

# The Conservation Agency

Exploration, Education, and Research

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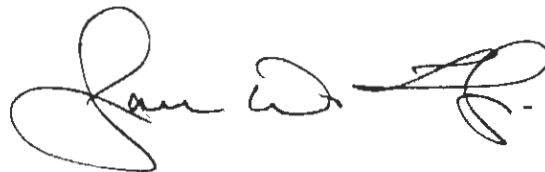
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"Report: British Virgin Islands, 1980"



JAMES D. LAZELL, JR.

**REPORT:  
BRITISH VIRGIN ISLANDS,  
1980**



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REPORT:

BRITISH VIRGIN ISLANDS, 1980

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Cover Photo: Phaethon aethureus, by George Marler

CONTENTS

INTRODUCTION. . . . .	1
METHODS AND NOMENCLATURE. . . . .	2
ELEMENTS OF DIVERSITY . . . . .	3
Insecta. . . . .	5
Amphibia . . . . .	13
Reptilia . . . . .	17
Aves . . . . .	36
Mammalia . . . . .	70
THE ISLANDS . . . . .	74
PARKS AND SANCTUARIES . . . . .	84
CONCLUSIONS AND RECOMMENDATIONS . . . . .	91
Feral livestock and the destruction of vegetation. . . . .	92
Mangrove destruction by man. . . . .	92
Faunal losses from human predation . . . . .	93
The international significance of the British Virgin Islands . . . . .	95
ANNOTATED BIBLIOGRAPHY. . . . .	96
KNOWLEDGEABLE INDIVIDUALS . . . . .	103
ACKNOWLEDGEMENTS. . . . .	105

## INTRODUCTION

The British Virgin Islands are the fragmented northeastern extremity of the Greater Antilles. All on the greater Puerto Rico Bank, they were connected to each other, the American Virgins (except St. Croix), and Puerto Rico itself by solid land during the glacial maxima -- most recently in the Würm (or "Wisconsin"), ca 40-10 thousand years ago. Geologically, the islands are largely of ancient continental strata: grano-diorites, shists, slates and shales, and basalt. The nether isle of Anegada and some smaller, scattered strata on other islands are made of oceanic, oolitic limestone laid down in the last interglacial -- the Sangamon, ca 120-40 thousand years ago.

One often hears these islands referred to as "volcanic." That is most misleading. There are igneous extrusives, like basalt, present, and these were originally of volcanic or tectonic origin, of course. However, there are no volcanoes, and no vulcanism, present anywhere on the Puerto Rico Bank (or anywhere in the Greater Antilles) today. The first cycle islands of the Lesser Antilles are "volcanic" in the most literal sense: they are volcanoes. The second cycle islands are of proximate volcanic origin: they are old volcanoes capped with oceanic limestone. The Virgin Islands are no more "volcanic" than are the Boston Harbor Islands or Mount Desert.

The fauna of the British Virgins is complex and diverse, with many more species per island than current biogeographic theory would predict. The animals may be: (1) components of the greater Puerto Rican fauna stranded by rising sea level; (2) overwater invaders from other Puerto Rico Bank

islands; (3) overwater invaders from the Lesser Antilles; or (4) autochthonous endemics (originating here and known nowhere else) whose ancestors came by any of the first three ways. I have in preparation a lengthy article on the biogeography of the islands, including description of the remarkable new species of Anolis from Carrot Rock; this will be published in a Bulletin of the Museum of Comparative Zoology, Harvard University. With George Marler, I have in preparation a popular article on nesting tropicbirds; this will be submitted to the Virgin Islander. With Robert Chipley and George Marler, I have completed a technical contribution to the ornithology of the islands; this has been submitted to The Ibis (British Ornithologists' Union).

#### METHODS AND NOMENCLATURE

I spent 40 days in the British Virgins, visiting 44 of the 46 named islands. I did not visit Jost Van Dyke or Mosquito, but these are large islands and have long species lists already, resulting from considerable study prior to my arrival. At least four unnamed cays support terrestrial vegetation beyond herb stage; these should be visited in the future. Because I had to cover an average of more than one cay per day, I undoubtedly missed many populations. Nevertheless, I obtained 44 new reptile records altogether -- 13 for islands with previous lists, the remainder for 18 islands not apparently visited previously by any zoologist. I obtained the first nesting records for three species of birds and a total of ten new island bird nesting records. I got a new species of lizard, genus Anolis.

I have followed the nomenclature of Philibosian and Yntema (1977) pretty closely, but two major departures are here noted (they are expanded on in expository detail in the biogeographic paper noted above, in preparation):

"Cyclura," a generic name standardly used for the endemic Anegada iguana, is a synonym of Iguana. Thus, the genus Iguana is represented by two species in the islands: one widespread elsewhere, the other endemic.

"Alsophis" and "Arrhyton" are not herein used for the colubrid snakes, both of which belong to the genus Dromicus. The two species in the British Virgins are obviously very closely related, differ primarily in simple character divergence, much as do Anolis cristatellus and A. pulchellus. I do not believe "Alsophis" is valid anywhere; "Arrhyton" might be valid as a monotypic splinter genus for its Cuban type-species.

#### ELEMENTS OF DIVERSITY

In keeping with established scientific policies of The Nature Conservancy, I here provide a brief account of each taxon (species or subspecies) that is endemic, rare, endangered, threatened, or simply so little-known as to require further study. These latter are of undetermined status at present.

The flora of the British Virgins has been the subject of intensive study by Dr. John Smith, resident on Tortola. His summary work, including discussion of all those plants which would qualify as elements of diversity, is in press at Cambridge University. In exchange for Dr. Smith's advice and cooperation, I have agreed not to include here specific information on plants prior to publication of his work. However, whenever a faunal range or potential park or sanctuary includes an important botanical site I shall so state. Publication of Dr. Smith's work will predictably add to the number of areas requiring preservation and protection.

I have not included marine life other than turtles and seabirds (which nest on land). However, I worked closely with George Marler, who

knows more about aquatic elements of diversity than anyone else. It is my intention to include all of his recommendations in my park and sanctuary proposals.

"Knowledgeable individuals" listed below are those in addition to those who have published relevant works, cited under "References."

Insecta

Family HESPERIIDAE

Choranthus vitellius

V-mark skipper

Description. -- A small (15 mm), stout-bodied, short-winged, orange butterfly with the antennae ending in a hook; black border pigment of the hind wing invading the third space from inside edge in the posterior row of spaces.

Status. -- Threatened. In the British Virgins, known only from Tortola, where it occurs from sea level to about 300 m. Common only at the West End and in the big ghuts draining Mount Sage, where taken in April, 1980. In the world, this species is also known from St. Thomas, Puerto Rico, and Florida.

Recommendations. -- Preserve native vegetation. Permit reasonable specimen collection because it is only through the efforts and observations of entomologists and collectors that we will gain useful knowledge. Collection of selected voucher specimens will not endanger this species. Do not permit widespread or (especially) aerial insecticide spraying.

References. -- Riley (1975).

Knowledgeable individual. -- Dr. J. A. Lorimer.



Insecta

Family HESPERIIDAE

Wallengrenia otho druryi

Broken-dash skipper

Description. -- A small (15 mm), stout-bodied, short-winged, yellow-brown butterfly with bronzy-greenish body hair scales, an oval, black spot in the middle of the forewing, and club-shaped antennae.

Status. -- Undetermined. In the British Virgins, known only from Tortola, where common enough at moderate to high elevations (but not Mount Sage near the top). Elsewhere, known from St. Thomas, Puerto Rico, and Hispaniola.

Recommendations. -- Apparently a species of early seral stages; if so, not endangered by any immediate threat. Needs life history and ecological study.

References. -- Riley (1975).

Knowledgeable individual. -- Dr. J. A. Lorimer.

Insecta

Family HESPERIIDAE

Achlyodes traso sagra

Jung's dusky-wing

Description. -- A medium-sized (to 28 mm), stout-bodied, short-winged butterfly with antennae slightly expanded distally, hooked back, and wings with a broad purple band on brown.

Status. -- Endangered. Known only from Mount Sage in the British Virgin Islands. In the world, known also from St. Thomas and scattered localities in Puerto Rico and Hispaniola.

Recommendations. -- Preserve native vegetation. Permit reasonable specimen collection because it is only through the efforts and observations of entomologists and collectors that we will gain useful knowledge. Collection of selected voucher specimens will not further endanger the species. Do not permit use of any pesticides on Mount Sage.

References. -- Riley (1975).

Knowledgeable individual. -- Dr. J. A. Lorimer.

Insecta

Family HESPERIIDAE

Ephyriades zephodes

Haitian dusky-wing

Description. -- A medium-sized (to 22 mm), stout-bodied, short-winged butterfly with antennae expanded and recurved. The male is plain black; the female brown with two big, silvery spots on the forewing that have their inner edges aligned.

Status. -- Undetermined. Known from Tortola, St. Thomas, Puerto Rico, Hispaniola, Cuba, and the Lesser Antillean island of St. Barts: "So little reliable material is, however, available that at present it is not possible to plot their distributions with certainty." (Riley, p. 175.)

Recommendations. -- Encourage a life history study with collection of selected voucher specimens.

References. -- Riley (1975).

Knowledgeable individual. -- Dr. J. A. Lorimer.

Insecta

Family HESPERIIDAE

Ephyriades arcas philemon

Hairy dusky-wing

Description. -- Nearly identical to the Haitian dusky-wing except the male has a very small white dot near the apex of the cell on the under-side of the forewing and the female's spots are not aligned.

Status. -- Undetermined. A very little-known species, but not rare on Tortola according to Lorimer. Also known from St. Thomas, Jamaica, and Cuba. See account of E. zephodes, the Haitian dusky-wing, above.

Recommendations. -- Encourage a life history study with appropriate collection of selected voucher specimens.

References. -- Riley (1975).

Knowledgeable individual. -- Dr. J. A. ~~Morimer~~.

Insecta

Family HESPERIIDAE

Epargyreus zestos

Zestos skipper

Description. -- A medium-sized (to 28 mm), stout-bodied, short-winged, brown butterfly with recurved antennae and bright, translucent brassy spots adjacent in the four anterior spaces of the forewing.

Status. -- Threatened. To date known only from one area along Ridge Road on Tortola. Not yet found on Mount Sage proper. Elsewhere in the Virgin Islands, known only from St. Thomas. Also occurs in the Lesser Antilles.

Recommendations. -- Encourage a life history study with appropriate collection of selected voucher specimens, especially from localities other than the one known to Lorimer. Because this seems to be a species of weedy roadside edge, it is probably not immediately endangered. However, the early stages are utterly unknown, so it is possible there is a very special food plant.

References. -- Riley (1975).

Knowledgeable individual. -- Dr. J. A. Lorimer.

Insecta

Family PAPILLIONIDAE

Battus polydamas thyamus

Virgin Island polydamas

Description. -- A large (to more than 50 mm) black butterfly without swallowtails; a band of yellow spots on the forewing and yellow-green spots on the hindwing.

Status. -- Endangered. Generally rare, but widespread: from the top of Mount Sage to sea level on Tortola. Elsewhere in the world known only from St. Thomas, St. John, and St. Croix.

Recommendations. -- Likes big trees. Preserve old-growth native trees. Restrict specimen collecting to those persons who have a valid scientific purpose for taking a voucher. Collection of a few specimens will not further endanger this species, but an avid collector who sets out to get a hundred could be devastating. Do not permit the use of pesticides in old-growth woodlands.

References. -- Riley (1975).

Knowledgeable individual. -- Dr. J. A. Lorimer.

Insecta

Family HELICONIIDAE

Dryas iulia iulia

Flambeau

Description. -- A slender, orange butterfly (to 40 mm) with black bordered wings (that of the hindwing triple) and two black bars through the forewing.

Status. -- Threatened. Tortola is the type-locality of this species, which is widespread but endemic to the Puerto Rico Bank islands.

Recommendations. -- Needs a complete life history study. Lorimer reports the species is sometimes common enough, but has a very short season, suggesting the possibility of only a single brood per year (very unusual in the tropics). The selective collecting necessary for a good life history and distributional study should be encouraged.

References. -- Riley (1975).

Knowledgeable individual. -- Dr. J. A. Lorimer.

Amphibia

Family BUFONIDAE

Bufo lemur

Ridge-headed toad

Description. -- A small (ca 4 cm), typically warty toad with very prominent, paired, parallel ridges on the head. Tadpole small and black.

Status. -- Endangered. Possibly extirpated from its type-locality, Virgin Gorda, this species has never been known from anywhere else except Puerto Rico, where it is listed as "uncommon" by Schwartz and Thomas and "last seen...1966" by Philibosian and Yntema.

Recommendations. -- An immediate search should be made to locate surviving populations of this remarkable near-endemic on Virgin Gorda around any fresh water ponds or ravine pools. These habitats should be preserved. Toads are especially susceptible to insecticide poisoning; that should be prohibited.

References. -- Schwartz and Thomas (1975); Philibosian and Yntema (1977).

Knowledgeable individuals. -- None known.



Amphibia

Family LEPTODACTYLIDAE

Leptodactylus albilabris

White-lipped frog

Description. -- Although quite unrelated, this looks rather like an American wood frog (Rana sylvatica): quite typically frog-like in shape and proportions, attaining about 5 cm, brown with a nearly black mask, and a boldly white lip. The tadpoles are ca 2 cm and brown.

