Survey of reptiles in the Wilderness section of the Garden Route National Park, South Africa

Niels H.G. Jacobsen¹*, Rod M. Randall²

Abstract. This paper reports on the current occurrence of reptiles in the Wilderness section (formerly the Wilderness National Park) of the Garden Route National Park, South Africa, in relation to that recorded previously as well as from other conservation areas in the southern Cape. Species richness and abundance is low with 32 species recorded. Possible reasons for this are discussed according to anthropogenic and climatic variables.

Keywords. Reptiles, Species richness, Conservation, southern Cape

Introduction

Little has been published about the herpetofauna of the southern Cape or of the national parks in the area, with the exception of an annotated checklist for the Tsitsikamma section (TS) of the Garden Route National Park (GRNP), formerly known as the Tsitsikamma National Park (Branch and Hanekom, 1987). As part of a mandate to compile an inventory of the fauna and flora of national parks, a survey of the reptiles of the Wilderness National Park, now called the Wilderness section of the GRNP, was commissioned in February 2008 with follow-up surveys in February and November 2009.

The study area lies on the coastal plain of the southern Cape in an area commonly referred to as the Garden Route, incorporating a system of lakes from the Swartvlei Estuary in the east to the Touw River Estuary in the west. Terrestrial areas include the north-facing slopes of the Langvlei Dune cordon, part of the dune and dune slack at Rondevlei, the steep south-facing slope of the dune along the seashore between Wilderness and the Swartvlei Estuary, as well as the valleys of the Touw and Duiwe Rivers (Figure 1).

Most of this area is covered by a fynbos/thicket mosaic, with the exception of wetland communities around the perimeter of the lakes and Serpentine channel, where some grassland also occurs on the floodplain. Coastal thicket extends along the high dunes along the seashore. Afrotemperate forest is limited to the Touw and Duiwe River valleys. The area is sandy with aeolianite or dune rock outcrops along the sea front dunes and at the ends of dune cordons above Swartvlei Lake.

Soils along the Touw and Duiwe River are loam to clay, often rocky, with sandstone and shale outcrops and cliffs present along these rivers. A large outcrop of calcareous marine sediment, underlain by Table Mountain quartzite forms a promontory at Gerike’s Point.

The earliest records of species for the southern Cape were based on specimens from Mossel Bay in the west and Knysna in the east (Boulenger, 1910). These were housed in the various South African Museums and later incorporated in the comprehensive works, ‘Lizards of South Africa’ and ‘The Snakes of Southern Africa’ respectively (FitzSimons, 1943, 1962). Broadley (1983) subsequently revised the snakes incorporating additional museum records which had been collected subsequent to the first edition, none being recorded from the Wilderness area. Branch (1981) published a list of the herpetofauna for the Cape Province, based on specimens housed in various museums. A relatively comprehensive list of 25 species from the Swartvlei system and environs, partly incorporated in the study area, was compiled by Palmer (1983). This was followed by the publication of additional distributions of some species, resulting from recent surveys in the province, including specimens from the area deposited by G. Palmer in the Port Elizabeth Museum (Branch, 1990). Apart from these and revisions of selected genera such as Acontias, Lycophidion and Leptotyphlops based on museum material (Broadley and Greer, 1969; Broadley,
Methods

Due to the difficulty in compiling a checklist of the reptiles in any one area, various methods are required to assess the presence of snakes and lizards. For this survey four methods were employed: 1. two persons traversed an area searching for species; 2. during March 2008 two rows of pitfall traps, comprising 10 x 10 l buckets, linked by drift fences, comprising 9 m lengths of lawn-edging 20 cm high, were erected in specific, predetermined areas. The pitfall traps were set up in four different habitats including dune crest and dune slack and rehabilitation area at Rondevlei, north facing slope of Langvlei Dune, Passerina sp. scrub and grass-sedge grassland along the Serpentine channel. These were left in situ for 3.5 days, except for the Langvlei Dune and Serpentine grassland sites where they were left for 2.5 days; 3. During February 2009 a combination of 5 funnel traps alternated by 5 pitfalls and linked by drift fences was deployed at four sites, including three where the pitfalls had been used previously. These were left in situ for 5.5 days each at the Rondevlei dune crest and Langvlei sites, 5 days at the Serpentine site and 4.5 days at a new site in a former rehabilitation area at Rondevlei; 4. During November 2009 a series of five pitfall traps alternating with funnel traps were placed in low forest above the Bosduif Loop trail for 5.5 days. The trap lines were visited twice daily at 07h30 and 16h00 respectively.

