Enviroteach

An environmental education resource for teachers

From the editor

Kia ora! This issue of Enviroteach focuses on animal migrations – the epic journeys made by some of Southland's wild creatures. It's crammed with information and suggestions for teaching and learning. I encourage you to pick up any ideas that are relevant to your class, adapt them and integrate them with the relevant curriculum area and learning outcomes you want to achieve.

Biodiversity is one of Environment Southland's top three priorities and much of the work we do contributes to the maintenance of biodiversity across the region. We have two full-time environmental educators who are available to assist schools with a wide range of environmental and science topics. We'd love to come and talk to your class, run some activities in the school grounds, or help with your field trip. We can also access a wide range of knowledge and information from our science experts at Environment Southland. These services are available to all schools in Southland, free of charge. So if you have questions or would like some help, contact Environment Southland's education team on 0800 76 88 45 or education@es.govt.nz.

All the best for term two!

Pat Hoffmann
Environmental education officer, Environment Southland

Waituna Lagoon

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environment SOUTHLAND REGIONAL COUNCIL
Te Taiao Tonga

Southland's migratory species

Animal migration refers to the regular, repeated, long-distance movement of wild animals, usually on a seasonal or annual basis. It occurs within most major animal groups, including birds, fish, insects and mammals.

Southland is home to several migratory species, including:

- aquatic birds (e.g. bartailed godwits, stilts, plovers, sandpipers, knots);
- seabirds (e.g. albatrosses, mollymawks, petrels);
- land-based birds (e.g. long-tailed and shining cuckoos);
- fish (e.g. whitebait species, eels, sharks, rays);
- insects (e.g. monarch butterflies, Australian painted ladies);
- mammals (e.g. southern right whales).

New River Estuary

Southland's estuaries

Southland's estuaries offer some of New Zealand's most important habitats for migratory birds and fish. Birds, fish, insects, and other wildlife depend on our estuaries to live, feed, nest, and reproduce. Some organisms live in them permanently, while others use them to complete part of their lifecycle.

Every year, thousands of migratory birds travel from the northern hemisphere to visit our estuaries and many migratory fish pass through them on their way up our rivers. The New River Estuary, for example, provides rich habitat for wildlife, and is home to a range of waterfowl and migratory wading birds including godwits.

It also provides extensive spawning habitat for marine and freshwater fish. These include native flounder, giant kōkopu and long finned eel. Many other fish live in the estuary on either a temporary or permanent basis. Several creek mouths between the Kingswell Creek and Mokomoko Inlet provide habitat for migratory fish and whitebait breeding.

Waituna Lagoon is part of the 20,000 ha Awarua Wetland which stretches from Fortrose to Bluff and is a Ramsar wetland of international importance. It is just one example of a number of lagoons and estuaries in Southland that are located at the end of intensively farmed catchments and are under stress.

Creeks, farm drains and groundwater constantly transport water, soil particles, nutrients and other material from the land and deposit them in the lagoon. Because of many years of land development in the catchment and changes in lagoon water levels, its health is under stress.

The main concerns are the accumulation in the lagoon of nutrients and sediment from land use activities, and the drainage of wetlands for land development. The catchment and lagoon require on-going active management to improve their ecological condition.

For an update on what is being done to help Waituna Lagoon, visit www.es.govt.nz and search for "Waituna".

Did you know?

An estuary is a body of water in which freshwater from rivers and streams mixes with saltwater from the sea.

Estuaries filter contaminants from the land and so protect the nearby coastal environment. They are sometimes described as the kidneys of the planet.

Southland's estuaries include:

- New River Estuary
- Awarua Bay
- Bluff Harbour
- Jacobs River Estuary
- Haldane Estuary
- Waikawa Harbour
- Toetoes Estuary

Waituna Lagoon is technically an ICOLL (Intermittently Open and Closed Lake and Lagoon) because it behaves like an estuary when open to the sea, and like a lake when closed.

Bartailed godwits and their Southland stopover

Bar-tailed godwit (PHOTOS: OTAGO DAILY TIMES)

The bartailed godwit (kūaka) is one of New Zealand's most well-known and adored migratory birds. In Southland, you can look for godwits between the months of September and April in places such as Awarua Bay, Waituna Lagoon, New River Estuary, Riverton Estuary, Tahakopa Bay, Papatowai River Mouth, Bluff Harbour, Fortrose, Catlins Lake, Waikawa Estuary and Haldane Estuary.

Every year, around the middle of March, the godwits depart from New Zealand, launching off from various estuaries in Manawatu, Miranda, Golden Bay, Christchurch, Otago and Southland. They fly directly to estuaries in Japan, Korea and China where they remain until May.