Status. -- Threatened. This species is endemic to the Puerto Rico Bank islands; in the British Virgins, it is known only from Tortola, Jost Van Dyke, and Anegada. It has a free-swimming tadpole stage, and therefore depends on fresh water pools.

Recommendations. -- Preserve native vegetation in the ghuts of Tortola and Jost Van Dyke, and old-growth woodlands generally (especially on Anegada). Loss of vegetative cover causes heating of the ground, loss of standing fresh water, lowering of the water table generally, and could lead to extirpation of this frog. On Anegada, it lives a largely subterranean existence.

References. -- Schwartz and Thomas (1975).

Knowledgeable individual. -- Lazell (Tortola only).

Amphibia

Family LEPTODACTYLIDAE

Eleutherodactylus cochrae

Whistling frog

Description. -- A small (ca 2 cm) frog with toe-disks. The voice is a high-pitched whistle. There is no free-swimming tadpole stage.

Status. -- Threatened. In the British Virgins, known only from Mount Sage and the well-forested ravines. Elsewhere in the world, this species is known from St. Thomas, St. John, Hassel Island (the type-locality), Bovoni Cay -- all U.S. Virgin Islands -- and scattered localities on Vieques Puerto Rico.

Recommendations. -- Preserve old-growth montane and ravine forests. Do not permit pesticide use in these areas, as these frogs are quite sensitive. Conduct a study to locate populations on Tortola and determine if the frogs reported from Guana and Peter Islands are this species.

References. -- Schwartz and Thomas (1975). Barbour and Loveridge (1946).

Knowledgeable individuals. -- None known.

Amphibia

Family LEPTODACTYLIDAE

Eleutherodactylus schwartzi

Bo-peep

Description. -- A small (ca 2 cm) frog with large toe-disks. Voice a two-syllable call resembling "bo-peep." There is no free-swimming tadpole stage.

Status. -- Threatened. Known from Tortola and Virgin Gorda only, and so today probably endemic to the British Virgins by virtue of its apparent extirpation from St. John. The type-locality is Rose Lodge, 750 ft (ca 240 m), Tortola.

Recommendations. -- Because this species is presumably found in wet ravines and high-elevation old-growth forest, these habitats should be preserved. An effort should be made to locate populations and specifically plan for their survival.

References. -- Schwartz and Thomas (1975); Thomas (1966).

Knowledgeable individual. -- Dr. Richard Thomas.

Reptilia

Family TESTUDINIDAE

Geochelone carbonaria

Red-footed tortoise

Description. -- A large (to 20 kg), high-dome-shelled, terrestrial turtle attractively patterned in shades of brown and with red scales on the front legs.

Status. -- Undetermined. Most authorities agree that this species is merely an exotic introduction, unworthy of our concern. I am not sure why. In view of the distribution of Geochelone fossils and subfossils, it is apparent that some closely-related tortoise could well have been native to the Virgin Islands. Various authors have claimed other species were "introduced" when closer examination revealed patterns of geographic indicating they were almost certainly quite native (see Iguana iguana). This species is widespread in South America and reported from many Lesser Antillean and Puerto Rico Bank islands. In the British Virgins, it is reported from Peter Island where I could not find it or anyone who knew of it (this record may be based on a single captive from St. Thomas: Philibosian and Yntema, 1976), and Tortola, where older people remember it as common a few decades ago. Dr. John Smith has found specimens in the big, well-forested ghuts in recent years, but the species is very rare today. It is rumored to occur on Virgin Gorda.

Recommendations. -- A search should be made for extant individuals and populations. Then, a thorough morphometric and/or electrophoretic study should be done to determine the status of the Virgin Islands' populations.

References. -- Underwood (1962); Schwartz and Thomas (1975); Philibosian and Yntema (1976, 1977); Auffenberg (1974).

Knowledgeable individual. -- Only Dr. John Smith claims to have seen a recent, living, wild specimen.

Reptilia

Family CHELONIIDAE

Chelonia mydas

Green turtle

Description. -- A large sea turtle with patterned, brown scutes on the shell and only two large plates on the top of the head from eyes to nose tip. The scutes may overlap slightly, but are not the widely imbricate (shingle-like) scales of the hawksbill.

Status. -- Endangered. This species is drastically reduced world-wide and virtually extinct as a breeding species in the Antilles. It is Red Book listed by the International Union for the Conservation of Nature, a status supposedly honoured by the British Government. Green turtles have been recorded as nesting on Anegada and subadults are fairly frequently killed and eaten, with several taken in early 1980.

Recommendations. -- Enforce legal protection for all sea turtles. Impose stiff fines for anyone caught with turtles, turtle parts, or eggs thereof in possession. Under no circumstances should it be legal to deal commercially in turtle meat, shell, hides, or eggs.

References. -- Philibosian and Yntema (1977).

Knowledgeable individuals. -- George Marler; Herman Groezinger (Anegada); J. D. Lazell.

Reptilia

Family CHELONIIDAE

Eretmochelys imbricata

Hawksbill

Description. -- A small (less than 1 m carapace length) sea turtle with patterned, brown scutes on the shell and four large plates on the top of the head from eyes to nose tip. The scutes overlap broadly: they are imbricate, like shingles on a roof.

Status. -- Endangered. This species is drastically reduced worldwide. The small islands of the Caribbean support scattered breeding individuals. The species is Red Book listed by the International Union for the Conservation of Nature, a status supposedly honoured by the British Government. In recent years there has been successful nesting at Anegada and on the north coast of Peter Island. We encountered two different adult females on Bank Reef, north of Peter Island, in April, 1980. The British Virgins could potentially be a sanctuary for this species of international importance.

Recommendations. -- Enforce legal protection for all sea turtles. Impose stiff fines for anyone caught with turtles, turtle parts, or eggs thereof in possession. Under no circumstances should it be legal to deal commercially in turtle meat, shell, hides, or eggs.

References. -- Philibosian and Yntema (1977).

Knowledgeable individuals. -- George Marler; Herman Groezinger (Anegada); J. D. Lazell.

Reptilia

Family DERMOCHELYIDAE

Dermochelys coriacea

Leatherback

Description. -- By weight, the largest of all living reptiles (to ca 900 kg; carapace to 2 m or more). No scutes; "shell" like pumpkin rind with seven prominent longitudinal ridges on the back. Above, dark brown or nearly black; below, patterned in white, rose, and/or lavender.

Status. -- Endangered. This species is drastically reduced worldwide and Red Book listed by the International Union for the Conservation of Nature -- which the British Government supposedly honours. There is reported nesting on the north coast of Tortola centered around Josias Bay.

Recommendations. -- The British Virgins could be potentially a nesting sanctuary for this highly migratory species of international importance. An effort should be made to find out everything possible about the nesting individuals and begin a tagging program. There should be rigid legal protection combined with stiff fines for molesting leatherbacks or taking their eggs, further backed up by beach patrol and rigorous enforcement. Because this warm-blooded animal migrates to the American and European Arctic there is the potential of funding through such agencies as the U.S. Fish and Wildlife Service and/or the World Wildlife Fund.

References. -- Philibosian and Yntema (1977); Lazell (1980).

Knowledgeable individuals. -- George Marler; Rowan Roy.

Reptilia

Family GEKKONIDAE

Thecadactylus rapicaudus

Giant woodslave

Description. -- A large gecko resembling the common house gecko (Hemidactylus mabouia), but the claws are quite invisible from above, lying between the scale rows on the undersides of the toes.

Status. -- Endangered. Known in the British Virgins only from Necker Island, which is the northwestern extremity of its range. The species also occurs on St. Croix and many Lesser Antillean islands, and is abundant on some of them. This is a classical example of a species that has reached these islands overwater from the east. Not encountered by Lazell.

Recommendations. -- This species lives in hollow trees, rock crevices, and buildings. The woodland habitat of Necker Island should be carefully preserved and introduction of exotic predators such as house cats should not be allowed. If cats are currently present, they should be trapped out. A thorough study of geographic variation in this gecko might reveal important differences between populations; certainly this population is unique and remarkable.

References. -- Schwartz and Thomas (1975); Philibosian and Yntema (1977); Underwood (1962).

Knowledgeable individuals. -- None known.



Reptilia

Family GEKKONIDAE

Sphaerodactylus parthenopion

Virgin Gorda gecko

Description. -- Said to be the smallest reptile on earth: to 18 mm, snout-vent. Velvety brown with much smaller scales than the common ground gecko (S. macrolepis) and an acutely pointed face.

Status. -- Endangered. An autochthonous endemic known to date only from its type-locality, Virgin Gorda. It was found above Pond Bay, between Little Dix and Savannah Bays, and on the SW slope of Gorda Peak at ca 500 ft (ca 150 m). The habitat is under rocks in the woods. There are a couple of dozen known specimens.

Recommendations. -- Preservation of the natural vegetation on the north slope of Milton Hill and the SW slopes of Gorda Peak right down to Pond Bay is the only way to insure survival of this species. A thorough study of its ecology and population biology should be made.

References. -- Schwartz and Thomas (1975); Philibosian and Yntema (1977); Thomas (1965); McWhirter (1980).

Knowledgeable individual. -- Dr. Richard Thomas.

Reptilia

Family IGUANIDAE

Anolis ~~cuvieri~~

Giant anole

roosevelti

Description. -- A huge anole -- tree lizard with an extensible throat fan and expanded toe pads -- attaining more than 100 mm snout-vent length.

Status. Undetermined. Known from scattered localities on Puerto Rico. Reported from Tortola in 1863, this record has "remained unverified for over a century." Because suitable habitat remains -- the big, old-growth woods on Mount Sage and adjacent ghuts -- I am unwilling to delete this species from consideration.

Recommendations. -- A search should be made for this and other little-known species (frogs, tortoise, butterflies) in the wetter, upland and ravine forests on Tortola. It might also occur in similar habitats on Virgin Gorda or even in the fine forest on the east end of Beef Island. It is possible that the species involved is not cuvieri, but roosevelti\* -- a form to date known only from Culebra and not seen alive since 1932; this, of course, would be most wonderful.

References. -- Reinhardt and Lutken (1863)\*; Schwartz and Thomas (1975).

Knowledgeable individuals. -- None known.

\* In Schwartz and Thomas (1975).

Yes!  
roosevelti - paper  
 Submitted. JOK, 5.xi.99

Reptilia

Family IGUANIDAE

Anolis ~~sp. nov.~~

Carrot Rock anole

*ernestwilliamsi*

Description. -- Resembles the common bush or "man" lizard (Anolis cristatellus), but much larger (to 82 mm snout-vent), with smaller scales, larger toe pads with more lamellae, a boldly mottled and marbled pattern, and a tricolored chin of grey, pale bluish white, and cream.

Status. -- Threatened. Confined to Carrot Rock south of Peter Island, where common. The only threats to this form would be habitat destruction by releasing goats or other stock on the island, or burning it over, or over-collecting by zealous reptile enthusiasts. This species was discovered in April, 1980, and will be named for Dr. Ernest E. Williams of Harvard, dean of Caribbean herpetologists and the foremost authority on the genus Anolis.

Recommendations. -- That such a distinctive species should have remained undetected for so long will mean considerable attention will be directed towards it. Predictably, evolutionary biologists will want to electrophorese its proteins, study its chromosomes, count its scales, film its behavior, etc., and collectors will long to own large series of pickled carcasses. I would recommend that a "bag limit" of ten specimens per year is plenty for scientific purposes (that is total, not per collector), and not likely to hurt the population, which must number a thousand or more. I would give preference to a collector who wanted to take live animals for protein and chromosome studies, even though the specimens would then be killed (one can count the scales then at leisure). A more detailed study of Carrot Rock, especially including the as-yet-unvisited, disjunct southern portion, should be made.

References. Lazell (in prep.).

Knowledgeable individual. -- George Marler.

Never happened! JDL, S.xi.99

Reptilia

Family IGUANIDAE

Iguana pinguis

Anegada iguana

Description. -- A great, massive, giant lizard attaining at least 1.5 m and weighing up to 15 kg. Colors somber, with little pattern except when very young (then banded like I. iguana). Crest scales rise from a thickened ridge of flesh running down the back.

Status. -- Endangered. Endemic to Anegada where subject to a long-term, well-documented decline resulting from competition with goats and other feral livestock, and predation from dogs and cats (and probably as eggs from rats), and sometimes even people. Habitat destruction for agriculture and housing proceeds apace. This species is Red Book listed by the International Union for the Conservation of Nature. Thus, the eyes of biologists and conservationists around the world have been focused on Anegada.

Recommendations. -- Anegada should be a National Park. The Anegada iguana should be hailed as the national animal of the British Virgin Islands. All habitat destruction should immediately cease: there are plenty of people on Anegada and no need for more; there are plenty of coconuts on Anegada and in the world: to trade the habitat of a spectacular, harmless animal found nowhere else on earth for a bunch of coconuts is insane. Livestock should be rounded up and penned. Feral cats and dogs should be shot on sight. People should be educated to appreciate -- indeed revere -- their unique, beneficent monster and tourists (if you really have to have them!) should be encouraged to try to see one. A long-term management plan should be developed and a warden appointed.

