Status and conservation of the reptiles and amphibians of the Bermuda islands

Jamie P. Bacon¹,², Jennifer A. Gray³, Lisa Kitson¹

¹ Bermuda Zoological Society, Flatts FL 04, Bermuda
² Corresponding author; email: jbacon@ibl.bm
³ Bermuda Government Department of Conservation Services, Flatts FL 04, Bermuda

Abstract. Bermuda’s herpetofauna includes three species of amphibians, one fossil tortoise, two species of freshwater turtles, five species of marine turtles, and four species of lizards. The amphibians Eleutherodactylus johnstonei, E. gossei and Bufo marinus were all introduced in the late 1880s. Amphibian population declines, including the possible extirpation of E. gossei, prompted the initiation in 1995 of an on-going investigation. Research into the high deformity rates in B. marinus has indicated that survival and development of larvae are affected by contaminants in a number of ponds and by the transgenerational transfer of accumulated contaminants. Of the two emydid turtles in Bermuda, Malaclemys terrapin may be native and its population characteristics are being studied; Trachemys scripta elegans is considered invasive and efforts are underway to remove its populations from the wild. The sizeable resident Chelonia mydas population has been the focus of a mark-recapture study since 1968. Results indicate that Bermuda is currently an important developmental habitat for green turtles originating from at least four different nesting beaches in the Caribbean. Immature Eretmochelys imbricata also reside on the Bermuda Platform and genetics studies suggest that multiple Caribbean genotypes are represented in Bermuda’s hawksbill population. Caretta caretta do not appear to be regular inhabitants, but two known loggerhead nesting events have recently occurred (in 1990 and 2005) and post-hatchling loggerheads regularly strand after winter storms. Dermochelys coriacea are only occasionally seen and the last record for a live Lepidochelys kempi in Bermuda occurred in 1949. Three of the lizard species are introduced Anolis; A. grahami grahami, A. leachii, and A. extremus. Their populations appear stable and they are presently not being studied. The fourth lizard, the Bermuda skink Eumeces longirostris, is Bermuda’s only endemic terrestrial vertebrate. It is classified as Critically Endangered on the IUCN Red List and is protected under the Protected Species Act (2003); much research has been undertaken recently to aid the development of effective conservation management plans for this species.

Key words: Bermuda; Bufo marinus; Caretta caretta; Chelonia mydas; chemical stressors; deformities; Eleutherodactylus gossei; Eretmochelys imbricata; Eumeces longirostris; Malaclemys terrapin.
Introduction

Bermuda is an isolated 5,560 ha chain of limestone islands on a 150,000 ha seamount located near 32°N and 64°W in the western North Atlantic. Situated some 960 km ESE of Cape Hatteras, North Carolina, Bermuda consists of a crescent-shaped chain of more than 360 low-lying islands that are closely linked. A shallow shelf consisting of coral reefs, shallow lagoons and seagrass meadows surrounds the islands and makes up the Bermuda Platform (fig. 1).

The Bermuda islands are positioned within the north-western sector of the Sargasso Sea, a vast area of weak and inconsistent currents whose surface is dotted with mats of Sargassum algae. The Sargasso Sea offers a unique refuge to a host of open ocean species, including sea turtles. Driven by the Gulf Stream Current from the northwest and the Canaries Counter Current from the southeast, the Sargasso Sea turns slowly clockwise. The Gulf Stream passes Bermuda to the west with great influence as eddies and gyres reach Bermuda’s shores and deliver warm water along with elements of the fauna and flora from the Caribbean and the east coast of North America.

While ocean surface temperatures range from 18°C in January to 28°C in August, the water mass surrounding Bermuda between the depths of 200 and 500 m is consistently about 18°C. Inshore temperatures may vary from 15°C to 30°C. Rainfall is not highly seasonal with a mean actual accumulation of approximately 150 cm being distributed throughout the year. October is the wettest month with an average of 16 cm, and April the driest at 10 cm. Temperatures show marked seasonality with mean monthly air temperatures ranging from 18.5°C in February to 29.6°C in August.

Seven of Bermuda’s largest islands are connected by bridges and comprise what is considered to be ‘mainland Bermuda’. The available land area (4,650 ha) is divided into nine parishes (fig. 1). Bermuda’s topography is dominated by low rolling hills of poorly fused limestone and fertile depressions.

A number of ponds are scattered throughout Bermuda, but the majority are either fully marine or brackish and many are man-made. The island’s few freshwater wetlands, estimated at 127 ha in the early 1600s, totaled only 58 ha in 1980 due to drainage for agriculture or mosquito control and through being used as landfill sites for waste disposal (Thomas, 2004). Presently, these freshwater habitats (some of which temporarily turn slightly brackish in the summer or fall) include one swamp forest, two marshes, two natural ponds and eight excavated ponds, some of which are located in former landfill sites. Additionally, there are a number of lined golf course ponds which provide fresh water habitats for terrapins and toads.

Currently, more than 50% of Bermuda’s land area is used for housing and over 75% of Bermuda is considered developed (Thomas, 2004). With a population of over 61,000 and a population density of 1,145 people per km², Bermuda is one of the most densely populated oceanic islands in the world (Anderson et al., 2001). As a result, Bermuda’s natural environment is at risk from chemical contamination caused by a variety of sources including illegal dumping, emissions from vehicles,