

NSW SCIENTIFIC COMMITTEE

Bellinger River Emydura *Emydura macquarii* (Bellinger River)

Review of Current Information in NSW

May 2008

Current status:

Bellinger River Emydura *Emydura macquarii* (Bellinger River) is currently listed as Vulnerable (as *Emydura macquarii signata*) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is now recognised that *Emydura macquarii* (Bellinger River) is genetically indistinct from *Emydura macquarii* sp., which is considered abundant in NSW. The NSW Scientific Committee recently determined that the *Emydura macquarii* (Bellinger River) does not meet criteria for listing under the *Threatened Species Conservation Act 1995* (TSC Act), based on information contained in this report and other information available for the species.

Species description:

The Bellinger River Emydura is a short-necked freshwater turtle with a light-coloured shell, pale belly, cream jaw-stripe and yellow eyes. It may be confused with two species: (1) the Eastern Snake-necked Turtle *Chelodina longicollis*, which has a long neck (extended head and neck longer than the shell) and black seams on the belly; (2) the similarly short-necked Georges' Turtle *Elseya georgesi* has a serrated hind edge to the shell, a dark belly with black seams, two distinct barbels (short spikes) on the chin, a distinct head shield, and silver eyes. The Bellinger River Emydura was believed to differ morphologically from other populations of the Murray Turtle, but is now known to be within the range of normal variation for this species. The few individuals with unusual characteristics are now believed to be hybrids with the Georges' Turtle.

Taxonomy:

Emydura macquarii (Gray 1830) (Chelidae) is an endemic Australian species, with several subspecies, in an endemic Australasian genus. The population in the Bellinger River catchment was thought to represent a distinct taxon, but has been recently reassigned to the widespread and secure population of the species that exists elsewhere in coastal NSW (Georges *et al.* 2007). Of six genetic types found in a recent Bellinger sample, two are shared with the Clarence River and two are shared with the Macleay, Nambucca and Hastings Rivers. Two are not known from outside the Bellinger, but this is explained as being due to low sampling effort in adjacent drainages. The two unique genetic types are suspected to be from a very recent introduction from the Coffs Creek drainage. Georges *et al.* (2007) conclude that the Bellinger River Emydura turtles are suspected to be a translocated population originating from several genetic sources (*i.e.* the adjoining Clarence, Nambucca, Macleay and Hastings drainages), and there is a confirmed case of accidental release of three individuals from Coffs Harbour at Bellingen.

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Distribution and number of populations:

The Bellinger River *Emydura* is a single population in the Bellinger and Kalang River drainages in coastal north-eastern NSW. It is geographically isolated (by about 5-10 km) from other populations in the Clarence and Nambucca drainages by rugged, forested ridge systems. However, it is not a recognisably unique genetic entity from other coastal populations of the species between the Clarence and Hastings drainages (Georges *et al.* 2007). The populations in the Clarence and Macleay have been previously classified as subspecies (*E. m. binjing* and *E. m. dharra* respectively), but they cluster together with genetic types from the Nambucca and Hastings as a single genetic group (Georges *et al.* 2007). Other genetic groups (from Georges *et al.* 2007) include a Hunter River group (*E. m. gunabarra*), a Sydney Basin group (*E. m. dharuk*), a Murray-Darling group (*E. m. macquarii*), a NSW/southern Queensland group (*E. m. signata*), and a Richmond River group (not formally named as a subspecies). The Richmond River group has been suggested as a subspecies (Cann 1998), but it is genetically close to the Hunter and southern Queensland groups (Georges *et al.* 2007). Although it is possible that *E. macquarii* has always been in the Bellinger in some form, the genetic data argue against such an interpretation, with no apparently unique genetic types discovered that were widespread throughout the population (Georges *et al.* 2007).

Apart from the subtropical Richmond-Tweed drainage (*Emydura* with *Elseya latisternum*), there is only one short-necked turtle (either *Emydura* or *Elseya*) in the other coastal river systems in NSW (e.g. *Elseya purvisi*, a sibling species of *E. georgesi*, in the Manning drainage) (Cann 1998; Swann *et al.* 2004). This situation suggests possible competitive exclusion over evolutionary time.

Hybridisation with *Elseya* in the Bellinger may have resulted after initially translocated *Emydura* individuals were unable to find mates of their own species. Of the seven trapped hybrids, all were more than 15 years old (Spencer *et al.* 2007). Furthermore, a Saw-shelled Turtle *E. latisternum* (native only to the Richmond-Tweed drainage in NSW) was trapped in the Kalang River (Spencer *et al.* 2007): further evidence of potential human introductions.

Ecology:

The ecology of the Bellinger River *Emydura* population is well understood following recent surveys and studies (Spencer & Thompson 2000; Blamires *et al.* 2005; Georges *et al.* 2007; Spencer *et al.* 2007).

Key habitat requirements

The Bellinger River *Emydura* inhabits shallow, still river pools with varied substrates (sand or rock), and including snags and logs, aquatic vegetation, and sandy banks.

Breeding biology

The Bellinger River *Emydura* lays clutches of eggs in spring and summer, in shallow excavations in river banks.

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Diet

The Bellinger River *Emydura* feeds mostly on insects (especially caddisfly larvae, other fly larvae, beetles and dragonfly nymphs), but this turtle is probably omnivorous to some extent like other populations (which eat some aquatic carrion, small vertebrates, other aquatic invertebrates, and water plants).

