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Faunal Studies of the Northern Swan Coastal Plain

A CONSIDERATION OF
PAST AND FUTURE CHANGES



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THE AMPHIBIANS AND REPTILES OF THE NORTHERN SWAN COASTAL PLAIN

G.M. Storr, G. Harold and G. Barron

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	Herdsman	Monger	Claremont
Banded Land Rail		X	X
Baillon's Crake	X		B
Spotted Crake	B	X	
Spotless Crake	B		X
Swamphen	B	B	B
Black-tailed Native Hen	B	X	B
Dusky Moorhen	B	X	B
Coot	B	X	B
Painted Snipe		X	
Red-capped Plover	X		
Black-fronted Plover	B		B
Eastern Curlew	X	X	
Wood Sandpiper	X		
Red-necked Stint	X		
Sharp-tailed Sandpiper	X		
Curlew Sandpiper	X		
Black-winged Stilt	B	X	X
Banded Stilt			X
Red-necked Avocet	X		X
Silver Gull		X	X
Caspian Tern		X	
Whiskered Tern	B		
White-winged Black Tern	X	X	
Clamorous Reed Warbler	B	X	B
Little Grassbird	B		B

THE AMPHIBIANS AND REPTILES OF THE NORTHERN SWAN COASTAL PLAIN

By G.M. Storr¹, G. Harold¹ and G. Barron²

INTRODUCTION

This is an annotated list of the 70 species of amphibians and reptiles recorded from that area bounded in the north by the Moore River, in the south by the Swan and Helena Rivers, in the east by the Darling Scarp, and in the west by the Indian Ocean. It is based on the collections of the Western Australian Museum, the literature (cited in the Bibliography), and observations by G. Barron (G.B.), Mrs K. Farmer (K.F.), G. Harold (G.H.), R.E. Johnstone (R.E.J.), G.M. Storr (G.M.S.) and S. Wilson (S.W.).
A. Chapman (A.C.)

In this list we try to give for each species some idea of its relative abundance, habitat preferences, and distribution (in zonal as well as geographic terms). In assessing relative abundance we have taken into account variation between species in the ease with which they are observed or captured. It has often been difficult to generalize on habitat preference; for, apart from the material collected by Harold and Barron during the Gnangara Mound Project (April 1977 to March 1978), most specimens from the area are unaccompanied by ecological data.

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As a pointer to zonal preferences, and as a measure of relative abundance, we list all the localities from north to south in which each species has been collected and observed, giving in parentheses the number of specimens from each locality. This includes, where data are available, collections other than those of the Western Australian Museum. In the past, many specimens donated to the Museum were catalogued even though they were not retained; we include such specimens in our counts whenever we are satisfied that the locality applies to the specimens (rather than to the donor) and that specimens were correctly identified.

The coastal plain can be divided into three longitudinal zones: the eastern, central and western. The eastern consists largely of the valleys and floodplains of the Helena, Swan and Moore Rivers, Ellen and Gingin Brooks, Red Gully Creek, and several small streams flowing out of the Darling Range. As the soils consist mainly of fertile loams and clays, much of the zone has been cleared for pastoral and horticultural purposes. However, the Flooded Gums (Eucalyptus rudis) and paperbarks (Melaleuca spp.) that fringed the watercourses, swamps and lakes of the zone have to a large extent survived development.

The central zone comprises the deep white sands of the Bassendean System. They were originally covered with heathy vegetation from which tall shrubs (especially Banksia spp.) and low trees emerged. Much of the zone has been cleared for Perth and its suburbs, pine plantations, and small farms (especially around the numerous freshwater lakes and seasonal swamps).

The western zone is underlain by aeolian limestone, which outcrops here and there in cliffs along the coast and lower

Swan River and on ridges in the Wanneroo - Yanchep district. The inland, sheltered parts of this zone support an open forest of Tuart (Eucalyptus gomphocephala). Towards the sea the vegetation becomes heath-like. Most of the coast is backed by sand dunes.

In the discussion the herpetofauna of the area is briefly analysed with respect to its zoogeography and vulnerability to environmental change.

SYSTEMATIC LIST

LEPTODACTYLIDAE (Ground Frogs)

Crinia georgiana Tschudi

Confined to eastern zone, north to Gingin.

Specimens: Gingin, including town and Molecap Creek (14); east of Gnangara (2); Guildford (1).

Heleioporus barycragus Lee

Confined to the eastern zone, north to Bullsbrook.

Specimens: "foothills near Bullsbrook" (1); Martyn Reserve, Ellen Brook (1); bottom of Red Hill (6); Middle Swan (3); Caversham Recreation Reserve (7); Swan View (3).

Heleioporus eyrei (Gray)

Very common in or near sandy winter swamps.

Specimens: Mission Lake, Moore River National Park (1); 24 km NW of Gingin (1); 3 km S of Gingin (1); South Gingin Proposed Reserve (4); Yanchep National Park (14); Neerabup National Park (3); Melaleuca Park (5); Bullsbrook (1);

Warbrook (2); 4 km N of Wanneroo (1); Wanneroo (1); Gnangara (1); Lake Gnangara (11); east of Gnangara (7); Mussel Pool (8); Herne Hill (1); Middle Swan (7); Swan View (1); Caversham (20); Guildford (2); Inglewood (2); Herdsman Lake (3); Wembley Downs (2); Lake Claremont (44); Kings Park (1); Crawley (2); Dalkeith (3).

Observations: Lake Joondalup (R.E.J.).

Heleioporus psammophilus Lee & Main

Confined to eastern zone.

Specimens: Swan View (3); Caversham (1).

Limnodynastes dorsalis (Gray)

Common in or near freshwater swamps and lakes.

Specimens: Beermullah (1); South Gingin Proposed Reserve (2); Yanchep National Park (13); Neerabup National Park (6); Melaleuca Park (1); Gnangara Lake (4); North Beach (3); Mussel Pool (7); North Midland (1); Caversham (4); Guildford (1); Osborne Park (1); Mt Lawley (8); Nedlands (2); North Perth (1); Leederville (1); Wembley (1); Subiaco (1); Lake Claremont (1); Cottesloe (1); Buckland Hill (1); North Fremantle (1).

