PROJECT PLATYPUS

HEALESVILLE SANCTUARY

Background Information

ZOOS VICTORIA

WERRIBEE MELBOURNE HEALESVILLE

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Background Information

Why do we have a 'Platypusary' at Healesville Sanctuary?

In the 1930's a wild caught platypus called 'Glennie' was kept and fed on tadpoles, worms and grubs for the longest time a platypus had been kept in captivity. A new and improved platypus enclosure was designed by Honorary Curator Robert Eadie at his home 'Glen Eadie' on the banks of the Picaninny Creek near the Sanctuary. It was called a '**Platypusary**'. A wild caught platypus, named 'Splash' was kept there for four years. He was trained to take food from the Curator's hand when a whistle was blown and became world famous. He was trained to cling to a dishmop and run up and down the Curator's arm.

'The most wonderful of all living mammals'?

In 1938 a young dispersing female platypus later named 'Jill' was picked up at Mt Toolebewong near Healesville Sanctuary and brought in. In the dry times of 1939 when the big fires were experienced, Badger Creek dried up to a series of waterholes. A young male platypus 'Jack' was brought in. In 1943 the pair bred and 'Corrie' was named after the Coranderrk, the name given to the lands of the Wurundjeri Aboriginal people whose dedication to bringing in yabbies and worms to feed the platypus was appreciated. 'Corrie' was the first platypus bred and hatched in captivity. David Fleay achieved this remarkable success in 1944. He described the platypus as 'the most wonderful of all living mammals.'

(David Fleay 1907-1993, naturalist, Curator at Melbourne Zoo and Director/ Consultant on Natural History, Healesville Sanctuary until 1951)

Captive Breeding

In 1999, 2 baby platypus emerged from 'Korinna''s burrow. Korinna herself came to the Sanctuary as a four month old in 1989. Twins were not expected although 2 eggs are normal in the wild. The twins were named Barak and Yarra Yarra.

Currently at the Sanctuary , we have two platypus who were stranded in the wild and rehabilitated: Milsom (boy) and Yamacoona (girl). We also have 5 captive bred platypus: Waddirang, Ember (who emerged just after the Black Saturday bushfires), Fleay and Binari (all girls) and Tarabi (boy).

Three reasons for displaying platypuses at Healesville Sanctuary

1. Public display in the Sidney Myer World of the Platypus

   The platypus is an Australian icon and of interest to international visitors. The behaviour and features are unique. They are an ideal species to deliver educational and conservation messages.
2. Captive breeding and research in the BHP Billiton Platypusary

   Healesville Sanctuary has a grand tradition and achieved many 'firsts' in platypus breeding and husbandry. The 'Platypusary' is an inviting exhibit and it includes all the elements that the platypus needs in a water and land environment. It presents opportunities to research the conditions for successful platypus reproduction. If the platypus do breed successfully, options can be explored for a 'soft release' to the wild.
3. Badger Creek is home to a population of wild Platypus

   Because the natural environment of Badger Creek is home to a population of wild platypus researchers can study them to explore this animal's secrets. The platypus is a valuable environmental indicator species. Studying it can help increase our knowledge of healthy riparian ecosystems and waterways and so help us survive in our world.

What is the conservation status of the platypus?

The platypus is regarded as commonly occurring but is classified as 'potentially vulnerable' because it responds so rapidly to changes in water quality and losses of food species. Although in the past it has been seen in the Murray River, it is probably now extinct in South Australia except for an introduced population on Kangaroo Island.

Common but vulnerable is the accepted status. The range of the platypus can be regarded as greatly reduced. The platypus is the last surviving example of an ancient species that has shrunk in diversity and has a reduced geographical range. in the east of Australia and Tasmania.

HEALESVILLE SANCTUARY

What is a 'platypus paradise'?

...a clear, pristine, sheltered rock pool of fresh water in a quiet slow-moving forest stream. It has relatively steep earth banks held by root systems or native shrubs. The stream flows slowly through areas of native vegetation and rocks. It has plants overhanging its banks to conceal the entrances to the burrows. It provides a range of different habitats for the insects that live on the bottom of the ponds. It also has mud on the bottom that shelters many different invertebrate species. On the banks are rocks and rotting vegetation and the overhanging branches deposit leaf litter in the stream to rot down and provide food for the insects. The platypus burrow system is complex and for breeding involves the female platypus excavating a burrow that terminates in a nest chamber above water level. She will plug up the entrance when she is ready to lay eggs.

