Murray River Turtle Information Package

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Species identification

There are three species of turtles in the River Murray in South Australia.

Murray short-necked turtle, *Emydura macquarii*

Also known as **thukubi** (Ngarrindjeri dictionary)

The short-necked turtle is very abundant and common in open water, including lagoons and the mainstream of the river. Males grow to about 2.2 kg and females may sometimes exceed 4.0 kg. They are typically olive green or bronze in colour (Fig. 1) on the carapace and cream underneath. The shell can be stained or covered in green algae or mud. The neck is short relative to the other species. The plastron is narrow and does not cover the legs when they are retracted. Short-necked turtles sometimes bask on logs in the water, but otherwise they rarely come out of the water, except to nest. They probably nest close to where they normally live and usually within 50 m of the water's edge. Nesting time in South Australia is usually from about the second week of November through to Christmas, with eggs taking 6-8 weeks to hatch. Some females lay two clutches of eggs in a season and the clutch size can be up to 30 eggs. Short-necked turtles are omnivorous, eating considerable plant material, as well as invertebrates. They are major consumers of dead animals, cleaning up dead fish and other animals in the water. Currently listed as threatened in Victoria because they are an ageing population.

Figure 1. *Emydura macquarii.* Photo: R. Spencer

Check box

- ❒ About the size of a dinner plate
- ❒ Most likely to be seen basking on logs (may just hear a big splash though)
- ❒ Small chunky neck
- ❒ Not on land much, may find them nesting in November

Eastern long-necked turtle, *Chelodina longicollis*

Also known as **malinthaipari** (Ngarrindjeri dictionary)

The Eastern long-necked turtle is the most widespread turtle in south-eastern Australia. It lives in any body of water, from the main river, to permanent and temporary fringing wetlands and farm dams. Long-necked turtles are the most terrestrial of the three species, often travelling from one water body to another. Thus, they are commonly killed on the roads. Long-necked turtle are the smallest of the three species, with males growing to almost 1 kg and females sometimes more than 1.5 kg. The carapace is typically very dark brown or black (Fig. 2), and the plastron is cream with distinctive black lines along the joins between the scutes of the plastron (Fig. 7,8). The plastron is wide, covering most of the limbs, head and tail when they are retracted. This species releases a distinct, pungent scent from glands on the bridge between the carapace and plastron. Nesting season is predominantly in November and December. The females may walk considerable distances from water, but generally less than 200 m, and many nests are close to water. The eggs take 2-3 months to hatch and the babies have distinct orange or red spots on their plastron (Fig. 3). Long-necked turtles are carnivores, mostly feeding on invertebrates from zooplankton to macro-invertebrates, including yabbies. They will eat dead animals in the water, which means that they can be caught in baited traps.

Figure 2. Adult female *Chelodina longicollis*. Note growth of algae on carapace.

Photo: M.B. Thompson

Figure 3. Hatchling *Chelodina longicollis*. Note the general black colour, except for bright orange or red spots on the plastron. The only species in the Murray with distinctive orange markings. The orgnge spots are lost as the turtle grows.

Note also the umbilical scar, which indicates that this individual hatched recently.

Check box

- ❒ About the size of a bread/side plate
- ❒ Most common species found on land
- ❒ Long, slender neck
- ❒ Distinct black markings on the plastron (underside)
- ❒ Pungent smell when you pick them up

Broad-shelled turtle, *Chelodina expansa*

Also known as **weri** (Ngarrindjeri dictionary)

The broad-shelled turtle is the largest of the three species and has the longest neck of any turtle in the world (Fig. 4,9). It is the least common species in the Murray, living only in permanent, deep water. Females may exceed 5 kg in mass and males may reach almost 4 kg. They are easy to tell apart from long-necked turtles because the plastron is narrow and lacks the distinct black lines between the scutes (Fig. 9). The plastron does not cover the legs, head and tail when they are retracted. Broad-shelled turtles nest in autumn, so their nesting time is after the nests of the other species have all hatched. The eggs are much larger than the other species. They nest singly and often quite some distance from the water – maybe even more than 500 m. Embryonic development can sometimes be arrested, giving the eggs a very long incubation period of a year of more. Broad-shelled turtles are obligate carnivores that feed mostly on fast swimming prey such as fish and shrimps, but will eat dead animals, as they are captured in traps baited meat. Endangered in Victoria.

