CONSERVATION RESEARCH REPORTS

Dietary Shifts of Turtles in Pristine and Oil-polluted Habitats of the Niger Delta in Southern Nigeria

LUISELLI ET AL. (2004. *Herpetological Journal* 14: 57–64) examined the diets of sympatric freshwater turtles at two study areas in the Niger Delta (southern Nigeria). One site was unpolluted and the other was polluted by an oil spill, but both areas were otherwise similar. Four species of turtle (*Trionyx triunguis*, *Pelusios castaneus*, *Pelusios niger*, and *Pelomedusa subrufa*) were captured in the unpolluted area, whereas only two species (*Pelusios castaneus* and *Pelusios niger*) were captured in the polluted area. In the unpolluted area, the taxonomic composition of the diets of *Pelusios castaneus* and *Pelusios niger* was similar, whereas the diets of *Pelomedusa subrufa* and *Trionyx triunguis* were very different from the other two species and one another. In the polluted area, the taxonomic composition of the diet of *Pelusios castaneus* was significantly different from that of conspecifics in the unpolluted area, and consisted mainly of plant matter, annelids (earthworms and leeches), and gastropods. The taxonomic composition of the diet of *Pelusios niger* was also significantly different from that of conspecifics at the unpolluted area, and consisted mainly of annelids and gastropods, and secondarily of plant matter. Amphibian prey (eggs, tadpoles, and adults), which were one of the main food types for all turtles in the unpolluted area, practically disappeared from the diet of turtles at the polluted area. The two species that survived the oil spill obviously shifted their dietary preferences. In both species, an obvious reduction in the breadth of the trophic niche was apparent. Such a reduction in trophic niche breadth may reflect the reduced availability of most food sources (particularly amphibians, fish, and environmentally-sensitive invertebrates) in the polluted area, despite over 10 years of restoration operations at the site. The reduction in trophic niche breadth also may reflect shifts in habitat use by the surviving turtles, which tended to concentrate into single habitat types in the polluted area, compared to the unpolluted area where they were more habitat generalists.

CHUCK SCHAFFER

Pelomedusa subrufa was restricted to unpolluted areas in the Niger Delta (Nigeria).

Biology of Endangered Ploughshare Tortoises

Successful conservation requires a good understanding of both the direct and indirect causes of any decline in population size. Harvests of wild populations often target the largest, oldest individuals that have the greatest economic value. If these individuals contribute disproportionately more to recruitment than conspecifics, the harvest will cause a greater reduction in population viability than initially anticipated. The Ploughshare Tortoise (*Geochelone yniphora*), endemic to Madagascar, has been reduced to <600 individuals due to exploitation and habitat loss. A trial release of captive-bred juveniles has been carried out but the relative suitability of individuals for release, in terms of body size, was not considered. Using data from a long-term mark-recapture study of an unharvested wild population of ploughshare tortoises, O'BRIEN ET AL. (2005. *Biological Conservation* 126: 141–145) found that larger juveniles were significantly more likely to survive their first year of life than smaller tortoises. Juveniles that survived beyond their first year of life generally grew at the same rate, but had a significantly larger hatch size (mean = 41.7 mm), compared with juveniles that did not survive (mean = 39.3 mm). The conservation implications of these results are that release of captive-bred Ploughshare Tortoises is likely to be more successful if larger individuals are released. Previous studies have reported larger female Ploughshare Tortoises laying larger eggs which hatch larger juveniles. This study shows individuals with a larger hatch size retain their size advantage over smaller conspecifics and are more likely to survive their first year of life. This suggests a harvest that targets the largest females in the Ploughshare Tortoises population could be highly detrimental to population viability.

LORA SMITH

The Ploughshare Tortoise (*Geochelone yniphora*), endemic to Madagascar, has been reduced to fewer than 600 individuals due to exploitation and habitat loss.