References. -- Carey (1975); Philibosian and Yntema (1975); Lazell (in prep.); Backshall (in prep.).

Knowledgeable individuals. -- Clement Faulkner; Herman Groezinger.

Reptilia

Family IGUANIDAE

Iguana iguana

Common iguana

Description. -- A very long (to 2 m) lizard generally patterned in green, purple, and black, with a crest of spike-like scales down the middle of the back (not arising from a fresh ridge) and a very large, circular plate on the jowl.

Status. -- Threatened. The Virgin Islands are the northern limit of the natural range. The species is known from Tortola (where rare), Virgin Gorda (Biras Hill region), Peter Island (where fairly common), and possibly Guana Island (not known there today). Elsewhere, it occurs on some U.S. Virgins (St. Thomas; Water and Hassel Islands; St. Croix), many Lesser Antilles, and most of tropical South and Central America. In some areas this species is extremely abundant, but not in the British Virgins.

Recommendations. -- Provide legal protection everywhere. Provide sanctuaries on Peter Island, Biras Hill (Virgin Gorda), and in the western ghuts of Tortola. Do not permit introduction of exotic iguana stocks (e.g. Rockefeller's rumored proposal for Sandy Cay) because such activities would predictably obliterate demonstrable patterns of geographic <sup>variation</sup> which might have real adaptive significance. A search should be made for iguanas in areas, like western Tortola and Guana, where they have been reported but are rare or presently unknown. Biras Hill would be an ideal place for a life history study; none has been done in a similar habitat or at an extreme of the range.

References. -- Lazell (1973); Schwartz and Thomas (1975); Philibosian and Yntema (1977).

Knowledgeable individuals. -- Dr. Norman Thomas (Virgin Gorda); George Marler.

Reptilia

Family SCINCIDAE

Mabuya sloanei

Slipperyback

Description. -- A lovely, shining lizard attaining about 100 mm snout-vent, patterned in bronze, black and pastel shades of brown and pink, with three bold, light neck stripes. Lives on the ground in rocks and leaf litter; moves slowly and behaves in a friendly, curious manner.

Status. -- Endangered. Formerly occurred from Jamaica north through Hispaniola to the southern Bahamas, eastward through Mona, Puerto Rico, and many Virgin Islands. The type-locality is St. Thomas, where the species is now rare. It is reported extirpated from St. John and much of its original range. Crombie (pers. comm.) says this form is a valid full species (not a subspecies of M. mabouya) and Schwartz and Thomas (1975) note "study of this group is complicated by the extinction or virtual extinction of a number of island populations." The British Virgins are an apparent stronghold for this species; it is fairly common still and known from Tortola, Anegada, Virgin Gorda, Jost Van Dyke, Peter, Great Camanoe, Norman, Ginger, Salt, Little Tobago, Fallen Jerusalem, and Round Rock.

Recommendations. -- Legal protection; education stressing the perfectly harmless, beneficial, insect-eating nature of this species; and appropriate sanctuary designations with enforcement to prevent habitat (natural vegetation) destruction should make the British Virgins an internationally important reservoir for this species.

References. -- Maclean, et al. (1977); Schwartz and Thomas (1975).

Knowledgeable individuals. -- J. D. Lazell; Ronald Crombie.

Reptilia  
Amphisbaena fenestrata

Family AMPHISBAENIDAE  
Virgin Islands amphisbaena

Description. -- A legless, annulated reptile superficially resembling a worm but with a mouth, forked tongue, and short, stumpy tail. Called a "blind-snake" by Philibosian and Yntema (1977), amphisbaenas are neither snakes nor lizards.

Status. -- Undetermined. A fossorial (burrowing) creature rarely encountered by humans, its life history is unknown. It seems dependent on moist soils in which to live. A harmless, beneficial, insect (grub) eater, known from Tortola, Virgin Gorda, Jost Van Dyke, and Great Camanoe in the British Virgins. Elsewhere, known only from the U.S. Virgins: St. Thomas (type-locality), Great St. James, and St. John. Thus, nearly endemic.

Recommendations. -- Preserve old-growth ravine forests -- and therefore the moist soils -- wherever these persist. Search during the rainy season for extant populations where the species is known, and on such likely islands as Guana where it has not yet been recorded. Encourage someone to do a life history study.

References. -- Philibosian and Yntema (1977); Schwartz and Thomas (1975).

Knowledgeable individuals. -- None known.

Reptilia

Family TYPHLOPIDAE

Typhlops richardi richardi

Virgin Island worm snake

Description. -- A slender, shiny, legless, and essentially eyeless snake with a blunt head and very similar tail. Not annulated. Separated at subspecies level from replacing forms by difficult scale counts (see Thomas, 1966, or identify by island of origin).

Status. -- Undetermined. A fossorial form rarely encountered by humans. We know little about its life history except that it favors moist soils, is perfectly harmless, and extremely beneficial: feeding on termite larvae. Known in the British Virgins only from Tortola (the "Prickly Pear Island" record, I believe, refers to an American Island, not the British one of the same name north of Virgin Gorda; this should be checked, however). Elsewhere in the world, known only from St. Thomas (type-locality), St. John, and St. Croix.

Recommendations. -- Preserve natural vegetation in ghuts and ravines so as to perpetuate moist soil conditions. During the rainy season, attempt to encourage someone to study this little-known species.

References. -- Thomas (1966); Schwartz and Thomas (1975); Philibosian and Yntema (1977).

Knowledgeable individual. -- Dr. Richard Thomas.



Reptilia

Family TYPHLOPIDAE

Typlops richardi naugus

Virgin Gorda worm snake

Description. -- A slender, shiny, legless, and essentially eyeless snake with a blunt head and very similar tail. Not annulated. Separated at subspecies level from replacing forms by difficult scale counts (see Thomas, 1966, or identify by island of origin).

Status. -- Threatened. Known only from Virgin Gorda, where it is endemic. Dependent on moist soils and woodlands that provide for its fossorial habits and termite-larva diet. The worm snakes on Beef Island approach this form, but are intermediate with the more widespread T. r. richardi (which see). Worm snakes are reported to occur on Salt Island; these might be naugus, or the nominate form, or an undescribed, new form.

Recommendations. -- Preserve the woodlands of Virgin Gorda so as to maintain the soils and ground moisture. Attempt to interest someone in studying this unique, harmless, beneficial creature.

References. -- Thomas (1966); Schwartz and Thomas (1975).

Knowledgeable individual, -- Dr. Richard Thomas.

Reptilia

Family TYPHLOPIDAE

Typlops richardi catapontus

Anegada worm snake

Description. -- A slender, shiny, legless, and essentially eyeless snake with a blunt head and very similar tail. Not annulated. Separated at subspecies level from replacing forms by difficult scale counts (see Thomas, 1966, or identify by island of origin).

Status. -- Threatened. Endemic to Anegada and found nowhere else on earth. Depends on moist soils and woodlands that provide for its fossorial habits and termite-larva diet.

Recommendations. -- Yet another in the long list of unique creatures occurring on this most atypical and peculiar of the Virgin Islands, this is one more form that needs to be carefully and conscientiously provided for in the future. The natural vegetation and soils of Anegada must be preserved. Someone should attempt to study this virtually unknown, but highly beneficial, animal.

References. -- Thomas (1966); Schwartz and Thomas (1975).

Knowledgeable individual. -- Dr. Richard Thomas.

Reptilia

Family BOIIDAE

Epicrates monensis granti

Virgin Islands tree boa

Description. -- A small boa (less than 2 m), but a fair-sized, heavy-bodied snake with a rather dog-like face, an irregular, marbled pattern, and two sharp spurs (vestigial hindlegs) flanking the anal opening.

Status. -- Endangered. Endemic to the Virgin Islands, where known from St. Thomas, Tortola (type-locality), Great Camanoe (specimen in possession of Andrew Gordon of that island; should be in a museum), and sight records for Guana and Necker Islands. Thus, nearly endemic. This species is listed as endangered by both the U.S. government and the International Union for the Conservation of Nature. It depends on big trees in dense woods, preferably with rock crevices or caves. No one knows what it eats in nature, but other members of this genus feed on bats, mice, frogs, and lizards. Mongooses, cats, and people are the worst enemies of this perfectly harmless, docile animal.

Recommendations. -- An attempt should be made to verify the existence of previously recorded populations and learn its ecology and life history. The as-yet-unproven populations on Guana and Necker (and Dr. John Smith reports a constricting snake seen once on Virgin Gorda) should be sought. This is a species for which the British Virgin Islands are potentially a major international reservoir.

References. -- Schwartz and Thomas (1975); Philibosian and Yntema (1977).

Knowledgeable individuals. -- Rowan Roy; Dr. John Smith.

Reptilia

Family COLUBRIDAE

Dromicus portoricencis richardi

Virgin Island ground snake

Description. -- A medium-sized (to well over 1 m), slender, faintly-striped, brown or grey-brown snake; the head is quite distinct from the neck, the eye large, and the snout pointed. Young are hard to tell from garden snakes (D. exiguus), but see comparative photograph in Philibosian and Yntema (1977).

Status. -- Endangered. Fairly widespread in the U.S. Virgin Islands, this form is known in the British Islands only from Peter and Salt. Unfortunately, people wage war on this perfectly harmless, greatly beneficial snake, and it is one of the few reptilian species directly endangered by human predation. Snakes fitting the description of this form are reported from Cooper and Ginger Islands. Ground snakes feed voraciously on rats and mice and therefore should be esteemed by people; they are prey to mongooses and house cats, but these losses are probably minor compared to man with cutlass, hoe, or stick.

Recommendations. -- Education would go a long way. Provide all snakes with legal protection (as was done so successfully in Grenada in the 1950's). Set aside sanctuaries on the various islands where this species occurs so that its natural habitat -- native woodland -- can recover. Attempt to validate the Ginger and Cooper Island sightings; begin a mark-and-recapture study to determine population sizes.

References. -- Philibosian and Yntema (1977); Schwartz and Thomas (1975); Schwartz (1966).

Knowledgeable individuals. -- None known.

Reptilia

Family COLUBRIDAE

Dromicus portoricensis anegadae

Anegada ground snake

Description. -- A medium-sized (to well over 1 m) slender, well-striped, grey-brown snake; the head is quite distinct from the neck, the eye large, and the snout pointed. Young can be separated from garden snakes (D. exiguus) by comparison with the photos given by Philibosian and Yntema. Subspecific separation from D. p. richardi is based on scale counts given by Schwartz (1966).

Status. -- Threatened. Endemic to the British Virgins where recorded from Anegada (type-locality; rather common), Necker, Mosquito, Virgin Gorda, and Guana (quite common on the last). The status of Tortola specimens is questionable, but a fresh specimen provided in March, 1980, by Dr. John Smith should help resolve the question. Snakes fitting the description of this form are reported sighted on Frenchman and Great Thatch. As with other large, diurnal snakes, people pose the greatest threat to this species simply because people usually kill every one they see (except on Guana Island!).

Recommendations. -- Education and legal protection: this is a harmless, beneficial species that eats rats and mice. Guana Island would be an ideal place to do a mark-and-recapture, population, and general ecological study of this snake. Nothing of the sort has ever been done in any depth for any member of this widespread Antillean genus -- let alone the endemic British Virgins form.

References. -- Schwartz (1966); Schwartz and Thomas (1975); Philibosian and Yntema (1977).

Knowledgeable individuals. -- Dr. John Smith; Mary Randall (Guana); Herman Groezinger (Anegada).

Reptilia

Family COLUBRIDAE

Dromicus exiguus exiguus

Garden snake

Description. -- A small (less than 60 cm), very slender, striped snake with the head not sharply distinct from the neck, the eye rather small (but plainly present and functional), and a rather blunt snout. If in doubt, see comparative photos in Philibosian and Yntema (1977).

Status. -- Endangered. In the British Virgins, known only from Tortola, Virgin Gorda, and Peter Island. In the world, known also from St. Thomas (type-locality), Culebra, and Hassel Island -- all U.S. Virgins or Puerto Rico. Therefore, nearly endemic. I did not encounter this snake and met no one who knew it, as differentiated from a ground snake. Presumably, people kill this snake as readily as the ground snake, and mongooses, cats, and even rats would prey upon it. It is perfectly harmless, but I do not know what it eats.

Recommendations. -- A search should be made for surviving populations and steps taken to provide them sanctuary. Education and legal protection about and for all snakes would help. This species needs a life-history study.

References. -- Philibosian and Yntema (1977). Schwartz and Thomas (1975).

Knowledgeable individuals. -- None known to me, but Dr. William Maclean might know about U.S. V.I. populations.

Aves

Family PODICIPEDIDAE

Podilymbus podiceps

Pied-billed grebe

Description. -- An aquatic, chicken-like bird with lobed (not webbed) feet and no shield on the forehead.

Status. -- Undetermined. A possible rare breeder at Josias Bay and Long Swamp. Philibosian and Yntema (1977) list it as breeding, but Mirecki (1977) says "no proof." A widespread and fairly common North American species that also nests on Puerto Rico, St. Thomas, St. John, and St. Croix.

Recommendations. -- Preserve mangrove habitats. Attempt to determine nesting.

References. -- Mirecki (1977); Philibosian and Yntema (1977).

