Report of findings of herpetofaunal survey of the Grenadines: April/May 2015

Brice P. Noonan

Overview:
The herpetofauna of the Grenadines is known to comprise 22 species (3 amphibians, 19 reptiles) of which 5 (1 amphibian, 4 reptiles) are introduced[1]. This survey was conducted as a part of a larger rapid inventory of patterns of diversity on the largely uninhabited of the Grenadines. Many of these islands host few to no permanent human residents, and as such pose a fantastic opportunity for St. Vincent and the Grenadines, along with appropriate partners, to enact meaningful conservation and monitoring activities. The purpose of this inventory, conducted in tandem with botanical and myrmecological teams, was to provide baseline insight into the state of biodiversity on these islands.

Sampling strategy:
Our biodiversity team traveled among the islands of the Grenadines over a 10 day period in 2015. We visited as many islands as possible, usually one per day and made rapid inventory assessments of the diversity and habitat. Due to logistical and time constraints, herpetological surveys were conducted exclusively during the day (with the exception of Bequia, Union, and Petit St. Vincent). The information reported herein should be taken not as an exhaustive list of species inhabiting these islands, but a preliminary survey that highlights abundant species and identifies islands most appropriate for further survey and conservation efforts (e.g. eradication of goats or protection of particular species).

Summary of findings:

Existing literature of herpetofaunal diversity and distribution within the Grenadines suggest there to be little differentiation among the islands; that is there are few endemics and most species found on these islands are found on most, if not all islands. The two exceptions are the diminutive geckos endemic to Union Island (*Gonatodes daudini*) and Isle de Quatre (*Sphaerodactylus kirbyi*). Both species were observed and were not uncommon. It should be noted however that *G. daudini* is known only from a small, boulder-strewn creek bed descending the western slopes of Union Island into Chatham Bay. This Bay is being developed and the area inhabited by this species is certain to become highly coveted land for the building of homes/resorts. It is imperative that this area be protected as there were no other similar habitats observed elsewhere on Union or any other island in the Grenadines.

On each island, I searched alone for reptiles and amphibians in the areas with the most suitable habitat. What follows is a list of each island, in order of visit, with the time spent searching, species collected, and additional species observed. Note that species "collected" were temporarily captured, nondestructively sampled for genetic material, and, in some instances, photographed.

1: www.caribherp.com

Battowia: 23 April 2015 (7 man hours)

Species collected: *Geochelone carbonaria, Copeoglossum aurae, Anolis aeneus, Mastigodryas brusei*

Additional species observed: *Iguana iguana*

Figure 1: Clockwise from top left: Scrub habitat near peak; Exposed rock and shrub habitat with view of Baliceaux to the South; Feral goat; *Geochelone carbonara* shell (deceased, undamaged); six *Geochelone carbonara* resting in low forest of the NE plateau; *Copeoglossum aurae.*

The survey of the herpetofauna began on the western escarpment of Battowia, with a quick climb to the plateau. This eastern plateau was covered in sparse, scrubby, wind-swept vegetation, with some of the largest trees of the island. *Anolis avenues* were abundant among the branches of fallen trees in this, and every other surveyed area of the island. The survey continued inland toward the forested northeastern edge of the plateau.

At the highest elevation, the vegetation formed a low, closed canopy with abundant leaf-litter (Figure 1). In this area, tortoises (*Geochelone carbonara*) occurred in incredibly high densities, often times seeking communal shelter around the same fallen log. Here and elsewhere on the island, low vegetation (0-0.5m) was sparse to absent due to the presence of feral goats on the island. A large *Copeoglossum aurae* was found on the trunk of a large *Ficus* tree, and it was in this forested area that a snake (*Mastigodryas brucei*) was observed. This island is obviously a very important nesting site for both Brown and Red Footed Boobies, as fledglings were perched in many of the low trees, unable to fly.

Isle Savane: 24 April 2015 (5 man hours)

Species collected: *Anolis aeneus*

Additional species observed: *Copeoglossum aurae*

Figure 2: Clockwise from top left: Low, scrubby vegetation characteristic of western face of Isle Savane; The exposed windward (eastern) portion of the island is covered in open rock inhabited by cacti or covered in low grasses; Permanent fishing settlement/base on northwest shore; *Copeoglossum aurae* observed among vegetation just above the fishing settlement. Note, we were unable to capture this specimen and confirm it was not *Marisora aurulae*, but photographs suggest it is *C. aurae.*

Isle Savane was an exceptionally small island with little habitat diversity. Much of the island was covered in low grass or bare rock (Figure 2). Though we expected the island to be inhabited, there was a permanent fishing camp on the western shore inhabited by

fewer than 6 people. Habitat disturbance was limited to the immediate area of the camp (Figure 2) and a small vegetable garden, and associated trails, to the south of the camp.