What do platypus eat?

Platypus feed on invertebrates living in the muddy zones of the creeks at all stages of their life cycles (as larvae, adults and eggs). Mayflies and Caddis fly larvae have been found in the cheek pouches of platypus in many areas. The complex bill can seek out prey, sort it, pick it up and sift it, then store it in cheek pouches to be thoroughly masticated while floating on the water surface. Caddis flies look like little walking sticks that use external objects such as wood to weave a web around themselves. They are very sensitive to changes in water quality such as increased phosphates that flow from agriculture into waterways. Mayflies spend most of their time as nymphs in water and are only adults on land for a brief few days to breed. Small molluscs are also eaten. Platypuses also eat worms, snails, freshwater shrimps, yabbies, frogs and tadpoles. (At Healesville Sanctuary, the captive platypus diet per day: 60 grams of earthworms, 50 grams of mealworms, 20-30 grams of yabbies, 40grams of fly pupae and 60 grams of Tubifex worms when available). Platypus sometimes eat small fish. (Native fish species include Short-finned Eel Tupong, Short-headed Lamprey, Australian Grayling, Common Galaxias, Broad-finned Galaxias and Spotted Galaxias.) They can eat half their bodyweight in a day and lactating females eat even more.

Where are platypus found?

Platypus were first seen by Europeans in the creeks around Sydney, such as the Hawkesbury River. They are now known to inhabit creeks that flow from the Great Dividing Range towards the sea. Some platypus are found in the headwaters of creeks that flow westward but they do not inhabit the streams that are slower moving as they travel westward from the Range. Platypus have been found in the Murray River just downstream from Echuca. They are also found in the Goulburn and Ovens River catchments and in waterways in the Otway Ranges, East Gippsland and Tasmania.

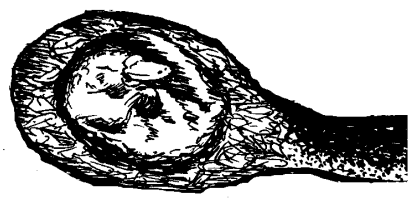
In Melbourne's early days in the late 1800's platypus were taken from the Yarra River, the Merri and Darebin Creeks for their skins. By the 1980's there were very few platypus left because of pollution and habitat destruction. They are now protected by law.

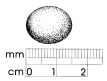
In the Yarra River catchment, platypus have been found in the Plenty River, Bruces Creek, Ruffey Creek, Diamond Creek, Running Creek, Arthurs Creek, Watsons Creek, Mullum Mullum Creek, Andersons Creek, Olinda Creek, Steels Creek, Sassafras Creek, Emerald Creek, Menzies Creek, Stringybark Creek, Woori Yallock Creek, Wandin Yallock Creek, Cockatoo Creek, Hoddles Creek, the Little Yarra River, Big Pat's Creek and the Yarra downstream to Heidelberg (only about 15 kilometres from inner city Melbourne) as well as the Maribyrnong River. Platypus are also found in the Dandenong Creek catchment downstream to Scoresby.

Even in streams with good habitat there are only about 1 or 2 platypus per kilometre of stream. The population size adjusts according to the amount of available food.

How do you get to see a wild platypus?

Platypus are not usually seen during the day, but at times they can be seen especially if they become familiar with a routine appearance of people moving very quietly. Sometimes males are seen as their range can cover 4 kilometres of stream. Between September and January females are occupied with breeding and are not likely to be seen. Around February, dispersing juveniles may be encountered as they leave their home range to establish themselves in new territory. The best chance of observing platypus in a known area is to approach really quietly without talking and look for a floating piece of log, and listen for the characteristic 'splash-dive' as the platypus retreats from the surface of the water. Platypus usually leave their burrows and search for food in the early morning or just after dark.

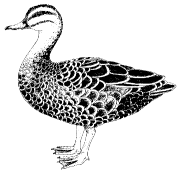




What is platypus classification?