Knowledgeable individual. -- Dr. Robert Chipley.

Aves

Family PHAETHONTIDAE

Phaethon lepturus

White-tailed tropicbird

Description. -- A beautiful black-and-white seabird with a long streamer-tail, without fine barring across the white areas of the back and wings.

Status. -- Endangered. Nowhere common in the world, this species nests in the British Virgins on Carval and Sandy Cay (first recorded, spring 1980) and possibly on Norman Island despite "frequent disturbance by boats." Apparently nesting at the west tip of Tortola, also.

Recommendations. -- The caves at the south side of the Bight, Norman Island, should be closed to tourists. If people go there, they should have to get a permit and demonstrate both scientific need and competence. Elsewhere, attempts to locate and photo-document nesting should continue.

References. -- Mirecki (1977); Philibosian and Yntema (1977); Bond (1971); Lazell et al. (in press).

Knowledgeable individuals. -- George Marler; Robert Chipley; Rowan Roy.



Aves

Family PHAETHONTIDAE

Phaethon aethureus

Red-billed tropicbird

Description. -- A beautiful black-and-white seabird with a long streamer-tail, with fine black barring across the back and on the uppersides of the wings.

Status. -- Endangered. Rare in the world. In the British Virgins, proven nesting for the first time in 1980 at Ginger (3 pairs), Carrot Rock (2 pairs), Guana, West Seal Dog, and Broken Jerusalem (all single nests).

Recommendations. -- Nesting should be monitored and any additional sites photo-documented. The proven nest sites should be given sanctuary status. A long-term population study is called for.

References. -- Mirecki (1977); Philibosian and Yntema (1977); Bond (1971); Lazell et al. (in press).

Knowledgeable individuals. -- Rowan Roy; George Marler.

Aves

Family PELICANIDAE

Pelicanus occidentalis

Brown pelican

Description. -- A brown pelican. Adults have two head patterns: head and neck all white with a yellow crown; and throat white, crown yellow or white, and back of neck rich chestnut. Various explanations are offered for these two color patterns, all of which are easily refuted by elementary field observations.

Status. -- Endangered. Formerly common in coastal North America, Central America, and the Antilles, the brown pelican has undergone crashing declines -- most obviously because of insecticides. In the British Virgins, the species no longer nests. It still roosts on Pelican Island (not Cay), Green Cay (both located in 1980), Virgin Gorda, Norman, Guana, George Dog, and Anegada.

Recommendations. -- Nesting might recommence at any present roosting site if there was no disturbance at the critical, site-selection stage. Sites should be monitored from a distance and given sanctuary status. Avoid all insecticide usage.

References. -- Mirecki (1977); Philibosian and Yntema (1977); Bond (1971); La Bastille and Richmond (1973); Lazell, et al. (in press).

Knowledgeable individuals. -- George Marler; Rowan Roy.

Aves

Family SULIDAE

Sula leucogaster

Brown booby

Description. -- A big, brown, aquatic bird with a white belly (when adult) and the skin of the beak extending broadly right up to the eyes.

Status. -- Threatened. This is the commonest Caribbean booby and the other two species are listed as endangered. Philibosian and Yntema (1977) were not aware of nesting in the British Virgins, but Mirecki (1977) found them nesting on Great Tobago (60 pairs) and Guana (about the same). Lazell et al. tripled the number of Great Tobago nests, found about 200 on Little Tobago, and four on the Indians. Shooting boobies is considered great sport by certain classes of humans not indigenous to the British Virgins, but which come from the west. Shooting beer cans and roadside signs is just as much sport, and equally indulged in by these types.

Recommendations. -- On certain days and seasons -- well known to local people -- fast-moving vessels wreathed in and streaming clouds of noxious fumes blast into the waters of the British Virgin Islands from the west. A few torpedos, light artillery, or even dynamite dropped from low-flying aircraft could easily eliminate this problem, making the world a far better place. Meantime, nesting areas should be set aside as sanctuaries and patrolled during the nesting season, ca February to May.

References. -- Mirecki (1977); Bond (1971); Lazell et al. (in press).

Knowledgeable individuals. -- Rowan Roy; George Marler.

Aves

Family FREGATIDAE

Fregata magnificens

Magnificent frigatebird

Description. -- A large, predominantly black seabird with long, pointed wings and tail. Males in breeding condition have a red throat pouch; adult females have a black head and white breast; young birds have a white head and breast.

Status. -- Threatened. This species has undergone considerable decline in many parts of its tropicopolitan range, but is still common in the British Virgins. It nests on Great Tobago (ca 200 pairs in March, 1980) and Anegada (no estimate). Nesting is suspected, but remains unproven, at Little Camanoe and George Dog. As with boobies, certain non-indigenous peoples who come from the west seem to delight in shooting frigatebirds -- even right off their nests. A more insidious threat is goat damage to the native vegetation, for frigatebirds nest in trees, and goats are preventing tree reproduction on Great Tobago because they consume the seedlings.

Recommendations. -- Set aside Great Tobago and the nesting sites on Anegada as sanctuaries; consider the same for George Dog if nesting can be proven or it seems likely that the birds would nest if provided sanctuary; consider the same for Little Camanoe, which could be purchased outright, or protected through a conservation easement and left in private hands (the sheep there are less destructive than goats, but their damage should be studied). Enforce laws protecting these birds (and immigration, port clearing, and related matters involving your visitors from the west).

References. -- Mirecki (1977); La Bastille and Richmond (1973).

Knowledgeable individual. -- George Marler.

Aves

Family ARDEIDAE

Ardea herodias

Great blue heron

Description. -- A tall (ca 1 m), long-legged, long-necked wader with a straight, blade-like bill, a grey body, white head, and black plumes on the head.

Status. -- Endangered. Philibosian and Yntema (1977) list this species as endangered throughout the Virgin Islands with nesting demonstrated only on St. Thomas and Anegada. Elsewhere in the world, this species is widespread and in some places fairly common. Lack of big trees, especially mangroves or old-growth forest near good swamp and wetland, will predictably extirpate this form.

Recommendations. -- Preserve all mangrove swamps, coastal and inland wetlands, and old-growth forests. Attempt to locate nest sites (often loosely colonial) so that monitoring and protection can be assured.

References. -- Philibosian and Yntema (1977); Mirecki (1977); La Bastille and Richmond (1973); Bond (1971).

Knowledgeable individuals. -- Rowan Roy; George Mitchell.

Aves

Family ARDEIDAE

Ardea occidentalis

Great white heron

Description. -- A tall (ca 1 m) long-legged, long-necked wader with a straight, blade-like beak, and all-white plumage. The legs and beak are yellow (one or the other or both black in other white herons).

Status. -- Endangered. Rarely seen this far east, this species has not been proven to breed in the British Virgins, but has been regularly seen on Tortola and Anegada. Some people call this a "color phase" of the great blue, but it behaves quite differently and nests at a different season where the two occur together in the Florida Keys. Others list it as a "subspecies" of the great blue, but subspecies cannot be sympatric, and these two are virtually throughout the nesting range of the great white. Occasional hybrids do occur, amounting to about two percent of the total great white population.

Recommendations. -- As with the great blue heron, preserve mangrove, wetlands, and old-growth forests.

References. -- Mirecki (1977); Bond (1971).

Knowledgeable individuals. -- Rowan Roy; J. D. Lazell (in Florida).

Aves

Family ARDEIDAE

Nycticorax nycticorax

Black-crowned night heron

Description. -- A small heron (ca 50 cms) of stocky proportions. The plumage of the body is slate, neck and throat white, and the crown black. The iris is bright red.

Status. -- Endangered. Philibosian and Yntema (1977) have no breeding records for the Virgin Islands. Mirecki (1977) says it formerly bred in mangroves along the south coast of Tortola, but there is no proof of recent successful nesting. Its mangrove habitat is being rapidly destroyed by coastal development.

Recommendations. -- Protect mangroves and coastal wetlands.

References. -- Mirecki (1977); LaBastille and Richmond (1973); Bond (1971).

Knowledgeable individuals. -- George Mitchell; Rowan Roy.

Aves

Family ARDEIDAE

Ixobrychus exilis

Least bittern

Description. -- A tiny heron (standing ca 30 cm) beautifully patterned in ochre, buff, brown, and black.

Status. -- Endangered. Extirpated as a breeding bird from St. Thomas and St. Croix, this species was still present at Long Swamp, Tortola, in 1976. It nests in Puerto Rico, other Antillean Islands, and North America, but is nowhere common. It must have mangroves and coastal wetlands to survive.

Recommendations. -- Enact and enforce strong mangrove and coastal wetlands protection legislation. Attempt to interest observers in searching for and studying this bird.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971).

Knowledgeable individual. -- Rowan Roy.



Aves

Family PHOENICOPTERIDAE

Phoenicopterus ruber

American flamingo

Description. -- A huge pink bird with a rather short, steeply down-curved bill.

Status. -- Endangered. Greatly reduced throughout its former range, which included most of the Greater Antilles and Bahamas, this species now thrives only at Inagua and Hialeah (Florida). The once-great nesting colony on Anegada is extirpated, and only occasional visitors are seen. This is a salt-pond filter feeder. Its loss from Anegada must be having profound (if unknown) ecological effects. The birds were shot out.

Recommendations. -- Immediate restoration should be attempted, utilizing Bahamian stock. Most of Anegada should be a sanctuary, and no shooting of flamingos should be permitted. There would have to be a warden.

References. -- Philibosian and Yntema (1977); Mirecki (1977); La Bastille and Richmond (1973); Bond (1971).

Knowledgeable individual. -- Oris Russell (Bahamas).

Aves

Family ANATIDAE

Dendrocygnus arborea

West Indian whistling-duck

Description. -- A large (to 50 cm), arboreal, gooselike duck with long legs (extending beyond tail in flight), with heavy black and buffy markings on sides, and a white abdomen spotted with black.

Status. -- Endangered. Extirpated as a breeding bird from St. Thomas, St. John, and St. Croix, Philibosian and Yntema (1977) list it as still present (but not proven nesting) in the British Virgins. Mirecki (1977) notes it has been extirpated from Anegada and the last known pair were eliminated when a mangrove swamp on Virgin Gorda was "reclaimed." A few still survive on Puerto Rico.

Recommendations. -- This species should be re-established on Anegada. No hunting should be permitted for the foreseeable future. A warden should be present. Eventually, we might hope that the species would build up and recolonize islands from which it is now gone. Mangroves and coastal wetlands must be protected.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971).

Knowledgeable individuals. -- None known.

Aves

Family ANATIDAE

Anas bahamensis

Bahama duck

Description. -- An ordinary-looking brown duck with white cheeks and a rather long, pointed tail.

Status. -- Threatened. Confined to the Antilles from the Bahamas east to Barbuda, and now much reduced from its former abundance. The Virgin Islands in general are the major reservoir for this species. It nests on St. Thomas, St. John, and St. Croix in the American islands, and on Anegada and Long Swamp, Tortola ("over a hundred" at both places). Nesting on a small scale (one or more pairs) is reported on Virgin Gorda and Guana Island. Both habitat destruction and uncontrolled hunting are hurting this species.

Recommendations. -- Here is another case where timely action in the British Virgins can have great international significance. Coastal mangrove swamps, ponds, and wetlands generally need to be preserved. Human predation (shooting) must be tightly controlled (preferably eliminated until numbers of ducks rebuild).

References. -- Philibosian and Yntema (1977); Mirecki (1977); La Bastille and Richmond (1973); Bond (1971).

Knowledgeable individuals. -- Rowan Roy; George Mitchell; Mary Randall.

Aves

Family BUTEONIDAE

Buteo jamaicensis

Red-tailed hawk

Description. -- A large, brown, broad-winged hawk with a red tail when adult.

Status. -- Threatened. Although widespread in the world, considerably reduced by pesticide pollution and shooting. Nests on St. Thomas and St. Croix, and present on St. John, in the U.S. Virgins. In the British Virgins at least ten pairs survive on Tortola, and a few (but less) on Virgin Gorda. The species has been extirpated from Anegada, but might quickly return if protected. Individuals have been seen on some smaller islands such as Salt and Guana, and additional nesting may occur. This bird feeds voraciously on rodents and is highly beneficial.

Recommendations. -- Education and enforced legal protection will help. Big trees are necessary for nest sites, so preserving old-growth forest is also required.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971).

Knowledgeable individuals. -- Rowan Roy; George Mitchell.

Aves

Family PANDIONIDAE

Pandion haliaetus

Osprey

Description. -- A very large -- almost eagle-sized -- hawk; predominantly white below and on head, slaty above and on top of tail (tail is banded from below). Feeds exclusively on fish, many of which are scavenged.

Status. -- Endangered. This species underwent a spectacular slump worldwide due to insecticide poisoning. It is now making a comeback, but is still much reduced. The osprey is rare in the Virgin Islands, and the only breeding record is half-a-century old for George Dog. People claim it nests on Anegada. Like other hawks, ospreys are often shot.

Recommendations. -- For survival this species needs mangroves and coastal wetlands for feeding habitat and big, old-growth trees for nesting. Education and legal protection will help.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971).

Knowledgeable individuals. -- Rowan Roy; George Mitchell.