Figure 4. Adult *Chelodina expansa*. Note extraordinarily long neck. Photo: H. Stricker

Check box

- ❒ About the size of a large platter. Very distinctive when you find one.
- ❒ Least common species found on land
- ❒ Very long, slender neck, flattened head

Sexing turtles

Generally speaking, female turtles grow larger than males and males have longer tails than females. That is because mating occurs in the water with the male on the top of the female and he has to reach around the female's carapace to insert his penis into her cloaca. The long penis extends from an opening half way down the tail, which extends its total length (Fig. 5).

Emydura macquarii and *Chelodina expansa* easily fit this description, but *Chelodina longicollis* is much more difficult to sex as the difference in tail length is less than in the other species and the tail is pulled tightly beneath the carapace when the turtle is picked up. Hatchlings and juveniles are impossible to sex, so they should just be recorded as "hatchling" or "juvenile". Adolescent turtles are often difficult to sex, too. Use your best judgement and, if in doubt, record them as "juvenile" or your best guess at sex, followed by a "?".

Emydura macquarii

Adult *E. macquarii* are easily sexed by their size and the length of their tail (Fig. 6). The tail of males is very long, with more than half extending past the end of the carapace, if the tail was extended straight out. The tail of females does extend beyond the carapace, but not much. The cloaca of the male is towards the end of the tail, whereas that of the female is not more than half way along the tail.

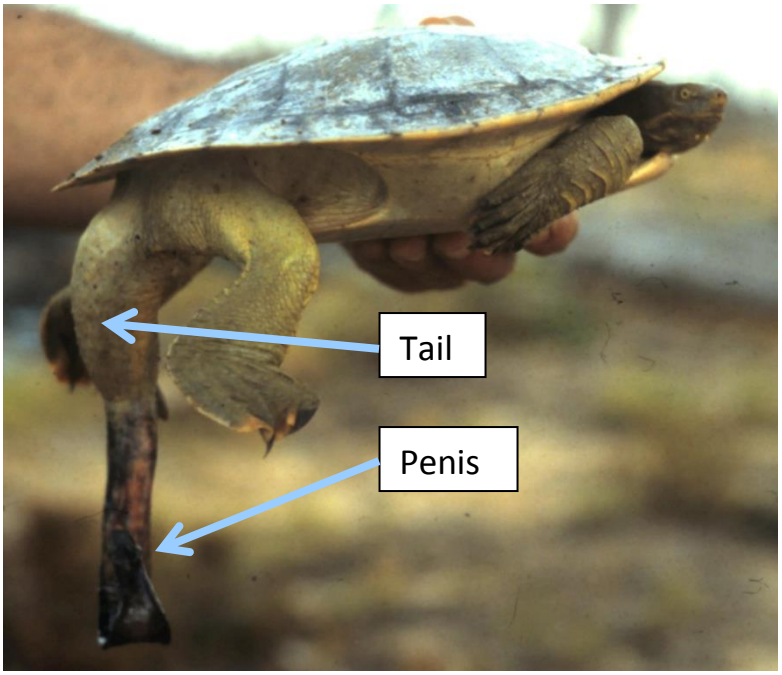

Figure 5. Extended penis of *Emydura macquarii*. Note that the cloaca is near the end of the tail.

Photo: M.B. Thompson

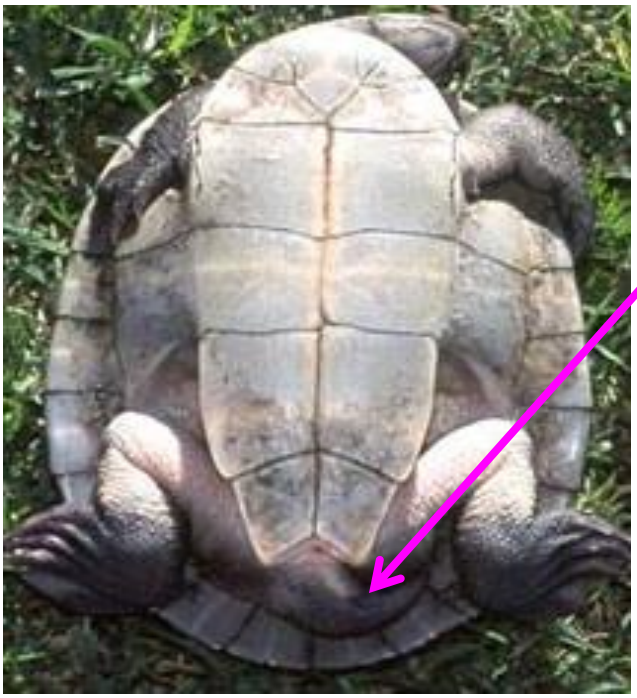

Figure 6. Male (top) and female(bottom) *Emydura macquarii*

Note that the plastron is narrow and does not cover the legs.

