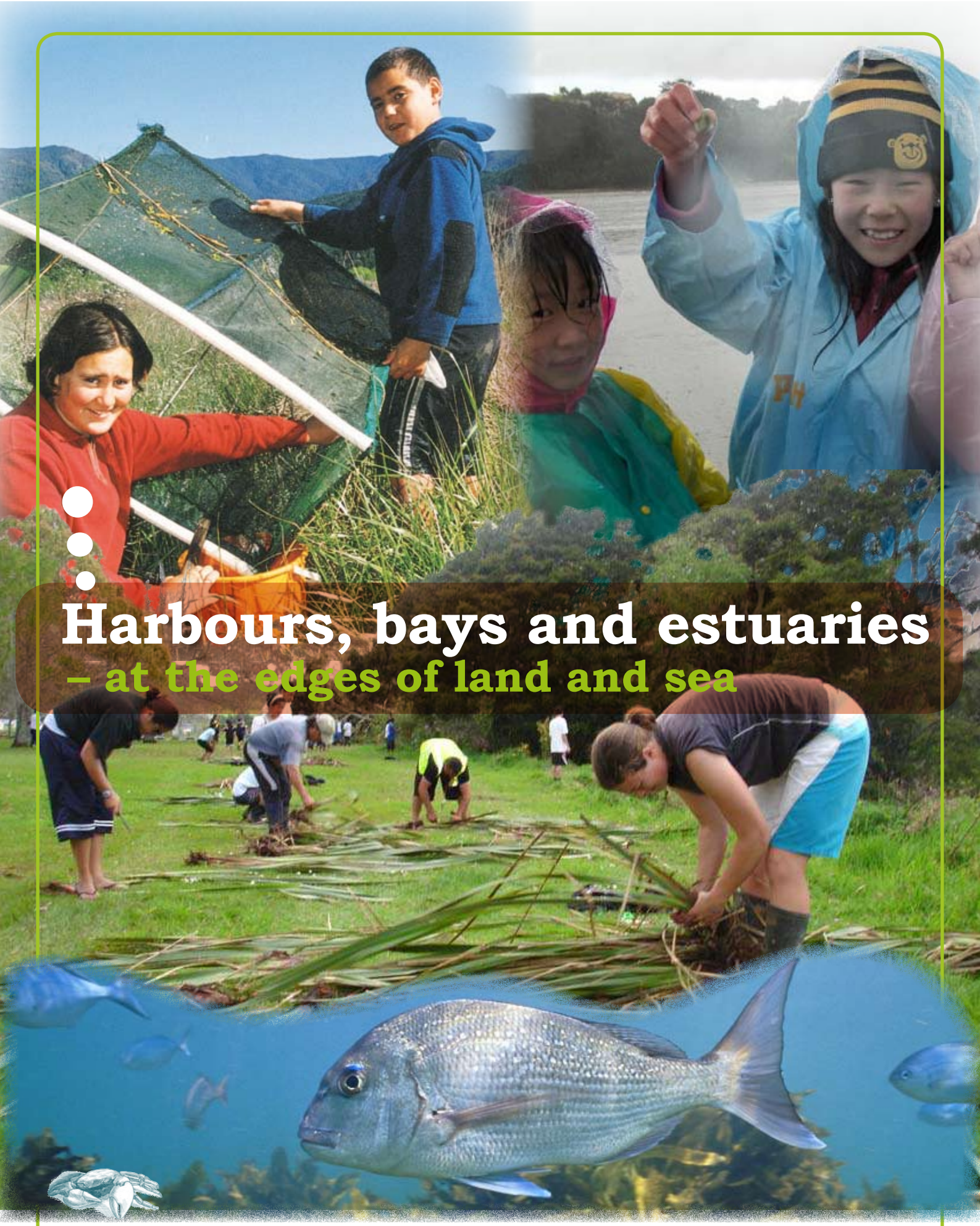

Harbours, bays and estuaries
– at the edges of land and sea

Department of Conservation
Te Papa Atawbai

Ministry of Fisheries
Te Tautiaki i nga tini a Tangaroa

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Getting muddy with cockles

Have you ever gathered cockles with your family? Not only is it fun to gather cockles, but for many Kiwis cockles are an important food source. In some places cockles are under pressure. We talked to Ministry of Fisheries Scientist Richard Ford to find out more about this shellfish that only grows in New Zealand.

