

Freshwater mussels in coastal streams of New South Wales

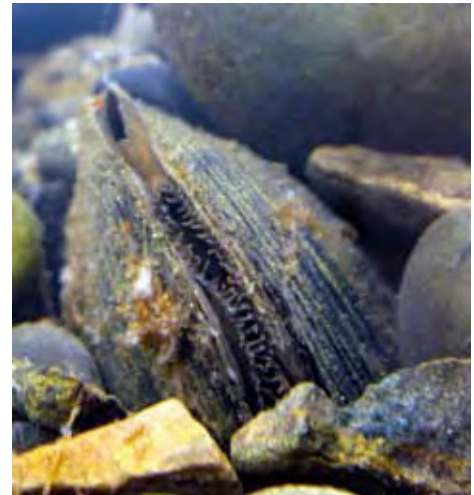
Freshwater mussels live on the bottom of streams and lakes, often in large numbers. Australia has 18 species of mussels, most of which are found nowhere else in the world. Eight species are found in NSW coastal waters. They are brown to black in colour and vary from 60 mm to 200 mm in length.

Mussel numbers have declined due to habitat loss, sedimentation of streams and nutrients in runoff from agricultural lands and urban areas.

Freshwater mussels (Hyriidae) should not be confused with basket shells (Corbiculidae) which grow no larger than 15 mm and have an orange shell.

Why are freshwater mussels important?

Freshwater mussels are important indicators of stream health as they are vulnerable to frequent habitat disturbance and are sensitive to pollution. They are also natural biofilters processing large volumes of water, thereby removing large quantities of nutrients, algae, bacteria and organic detritus. Excessive nutrient concentrations can reduce water quality and contribute to nuisance algal blooms. Because they are long-lived (10–40 years) and may occur in large numbers, they can lock up significant amounts of nutrients for many years. Mussel waste products are food for other animals and they, in turn, are food for water rats and platypus.



Mussels take in water through an incurrent siphon (fringed by papillae) removing the suspended particles and expelling the filtered water through the excurrent siphon.
Photo: Hugh Jones/OEH



Juvenile mussels need to spend their early development attached to fish gills or fins. Photo: Hugh Jones/OEH

Mussel life cycle

The life cycle of freshwater mussels involves a parasitic larval stage that must complete its development on a fish host. After spending a period of weeks to months attached to the gills or fins of a suitable host, the juvenile mussel drops to the bed of the stream where it spends the first few years of its life buried beneath the sediments. Mussels are sensitive to contaminants in the sediment at this stage of their life. They use a wide range of native fish species as hosts, as well as some introduced species such as the eastern gambusia. The wellbeing of mussel populations is closely linked to the health of the fish community – if there are no fish there are no mussels.

Where do mussels live?

Freshwater mussels are mostly found in permanent streams and lakes. The floodplain mussel (*Velesunio ambiguus*) is an exception as it inhabits temporary creeks and ponds, including farm dams, and avoids strongly flowing rivers. Complex river channels with a diversity of habitats often support mussels as do streams with extensive riparian (streambank) vegetation.

Mussels live in stable habitats that are protected from strong flows, avoiding the centre of the stream channel and gravel or sand bars where the streambed sediments tend to move during floods. Boulders or woody debris provide protection during floods and stabilise the streambed. Recesses along the bank often provide suitable habitat, particularly where there are overhanging trees and dense mat rush (*Lomandra* species).



Freshwater mussels come in various sizes but typically fit in the palm of the hand. *Cucumerunio novaehollandiae* (top) and *Alathyria profuga* (bottom) are common in streams of the Hunter–Central rivers region. Photo: Kerry Wilson

Mussels in decline

Freshwater mussel populations have decreased over the last 200 years. In some river systems mussels persist as fragmented, small populations which are susceptible to a range of threats and have a high risk of extinction. Recent surveys have revealed declining populations in the Hawkesbury–Nepean, Hunter and Hastings rivers systems. Mussel populations have declined in those rivers on the far south coast of NSW that have been impacted by sand slugs.

Threats to freshwater mussels include:

- accelerated rates of stream erosion and sedimentation
- chemical and organic pollution
- altered flow regimes from dams and water extraction
- invasive aquatic weeds such as salvinia (*Salvinia molesta*) and water hyacinth (*Eichhornia crassipes*).



