. Present the information you gain in two different types of graphs (bar, pie, leaf and stem etc).

Activity 11 — Mapping

Social Studies *Place and Environment*
Maths *Geometry, measurement*

Copy a map of the Taranaki region and mark in ten rivers or streams close to your location that provide a suitable habitat for native freshwater fish.

Examine the rivers you chose on a detailed topographical map to determine their headwaters. Use the key to measure the length of two of the rivers from source to sea.

Activity 12 — Fish barriers

Science *Making sense of the living world*
Social Studies *Resources and economic activities*

Contact your local regional or district council to research the barriers to fish migration in your local streams or rivers.

Find out which barriers have fish passes installed, what height the barriers are, what types of fish pass and any records as to their effectiveness.

Activity 13 — Game

The Arts *Communicating and interpreting meaning*
English *Expressive writing*

Design a board game (ladder and dice type like snakes and ladders) based on a river that provides habitat for native freshwater fish. Think of reward and penalty squares and place these on the board. Try the game out yourself.

Activity 14 — Bebop

The Arts *Developing ideas in Music; Communicating and interpreting meaning in music*

Make up a rap about the future protection of native freshwater fish.

Activity 15 — Passes and Traps

Science *Making sense of the living world*
Technology *Technological capability*

Design a method to allow native freshwater fish to migrate above a 10 m high vertical dam on a river

Design an instrument that would be useful to catch native fish to allow you to do a population count in a section of your local stream

(Remember: the fish must not be harmed)

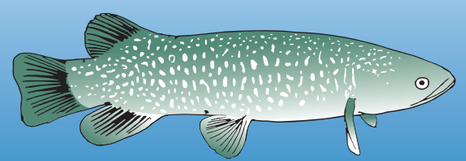
Biology Laboratory

Visit the biology laboratory at the Taranaki Regional Council

See:

- some of our rare native fish
- marine species
- introduced fish
- invertebrate creatures on our video microscope

A lesson at the biology laboratory incorporates all of these and teaches children about a special part of our environment.



If you have any further questions do not hesitate to contact:

Information Officer (Environmental Education)
Taranaki Regional Council - 47 Cloten Road - Stratford
Ph: 06 765 7127 Fax: 06 765 5097

Mini Study: Native freshwater fish of Taranaki

TARANAKI REGIONAL COUNCIL

As a follow-up to the river study involving invertebrate sampling, it is possible to explore the next level on the food chain fish. This mini-unit provides some activities that may lead students to develop deeper knowledge and understanding of these little known creatures of our native fauna.

Teachers should assist students to choose activities suitable to their level and ability. Curriculum links are in italics under each activity. Reference material is included with this mini-unit.

Activity 1 — Background information

How many freshwater fish can you name?
What do you know about their habitat, food, habits?
Which freshwater fish are native to New Zealand?
What major threats face our native fish?
What can we do to help them?

On a large sheet of paper record what you know about our native freshwater fish. Also record ideas and questions you would like answers to.

Activity 2 — Research

English - Reading *Transactional writing*
Science *Making sense of the living world*

Find the English and scientific names for the different species
Research what the scientific names represent
Does the same format exist for a tree name?
Does the same format exist for a flower name?

Activity 3 — Fact sheets

English *Transactional writing*
Science *Making sense of the living world*

Write a fact sheet for five different native freshwater fish. Ensure you include:
- common and scientific names
- habitat details
- food etc

Present your information clearly and concisely.

Activity 4 — Speech/Debate

English *Listening and Speaking*
Social Studies *Place and Environment*

Prepare a three minute speech on one of the following topics
- Native fish need our help!
- Trout are destroying our native fish species!
- Native fish need clean streams!

Prepare a debate on the topic "Native freshwater fish are an expendable species"

Divide the class into groups to debate this topic. Allow time for students to develop their argument within the group and to decide on speaking order.

Activity 5 — Poster

Arts *Developing ideas in visual art*
Communicating and interpreting ideas
English *Visual language presentation*
Science *Making sense of the living world*

Design a poster to promote the protection of:
- native freshwater fish; or
- habitats; or
- water quality in rivers/streams; or etc

Activity 6 — Word find

English *skills spelling*

Make up a word find that incorporates the names of freshwater fish and other details such as habitat and invertebrates.