SCIENTIST RICHARD FORD TELLS US ALL ABOUT COCKLES, PIPI AND TUATUA.

What are cockles?

Cockles or tuangi are bivalve molluscs. That means they have soft bodies that are protected by two outer shells – bi means two. Their two shells or "valves" are connected by a short ligament at the back that works like a hinge.

It might not look like it, but **cockles can actually move** around. They burrow with their single foot into soft mud which is why you have to dig for them when you go out to collect them. If too much sediment gets dumped on them though – say after a heavy rainfall when sediment is washed down from the surrounding land – they can't burrow out and may die.

The cockles we have in New Zealand are **found nowhere else in the world**, although they're closely related to other species around the world that are often called clams. In fact, sometimes New Zealand cockles are called little-necked clams.

Cockle. Illustrations by Lisa Paton.

bivalve molluscs

Photo courtesy Ministry of Fisheries.

Cockle in motion.

How do they eat?

Like other bivalves, cockles don't have heads. To eat, they pump water across their gills and catch phytoplankton (tiny plants). They then move the phytoplankton into their mouths. This process is called **filter feeding.**

You can tell when cockles are filter feeding because their shells are open.

Where do they live?

Cockles can be found in estuaries, mudflats and intertidal beaches all around New Zealand. Often cockles can be found near pipi beds, although pipi like to grow in sandier places than cockles so their beds will often be closer to where the estuary meets the sea.

Researchers have found that cockles prefer areas where there is **plenty of phytoplankton** but not too much sediment being washed down by rivers and streams.

Other shellfish that sometimes get confused with cockles

Pipi *(Paphies australis)* **live near the mouth of estuaries and harbours. They have a more oval-shaped shell.**

(Paphies subtriangulata) **Tuatua are found on open beaches and have a more irregular shell shape.**

Pipi near Mair Bank outside Whangarei Harbour. Photo courtesy Richard Ford, Ministry of Fisheries.

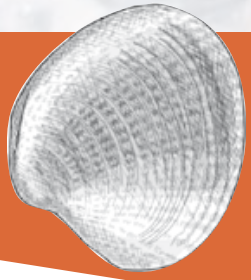
Do cockles have predators?

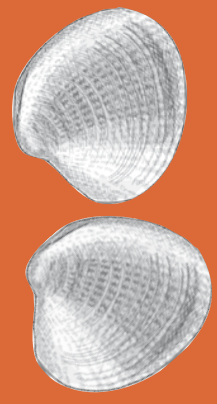
Yes, especially when they're young. Older cockles are harder for predators to eat because their shells are thicker and they live deeper in the sediment.

Sand flounder and other predatory fish eat cockles. Cockles are also an **important food source for many shorebirds** like oystercatchers.

There is a parasitic worm *(Curtuteria australis)* that as an adult lives in the intestines of some shorebirds. The adult worm's eggs are released out of the infected bird's faeces into the water where cockle live. Once the eggs hatch and move into the larvae stage they are sometimes eaten by cockles. Once eaten, the larvae move down into the region of the cockle's foot and replace some of the cockle's muscle tissue which causes the cockle's foot to shorten. At that point, the infected cockle can't burrow as deeply into the soft mud. So the cockle is more easily seen by the shorebirds that prey on them. When a shorebird eats an infected cockle the worm starts living in the bird's intestine and the whole process begins again.

South Island pied oystercatcher on nest with egg, Waituna Wetlands Scientific Reserve. Photo courtesy DOC, photographer Gordon Watson.





The Chinese Conservation Education Trust monitors cockles at Cockle Bay near Auckland. Their work helps the Ministry of Fisheries know how cockles are doing there. It's also a good way to teach people of all ages about the environment cockles need to survive.

Photos courtesy CCET.

digging

Big storms can cause big problems for plants and animals that live in our coastal environment. This cockle bed in Whangapoua Harbour was smothered by sediment carried down from streams and rivers during a big storm. Photo courtesy Don Morrisey, NIWA.

How old do cockles live to be?

Cockles can live to be about 25 years old. They mature between the ages of two and seven. Environmental factors like water temperature and food can influence a cockle's growth.

What impacts do humans have on cockle numbers?

While in many places cockle numbers are stable there are places where their populations seem to be declining. We think the reasons for this are that sometimes too many people are taking too many cockles (overharvesting), sometimes because of land-based effects on their habitat, and sometimes a combination of both these things.