Observations: Lake Jandabup (R.E.J.).

Myobatrachus gouldii (Gray)

Common in sandy parts of central and western zones; usually found below ground in termite-infested wood.

Specimens: Gingin (1); South Gingin Proposed Reserve (1); Wanneroo (2); 3 km S of Wanneroo (1); Wanneroo Research Centre (1); Craigie (1); Mussel Pool (7); Morley (2); Dianella (1);

Tuart Heights (1); Nollamara (2); Double View (1); Bassendean
(1); Mt Hawthorn (1); Wembley Downs (1); City Beach (2);
Reabold Hill (1); Floreat Park (1); Wembley (3); North Perth
(1); Kings Park (2); Crawley (2); Nedlands (1); Dalkeith (1).

Neobatrachus pelobatoides (Werner)

Common. Confined to eastern zone.

Specimens: South Gingin Proposed Reserve (21); 8 km N
of Bullsbrook (1); Twin Swamps Reserve (5); Martyn Reserve,
Ellen Brook (4); Middle Swan (8); Caversham (128); 3 km N
of Guildford (3).

Pseudophryne guentheri Boulenger

Moderately common in eastern and central zones; scarce
further west (Neerabup National Park).

Specimens: "banks of Moore River" (1); Moore River
National Park (1); Gingin (1); South Gingin Proposed Reserve
(5); Lake Nambung (1); Neerabup National Park (1); Melaleuca
Park (4); Martyn Reserve, Ellen Brook (11); east of Gnangara
(5); Mussel Pool (3); Middle Swan (6); Caversham (19); West
Midland (2); Guildford (3).

Ranidella glauerti (Loveridge)

Common in eastern zone; moderately common in central
zone.

Specimens: Mission Lake, Moore River National Park (4);
Gingin (7); 7 km N of Muchea (1); Melaleuca Park (2);
Gnangara (38); foot of Red Hill (29).

Observations: Loch McNess (G.H. and G.B.); Neerabup
National Park (G.H.).

Ranidella insignifera (Moore)

Common in eastern zone; moderately common in central zone.

Specimens: Gingin (6); South Gingin Proposed Reserve (3); Lake Bambun (8); 7 km N of Muchea (3); Bullsbrook (5); Melaleuca Park (16); Martyn Reserve, Ellen Brook (3); Upper Swan (4); Mussel Pool (7); Red Hill road (46); Caversham (20); Midland (7).

Observations: Lake Jandabup (calling on 30 June 1977 - R.E.J.).

Ranidella pseudinsignifera (Littlejohn)

Rare [though common to immediate east]. Confined to foot of Darling Scarp, eastern zone.

Specimens: Bullsbrook (1); foot of Red Hill (1).

HYLIDAE (Tree Frogs)

Litoria adelaidensis (Gray)

Common in vicinity of permanent fresh water.

Specimens: Mission Lake, Moore River National Park (2); Gingin Brook East (1); Gingin (3); Yanchep National Park (13); Pearce (1); Martyn Reserve, Ellen Brook (1); 4 km N of Wanneroo (7); Wanneroo (7); Millendon (1); Mussel Pool (8); Osborne Park (14); Herdsman Lake (1); Lake Monger (1); Claremont (13).

Observations: 0.5 km S of Guilderton turnoff, Lancelin road (many calling - G.H. and G.B.); Lake Nowergup (G.H. and G.B.); Melaleuca Park (ca 20 calling at seasonal swamp, August 1977 - G.H. and G.B.).

Litoria moorei (Copland)

Very common in vicinity of permanent fresh water.

Specimens: Regans Ford (1); Gingin (2); Loch McNess (20); Martyn Reserve, Ellen Brook (3); 4 km N of Wanneroo (1); Wanneroo (2); Mussel Pool (8); Midland (1); North Beach (8); Balcatta Swamp (1); Dianella (7); Osborne Park (2); Bayswater (2); Mt Lawley (1); Perry Lakes (7); Lake Monger (6); East Perth (4); Causeway (133); Subiaco (4); Karrakatta (1); Lake Claremont (6); Cottesloe (1).

Observations: 0.5 km S of Guilderton turnoff, Lancelin road (many calling on 14 December 1977 - G.H. and G.B.).

CHELUIDAE (Side-necked Turtles)

Chelodina oblonga Gray

Common in permanent fresh water; also seasonal swamps.

Specimens: Guilderton (1); Lake Bambun (1); Lake Nowergup (1); near Bullsbrook (1); Lake Goollelal (2); West Swan (1); Midland (2); Bassendean (1); Bayswater (5); Maylands (1); Lake Monger (3); Hyde Park (3); Subiaco (1); East Perth (1); Queens Gardens (1); Shenton Park (12); Lake Claremont (2).

Observations: Lake Beermullah (common - R.E.J.); Lake Chandala (R.E.J.); Loch McNess (R.E.J.); Melaleuca Park (G.H. and G.B.); Lake Joondalup (common - R.E.J.); Lake Jandabup (R.E.J.); Mussel Pool (G.H.).

Pseudemydura umbrina Siebenrock

Rare. Confined to seasonal swamps along Ellen Brook, eastern zone.

Specimens: "Bullsbrook" (1); Twin Swamps Reserve (28); Martyn Reserve, Ellen Brook (4).

GEKKONIDAE (Geckos)

Crenadactylus ocellatus ocellatus (Gray)

Scarce. Confined to Tuart belt of western zone and to eastern zone.

Specimens: Yanchep National Park (2); Martyn Reserve, Ellen Brook (1); Wanneroo (2).

Observations: Neerabup National Park (G.H. and G.B.).

Diplodactylus alboguttatus Werner

Scarce, at least in south, where it is confined to western zone.

Specimens: Moore River National Park (2); City Beach (2); Reabold Hill (2).