Captured animals were removed, noted and released near the capture site; 5. Nocturnal surveys for chameleons were conducted on two occasions in the Ebb-and-Flow rest camp bordering the forest and in forest along the Half-collared Kingfisher Trail running parallel to the Touw River.

In addition, specimens collected and housed at the Rondevlei Office of Scientific Services in the GRNP were examined and recorded. Voucher specimens were deposited in the indigenous species collection at the Rondevlei Office. Sight records and observations by South African National Parks (SANParks) staff were used. Where possible such records were verified and those considered doubtful were disregarded. All literature records which could be verified were also incorporated including those listed for the Goukamma Nature Reserve (GNR).
Table 1. Reptile species recorded in the Wilderness section (WS) of the Garden Route National Park, South Africa. The species list is compared to that compiled for the Tsitsikamma section (TS) of the Garden Route National Park (Branch and Hanekom 1987) and the Goukamma Nature Reserve (GNR) (J. Huisamen 2008, in litt).

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<th>Class</th>
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<td>Chelonia mydas</td>
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<td>Dermochelys coritce</td>
<td>Leatherback turtle</td>
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</tbody>
</table>
Results

A total of 32 species, comprising 11 lizard, 14 snake, 3 tortoise, 1 terrapin and 3 sea turtle species have been recorded within the study area (Table 1).

The results from pitfall trapping yielded two reptile species in 120 trap nights: Red-sided Skink (4) and hatchling Spotted Skaapsteker (2). In contrast the funnel/ pitfall traps yielded 36 reptiles in 205 trap nights including: Red-sided Skink (27), Yellow-throated Plated Lizard (1), Cape Grass Lizard (1), Brown Water Snake (1), Cross-marked Sand Snake (3), Green Water Snake (2), Eastern Green Snake (1) and Puff Adder (1). The funnel and pitfall trap combination above the Bosduif Loop trail yielded one reptile, a Red-sided Skink, in 55 trap nights.

The field surveys only produced additional locality records of species previously recorded within the study area such as Ocellated Thick-toed Gecko, Red-sided Skink, Southern Rock Agama and Spotted Harlequin Snake.

Species confirmed as occurring within the study area are discussed in greater detail below, including sight and literature records from the proximity.

Annotated Checklist

Marbled Leaf-toed Gecko
Afrogecko porphyreus (Daudin, 1802)
A gecko recorded on six occasions in the study area with four during the survey. They were usually associated with buildings and on one occasion in fynbos vegetation. Two pairs of eggs measuring 8.3–8.6 x 6.8–7.2 mm found in hollows in a rotten log are believed to belong to this species. There are also records from the TS and the GNR (Table 1).

Ocellated Thick-toed Gecko
Pachydactylus geitje (Sparrman, 1778)
A terrestrial gecko for which there are three records for the study area, including two early records (Branch 1990). It was not recorded during the survey. The species is also listed for the GNR (Table 1).

Southern Rock Agama
Agama atra Daudin, 1802
An agama recorded at two localities near the littoral zone during the survey. These are the only localities from which it is known in the study area and it is locally common at each of them. The species is known from both the TS and GNR (Table 1).

Knysna Dwarf Chameleon
Bradypodion damaranum (Boulenger, 1887)
An endemic dwarf chameleon of the southern Cape Afrotemperate forests, which was not recorded during the survey. There is one record for the study area in forest habitat (RMR). The species is known from TS (Table 1) and Afrotemperate forests of the GRNP (Branch, 1990).