In May the birds leave Asia and fly to their breeding grounds in Alaska. In September they then prepare for their long flight back to New Zealand by feeding along the coastlands of south-western Alaska (Yukon-Kuskokwim) delta and the Alaska Peninsula.

They return to New Zealand between September and mid-October, on a non-stop flight across the Pacific Ocean which takes 7–9 days. They arrive exhausted and hungry, and in some parts of the country, church bells are rung to welcome them home.

Did you know?

The godwit used to be the emblem of the National Airways Corporation of New Zealand, which was the national domestic airline of New Zealand from 1947 until 1978 when it amalgamated with Air New Zealand. The godwit was chosen because it is native to New Zealand and because of the incredible distances it can cover in flight.

ACTIVITY

- Research the migration route of the bartailed godwit. Draw it on a map and calculate the distance covered and the flying time between each stop.
- Research the habitat requirements of the bartailed godwit, e.g. what they eat, where they roost, and what they need to survive, feed and breed. Investigate why they travel to these particular destinations on their annual migration.
- Why do you think the bar-tailed godwit has this iconic status in New Zealand culture? Can you think of any other migratory species that have cultural significance?
- Identify some of the special qualities and characteristics of New Zealand's migratory species (e.g. courage, strength, tenacity, endurance). Design a logo for an imaginary company, product or service incorporating an image of your favourite migratory animal and explain why you think the image is appropriate.

Migratory flyways

What is a flyway?

A flyway is a flight path used in bird migration which directly links important sites and habitats.

Flyways generally span over continents and often oceans. Nine major migratory routes have been recognised globally.

International flyways

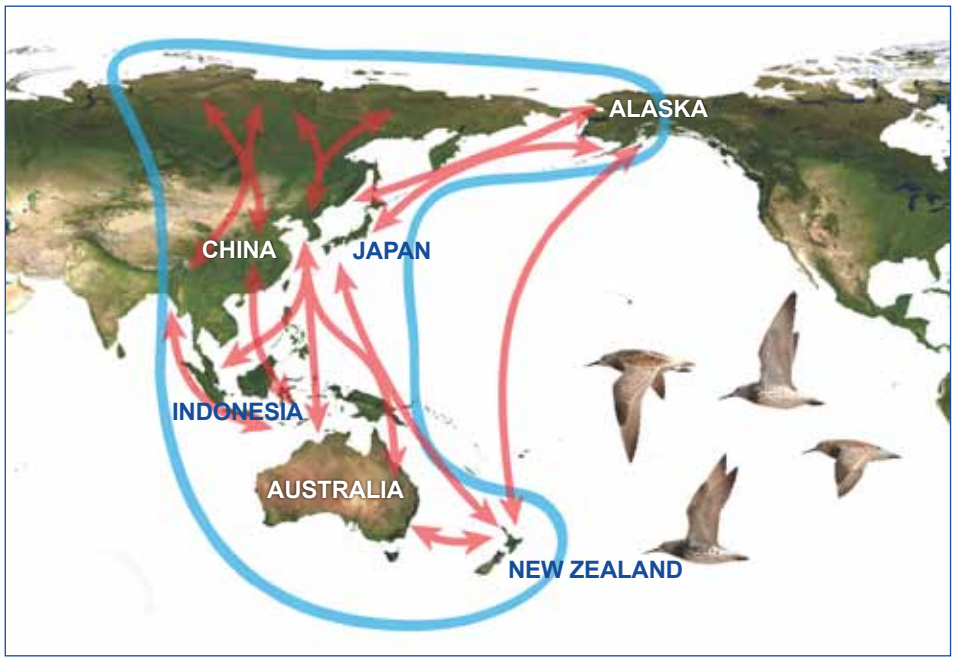
While migrating, many species cross international borders. Different countries have different laws, interests and political priorities. Migratory animals are particularly vulnerable in international waters where countries have a shared responsibility to protect them.

The East Asian-Australasian Flyway

The East Asian-Australasian Flyway extends from within the Arctic Circle, through East and South-east Asia, to Australia and New Zealand, stretching across 22 countries.

Many migratory birds travel along the flyway at different times of the year and international cooperation is essential for its protection.

More information about The East Asian-Australasian Flyway can be found at www.eaaflyway.net.



The East Asian-Australasian Flyway encompasses 22 countries and is home to over 50 million migratory waterbirds, including bartailed godwits.

ACTIVITY

Research the East Asian-Australasian Flyway.

- Find out which countries are included in it.
- Try to find out what the attitude of each country is towards protection of migratory birds and what people are doing to help.

