

## Supplementary material

### Significant genetic structure despite high vagility revealed through mitochondrial phylogeography of an Australian freshwater turtle (*Chelodina longicollis*)

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## Specimens examined

Data for *Chelodina longicollis* are given by freshwater biogeographic region, drainage (in bold), local river or region, number of specimens collected (in brackets), latitude and longitude and specimen number(s) (Wildlife Tissue Collection, University of Canberra, UC < Aus > in GenBank).

Drainage names follow those defined by the Australian Water Resources Management Committee (Bureau of Meteorology 1997). An asterisk denotes samples used in the mitochondrial enrichment and serial dilution procedure.

**Central Australian Province. Bulloo River:** Bulloo River [1] (26.6107°S, 144.2680°E) AA18058. **Cooper Creek:** Thompson River [1] (22.5933°S, 145.6779°E) 98ClonDunn-2.

**Murray–Darling Basin. Border Rivers:** Severn River [12] (28.8667°S, 151.7833°E) 3061- 66, (29.1380°S, 150.9842°E) AA20775–78, (28.8978°S, 151.9447°E) QM J84640, J85191; Beardy Creek [6] (29.2107°S, 151.3789°E) AA20575–80; Dumaresq River [2] (28.9889°S, 151.2777°E) AA20597619; Macintyre River [2] (28.5484°S, 150.3014°E) AA32770, 89. **Castlereagh River:** Coonabarabran region [7] (31.3996°S, 149.3432°E) AA32178–84; Castlereagh River [8] (31.2675°S, 149.2810°E) AA32193–95, (31.2719°S, 149.2558°E) AA32401–05. **Condamine–Culgoa Rivers:** Wallam Creek [4] (26.9561°S, 147.7439°E) 737–40; Narran River [4] (29.7167°S, 147.4502°E) AA32086–89; Box Creek [5] (25.8033°S, 148.2396°E) AA32262–64, 66, 68; Maranoa River [1] (26.4891°S, 147.9815°E) AA33076; Mungallala Creek [1] (28.0201°S, 147.3810°E) AA33085; Neabul Creek [5] (27.7169°S, 147.6995°E) AA33086–90. **Gwydir River:** Roumala Creek [5] (30.4956°S,

151.1329°E) 188–92; Hall’s Creek [4] (29.8595°S, 150.5812°E) AA20742, (29.8631°S, 150.5709°E) AA32438–40; Gwydir River [1] (29.4941°S, 150.1648°E) AA32431; Myall Creek [1] (29.7548°S, 151.0483°E) AA32435. **Lachlan River:** Lake Forbes [5] (33.3820°S, 148.0010°E) AA10928–30, 42–43; **Macquarie River:** Fine Gold Dam [6] (32.6651°S, 149.1678°E) AA11833–38; Macquarie River [7] (31.8887°S, 148.0924°E) AA32167, 68\*, 69, (32.2256°S, 148.2478°E) AA32173–74, (31.8887°S, 148.0924°E) AA32175, 77. **Moonie River:** Moonie River [7] (28.0909°S, 149.2470°E) 733, (27.8948°S, 149.5599°E) AA46402–05, 07, 08. **Murray–Riverina:** Murray River [2] (36.0929°S, 146.9484°E) 174, 620, AA20685–89. **Lower Murray:** Murray River [6] (34.0860°S, 140.7896°E) AA20514–17, (35.0333°S, 139.3702°E) AA32107, (35.0867°S, 139.3066°E) AA37272. **Murrumbidgee River:** Yass River [5] (34.8646°S, 149.0093°E) AA20629, 32–34, 37; Murrumbidgee River [4] (34.2729°S, 146.0322°E) AA32127, (34.7546°S, 146.5447°E) MB016–17, 22; Barren Box Swamp [8] (34.1735°S, 145.8017°E) AA32146, AA33212, 14–19; Molonglo River [4] (35.2190°S, 149.0010°E) AA42303–06; **Namoi River:** Gunnedah region [4] (30.9742°S, 150.2588°E) AA32414, 15\*, 16, (30.9742°S, 150.2588°E) AA32422; Namoi River [5] (30.9722°S, 150.2542°E) AA32418, (30.2425°S, 149.6839°E) AA32424–25, 27–28. **Paroo River:** Eulo Creek [1] (28.1606°S, 145.0448°E) AA18024. **Warrego River:** Warrego River [10] (28.0684°S, 145.6787°E) AA10161–64, AA10229–31, (28.3202°S, 145.7274°E) AA13049–50, (28.2051°S, 145.7144°E) AA13057; Sanford Park Lagoon [6] (26.9234°S, 146.0372°E) AA13149–54; Sanford Park Waterhole [1] (26.9066°S, 146.0333°E) AA13168; Quilberry Waterhole [1] (27.0804°S, 145.9231°E) AA13355.

