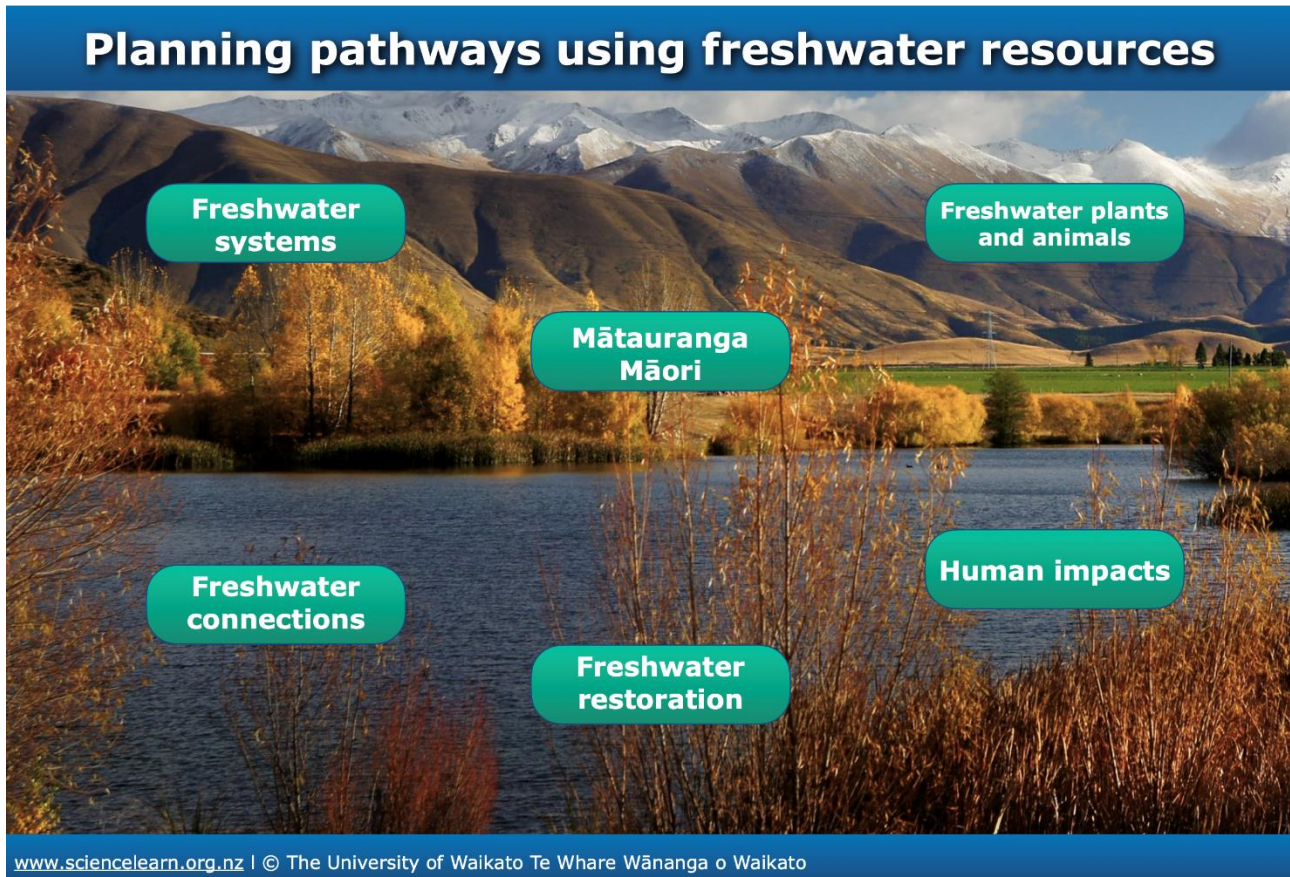


Planning pathways using freshwater resources

This interactive groups Hub resources into key science and mātauranga Māori concepts. The article [Freshwater resources – planning pathways](#) provides pedagogical suggestions and links to the science capabilities.



The [interactive diagram](#) provides a selection of pathways that allow for different approaches and starting points using resources about Aotearoa New Zealand's freshwater systems. The aim is to assist educators with their planning of lessons and units of work by providing options that cover multiple science and mātauranga Māori concepts.

This interactive uses selected resources – many more are curated in our [freshwater](#) topic. Use the filters to narrow your search. If using the online version, click on the labels for links to supporting articles, media, data and student materials.

Background image courtesy of [Bernard Spragg](#).

Transcript

- [Freshwater systems](#)
- [Freshwater connections](#)
- [Mātauranga Māori](#)
- [Freshwater restoration](#)
- [Freshwater plants and animals](#)
- [Human impacts](#)

Freshwater systems

Ki uta ki tai refers to the concept of from the mountains to the sea. It acknowledges the journey that water makes across the land. Freshwater begins this journey as precipitation in the atmosphere and becomes part of freshwater systems that include streams, rivers, lakes, wetlands and estuaries – before flowing to the sea or returning to the atmosphere. Freshwater is also held/stored as groundwater and in glaciers.



Braided river, Canterbury. Public domain.

The following resources provide information about some of the components of freshwater systems.

Articles

- [The water cycle](#)
- [Tōku awa koiora](#) – curation of river resources
- [Te Repo](#) – curation of repo (wetland) resources
- [The lakes of Aotearoa New Zealand](#)
- [Wetlands](#)
- [Disappearing glaciers](#)

Media

- [Learning about the water cycle](#) – interactive
- [Te whakamahi i ngā rauemi o Tuihonoa Te Reo o Te Repo hei whakarite ara whakaako](#) – interactive
- [Water distribution](#) – video

Activities

- [Water cycle models](#)
- [Water in nature](#)
- [Mapping my local water catchment](#)
- [Build a model water catchment](#)
- [Exploring my local lake](#)
- [Wetland \(repo\) connections – ecological and cultural perspectives](#)
- [Constructing an aquifer model](#)

Freshwater connections

The freshwater environment is a holistic system that connects landscapes, ecosystems and people. Freshwater connections can be physical, ecological, social, cultural or economic.