Diplodactylus polyophthalmus Günther

Scarce [much more plentiful in Darling Range]. On the coastal plain confined to Tuart belt of western zone.

Specimens: 8 km S of Yanchep (1); Neerabup National Park (2); Wanneroo (2); Kings Park (5).

Diplodactylus spinigerus Gray

Common in western zone in coastal dunes and limestone country, where it extends south to the Swan River; uncommon in central and eastern zones, where it is not found south of Melaleuca Park.

Specimens: Moore River National Park (3); "Moore River" (3); 6 km E of Guilderton (1); Gingin (2); Yanchep National Park (9); Muchea (1); Melaleuca Park (3); North Beach (2); Tuart Hill (1); Scarborough (4); Wembley Downs (1); City Beach (2); Wembley Beach (2); Swanbourne Beach (1);

Point Resolution, Dalkeith (1); Cottesloe (8); Buckland Hill (1); Fremantle (2).

Phyllodactylus marmoratus (Gray)

Moderately common in western and central zones; rare in eastern zone.

Specimens: Yanchep National Park (7); Neerabup National Park (2); Mussel Pool (2); Balcatta (1); Midland (1); Guildford (1); Dianella (1); Osborne Park (1); Inglewood (1); Maylands (3); Mt Lawley (1); North Perth (1); East Perth (1); Leederville (1); Wembley (1); Reabold Hill (2); Subiaco (2); Shenton Park (1); Crawley (1); Nedlands (1); Cottesloe (3).

Observations: Point Resolution, Dalkeith (G.H.).

Phyllurus milii Bory

Scarce. Confined to limestone caves, cliffs and outcrops in western zone.

Specimens: Wanneroo (3); Subiaco (1); bank of Swan River, Claremont (2); Fremantle (1).

Observations: near Yanchep caves (G.M.S.).

PYGOPODIDAE (Legless Lizards)

Aclys concinna Kluge

Scarce [much more plentiful north of our area]. Confined to western zone.

Specimens: Yanchep National Park (1); Sorrento (1).

Aprasia pulchella Gray

Scarce [much more plentiful on Darling Range]. Confined to eastern and central zones, in the vicinity of the Swan River.

Specimens: Upper Swan (1); Guildford (2); Bayswater (2).

Aprasia repens (Fry)

Very common in sandy country.

Specimens: West Gingin (1); Yanchep National Park (1); Neerabup National Park (3); Twin Swamps Reserve (4); Wanneroo (5); Duncraig (1); Sorrento (1); Waterman (1); Balga (4); Mussel Pool (1); Karrinyup (2); Doubleview (6); Mt Yokine (4); Osborne Park (2); West Midland (1); Dianella (1); Nollamara (1); Morley (8); Embleton (1); Bassendean (1); Bayswater (7); Meltham (1); Inglewood (1); Wembley Downs (1); Herdsman Lake (2); City Beach (5); Floreat Park (6); Wembley (1); Maylands (2); Mt Lawley (9); Leederville (1); Perth (5); Subiaco (1); Shenton Park (1); Nedlands (7); Claremont (3); Swanbourne Beach (2); Cottesloe (5).

Delma fraseri Gray

Scarce.

Specimens: Gingin (1); Yanchep Beach (1); Malaleuca Park (7); Burns Beach (1); East Perth (1); Hollywood (1).

Delma grayii Smith

Scarce. Confined to western and eastern zones, evidently avoiding the deep white sands of central zone.

Specimens: Yanchep (1); Yanchep Beach (1); Burns Beach (1); Sorrento (2); Marmion (1); Middle Swan (1); Guildford (1).

Observations: Martyn Reserve, Ellen Brook (G.H.).

Lialis burtonis Gray

Very common.

Specimens: Moore River National Park (1); Beermullah (1); Gingin (1); Yanchep (1); Muchea (3); Bullsbrook (3); Melaleuca Park (3); Burns Beach (1); Twin Swamps Reserve (1); Martyn Reserve, Ellen Brook (1); 3 km E of Wanneroo (1); Wanneroo Wildlife Research Centre (4); Sorrento (1); Marmion (1); Waterman (3); Mussel Pool (1); Herne Hill (1); North Beach (5); Trigg (1); Beechboro (2); Midland (5); Morley (1); Yokine (4); Dianella (1); Nollamara (1); Tuart Hill (1); Scarborough (9); Osborne Park (1); Bedford (2); Guildford (1); West Guildford (1); Bassendean (6); Bayswater (11); Inglewood (3); Mt Hawthorn (3); Wembley Downs (2); Maylands (9); Mt Lawley (11); City Beach (5); Perry Lakes (1); Floreat Park (2); Wembley (6); West Leederville (1); Subiaco (5); Jolimont (2); Kings Park (3); Hollywood (3); Mt Claremont (2); Crawley (1); Nedlands (3); Claremont (2); Dalkeith (2); Cottesloe (2); Buckland Hill (2).

Pletholax gracilis gracilis Schlegel

Uncommon in coastal dunes of western zone; scarce elsewhere in western zone and in central zone.

Specimens: Sorrento (1); 2 km N of Marmion (6); North Beach (3); Dianella (2); Maylands (1); City Beach (3).

Pygopus lepidopodus (Lacépède)

Scarce. Apparently favouring vicinity of water.

Specimens: Mission Lake, Moore River National Park (1); Muchea (4); Melaleuca Park (1); Bayswater (1); Maylands (1); East Perth (1); Jolimont (1).

AGAMIDAE

Amphibolurus adelaidensis adelaidensis (Gray)

Common. Sandy country with low vegetation, e.g. banksia scrub and coastal heath.

Specimens: Moore River National Park (4); South Gingin Proposed Reserve (10); Burns Beach (6); Muchea (1); Lake Pinjar (1); Melaleuca Park (11); Sorrento (5); Mussel Pool (5); Inglewood (1); Bayswater (1); Wembley Downs (2); Floreat Beach (1); City Beach (4); Reabold Hill (1); Lake Monger (1); West Leederville (1); Nedlands (1).