Aves

Family RALLIDAE

Rallus longirostris

Clapper rail

Description. -- A long-legged, long-billed wading bird standing ca 25 cm; shades of dark grey-brown all over except for light and dark vertical bars on abdomen and under tail.

Status. -- Endangered. Nests on St. Thomas and St. Croix in the American islands, and from Puerto Rico westward to North America. However, Robertson (pers. comm.) says the taxonomy of clapper rails is poorly understood and there is a real possibility that the more western populations are not the same thing. In the British Virgins this species still nests on Anegada and Tortola (Long Swamp); its only known nesting site on Virgin Gorda has been destroyed. Habitat destruction will eliminate this species.

Recommendations. -- Protect mangroves and all coastal wetlands. Document existing populations and search for this species in areas where it has been seen, but not yet proven to breed, like Necker Island. Interest someone in a taxonomic study to see if this form is endemic.

References. -- Philibosian and Yntema (1977); Mirecki (1977); La Bastille and Richmond (1973); Bond (1971).

Knowledgeable individual. -- Dr. William Robertson (Florida).

Aves

Family RALLIDAE

Fulica caribbea

Caribbean coot

Description. -- A dark, slate-colored, chicken-like water bird with lobed toes and a conspicuous shield of bill skin extending up onto forehead.

Status. -- Endangered. Recorded nesting on St. Thomas, St. John, and St. Croix in the U.S. Virgins, and on Puerto Rico, but much reduced throughout its range. Endemic to the Antilles. In the British Virgins, known only from Josias Bay, where seen regularly right up to April, 1980. Probably nests at Josias Bay and may nest in Long Swamp, Tortola. Not known from Anegada.

Recommendations. -- Enforced legal protection will help, though local people do not much fancy this bird for eating. Habitat protection is the most important thing: mangroves and coastal wetlands. Encourage survey and study.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971).

Knowledgeable individuals. -- None known.

Aves

Family CHARADRIIDAE

Charadrius alexandrinus

Snowy plover

Description. -- A small (stands ca 100 mm), long-legged, short-billed shorebird, white below and pale grey above, with a dark bar on the base of the neck, but no complete dark ring.

Status. -- Endangered. Present, but not proven to nest on St. Croix; nests on Puerto Rico and westward to North America. Suspected nesting on Anegada, where up to 20 individuals have been seen. If this species can be demonstrated to nest in the British Virgins, this will be a fact of great regional significance.

Recommendations. -- Preserve coastal wetland habitat and all the wetlands of Anegada. Conduct a survey and study of this species.

References. -- Philibosian and Yntema (1977); Mirecki (1977); La Bastille and Richmond (1973); Bond (1971).

Knowledgeable individual. -- Rowan Roy.



Aves

Family SCOLOPACIDAE

Catoptrophorus semipalmatus

Willet

Description. -- A medium-sized (stands ca 20 cms) wading bird with long legs and a long bill. Grey above and largely white below, with a bold, broad white stripe in the largely black wing very conspicuous in flight.

Status. -- Endangered. On the entire Puerto Rico Bank, known to nest only on Anegada, where one or more pairs exist. Also recorded nesting on St. Croix and common in some parts of coastal North America. This species was shot out over much of its range (e.g. New England) earlier in this century, and is now making a comeback. But, habitat destruction may yet reverse this good trend.

Recommendations. -- Preserve coastal wetlands and all of the wetland habitat of Anegada. Do not permit shooting.

References. -- Philibosian and Yntema (1977); Mirecki (1977); La Bastille and Richmond (1973); Bond (1971).

Knowledgeable individuals. -- None known.

Aves

Family LARIDAE

Gelochelidon nilotica

Gull-billed tern

Description. -- A slender-winged seabird of pigeon-size. Very pale grey above, white below, with a thick, black bill, small black feet, and a black cap covering the entire top of the head in breeding plumage (reduced to grey in winter). The tail is white, short, and shallowly forked.

Status. -- Endangered. Once a widespread common species in the world, gull-bills were almost exterminated by eggging and the millinery trade, and have not substantially recovered. Nesting is reported on St. Thomas and St. Croix in the U.S. Virgins, at Sombrero in the Lesser Antilles, and at scattered sites westward to the southern United States. Twenty birds were observed at Windlass Bight Pond, Anegada, and nesting was suspected. If so, this is of great international significance.

Recommendations. -- Preserve Anegada. Initiate a study of this species.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Pough (1951); Lazell (1964).

Knowledgeable individuals. -- Dr. Ruud van Halewijn; Rowan Roy.

Aves

Family LARIDAE

Sterna dougalli

Roseate tern

Description. -- A slender-winged, pigeon-sized seabird. Grey above, white below, with orange feet, a slender, largely black (but reddish at base) bill. The white tail is extremely long and deeply forked; it extends far beyond the wing tips when the bird is at rest.

Status. -- Endangered. This species is undergoing a spectacular decline worldwide and may soon become extinct. The reasons are not fully understood, but certainly habitat destruction is a major factor, especially on the Puerto Rico Bank. This species is reported to nest on St. Thomas and St. John in the U.S. Virgins, and on Puerto Rico and in small, scattered colonies north to Massachusetts. In the British Virgins in 1976 ca 30 pairs nested on Guana and ca ten pairs on Cooper. There may have been nesting on Cockroach. We could confirm no nesting in 1980 anywhere. Nested on Sombrero in the 1960's.

Recommendations. -- In view of the plight of this bird worldwide, the nesting aggregations in the British Virgins assume major international importance. Nesting sites are highly temporary, so our failure to find nesters in 1980 does not mean there were none. Also, they may nest later than April. Wetlands protection and a thorough study of this species are both needed.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971); Lazell (1964).

Knowledgeable individuals. -- Dr. Paul Buckley; Dr. Ruud van Halewijn.

Aves

Family LARIDAE

Sterna fuscata

Sooty tern

Description. -- A slender-winged, pigeon-sized seabird. Nearly black above, white below, with black feet, black bill and a white forehead. The tail is deeply forked and (except for outer border) black.

Status. -- Undetermined. A widespread nester in the tropics, but reportedly of peculiar habits, nesting every nine or ten months, rather than annually. Philibosian and Yntema (1977) did not list it as occurring in the British Virgins at all, but did record breeding around St. Thomas and St. John. Mirecki (1977) reported them "uncommon," with ca 100 pairs nesting on the Carval (east of Cooper Island).

Recommendations. -- Set aside the Carval as a sanctuary. Initiate a population study of this species.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971); Lazell (1967); Pough (1951).

Knowledgeable individuals. -- George Marler; Rowan Roy; Dr. Ruud van Halewijn; Dr. William Robertson.

Aves

Family LARIDAE

Sterna anaethetus

Bridled tern

Description. -- A slender-winged, pigeon-sized seabird. Grey above, white below, with dark grey feet, a nearly black bill, and a black cap but a white forehead -- the white extending well beyond the eye. The tail is deeply forked and, except for the outer borders, dark grey.

Status. -- Undetermined. This is a widespread tropical nester, but almost nothing is known about it. Philibosian and Yntema (1977) record it nesting around St. Thomas and St. John, in the U.S. Virgins. Mirecki (1977) suspected nesting on Carval, Carrot Rock, Norman, West Dog, West Seal Dog, Necker, and Cockroach. In no case were there more than a few pairs.

Recommendations. -- Carval, Carrot Rock, the Dogs (including both Cockroach cays), and the Seal Dogs should all be sanctuaries. Initiate a population study of this species.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971); Lazell (1967).

Knowledgeable individuals. -- George Marler; Rowan Roy; Dr. Ruud van Halewijn; Dr. William Robertson.

Aves

Family LARIDAE

Sterna albifrons

Least tern

Description. -- A slender-winged seabird smaller than a pigeon. Grey above, white below, with yellow feet, a yellow bill, and a black cap with a white forehead. Tail white and forked.

Status. -- Endangered. This species underwent catastrophic devastation by the millinery trade in the gay nineties, but has made a comeback. It is recorded nesting around St. Thomas and St. Croix by Philibosian and Yntema (1977). Mirecki (1977) estimated ca 30 pairs nesting on Beef Island and ca 50 pairs suspected nesting on Anegada.

Recommendations. -- Protect coastal wetlands and all of Anegada. Survey populations and monitor them.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Pough (1951).

Knowledgeable individual. -- Dr. Paul Buckley.

Aves

Family LARIDAE

Sterna maxima

Royal tern

Description. -- A slender-winged, big pigeon-sized seabird. Grey above, white below, with black feet and a big, orange bill. There is a black cap extending back to form a crest; the forehead is white most of the year, but not in the short breeding season. The tail is rather deeply forked and white.

Status. -- Endangered. Philibosian and Yntema (1977) record nesting around St. Thomas and Puerto Rico, but none proven anywhere in the British Virgins. Mirecki (1977) suspected nesting at Anegada. This species is widespread around the Atlantic Ocean generally and quite common along the southern coasts of North America. However, nesting in the British Virgins would be of considerable regional significance.

Recommendations. -- Preserve coastal wetlands and all of Anegada.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971).

Knowledgeable individuals. -- Rowan Roy; Dr. Ruud van Halewijn.

Aves

Family LARIDAE

Sterna sandvichensis

Sandwich tern

Description. -- A slender-winged, pigeon-sized seabird. Grey above, white below, with black feet and a yellow-tipped black bill. The black cap covers the forehead and extends to form a crest. The tail is white and deeply forked.

Status. -- Endangered. "One of the rarer terns" (Mirecki, 1977). Philibosian and Yntema (1977) recorded it nesting only around St. Thomas anywhere in the Virgins, but Mirecki (1977) suspected breeding in two colonies totalling ca 300 birds on Anegada. Pough (1951) believed this species was expanding its range northward on both sides of the Atlantic. A breeding population in the British Virgins is of great international significance.

Recommendations. -- Protect coastal wetlands and all of Anegada.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971); Pough (1951).

Knowledgeable individuals. -- Rowan Roy; Dr. Ruud van Halewijn.



Aves

Family LARIDAE

Anous stolidus

Brown noddy

Description. -- A slender-winged, pigeon-sized seabird that is about the opposite of other terns: near-black below, brown above, with a white cap and forehead, and a rounded tail.

Status. -- Undetermined. A widespread tropicopolitan bird nesting in colonies on small cays. Often abundant, Mirecki (1977) noted thousands, but "it was never ascertained where these birds came from." Nesting is to date recorded only on the Carval and Ginger Island in the British Virgins.

Recommendations. -- The Carval should be set aside as a sanctuary. A study of this species in the British Virgins is called for.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971); Lazell (1967).

Knowledgeable individuals. -- Rowan Roy; Dr. Ruud van Halewijn; Dr. William Robertson.

Aves

Family COLUMBIDAE

Columba leucocephala

White-crowned pigeon

Description. -- A large slate-colored pigeon with a white cap.

Status. -- Endangered. Probably extirpated as a breeding bird (but so listed by Philibosian and Yntema, 1977). Mirecki (1977) recorded only two individuals in 1976, from Beef Island and Jost Van Dyke. This species was simply shot out; in the 1930's it was abundant.

Recommendations. -- This species prefers to nest on tiny cays, especially in mangroves. It then flies daily to big, old-growth forest and shady ravine habitats to feed. Both habitats must be protected. The woods on the east end of Beef Island are ideal feeding grounds. These birds must be protected from shooting until their numbers recover; they could potentially again be an important resource for food and sport.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971).

Knowledgeable individual. -- George Mitchell.

Aves

Family COLUMBIDAE

Geotrygon mystacea

Bridled quail-dove

Description. -- A stocky ground dove; largely slaty but with bold black and white facial markings.

Status. -- Undetermined. Philibosian and Yntema (1977) list it as endangered with breeding records only for St. Thomas and St. Croix in the U.S. Virgins. They regard this bird as "accidental" in Puerto Rico, and had no nesting evidence for the British Virgins. Robertson (1962) reported it declining severely on St. John. Mirecki (1977) cited evidence that it was once common on Virgin Gorda, Jost Van Dyke, Norman, Peter, and Beef Islands, but in 1976 survived only on Mount Sage and the better-forested ghuts of Tortola and on Guana Island. Given this sort of evidence, I would regard this species as at least threatened and probably endangered. However, Dr. Robert Chipley had no problem finding the birds on Mount Sage and on Guana, and Rowan Roy regards the species as "common" in the right habitats.

Recommendations. -- While a survey should be undertaken to locate and assay populations of this lovely bird, it is nevertheless obvious that it can only survive if the appropriate old-growth and ravine forests are preserved.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971).

Knowledgeable individuals. -- Rowan Roy; Dr. Robert Chipley.

Aves

Family STRIGIDAE

Otus nudipes

Puerto Rican screech owl

Description. -- A small owl (standing ca 20 cms) without ear tufts or feathers on the legs. Emits a high, wavering, whistle-like call.

Status. -- Endangered. Endemic to the islands of the Puerto Rico Bank and St. Croix. Extirpated from St. Thomas and St. John in the U.S. Virgins (Philibosian and Yntema, 1977). In the British Virgins, known from Tortola and reported on Virgin Gorda and Guana Island. Almost nothing is known about this small, forest-dwelling owl in terms of life history or behavior.

Recommendations. -- Requires extensive old-growth forests and lushly vegetated ravines for survival. An ideal subject for scientific study and one of the world's least-known birds.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971).