Activity 7 — Letter to Editor

English *Transactional writing*
Science *Making sense of the living world*
Social Studies *Time continuity change*

You have just found three native fish floating dead in your local stream. You have informed your local Regional Council, now write a letter to the editor of your local paper informing people of the effects of pollution on native freshwater fish.

Native freshwater fish in Taranaki

There are 27 native freshwater fish species and several marine species that occasionally wander into New Zealand rivers. Taranaki proudly provides home for at least 18 of these species although others may be present but as yet undiscovered.

Native fish in Taranaki streams and rivers encompass eels, bullies, whitebait, torrentfish, smelt, mullet, flounder and lamprey. These native species have to compete with three major introduced species: rainbow and brown trout, and perch. Many people confuse these three with our native fish but they have all been introduced to our waterways.

Most of our native freshwater fish are **diadromous -** meaning they have a marine or estuarine stage in their life-cycle. Simply put, it means that at some stage in their life they must migrate to the sea, either as adults or juveniles. An example of this migratory habit is whitebait. The larvae are washed out to sea after hatching and then migrate back into streams from the sea in spring. Likewise adult eels migrate to their spawning grounds in the Pacific Ocean. Juvenile eels (elvers) return to our streams and rivers in summer.

Some of our native freshwater fish have probably existed since New Zealand separated from Gondwanaland, yet the general public displays a lack of awareness or concern for their many interesting and unique features. The fact that they are nocturnal in their habits is one reason for this. It is only when we look closely that the colours on our native fish become more obvious so this could also be a factor. Finally, most species are quite small even as adults and are of little interest to fishermen. Obvious exceptions are eels because they are common and large, and whitebait because their small size is compensated for by their number during the fishing season.

Inanga *(Galaxias maculatus)*

The most common of the family. Spawn in river margin vegetation flooded by extreme high tides.

Short-jawed kokopu *(Galaxias postvectis)*

Significant populations of this high conservation value fish exist in catchments in our National Park.

Banded kokopu *(Galaxias fasciatus)*

Prefer stony, bush covered streams but can survive in weedy farmland streams.

Giant kokopu *(Galaxias argenteus)*

Large fish which grows up to 58cm in length.

The Whitebait (Galaxiidae) family is a name that represents the juvenile stage of a number of our native fish. People mistakenly think the term whitebait refers to a particular species of fish but the juvenile whitebait can mature into:

Koaro *(Galaxias brevipinnis)*

Prefer fast-flowing, stony habitats in upper catchments such as those offered by the Egmont National Park. Excellent climbers.

Brown mudfish *(Neochanna apoda)*

Once thought to be rare. A non-migratory member of the whitebait family. Brown mudfish are one of the more mysterious of our native fish. Once thought to be nearly extinct, researchers have been delighted to find families of this secretive and elusive fish in both the North and South Islands. One of the most fascinating features of the mudfish is its ability to live for long periods of time burrowed deep into the soil when the water in their pool dries up. Early settlers often found them in their swampy potato patches the original 'fish and chips' noted early scientists!!

A significant find of brown mudfish was made in the Ngaere swamp area and an extensive programme to maintain and protect their habitat is currently under way, even though the wetland area has shrunk from 4000 hectares to 10 hectares today.

Unfortunately one of our native freshwater species, the grayling, has already become extinct, while other species are rapidly coming under threat due to the loss of their natural habitat. Another impediment faced by native fish answering the desire to migrate upstream is obstruction caused by man-made barriers such as dams, weirs and culverts. Historically many were used for water intake purposes for dairy factories which have long since closed, or were for small hydro-electric power schemes which are also no longer in use.

The native freshwater fish differ greatly in their climbing ability. Some are excellent climbers and climb steep channels right up into the National Park. Others are poor climbers and stay in lowland reaches of the rivers.