Cape Legless Skink
Acontias meleagris meleagris (Linnaeus, 1758)
There are only two records of the Cape Legless Skink from the study area and it was not recorded during the survey. The species is listed as occurring at Swartvlei and environs (Palmer, 1983) and, in contrast with the apparent scarcity of the species in the study area, it appears to be common in an adjacent area in loamy to clayey soils (NHGJ). It is known from both the TS and GNR (Table 1).

Red-sided Skink
Trachylepis homalocephala (Wiegmann, 1828)
A widespread skink for which there are 46 records from the study area, including 36 during the survey. It occurs within most habitats in the study area, especially fynbos and thicket, where it is the most common reptile. Two clutches, one of five eggs and the other of nine, measuring 13.3–15.3 x 9.6–11.3 mm were found buried in the soil. They hatched on the 8 March 2008 and measured 60.0 mm total length. The paucity of adult sightings in late summer-autumn and the concomitant presence of numerous juveniles at this time, indicates that individuals have a short lifespan of less than eighteen months. The species is listed as occurring at Swartvlei and environs (Palmer, 1983), as well as the TS and GNR (Table 1).

Cape Skink
Trachylepis capensis (Gray, 1831)
A skink with a wide distribution in southern Africa but which has only been recorded once in the study area and was not recorded during the survey. Nevertheless it is listed for Swartvlei and environs (Palmer, 1983), has been recorded in the general area (NHGJ) and is listed for the GNR (Table 1).

Yellow-throated Plated Lizard
Gerrhosaurus flavigularis Wiegmann, 1828
A lizard of grassland and open woodland/ scrub and recorded three times in the study area, including once during the survey. The records were from fynbos and thicket habitats. The species has also been recorded from the GNR (Table 1).
Cape Grass Lizard
*Chamaesaura anguina* (Linnaeus, 1758)
A lizard of grassland and fynbos recorded twice from the study area: once in 1981 (Branch 1990) and once during the survey. Records from the study area were from fynbos habitats. A specimen was collected near the study area in 1982 (Branch, 1990) and the species is listed for the GNR (Table 1).

Blue-spotted Girdled Lizard
*Ninurta coeruleopunctatus* (Hewitt & Methuen, 1913)
A southern Cape endemic species confined to river valleys in the study area. There are 12 records for the study area, including 3 during the survey. All records were from rock outcrops in thicket and scrub forest habitats. The species has also been recorded at the TS section of the GRNP (Table 1).

Cape Girdled Lizard
*Cordylus cordylus* (Linnaeus, 1758)
A South African endemic species for which there are five records from two localities in the study area, including four during the survey. Four of these records, including a specimen (PEM R 3514) housed in the Port Elizabeth Museum from 1981 (W. R. Branch, in litt.), were from an aeolianite outcrop in the dune cordon near Swartvlei Lake in a fynbos and thicket habitat. These records confirm the unexpected existence of populations of the species in the study area, where it is unknown in other coastal protected areas (Table 1).

Common Brown Water Snake
*Lycodonomorphus rufulus* (Lichtenstein, 1823)
A semi-aquatic snake with three records for the study area, including one record of an immature trapped during the survey. The records are from fynbos and thicket habitats. It is listed for the Swartvlei system and adjacent areas (Palmer, 1983), as well as the TS and GNR (Table 1).

Olive House Snake
*Lycodonomorphus inornatus* (Dumeril & Bibron, 1854)
An endemic South African snake for which there are three records in the study area but none during the survey. The records were from fynbos and thicket habitat. The species is also listed for the TS and GNR (Table 1).

Common Slug-eater
*Duberria lutrix lutrix* (Linnaeus, 1758)
There are four records for the study area but none during the survey. The records are from fynbos and thicket habitat and strangely from beaches. It is also listed for Swartvlei and environs (Palmer, 1983), TS and GNR (Table 1).

Spotted Skaapsteker
*Psammophylax rhombeatus rhombeatus* (Linnaeus, 1758)
There are four records for the study area, including two during the survey. The records are mostly from fynbos habitat. It is also listed for the Swartvlei system and environs (Palmer, 1983) and GNR (Table 1).