The ventral colour is generally a light olive or cream, although it may be stained brown or rusty coloured. There are no dark lines along the joins between scutes of the plastron.

The top photo is a male. Note that the tail is long. If it was straight out from the body, two thirds of it would extend beyond the carapace.

The cloacal opening is three quarters of the way to the tip.

Females (bottom) have a much smaller tail and the cloaca is approximately halfway to the tip.

NB. Do not use shape of plastron to identify sex in this species.

Photo: R. Spencer

Chelodina longicollis

For this species, you need to use the shape of the plastron to identify the sex. Turn the turtle onto its back. If it is large (larger than 1,000 g) it is almost certainly female. The notch at the back of the plastron in mature females is rounded and in males it is "V-shaped". Also, the posterior plastron of females tends to bulge outwards, whereas in males it tends to be concave (Fig. 7,8).

Figure 7. *Chelodina longicollis*. As adults, there are very distinct black lines between each of the scutes on the plastron. Note that the plastron is broad and mostly covers the legs.

This is a male. Note the:

- slightly concave posterior plastron

- V-shaped notch at the back of the plastron

- tail is pulled in very tightly so that you can't see its length

Photo: R. Spencer

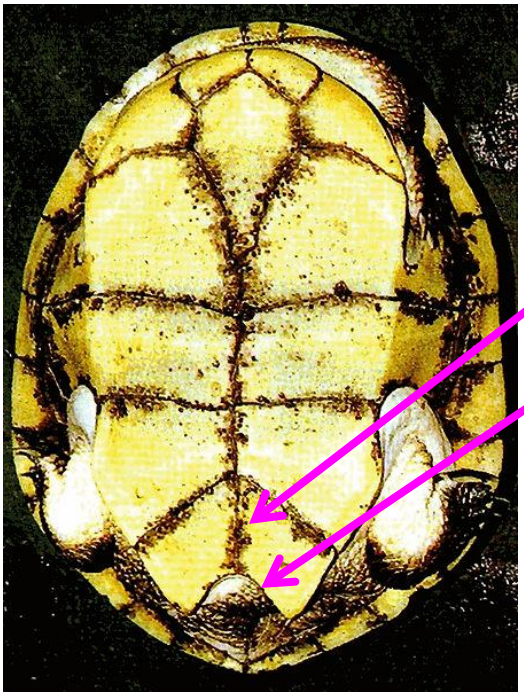

Figure. 8. *Chelodina longicollis*.

This is a female. Note the:

- slightly convex (outwardly rounded) posterior plastron

- U-shaped notch at the back of the plastron. Can look an exaggerated V-shape too.

- tail is pulled in very tightly so that you can't see its length

Photo: M.B.Thompson

Chelodina expansa

Sexing of *C. expansa* is similar to that for *E. macquarii*. Males have longer tails and do not grow as large as females (Fig. 9). The difference between the male and female tail in *C. expansa* is not as exaggerated as in *E. macquarii*.

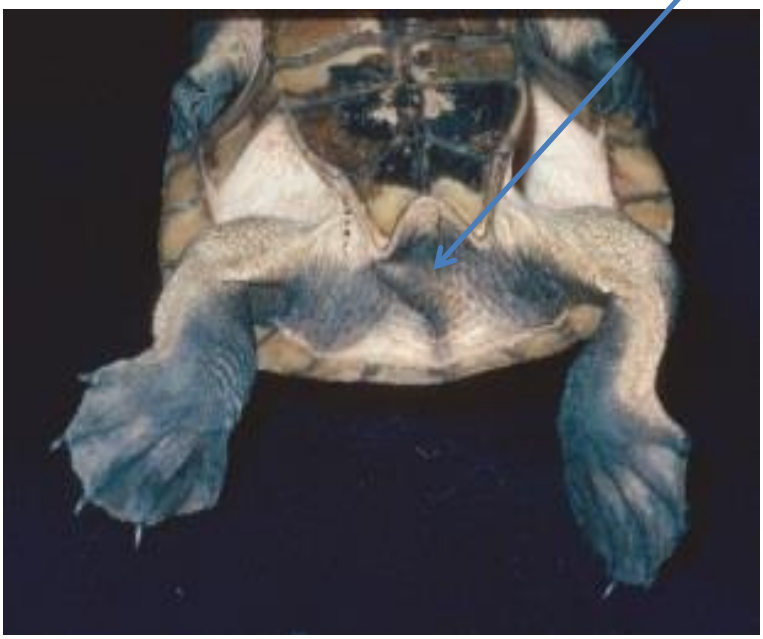

Figure 9. *Chelodina expansa* is the largest species in the Murray and has a very long neck. The plastron is narrow and does not cover the legs when they are retracted. There are no distinct black lines between scutes on the plastron. The plastron is generally cream in colour, but often is stained as in this specimen.

