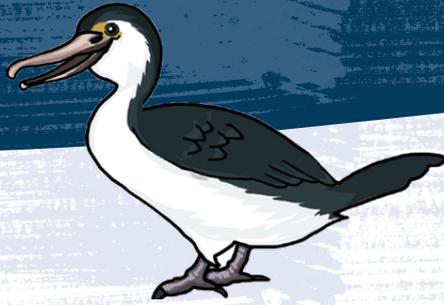


Appendices



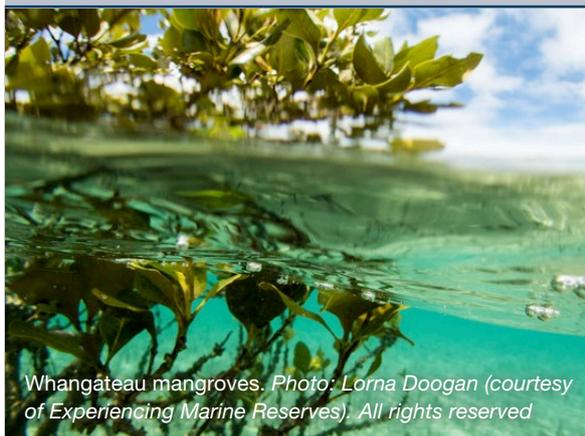
VISITING HARBOURS AND ESTUARIES: NOTES FOR SCHOOLS AND EDUCATORS

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VISITING WHANGATEAU HARBOUR

The following information can be used to help plan your educational visit to Whangateau Harbour. Have fun and remember to look after this estuary and the plants and animals that live here during your visit.

NOTES FOR SCHOOLS AND EDUCATORS



Whangateau mangroves. Photo: Lorna Doogan (courtesy of Experiencing Marine Reserves). All rights reserved



Snorkelling in mangroves in the Whangateau Harbour. Photo: Lydia Green, Saltwater Eco. All rights reserved

Key information



The picturesque Whangateau Harbour is a coastal estuary in north Auckland.

Whangateau is one of the last harbours in the North Island to remain in exceptional condition. It is home to extensive, healthy cockle beds and mature mangrove forests, both of which contribute to the excellent water clarity for educational snorkelling/kayaking/paddleboarding activities.

Cool facts about this estuary

- Whangateau is one of the healthiest estuaries in the Auckland region.
- It is close to the Tāwharanui and Cape Rodney - Okakari Point (Goat Island) marine reserves.

Getting there

Whangateau is approximately 10 min from Matakana Village, just over an hour's drive north of Auckland City.

From Warkworth, take State Highway 1 and turn off towards Leigh/Matakana on Matakana Road. Drive through Matakana and go straight through the roundabout towards Leigh onto Leigh Road.

Access Whangateau Estuary at Whangateau Reserve, down the driveway opposite 510 Leigh Road.

You can also access the other side of the estuary at a smaller site at Point Wells on Riverside Drive.



Visitor facilities and parking

Parking is available next to the playground at Whangateau Reserve, as well as at Whangateau Hall. Buses can access the reserve here.

The reserve has expansive grassed areas that are suitable for picnics, a large playground and a barbeque. It is adjacent to the Whangateau Holiday Park and campground. There are no food outlets or drinking water at this location, so you will need to bring your own refreshments.

Several toilets are available here.

Self-guided activities for school groups

Biodiversity survey

Investigate what is living in this estuary by conducting a Marine Metre Squared Project (Mm2) sandy shore or rocky shore survey. The shore adjacent to the reserve and near the playground is suitable a few hours either side of low tide. Use the survey to look for changes over time, which may depend on the season, weather or even human impacts.

For more information and to view other survey results, see

 Marine Metre Squared and  *Activity 9: Visiting estuaries.*

Note: when conducting a Mm2 survey, it is important to keep disturbance of sand and animals to a minimum and put them back where you found them.

Observing shorebirds / five-minute bird count

The walkway along the coastline at Whangateau Reserve is the best place for viewing wading birds. Make sure you are quiet and still to maximise your chances of spotting shorebirds. The Gulf Journal  Shorebirds of the Hauraki Gulf poster can be used to identify local birds. The Department of Conservation (DOC) website provides instructions on how to carry out  Five-minute bird counts.

Estuary survey

Look for key species of seaweeds, plants, snails, crabs and other invertebrates of the estuary at low tide. See  MarineWatch estuary survey species ID slides.

Beat plastic pollution with Young Ocean Explorers

Find out how you can help beat plastic pollution in estuaries by completing this

 Young Ocean Explorers beat plastic pollution assignment.

Short walks

Esplanade (10 min, 500 m one way): The esplanade at Whangateau Reserve offers a very short, easy walk along the coastline. Walk in front of the rugby fields and past the campground.

Point Wells Reserve, Riverside Drive, Point Wells (45 min return): This walk starts at the boat ramp on Riverside Drive, from where it passes around the grassy foreshore reserve beside Whangateau Harbour and follows the bollard markers to the village via the accessway to Harbour View Road.



Health and Safety considerations

- Ensure you know the tide times; sandy shore surveys should be started 1–2 hr before low tide.
- Some sharp rock shelves are present that could create slipping hazards.
- There is a dog exercise area next to Whangateau Reserve. Advise students of the procedure for dealing with unknown dogs.

Teachers should also consider general risk management around water and general health and safety considerations for schools in coastal environments – see  *Activity 9: Visiting estuaries.*

Note: The health and safety considerations listed here are not a substitute for a detailed safety plan.

This plan should be written by the educators, staff and students who are visiting the site. It should reflect the school's safety policies and procedures and be based on accepted best practice in Education Outside the Classroom (EOTC). A prior site visit by staff is highly recommended to identify and manage any current risks/hazards.

Native or endemic species found at this estuary

Please note: The Ministry of Primary Industries currently has a ban on collecting shellfish from Whangateau Reserve. For more information, see  Fisheries (Whangateau Harbour Cockle and Pipi Harvest Closure) Notice 2015 (Notice No. MPI 567)

On the sand flats and surrounds, you may see shorebirds such as New Zealand dotterels/tūturiwhatu, variable oystercatchers/tōrea pango, red-billed gulls/tarāpunga, black-backed gulls/karoro, pied shags/kāruhiruhi, pied stilts/poaka and kingfishers/kōtare.

Seasonal visitors include bar-tailed godwits/kuaka, spoonbills/kōtuku ngutupapa and banded dotterels/pohowera.

Underwater you can see juvenile snapper/tāmure, black bream/parore, eagle rays/whai repo, yellow-eyed mullet/kātaha, grey mullet/kanae raukura and juvenile trevally/araara.

You can also find cockles/tuangi, pipi, tuatua, oysters/tio, barnacles/werewere, estuary anemones, lug worms, mantis shrimps and mud crabs/pāpaka on the rocks and in the sediment.

Habitats found at this estuary

At low tide there are extensive sand flats, shell banks, mud flats and some rocky shore near the reserve. There are also mangroves/mānawa on the south side near the Whangateau Holiday Park, as well as some areas of seagrass/karepō and Neptune's necklace/rimurimu.

The most accessible mangroves surround Horseshoe Island, which can be easily walked to at low tide or snorkelled to at high tide. Horseshoe Island is also a New Zealand dotterel/tūturiwhatu breeding site.



Education providers working in this estuary.

Experiencing Marine Reserves (EMR)

 Experiencing Marine Reserves is a charitable trust/not-for-profit organisation that specialises in providing safe snorkelling experiences for school groups in estuaries and marine reserves. All of the necessary gear and expertise are provided. For more information, email info@emr.org.nz and/or view their  Facebook page.