Knowledgeable individual. -- Mary Randall (Guana Island).

Aves

Family CAPRIMULGIDAE

Chordeiles minor

Nighthawk

Description. -- A long-winged, bat-like bird with a disproportionately big head, gaping mouth (but a tiny beak), tiny feet, and a big white spot in the dark wings (looks like it has a hole in each wing in flight).

Status. -- Undetermined. Philibosian and Yntema (1977) list it as present, but not proven breeding, on St. Thomas, St. John, and St. Croix in the U.S. Virgins, and nesting only on Puerto Rico on the entire Bank. Mirecki (1977) suspected nesting on Anegada, and lists records of its presence on Tortola. He states "...the records from Anegada are of special interest since this is the easternmost point of its range in the West Indies.... The call of these birds was considerably different from the North American species...." The Anegada nighthawks could constitute quite a special find for some enterprising ornithologist.

Recommendations. -- Preserve Anegada. Encourage a study of this species.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971).

Knowledgeable individual. -- Rowan Roy.

Aves

Family TROCHILIDAE

Anthracothorax dominicus

Antillean mango

Description. -- A large (80 mm) hummingbird with a long, curved bill. The male is emerald and iridescent black, rather like both sexes of the common green-throated carib, but the female is unmistakable: brown above and near-white below.

Status. -- Endangered. Philibosian and Yntema (1977) list this species as extirpated from St. Thomas and St. John in the U.S. Virgins, and extirpated from Anegada. Carey (1975), however, found the species there in 1968 at Windberg Cay, which retains old-growth forest. Mirecki (1977) thought it might still occur on Jost Van Dyke. George Mitchell (pers. comm.) located a pair on 27 February, 1977, and another single on 12 March, 1977, near the east end of Beef Island. While this species still occurs on Puerto Rico in numbers, the Virgin Islands populations are widely isolated and remarkable. It seems the British Virgins provide their only hope of survival.

Recommendations. -- Preserve old-growth and ravine forests, especially that on the east end of Beef Island and all over Anegada.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971); Terborough (1973).

Knowledgeable individual. -- George Mitchell.

Aves

Family HIRUNDINIDAE

Progne dominicensis

Caribbean martin

Description. -- A solidly iridescent blackish swallow; long wings, short tail, fast flight.

Status. -- Undetermined. May be the same as Progne subis, the North American martin, but all martins have declined as a result of insecticide spraying. Philibosian and Yntema (1977) record it nesting in St. Thomas, St. John, and St. Croix, and on Puerto Rico among the American islands. Mirecki (1977) found it nesting on Great Camanoe and "the Dogs" (did not specify which); he listed it as present on Peter Island. Dr. Robert Chipley (Lazell, et al., in press) found it present on Scrub Island. Rowan Roy has seen it at Road Harbor, Tortola.

Recommendations. -- Needs further study. Avoid insecticide spraying.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Lazell, et al. (in press).

Knowledgeable individual. -- Rowan Roy.

Aves

Family VIREONIDAE

Vireo altiloquus

Black-whiskered vireo

Description. -- A little grey bird washed with dull brown or olive; there is a dark grey cap, a light line over the eye, a dark line through the eye (which is red in adults), and a dark "whisker," or cheek stripe.

Status. -- Endangered. Once abundant (references in Mirecki, 1977), this species was reduced to a pathetic three pairs in 1976, all in mangroves on Beef Island. The species is widespread in the Greater Antilles and occurs in the Florida Keys. It is a mangrove inhabitant and needs big (especially black) mangroves for territorial behavior. It is insectivorous.

Recommendations. -- Preserve mangroves and avoid insecticide spraying.

References. -- Philibosian and Yntema (1977); Mirecki (1977); Bond (1971).

Knowledgeable individual. -- Rowan Roy.



Mammalia

Family NOCTILIONIDAE

Noctilio leporinus

Fisherman bat

Description. -- A very large (wingspread 50 cms) tailless bat with pointed ears and a face rather like a mastiff dog. Catches fish with its hind feet.

Status. -- Endangered. This remarkable bat is widespread in the Antilles and South America, but nowhere abundant. Philibosian and Yntema (1977) record it as breeding on Puerto Rico, St. Thomas, St. John, and St. Croix, but nowhere in the British Virgins. Johnson (1978) claims to have seen it at Gorda Sound, but all his photographs are from St. John. Several people reported seeing this bat around Tortola to me, but I never saw one. It is said to sleep in rock crevices.

Recommendations. -- We need proof -- preferably an actual specimen -- of the occurrence of this species in the British Virgins (collecting one voucher specimen will not further endanger the species). Then we can search for its roost sites and begin planning for its conservation.

References. -- Philibosian and Yntema (1977); Johnson (1978); Peterson (1964); Allen (1940).

Knowledgeable individuals. -- None known.

Mammalia

Family PHYLLOSTOMATIDAE

Artibeus jamaicensis

Fruit bat

Description. -- A large (wingspread ca 30 cm) tailless bat with pointed ears and a lance-shaped nose leaf. The calcar is a large strut which supports the interfemoral membrane. Feeds on fruit.

Status. -- Undetermined. This is a widespread and generally common Antillean bat, shown by Philibosian and Yntema (1977) as occurring throughout the Puerto Rico Bank. I never encountered it, and have seen no specimens from the British Virgins. I do not know if there are subspecies, or, if so, which occurs here.

Recommendations. -- Needs study.

References. -- Philibosian and Yntema (1977); Peterson (1964); Allen (1940).

Knowledgeable individuals. -- None known.

Mammalia

Family PHYLLOSTOMATIDAE

Brachyphylla cavernarum

Cave bat

Description. -- A large (wingspread ca 30 cm) tailless bat with a small nose leaf. The calcar is reduced to a mere nodule and the interfemoral membrane is narrow. Feeds on insects.

Status. -- Undetermined. Bats, presumed to be this species, occupy the caves on Norman Island. There are said to be bats in a cave on Guana Island. This species is widespread on the Puerto Rico Bank, breeding on Puerto Rico, St. Thomas, St. John, and according to Philibosian and Yntema (1977) somewhere in the British Virgins -- but not Anegada.

Recommendations. -- Needs study.

References. -- Philibosian and Yntema (1977); Allen (1940).

Knowledgeable individual. -- Mary Randall.

Mammalia

Family MOLOSSIDAE

Molossus molossus

Velvety free-tailed bat

Description. -- A rather small (wingspread ca 20 cm) bat with a long tail that projects well beyond the interfemoral membrane. The ears are rounded and there is no nose leaf. Feeds on insects.

Status. -- Undetermined. Presumed by me to be the common bat seen emerging from buildings in Road Town, but I am not sure and have seen no specimens. There are subspecies, but I do not know which occurs in the British Virgins. Philobosian and Yntema (1977) show this species as breeding on Puerto Rico, St. Thomas, St. John, and somewhere in the British Virgins -- but not Anegada.

Recommendations. -- Needs study.

References. -- Philobosian and Yntema (1977); Allen (1940).

Knowledgeable individuals. -- None known.

## THE ISLANDS

I here provide thumbnail sketches of the 46 named islands. The page numbers in parentheses refer to my field notes made in March and April, 1980. The first datum, human population, is just what I was told; the 1980 census was just underway and more accurate data should now be available. I have listed the islands alphabetically, except that those clustered islands with the same base name, modified by an adjective such as East, West, Great, Little, etc., are listed by their base name. There are four unnamed islands I did not visit. The largest is about 1.2 ha, something like 30 m high, and lies off Key Point on the south side of the western peninsula of Peter Island. Another lies just south of Dead Man's Chest. The third is the disjunct southern portion of the Carrot Rock scarp. The fourth is off the southwest tip of Norman Island; it may be "the Carvel" (not to be confused with the Carval), or that name may apply to a nearby rock. There may well be more.

All of those unnamed, unvisited islands are important because they probably harbor nesting seabirds; they have at least shrub-stage vegetation; they probably harbor such land animals as lizards; and they may produce surprises wholly unforeseen, as did Carrot Rock. It is my ambition to return and visit them. Meantime, perhaps the Government will name them.

ANEGADA (pp. 402-404). 3872 ha, 8.5 m. Pop. 162, with goats, sheep, cattle, dogs, cats, rats, mice, and poultry. This island should be a national park. It harbors the endemic Iguana pinguis, and the endemic worm snake Typlops richardi catapontus. In addition it has the white-lipped frog, the slippery-back, and the Anegada ground snake. The list of birds is formidable with several terns, the willet, the snowy plover, the Antillean mango, the

magnificent frigatebird, and many more. The possibility of re-establishing flamingos and West Indian whistling-ducks is exciting. Both botanically and geologically, Anegada is remarkable and wonderful (Martin-Kaye, 1959; Howard, 1970; Britton, 1916; D'Arcy, 1971a, 1971b, 1975; Smith, in press). I recommend that as much of Anegada as possible be immediately set aside as park and wildlife sanctuary; that livestock be rounded up and penned; that feral cats and dogs be extirpated; that development schemes be terminated; and that the natural wonders of Anegada be extolled through a program to educate the citizens of the British Virgin Islands and the world, pointing out just what a remarkable place Anegada really is. The international importance of Anegada for its endemic forms, its potential as a reservoir for more widespread endangered species -- including nesting sea turtles -- and as a living laboratory for scientific study far outweigh any commercial gain that can accrue from "development."

BEEF ISLAND (pp. 400, 404, 410). 372 ha, 224 m. Pop. undetermined, but substantial, with all forms of livestock, rats, mice, and mongoose. This island is pretty well done-in, except for the spectacular, fine, old-growth forest on the east end slopes. This is critical habitat for white-crowned pigeon, Antillean mango, and possibly such reptiles as the giant anole, red-footed tortoise, and Virgin Islands tree boa.

BELLIAMY CAY (p. 404). 0.7 ha, 3.0 m. Pop. 4-7, with a dog, several cats, and lots of rats. This tiny bit of land is quite all right just the way it is.

BUCK ISLAND (p. 400). 17.0 ha, 56 m. Pop. undetermined, but basically one family, with goats, sheep, cats, and rats. This island is in deplorable condition, suffering the worst goat damage I have seen. It illustrates perfectly Lazell's

Antillean cat-rat rule: the numbers of cats and rats are directly related, and the relationship is linear. It is not clear whether cats cause rats or vice versa, but they always occur together and as one increases so does the other. At Buck Island the numbers of each fairly stagger the imagination. There is nothing to do about this place now, but someday it would be nice to reclaim (in the truest sense) it for nature, and eliminate its infestations.

CAMANOE, GREAT (p. 408). 337 ha, 187 m. Pop. undetermined, but ca 50. Various livestock including goats, dogs, and cats, and rats too, of course. This island is important as habitat for the slipperyback, the amphisbaena, and the boa. Further study is needed on how best to plan for the survival of these, but preservation of ravine forests is important.

CAMANOE, LITTLE (p. 408). 16.2 ha, 33 m. Uninhabited. Sheep present. A nice cay with the usual complement of wildlife, but nothing remarkable. This place is doing fine and we may hope the Penn family will elect to leave it just as it is. Should they decide to develop it, however, I would recommend government acquisition.

CARROT ROCK (pp. 398, 420). 1.3 ha, 27.6 m. Uninhabited; no exotics or feral domestics. The unique home of a striking new species of large Anolis lizard, and nesting site for at least two pairs of red-billed tropicbirds and several bridled terns, this island is perfect just the way it is. The trick is simply to keep it this way.

CARVAL (p. 422). 0.8 ha, 36.1 m. Uninhabited; no exotics or feral domestics. This is an important nesting site for white-tailed tropicbirds, sooty and bridled terns, and brown noddies. I was unable to climb up to

the vegetation (but George Marler has), so do not know if this cay supports lizards, or if so, what kind. Thus, further investigation is needed. In any case, Carval is perfect and merely needs to be preserved just as it is.

COCKROACH, NORTH (p. 392). 0.1 ha, 16 m. Uninhabited; no exotics or feral domestics. I could not find lizards on this cay despite good clumps of sea-grapes, but I suspect a few live here. The green-throated carib hummingbird nests here; while this is not at all a rare species, it is interesting that Mirecki (1977) had no actual nesting records for the British Virgins. This cay needs further investigation at a wetter time of year, but is perfect and merely needs to be kept just the way it is.

COCKROACH, SOUTH (p. 392). 0.4 ha, 21 m. Uninhabited; no exotics or feral domestics. This cay supports a population of the common Anolis cristatellus wileyae and, more importantly, is nesting habitat for bridled and possibly roseate terns. It is perfect and need only be maintained just as it is.

COOPER ISLAND (p. 376). 138 ha, 155 m. Pop. 6-24, with goats, chickens, dogs, cats, and rats. This island needs further study. People report both slipperybacks and ground snakes, but I could find none. Roseate terns may nest here. Some of this island should be set aside as a sanctuary and the goats and cats (at least) controlled.

DEAD MANS CHEST (p. 374). 14.1 ha, 65.6 m. Uninhabited; no livestock. A lovely island which should be preserved just the way it is. The government shooting range does not hurt anything I am aware of.

DOG, GEORGE (p. 384). 15.4 ha, 82 m. Uninhabited but with goats. If the goats were removed the vegetation would quickly recover and this island would be in fine shape.