Observations: Twin Swamps Reserve (G.H.).

Amphibolurus minor minor Sternfeld

Moderately common in western zone; uncommon in central and eastern zones.

Specimens: Moore River National Park (3); Melaleuca Park (2); Quinns Rock (1); Burns Beach (3); Warbrook (1); Upper Swan (1); Wanneroo Wildlife Research Centre (1); Sorrento (2); Mussel Pool (1); Midland (1); Osborne Park (1); Wembley Downs (1); City Beach (1); Reabold Hill (3); Floreat Park (5); North Perth (1); Mt Lawley (2); Kings Park (2); Subiaco (1); Shenton Park (1); Crawley (1); Cottesloe (1).

Observations: Neerabup National Park (G.H.).

SCINCIDAE (Skinks)

Cryptoblepharus plagiocephalus (Cocteau)

Common in open forests and woodlands, usually feeding on vertical surfaces, e.g. tree trunks, fences and walls; still found in city (Perth).

Specimens: Moore River National Park (2); Guilderton (1); Gingin (1); South Gingin Proposed Reserve (1); Yanchep National Park (3); Muchea (1); Neerabup National Park (1); Melaleuca Park (13); Bullsbrook (1); Warbrook (2); Twin Swamps Reserve (1); east of Gnangara (1); Mussel Pool (3); Middle Swan (1); Guildford (1); Yokine (1); Morley (1); Floreat Park (1); Wembley (2); Subiaco (3); Perth (1); Crawley (5); Dalkeith (3); Cottesloe (2).

Observations: Martyn Reserve, Ellen Brook (G.H. and G.B.); West Leederville (G.H.).

Ctenotus fallens Storr

Moderately common. Tending to avoid the deep white sands favoured by its congener C. lesueurii.

Specimens: Moore River National Park (1); Beermullah (1); Guilderton (1); 3 km S of Gingin (4); South Gingin Proposed Reserve (1); Melaleuca Park (3); 5 km SE of Bullsbrook (1); Burns Beach (8); Twin Swamps Reserve (2); Martyn Reserve, Ellen Brook (1); Sorrento (4); Mussel Pool (1); City Beach (3); Wembley (1); North Perth (2); bank of Swan River, Claremont (1); Point Resolution, Dalkeith (1); Cottesloe (1).

Ctenotus gemmula Storr

Uncommon. Confined to southern quarter of central zone. White sandplains with low to moderately low vegetation, e.g. banksia scrub and heath.

Specimens: Melaleuca Park (5); Mussel Pool (3).

Ctenotus impar Storr

Scarce.

Specimens: Wanneroo (2); Mussel Pool (1); Bellevue (1).

Ctenotus lesueurii (Duméril & Bibron)

Moderately common. Deep white sands (coastal dunes as well as inland sandplains).

Specimens: South Gingin Proposed Reserve (5); Muchea (1); Melaleuca Park (2); Mussel Pool (1); Scarborough (3); Yokine (3); Bedford (1); Maylands (2); North Perth (1); Leederville (1); Kings Park (1); Nedlands (1).

Egernia kingii Gray

Uncommon. Favouring coastal cliffs and vicinity of swamps and watercourses.

Specimens: Gingin (1); Yanchep National Park (1); Burns Beach (1); Marmion (1); North Beach (2); Morley (1); Guildford (1); West Leederville (1).

Egernia luctuosa Peters

Scarce in south; apparently absent from country north of Perth and suburbs. Swamp vegetation around lakes and along watercourses.

Specimens: Herdsman Lake (1); Lake Monger (1); Maylands (1).

Egernia napoleonis Gray

Uncommon. Usually found in stumps or under bark of trees and shrubs, including blackboys (Xanthorrhoea).

Specimens: South Gingin Proposed Reserve (1); 13 km N of Yanchep (1); Neerabup National Park (1); Muchea (1); Melaleuca Park (1); Bullsbrook (1); Wanneroo (1); Mussel Pool (3); Guildford (1); Swanbourne (1).

Hemiergus peronii quadrilineata (Duméril & Bibron)

Very common in sandy country (coastal dunes as well as inland sandplains. Seldom found in summer (does it aestivate?);

Specimens: Yanchep National Park (11); Neerabup National Park (2); Twin Swamps Reserve (1); Wanneroo (7); Upper Swan (4); "just east of Gnangara" (1); North Beach (4); Scarborough (2); Tuart Hill (1); Yokine (2); Nollamara (1); Guildford (2); Mt Lawley (3); North Perth (2); City Beach (4); Floreat Park (4); Leederville (2); Subiaco (2); Kings Park (9); Crawley (2); Nedlands (4); Claremont (9); Swanbourne (1); Dalkeith (5); Peppermint Grove (1); Buckland Hill (4).

Observations: Lake Joondalup (G.H.); Subiaco (G.H.).

Leiolopisma trilineatum (Gray)

Moderately common in damp places (in swamps, around lakes and along streams), north to Gingin Brook.

Specimens: Gingin Brook East (1); Gingin (1); Yanchep National Park (1); Lake Neerabup (2); Melaleuca Park (5); Mussel Pool (2); North Beach (1); 4 km NW of Osborne Park (2); Bassendean (1); Causeway, Swan River (1).

Observations: north end of Lake Joondalup (G.H.).

Lerista elegans (Gray)

Moderately common in western and central zones.

Specimens: Moore River National Park (1); South Gingin Proposed Reserve (3); Yanchep National Park (5); Melaleuca Park (5); Burns Beach (4); Yokine (1); Morley (1); Wembley Downs (1); City Beach (1); Wembley (12); Claremont (1); Cottesloe (1).

Lerista lineopunctulata (Duméril & Bibron)

Common in sandy country (inland sandplains as well as coastal dunes) in western zone; scarce in central and eastern zones.