Saltwater Eco Ltd

The  Saltwater Eco team create outdoor learning experiences for small to medium sized groups of local and international students. They facilitate marine and environmentally focused programmes, bringing together recreation, education, conservation and culture.

Other education experiences

Goat Island Marine Discovery Centre

The  Goat Island Marine Discovery Centre is a 10-min drive from Whangateau Reserve and has a variety of educational programmes and displays available for schools.

ACKNOWLEDGEMENTS

Our sincere thanks to Lydia Green (Saltwater Eco), Samara Nicholas and Lorna Doogan (Experiencing Marine Reserves), and Michelle Jenkinson (DOC) for their expert advice and assistance in preparing these site visit notes.

Protect our wildlife from invasive pests – check your clothing and footwear for weed seeds and soil before and after each trip.



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Experience Monitor Restore

Resources
Links to more information for iwi community groups, experts, visitors, teachers and children.



VISITING MANUKAU HARBOUR / AMBURY REGIONAL PARK

The following information can be used to help plan your educational visit to Manukau Harbour / Ambury Regional Park. Have fun and remember to look after this estuary and the plants and animals that live here during your visit.

NOTES FOR SCHOOLS AND EDUCATORS



Ambury Regional Park. Photos: Michal Klajban (CC BY-SA 4.0)



Key information



Manukau Harbour is New Zealand's second largest harbour and an internationally significant feeding and breeding area for migratory birds. This busy, populated harbour demonstrates a slice of Auckland's natural coastal environment amongst the surrounding city suburbs.

Ambury Regional Park (Ambury Farm) is an ideal location for an educational visit to the harbour. Auckland Council manages this well-equipped, accessible and sheltered park, which hosts a working farm, important shorebird habitat and several scenic walks and has many facilities on site.

Other possible locations for educational visits to Manukau Harbour include Huia, French Bay Beach, Onehunga Foreshore and Āwhitu.

The area has a rich history of Māori settlement and features numerous archaeological sites. Manukau was a highly contested harbour, and various iwi settled there and competed for resources. Te Arawa, Ngāpuhi and Ngāti Whātua have long-standing associations with the harbour.

Cool facts about this estuary

- More than 86 different bird species have been identified at Ambury Regional Park.
- The park sits on an old lava field, which was formed about 18,000 years ago by the eruption of the nearby Māngere mountain.

Getting there

Take State Highway 20 and follow the signs to Mangere Bridge and Coronation Road. Turn into Ambury Regional Park at 43 Ambury Road, Mangere.



Visitor facilities and parking

Parking is available at Ambury Regional Park. Drinking water, picnic tables, shelters and several toilets are also at hand. Cell phone reception is available throughout the park.

Large sites that are suitable for groups and include barbeques, shelters and bird hides can be booked through Auckland Council. It is best to book the sites in advance to avoid disappointment, as other large school groups may be using the facilities.

Auckland Council Rangers or education staff may also be available to help during your visit. For more information, see  Ambury Regional Park and the  Map of Ambury Farm Regional Park.

Self-guided activities for school groups

Biodiversity survey

Investigate what is living in the harbour by conducting a Marine Metre Squared Project (Mm2) sandy shore survey. The small beaches along the Foreshore Walk are suitable for the survey approximately 2-3 hr either side of low tide. Use the survey to look for changes over time, which may depend on the season, weather or even human impacts. For more information and to view other survey results, see  Marine Metre Squared and  Activity 9: *Visiting estuaries*.

Note: when conducting a Mm2 survey, it is important to keep disturbance of sand and animals to a minimum and put them back where you found them.

Observing shorebirds / five-minute bird count

There are several bird hides along the Foreshore Walk that are suitable for bird watching or making a bird count. Make sure you are quiet and still to maximise your chances of spotting shorebirds. The Gulf Journal  Shorebirds of the Hauraki Gulf poster can be used to identify local birds. The Department of Conservation (DOC) website provides instructions on how to carry out  Five-minute bird counts.

Estuary survey

Look for seaweeds, plants, snails, crabs and other invertebrates of the estuary at low tide. See  MarineWatch estuary survey species ID slides.

Beat plastic pollution with Young Ocean Explorers

Find out how you can help beat plastic pollution in estuaries by completing this  Young Ocean Explorers beat plastic pollution assignment.

Short walks

Foreshore Walk (45 min, 2 km return): This walk starts at the main car park and takes you around the harbour foreshore, where you can see birds, shell banks and muddy shores. There are suitable locations for the suggested activities above on this walk, including a large bird hide that is ideal for bird watching.

Coastal Walkway, Watercare Auckland (7 km): The  Coastal walkway is a longer walk that also loops around the coast and includes a New Zealand dotterel/tūturiwhatu nesting site.

Additional walks in this park can be found on the  Map of Ambury Farm Regional Park.



Health and safety considerations

- Take care around farm animals when walking through paddocks, particularly calves, lambs and parents, as they can be wary of people and protective of their young. Keep your distance and avoid approaching family groups.
- Please leave gates as you find them.
- Sometimes electric fences are used with livestock. Avoid these with students.
- Bacteria and contaminants can sometimes be found in the harbour. Minimise contact with sediment and wash hands before eating.
- There are many rabbit warrens throughout the park. Take care when walking on the grass and watch out for rabbit holes and uneven ground.

Teachers should also consider general risk management around water and general health and safety considerations for schools in coastal environments – see  Activity 9: Visiting estuaries.

Note: The health and safety considerations listed here are not a substitute for a detailed safety plan.

This plan should be written by the educators, staff and students who are visiting the site. It should reflect the school's safety policies and procedures and be based on accepted best practice in Education Outside the Classroom (EOTC). A prior site visit by staff is highly recommended to identify and manage any current risks/hazards.

Native or endemic species found at this estuary

Manukau Harbour hosts a significant proportion of the 100,000 bar-tailed godwits/kuaka that visit New Zealand each year after flying all the way from Alaska.

Pied stilts/poaka, variable oystercatchers/tōrea pango, white-faced herons/matuku moana, reef herons/tīkāka and paradise ducks are commonly seen along the Foreshore Walk, while threatened wrybills/ngutu pare are also present but harder to spot.

Other bird species found here include Caspian terns/taranui, white-fronted terns/tara, a variety of shags/kawau, kingfishers/kōtare and spur-winged plovers/tuturuatu.

New Zealand dotterels/tūturiwhatu can also be found on the Watercare Coastal Walkway.

Habitats found at this estuary

The vast mud flats at this estuary are important shorebird habitat. There are also areas of sandy shore, open water, beaches and small patches of rocky shore along the Foreshore Walk, as well as some saltmarsh habitat and a series of plantings from fresh to salt water that can be accessed through the cattle yards.

On the Watercare Coastal Walkway, you can also see shell banks and some mangroves, as well as sand and mud flats.



Education providers in the area

Auckland Council

Auckland Council's Learning Through Experience education team offer several facilitated programmes for school groups. The Magical Migrants programme focusses on observing the shorebirds of the harbour and is suitable for Year 0-8 students.

For more information, visit the  Auckland Council website and search for 'Ambury' or 'Learning Through Experience'.

Other programmes can also be organised for your school to address your desired outcomes. For school bookings and to find out about current programmes that are available, email ambury.schoolbookings@aucklandcouncil.govt.nz.

Note: If you are going on a self-guided trip, it is still advisable to let the educators know so that your desired location is not double booked.

Other education experiences

Māngere Mountain Education Centre

 Māngere Mountain Education Centre offers a range of educational programmes, including kite making, flax work and medicinal gardens.

Additional educational opportunities on offer in the south Auckland region can be viewed at  Live Lightly at School.

ACKNOWLEDGEMENTS

Our sincere thanks to Paul Swift and Rose Crooks (Auckland Council), and Michelle Jenkinson (DOC) for their advice and assistance in preparing these site visit notes.