Threats to migratory species

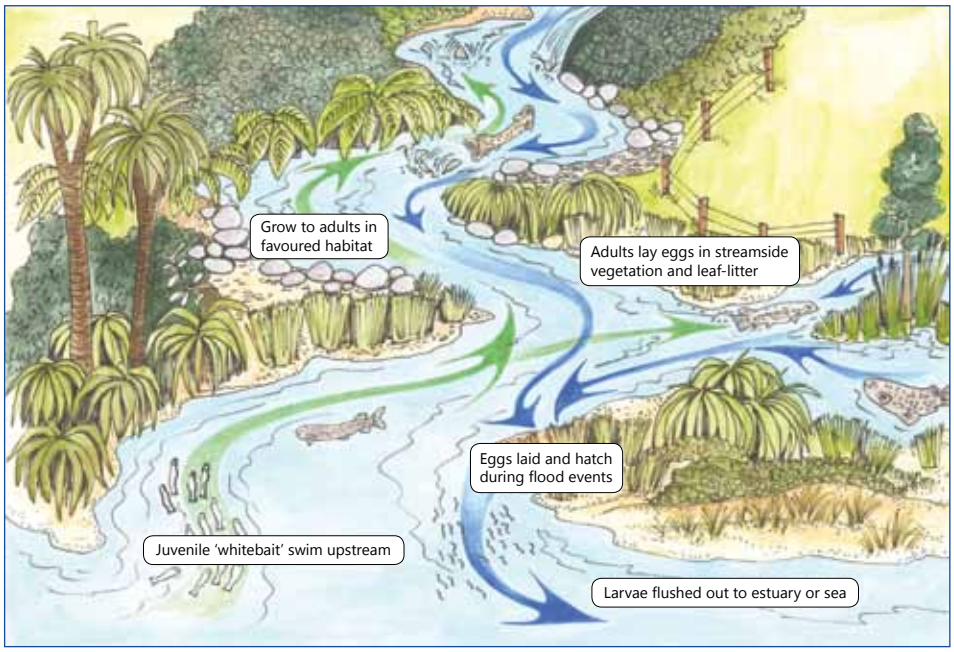
Migratory species, including birds and fish, have many threats to contend with. In Southland these include:

- Loss of habitat (e.g. through drainage of wetlands and fires).
- Physical barriers to migration (e.g. tidegates, dams, culverts and power lines).
- Disturbance (e.g. noise, or lights at night).
- Introduced predators (e.g. stoats, rats and cats).
- Pollution (e.g. agricultural and industrial pollutants, waste material and debris).
- Unsustainable fishing practices (e.g. seabirds getting tangled in fishing lines and nets).

Find out what Environment Southland is doing to help migratory species on page 7 and what you can do on page 8.

Inanga in Southland

Several species of native fish migrate between the sea and Southland's freshwater habitats as part of their lifecycle. The inanga is probably the most familiar of our migratory species. The adults live in our freshwater creeks, rivers, lakes and wetlands and the young larvae live in the sea. In autumn, the adults migrate downstream into estuaries where they lay their eggs among plants and grasses. When the eggs hatch, the larvae float out to sea where they live and grow over winter. In the spring, the juvenile fish migrate back upstream as whitebait. Researchers have observed juvenile inanga migrating upstream at a rate of 0.31 to 1.36km per day.



Whitebait.

Adult inanga caught in the Waiau River.
(PHOTO MARK SUTTON)

Did you know?

The small fish caught each spring by whitebaiters in Southland are actually the juveniles of five species of native fish that are attempting to migrate from the sea up into our rivers.

ACTIVITY

Identify your nearest estuary. Which main river flows into it? Does the area offer suitable habitat for migratory species? Investigate what land use activities and developments are taking place in the surrounding area. How do you think these activities might affect migratory birds and fish? What can be done to help protect these species and their habitat?

Fish barriers

A fish barrier is a structure, either natural or man-made, that prevents the movement of fish and other aquatic organisms. Potential barriers include dams, tidegates and perched or eroded culverts, which, unless they are properly designed, will impede the ability of fish such as eels, lamprey, whitebait, black flounder, trout and salmon to migrate up or down stream to feeding or breeding grounds. If the lifecycle of a species depends on its ability to migrate, the introduction of a barrier may lead to local extinction of that species.

Lamprey, for example, spawn in the upper catchment. In the Mataura River the Mataura Falls form a natural roadblock to lamprey wanting to get further up the catchment to spawn. This type of migration is known as 'anadromy' (when fish migrate up the catchment to spawn). 'Catadromy' is the opposite (when fish seek the ocean to spawn, e.g. eels).

Some of Southland's waterways contain structures which have been designed or modified to improve fish passage. At Lake Monowai, for example, the control structure at the lake outlet presents a significant barrier to fish. This structure is part of the Monowai hydro power scheme. In an attempt to improve fish passage for juvenile eels (elvers), an elver pass has been built alongside the lake outlet structure.