Cross-marked Sand Snake
*Psammophis crucifer* (Daudin, 1803)
There are seven records for the Cross-marked Sand Snake for the study area, including three during the survey. Most of the records are from fynbos habitat. The species is listed for the Swartvlei system and adjacent areas (Palmer, 1983) and from Wilderness Heights (Jacobsen, 2006).

Green Water Snake
*Philothamnus hoplogaster* (Gunther, 1863)
A diurnal snake for which there are three records from the study area, all obtained during the survey. All records were obtained in fynbos habitat, although the species is usually associated with moist environments. The species is also listed for the Swartvlei system and adjacent areas (Palmer, 1983) and from Wilderness Heights (Jacobsen, 2006).

Eastern Green Snake
*Philothamnus natalensis occidentalis* Broadley, 1966
There are two records from the study area, including one during the survey. Both are from fynbos habitat. The species is listed for both TS and GNR (Table 1).

Boomslang
*Dispholidus typus* (Smith, 1828)
There are eight records for this widespread diurnal snake in the study area, including one during the field survey. It has been recorded in fynbos, thicket and forest habitats. The species is listed for the Swartvlei system and adjacent areas (Palmer, 1983), TS and GNR (Table 1).

Common Egg-eater
*Dasypeltis scabra* (Linnaeus, 1758)
The Common Egg-eater is widely distributed in southern Africa, but has been recorded only twice in the study area and was not recorded during the survey. The
records were obtained in fynbos/thicket habitat. The species is listed for Swartvlei and environs (Palmer, 1983), as well as TS and GNR (Table 1).

Spotted Harlequin Snake  
*Homoroselaps lacteus* (Linnaeus, 1758)  
The Spotted Harlequin Snake is an uncommon fossorial species for which there are five records from the study area, including one during the survey. All records are from fynbos and fynbos/thicket habitat. The species is listed for the Swartvlei system and adjacent areas (Palmer, 1983), and GNR (Table 1).

Cape Cobra  
*Naja nivea* (Linnaeus, 1758)  
This rare species has been recorded once in the study area and was not recorded during the survey. Two adults were caught and removed from properties on the dune cordon in fynbos/thicket habitat near the study area between 2009 and 2010 (NHGJ). The species is listed for the Swartvlei system and adjacent areas (Palmer, 1983) and the GNR (Table 1).

Yellow-bellied Sea Snake  
*Hydrophis platura* (Linnaeus, 1766)  
A pelagic sea snake of the Indo-Pacific occasionally washed up on beaches along the East coast of South Africa. There is one record from the study area of a specimen found on the beach. The species has been recorded at both the TS and GNR (Table 1).

Common Night Adder  
*Causus rhombeatus* (Lichtenstein, 1823)  
The Common Night Adder is a nocturnal snake of mesic areas for which there are five records from the study area, including one during the survey. All records were from fynbos habitats. The species is listed for the Swartvlei system and adjacent areas (Palmer, 1983) and the TS (Table 1).

Puff Adder  
*Bitis arietans arietans* (Merrem, 1820)  
The Puff Adder is a widely distributed snake in southern Africa for which there are 14 records for the study area, including one during the survey. The records cover a range of habitats from the margins of wetlands (3), through fynbos/thicket mosaic (8) to forest (3). The species is listed for the Swartvlei system and adjacent areas (Palmer, 1983), as well as the TS and GNR (Table 1).

Leopard Tortoise  
*Stigmochelys pardalis* (Bell, 1828)  
This widespread tortoise has been recorded on 18 occasions in the study area, including three times during the survey. The records are from fynbos/thicket mosaic, margins of forest, wetlands and disturbed areas. The species is listed for the TS and GNR (Table 1) but significantly it was not recorded in the Swartvlei system or adjacent areas prior to the late 1980s (Palmer, 1983). Releases of Leopard Tortoises from captive environments are known to have taken place in the study area, following which sightings of the species increased markedly. Juveniles, weighing 102 g and 112 g, were found near the Rondevlei Office in July 2009 and December 2010 respectively, thereby indicating that the species may be breeding in the study area. The absence of the species in the area prior to the late 1980s, followed by known releases of captive animals, indicates that the species may not be indigenous to the study area.