Protect our wildlife from invasive pests – check your clothing and footwear for weed seeds and soil before and after each trip.



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VISITING PŪKOROKORO MIRANDA

The following information can be used to help plan your educational visit to Pūkorooro Miranda. Have fun and remember to look after this estuary and the plants and animals that live here during your visit.

NOTES FOR SCHOOLS AND EDUCATORS



Pūkorooro Miranda Shorebird Centre. Photos: Jim Eagles (left) and Pūkorooro Miranda Shorebird Centre (right)

Key information



Pūkorooro Miranda is on the Firth of Thames in the Waikato region of the North Island.

This large, internationally significant estuary/wetland is a haven for around 40,000 migrant and endemic birds. Migratory wading birds, such as bar-tailed godwits/kuaka, fly here in spring from as far away as Alaska and Siberia to enjoy our warm summer, while New Zealand migrants from the South Island, such as wrybills/ngutu pare and South Island pied oystercatchers/tōrea tuawhenua, overwinter here.

The shallow, warm waters here provide plentiful food for birds and other animals, and this peaceful, scenic coastline attracts many visitors each year.

The area is known as Pūkorooro to local iwi, which can be translated as ‘the long-throated purse net’, describing the entrance to the Pūkorooro Stream and the fishing that once occurred in the area.

Ngāti Pāoa are recognised as having mana whenua (territorial rights) over the Pūkorooro area, while Ngāti Hako, Ngāti Whanaunga, Ngāti Tamaterā and Ngāti Maru also have traditional and cultural connections.

The estuary is part of the Firth of Thames, which is an internationally protected  Ramsar site.



Getting there

Turn off State Highway 2 at Mangatawhiri to take Mangatawhiri Road towards Miranda/Firth of Thames and then turn on to East Coast Road. Pūkoro Mirānda Shorebird Centre is at 283 East Coast Road, Miranda.

Visitor facilities and parking

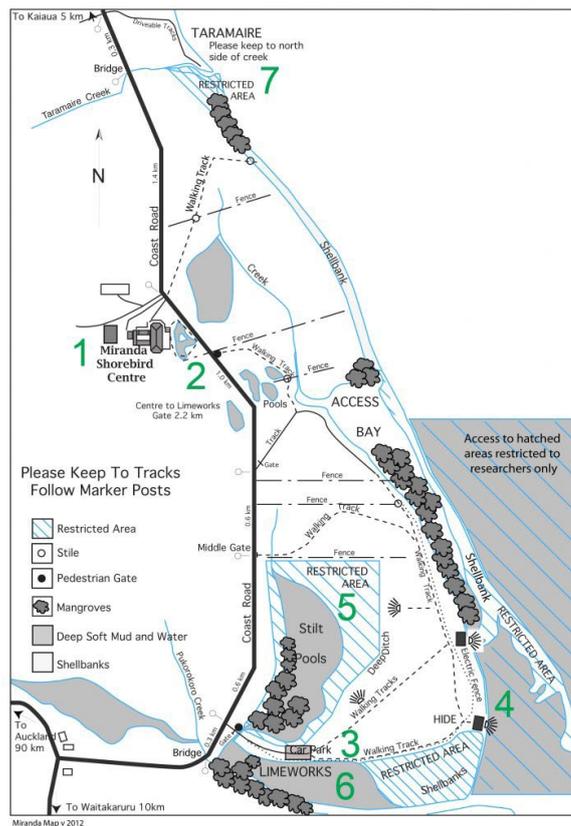
Pūkoro Mirānda Shorebird Centre has excellent information displays and an educational shop (see education providers on page 14). The centre is also walking distance to many observation areas for migratory shorebirds. There is no food or drink available here.

A car park with walking tracks to bird hides can be found over the Pūkoro Stream bridge on the East Coast Road (see map following). There is no public access to the mud flats from this location (some mud flats have restricted access due to shorebird breeding locations; see map below).

The mud flats can be accessed at Ray's Rest Reserve (beside the Taramaire Wildlife Refuge Reserve), 1 km north of the Shorebird Centre or anywhere on the shore at Kaiāua.

Accommodation for small groups can be arranged by prior booking – see  Pūkoro Mirānda Shorebird Centre visit and stay.

There is a small reserve at Kaiāua (955 East Coast Road) with a playground and public toilets. There are also a few shops nearby where you can purchase food and drinks.



Our care code/kaupapa: looking after the birds at this site

- *Shorebirds can be easily disturbed by people, which can interfere with their breeding. Disturbed roosting birds may be forced to leave and find another roosting spot.*
- *If roosting birds become restless while you are moving towards them, please back away until they settle down again.*
- *Birds feed on the mud flats when the tide is out and then congregate at high-tide roosts when the tide recedes to wait for the mud flats to become available again. Therefore, the best time to **view the birds** is at high tide, but it is important not to disturb them: stay off the beaches at **high tide** and keep a fair distance away to help reduce disturbance.*
- *The recommended time to **conduct activities on the beach** is within 1 hr either side of low tide out of respect for the birds.*

Note: This fragile habitat is easily disturbed by people so, if possible, please organise your visit through the Shorebird Centre (see education providers).

Biodiversity survey

This site is not suitable for the Marine Metre Squared Project (Mm2) sandy shore survey, as the habitat is too vulnerable. See 📍 *Activity 9: Visiting estuaries* for other suitable sites.

Observing shorebirds / five-minute bird count

The best time to see shorebirds at the Pūkoro Mirando Naturalist Trust bird hides (see map on page above) is 2 hr either side of high tide.

For a guide to the birds that can be found at this location, visit 📍 Pūkoro Mirando Shorebird Centre. The DOC website provides instructions on how to carry out 📍 Five-minute bird counts.

Estuary survey

Look for key species of seaweeds, plants, snails, crabs and other invertebrates of the estuary. See 📍 MarineWatch estuary survey species ID slides.

Beat plastic pollution with Young Ocean Explorers

To find out how you can help beat plastic pollution in estuaries, complete the 📍 Young Ocean Explorers beat plastic pollution assignment.

Short walks

Shorebird Centre to bird hides (35 min, 2 km one way): This easy walk starts at the Shorebird Centre and goes to the bird hides, passing information signs along the way. There is also a car park closer to the hides, 2 km from the Shorebird Centre.

For additional learning experiences, see 📍 *Activity 9: Visiting estuaries*.



Health and safety considerations

- Sharp objects such as oyster shells may be hidden in the mud or on the rocks. Wear appropriate footwear to protect your feet (eg full shoes, no jandals).
- The mud can be very deep in places, so adult supervision is advised.
- Botulism outbreaks have occurred in the past during the warm summer season, resulting in sick, dying birds being found on the mud flat. Do not touch dead birds with bare hands.

Teachers should also consider general risk management around water and general health and safety considerations for schools in coastal environments – see

📍 *Activity 9: Visiting estuaries.*

Note: The health and safety considerations listed here are not a substitute for a detailed safety plan.

This plan should be written by the educators, staff and students who are visiting the site. It should reflect the school's safety policies and procedures and be based on accepted best practice in EOTC. A prior site visit by staff is highly recommended to identify and manage any current risks/hazards.

Native or endemic species found at this estuary

Endemic birds that are found at Miranda include wrybills/ngutu pare, New Zealand dotterels/tūturiwhatu, South Island pied oystercatchers/tōrea tuawhenua, variable oystercatchers/tōrea pango, banded rails/moho pererū, white-faced herons/matuku moana and black-billed gulls/karoro, among others. Pied stilts/poaka and spur-winged plovers/tuturuatu are also often seen.

Visiting Arctic migrants include bar-tailed godwits/kuaka, lesser or red knots/huahou and Pacific golden plovers/kuriri.