Petit Canouan: 24 April 2015 (5 man hours)

Species collected: *Ameiva ameiva, Anolis aeneus, Thecadactylus rapicauda*
Additional species observed:

Figure 3: Clockwise from top left: Open grassland in which many birds were nesting on northern slope of Petit Canouan; More habitat and myrmecologists in action on northeast face of Petit Canouan; *Ameiva ameiva* collected under large flat rocks on Petit Canouan; *Ameiva ameiva* feeding on carcass of a dead tern.

Petit Canouan was found to be uninhabited and undamaged by feral goats. Notably, an invasive grass covered much of the island, though the nesting terns (of which there were thousands) appeared to be bothered little by this grass. Foliage on this island was limited to 2 very small patches of trees in which *Anolis* were observed. The only other two species observed (*Ameiva ameiva, Thecadactylus rapicauda*) were observed in the open grassy areas sheltering beneath large flat stones. Notably, *Ameiva* were observed feeding on the carcass of a dead tern (Figure 3), which may form an important food source during breeding season.

Petit St. Vincent: 25 April 2015 (10 man hours)

Species collected: *Anolis aeneus, Corallus grenadensis, Eleutherodactylus johnstonei*

Additional species observed: *Gymnopthalmus underwoodi*

Figure 4: Scrub habitat characteristic of elevated areas on Petit St. Vincent (Left); View of eastern, developed portion of the island from the peak of western uplands (Right).

The island of Petit St. Vincent is well developed on the southern and eastern sides, with the western 'mountain' being disturbed only by a looping hiking trail. The habitat on this island, especially the western elevated region, is noticeably drier than most areas surveyed in the Grenadines (Figure 4). *Corallus* were observed in the evening along the trees lining the western shoreline and were quite abundant. This is the only island upon which an anuran was discovered (*Eleutherodactylus johnstonei*), which was found under rubbish surrounding a small waste/drainage pond to the north of the resort main structure. *Geochelone carbonaria* were observed in an enclosed pen at the resort, but it is unknown whether they naturally occur on Petit St. Vincent or they were brought there recently by man.

Union Island 26 April 2015 (9 man hours)

Species collected: *Ameiva ameiva, Anolis aeneus, Bachia heteropa, Corallus grenadensis, Geochelone carbonaria, Gonatodes daudini, Hemidactylus mabouia, Mastigodryas brucei*

Union Island was one of the largest islands sampled, though our efforts were concentrated on the less populated western coastline bordering Chatham Bay. Both habitat and reptile diversity on this island were quite high. The boulder-strewn gully that descends the slopes of the western ridgeline into the southern corner of Chatham Bay contained some of the highest and certainly the wettest forest observed in the Grenadines during this survey. Unsurprisingly, this created fantastic habitat for a number of species that are incapable of surviving in the more xeric habitats common to the Grenadines (e.g. *Bachia heteropa* and the endemic *Gonatodes daudini,* Figure 5). *Corallus grenadensis* were found to be exceptionally abundant in the thick vegetation lining Chatham Bay during the night survey. The

eastern half of Union Island is densely populated and the biotic and habitat diversity of the western regions sampled as a part of this survey certainly merit consideration for conservation action in this region as it will surely face development pressure in the coming years.

Figure 5: Clockwise from top left: View of Chatham Bay from the north; *Anolis aeneus; Geochelone carbonaria; Bachia heteropa; Gonatodes daudini; Corallus grenadensis*

Tobago Cays

Petit Bateau 28 April 2015 (3 man hours)
Species collected: *Iguana iguana, Hemidactylus mabouia, Thecadactylus rapicauda*
Additional species observed:

Petit Rameau: 28 April 2015 (2 man hours)
Species collected: *Anolis avenues*
Additional species observed:

Figure 6: Iguana iguana on Petit Bateau; View from peak of Petit Bateau of Petit Rameau to the north (Canouan in the distance).

The Tobago Cays are a series of small islands that provide a beautiful anchorage that seems to be very popular with nautical tourists. In visiting two of these during our single day stay, it was clear that these islands have been visited and modified by many people, though there are no permanent residents. I did not observe any resident goats, and the vegetation was quite abundant and provided a great deal of cover. While the quality of habitat remains quite high, the level of human visitation and the small size of these islands decreases their importance for conservation of Grenadines biodiversity, but provides excellent opportunity for education and interaction/eco-tourism (especially given the nearby reefs).