**Eastern Province. Burdekin River:** Alpha Creek [1] (23.6520°S, 146.6380°E) 00ChlBurd; Mistake Creek [1] (22.5637°S, 147.0728°E) AA19284. **Burnett River:** Cable House Creek [6] (24.7966°S, 152.4419°E) AA00240, 47–49, AA00903, 5; Munduberra region [10] (25.5933°S, 151.3153°E) AA11789, 91, AA11821–28; Barambah Creek [1] (26.2380°S, 151.9264°E) AA33554. **Fitzroy River (Qld):** Carnarvon Creek [1] (24.9239°S, 148.6004°E) AA19310; Hutton Creek [4] (25.8143°S, 148.3079°E) AA32033–35, (25.8103°S, 148.299°E) AA32036, (25.8143°S, 148.3079°E) AA32300; Dawson River [1] (25.3920°S, 148.668°E) AA32283. **Moreton Island:** Blue Lagoon [2] (27.0874°S, 153.4379°E) AA4270, 87. **Bega River:** Bega region [2] (36.6317°S, 149.7954°E) 765766; Bega River [1] (36.4621°S, 149.8643°E) AA33490. **Clarence River:** Clarence River [7] (29.0513°S, 152.5898°E) 193195196, (29.5490°S, 152.6647°E) AA18685, (29.5376°S, 152.5503°E) AA18706–08; Broadwater Creek [3] (29.4277°S, 153.0847°E) AA18589–91. **Clyde River–Jervis Bay:** Blacks Waterhole [5] (35.1740°S, 150.7003°E) BL001–005. **Hawkesbury River:** Nepean River [3]

(33.8570°S, 150.6180°E) 997, (33.7278°S, 150.6557°E) 741/744. **Hunter River:** Hunter River [2] (32.1333°S, 151.0333°E) 194200; Lake St Claire [2] (32.3332°S, 151.2911°E) AA18392–93; Williams River [6] (32.5820°S, 151.7839°E) AA18398–03; Lostock Dam [6] (32.3322°S, 151.4543°E) AA18461–66. **Macleay River:** Georges Creek [8] (30.8523°S, 152.0871°E) 3050–55, 57, 58. **Richmond River:** Richmond River [1] (28.8579°S, 153.0257°E) AA18538. **Snowy River:** Orbost lagoon [1] (37.7139°S, 148.4563°E) AA33489. **Thomson River:** Stradford wetlands [4] (38.0944°S, 147.0577°E) AA33462, 69, 71, 72. **Latrobe River:** Traralgon Creek [2] (38.3192°S, 146.4468°E) AA33457, (38.1516°S, 146.2830°E) AA33459.

**Bass Province. Barwon River:** Leigh River [3] (37.5526°S, 143.9353°E) AA33453–55. **Hopkins River:** Lake Bolac region [10] (37.7666°S, 142.722°E) AA33440–46, 48–50. **Millicent Coast:** Gymbowen region [1] (36.7288°S, 141.5861°E) AA33430; Goroke region [1] (36.7185°S, 141.4333°E) AA33431; Karnak region [1] (36.9009°S, 141.5022°E) AA33432; Edenhope region [4] (37.0288°S, 141.2717°E) AA33433–34, (37.0901°S, 141.1773°E) AA33435, (37.0662°S, 141.2029°E) AA33436; Hamilton region [2] (37.4883°S, 141.9952°E) AA43387–88; Penola region [1] (37.5477°S, 140.8164°E) ABTC51959; Blue Lake [1] (37.8444°S, 140.7776°E) ABTC51976. **Mitchell River (Vic):** Paynesville region [2] (37.9123°S, 147.7194°E) AA33473–74; MacLeod's Morass [9] (37.8423°S, 147.6303°E) AA33476–84. **Portland Coast:** Fitzroy River (Vic) [1] (38.1768°S, 141.6861°E) AA33437.

Voucher numbers are for the Wildlife Tissue Collection at the University of Canberra (<http://iae.canberra.edu.au/cgi-bin/locations.cgi>). Photograph vouchers are available on request.

**Table S1. Haplotype frequencies for each drainage**

Freshwater biogeographic region	Drainage	<i>n</i>	<i>n</i> haps	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28		
<b>Murray–Darling Basin</b>																																	
	Murray	13	2																12	1													
	Murrumbidgee	21	2																												1	20	
	Lachlan	5	2																												4	1	
	Macquarie	13	1																													13	
	Castlereagh	15	2								6																					9	
	Namoi	9	4			4				1									1												3		
	Gwydir	11	1			11																											
	Border Rivers	22	3		8	12														2													
	Moonie	7	2																6		1												
	Condamine	20	3																16		1				3								
	Warrego	18	2														11		7														
	Paroo	1	1																												1		
<b>Central Australian Province</b>																																	
	Bulloo	1	1																													1	
	Cooper	1	1															1															
<b>Eastern Province</b>																																	
	Richmond	1	1		1																												
	Clarence	10	1		10																												
	Macleay	8	1			8																											
	Hunter	16	5					1		7	2					4	2																
	Hawkesbury	3	2					2		1																							
	Clyde	5	2											1	4																		
	Bega	3	1											3																			
	Snowy	1	1											1																			
	Mitchell	11	2											8	3																		
	Thompson	4	1											4																			
	La Trobe	2	1											2																			
	Burnett	17	3																					1	10		6						
	Fitzroy-Dawson	7	3														1	5							1								
	Burdekin	2	1														2																
	Moreton Island	2	1		2																												
<b>Bass Province</b>																																	
	Barwon	3	2																	1	2												
	Hopkins	10	1																														
	Portland	1	1																														
	Glenelg	2	1																														
	Millicent	9	1																														

**Reference**

Bureau of Meteorology (1997). Australia’s river basins 1997. Available at <http://www.bom.gov.au/water/about/riverBasinAuxNav.shtml> [Verified 14 February 2015].