For further information, see 📍 Miranda's migratory birds and 📍 Pūkorokoro Miranda Shorebird Centre.



Habitats found at this estuary

This site includes shallow estuarine water and mud flats, shell banks, grass flats, mangrove forest, saltmarsh and limited freshwater swamp margins. The undisturbed shell bank habitats provide ideal nesting grounds for many birds.

For more information on the habitats in this reserve, see  Shorebirds of Pūkoro-koro Miranda.

Education providers in the area

Pūkoro-koro Miranda Shorebird Centre

The  Pūkoro-koro Miranda Shorebird Centre provides a wide range of options for visits, education programmes and resources for schools. We recommend booking a school visit to the education centre so that the skilled staff can tailor your learning programme to your needs.

Please contact admin@shorebirds.org.nz or educator@shorebirds.org.nz for enquiries.

Experiencing Marine Reserves (EMR)

 Experiencing Marine Reserves is a charitable trust/not-for-profit organisation that specialises in guided experiences for school groups in estuaries and marine reserves. All of the necessary gear and expertise is provided. For more information, email info@emr.org.nz.

Other education experiences

Rangipo Museum

 Rangipo Museum at 729 East Coast Road not only provides access to rare plants and animals but also offers a great view of the Miranda-Kai-ua chenier plain that makes this area so special. Bookings are essential for visiting the museum.

ACKNOWLEDGEMENTS

Our sincere thanks to Alex Eagles Tully (Pūkoro-koro Miranda Shorebird Centre) and Mailee Stanbury (DOC) for their expert advice and assistance in preparing these site visit notes.

Protect our wildlife from invasive pests – check your clothing and footwear for weed seeds and soil before and after each trip.



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VISITING ŌHIWA HARBOUR ESTUARY

The following information can be used to help plan your educational visit to Ōhiwa Harbour. Have fun and remember to look after this estuary and the plants and animals that live here during your visit.

NOTES FOR SCHOOLS AND EDUCATORS



Ōhiwa Harbour, Bay of Plenty. Photo: Phillip Capper (CC BY 2.0)

Key information



The idyllic Ōhiwa Harbour is a large, shallow estuary in the North Island's Bay of Plenty. It is recognised as having nationally and internationally significant natural and landscape features.

Ōhiwa Harbour is situated 11 km east of Whakatane (10 min by car) and 16 km west of Ōpōtiki.

The harbour covers about 26 km² and is home to a wide variety of native birds and fishes, as well as migratory wading birds. The 'Birds a Plenty' bird festival and the 'Welcoming of the godwits' are held here each year.

Ōhiwa has a long history of Māori occupation and association and is of significant cultural importance to many iwi, including Ngāti Awa, Upokorehe, Whakatōhea and Ngāi Tahu. Tokitoki Historic Reserve is the location of the oldest recorded human-occupied sites in the area.

For more information, see  Bay of Plenty Regional Council and  Whakātane & Ōhope.

Cool facts about this estuary

- Ōhiwa Harbour is home to ten islands, including Ohakana, Hokianga, Uretara and Whangakopikopiko.
- This estuary is home to the most southern mangroves in the North Island!
- Marine mammals, including orca/maki, common dolphins/aihe and New Zealand fur seals/kekeno, regularly frequent the harbour.
- Ōhiwa Harbour is an ideal spot for fishing, surfing, kayaking and other water sports.
- The sequence of trees and plants surrounding some of the harbour is unique in this district and similar to how it was before people arrived here.



Getting there

There are several ways to get to Ōhiwa Harbour. You can drive through Ōhope and follow Harbour Road to the East End Boat Ramp at Ōhope Spit or follow Wainui Road eastwards along the harbour margins. Otherwise, follow Ōhiwa Beach Road from Ōpōtiki to Ōhiwa Spit or follow State Highway 2 to Ruatuna Road south along the harbour margins.

Visitor facilities and parking

Parking is available at many sites, including the Ōhope and Ruatuna Road boat ramps and Ōhiwa Spit. There is also a car park and lookout at the Nukuhoa Saltmarsh on Burke Road.

Public toilets are located at the Ōhope boat ramp and Ruatuna Road.

There are no food outlets or drinking water at this estuary, so you will need to bring your own refreshments. These can be purchased in Ōhope or Ōpōtiki.

There are public shelters with accompanying interpretation panels at the Ōhope boat ramp and Ōhiwa Spit.

Ōhiwa Beach Holiday Park and Ōhope Beach TOP 10 Holiday Park are excellent options for camping. Otherwise, check the Whakatāne and Ōpōtiki District Council websites for freedom camping locations

Self-guided activities for school groups

Biodiversity survey

Try completing a Marine Metre Squared Project (Mm2) sandy shore survey at Ōhiwa Spit, Ōhiwa Beach or Ōhope Spit (inside the harbour) to investigate what is living in this estuary. Use the survey to look for changes over time, which may depend on the season, weather or even human impacts. For more information and to view other survey results, see  Marine Metre Squared and *Activity 9: Visiting estuaries*.

Note: when conducting a Mm2 survey, it is important to keep disturbance of sand and animals to a minimum and put them back where you found them.

Observing shorebirds / five-minute bird count

There are several suitable locations for undertaking five-minute bird counts, including Nukuhoa Saltmarsh, Ōhiwa Spit and near the old Kutarere Wharf. The DOC website provides instructions on how to carry out  Five-minute bird counts.

Estuary survey

Look for key species of seaweeds, plants, snails, crabs and other invertebrates of the estuary. See  MarineWatch estuary survey species ID slides.

Beat plastic pollution with Young Ocean Explorers

Find out how you can help beat plastic pollution in estuaries by completing this  Young Ocean Explorers assignment.

Short walks

Ōhiwa Nature Trail (30 min): This pleasant, short walk is set amongst native forest and takes you through a glow worm grotto and to a waterfall.

Ōhiwa Walkway (30 min): This walkway travels from the beach, along the harbour to the boat ramp.



Health and Safety considerations

- Sharp objects such as oyster shells may be hidden in the mud or on the rocks. Wear appropriate footwear (eg full shoes, no jandals) to protect your feet from these.
- The mud can be very deep in places, so adult supervision is advised.
- The harbour has a very fast tidal flow, so caution is advised if crossing any channels.

Teachers should also consider general risk management around water and general health and safety considerations for schools in coastal environments – see

 *Activity 9: Visiting estuaries.*

Please note: The health and safety considerations listed here are not a substitute for a detailed safety plan.

This plan should be written by the educators, staff and students who are visiting the site. It should reflect the school's safety policies and procedures and be based on accepted best practice in EOTC. A prior site visit by staff is highly recommended to identify and manage any current risks/hazards.

Native or endemic species found at this estuary

The lower harbour contains mussels/kuku, cockles/tuangi and pipi, while the upper harbour has mud snails/whētiko, mud crabs and mangroves/mānawa.

The coastal margins of the harbour are home to a number of threatened and migratory birds, such as bar-tailed godwits/kuaka and northern New Zealand dotterels/tūturiwhatu, while fernbirds/mātātā, bitterns/matuku hūrepo and banded rails/katatai can be found in the saltmarsh. White herons/kōtuku are vagrant (occasional visitors) and royal spoonbills/kōtuku-ngutupapa also stop by. There is also a population of North Island brown kiwi in the Ōhiwa Harbour catchment relatively close to urban areas.

Visitors are encouraged to have any accompanying dogs on a leash because of the kiwi and other rare species living near the harbour.

Seagrass/karepō provides habitat for many animals.

Habitats found at this estuary

A wide variety of habitats are found around the harbour, including saltmarsh, sand dunes, mud flats, mangrove forests, scrubland, forests (native and introduced), sandbanks, seagrass/karepō, wetlands, river valley flats and open water.

The harbour is separated from the ocean by a 6-km-long sandspit.