Classification: The vertebrate animals are the ones with true backbones. They include seven classes – the amphibians, 3 classes of fish, reptiles, birds and the mammals. Each class contains a number of orders of animals which are similar to each other. Within each order there are usually several families. The platypus is grouped with the echidna into the order Monotremata. The monotremes are distinctive in that they lay eggs instead of giving birth to live young.

The first specimen was a dried skin sent to Britain from Australia in 1798. It was thought to be a fake stitched together by a taxidermist using the parts of a mammal and the beak of a duck. Platypuses have been described as 'primitive mammals' and 'furred reptiles'. The early settlers called the platypus 'duckbill' or watermole'. It was then given the name 'Platypus anatinus' (flat-footed, ducklike animal) in 1799. However 'platypus' had already been given to a group of beetles, so another name had to be found; this was *Ornithorhynchus anatinus*.



How do Aboriginal stories describe the origin of the platypus?

The platypus was common in the Yarra River and the Wurundjeri name for the platypus is 'dulaiwurrong' referring to its 'big lips'. Other places in Australia had different languages and their names include 'boondaburra' 'mallingong' and 'tambreet'.

In a Yarra River Wurundjeri Creation story, the first platypus was created when a young female duck mated with a very persistent water rat. The babies had the bill of their mother, and the dense brown fur, four legs and webbed feet of their father.

What features does the platypus share with mammals?

- Covered with fur: two layers of silky fur, a woolly undercoat in a pale colour with long shiny guard hairs to trap air to keep the platypus dry and warm even in freezing water for up to 12 or more hours
- mammary glands, (areolae) that produce milk composed of casein (the primary protein), whey, proteins, carbohydrates, fat and minerals
- four chambered heart
- warmblooded or endothermic producing heat and maintaining body temperature by its own metabolism. Body temperature is regulated to a lower temperature than other mammals (32˚C as opposed to the 37-38˚C of humans) Platypus can swim in freezing water by increasing their metabolic rate. (Reptiles are not insulated with fur or feathers. Reptiles are ectothermic. In order to be active they absorb heat from basking in the sun)
- two epipubic bones of an unknown function, but shared with all marsupials even though the platypus does not have a pouch
- seven cervical vertebrae
- legs are splayed like a reptile but rotate in the socket like a mammal

What features does it share with reptiles?

- lays eggs that have a soft shell like a lizards that retain the eggs inside the genital tract until the young are ready to hatch. (ovoviparous) Platypus eggs are about 14 mm by 17 mm in size and they feel and look like parchment
- legs are splayed under the body like a reptile
- skeleton looks like a reptile
- produces vitamin C in its liver (not kidneys)
- body is 'dragged' along the ground
- venom glands
- baby hatchlings have a sharp egg tooth on the upper jaw just like reptiles such as the crocodile to help them tear open the rubbery shell of the egg
- shoulder girdle is like a modern reptile with a T shaped bone called an 'interclavicle'
- legs end in webbed feet each with 5 claws like a goanna. the webbing can be folded back to expose the claws for digging and for walking across land
- females have a cloaca
- males have internal testes

What features does it share with birds?

Lays eggs

Bill looks like a duck's bill

Can regulate its body temperature

Reproductive system is like a bird's

Shoulder girdle of a bird

What features does it share with other organisms?

Like fishes and sharks, the platypus has electroreceptors in its bill for locating prey under water.

What does platypus venom feel like?

The platypus is the only venomous furred creature in the world.

In Queensland a 57 year old man was spurred on his right hand by the leg of a male platypus. There were two spur wounds. Instantly he was in severe pain. The agony was long lasting and the pain was acute. He took the normal painkillers but they did not help. He was admitted to hospital. The doctors put him on an intravenous narcotic drip for the pain. He was then given a pain block to his right wrist. He felt some relief, but he still required narcotic analgesics for several days afterwards. He stayed in hospital for 6 days. The hand was swollen and painful and for 3 weeks he could not move it. For another 3 months he was unable to use his hand normally.

To date, there is no antivenene for platypus venom and the only way to help the patient is to block the nerves to the area that has been affected. The poison is not life-threatening but the pain is severe. In the days when platypus were hunted for fur, dogs were spurred on the nose when they were sent out to retrieve platypus from creeks. Apparently they died after respiratory and cardiac arrest.