Specimens: Guilderton (1); Gingin (1); Yanchep (1); Muchea (1); Bullsbrook East (1); Burns Beach (7); Wanneroo (1); Gnangara Lake (1); North Beach (1); Karrinyup (1); Osborne Park (1); Nollamara (1); City Beach (3); Floreat Park (1); West Leederville (1); Leederville (1); Subiaco (2); Kings Park (1); Nedlands (1); Mt Claremont (2); Swanbourne (2); Cottesloe (3); Buckland Hill (1).

Lerista praepedita (Boulenger)

Very common in sandy country in western and central zones; rare or absent in eastern zone.

Specimens: Guilderton (1); Gingin (1); South Gingin Proposed Reserve (12); Yanchep National Park (1); Neerabup National Park (1); Melaleuca Park (21); Burns Beach (3); Wanneroo (2); Gnangara (2); Sorrento (1); Waterman (1); Balga (4); Karrinyup (1); Balcatta (1); Yokine (1); Scarborough (1); Doubleview (4); Osborne Park (1); Tuart Hill (1); Dianella (1); Morley (2); Guildford (2); Bassendean (1); Bayswater (3); Inglewood (1); Mt Hawthorn (3); Wembley (4); Mt Lawley (2); North Perth (2); Subiaco (4); Nedlands (3); Claremont (1); Cottesloe (2); Mosman Park (1); Buckland Hill (1).

Menetia greyii Gray

Common in Tuart belt of western zone; uncommon in central and eastern zones; rare near coast.

Specimens: Regans Ford (1); Gingin (1); South Gingin

Proposed Reserve (1); Yanchep National Park (2); Neerabup National Park (1); 8 km N of Wanneroo (1); Melaleuca Park (4); Burns Beach (2); Wanneroo (14); Twin Swamps Reserve (1); Martyn Reserve, Ellen Brook (1); Upper Swan (2); Herne Hill (5); Mussel Pool (1); Guildford (4); West Perth (1); Wembley (10); Floreat Park (1); Reabold Hill (1); Crawley (1); Nedlands (1); Dalkeith (1).

Observations: West Leederville (G.H.).

Morethia lineocellata (Duméril & Bibron)

Uncommon in western and central zones, in sandy country (coastal dunes as well as inland sandplains); absent from eastern zone.

Specimens: South Gingin Proposed Reserve (5); 20 km W of Muchea (1); Melaleuca Park (7); Burns Beach (1); Sorrento (2); Mussel Pool (3); Morley (1).

Morethia obscura Storr

Uncommon in western and central zones, favouring damper situations than M. lineocellata; absent from eastern zone.

Specimens: Moore River National Park (2); Lake Neerabup (2); Melaleuca Park (3); Pinnaroo Valley, Wanneroo (1); Sorrento (1); Mussel Pool (1); Crawley (3); bank of Swan River, Claremont (6).

Observations: Burns Beach (G.H. and G.B.); north end of Lake Joondalup (G.H.).

Omolepida branchialis (Günther)

Uncommon. Confined to western zone. Coastal limestone and dunes.

Specimens: Burns Beach (1); near Wanneroo (2); Sorrento (1); Marmion (1); North Beach (2); Scarborough (2); City Beach (2).

Tiliqua occipitalis (Peters)

Uncommon.

Specimens: Upper Swan (1); Duncraig (1); Mussel Pool (1); West Swan (1); Scarborough (1); Osborne Park (1); Beechboro (1); Bayswater (2); Mt Hawthorn (1); Mt Lawley (1); West Leederville (1); Wembley (1); Karrakatta (1).

Observations: Melaleuca Park (G.H. and G.B.); between Mullaloo and Sorrento (A.C.).

Tiliqua rugosa rugosa (Gray)

Common, especially in cleared country.

Specimens: Yanchep National Park (1); Melaleuca Park (1); Mussel Pool (1); Caversham (1); North Perth (2); Kings Park (2); Crawley (1); Pelican Point (2); Cottesloe (1); North Fremantle (1).

Observations: Neerabup National Park (G.H. and G.B.); Burns Beach (G.H. and G.B.); Twin Swamps Reserve (G.H. and G.B.); Martyn Reserve, Ellen Brook (G.H. and G.B.).

VARANIDAE (Monitors or "Goannas")

Varanus gouldii (Gray)

Scarce.

Specimens: Scarborough (2); Osborne Park (1); Mt Lawley (1); City Beach (1); Kings Park (4); Nedlands (1).

Observations: Neerabup National Park (G.H. and G.B.); Mussel Pool (G.H. and G.B.).

Varanus rosenbergii Mertens

In this region only known from Mussel Pool, where only one was seen; it was collected in open Jarrah-Marri-Banksia woodland on 29 October 1975.

Varanus tristis tristis (Schlegel)

Scarce in western and eastern zones, apparently absent in central zone.

Specimens: Neerabup National Park (1); Upper Swan (1); Millendon (1); Sorrento (1); Midland (1); Wembley Downs (1); Floreat Park (1); Swanbourne (1).

Observations: Martyn Reserve, Ellen Brook (G.H. and G.B.).

TYPHLOPIDAE (Blind Snakes)

Typhlina australis (Gray)

Common in eastern zone; uncommon to moderately common in central and western zones.

Specimens: Beermullah (1); Gingin (2); 15 km S of Guilderton turnoff, Lancelin road (1); South Gingin Proposed Reserve (1); Muchea (2); Bullsbrook (1); Twin Swamps Reserve (2); Wanneroo (3); Herne Hill (1); Mussel Pool (1); Beechboro (1); Doubleview (1); Midland (1); Guildford (3); Bedford (1); Bayswater (2); Maylands (2); Wembley Downs (1); Wembley (2); City Beach (1); Leederville (1); Subiaco (1); Nedlands (2); Mt Claremont (1); Claremont (1).

Typhlina bituberculata (Peters)

Uncommon. Confined to eastern zone.

Specimens: Beermullah (2); Upper Swan (2); Herne Hill (1); Midland (1); Guildford (1).