To address the overharvesting issue, New Zealand limits people to taking only 50 cockles each day in the Auckland-Coromandel area and 150 each day for the rest of the country. In some areas these limits seems sustainable, but in other areas cockle numbers

recording

sampling

are still declining. In some places, the beaches have been closed to shellfish harvesting for periods of time with the hope the closure will allow cockle and other shellfish populations to rebound.

In three areas in New Zealand cockles are also **commercially harvested.** In these areas they are regulated (under the quota management system) and monitored to make sure that cockle population numbers remain stable.

Perhaps the hardest issue to address is the **effect of land-based activities on cockle populations.** After all, it's hard for someone to realise that what they do many kilometres away from an estuary impacts the plants and animals that live there. Across the country local councils and community groups are working on this issue though – through planning processes, monitoring programmes, and activities like riparian restoration projects.

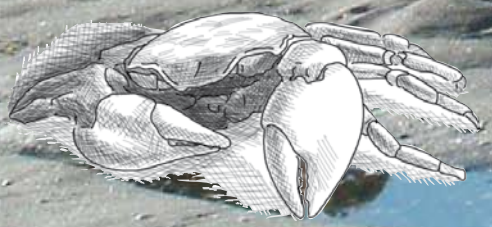
At Te Matuku estuary on Waiheke Island, students monitor cockles as part of their year-long education in marine conservation through WWF's Auckland Marine Matters Programme. Not only do these students count the cockles at Te Matuku estuary, they also measure them. The site is being compared with 11 other sites in the Hauraki Gulf Marine Park.

Photos courtesy Janet Hunt.

Cockles in trouble at Cheltenham Beach

- Cheltenham Beach is on Auckland's North Shore, not far from the port and the city centre. Despite being in the middle of a large city, until a few years ago Cheltenham had a healthy population of good-sized cockles that locals and visitors often enjoyed gathering.
- In the early 1990s though, residents noticed that cockle numbers were falling. They thought the cause was simply overharvesting. So the Ministry of Fisheries applied a temporary closure to harvesting for two years to enable the population to recover.
- A group of residents and Royal Forest and Bird Protection Society members formed a group called the Cheltenham Beach Caretakers. The caretakers surveyed the cockle population so everyone would know when harvesting could begin again. The results were disappointing as there was no sign of the hoped for recovery. The first two-year closure was extended for another two years, but with still no significant increase in cockle numbers, Cheltenham was closed permanently to shellfish gathering.
- Although cockles were once abundant at this beach they have now almost disappeared. People have not taken any for over 10 years, so the indications are that harvesting is not the problem. While the exact cause is unclear, it seems very likely that environmental changes have occurred at Cheltenham so that it is no longer a suitable habitat for these shellfish.

People gathering cockles.
Photo courtesy Ministry of Fisheries.



Acknowledgements

The Ministry of Fisheries and the Department of Conservation have developed this web-based educational resource to help students learn more about the effects of land-based activities on our coastal environment.

The student activities in this resource have been developed for Years 7&8, but many of the activities may easily be adapted for older students.

Special thanks to the three scientists who agreed to be interviewed for this resource: Dave West, Department of Conservation (Whitebait in our waters); Richard Ford, Ministry of Fisheries (Getting muddy with cockles); and Mark Morrison, National Institute of Water & Atmospheric Research (Our prized snapper).

Thanks also to Bruno David, Michael Hickford and Jane Goodman for reviewing and commenting on the "Whitebait in our waters" story. Thanks to Blake Abernethy and Richard Fanselow for their additions to "Getting muddy with cockles" and for reviewing this resource.

Eduardo Villouta, Department of Conservation, and Simon Thomas, Ministry of Fisheries, offered valuable advice on the development of this resource.

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The information in this resource was drawn, in part, from *A review of land-based effects on coastal fisheries and supporting biodiversity in New Zealand,* New Zealand Aquatic Environment and Biodiversity Report No. 37, 2009. This scientific review from the National Institute of Water & Atmospheric Research was produced for the Ministry of Fisheries and is available at www.fish.govt.nz.

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ISBN 978-0-478-11919-4 (Online)

August 2009

Front cover photo credits: Ian Trafford (top left); Chinese Conservation Education Trust (top right); Kim Boyle, Whitebait Connection (middle); Kim Westerskov (bottom).