This specimen is a small male. The tail is short (it will be thicker with adult males) but longer than the adult female turtle below.

Photo: Cann (1998)

Nesting behaviour

All three species are aquatic, but must lay their eggs in nests on land. The females emerge to dig their nest, most commonly in or just after rainy weather at the right time of the year for the species. They may actually come out and walk around on land several time in the two weeks leading up to actually nesting. How the females determine exactly where to nest is not known, but generally speaking they avoid dense vegetation where the nest would be shaded.

Turtles have a very characteristic method of nesting. The nest chamber is dug using the back legs, so the female cannot see what she is doing (Fig. 10). If she hits an obstruction e.g., a rock or root, she will abandon the nest and try somewhere else. You will often see these abandoned nesting attempts. Record them and try to identify why they were abandoned.

The nesting female digs down with one foot, removing a foot full of dirt and placing beside the nest hole, and then she repeats that action with the opposite foot and so on until she has dug a hole as deep as she can reach. As she gets towards the bottom of the nest, she may raise the front of her body up on her front legs to get better reach into the hole with her back legs. Hence, the depth of the nest is determined by the length of her back legs. Once the hole is deep enough, she digs backwards at the bottom of the hole to end up with a boot-shaped nest chamber.

She then lays eggs into the hole. They drop into each other, sometimes causing small indentation fractures as they crash together. If the eggshell and it underlying membranes are not breached, however, the egg remains viable. The boot-shaped nature of the nest chamber allows eggs to roll backwards into the nest.

Once all eggs are laid, the female begins to refill the hole with her back legs, dropping soil onto the eggs (Fig. 11). The shape of the hole means that often there is an air space left above the eggs in the “foot” or the boot-shaped hole. Once the hole is filled, forming what is called a nest plug, she positions herself over the completed nest, stretches her legs out fully, and then pulls them out from under her body so that her plastron bangs down on the nest. She repeats these body slams several times so that the nest becomes disguised.

A completed nest is remarkably cryptic, but is often detectable because bits of grass and other vegetation are sticking out of the nest plug in a way that does not look “normal”. A female on the way back to the water will have mud on the posterior of her plastron (Fig. 12).

Figure 10. *Chelodina longicollis* nesting in South Australia. Note that the female has dug a hole with her back legs and cannot see what she is doing.

Photo: M.B. Thompson

Figure 11. Female *Emydura macquarii* just finished laying eggs and beginning to fill in the nest plug.

Photo: R. Spencer

Figure 12. Female *Chelodina expansa* that had just completed nesting. Note the mud caked on her plastron.

If you find one female nesting, there may be others in the area. Try to avoid going near them if they are still digging- they will leave. If they seem quiet and only moving every few minutes, then you can probably approach from behind (very slowly). Approach if you can flag the nest, or GPS the exact location, but otherwise leave the area because there are other females in the water that are watching and waiting for you to go.

Emydura macquarii will nest *en masse* during spring storms. *Chelodina longicollis* will also nest after spring storms, but they won't often nest close to shore. *Chelodina expansa* nests in Autumn (around Anzac Day) and we have recently quantified their nesting preferences (see Fig. 13). All species appear to prefer nesting beaches with low vegetation or sand.

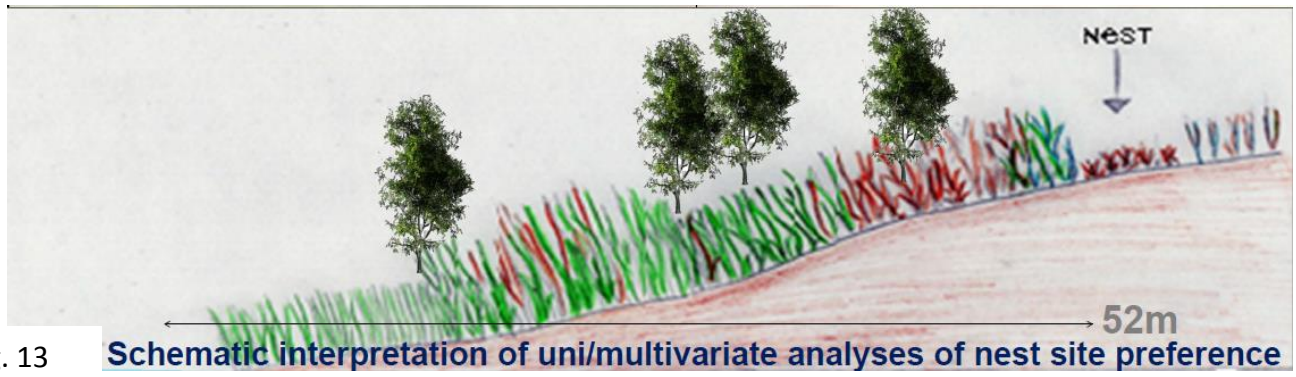

Fig. 13 Schematic interpretation of uni/multivariate analyses of nest site preference