BOIDAE (Pythons)

Liasis childreni Gray

Scarce. Confined to eastern zone and to Tuart belt of western zone.

Specimens: 16 km N of Wanneroo (1); Herne Hill (1); Caversham (1); West Midland (1); Bassendean (1).

Python spilotus variegatus (Gray)

Scarce. Confined to eastern zone and to limestone belt of western zone.

Specimens: Yanchep (2); Midland (1); Beechboro (1).

Observations: Guilderton (K.F.).

ELAPIDAE (Front-fanged Snakes)

Brachyaspis curta (Schlegel)

Moderately common in western zone, including coastal dunes; uncommon in central and eastern zones.

Specimens: Guilderton (1); Two Rocks (1); Muchea (1, a female containing 9 embryos); Pearce (1); Bullsbrook (1); Wanneroo (1); Sorrento (1); North Beach (1); Trigg (1); Scarborough (3); Caversham (1); Guildford (1); Morley (1; its stomach contained a frog, Heleioporus eyrei); Bayswater (6); Maylands (4); Mt Lawley (1); City Beach (5, excluding 8 young born after their mother was captured); Reabold Hill (1).

Observations: Yanchep National Park (S.W.).

Demansia reticulata reticulata (Gray)

Moderately common in western zone (especially the Tuart belt), but quickly disappearing from built-up areas, e.g. last collected at Scarborough in 1936, Dalkeith in 1939, and Medlands

and Kings Park in 1942; rare in central and eastern zones.

Specimens: Moore River National Park (1); Yanchep (2); 16 km N of Wanneroo (1); Whitford Beach (1); Sorrento (2); Caversham (1); Midland (1); Scarborough (1); Subiaco (1); Jolimont (1); Kings Park (6); Hollywood (1); Nedlands (4; one of these, R8297, had bitten a child twice without serious results); Dalkeith (3).

Denisonia coronata (Schlegel)

Here, at the northern end of its range, this snake is scarce [it is common on the south coast].

Specimens: Muchea (1); Wanneroo (2); Beechboro (1); Bassendean (1); North Perth (1); Subiaco (1)

Denisonia gouldii (Gray)

Generally common, especially in blackboy (Xanthorrhoea) country, though inexplicably not recorded from certain western suburban areas (Kings Park, Nedlands, Dalkeith, Claremont).

Specimens: Gingin (4); South Gingin Proposed Reserve (1); Yanchep National Park (4); Muchea (2); 10 km S of Yanchep (1); 16 km N of Wanneroo (1); Lake Pinjar (2); Neerabup National Park (5); Melaleuca Park (2); North Wanneroo (1); Wanneroo (8); 5 km SW of Wanneroo (1); Upper Swan (1); Lake Goollelal (1); Mussel Pool (3); West Swan (2); North Beach (1); Trigg (1); Lake Gwelup (1); Balcatta (1); Yokine (2); Morley (2); Midland (1); West Midland (1); Guildford (2); South Guildford (1); Bassendean (3); Bedford (1); Dianella (2); Nollamara (1); Tuart Hill (3); Osborne Park (1); Scarborough (1); Mt Hawthorn (3); Inglewood (1); Bayswater (6); Maylands (2); Mt Lawley (4); North Perth (4); Wembley (1); West Leederville (1); Subiaco (1); Leederville (1); East Perth (2); Cottesloe (5).

Notechis scutatus occidentalis Glauert

Common in central and eastern zones and in low-lying eastern parts of western zone. In swamps, around lakes and along the Swan River (above the Causeway).

Specimens: 7 km N of Gingin; Gingin (4); Bullsbrook (1); Twin Swamps Reserve (1); Wanneroo (3); East Wanneroo (1); Upper Swan (3); Gnangara Lake (3); 8 km SSE of Wanneroo (1); Mussel Pool (1); Balcatta (1); Yokine (1); Morley (1); Beechboro (4); Caversham (2); Midland (1); East Guildford (1); West Guildford (1); Bassendean (4); North Beach road (1); Osborne Park (3); Herdsman Lake (8); Mt Hawthorn (1); Inglewood (1); Bayswater (8); Maylands (9); Mt Lawley (2); Lake Monger (3); Wembley (2); East Perth (1).

Observations: 13 km E of Guilderton (K.F.); Lake Bambun (R.E.J.); Lake Chandala (R.E.J.); Loch McNess (G.H.); north end of Lake Joondalup (G.H.).

Pseudechis australis (Gray)

Status unknown. From 1924 to 1939 the Western Australian Museum received ten specimens of Mulga Snake from the southern part of the eastern zone (an area largely given over to farmlets and vineyards). It is possible that these snakes represent a natural population, but it is more likely that they were accidental introduced, perhaps in hay, from further north or east (cf.

Pseudonaja nuchalis).

Specimens: Upper Swan (2); Herne Hill (1); Swan View (2); Greenmount (1); Midland (1); West Guildford (1).

Pseudonaja affinis affinis Günther

Locally very common in western and central zones; moderately common in eastern zone. The Dugite, like its principal prey, the House Mouse (Mus musculus), is most numerous on the immediate outskirts of settlement. Its cycle of abundance is thus: (1) relatively low densities in undisturbed bush remote from settlement, (2) increasing densities as settlement approaches, (3) decreasing densities from the beginning of housing developments, (4) extinction as area becomes completely built up.