For more information about the habitats and animals in this harbour, see

 Ōhiwa Harbour



*Other education/
recreation
experiences*

Museums

Both historic and contemporary displays are provided at  Opotiki Museum and  Whakatāne Museum and Arts.

i-SITES

Visit the Ōpōtiki and Whakatāne i-SITE visitor information centres for visitor information and advice.

'Life's a Beach'

 Life's a beach is a teaching resource provided by the Bay of Plenty Regional Council.

LEARNZ field trip: Harbours and estuaries

The  LEARNZ Harbours and estuaries field trip investigates Ōhiwa Harbour, a regional taonga.

ACKNOWLEDGEMENTS

Our sincere thanks to Pete Livingstone, Mithuna Sothieson and Kerryn Penny (DOC), and Bay of Plenty Regional Council for their advice and assistance in preparing these site visit notes.

**Protect our wildlife from invasive
pests – check your clothing and
footwear for weed seeds and soil
before and after each trip.**



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iwi community
groups, experts, visitors,
teachers and children.



VISITING ŌKĀRITO LAGOON

The following information can be used to help plan your educational visit to Ōkārito Lagoon. Have fun and remember to look after this estuary and the plants and animals that live here during your visit.

NOTES FOR SCHOOLS AND EDUCATORS



Ōkārito Lagoon. Photo: Petrus Hedman (CC BY 4.0)

Key information



Ōkārito Lagoon is the largest unmodified wetland on the West Coast of the South Island. It is part of a tidal estuary that is home to thousands of native birds belonging to more than 76 different species, including the famous white heron/kōtuku and royal spoonbill/kōtuku-ngutupapa.

For centuries, this lagoon has been a valuable natural resource for Māori and Europeans alike. As well as being a rich mahinga kai (food-gathering site), flax and timber were milled and exported from the wharf in the late 19th and early 20th centuries.

The small village is now home to around 30 permanent residents and is a fantastic area to explore many different habitats. The Ōkārito Kiwi Sanctuary is home to the endangered Ōkārito brown kiwi/rowi, the only natural mainland population of which is restricted to the Ōkārito Forest and numbers around 450 birds.

For more information, see  Ōkārito area.

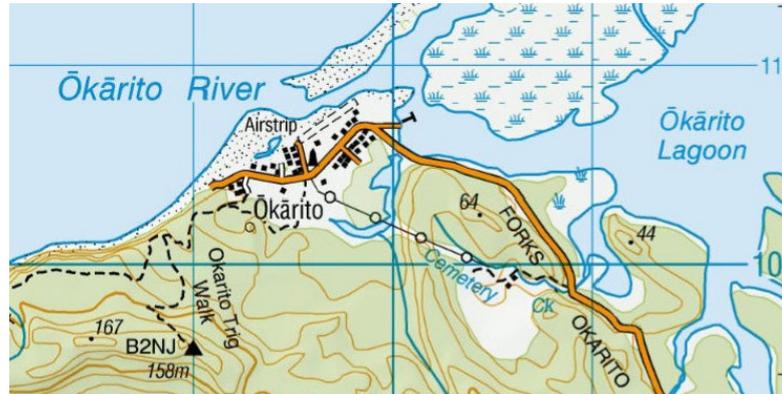
Cool facts about this estuary

- The Ōkārito township was once a bustling goldrush area, with miners flocking to mine the black sand beaches. Established in 1865, the population peaked at 4000 people and the busy township boasted 33 stores.
- Ōkārito is only a 30-min drive from Franz Josef Glacier/Kā Roimata o Hine Hukatere.



Getting there

Drive 15 km north from Franz Josef/Waiiau township on State Highway 6 to the Ōkārito Forks turnoff, which is signposted on the left. Drive 13 km along a sealed road to Ōkārito township.



Visitor facilities and parking

The tidal mud flats of Ōkārito Lagoon can be accessed by the historic wharf shed off Wharf Street. Parking is available here and interpretation panels with local storytelling are displayed inside the wharf shed. There are no shops in Ōkārito, so make sure you take your own refreshments and adequate fuel. There is also only patchy cell phone coverage in the township, which should not be relied upon in an emergency, so please have alternative safety measures in place.

Toilets are available 500 m away at the Ōkārito Campground.

Self-guided activities for school groups

Biodiversity survey

Try completing a Marine Metre Squared Project (Mm2) sandy shore survey around the Ōkārito wharf to investigate what is living in this estuary. Use the survey to look for changes over time, which may depend on the season, weather or even human impacts. Note: There are tidal restrictions to visiting the beach to Three Mile Lagoon. **Do not attempt to cross the mouth of the Ōkārito Lagoon.**

Note: when conducting a Mm2 survey, it is important to keep disturbance of sand and animals to a minimum and put them back where you found them.

For more information, resources and other survey results, see [Marine Metre Squared](#), [NZAEE Seaweed](#) and *Activity 9: Visiting estuaries*.

Observing shorebirds / five-minute bird count

The sandspit (to the left of the wharf in the map above) is the best spot for birdwatching at the lagoon and is the easiest part of the estuary to access. Birds can also be observed while kayaking.

Keep your distance, as the birds like a quiet life!

The DOC website provides instructions on how to carry out [Five-minute bird counts](#).

Estuary survey

Look for key species of seaweeds, plants, snails, crabs and other invertebrates of the estuary. See [MarineWatch estuary survey species ID slides](#).



Self-guided activities for school groups

Beat plastic pollution with Young Ocean Explorers

Find out how you can help beat plastic pollution in estuaries by completing this  Young Ocean Explorers assignment.

Conduct a litter survey on Ōkārito Beach to investigate human impacts on this estuary.

Kayak trail (1–3 hr)

The self-guided  Ōkārito Lagoon Kayak Trail allows you to explore the lagoon on the water in a kayak.

Short walks

Ōkārito Wetland Walk (20 min, 1 km return): This track starts at the car park by the Ōkārito School House and winds through bush before crossing the estuary on a curving boardwalk. Watch for small fish darting amongst the rushes. If you are very lucky, you may spot the secretive fernbird/mātātā and the Australasian bittern/matuku hūrepo. The track then climbs gently to a viewpoint overlooking the estuary.

Pakihi Walk (30 min, 1 km return): This track crosses a pakihi swamp before climbing gently through a forest of kāmahi and rimu to a lookout platform. ‘Pakihi’ refers to the fire-induced plant community that grows here on poorly drained infertile soils. At the top you will be rewarded with views of the surrounding rainforest, coastal landforms and the Southern Alps/Kā Tiritiri o te Moana, including Aoraki Mount Cook, as well as a glimpse of the Franz Josef Glacier/Kā Roimata o Hine Hukatere.

For other walks in the area, see  Ōkārito walking tracks.

Health and safety considerations

- Do not cross the mouth of the Ōkārito Lagoon, as the flow and shifting mouth can be very dangerous to people and boats. Many lives have been lost to quicksand and swift-flowing water along west coast beaches. It is extremely dangerous to attempt to cross river mouths or lagoons running out to sea.
- Ōkārito Lagoon is tidal, so you must plan your visit around low tide if you wish to explore the mud flats. Check out  Tide times for Okarito.
- The coastal route of the Three Mile Pack Track: Ōkārito Coastal Walk is only suitable within 1 hr either side of low tide. Return to Ōkārito via the inland pack track outside this low-tide window. There is no track beyond the bridge over Three Mile Lagoon.
- Kayakers are always advised to stay upstream of the wharf building.
- Take insect repellent as sandflies can be numerous.
- Wear appropriate footwear and carry wet weather gear.

Teachers should also consider general risk management around water and general health and safety considerations for schools in coastal environments – see

 *Activity 9: Visiting estuaries.*

Please note: The health and safety considerations listed here are not a substitute for a detailed safety plan.