Catholic Island: 28 April 2015 (3 man hours)
Species collected: *Anolis aeneus, Thecadactylus rapicauda*
Additional species observed:

Catholic is a very small island with abundant scrubby vegetation. Two species of lizards were observed on this uninhabited island. We were able to spend very little time on this island, though the diversity of reptiles and habitat were quite similar to the nearby Tobago Cays.

Baliceaux: 29 April 2015 (4 man hours)

Species collected: *Ameiva ameiva, Anolis richardii*, *Geochelone carbonaria, Gymnopthalmus underwoodi, Hemidactylus mabouia*
Additional species observed: *Anolis aeneus*

Figure 7: Clockwise from top left: View of eastern coastline of Baliceaux from the north; View of northeast coastline from the south; *Anolis aeneus*; *Geochelone carbonaria* collected within 10 minutes of landfall in western bay, specimens here are immobilized for individual examination before release; *Geochelone carbonaria* in situ; shell of *Geochelone carbonaria*, no cause of death apparent.

Though it is smaller than the largest and most ecologically diverse islands of the Grenadines, Baliceaux is a large island with a diverse array of habitats. Upon landing on the western shore, the first impression of the island is that it has nearly been

denuded of grasses and low-growing vegetation in the open areas of the center of the island (see Figure 7, bottom right). Feral goats are clearly abundant on this island. This island is also home to the densest population of tortoises I have ever observed. Within 15 minutes of landing on shore, I had collected approximately 20 tortoises walking about the area (an endeavor facilitated by the visibility resulting from goat grazing). Though both tortoises and goats feed on low-growing vegetation, it is clear the presence of goats has not had too severe an impact on the population of tortoises on this island. *Anolis aeneus* were quite abundant on the island, and *Anolis richardii* were observed in the more heavily forested areas where *Gymnophtalmus* were also common in the leaf litter. Though it appears this island is not permanently inhabited by humans, a number of structures indicate it is a common stop for fishermen. In these structures, *Hemidactylus mabouia* were quite common. A large and diverse island, Baliceaux would benefit greatly from the release of the ecological pressures presented by goats.

Isle de Quatre: 1 May 2015 (9 man hours)

Species collected: *Anolis aeneus, Sphaerodactylus kirbyi*
Additional species observed: Possible *Anoils aeneus/sagrei* hybrid

Figure 8: View of southeastern slope of Isle de Quatre from the north; Possible *Anolis aeneus/sagrei* hybrid from Isle de Quatre.

Isle de Quatre is geographically near to and similar to (in size and topography/habitat diversity) Baliceaux. The impact of feral goats on this island was much less apparent (if they are present at all). The density of foliage on this island made exploration far more difficult than on Baliceaux (where it was facilitated by the feeding of goats). Most of the survey was conducted on and around trails that exist along the northern half of the island. The heavy vegetation cover my explain the lack of observation of some species (i.e. *Geochelone, Gymnophtalmus*). The endemic *Sphaerodactylus kirbyi* was found under flotsam near the beach, and was not uncommon. This is the only island on which the invasive Cuban species *Anolis sagrei* (possibly a hybrid with *A. aeneus* based on side stripes) was observed.

Petit Nevis: 2 May 2015 (3 man hours)

Species collected: *Anolis aeneus, Mastigodryas brucei*
Additional species observed: *Ameiva ameiva*

A small island near Bequia, Petit Nevis is a low-lying, airid, goat-inhabited island. Little herpetofaunal diversity was observed during our brief survey of this island.

Bequia: 3 May 2015 (18 man hours)

Species collected: *Anolis richardii, Anolis aeneus, Corallus grenadensis, Sphaerodactylus kirbyi*
Additional species observed: *Ameiva ameiva, Iguana iguana, Copeoglossum aurae*

Figure 9: Two *Corallus grenadensis* collected from forest to the north of Belmont Shoal bay, Bequia illustrating color variation present within this population; *Anolis richardii*.

A large and ecologically diverse island, Bequia boasted a very diverse herpetofauna as revealed during my brief survey over the course of 2 days (including night time surveys). While densely populated (relative to other islands of the Grenadines), there remain many unspoiled areas inhabited by a diverse biota on this island. Based out of Belmont Shoal, surveys were conducted by leaving town on foot to explore the uplands to the North and Northeast of the bay. The forests immediately to the north of the Yacht Club have the highest canopies of any forest observed during this survey of the Grenadines. In these forests *Anolis richardii, Corallus grenadensis,* and *Iguana iguana* were quite common. While a more extensive survey would surely reveal the presence of other leaf-litter species not recorded here, the diversity encountered highlights the importance of this island to the biodiversity of the Grenadines.