DOG, GREAT (p. 384). 33.2 ha, 88.6 m. Uninhabited but with rats. A poisoning campaign to get rid of these rats could restore this island to major potential seabird nesting habitat.

DOG, WEST (p. 396). 12.5 ha, 49.2 m. Uninhabited; no livestock. In fine shape, this cay needs protection as it is nesting habitat for bridled terns. It is a sanctuary already.

EUSTATIA (p. 386). 10.5 ha, 52 m. Population undetermined, but several families at least seasonally. Goats and burros. This cay has the usual complement of reptiles, but nothing remarkable known. The livestock seems to be controlled at present.

FRENCHMANS CAY (p. 382). 24.1 ha, 131.2 m. Population undetermined, but considerable for a small island, with goats, cattle, chickens, horses, dogs, cats, and rats. It is imperative to cease destruction of mangroves here; once this cay had some of the best mangrove habitats, and the remnants are still worth preserving as potential nesting habitat for black-crowned night herons and black-whiskered vireos. Ground snakes are reported to occur here.

GINGER ISLAND (p. 376). 104.8 ha, 164 m. Uninhabited but infested with goats and cattle. This island is habitat for the slipperyback and supports nesting red-billed tropic birds and brown noddies. The livestock should be eliminated or at least controlled.

GREEN CAY (p. 390). 6.7 ha, 35.4 m. Uninhabited, but with goats. The beautiful, old-growth manchineel woods on the little southwestern coastal plain are a major roost site for brown pelicans. Provided protection from disturbance, this could be a potential nesting site. It is imperative to preserve this area intact.

GUANA ISLAND (pp. 384, 406-8). 296.7 ha, 265.7 m. Pop. 1-32, sheep, burros, cats, a dog, a chicken, rats, and mice. This island retains some of the finest old-growth ravine forest on the Puerto Rico Bank and is home to a remarkable assortment of creatures: the Anegada ground snake (nowhere else so abundant), the Virgin Islands tree boa, probably the slipperyback, some sort of frog, bats, owls, Bahama ducks, from one to four nesting red-billed tropic birds, bridled quail-doves, a good booby colony, roseate terns, and possibly a nesting pair of red-tailed hawks. Its diversity is amazing for its size. This island would be ideal for the detailed study of a small tropical island ecosystem. It is to be fervently hoped that the owner will revere Guana Island just as it is (the sheep are under control, as are both burros).

INDIANS (p. 398). 0.2 ha, 21 m. Uninhabited; no exotics or feral domestics. I could not climb to the best patch of vegetation, which may harbor lizards. This cluster of rocks is lovely and should be protected and preserved. Sadly, persons from the west often come here (without benefit of port clearance) and have killed nesting boobies (and no doubt performed other atrocities) in the past.

JERUSALEM, BROKEN (p. 378). 0.9 ha, 9.8 m. Uninhabited; no exotics or feral domestics. A beautiful jumble of rocks with lizards (the common Anolis cristatellus wileyae) and at least one nesting red-billed tropicbird. Must be kept just the way it is.

JERUSALEM, FALLEN (p. 387). 12.2 ha, 45.9 m. Uninhabited, but with goats, cats, and rats. Habitat for the slipperyback, this island would be vastly improved by removal of the goats, cats, and rats.

JOST VAN DYKE (not visited). 839.8 ha, 347.8 m. Population undetermined; presumably all sorts of livestock, cats, rats, mice, etc. Important as habitat for the white-lipped frog, slipperyback, and amphisbaena -- and possibly the Antillean mango hummingbird. Forests need careful preservation. This island needs study.

JOST VAN DYKE, LITTLE (p. 390). 62.7 ha, 120.4 m. Uninhabited, but with goats. Unremarkable, with the usual complement of common species, this cay would be vastly improved by removal or control of the goats. Needs further study.

MARINA CAY (p. 406). 1.0 ha, 4.8 m. Pop. 2-30, a dog, cats, and rats. This islet is amazing for its spectacular lizard fauna, consisting of five species. All are common and widespread, but no other island so small has so many different kinds. I would urge elimination of the cats and control of the rats with covered poison-bait stations.

MOSQUITO ISLAND (not visited). 49.8 ha, 95.1 m. I do not know if this island is inhabited or supports livestock (I suspect at least the latter). The Anegada ground snake occurs here, and its habitat should be protected. Needs study.

NECKER ISLAND (p. 386). 29.9 ha, 33 m. Uninhabited. People say there are goats, but I saw none. This island is the only known habitat in the Virgin Islands for the giant woodslave (Thecadactylus rapicaudus) and its northwesternmost locality on earth. In addition, there are Anegada ground snakes, and Dr. John Smith reports Virgin Islands tree boas. This island should not be developed. Cats and dogs would be a potential disaster for the fauna, most immediately the nesting bridled terns. This entire island should be a patrolled wildlife sanctuary.

NORMAN ISLAND (p. 372). 257.2 ha, 131 m. Uninhabited, but with goats, cattle, burros, and rats. Habitat for slipperyback. The caves south of the Bight harbor bats and white-tailed tropicbirds; these should be part of a patrolled wildlife sanctuary.

PELICAN ISLAND (p. 396). 3.4 ha, 59.1 m. Uninhabited, but with rats. An important pelican roost site that could be nesting habitat if patrolled and preserved.

PETER ISLAND (pp. 392, 408). 429.4 ha, 177.2 m. Pop. 9-100, with goats, cattle, horses, chickens, dogs, cats, and rats. A comprehensive plan should be developed for conservation on Peter Island, which is habitat for Iguana iguana, the slipperyback, the Virgin Island ground snake, the garden snake, and -- people say -- some sort of frog. Hawksbill turtles live just off-shore and are reported to nest on the beaches. These beaches might be included in a marine sanctuary.

PRICKLY PEAR ISLAND (p. 386). 69.6 ha, 62 m. Uninhabited, but both goats and sheep. This may be habitat for the Virgin Gorda worm snake, but is otherwise unremarkable as presently known.

ROUND ROCK (p. 378). 7.6 ha, 72.2 m. Uninhabited; no exotics or feral domestics. Habitat for the slipperyback (and three other common lizards). Perfect, needs only to be left just as it is.

SABA ROCK (p. 386). 0.2 ha, 4.8 m. Pop. 2, with cats and rats. Two species of native lizards are present and common. Seems to be fine just as it is.

SALT ISLAND (p. 368). 78.1 ha, 124.7 m. Pop. ca 6, with goats, chickens, dogs, cats, and rats. This island has a remarkably diverse fauna of

at least seven species of reptiles, including the slipperyback and Virgin Islands ground snake. Worm snakes are reported. A plan should be made to exclude the goats from a portion of the island, such as the northwest tip, so the vegetation can recover and the native fauna can persist.

SANDY CAY (p. 390). 5.5 ha, 21.7 m. Uninhabited; no exotics or feral domestics. A lovely cay in fine shape, supporting at least three pairs of nesting white-tailed tropicbirds. Iguanas should most emphatically not be introduced here because they eat eggs and young birds. Sandy Cay should be left just as it is.

SANDY SPIT (p. 390). 0.1 ha, 1 m. Uninhabited; no exotics or feral domestics. This bit of land is remarkable because it harbors two species of lizards (both common; Anolis cristatellus wileyae and Sphaerodactylus m. macrolepis). It may be the smallest land area on earth that does. It is perfect and should be left just as it is. Note that hurricane overwash (e.g. David on 29 August, 1979) does not extirpate the lizards.

SCRUB ISLAND (p. 406). 97.2 ha, 141.1 m. Uninhabited. I did not encounter livestock but expect goats are present. I found the usual complement of common lizards, but nothing remarkable. Needs study.

SEAL DOG, EAST (p. 396). 0.8 ha, 24.3 m. Uninhabited but infested with rats. If the rats could be eliminated this would be a major potential seabird nesting site. Covered poison-bait stations should work.

SEAL DOG, WEST (p. 396). 1.9 ha, 32.8 m. Uninhabited. No exotics or feral domestics. This cay is nesting habitat for red-billed tropicbirds and bridled terns. It is perfect and should be kept just as it is.

THATCH, GREAT (p. 388). 123.1 ha, 187 m. Uninhabited, but with goats, cats, and rats. Unremarkable, unless the stories of snakes turn out to be true.

THATCH, LITTLE (p. 388). 23.5 ha, 100 m. Uninhabited, but loaded with rats. Unremarkable. A good place for development, since it would amount to restoration of the existing buildings. Why not persuade the developers of Necker to take this island instead?

TOBAGO, GREAT (p. 374). 88.6 ha, 147 m. Uninhabited, but infested with goats. This gorgeous island is nesting habitat for hundreds of pairs of brown boobies, and the only proven nesting habitat in the British Virgins except Anegada for magnificent frigatebirds. The goats should be immediately removed because they eat seedlings and therefore prevent regrowth of the big trees the frigatebirds must have to nest in.

TOBAGO, LITTLE (p. 388). 22.3 ha, 91.5 m. Uninhabited; a few goats. This beautiful island is habitat for the slipperyback and hundreds of nesting boobies. Lack of water probably keeps the goat population down, but getting rid of them would be a good idea. A near-perfect island deserving full protection as a sanctuary.

TORTOLA (pp. 372, 382, 400, 410, 420). 5,494 ha, 521 m. Pop. ca 8,500; all livestock, rats, mice, mongoose, etc. This, the largest and highest of the Virgin Islands, provides habitat for eight endangered, threatened, or little-known butterflies, three threatened frogs, the slipperyback, Iguana iguana, the amphisbaena, the Anegada ground snake, Virgin Islands worm snake and tree boa, the red-footed tortoise, the owl, bridled quail-dove, red-tailed hawk, black-crowned night heron, least bittern, clapper rail, Caribbean coot,

Bahama duck, and black-whiskered vireo. On its beaches nest leatherback turtles. Expansion of existing sanctuaries and establishment of several new ones is clearly called for.

VIRGIN GORDA (p. 386). 2130 ha, 414 m. Population undetermined, but considerable: ca 1,000. Presumably all livestock, cats, dogs, rats, and mice (but no mongoose) occur. This island provides habitat for a desperately endangered toad, a threatened frog, and endemic gecko (Sphaerodactylus parthenopion) said to be the smallest reptile on earth, an endemic worm snake, the slipperyback, Iguana iguana, the amphisbaena, the Anegada ground snake, the garden snake, the owl, Bahama ducks, and possibly the red-footed tortoise. Pelicans, whistling-ducks, and clapper rails may have been extirpated as nesting species, but might survive. Expansion of existing sanctuaries and establishment of new ones is clearly called for.

#### PARKS AND SANCTUARIES

##### 1. Virgin Gorda Peak

The existing reserve should be expanded to the south and west right to the Plum Tree Bay road and Pond Bay. Black Rock and Milton Hill should be added. Such a reserve would protect the endemic Virgin Gorda gecko, smallest reptile on earth, the threatened frog, the slipperyback, the amphisbaena, both the ground and garden snakes, the owl, and possibly the desperately endangered Bufo lemur.

##### 2. The Jerusalems

The existing reserve should be expanded to include Broken Jerusalem, Round Rock, and the Blinders. This would then include nesting habitat for the red-billed tropicbird, and more habitat for the slipperyback.

3. The Dogs

The existing sanctuary should be expanded to include all the Dogs, Cockroaches, and Seal Dogs. This would then provide more nesting habitat for bridled terns, red-billed tropicbirds, and a pelican roost.

4. Sage Mountain

The existing reserve should be expanded to include the major ghuts, especially Ballast Bay, Pickate, Vanterpool, Buntin, Brown, and Obie. Such a reserve would provide habitat for all the butterflies, all three threatened frogs, the slipperyback, the amphisbaena, both ground and garden snakes, the tree boa, the worm snake, the owl, the bridled quail-dove, the red-tailed hawk, and probably Iguana iguana and the red-footed tortoise.

5. Dead Man's Chest and R.M.S. Rhone

A major land and marine park should be designated here, taking in the western corner of Salt Island (which should then be cyclone-fenced off and have the goats removed), Dead Man's Chest and the little cays and rocks south of it, all intervening sea bottoms and reefs, and sea bottom westward to and including the Bank Reef and anchor of the Rhone, Great Harbor Point of Peter Island (which should be cyclone-fenced off and have the goats removed), and all the beach in Great Harbor. Such a protected zone would provide considerable habitat for the slipperyback, Iguana iguana, both ground and garden snakes, and a whole population of hawksbill sea turtles.

6. Anegada

The existing Flamingo Pond sanctuary should be expanded to include as much of Anegada as possible, including all mangroves, inland and coastal wetlands, the inland cays (with Windberg Cay -- the Iguana pinguis nursery and



Antillean mango habitat -- an immediate necessity), the citron bush, and all the beaches. This sanctuary will provide for the Anegada iguana, found nowhere else on earth, the similarly endemic Anegada worm snake, the slippery-back, the ground snake, Sandwich, royal, gull-billed, and least terns, Bahama duck, osprey, great blue heron, clapper rail, snowy plover, willet, Antillean mango hummingbird, white-lipped frog, and possibly great white heron. This would provide nesting habitat for the internationally endangered hawksbill and green turtles. The flamingos and West Indian whistling-ducks should be re-established. Once protected and patrolled Anegada would rank as one of the finest wildlife sanctuaries on earth. I regard this as the absolute top priority and most critical issue in the British Virgins, and probably the most immediate necessity for conservation in the entire Caribbean region.