This plan should be written by the educators, staff and students who are visiting the site. It should reflect the school’s safety policies and procedures and be based on accepted best practice in EOTC. A prior site visit by staff is highly recommended to identify and manage any current risks/hazards.



Native or endemic species found at this estuary

Ōkārito Lagoon is home to a large array of bird life. The beautiful white heron/kōtuku is rare in New Zealand and only breeds in one location here, north of the lagoon. These birds spend time in the estuary while breeding, feeding on small fish and invertebrates.



White heron/kōtuku. Photo: Peter J. McClelland

Other birds found at this estuary include royal spoonbills/kōtuku-ngutupapa, pied stilts/poaka, eastern bar-tailed godwits/kuaka, Australasian crested grebes/kāmana, little shags/kōau, Australasian bitterns/matuku hūrepo, fernbirds/mātātā, tūi, kererū, kingfishers/kōtare and pūkeko.

In the water, you can find longfin eels/tuna and whitebait/juvenile īnanga.

The nearby Ōkārito Forest is home to the most threatened species of kiwi, the Ōkārito brown kiwi/rowi, which has only one remaining breeding population. Here, you will also find the ancient forest giants kahikatea and rimu.

Habitats found at this estuary

This estuary contains mud flats, a tidal lagoon and sandy beaches.



Education providers in the area

Guided tour operators

Local guided tour options for exploring the Ōkārito area include  Okarito Boat Eco Tours,  Okarito Kayaks and  Okarito Kiwi Tours.

DOC rangers

DOC rangers may also be available to speak to sizeable education groups at the lagoon. If interested, please contact the Westland Tai Poutini National Park Visitor Centre at 69 Cron St, Franz Josef, South Westland.
Email westlandtaipoutininp_vc@doc.govt.nz or phone +64 3 752 0360.

Other education experiences

Toyota Kiwi Guardians Ōkārito

For activities and an adventure map, see  Kiwi Guardians at Ōkārito.

Donovan's Store, the Ōkārito wharf shed and the Ōkārito School House

Visit Donovan's Store, the Ōkārito wharf shed and the Ōkārito School House to learn more about the history of the gold rush boomtown, which almost reverted into the wilderness. See  Historic Ōkārito.

Waiau Glacier Coast Marine Reserve

This area also boasts the  Waiau Glacier Coast Marine Reserve.

ACKNOWLEDGEMENTS

Our sincere thanks to Michael McMillan (DOC) for his expert advice and assistance in preparing these site visit notes.

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VISITING ARAMOANA / OTAGO HARBOUR

The following information can be used to help plan your educational visit to Aramoana / Otago Harbour. Have fun and remember to look after this estuary and the plants and animals that live here during your visit.

NOTES FOR SCHOOLS AND EDUCATORS



Aramoana Saltmarsh walk and boardwalk. Photo: Laura Honey, DOC

Key information



The spectacular Otago Harbour is a large inlet on the far southeast coast of the South Island that forms a gateway to the city of Dunedin. This harbour is the largest feature of the 'drowned valley' landscape that characterises the Otago coastline.

At just under 360 ha, the Aramoana Ecological Area is a highly productive and varied landscape of unique character in Otago. Here, mud flats, saltmarsh, salt meadow and shrubland bounded by rolling dunes join to form the most intact example of this type of ecosystem in Otago.

The Aramoana Saltmarsh is part of the Aramoana Ecological Area and sits at the entrance to the harbour. Its upper limit includes the second largest representation of dune slacks (important wet dune hollows) in New Zealand, giving this area national significance.

The saltmarsh is sheltered by a prominent sandspit at the entrance to the harbour. This is all that is left of what was once the large island Kā Pukepuke-o-Te-Waiparapara, which was described as hilly and forested in historical land claims from 1879. The channel that allows ships to enter Otago Harbour between the sandspit and Harington Point is known as Huikaau in recognition of the mixing of waters that occurs where the ocean currents meet.

To find out more about the harbour and saltmarsh, see  Aramoana area.



Aramoana is a place of cultural significance for Tē Rūnanga o Ōtākou as the location where sea trails were linked to land trails in the mobile lifestyle of early Māori. In the pursuit of mahika kai (forest, freshwater and marine resources), Māori travelled great distances and depended on seasonal access to resources throughout the region. Otago Harbour provided an important base to return to, with access to abundant barracouta/mangā and mackerel/hauture for drying in late summer and a continual supply of cockles/tuangi. Aramoana, which means ‘pathway to the sea’, was also the place where Ngāi Tahu whānau crossed the mouth of the harbour to travel north through to Pūrākaunui.

To find out more about the history of this area and traditional Māori place names, see the 🗺 Ngāi Tahu Atlas and 🗺 Te Rūnanga o Ōtākou.

Getting there

From Dunedin, take State Highway 88 towards Port Chalmers and then on to Aramoana. The Aramoana Saltmarsh Boardwalk can be accessed from the Aramoana Domain on Moana Road, opposite the Community Hall. As you drive along Moana Road towards the spit and mole, look for a vehicle access gate on the right-hand side (signposted for toilets and a picnic area) that gives access to the Aramoana Domain on which you can park (if the gate is locked, continue along the road until it curves left, where there is a car park on the right). The path to the boardwalk starts from the back of the grassy domain – look for the sign under the tall trees.

See maps below for Aramoana and the spit (left) and access to the viewing platform (right).



Visitor facilities and parking

Parking is available at the Aramoana Domain on Moana Road, adjacent to the settlement of Aramoana, or in the car park further along where the road curves left towards the mole and the spit is accessed to the right. The Domain also has public toilets and a picnic area.

There is a bookable community hall at the Aramoana Domain, where you can obtain shelter and drinking water during your visit.



Biodiversity survey

Try completing a Marine Metre Squared Project (Mm2) sandy shore survey on the mud flats to investigate what is living in this environment. Use the survey to look for changes over time, which may depend on the season, weather or even human impacts. For more information and to check other available data, see  Marine Metre Squared.

Note: when conducting a Mm2 survey, it is important to keep disturbance of sand and animals to a minimum and put them back where you found them.

To assist with plant, shell and animal identification as you explore the estuary, check out the  Southern NZ sandy & muddy shore guide.

Observing shorebirds / five-minute bird count

The walkway around the estuary has informative signage that displays information about the various bird species that can be seen here. The Aramoana Boardwalk and mud flats are good places to observe wading birds.

The DOC website provides instructions on how to carry out  Five-minute bird counts.

Estuary survey

Look on the mud flats from the Aramoana Boardwalk at low tide for key species of seaweeds, plants, snails, crabs and other invertebrates of the estuary. See  MarineWatch estuary survey species ID slides.

Beat plastic pollution with Young Ocean Explorers

Find out how you can help beat plastic pollution in harbours and estuaries by completing this  Young Ocean Explorers assignment.

Kiwi Guardians: Otago Harbour/Aramoana

Try completing activities 7 and 9 on the  Toyota Kiwi Guardians Adventure Map.

Short walks

Aramoana Boardwalk (20–45 min return): The boardwalk starts at the Aramoana Domain and passes through tall flax and salt scrub vegetation and across mud flats to a platform that provides panoramic views of the saltmarsh and harbour. Take your time to spot mud crabs and birds wading and roosting in the marsh habitat.

Aramoana Spit (45 min, 3 km return): From Moana Street, travel out along the sandspit to discover the thin margin of land that is all that remains of a forested island. Take in the sweeping views of the harbour and narrow channel towards Harington Point.