Parrot-beaked Tortoise  
*Homopus areolatus* (Thunberg, 1787)  
The Parrot-beaked Tortoise is a South African endemic species, primarily associated with the Cape Floristic Region. There are 38 records from the study area (I.A Russell, pers. comm.; RMR) but it was not recorded during the survey. All records were confined to fynbos and fynbos/thicket habitats. The species is listed for the Swartvlei system and adjacent areas (Palmer, 1983) and the GNR (Table 1).

Angulate Tortoise  
*Chersina angulata* (Schweigger, 1812)  
The Angulate Tortoise is the common tortoise of the Cape Floristic Region for which there are 25 records from the study area, including four during the field surveys. The records are from fynbos/thicket habitats and disturbed areas. The species is listed for the Swartvlei system and adjacent areas (Palmer, 1983), as well as the TS and GNR (Table 1).

Angulate Tortoises are known to have been released in the study area thus augmenting local populations present in the area.

Marsh Terrapin  
*Pelomedusa subrufa* (Lacepede, 1788)  
The Marsh Terrapin is the most common and widespread terrapin in South Africa for which there are nine records in the study area but none during the survey. It has been recorded in the Touw River estuary and coastal lakes.
There are confirmed breeding records in the form of eggs being laid and a hatchling. The species is listed for the Swartvlei system and adjacent areas (Palmer, 1983) and the GNR (Table 1).

**Loggerhead Turtle**  
*Caretta caretta* (Linnaeus, 1758)  
The Loggerhead is a coastal turtle for which there are four records from beaches in the study area but none during the survey. Three of the records were of hatchlings and the fourth was an adult. The species is listed for the Swartvlei system and adjacent areas (Palmer, 1983), as well as the TS and GNR (Table 1).

**Green Turtle**  
*Chelonia mydas* (Linnaeus, 1758)  
The Green Turtle is a species of coastal tropical seas occurring along the east coast of South Africa for which there are three records for the study area but none during the survey. All records were of adults: two on beaches and one in an estuary (RMR). The species is listed for both the TS and GNR (Table 1).

**Leatherback Turtle**  
*Dermochelys coriacea* (Vandelli, 1761)  
The Leatherback Turtle is pelagic turtle of temperate and tropical seas which occurs mainly on the east coast of South Africa. There is one record, a recently dead juvenile, from a beach in the study area but none during the survey. The species is listed for both the TS and GNR (Table 1).

**Discussion**

A total of 32 reptile species have been recorded from the study area, including four vagrant species: the Loggerhead, Leatherback and Green turtles and the Yellow-bellied Sea Snake. With the exception of the Knysna Dwarf Chameleon and the Blue-spotted Girdled Lizard, both of which are endemic to the Garden Route, the remainder of the species have wider distributions within the southern Cape and South Africa.

The list for the study area is comparable to the 25 species recorded from the TS section of the GRNP (Branch and Hanekom, 1987) and the 34 species from the nearby GNR (J. Huisamen, 2008 in litt) with which it shares 20 and 27 species respectively (Table 1). The combined list for the study area and TS brings the total for the GRNP to 37 species.

The recent records of the Cape Girdled Lizard in the study area in conjunction with a record from the same locality about 30 years previously (W.R. Branch, in litt.) confirms that the species can survive in habitat which is largely devoid of the rocky habitat preferred by the species. These records also reveal the occurrence of the species in a coastal area previously considered to be devoid of the species, where it is believed to have been excluded by the Blue-spotted Girdled Lizard (Branch, 1990; Branch, 1998).

The results of the survey indicate that disturbed areas have a poor reptile fauna. The dune ridge behind the Scientific Section offices, which had not been burnt for over 30 years, had the highest snake species richness with seven individuals of five different taxa being recorded. With the exception of a single immature Puff Adder captured on the Langvlei Dune no other snake was trapped in the remaining areas. All of the latter sites had been variously impacted previously, the low capture rate inferring that the rate of recolonisation is poor and perhaps a consequence of anthropogenic impacts in the areas surrounding the study area.