7. The Valley

I am not sure just where this is and did not visit it. If it is Valley Ghut, it should be expanded to include Valley Hill and connected to the west with Virgin Gorda Peak reserve. It would then be a superb supplement to that reserve and help save all the species mentioned there.

8. Queen Elizabeth II Park

A recreational facility in Road Town.

9. Spring Bay

A recreational facility on Virgin Gorda.

10. Devils Bay

I cannot locate this on E803 (D.O.S. 346) Edition 3 (1974) of Virgin Gorda, and did not visit it. It sounds like fine habitat for slipperyback, ground and garden snakes, and possibly the amphisbaena and worm snake. At 58 acres, it is very small; it probably needs expansion.

11. Botanical Garden

A scientific and educational facility on Tortola.

12. Fat Hogs Bay

This twelve acre protected area needs to be expanded to include the entire Long Swamp ecosystem with all adjacent mangroves and coastal wetlands, and with a good buffer zone to prevent filling, rubbish-tipping, and other abuses occurring today. This is the finest mangrove area left west of Anegada and critical habitat for black-crowned night heron, least bittern, clapper rail, Caribbean coot, great blue and possibly great white herons, Bahama duck, and black-whiskered vireo. This area could potentially again be habitat for flamingo and West Indian whistling-duck.

13. R.M.S. Rhone

This archeological and coral reef site should be incorporated in the major park discussed above (5).

14. Necker Island

This entire island should be preserved intact with no development or permanent human habitation. People living on the island will predictably cause cats, rats, mice, and other vermin, and are quite likely to kill wildlife themselves outright. Necker is the only habitat in the Virgin Islands for the giant woodslave gecko. It is prime habitat for the Anegada ground snake and reported to support the very rare Virgin Islands tree boa. It is breeding habitat for bridled terns. There are far more appropriate places for humans and development; the existing but abandoned facility on Little Thatch comes immediately to mind. Save Necker Island intact.

15. Tobagos

Great and Little Tobagos should be set aside and declared a national park and sanctuary. They provide habitat for the slipperyback, and the best nesting sites for the brown booby and magnificent frigatebird in the British Virgins. The goats must be removed so that the forest -- critical for frigatebird nesting -- can recover.

16. Sandy Spit

Centered on Sandy Spit -- probably the smallest and lowest island in the world which supports two species of lizards -- a major land and marine sanctuary should include Green Cay and Sandy Cay and all adjacent sea bottoms. This will provide roosting (and potential nesting) habitat for brown pelicans and save the nesting habitat of the white-tailed tropicbird.

17. Josias Bay

Located on the north side of Tortola, this bay, its beaches, its pond, mangroves, and all adjacent wetlands should be set aside as a reserve and sanctuary. It is critical habitat for nesting leatherbacks -- the largest living reptile on earth. It is superb habitat for Caribbean coot, Bahama duck, pied-billed grebe, black-crowned night heron, least bittern, black-whiskered vireo, and -- potentially -- West Indian whistling-duck and even a few flamingos.

18. Guana Island

This richly diverse, beautiful, and unspoiled island is in fine shape right now. To encourage the owner to keep it that way, I would offer a tax-break-incentive, with the understanding that the natural vegetation will not be disturbed (except for trail maintenance, of course), that no

exotic plants or animals will be introduced, and that domestic animals will be controlled so as not to harm native plants and animals. This is the best habitat known for Anegada ground snake and excellent habitat for owl, bridled quail-dove, brown booby, Bahama duck, and red-billed tropicbird. It is probably also habitat for slipperyback, one of the threatened frogs, and the very rare Virgin Islands tree boa. It has a bat cave, a salt pond, mangroves, and probably nesting roseate terns. It may well be the most faunally diverse and best preserved island of its size in the Antilles.

19. Beef Island Forest

The superb old-growth forest on the east-facing slopes of Beef Island is perhaps the biggest and best of its kind remaining on the Puerto Rico Bank. It is habitat for Antillean mango hummingbird and worm snake. It is potential habitat for giant anole, red-footed tortoise, owl, red-tailed hawk, and white-crowned pigeon. It should be preserved intact.

20. The Indians

A land and marine park here should include the Indians, Pelican Island, and adjacent reefs and sea bottoms. This will provide nesting habitat for the brown booby and roosting (with potential nesting) habitat for the brown pelican, as well as a spectacular diversity of marine forms.

21. Norman Island

The southwest end of Norman should be set aside as a sanctuary. It would have to be cyclone-fenced and have the feral livestock removed. It would provide critical habitat for bats (the only native mammals in the Virgin Islands), white-tailed tropicbirds, slipperyback, and nesting bridled terns.

22. Ginger Island

This entire cay and its adjacent sea bottoms should be set aside as a preserve and sanctuary. The feral livestock should be removed. This island is habitat for slipperyback and nesting noddies and red-billed tropicbirds. Its reefs and turtlegrass flats are superb habitat for green and hawksbill sea turtles. It may support a ground snake population.

23. Biras Hill

The entire east end of Virgin Gorda (apart from the grounds of the Bitter End Hotel) should be a sanctuary and reserve. A cyclone fence across the haulover between Biras Creek and Berchers Bay would enable elimination of feral livestock. This is perhaps the best Iguana iguana habitat in the British Virgins, and also habitat for slipperyback, both ground and garden snakes, amphisbaena, worm snake, owl, red-tailed hawk, and possibly such rare forms as the toad Bufo lemur and Virgin Gorda gecko.

24. Carval

This rock is in fine shape and should be designated a sanctuary for its nesting seabirds: white-tailed tropicbird, brown noddy, and sooty and bridled terns.

25. Carrot Rock

This double cay is fine just as it is and need only be designated a sanctuary for its endemic Anolis lizard and nesting red-billed tropicbirds.

## CONCLUSIONS AND RECOMMENDATIONS

The British Virgin Islands provide the finest and most immediate opportunity for conservation in the Antillean-Caribbean region. Nowhere else on earth can one see both the largest living reptile -- the leatherback -- and the smallest -- the Virgin Gorda gecko. The massive Anegada iguana, the tiny Virgin Gorda gecko, the beautiful Carrot Rock anole, and the Virgin Islands bo-peep are endemic full species. The Anegada ground snake, Anegada worm snake, and Virgin Gorda worm snake are endemic subspecies. Tortola, highest and largest of all the Virgin Islands, is type-locality for a flambeau butterfly and the internationally endangered Virgin Islands tree boa. Virgin Gorda is type-locality for the desperately endangered ridge-headed toad. Sandy Spit is probably the smallest and lowest island in the world which supports two species of lizards. Anegada is utterly unlike any other island on earth.

Yet, today the British Virgins face all the same pressures against conservation that are widespread in the West Indies and much of the world. Population, now low at about ten thousand, is increasing. Greedy people seek to develop real estate and expand commerce and population so as to make these islands evermore like their American neighbors. As development, tourism, and population increase prices will steeply inflate, people will become increasingly discontent, the rich will get richer, the poor will get poorer, and strife and tension -- so typical of many islands in the West Indies, and especially the American Virgins -- will become the norm. And faunal and floral losses will proceed apace. It is a sad truism that people do not know when they are well-off.

### Feral livestock and the destruction of vegetation

One of the most pervasive and insidious threats to the natural ecosystems of the islands of the world is released livestock. Sadly, the problem is also rampant in the British Virgins. Typically, animals such as goats are merely put on an island and left to increase. Their population expands until some limiting factor such as lack of food or water is reached. Since man is the only (and infrequent) predator, the animals rapidly increase to the point where many plant species are wiped out or -- in the case of trees -- prevented from reproducing. The animals live right to the margin of possibility, so they are characteristically scrawny and poor. In droughts they die off in large numbers. However, before they die they consume everything they can. This destruction of vegetation leads to severe soil erosion with resulting siltation of inshore reefs, loss of island fertility, and probable long-term and even permanent deleterious effects. Species and populations of native animals and plants may be exterminated or extirpated indirectly, by habitat loss, reduction of water tables, loss of soil and soil moisture, or -- of course -- directly because goats, cattle, cats, dogs, etc., eat them.

Raising livestock by this cavalier method is folly. Any competent stockman knows herds must be culled and managed and kept well below the carrying capacity of the land. On the uninhabited islands in the British Virgins livestock and feral domestics should simply be eliminated before they do irreparable harm. On inhabited islands stock should be controlled and managed to the benefit of the animals, their owners, and the ecosystem.

### Mangrove destruction by man

Virtually throughout the civilized world the value of coastal wetlands has been codified into legal protection. Mangroves are the major

source of the detritus that forms the base of the food chain sustaining marine life, including important human food resources. Mangroves additionally provide protected, cool-water nurseries and are a buffer against tropical storm damage and coastal erosion. In Road Town and along the southwest coast of Tortola where so much mangrove has been destroyed, hurricane damage will predictably be vastly increased the next time one hits. Reliable observers have already noted depletion of fin fish and shellfish resources. Mangroves and coastal wetlands should be legally protected and no further filling or development should take place in them. Thought should be given to mangrove restoration in the areas that have been destroyed.

#### Faunal losses from human predation

Fortunately, the low human population of the British Virgins has kept these losses to a minimum. No mammals, reptiles, or amphibians have been proven to be gone, although the ridge-headed toad, Bufo lemur, of Virgin Gorda may be extirpated. The major losses have been birds: flamingo, white-crowned pigeon, West Indian whistling-duck, and possibly the Antillean mango hummingbird. In the first three cases the birds were simply shot to rarity or extinction, although mangrove destruction apparently dealt the duck its final blow on Virgin Gorda. The mango has been a victim of habitat destruction: the loss of big, old-growth trees and forests. All of the sea turtles and snakes are prone to outright human predation, the former for meat and eggs, the latter from sheer malice. All of the snakes present in the islands are harmless and beneficial, feeding on rats, mice, or insects such as termites.

Today probably the worst human predation problems come from the American Virgin Islands and Puerto Rico. Americans invade the British Virgins in power boats, armed to the teeth. They shoot birds, fish, turtles,



and anything else they fancy. Often, they do not clear immigration or customs. There is far too little patrol or law enforcement in the British Islands. Americans regard the islands as a sort of wide-open haven for mischief and mayhem. This must be changed.

Laws protecting snakes, all sea turtles and their eggs, and all nesting birds should be enacted and enforced. A regular patrol of turtle nesting beaches and bird nesting cays should be initiated. Educational programs to tell people of the harmless, beneficial nature of their wildlife -- especially the snakes -- should be instituted. In the late 1950's in Grenada, Dr. John R. Groome managed to get legislation passed protecting that island's three species of harmless, beneficial snakes. The law attracted so much attention -- even among the snake haters -- that it became almost self-enforcing. I had a permit to collect, but everytime I picked up a snake someone would pop out of the bushes to tell me I was breaking the law. It really worked. People then wanted to know why the snakes were protected; once it was explained that they ate rats and mice -- and were harmless to people -- the populace was essentially educated in this subject.

Turtle killing and egg removal are a worse problem because these species are a historically important food resource and are now internationally endangered. However, if the three nesting species are to recover their former abundance, and so become important food resources again, they must be legally protected now.

Restoration of the extirpated flamingo and whistling-duck, especially on Anegada, is clearly in order. Then, protective laws combined with a patrolling warden will, we may hope, allow the increase of these spectacular species.

The international significance of the British Virgin Islands

For the endemic forms -- Anegada iguana, Virgin Gorda gecko, Carrot Rock anole, Virgin Islands bo-peep, Anegada ground snake, and Anegada and Virgin Gorda worm snakes -- these islands are the only home on this small planet. If they are to survive at all, it will be because they survive here. For a large number of other species which also occur elsewhere, the British Virgins provide the best known habitat remaining in the world. These species include the slipperyback, the Virgin Islands amphisbaena, the Virgin Islands tree boa, the Virgin Islands polydamas butterfly, the Tortola flambeau, and the bridled quail-dove. For a longer list these islands provide critical habitat of major importance to the survival of these species in the region and the world. These include seven butterflies, the toad, the whistling frog, the Virgin Islands ground and worm snakes, roseate, gull-billed, and Sandwich terns, snowy plover, willet, nighthawk, Bahama duck, Puerto Rican screech owl, and many more.

I believe a strong policy of conservation involving parks and sanctuaries, education, legislation, enforcement, and scientific research would make the British Virgin Islands renowned throughout the world. I have traveled all over the West Indies and the world for more than 20 years, and I know of no other area of comparable size with so much to conserve. I urge the Government to follow up on the good start that has been made in designating parks and sanctuaries and forge ahead with more -- most immediately on Anegada. I would urge the establishment of a Biological Survey and appointment of two Government Biologists (at least): a botanist and a zoologist. Articles -- both popular and technical -- and books should be written and published, and films made extolling this wonderful flora and fauna so as to

attract worldwide attention to it. An effort should be made in the schools to foster interest in biology and ecology so that we may hope young people will come along who will study and revere their native plants and wildlife. The opportunity is spectacular; I hope it will be seized.

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