Aramoana Mole (30 min, 2.5 km return): Take a walk along this artificially constructed breakwater (or mole) to reach a fine viewpoint of the open sea, Taiaroa Head (Pukekura) and sweeping Spit Beach. Pack your binoculars for a chance to spot royal albatrosses/toroa on Taiaroa Head and don't forget to also look closely at ground level for the threatened Cook's scurvy grass/nau, which persists in this highly modified landscape.



Health and Safety considerations

- In the Aramoana area, take care when crossing roads, walking along shared spaces with vehicles and travelling across the boardwalk. Keep to marked paths and the boardwalk to stay safe and avoid damaging the delicate plants and animals.
- If walking onto the Aramoana Mole, note that there is a high likelihood of encountering seals. Give these wild animals plenty of space and enjoy them from a safe distance.
- The opportunity exists to learn the differences between seals and sea lions in this area. Sea lions haul out on the spit while seals often rest on the mole. Sea lions are not afraid of people and may charge those who get too close. Observe them from a distance and have a plan to retreat in a calm way if members of your group attract the attention of a curious sea lion.

Teachers should also consider general risk management around water, sand/mud and coastal wildlife and general health and safety considerations for schools in coastal environments - see  Activity 9: Visiting estuaries.

Please note: The health and safety considerations listed here are not a substitute for school safety planning.

This plan should be written by the educators, staff and students who are visiting the site. It should reflect the school's safety policies and procedures and be based on accepted best practice in EOTC. A prior site visit by staff is highly recommended to identify and manage any current risks/hazards.

Native or endemic species found at this estuary

Ninety species of fishes use Otago Harbour as part of their lifecycle, with the Aramoana Estuary providing critical habitat for juvenile rearing. These fish species include flounder/pātiki, mullet/kātaka, sole/pātiki rore, gurnard/pūwhaiāu, red cod/hoka, eels/tuna and whitebait/juvenile īnanga that migrate through the area.

The saltmarsh provides habitat for migratory eastern bar-tailed godwits/kuaka, South Island pied oystercatchers/tōrea tuawhenua, pied stilts/turuturu pourewa, spur-winged plovers/tuturuatu, banded dotterels/piopio, white-faced herons/matuku moana, and various species of ducks and gulls.

In addition, 400 species of seabed invertebrates have been recorded in Otago Harbour, many of which rely on the mud flats of the Aramoana Estuary. The  Southern NZ sandy and muddy shore guide introduces you to a range of these animals.

New Zealand's only species of seagrass/karepō thrives in the intertidal flats of Aramoana. Although this seagrass grows throughout the country, it is threatened by human activities, especially runoff from land modification. Aramoana and the greater Otago Harbour still showcase extensive meadows of this important seagrass.



Habitats found at this estuary

Habitats present at Otago Harbour/Aramoana include saltmarsh, intertidal mud flats and seagrass meadows.

The saltmarsh provides habitat of national importance for breeding fish, wading birds (including those that migrate from the other side of the world), invertebrates and special salt-tolerant plants. It can be divided into three zones.

The upper zone contains tall rushes, sedges and shore ribbonwood/mākaka. The red-stemmed, narrow-leaved shore ribbonwood/mākaka and jointed rush/oioi provide habitat for the reclusive and hard-to-spot fernbird/mātātā.

The middle zone of the marsh appears as a low-lying miniature forest with plants of decidedly shorter stature than those of the upper marsh. This zone in combination with the plants of the upper marsh provides habitat for over 80 native moth species.

The plants that live in the lower zone of the marsh tolerate regular submergence by the tide.

The threatened seagrass/karepō makes a large appearance in the intertidal flats. This plant underpins the entire marine ecosystem by enhancing primary production and nutrient cycling, stabilising sediments, increasing biodiversity, and providing a nursery for a range of invertebrates and fishes.

For more information on the habitats in this estuary, see  Aramoana Saltmarsh.

Education providers in the area

New Zealand Marine Studies Centre

The  New Zealand Marine Studies Centre at the University of Otago provides a range of options for school groups and educational visits to the harbour.

Aramoana Otago Conservation Charitable Trust

For information about education from the Trust, email conserve.aramoana@gmail.com.

Healthy Harbour Watchers

 Healthy Harbour Watchers is a community-based monitoring programme based at the University of Otago that welcomes volunteers.

Te Rūnanga o Ōtākou

 Te Rūnanga o Ōtākou



Other education experiences

DOC Ōtepoti / Dunedin Visitor Centre

50 The Octagon, Dunedin
Phone: 03 474 3300
Email: dunedinvc@doc.govt.nz

Royal Albatross Centre

1260 Harington Point Road, Otago Peninsula, Dunedin
Phone: 03 478 0499
Email: reservations@albatross.org.nz

The Otago Museum

419 Great King Street, Dunedin
Phone: 03 474 7474
Email: mail@otagomuseum.nz

Experiencing Marine Reserves (EMR)

 Experiencing Marine Reserves is a charitable trust/not-for-profit organisation that specialises in providing safe snorkelling experiences for school groups in estuaries and marine reserves. All of the necessary gear and expertise are provided. For more information, email info@emr.org.nz.

ACKNOWLEDGEMENTS

Our sincere thanks to Crystal Brindle and Jim Fyfe (DOC) for their expert advice and assistance in preparing these site visit notes.

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VISITING THE ESTUARY OF THE HEATHCOTE AND AVON RIVERS/IHUTAI

The following information can be used to help plan your educational visit to the Estuary of the Avon and Heathcote Rivers/Ihutai. Have fun and remember to look after this estuary and the plants and animals that live here during your visit.

NOTES FOR SCHOOLS AND EDUCATORS



Left: Rawhiti School at the Estuary of the Avon and Heathcote Rivers/Ihutai. Photo: Tanya Jenkins

Right: View of the Estuary of the Avon and Heathcote Rivers/Ihutai from South Brighton. Photo: Cameron Walker

Key information



The Estuary of the Avon and Heathcote Rivers/Ihutai is the largest semi-enclosed shallow estuary in Canterbury. Here, fresh water from both the Avon River/Ōtakaro and Heathcote River meet and mix with salt water from the ocean.

The estuary area includes 880 ha of mud flats, 100 ha of paddocks and 240 ha of oxidation ponds. It includes several parks and wetlands.

Te Ihutai is of great cultural significance to tangata whenua and is an important mahinga kai site for several iwi.

For more information, see  Avon-Heathcote Estuary Ihutai Trust.

Getting there

The Charlesworth Reserve and McCormacks Bay Wetland Reserve both have facilities suitable for large groups and education visits.

To access McCormacks Bay Wetland Reserve, turn off State Highway 74 at Ferry Road and continue to Main Road and then McCormacks Road.

To reach Charlesworth Reserve, turn into Linwood Avenue and then continue on to Humphreys Drive.

South Brighton Park is an alternative location for your visit, which can be accessed at the end of Beatty Street.



Visitor facilities and parking

Charlesworth Reserve

Parking is available for Charlesworth Reserve at the car park next to 54 Charlesworth Street.

There are toilets on Humphreys Drive near Charlesworth Reserve. See  Charlesworth Wetland.

McCormacks Bay Wetland Reserve

Parking for McCormacks Bay Wetland Reserve is along McCormacks Bay Road, adjacent to the reserve.

Toilets and a playground are located at the reserve on McCormacks Bay Road. See  McCormacks Bay.

There are large grassed areas and picnic sites at both reserves, as well as drinking water. There are also plenty of food outlets nearby.

South New Brighton Park / South Brighton Domain

This park has a large car park with a fantastic playground and public toilets. There is also a bookable picnic area – contact Christchurch City Council for details.

Suggested self-guided activities for school group

The Avon-Heathcote Estuary Ihutai Education Resource

by Tanya Jenkins / Avon-Heathcote Estuary Ihutai Trust.

This education resource has a range of options for self-guided activities at this site. Click on the link at  Education resource for teachers and parents.