All freshwater occurs within a catchment – an area of land, often bordered by hills or mountains, in which the water is collected and through which it moves.

Catchments host ecosystems – the interactions/connections between plants, animals and microorganisms and the physical and chemical components of the natural environment.



Pūkeko. Public domain.

Humans also have connections with freshwater. Water is the basis for all life. It is taonga, something to be cherished and looked after. For Māori, wai holds mauri – a spiritual life force that links the health of freshwater to everything that is connected to it.

The following resources provide information about the many connections within freshwater systems.

Articles

- [Water catchments](#)
- [River ecosystems](#)
- [Waitī – freshwater environments](#)
- [Tōku awa koiora](#) – curation of river resources
- [Te Repo](#) – curation of repo (wetland) resources

Media

- [Wai Māori](#) – interactive
- [Awa and iwi](#) – video
- [Waitī – reflecting on our freshwater environment](#) – infographic

Activities

- [Mapping my local water catchment](#)
- [Build a model water catchment](#)
- [Freshwater ecosystem](#)

Mātauranga Māori

In te ao Māori, the human and non-human worlds are indivisible. There are kinship relationships and therefore responsibilities towards natural features. A healthy mauri is a sign that the awa, roto or repo is expressing its mana or spiritual power. Freshwater systems act as reservoirs of te reo, tikanga and mātauranga Māori.

The following resources provide information about mātauranga associated with freshwater systems.



Raupō (bulrush). Public domain.

Articles

- [Monitoring kōura](#)
- [Cultural indicators for repo](#)
- [Can mātauranga Māori help save New Zealand's freshwater mussels?](#)
- [Ngāti Hauā Mahi Trust](#)
- [He reo nō te puehu – A voice from the dust](#)
- [Mahinga kai](#)

Media

- [Wai Māori](#) – interactive
- [Te whakamahi i ngā rauemi o Tuihonoa Te Reo o Te Repo hei whakarite ara whakaako](#) – interactive
- [Mātauranga Māori – that which is passed down](#) – video
- [Te ao Māori and repo](#) – video

Activities

- [Te mana o te wai](#)
- [Building a tau kōura](#)
- [Using He reo nō te puehu](#)

Freshwater restoration

Te mana o te wai – the holistic wellbeing of water – is key to environmental and human wellbeing. We can enhance both by restoring threatened freshwater ecosystems.

Articles

- [Rivers and Us](#) – curation
- [Tōku awa koiora](#) – curation
- [Repo \(wetlands\)](#) – curation
- [Tuihonoa Te Reo o Te Repo](#) – curation
- [Wetland restoration](#)
- [Give our native fish a hand!](#)
- [Āwhinahia ngā ika nei!](#)
- [Planning for change](#)
- [Te whakamāherehere i ngā panonitanga](#)
- [Testing the waters](#) – *Connected* article



Harakeke. J Christianson, CC BY 4.0.

Media

- [Stream health monitoring and assessment](#) – interactive
- [Inquiry and action learning process](#) – interactive
- [Benefits of environmental education](#) – video
- [Indicators of water quality – introduction](#) – video

Activities

- [Monitoring stream health](#)
- [Ake Ake – forever and ever](#)

Freshwater plants and animals

Streams, rivers, lakes and wetlands provide habitats for numerous plants and animals – including pests.

The following resources provide information about native, introduced and pest species that live in freshwater systems.

Articles

- [Wetland plants](#)
- [Freshwater macroinvertebrates](#)
- [Aquatic insect life](#)
- [Freshwater fish of New Zealand](#)
- [Ngā ika taketake wai māori o Aotearoa](#)
- [Monitoring kōura](#)
- [Whitebait](#)
- [Longfin eels](#)
- [Wetland animals](#)
- [Introducing New Zealand ducks](#)

Media

- [Pest plants](#) – video
- [Kōura](#) – video

Activities

- [Utilising *Navigating our freshwater environment*](#)
- [Te mana o te wai](#)
- [Saving taonga](#)
- [River connections](#)
- [Observing freshwater invertebrates](#)
- [Building a tau kōura](#)
- [Freshwater fish of New Zealand quiz](#)
- [Which duck is which?](#)
- [Mixing and matching ducks](#)
- [Duck dominoes](#)



Red hooded orchid (*Corybas carsei*) at Whangamarino Wetland. Catherine Beard, [CC BY 4.0](#).

Human impacts

Freshwater environments are affected by pressures from human activities. Land clearance and land use, modifications to freshwater systems, the introduction of exotic species, irrigation and climate change have impacts. These, in turn, have impacts on our culture, recreation, freshwater species, habitats, ecosystems, health and economy.

The degradation of our freshwater can impact the ability to maintain mātauranga Māori and access mahinga kai.



Pivot irrigator, 123RF Ltd.

The following resources provide information about human impacts on freshwater.

Articles

- [Our freshwater 2023](#)
- [Waitī – freshwater environments](#)
- [Water quality – factors and issues](#)
- [Human impacts on rivers](#)
- [Water issues and effects](#)
- [Water quality monitoring](#)
- [Farming and environmental pollution](#)
- [Nutrients](#) – resource curation

Media

- [Culverts, ramps and baffles](#) – video
- [Wastewater](#) – video
- [Land use – impacts on waterways](#) – interactive
- [Our use of water – impacts on water quality](#) – interactive

Activities

- [Nutrient pollution](#)
- [Farming and environmental issues](#)