A dense fringe of mat rush (*Lomandra longifolia*) with its flexible stems and strong root system provides ideal protection for the lower section of the streambank. Photo: Kerry Wilson

Managing mussel habitats

The following strategies will help to improve habitats for mussels. Conservation will be most effective if neighbouring landowners work together to restore habitats.

Fence off riparian land – Appropriately placed fencing, designed to survive floods, will restrict stock access and gives trees and shrubs a chance to regenerate. Riparian vegetation not only provides shade, improving water quality, but also protects streambanks from erosion and will return large timber to the stream, increasing habitat for mussels.

Plant filter strips – Dense, spreading grasses maintained at a height of at least 10–15 cm will complement riparian vegetation in reducing silt loads. These should be widest at gullies and other low points where water flows into the stream.

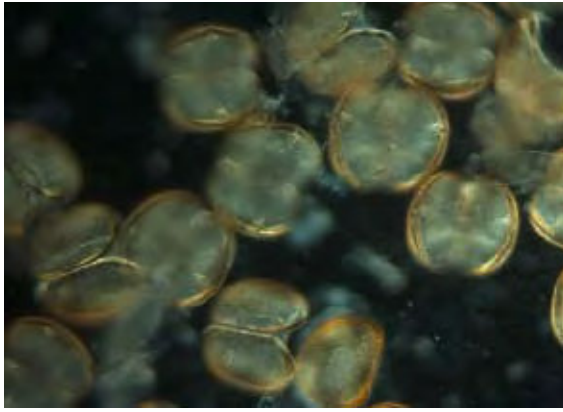


This stream reach with its well-developed fringe of riparian vegetation and plenty of large wood in the channel provides excellent habitat for mussels. Photo: Kerry Wilson

Restore degraded streambanks – A range of species should be planted from collected seed or tube stock to establish a multilayered canopy. The fine roots of trees and shrubs reinforce streambanks, while a dense groundcover growing on the bank reduces the removal of soil by the flowing water. Plants with flexible stems or a dense canopy are excellent for this purpose.

Restore aquatic habitats – Careful placement of boulders or large timber in the stream will create habitats for mussels by providing refuges during floods and reducing streambed movement. This is particularly important for small, sandbed streams. Clusters of large boulders on outer bends of rivers create suitable microhabitats for flow-loving species.

Stabilise the streambed – Some types of stream erosion need to be addressed by structures or bank stabilisation works (along with restoration of riparian vegetation). Such engineering solutions make use of rock or large woody debris to stabilise the streambed or protect the base of the streambank from erosion. Instream remediation actions are specialised, often expensive, and have to be undertaken with the oversight of the catchment management authority (CMA).



These tiny hooked larvae are only 0.25 mm diameter and are ready to attach to the gills or fins of a suitable host fish. Photo: Hugh Jones/OEH



A large mussel bed of *Cucumerunio novaehollandiae* in the Gloucester River. Photo: Kerry Wilson

Further information

Contact your local CMA (www.cma.nsw.gov.au) before starting restoration work, especially as instream works involve legal issues. CMA officers can help to assess, plan and implement a riparian land management program. CMAs may be able to provide funding and support to landholders and community groups.

Detailed information on identification of mussels, their habitats and life cycle can be found at www.environment.nsw.gov.au/animals/NativeAnimalFactSheetsByTitle.htm, from Environment Line on 151 555 or by email to info@environment.nsw.gov.au.



Gloucester River panorama. Photo: Kerry Willson

This project has been assisted by the NSW Government through its Environmental Trust.



Published by:

Office of Environment and Heritage
Department of Premier and Cabinet
59–61 Goulburn Street, Sydney
PO Box A230, Sydney South 1232

Phone: (02) 9995 5000 (switchboard)
131 555 (environment information and publications requests)
1300 361 967 (national parks, climate change and energy efficiency information and publications requests)

Fax: (02) 9995 5999 TTY: (02) 9211 4723

Email: info@environment.nsw.gov.au Website: www.environment.nsw.gov.au

OEH 2011/0307 ISBN 978 1 74293 241 5 May 2011