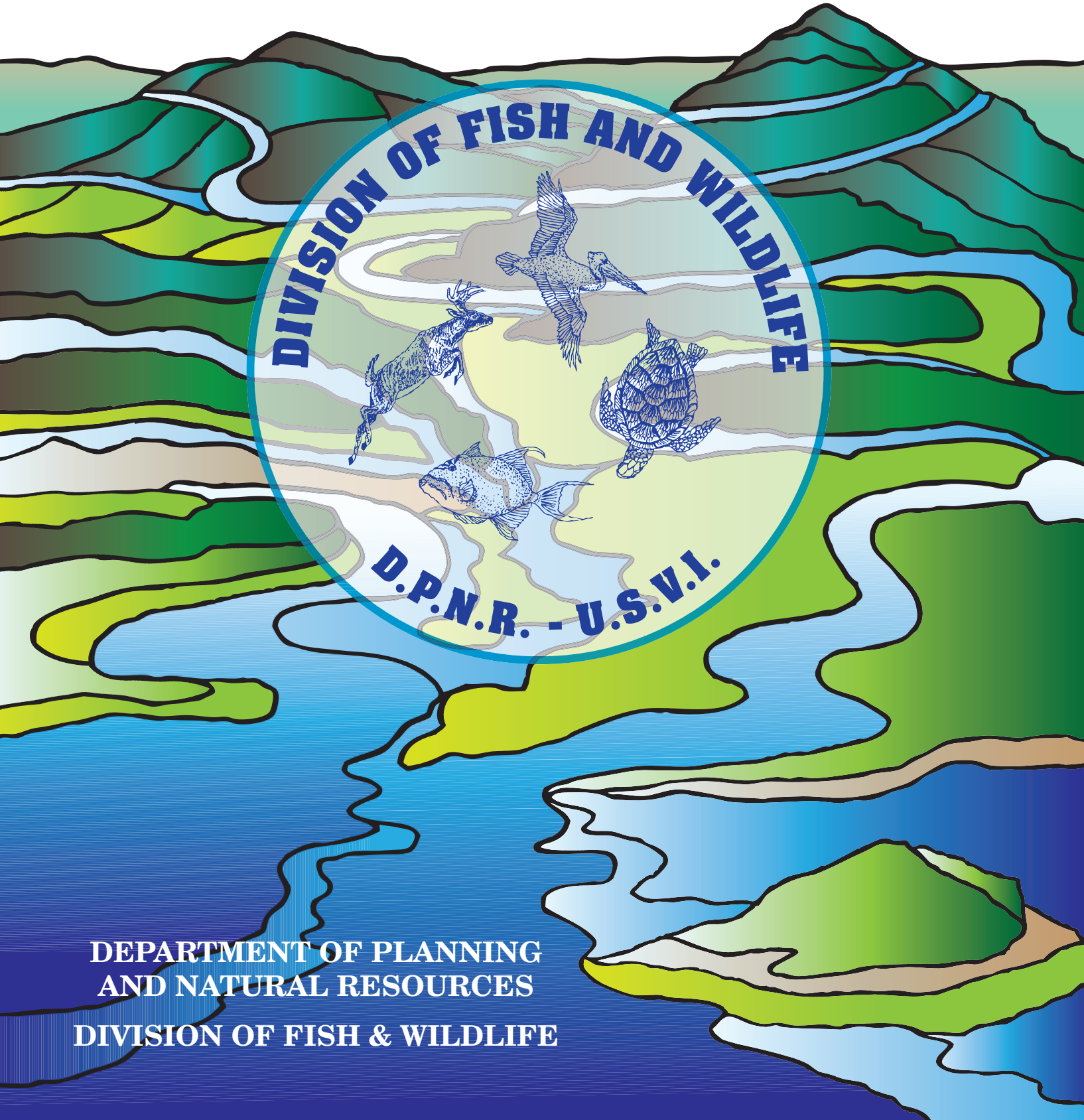
United States Virgin Islands

FACTSHEETS



DEPARTMENT OF PLANNING
AND NATURAL RESOURCES

DIVISION OF FISH & WILDLIFE





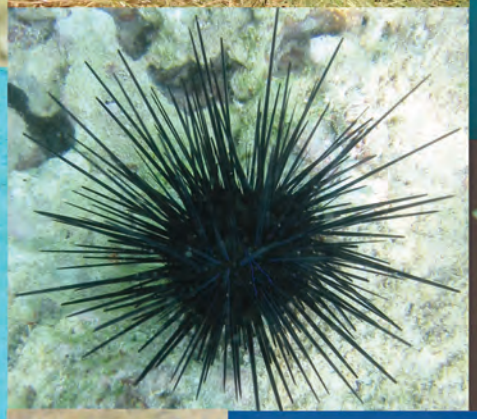




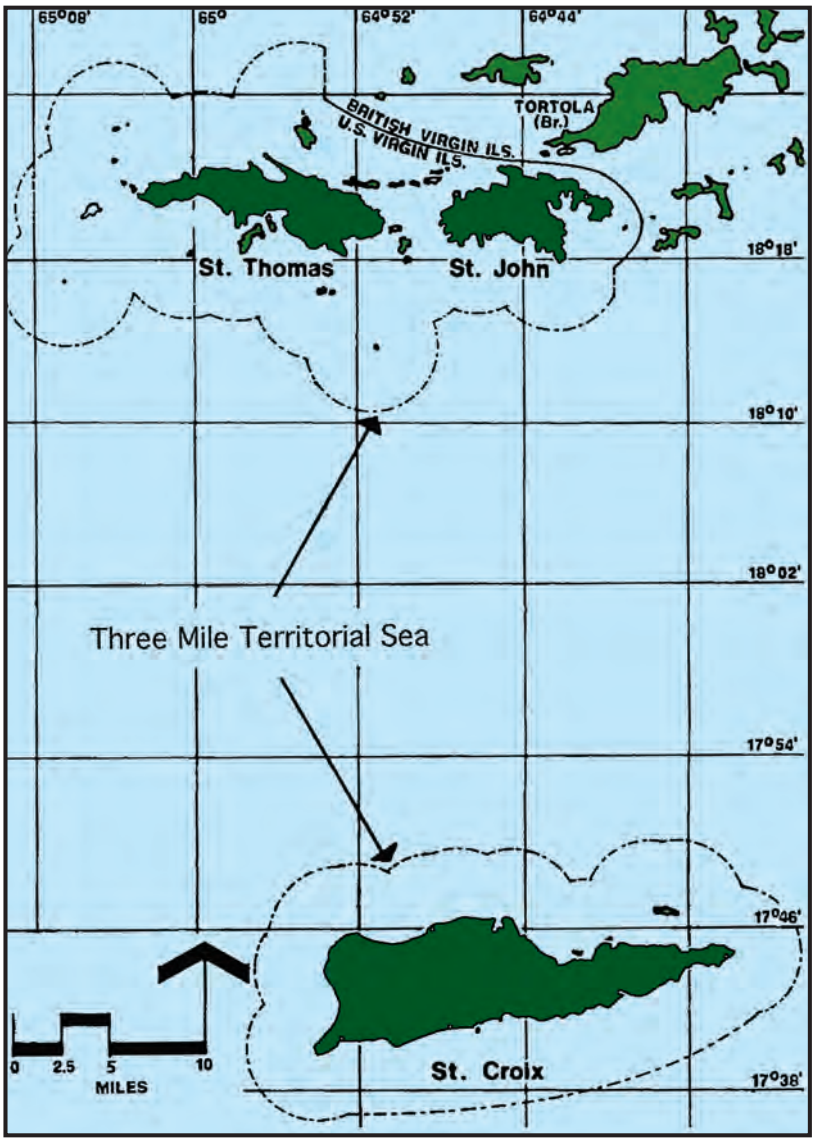








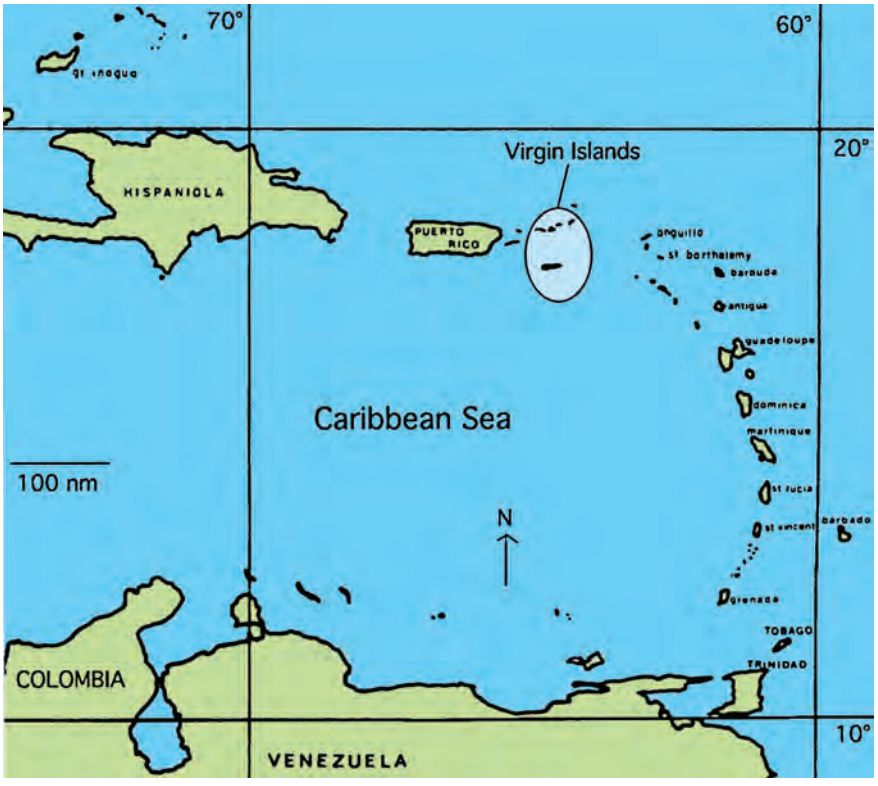

TABLE OF CONTENTS



MISSION STATEMENT OF THE DEPARTMENT OF PLANNING & NATURAL RESOURCES DIVISION OF FISH & WILDLIFE

The Division of Fish and Wildlife (DFW) is charged with the assessment and monitoring of fish and wildlife resources within the U.S. Virgin Islands. The Division provides scientific advice to the Commissioner of the Department of Planning and Natural Resources on the condition of the marine resources and the best strategies to sustain these resources for all of the citizens of the U.S. Virgin Islands. The Division is composed of three bureaus: (1) Bureau of Fisheries, (2) Bureau of Wildlife, and (3) Bureau of Environmental Education. DFW has two offices. The main office is in Red Hook, St. Thomas. The St. Croix office is located in the Rainbow Plaza in Frederiksted.