Specimens: Lake Nambung (1); Lake Pinjar (1); 16 km N of Wanneroo (1); Pearce (5); Twin Swamps Reserve (1); Upper Swan (5); Wanneroo (3); Whitford Beach (2); Sorrento (4); West Swan (6); Herne Hill (2); North Beach (8); Waterman (3); Mussel Pool (1); Middle Swan (2); Trigg (4); Karrinyup (1); Balcatta (1); Beechboro (3); Caversham (10); Bellevue (1); Midland (2); West Midland (4); East Guildford (1); Guildford (15); South Guildford (3); Bassendean (15); Morley (5); Bedford (1); Dianella (1); Tuart Hill (1); Osborne Park (2); Scarborough (11); Wembley Downs (1); Inglewood (3); Ashfield (1); Bayswater (11); Maylands (15); Mt Lawley (15); North Perth (3); Wembley (3); Floreat Park (2); City Beach (17); Reabold Hill (1); Perry Lakes (2); Jolimont (2); Subiaco (2); West Perth (1); Leederville (1); Daglish (1); Mounts Bay Road, Perth (2); Kings Park (12); Graylands (1); Crawley (4); Nedlands (5); Dalkeith (15); Mt Claremont (1); Claremont (10); Swanbourne (5); Swanbourne Beach (1); North Cottesloe (2); Cottesloe (6); Mosman Park (11); Buckland Hill (6).

Observations: Guilderton (K.F.); Yanchep National Park (G.H. and G.B.); Neerabup National Park (G.H.); Burns Beach (G.H. and G.B.); north end of Lake Joondalup (G.H.).

Pseudonaja nuchalis Günther

Confined to the eastern zone. As it was not recorded here before 1936, it is possible that this species was accidentally introduced in hay or other produce from the Wheat Belt. It is now moderately common in the farming country about the Swan River.

Specimens: Regans Ford (1); Gingin (1); Bullsbrook (1); Millendon (1); Herne Hill (3); West Swan (1); Middle Swan (1); Swan View (7); Greenmount (1); South Guildford (1); Morley (1).

Vermicella bertholdi (Jan)

Common in sandy country, i.e. western and central zones; uncommon in eastern zone.

Specimens: Gingin (2); 9 and 10 km N of Yanchep turnoff, Lancelin road (2); Quinns Rocks (1); Neerabup National Park (1); Bullsbrook (3); Melaleuca Park (1); Wanneroo (4); Sorrento (3); Marmion (3); Waterman (4); Padbury (1); North Beach (3); Trigg (2); Karrinyup (3); North Innaloo (1); Balga (1); Caversham (1); Beechboro (1); Yokine (1); Tuart Hill (6); Osborne Park (8); North Scarborough (2); Scarborough (16); Wembley Downs (1); Mt Hawthorn (6); Bassendean (1); Bayswater (3); Maylands (16); Mt Lawley (1); North Perth (3); Lake Monger (1); Wembley (15); Floreat Park (4); City Beach (10); West Leederville (1); Leederville (6); Subiaco (4); East Perth (1); Mounts Bay (1); Kings Park (5); Shenton Park (1); Hollywood (2); Nedlands (10); Dalkeith (8); Mt Claremont (2); Claremont (8); Swanbourne (6).

Vermicella bimaculata Duméril, Bibron & Duméril

Moderately common in deep sands of western and central zones; rare in eastern zone.

Specimens: Neerabup National Park (1); 3 km NE of Bullsbrook East P.O. (1); Melaleuca Park (1); Burns Beach (2);

Wanneroo (2); Gnangara Lake (1); North Whitford Beach (1);
Whitford Beach (1); Sorrento (1); Scarborough (2); Dianella (1);
South Guildford (1); Bassendean (2); Bayswater (3); Inglewood (1);
Maylands (2); Mt Lawley (1); Reabold Hill (1); West Perth (1);
Nedlands (1); Claremont (1); Cottesloe (1); Buckland Hill (1).

Vermicella calonotos (Duméril, Bibron & Duméril)

Common in deep white sand of central zone; moderately
common in western zone; rare in eastern zone.

Specimens: Guilderton (1); Yanchep (1); Yanchep Beach (1);
Quinns Rock (1); Pearce (1); Melaleuca Park (2); Wanneroo (1);
Whitford Beach (1); Sorrento (3); North Beach (2); Caversham (1);
Bassendean (5); Embleton (1); Bedford (3); Dianella (2);
Scarborough (2); Inglewood (2); Bayswater (8); Maylands (5);
Mt Lawley (7); North Perth (1); City Beach (1); Reabold Hill (1);
Leederville (1); West Perth (1); Jolimont (1); Shenton Park (1);
Buckland Hill (1).

Vermicella fasciolata fasciolata (Günther)

Uncommon in western zone; rare in central and eastern
zones.

Specimens: Regans Ford (1); Bullsbrook (1); Warbrook (1);
Caversham (1); Morley (2); Doubleview (1); Mt Hawthorn (1);
North Perth (1); City Beach (2); Reabold Hill (2); Subiaco (1);
Mt Claremont (1); Swanbourne (3).

Vermicella semifasciata semifasciata (Günther)

Moderately common. Found in all zones, often in buried
or half-buried rotten wood.

Specimens. "Moore River" (1); South Gingin Proposed
Reserve (1); 8 km N of Yanchep turnoff, Lancelin road (1);

Muchea (3); 10 km SE of Yanchep (1); Neerabup National Park (2); 10 km N of Wanneroo (1); Wanneroo (3); Upper Swan (3); Henley Park, West Swan (1); Sorrento (2), Waterman (1); (1); Girrawheen (1); Karrinyup (1); Scarborough (3); Yokine (1); Tuart Hill (1); Morley (1); Midland (1); Guildford (1); Bassendean (2); Bayswater (2); Inglewood (2); Wembley Downs (2); Maylands (1); North Perth (2); City Beach (2); Jolimont (1); Subiaco (1); Cottesloe (2).

DISCUSSION

(1); The northern Swan Coastal Plain supports a rich herpetofauna of 42 genera and 70 species distributed among eleven families as follows:

Leptodactylidae (7 genera, 11 species)

Hylidae (1 genus, 2 species)

Cheluidae (2 genera, 2 species)

Gekkonidae (4 genera, 6 species)

Pygopodidae (6 genera, 8 species)

Agamidae (1 genus, 2 species)

Scincidae (10 genera, 19 species)

Varanidae (1 genus, 3 species)

Typhlopidae (1 genus, 2 species)

Boidae (2 genera, 2 species)

Elapidae (7 genera, 13 species)

(1); Particularly well represented are the legless lizards (Pygopodidae), skinks and elapid snakes. The wealth of pygopodids is understandable; for, with two endemic genera and 14 of the 31 species, the west coast and coastal plains of Western Australia constitute the stronghold of the family; in the rest of the Australo-Papuan continent, especially in northern

Australia and New Guinea, the family is becoming relictual. The richness of elapids is largely due to the occurrence of five species of the fossorial genus Vermicella, another group that is becoming relictual elsewhere in Australia.