Biodiversity survey

Investigate what is living in this estuary by completing a Marine Metre Squared Project (Mm²) sandy shore or rocky shore survey at low tide at McCormacks Bay, Pleasant Point or along Humphreys Drive, adjacent to Charlesworth Reserve. For more information, see  Marine Metre Squared and  *Activity 9: Visiting estuaries*.

Note: when conducting a Mm² survey, it is important to keep disturbance of sand and animals to a minimum and put them back where you found them.

Observing shorebirds / five-minute bird count

The best places for viewing wading birds are McCormacks Bay, Pleasant Point or at the Linwood Canal on the northern edge of Charlesworth Reserve.

Make sure you are quiet and still to maximise your chances of spotting shorebirds. Birds like to sit on the islands far from shore, so binoculars would be useful for viewing them.

The DOC website provides instructions on how to carry out  Five-minute bird counts.

Estuary survey

Look for key species of seaweeds, plants, snails, crabs and other invertebrates of the estuary on the beaches at low tide. See  MarineWatch estuary survey species ID slides.



Suggested self-guided activities for school groups

Beat plastic pollution with Young Ocean Explorers

Find out how you can help beat plastic pollution in estuaries by completing this  Young Ocean Explorers assignment.

Short walks

Wetland Edge Walk (15–20 min return): The  Wetland Edge Walk takes you around the wetland at Charlesworth Reserve.

Estuary Edge Walk, New Brighton (30 min, 2 km): Take the  Estuary Edge Walk over the boardwalk on saltmarsh around the estuary.

Health and safety considerations

- The weather can be very changeable at this site, so bring appropriate clothing for a range of conditions.
- There may be sharp objects such as broken glass, litter, sticks and shells on the mud flats, so please wear full shoes with intact soles.
- Mud flats can be extremely slippery, so watch your footing.

Also see *Section 1: Planning your visit to the estuary in the Avon-Heathcote Estuary Ihutai Education Resource* by Tanya Jenkins / Avon-Heathcote Estuary Ihutai Trust for other health and safety information for this site. Click on the link at  Education resource for teachers and parents.

Teachers should also consider general risk management around water and general health and safety considerations for schools in coastal environments – see  Activity 9: Visiting estuaries.

Note: The health and safety considerations listed here are not a substitute for a detailed safety plan.

This plan should be written by the educators, staff and students who are visiting the site. It should reflect the school's safety policies and procedures and be based on accepted best practice in EOTC. A prior site visit by staff is highly recommended to identify and manage any current risks/hazards.

Native or endemic species found at this estuary

More than 114 different bird species and 28 different fish species live in this estuary.

Approximately 5% of the population of South Island pied oystercatchers/tōrea live in the area. You may also spot wading birds such as variable oystercatchers/ tōrea, pied stilts/poaka, white herons/kōtuku, little black shags/kawau tūi and white-faced herons/matuku moana. Rare but regular visitors include bar-tailed godwits/kuaka, grey teals/tētē, royal spoonbills/kōtuku ngutupapa, white-fronted terns/tara and wrybills/ngutu pare.

The Bromley ponds support 75% of the New Zealand shoveller/kuruwhengi population and 15% of the New Zealand scaup/black teal/pāpango population. You can also see these birds at Linwood Canal.

Flounder, eel/tuna, yellow-eyed mullet and whitebait/juvenile īnanga are found in the water of the estuary.

Tunnelling mud crabs, stalk-eyed crabs, and mud flat snails are common on the mud flats.



Habitats found at this estuary

Charlesworth Reserve

You can find saltmarshes, a salt meadow, tidal pools, coastal bush, shrubland and shallow open water at this reserve.

McCormacks Bay Wetland Reserve

This bay hosts regenerating saltmarsh, coastal shrubland, mud flats open water and coastal bush.

For other habitat information for this site, see the Avon-Heathcote Estuary Ihutai Education Resource by Tanya Jenkins / Avon-Heathcote Estuary Ihutai Trust – click on the link at  Education resource for teachers and parents.

Education providers in the area

Christchurch City Council

Christchurch City Council offers related  Learning Through Action programmes at nearby locations for schools and education groups.

Other education experiences

Canterbury Museum

Nearby  Canterbury Museum offers a range of relevant learning experiences and education programmes.

ACKNOWLEDGEMENTS

Thank you to Tanya Jenkins (Avon-Heathcote Estuary Ihutai Trust) and Vanessa Mander (DOC) for their assistance, advice, photos and contributions to this resource.

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Experience Monitor Restore

Resources
Links to more information for iwi community groups, experts, visitors, teachers and children.



GLOSSARY

breeding	To produce offspring/have young (eg eggs and young).
buoyancy	The force that causes objects to float.
ecosystem	A natural system of complex relationships, including the physical environment, plants, animals and other living things.
endangered	A plant or animal species that exists in such small numbers that it is in danger of becoming extinct.
endemic	A living thing that has evolved in New Zealand and breeds and lives naturally, only in this country.
environmental issue	A problem or difficulty of concern for the environment.
estuary	Estuaries are partly enclosed coastal areas of shallow water, that are affected by tides. They are places where the fresh water of a river meets and mixes with the salt water of the sea.
habitat	A place where a living thing/ population naturally lives.
Incubation	Keeping the egg(s) warm and safe.
introduced	Has been brought to New Zealand by people.
juvenile	A young animal that has not yet reached adulthood and hasn't yet had offspring.
kaitiaki	Tangata whenua who have been given responsibility to protect and look after an area's resources. They act to restore ecosystems through a holistic approach, recognising that all things are interconnected.
kaitiakitanga	Kaitiakitanga is a way of thinking about and looking after the environment in order to help maintain the balance of everything within it. It can be loosely translated into English as protection or guardianship.
life cycle	A series of stages a living thing passes through during its lifetime – from birth to death.
mauri	The essence or life force present in all living things.
migrate	Travel to another specific location to breed or feed.
native	Living things that have come to New Zealand by themselves and have established populations here. They may also live in other countries.
roost	A place where birds settle down for rest or sleep.
shellfish	An animal that lives in a shell: eg pipi, cockle, oyster.
threat	Something that can harm, kill or disturb native animals or the environment.
value	A deeply held belief about what is important.



TEACHING STRATEGIES

BRAINSTORM

Students call out their ideas one at a time and the teacher records ideas, without filtering, on a whiteboard/ device or piece of paper that is visible to all students. After students have finished calling out ideas, the ideas can be discussed and/or grouped. This may be the start of an investigation or a way to record thinking at the beginning and end of a learning cycle.

TALKING DONUT

Students make two circles, one on the inside and one on the outside. Those in the inside circle turn to face a partner in the outside circle. They can discuss a question or topic until prompted. If you wish, one circle can move clockwise to then face a new partner and continue discussion.

THINK, PAIR, SHARE

Students consider a point and think about it for a few minutes individually. Then the students pair up and take turns to listen to one another's ideas. The listener can reflect back or summarise the speaker's points. They then swap roles. To conclude, the teacher can ask a few pairs to share what their partner said with the class.

THINK, PAIR, SQUARE

Students think about the learning focus, then share their thoughts, ideas and knowledge with a partner. This first pair constructs a summary of both of their ideas between them. The pairs then join with another pair (to form a square), share their paired summaries and collaborate to co-produce another joint summary.

JIGSAW/4 STRAY, ONE STAY

Students form into groups of 4 to 6. This is their home group. They work at their station/table on a particular task and record results. They discuss how to share the results and summarise findings for others.

Students from each group number off, each choosing a different station to visit. The group then separates, leaving one member behind to explain and summarise to the students visiting their station. The students visit their designated station and listen to the summary of results of that group. After a defined time, they return to their home group and report back to the group. In this way the whole class can be informed of all the groups' conclusions.