Herpetofaunal Diversity in Southeastern National Parks

The southeastern United States supports about half of the nations species of amphibians and reptiles, of which about 20% are endemic to the region. Because few areas have been formally inventoried,

TURBERVILLE ET AL. (2005. *Southeastern Naturalist* 4:537–569) conducted biological inventories at 16 parks in the National Park Service's Southeast Coast Network. Using a variety of standard field techniques and surveys of museum collections, the authors documented the presence of 123 native species of amphibians and reptiles in the 16 parks, with numbers of species ranging from 6–64 per park.

SUZANNE L. COLLINS, CNAH

Alligator Snapping Turtles (*Macroclemys temminckii*) and American Alligators (*Alligator mississippiensis*) are but two of 123 native species of amphibians and reptiles found in 16 national parks in the southeastern United States.

CHUCK SHAEFER

Where Gopher Tortoises (*Gopherus polyphemus*) are present, their burrows are used for shelter by many other animals.

Increasing Leatherback Numbers Linked to Long-term Nest Protection

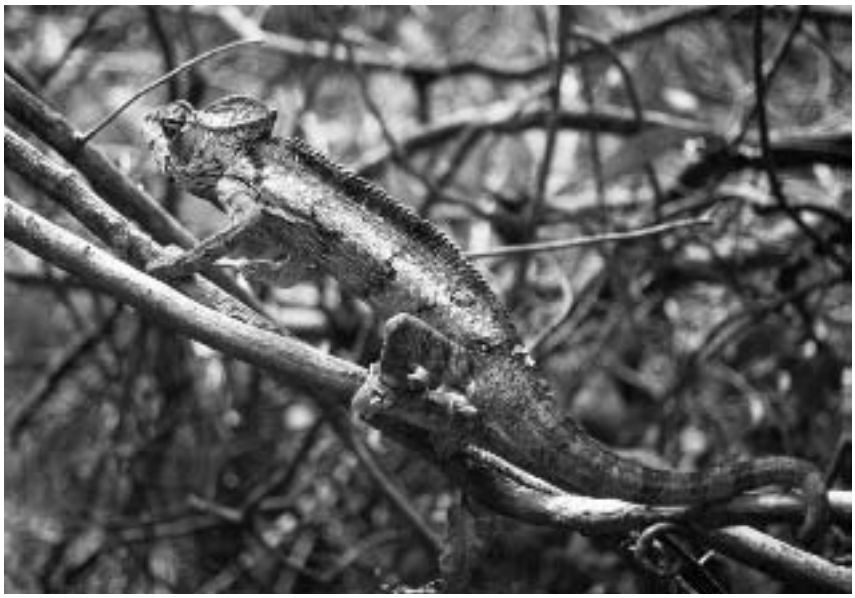
The Leatherback Turtle (*Dermochelys coriacea*) is considered to be at serious risk of global extinction, despite ongoing conservation efforts. Intensive long-term monitoring of a Leatherback nesting population on Sandy Point (St. Croix, US Virgin Islands) offers a unique opportunity to quantify basic population parameters and evaluate effectiveness of nesting beach conservation practices. DUTTON ET AL. (2005. *Biological Conservation* 126: 186–194) reported a significant increase in the number of females nesting annually from ca. 18–30 in the 1980s to 186 in 2001, with a corresponding increase in annual hatchling production from ca. 2000 to over 49,000. They then analyzed resighting data from 1991 to 2001 with an open robust-design capture-mark-recapture model to estimate annual nester survival and adult abundance for this population. The expected annual survival probability was estimated at ca. 0.893 (95% CI: 0.87–0.92) and the population was estimated to be increasing ca. 13% pa since the early 1990s. Taken together with DNA fingerprinting that identify mother-daughter relations, their findings suggest that the increase in the size of the nesting population since 1991 was probably due to an aggressive program of beach protection and egg relocation initiated more than 20 years ago. Beach protection and egg relocation provide a simple and effective conservation strategy for this Northern Caribbean nesting population as long as adult survival at sea remains relatively high.