The amphibians are poorly represented, especially the Hylidae. The local paucity of tree frogs is a reflection of their regional paucity (3 species in southwestern Australia vs. 20 in southeastern Australia). Nor are the leptodactylid frogs well represented; of the 11 species found in the eastern zone, only 6 extend to the central zone and 5 to the western.

Only one species, the turtle Pseudemydura umbrina, is restricted to our area. However there are several species and subspecies on the list that are endemic or almost endemic to a larger unit of which the northern Swan Coastal Plain forms part, namely the west coast and coastal plains from North West Cape south to Geographe Bay; in this category are Ranidella insignifera, Diplodactylus alboguttatus, Aprasia repens, Pletholax gracilis, Amphibolurus a. adelaidensis, Ctenotus lesueurii, Hemiergis peronii quadrilineata, Lerista elegans, L. lineopunctulata, L. praepedita, Morethia lineocellata and Vermicella calonotos.

As we have already noticed, the eastern zone is much richer than the others in leptodactylid frogs; on the other hand it is considerably poorer in skinks. The Western zone, owing to the presence of limestone, is twice as rich as the others in geckos. These and other interzonal differences are indicated in the following table, which gives the number of species in each family recorded for each zone.

	Western	Central	Eastern
Leptodactylidae	5	6	11
Hylidae	2	2	2
Cheluidae	1	1	2
Gekkonidae	6	2	3
Pygopodidae	7	6	6
Agamidae	2	2	2
Scincidae	18	18	13
Varanidae	2	2	1
Typhlopidae	1	1	2
Boidae	2	0	2
Elapidae	11	11	13
total	57	51	57

Seventeen of the 70 species recorded for the area are considered scarce or rare. Most of them are only scarce or rare because of paucity of suitable habitat on the coastal plain and are much more plentiful on the adjacent plateau; such species are Ranidella pseudinsignera, Crenadactylus ocellatus, Diplodactylus polyophthalmus, Aprasia pulchella, Delma fraseri, D. grayii, Pygopus lepidopodus, Ctenotus impar, Varanus gouldii, V. rosenbergii, V. tristis, Liasis childreni and Python spilotus. Two species, Egernia luctuosa and Denisonia coronata, are scarce or rare because they are at the northern limit of their distribution both are common on the south coast. Another two species, Diplodactylus alboguttatus and Aclys concinna, are scarce or rare because they are at the southern limit of their distribution; both are common north of the Moore River.

Restricted to a few seasonal swamps along Ellen Brook, and in numbers that are precariously low, the endemic turtle Pseudemydura umbrina poses a grave problem for its conservation

as a species. However the conservation of other amphibians and reptiles as viable communities also demands concern in our area, which is one of the most disturbed in the State.

The greater part of Perth and its suburbs lies within our area. Most species decline as the land is built over; the first to go are generally the snakes and monitors; the last to disappear are generally the small skinks, several of which persist in suburban gardens, and one (Cryptoblepharus plagiocephalus) even survives in the city.

Although at least one frog (Ranidella glauerti), one lizard (Tiliqua rugosa) and one snake (Pseudonaja affinis) prosper in partly cleared country, most elements of the herpetofauna gradually decline and disappear from farm lands.

It now remains to notice that part of the fauna which inhabits wet lands. All of the amphibians listed, except Myobatrachus gouldii, require unpolluted surface water for the development of their larvae. Now wet lands are disappearing or deteriorating rapidly in the southern part of our area through drainage, reclamation, garbage disposal, pest control and the destruction of fringing vegetation. With increasing use of subterranean water one can also expect a decline in the wetlands of the north of our area. As well as frogs, certain reptiles require surface water or damp places, namely the turtles Chelodina oblonga and Pseudemydura umbrina, the skinks Egernia luctuosa and Leiolopisma trilineatum, and the snake Notechis scutatus.

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THE FRESHWATER FISHES OF THE NORTHERN SWAN COASTAL PLAIN

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INTRODUCTION

Considering its proximity to the Perth metropolitan district there is surprisingly little published information dealing with the fishes of the Swan Coastal Plain. Allen (in press) has given a general summary of the species inhabiting the Southwest. However, he emphasised the paucity of knowledge concerning life history and ecological data, particularly with regards to native fishes. The present paper reports the results of a faunal survey of the Northern Swan Coastal Plain (subsequently abbreviated NSCP) conducted by the Department of Fishes of the Western Australian Museum between March 1977 and May 1978. The primary purpose of this work was to document the resident species with emphasis on their local distribution and ecology. In addition, special consideration was given to the possible effects of a decreased level in the water table as a result of proposed groundwater extraction.

Representative lakes and watercourses of the NSCP were sampled periodically throughout the study period. Sites were selected with the intention of representing as wide a range of habitats as possible. In addition to regular monthly visits to the major sites (i.e. Lakes Bambun, Beermullah, Chandala, Jandabup, Joondalup and Loch McNess) random sampling was conducted at other scattered localities including Ellen Brook, Lake Guraga and Regan's Ford on the Moore River. The specimens taken during the survey have been deposited in the fish collection of the Western Australian Museum.

Sampling methods consisted of fine meshed dipnets, a chemical ichthyocide (derris powder with 6-8% rotenone content), a small box dredge towed behind an outboard powered punt and a small seine net. The first two methods proved to be the most effective as deep layers of detritus and submerged objects such as tree branches greatly restricted the use of the dredge and seine net.

The results of the sampling program are presented below in the form of an annotated species list which is followed by an account of the fish populations for each lake and stream that was studied. In the first section, families are