The Division is 100% federally funded by the U.S. Department of Interior, U.S. Fish and Wildlife Service, Federal Assistance Service (USFWS/FA) and by the National Oceanic and Atmospheric Administration, National Marine Fisheries Services (NOAA/NMFS).



DIVISION OF FISH AND WILDLIFE

D.P.N.R. - U.S.V.I.

U.S.V.I. Factsheet #01

Virgin Islands Tree boa

Epicrates monensu granti

Background

There are two subspecies of the boa *Epicrates monensis*. The Mona boa (*Epicrates monensis monensis)*, is only found on Mona Island west of Puerto Rico, and the Virgin Islands tree boa (*Epicrates monensis granti)*, which is found on Puerto Rico and the U.S. and British Virgin Islands. The VI tree boa, worm snake, racer, and the garden snake are the only snakes found in the territory.

In 1979 the VI tree boa was listed as an endangered species by the U.S. Fish and Wildlife Service. It is also listed on Appendix I of the Convention on the Trade in Endangered Species (CITES), which lists the world's most critically imperiled species.

Tree boas may live longer than 25 years. Like most boas, the tree boa is nocturnal- although occasionally they may be found basking in the sun during the day. In daytime they are usually found under rocks or logs. They may grow to become 41 inches in length.

Common Names

The tree boa is also called the "Culebrón de la Sabana", by Spanish speakers, because of the dry savannah-like habitats they live in.

Description

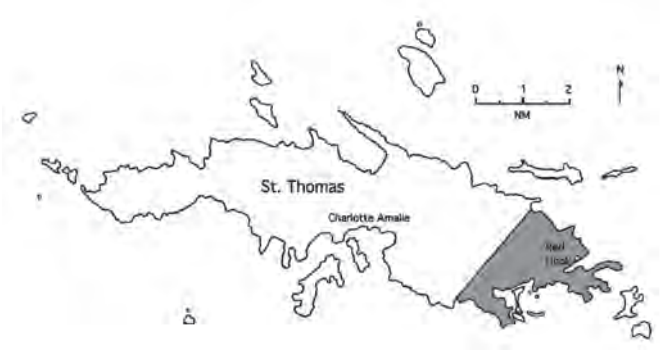
The VI tree boa is easily identified within its entire range, as it is the only native snake with blotches. The body in adults is a light brown, with chestnut blotches edged in black. A newly shed boa will have a blue-purple iridescence as well. The juveniles are a light grey with black blotches, and change to the adult coloration as they mature.