Both male and female platypus have a spur, but the female spur is shed by 8-10 months of age. A small pit is left to show the spot. The males have a spur from the time they leave their mother's nursery burrow. The spurs are obvious and are about 1 cm long and cone-shaped. The spurs are covered with a white substance like chalk that is chipped away so that at the age of about 9 months the hollow, brownish spur can be seen. It is connected to a venom gland in the thigh. When the young male is two years old and mature, the gland produces toxin. During the breeding season the males probably use their spurs as weapons when competing for breeding territory and for females. Wild caught males have been found with healed spur wounds. In captivity, male platypus have been known to kill each other but this could be attributable to being enclosed in limited area with no means to escape aggression. One captive 15 year old male platypus died after being spurred by a young male but he may have died from infection. In the wild, male platypus in some places have a home range that is only theirs so that they avoid each other. Sometimes they have an overlap and share their home range but they will separate in the breeding season or look for food at different times of the day or night.

What do you do if you find a platypus tangled in an Opera House yabby net or fishing line?

Phone the RACV Wildlife Connect line on 13 11 11. The RACV will connect you with the established 24 hour volunteer wildlife rescue service in your area. Or phone Healesville Sanctuary Australian Wildlife Health Centre on 5957 2829.

Applying learning

This table can be used by teachers to encourage students to link up effects to causes and to suggest appropriate community actions.

Causes	Effects	Actions
Introduced plants on banks eg willows, blackberries	Low numbers of aquatic invertebrates	Community weeding days; take care with herbicides; disturb no more than 20% of platypus habitat in 1 year
Bank erosion	Predation by foxes, increased impact of floods, unsafe burrows	Community planting days
Household chemicals, pesticides washed into gullies	Foul platypus fur, poisoning platypus prey species	Use non-toxic alternatives eg. mechanical 'snakes' to clear blocked drains; wash cars on lawns
Increased salt from dryland or irrigated areas	Saline water holds less oxygen, productivity of streams is reduced; platypus electroreceptors may not work	Planting trees to lower water table
Increased runoff of phosphates and organic nitrogen from agriculture	Water holds less oxygen, toxic blue-green algae mat grow or bacteria that consume oxygen	Use only phosphate free detergent to wash dishes and clothes
Overloaded septic systems	Excess nutrients are not treated in septic tanks and flow into streams	Avoid putting too many loads through washing machine on one day
Grazing pressure from cattle	Erosion on banks, fouled water	Fencing, planting, provision of watering points for cattle away from creek
Toxic compounds and heavy metals	Bioaccumulation—platypus as top order predator have increased concentrations	Dispose of dangerous waste appropriately
Rubbish in streams or on banks	Platypus caught in plastic, cut or scarred on broken glass or barbed wire, entangled in fishing line	Pick up litter, join community Clean ups', cut rings of plastic tops, retrieve fishing line, refuse plastic bags

What about phosphates?

Phosphates are naturally occurring nutrients in waterways and phosphates in household cleaning products are completely non-toxic. Problems occur however, when there is excessive discharge into aquatic environments via our drains and our stormwater systems. Phosphates can disrupt the macro-invertebrates on which the platypus feed and poor water clarity caused by increased algae impedes the ability of the platypus as it forages for food.

Although exact platypus numbers are hard to determine, annual platypus surveys conducted by CESAR consultants in Melbourne's surrounds indicate the population in Victoria is declining.

Phosphates can be found in about 97% of household cleaning products. (Tjandraatmadja, G., Pollard, C., Sheedy, C., Gozukara, Y., 2010, 'Sources of contaminants in domestic wastewater: Nutrients and additional elements from household products'. CSIRO, Water for a Healthy Country Flagship Report)

Every week Australians wash 450 tonnes of phosphates down the drain. (Australian Bureau of Statistics Population Statistics + CSIRO, Water for a Healthy Country Flagship Report)

Most of the phosphates come from the laundry followed by the kitchen and the bathroom. (Tjandraatmadja, G., Pollard, C., Sheedy, C., Gozukara, Y., 2010)

Each person who makes the switch to phosphate free detergents saves around 2kg of phosphates from going down the drain each year. One family of five can save around 10.4kg a year and that's great news for platypus. (Tjandraatmadja, G., Pollard, C., Sheedy, C., Gozukara, Y., 2010)