ROZENN LE SCAO

Leatherbacks (*Dermochelys coriacea*) are critically endangered. Beach protection and egg relocation provide a simple and effective conservation strategy for nesting populations as long as adult survival at sea remains relatively high.

Impact of Deforestation on Lizards, Small Mammals, and Birds in Southern Madagascar

Madagascar is a global biodiversity hotspot threatened by forest loss, degradation, and fragmentation, all of which are detrimental to the future survival of forest-dwelling organisms. For conservation purposes, determining how species respond to habitat disturbance, specifically deforestation, is essential. SCOTT ET AL. (2006. *Biological Conservation* 127: 72–87) investigated the impacts of deforestation on three vertebrate communities, lizards, small mammals, and birds, in an area of spiny forest subjected to anthropogenic forest clearance. Spiny forest has high levels of endemism, but conservation in this unique ecosystem is hindered by the lack of research. The authors assessed species richness, species abundance, and community composition of lizards, small mammals, and birds in six areas of 'forest' and six 'cleared' areas. From surveys and opportunistic sightings, they recorded a total of 70 species of birds, 14 species of



MICHIEL DE BOER

Oustalet's Chameleon (*Furcifer oustaleti*) is one of the world's largest chameleons and is one of the many unique species of lizards that inhabit the spiny forests of Madagascar.

mammals, and 38 species of reptiles and amphibians. They found forest clearing to have a negative effect on species richness and community structure of all groups and identified loss of canopy cover as a driving factor. However, the response and sensitivity to clearing varied between groups and species. Lizards (50%) and small mammals (40%) had the greatest decline in species richness in response to clearing as compared to birds (26%), although birds showed the greatest shift in community structure. The community in cleared areas contained more generalist and introduced species than species unique to the spiny forest. The first species to suffer from forest clearance were those of high conservation priority due to their restricted geographic range.

RICHARD DANIEL

Larger individuals of Timber Rattlesnakes (*Crotalus horridus*) were more likely than smaller snakes to avoid roads. However, 50% of snakes on the road froze for up to a minute even before vehicles passed, prolonging crossing times and magnifying susceptibility to road mortality.

Roads and Snake Movements

Roads affect survivorship and behavior and can act as barriers to movement, which exacerbates habitat fragmentation and disrupts landscape permeability. ANDREWS AND GIBBONS (2005. *Copeia* 2005: 772–782) conducted field experiments that demonstrated interspecific differences in snakes of the southeastern United States that encountered roads. Smaller species exhibited higher levels of road avoidance, venomous species crossed more slowly than nonvenomous forms, and three species responded to traffic by becoming immobile, which prolonged crossing times and magnified susceptibility to road mortality. All species crossed roads at perpendicular angles. Models using crossing speeds indicated that some species couldn't successfully cross roads with high traffic densities.

Conservation and Reptilian Diversity on the Guiana Shield

The Guiana Shield region is a biologically rich area that includes much of northeastern South America. It is strictly defined by the underlying geological formation of the same name. Total area is approximately 1,520,000 km^2 and portions or all of five nations are included. In their introduction to the "Checklist of the terrestrial vertebrates of the Guiana Shield," editors HOLLOWELL AND REYNOLDS (2005. *Bulletin of the Biological Society of Washington* (13): x + 98 pp.) addressed conservation:

With the exception of a few populated localities, the environment of the Guiana Shield has benefited from limited access and low population densities, although this same isolation has hindered biodiversity research. Estimates vary, but much of the vegetation is still relatively undisturbed by human activities. Recently, however, the pace of disturbance has greatly increased. Current threats include large-scale logging, large- and small-scale gold and diamond mining, oil prospecting, bauxite mining, hydroelectric dams, wildlife trade, and population-related pressures such as burning, grazing, agriculture, and the expansion of Amerindian villages. Taken together, these impacts have begun to take their toll, with vast areas vulnerable to increasing disturbance.