Classification

The VI tree boa is a reptile, like all snakes. It belongs to the family Boidae, in the order Squamata, suborder Serpentes. All boas are constrictors; they suffocate their prey by squeezing it and are not venomous.

Distribution & Habitat

Tree boas are found on the east end of St. Thomas and on a few offshore cays. They generally live in xeric (dry) habitat, which is characterized by poor rocky soils, in scrub-woodland or subtropical dry forest. Although the VI Tree boa has been found on Virgin Gorda, Tortola, and other low profile cays on the Puerto Rico Bank none have been found on St. John.



Location of VI Tree boa habitat on the east end of St. Thomas, USVI.

Diet

Anoles are the preferred food item for the tree boa, although they may also eat hatchling iguanas, nestling birds, or mice. From limited observations of snakes hunting they seem to glide along tree branches looking for sleeping lizards. The lizards and other prey are constricted before being swallowed headfirst and whole.

Reproduction

The VI tree boa, like most boas, is viviparous. There is a primitive placental attachment from the mother to the young. Gravid adult females thermoregulate during gestation, or pregnancy, which lasts about 150 days. The young are born alive in litters of 2-10 depending on the size of the mother. They usually produce young biennially, or every other year, but if food is scarce it may only be every third or fourth year. The young are usually born in late August through October. Baby tree boas are self-sufficient at birth and must hunt food successfully within three weeks if they are to stay alive. There is no maternal care.

Status in the VI

To help ensure the long-term survival of the VI tree boa, the Division of Fish and Wildlife has reintroduced this species to offshore cays that are free of rats and mongooses by relocating boas brought in by the public and releasing captive born animals from the Toledo Zoo.

In the absence of these predators, the tree boa has the potential to achieve high population densities, sometimes greater than 50 snakes per acre. A recent survey of the VI tree boa population has determined that the snakes are successfully breeding and thriving on some of the offshore cays.

What you can do to HELP

1. Please call the Division of Fish and Wildlife, 340-775-6762 St. Thomas if you see any VI tree boas in danger of being injured or killed.
2. Leave tree boas alone if they are not in danger. They are not venomous and they pose no threat to humans. The boa is nocturnal and hides whenever there are lights shining. It is illegal to capture them and they do not make good pets.
3. Reduce the amount of pesticides and chemicals used to control pests. This will help the VI tree boa.
4. If you find a VI tree boa in danger, for example in the middle of a construction site, or a dead boa, please place it in a container (so that if it is alive it can breathe), and bring it to the Division of Fish and Wildlife at Red Hook.
5. Remember, it is illegal to take, catch, possess, injure, harass, or kill any indigenous or endangered species. The only exceptions are for people holding valid permits from the Division of Fish and Wildlife.
7. For more information on this and other animals in the Virgin Islands please visit out website at: www.vifishandwildlife.com

Written by William Coles and Peter Tolson
This publication was reprinted with funds from The State Wildlife Grant Program.
FOR MORE INFORMATION ON OUR NATIVE ANIMALS CONTACT DIVISION OF FISH AND WILDLIFE
6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

U.S.V.I. Factsheet #02

Virgin Islands Amphisbaena

Amphisbaena fenestrata

Classification

Kingdom	Animalia
Phylum	Chordata
Subphylum	Vertebrata
Class	Reptilia
Order	Squamata
Suborder	Amphisbaenia
Family	Amphisbaenidae
Genus	*Amphisbaena*
species	*fenestrata*

Identification Characteristics

- Tail Spine: None; tail tip pointed like head
- Color: Uniform grey or pinkish above and below
- Eyes: Greatly Reduced
- Head shape: Pointed
- Body: Cylindrical with square-shaped scales

Description

The Virgin Islands Amphisbaena belongs to a unique suborder of reptiles found mostly in Africa, South America, and the Caribbean. Neither a lizard nor a snake, amphisbaenians superficially resemble primitive snakes and legless lizards. There are four families of amphisbaenians with 158 species world-wide. Only two genera, *Amphisbaena* and *Cadea*, are present in the Caribbean.

Amphisbaenians are elongated with a short tail that ends abruptly, resembling the head. The head is stout and pointed, with no neck. The skull is made of solid bone, an adaptation to a burrowing lifestyle. All limbless species have remnants of the pelvic and shoulder girdles. The skin of amphisbaenians is loosely attached to the body, such that when the reptile moves, generally in an accordion-like motion, the skin appears to move and drag the body along behind. Most species are less than 6 inches long.