A feature of newer structures is the requirement to construct a suitable 'fish pass' to enable our freshwater native fish passage along the waterway. The type and design of these is determined by such factors as the height of the obstruction, the river flow, and the location of the obstruction in relation to its position on the waterway. Dams or weirs on the upper reaches of a stream may not create a serious obstruction to some native species as they cannot migrate this far upstream due to natural obstacles such as waterfalls or rapids. Conversely barriers located on lower catchments would need to allow for the upstream migration of all freshwater species.

Another family with a variety of members is the bully (Eleotridae). Main family members are:

Redfinned bully (Gobiomorphus huttoni)

Most common and colourful of our native fish. Spawns in freshwater but juveniles washed out to sea.

Bluegilled bully *(Gobiomorphus hubbsi)*

Prefers swift-flowing riffles and rapids. Smallest of the bully family. Rare in Taranaki.

Common bully *(Gobiomorphus cotidianus)*

Prefers the middle reaches of our streams and rivers. Larger than the Crans or Redfinned bully.

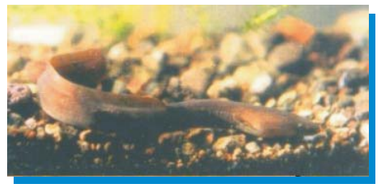
Crans bully *(Gobiomorphus basalis)*

Common in upper ring plain streams. Capable of living entire life-cycle in freshwater.

Both varieties of the eel species are particularly abundant in our local streams and rivers.

Shortfinned eel *(Anguilla australis)*

Prefers the slower moving streams and lakes.



Longfinned eel *(Anguilla dieffenbachii)*

Dominate the upper reaches of the Taranaki ringplain streams. Both varieties are excellent climbers and are capable of climbing a steep channel up the damp vertical walls that stand in their way.

Lamprey *(Geotria australis)*

Lamprey are found all over New Zealand, particularly near the coast. Young lamprey live in river gravel for several years until they reach a length of 80-100mm when they undergo a metamorphosis. During this process their colour changes from mud-brown to blue, their eyes appear and the dorsal fin grows. In winter the juvenile lamprey migrate to the sea where they attach themselves to a host fish with their sucker-like mouth and begin to feed on the body fluids of the host. Several years later the lamprey migrate from the sea into streams for spawning.

Both eels and lamprey have special significance to the Maori people of Taranaki. The lamprey migration during winter provides a prized food source for the local Maori population. The two species of eel also provide the Maori with a food source and contribute to a significant commercial operation.

Torrentfish *(Cheimarrichthys fosteri)*

As it's name suggests it thrives in the fast-flowing turbulent water associated with many of our mountain streams, but can also be found in slower, meandering rivers. Torrentfish are not good climbers so they are more likely to be found in the mid to lower reaches of Taranaki streams.

Smelt *(Retropinna retropinna)*

Are abundant in the lower reaches of local streams and rivers. It is sometimes called the cucumber fish because of the strong 'cucumber' smell when they are taken out of the water. Smelt are not strong swimmers so they struggle in swift strong currents and find weirs, waterfalls and dams an impassable obstruction.

Some interesting websites with information on native freshwater fish are:

http://www.nzfreshwater.f2s.com/index.html

http://www.forento.co.nz/wildlife.htm

http://www.kaipatiki.org.nz/options/Survey/fauna/fish.htm

What can we do?

The most significant threat to our native freshwater fish has been the relentless drive for more and improved pasture. Large sections of our wetlands areas have been drained to improve their pastoral capability, and large stretches of our waterways have been exposed to the sun's rays through the clearing of riverside vegetation. The opening up to the waterways has meant that stock has had direct access to the water thereby trampling and eroding the banks and contaminating the water with their waste. To ensure the survival of these remarkable species we need to promote their cause to the general public so that people become aware of the habitat these native species need to ensure their survival.

Actions we can take:

- spread the word about our native freshwater fish
- help people understand the importance of habitats
- promote the need to maintain wetlands
- promote the importance of riparian (riverside) planting
- lobby for the maintenance of unpolluted waterways.

Learn About Our Native Fish at the Taranaki Regional Council