Increasing human settlement in the areas flanking the park has had an impact. Apart from habitat destruction and reduction in foraging area, direct persecution is likely to affect populations in these areas. Human persecution of snakes in the area is substantial particularly where these reptiles are exposed when crossing roads and when foraging around human dwellings. In addition domestic animals such as cats and dogs also kill numbers of reptiles, one owner on the Langvlei dune cordon mentioned that her cat had killed Green Water Snakes and other species (P. Manders, 2009 pers. comm.). The study area is comprised of narrow strips of land between human habitation and the lakes, with the result that many reptiles will move out of the park into the conflict zone. The inevitable mortality will reduce the ability of some species to come into contact with conspecifics to reproduce, reducing the likelihood of recolonization of areas following substantial perturbations such as wildfires.

A road network, including a national road (N2), surrounds and dissects the area. Road kills of Spotted Harlequin Snake, Olive Snake, Common Egg-eater, Spotted Skaapsteker, Cross-marked Grass Snake, Boomslang, Puff Adder, Cape Cobra, Angulate Tortoise and Parrot-beaked Tortoise have been recorded, mostly on the road leading to the Scientific Services Office at Rondevlei (SANParks, unpubl.), while road kills of Olive Snake, Common Slug-eater, Brown Water Snake, Common Egg-eater, Puff Adder, Common Night Adder and Boomslang were noted along a 2 km stretch of...
The climate in the southern Cape is mild with average daily temperatures rarely exceeding 19°C and nocturnal temperatures remain above 10°C for only the summer months. Daily mean maximum air temperature at Swartvlei varies from 25°C in summer to 19°C in winter, with mean daily minimum air temperature 15°C in summer and 7°C in winter (Whitfield et al., 1983). This appears to limit the occurrence of many species even along the coastal plain, most reptiles preferring a warmer climate with fewer cloudy days. The lizards appear to be the most affected, with only 11 taxa having been recorded, one of which is a forest adapted species and another fossorial.

The reptiles of the study area are therefore mostly comprised of temperate species such as the Olive Snake, Common Slug-eater, Blue-spotted Girdled Lizard, Knysna Dwarf Chameleon, Cape Legless Skink, Ocellated Thick-toed Gecko, Marbled Leaf-toed Gecko, Angulate Tortoise and Parrot-beak Tortoise, together with some tropical elements with broad habitat tolerances such as Puff Adder, Common Night Adder, Boomslang and Yellow-throated Plated Lizard.

The composition and abundance of reptiles in the study area are therefore a reflection of many variables, most of which have been influenced by anthropogenic activities in the past and continue to do so. There is an urgent need for a more concerted effort with regard to the acquisition of land on the vulnerable coastal plains and marine platform. Although the creation of the GRNP may help to ameliorate this, most of the land along the coastal plain is under private ownership without any incentive to act as environmental custodians. It is therefore also imperative to create awareness amongst landowners and the general public about the vulnerability of the area, its flora and fauna and their responsibilities to ensure its continued survival.

Conclusion

Apart from conserving populations of reptiles occurring in the southern Cape, especially those along the coastal plain, the study area is important in conserving additional populations of endemic species such as the Knysna Dwarf Chameleon and Blue-spotted Girdled Lizard at the western end of their distribution thereby complementing populations in the Tsitsikamma section of the GRNP which lie at the eastern end of their ranges. A number of peculiar distribution anomalies are present in the area, which need to be resolved in order to clarify the biogeography of the reptiles along the Garden Route.

It is unfortunate that existing terrestrial areas within the study area are too small and fragmented to sustain a viable population of some species such as the Cape Cobra. The paucity of species within disturbed areas
and apparent lack of recruitment is cause for concern. The acquisition of additional terrestrial habitat along the coastal plain and of the marine platform should be regarded as a matter of priority.

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References