The control structure at the outlet of Lake Monowai (inset) is a barrier to fish moving upstream and downstream. An elver pass – a covered ramp with a strip of synthetic grass inside, has been constructed to assist with their migration. The black pipe carries water pumped to the top of the ramp, so there is always some flow coming down. Elvers need to find their way onto the ramp and climb to the top. The main difficulty with this elver pass is there is a lot of flow coming over the control structure and comparatively little coming down the ramp. Since fish are attracted to the source of flow, some may struggle to locate the ramp. Meridian Energy also runs a trap and transfer programme for elvers and migrant eels (adults wanting to return to the sea) which is currently more effective than the elver pass.

ACTIVITY

Unfortunately, Southland has many structures which act as fish barriers. Look at these photos taken at various locations in Southland. Can you identify the fish barrier in each picture?

How does Environment Southland help migratory species?

Senior Environmental Technical Officer, Warren McNamara, with a long-fin eel caught in the Oreti River during a survey of fish species and habitat.

As a Regional Council, Environment Southland is expected to:

- Gather information to understand the health of waterways and estuaries, and the animals that live in them;
- Identify areas of international or national importance to migratory species
- Protect the habitat value of Southland's estuaries;
- Maintain and enhance lowland / coastal lakes for native fish;
- Regulate water use to make sure there is enough water for environmental needs including the need for fish passage;
- Regulate activities in the coastal zone, e.g. activities that occur close to habitat used by migratory species;
- Help land users to manage their land more sustainably.

About one third of the work Environment Southland does contributes to maintenance of biodiversity in the region. For example:

- Our technical staff monitor species and their habitats;
- We work with schools, groups and individuals who want to carry out native and riparian plantings;
- Our land sustainability team provides on-farm advice and works with community groups to increase awareness of land management issues and good environmental practices;
- We have a strong and successful biosecurity programme for managing pest animals (e.g. possums, ferrets, rooks) and plants (e.g. gorse, broom, wilding trees);
- Our catchment management team times their channel cleaning operations to avoid key times for fish migration.
- Our compliance team inspects whitebait stands annually. The Coastal Plan for Southland has set a limit on the number of whitebait stands in Southland at those that were occupied at 15 February 1997. New whitebait stands are prohibited;
- We prohibit the use of vehicles in some parts of the foreshore e.g. to protect feeding grounds for migratory birds, and we prohibit marine farming in some areas e.g. areas of national importance for migratory waders.

Catchment Management Engineering Assistant, Robin Wilson, assists students from Southland Girls' High School with a planting project at the New River Estuary.

What can you do to help?

There are many ways you can get involved in improving the health of our waterways and estuaries. You can:

- Become a conservation volunteer.
- Help at planting days or find a stretch of waterway where you can get started on your own planting project. This will provide valuable habitat for migratory fish.
- Grow your own locally-sourced native plants to enhance habitat for native biodiversity.
- If you already have native forest, scrub, wetland or grassland on your property, arrange to have a free survey done to learn more about it. Environment Southland offers surveys of high value areas on properties to assist landowners to identify areas with high biodiversity values and to provide recommendations and advice on protecting and enhancing them.
- If you're involved in work being carried out near a waterway, be careful of the timing of your activities and avoid spawning and migration periods. This applies particularly to forestry operations, farmers, contractors and developers.
- Adhere to good management practices on your land at all times. Be aware of the potential impacts of your activities on migratory fish and their habitat. Protect spawning habitat, fish cover and migratory pathways.
- Download Forest and Bird's free mobile app which ranks the sustainability of more than 117 commercially harvested New Zealand seafood varieties. The Best Fish Guide 2017 is New Zealand's only comprehensive and independent guide to sustainable seafood. It uses a traffic light system to guide consumers in their seafood choices.
- Celebrate World Wetlands Day (2 Feb), World Fish Migration Day (21 April) and World Migratory Bird Day (14 May).

A group from Southland Girls' High School takes part in a planting project at Waituna.

Further information

For more information on the health of our waterways and estuaries contact Environment Southland. Our staff can provide a wealth of information. Visit our website to view a range of maps and data regularly updated from monitoring sites across Southland.

Other organisations

Besides the work of agencies like the Department of Conservation and Environment Southland, there are a several other groups involved in restoration and protection of estuaries and wetlands, including:

- **Forest and Bird Southland –** keeps an eye on issues that can affect biodiversity, e.g. by creating awareness, making submissions and circulating petitions.
- **The Waiau Fisheries and Wildlife Habitat Enhancement Trust –** established in 1996 to mitigate and remedy the adverse effects of the Manapouri Hydro Power Scheme on the fisheries and wildlife values of the Waiau Catchment.
- **Waituna Landcare Group –** formed in 2001 to help protect the Waituna Lagoon through community education and local action.