The status of conservation efforts varies by country. Throughout the Guiana Shield, many areas that are designated as protected are often only "paper" parks, because a lack of infrastructure and funds fails to protect the areas. Over the last four decades, Venezuela has established seven national parks, 29 natural monuments, and two biosphere reserves covering about 142,280 km^2, more than 30% of its share of the Guiana Shield. In Guyana, the progress of conservation efforts has been slower, with only one

Number of reptilian species known to occur on the Guiana Shield: Total numbers of species listed by family, species with broadly endemic distributions within the area, and species with site-specific endemic distributions.

Family	Species	Shield-wide Endemics	Site-specific Endemics
Colubridae	104	6	15
Gymnophthalmidae	45	7	18
Iguanidae (*sensu lato*)	32	2	9
Gekkonidae	16	4	1
Elapidae	13	4	1
Teiidae	12	1	1
Amphisbaenidae	10	3	5
Leptotyphlopidae	8	2	1
Boidae	8	1	-
Viperidae	8	-	1
Chelidae	8	1	-
Podocnemididae	6	1	-
Crocodylidae	5	1	-
Anomalepididae	4	-	1
Cheloniidae	4	-	-
Scincidae	3	1	-
Typhlopidae	3	-	-
Testudinidae	2	-	-
Dermochelyidae	1	-	-
Kinosternidae	1	-	-
Bataguridae	1	-	-
Aniliidae	1	-	-

Three species from the Guiana Shield: *Phimophis guianensis* (left) and *Siphlophis compressus* (center) are colubrid snakes, and *Anolis* (*Norops*) *nitens nitens* (right) is an iguanian lizard.

national park of 627 km^2, about 3% of the country's area, although additional reserves are under consideration. Guyana's 3,710 km^2 Iwokrama Forest is dedicated to sustainable use. Surinam's protected areas system includes one national park and a network of 11 reserves, totaling almost 20,000 km^2, over 12% of its total area. This includes the recently created 16,000 km^2 Central Surinam Nature Reserve, a UNESCO World Heritage Site that joined and expanded three existing reserves. French Guiana has no officially designated protected areas, but 18 proposed sites total 6,710 km^2, about 7.5% of it area. The natural areas of Venezuela and Guyana are currently under the most anthropogenic pressure, while those of French Guiana are probably less threatened.

Cooperation among the nations with areas on the Guiana Shield is sometimes hampered by border disputes and illegal cross-border transportation of gold and wildlife. The implementation of conservation practices is further complicated by many issues concerning the indigenous peoples of the region. All of these challenges will have to be overcome on the way to designing and maintaining a viable reserve system.

Ávila Pires (2005. Reptiles, pp. 24–40. In: *Bulletin of the Biological Society of Washington* (13): x + 98 pp.) listed 295 species of reptiles currently known from the Guiana Shield (see Table). When only species endemic to the region are considered, the proportion of lizards and amphisbaenians increases, whereas the proportion of snakes decreases. These differences may be real or sampling artifacts. Amphisbaenians are difficult to sample and ranges of several species could be wider than presently known, decreasing the number of species considered to be Guiana Shield endemics. In contrast, ranges of widely distributed species of snakes are well-known and probably real, unless most currently recognized species turn out to be species complexes. Many new species remain to be discovered, especially in the highlands.

Variability in *Brachylophus*

Most iguanas are found in the Americas, but the genus *Brachylophus* occurs in Fiji and Tonga in the South Pacific. Effective conservation relies on understanding the relationships among the populations on various islands, which have previously been poorly understood. Burns et al. (2006. *Pacific Conservation Biology* 12:64–77) analyzed DNA samples from 35 individuals from 10 islands. They identified three forms, of which the Tonga animals were the most genetically distinct. Fijian and Tongan populations have each evolved following their separation at least 7 million years ago. The authors suggest a need to reassess conservation strategies to better reflect the greater degree of differentiation identified by this study. Most populations are small and vulnerable to introduced predators, especially cats and mongooses. Both on-site and zoo-based measures are urgently recommended.

JOE BURGESS

Fijian iguanas in the genus *Brachylophus*, like this *B. vitiensis*, may include more genetically distinct entities than previously thought.