The Virgin Islands Amphisbaena is around 6 – 8 inches long (15-25 cm) and about 1 cm (3/8 inch) in diameter. Their body is grey or pinkish, with transverse square-shaped scales. The head is pointed and the eyes are reduced to small spots under the skin that are only able to discern light and dark. At first glance, they look very similar to earthworms!

Distribution & Habitat

The Virgin Islands Amphisbaena is found on all three main islands, although it has not been recorded on any of the smaller islands. They are entirely subterranean, but can be found underneath rocks, logs, and surface debris. They

are more frequently encountered in moist habitats in higher elevations, but have also been observed in low lying coastal areas. Croix they have been found in drier areas. Gardeners on occasion unearth them while digging.

Diet

Amphisbaenians are carnivorous, and can tear chunks out of larger prey with powerful, interlocking teeth. Their diet consists of other underground organisms, such as earthworms, ant and termite pupae, and beetle pupae. When handled, they will open their mouths to bite; although they have sharp teeth and strong jaws, they are unable to inflict any damage to humans. They are not venomous.

Reproduction

Most species of amphisbaenians lay eggs, although some species are known to be live-bearers. The reproduction of the VI amphisbaena is unknown.

Status in the VI

The ecology and general biology of amphisbaenians in the U.S. Virgin Islands is unknown. The little we do know is from anecdotal evidence collected by individuals over the years. What we do know is that they are not very abundant because very few people have seen them. Those who have are mainly gardeners and farmers or others who spend time working with soil. They may also be seen by homeowners with cats, as the cats may bring them into the house. They are frequently confused with earthworms because they are similarly shaped and colored.

Myths

Because of the behavior and external morphology of amphisbaenians (both ends look like heads!), myths were created about them. The Greeks considered the amphisbaena a serpent with two heads and glowing eyes. Other myths about them include:

- Ff cut in half, both halves will rejoin.
- If the heads hold each other, the amphisbaena can roll along like a hoop.
- Wearing a live amphisbaena is said to help in pregnancy.
- Wearing a dead one will help rheumatism.

NONE OF THESE ARE TRUE!

What you can do to HELP

1. Amphisbaenians are not venomous and are very valuable to us in the tropics. They eat soft bodied invertebrates (including termites) and other insects that we consider pests.
2. Amphisbaenians are extremely sensitive to dry air and quickly die when removed from moist soil. They also need to eat regularly, and unless they are fed termites or other small soft-bodied invertebrates they will die. They do not make good pets.
3. Reducing the amount of pesticides and chemicals we use to control pests will help the amphisbaenians.
4. Please, if possible let them take care of themselves. They have been doing their job for millions of years, and are a great benefit to us.
5. Remember it is illegal to, or attempt to; take, catch, possess, injure, harass, or kill any indigenous species. The only exceptions are for people holding valid permits from the Division of Fish and Wildlife
7. For more information on this and other animals in the Virgin Islands please visit out website at: www.vifishandwildlife.com

Written by Renata Platenberg and William Coles
This publication was reprinted with funds from The State Wildlife Grant Program.

FOR MORE INFORMATION ON OUR NATIVE ANIMALS CONTACT

DIVISION OF FISH AND WILDLIFE
6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

Virgin Islands Blind Snake

Typhlops richardii

Classification

Kingdom	Animalia
Phylum	Chordata
Subphylum	Vertebrata
Class	Reptilia
Order	Squamata
Suborder	Ophidia (Serpentes)
Family	Typhlopidae
Genus	*Typhlops*
species	*richardii*

Identification Characteristics

- Tail Spine — Present
- Color distribution: — bicolor: Grey/Brown above and cream below
- Eyes — Greatly Reduced
- Head shape: — Rounded or Weakly pointed
- Body — Cylindrical, with smooth, close-set scales

Description

The animals in the genus *Typhlops* are generally known as blind snakes. Many snakes of this genus inhabit the Greater Antilles, the Bahamas, and some of the Lesser Antilles. Their bodies are almost perfectly cylindrical, and their scales are small, smooth, and tightly set, all of these being adaptations to a subterranean existence. They lack the enlarged ventral scales seen in other snakes. They are grey or brown on the dorsal side and a creamy grey ventrally. Their eyes are reduced to tiny dark spots under the skin, an additional adaptation to their subterranean life, and they are only able to distinguish between light and dark. Their head is slightly flattened and round. The tail ends in a sharp point, which can inflict a startling but totally harmless prick on any hand that holds them. Like all snakes in the U.S. Virgin Islands, the blind snake is not venomous.