Nest predation

Foxes generally dig up the nest and removed the eggs. They crack open the eggs and eat the contents, usually leaving the eggshells adjacent to the nest (Fig. 14, 15). Look around because eggshells blow easily in the wind and may be some distance from the nest when you find it. Foxes generally dig a fairly narrow entrance to the nest – just large enough to put their snout in to pull out the eggs. Foxes often defecate on the nest afterwards.

Water rats generally excavate nests that are fairly close to the water. They dig a very narrow entrance to the eggs chamber, pull the eggs out of the nest, break them open and eat the contents next to the nest. Water rats may not eat all of the eggs in a nest, so check for intact eggs in the bottom of the nest chamber. Water rats sometimes leave teeth marks in the egg where they have grabbed it to remove it from the nest.

Goannas. Identifying turtle nests that have been excavated by goannas is tricky because the nest is dug open widely and they eat the whole egg, shell and all. Hence, there is no evidence of eggshells. Goannas dig up other prey, too. To identify whether the remaining hole was a turtle nest, look carefully at the shape of the bottom of the hole. The bottom of a turtle nest is generally fairly smooth, rounded and slightly boot-shaped. You have to use your judgment. Identifying that the hole was dug by a goanna is relatively easy in harder soil as they leave distinct claw marks. The holes dug by goannas are far less 'delicate' than foxes, and nest chambers are often completely destroyed.

Crows/Magpies. Crows excavate turtle nests during the day time, most likely after they have seen a turtle nesting. Generally, nest dug by crows will be in sand or softer soil and there should be plenty of obvious bird footprints. They will also break open the eggs and eat the contents, leave eggshell remains, but sometimes they may eat eggs whole. They will use their beaks to open the nest chamber (circular hole, no scratching)

Figure 14. Nest that have been dug up and the eggs destroyed by foxes on the River Murray. In most cases, eggshells are still visible near the nest. Goannas do not leave eggshells.

Photo: R. Spencer

Figure 15. Nest dug up by a fox, with eggshells scattered nearby. Note that it is common for turtles to nest adjacent to low vegetation such as in this example.

Photo: R. Spencer

Other causes of death

Turtles die in all sorts of ways. On land, the dead turtles are usually female, having been killed when they come to land to nest. Deaths are cause by:

Cars. Record all road deaths and identify the species and sex of the victim. Most victims will be female (Fig. 16). Note that male *Chelodina longicollis* sometimes fall victim to road deaths, but it would be very rare to find a male of the other two species.

Figure 16. A female *Chelodina expansa* killed on the road near the River Murray. Note the eggs in her body.

Photo: R. Spencer

Fishing. Turtles drown in fish nets and fish and yabbie traps (Fig. 17). If you find adult or juvenile turtles dead on the bank with no signs of predation or trauma, then they may have been the victim of drowning in nets. Note that some fishermen illegally kill turtles that they catch with a hook on a line, too.

Figure 17. Turtles can drown in fishing nets. This net is actually a legally set turtle trap in the River Murray being tended by Ricky Spencer.

Photo: M.B. Thompson

Water management. Turtles are killed by water management in a number of ways. The main cause of death is probably drowing in water regulation and fish-excluder structures, although the effects of water management (Fig. 16) may have detrimental effects on turtles in the longer term.

Figure 16. Water management structures, such as dams and fish excluders may result in drowning of turtles.

Photo: M.B. Thompson

Foxes. Foxes often kill adult turtles on land, usually nesting females. The signs of foxes having killed a turtle is that its head and legs have been eaten off, as foxes are unable to crack the shell of adult turtles. Note that foxes may cache dead turtles, with reports of twenty or more dead female turtles being cached around a single fox den.

Figure 17. *Emydura macquarii* killed by foxes or dogs. Note the signs of teeth marks on the plastron as well as the back leg that has been snapped off.

If you find small turtles like this, it is likely that a water rat has killed it in the water and dragged it to its midden (others might be nearby)

Other causes of death. Keep your eye out for any dead turtles and try to identify the cause of death. Causes of death that we have observed include being struck by a boat or propeller, salinity, being stood on by cattle and getting caught in fences.