Social biology

The Bellinger River *Emydura* occurs solitarily or in pairs.

Territoriality/home range

No information is available on the territoriality of this species; density is about five animals per hectare.

Generation length

Age at maturity of the Bellinger River *Emydura* is thought to be six year and longevity 17 years, hence the generation length (IUCN 2008) of the species is estimated to be 12 years.

Ability to disperse/susceptibility to population fragmentation

These turtles have limited overland dispersal ability, reflected in different subspecies being described for the Clarence, Macleay, Hunter, Sydney Basin and Murray-Darling drainages. These different regional populations are recognisable genetic groups, although the Bellinger population is a genetic mix of the Clarence-Macleay group (Georges *et al.* 2007).

Number of mature individuals:

Seventy-six individuals of the Bellinger River *Emydura* were found in the Bellinger River in three weeks of intensive survey in March 2007, giving a density estimate of about five turtles per hectare (Spencer *et al.* 2007), a large increase over previous assessments of “extremely low numbers” or “small population” (Spencer & Thompson 2000; NSW NPWS 2001). There are too few data to estimate total population size (Blamires *et al.* 2005).

Threats:

The main threat to the Bellinger River *Emydura* is nest predation by the fox. ‘Predation by the European Red Fox *Vulpes vulpes*’ is listed as a Key Threatening Process under the TSC Act in NSW. Other threats include water pollution and river sedimentation, human construction works (*e.g.* bridges, fords), extraction of river sand and gravel, removal or degradation of riparian vegetation, road kill, and line fishing. Hybridisation and competition by Georges’ Turtle are long-term threats, but *Emydura* may be competitively superior.

Extreme fluctuations:

There is no evidence of extreme fluctuations in the population or habitat of in the Bellinger River *Emydura*.

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Population reduction and continuing declines:

There is no evidence of a population reduction or continuing declines in the Bellinger River *Emydura*. Demographic parameters are not available for the *Emydura* in the Bellinger River, but they are for Georges' Turtle in this river system (Blamires *et al.* 2005). Using known rates of adult female and juvenile survival of the Murray Turtle (95% and 65% respectively) in other river systems, and of fox predation rates of 72% on turtle nests in the Bellinger, modelling suggests that the *Emydura* population will not decline significantly (*c.* 5%) by 2035 (Spencer *et al.* 2007). However, at survival rates for Georges' Turtle in the Bellinger (86% and 58%), the Bellinger *Emydura* is predicted to decline by about 60% by 2035. Conversely, the population is projected to increase by about 50% by 2035 under effective fox control (Spencer *et al.* 2007); this population is managed under the Fox Threat Abatement Plan. The recovery plan actions (NSW NPWS 2001) have apparently been effective in gauging and maintaining Bellinger River *Emydura* numbers (Eco Logical 2007).

Extent of Occurrence (EOO) & Area of Occupancy (AOO):

For the Bellinger River *Emydura* inhabiting linear riverine habitat, AOO of the relevant population is about 30 km of the Bellinger River and about 20 km of the Kalang River above their tidal limits, up to the limit of habitable pools in the escarpment foothills. Assuming a mean of 20 m wide of habitable river, AOO is at least 10 km² of the main river and an unknown area of tributaries, and is about 100 km² if a grid of 2 km square is applied to the river system. However, in light of the genetic data for the subspecies, EOO is potentially the coastal drainages from the Clarence catchment to the Hastings catchment. Calculated EOO is thus about 37 500 km² (300 km of coastal plain x 150 km wide in the north to 100 km wide in the south, or about 125 km wide on average). AOO would accordingly be larger by a factor of tens to hundreds, or up to 1000 km².

Severe fragmentation:

The Bellinger population is geographically isolated (by about 5-10 km) from Murray Turtle populations in neighbouring catchments, with limited ability to disperse overland. Based on the presence and distribution of genetic types in the recent sample, it has no unique genetics that set it apart from populations in adjoining catchments (Clarence to Hastings drainages). The pattern of genetic diversity in the Bellinger population suggests that at least some of this diversity is derived from natural or human-mediated dispersal from adjacent drainages (Georges *et al.* 2007). The Turtle is mobile within the Bellinger-Kalang system (Spencer 2006).

References:

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Explanatory note

Between 2007 and 2009 the NSW Scientific Committee undertook a systematic review of the conservation status of a selection of plant and animal species listed under the Threatened Species Conservation Act. This species summary report provides a review of the information gathered on this species at the time the Review was undertaken.

The Scientific Committee's report on the Review of Schedules project and final determinations relating to species that were either delisted or had a change in conservation status can be found on the following website: www.environment.nsw.gov.au.

The Committee gratefully acknowledges the past and present Committee members and project officers who ably assisted the Committee in undertaking the Review of Schedules Project. Information on the people involved in the project can be found in the Acknowledgement section of the project report entitled "Review of the Schedules of the Threatened Species Conservation Act 1995. A summary report on the review of selected species" which is available on the abovementioned website.

This species summary report may be cited as:

NSW Scientific Committee (2008) Bellinger River Emydura, *Emydura macquarii* (Bellinger River). Review of current information in NSW. May 2008. Unpublished report arising from the Review of the Schedules of the Threatened Species Conservation Act 1995. NSW Scientific Committee, Hurstville.