Distribution & Habitat

Blind snakes may be found throughout the Virgin Islands. On St. Thomas they are fairly common in moist areas, although they are also found in drier coastal habitats. In St. Croix they have been found in drier areas. They have occasionally been seen on cement walkways and streets. They are commonly confused with worms and may be more common than the average gardener is aware.

The most obvious way to distinguish between the blind snake and a worm is to look for the grooves that encircle the worm's body. These are not present on the blind snake. Blind snakes are smooth and cylindrically shaped with

small scales, visible to those with very good eyesight. When threatened above ground the blind snake will coil up with its head protected by the coils and the tail exposed. It will lash out with its tail, which may have a white tip on the end. In contrast, worms will coil themselves into a sticky writhing ball.

Diet

In contrast to most other snakes, the blind snake doesn't feed on large prey. It is specialized to feed on ant or termite pupae, larvae, eggs, and occasionally adults. The blind snake lives closely associated with its prey, under termite mounds, rocks, and fallen logs, and it "swims" easily into loose soil when it is disturbed. The snake feeds on the bodily fluids of termites and ants. The snake crushes the prey which releases the body juices into its mouth, which it swallows. The exoskeleton is regurgitated (spat up).

Reproduction

The blind snake lays soft shelled eggs like other reptiles. They are likely to deposit their eggs in protected areas, where the young will hatch and quickly be able to find food. The reproduction of the blind snake has not been studied. We do not know the length of time it takes for the eggs to hatch, or the numbers of eggs laid. The reproductive biology of the VI blind snake is unknown.

Status in the VI

The ecology and general biology of blind snakes in the U.S. Virgin Islands is also unknown. The little we do know is from anecdotal evidence collected by individuals over the years. They seem to be fairly common and widespread across St. Thomas, St. John, and St. Croix, and have been recorded on several of the uninhabited cays. Little else is known about them because of their underground existence. Those who encounter them are mainly gardeners and farmers or others who spend time working with soil. They are also seen by homeowners with cats. The cats may bring these snakes into the house. Blind snakes are frequently confused with earthworms because they are similarly shaped and colored.

What you can do to HELP

1. Blind snakes are not venomous and are very valuable to us in the tropics. They eat soft bodied invertebrates (primarily termites) and other insects that we consider pests.
2. Blind snakes need to eat regularly, and unless they are fed termites or other small soft-bodied invertebrates they will die. They do not make good pets.
3. Reducing the amount of pesticides and chemicals we use to control pests will help the blind snakes.
4. Please, if possible let them take care of themselves. They have been doing their job for millions of years, and are a great benefit to us.
5. Remember it is illegal to, or attempt to; take, catch, possess, injure, harass, or kill any indigenous species. The only exceptions are for people holding valid permits from the Division of Fish and Wildlife
7. For more information on this and other animals in the Virgin Islands please visit out website at:

   www.vifishandwildlife.com

Written by William Coles and Renata Platenberg
This publication was reprinted with funds from The State Wildlife Grant Program.

FOR MORE INFORMATION ON OUR NATIVE ANIMALS CONTACT

DIVISION OF FISH AND WILDLIFE

6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

U.S.V.I. Factsheet #04

St. Croix Ground Lizard

Ameiva polops

Taxonomy

Kingdom	-	Anamalia
Phylum	-	Chordata
Subphylum	-	Vertebrata
Class	-	Reptilia
Order	-	Squamata
Suborder	-	Autarchoglossa
Family	-	Teiidae
Genus	-	*Ameiva*
Species	-	*polops*

IDENTIFICATION CHARACTERISTICS

- Dorsal stripes are present
- Ringed tail
- Tail and belly color is bluish.

The St. Croix Ground Lizard (*Ameiva polops*) is a small species of *Ameiva*. It has parallel longitudinal black, white, and light-brown stripes along the body. The belly is light gray with lateral blue margins. The undersides of the legs, throat, and chest are pinkish. The tail has alternating rings of blue and black. The top of the head is a uniform brown color. The lizard is most readily identified by the blue color to the tail and when disturbed it does not climb, unlike similar looking anoles. The ground lizard when disturbed will seek shelter in burrows, under leaf litter, brush, rocks or wood.

The St. Croix Ground lizard is one of the most endangered species in the Virgin Islands. It was thought to be extinct on St. Croix during the early 20th century, but in the late 1960's a remnant population was observed on the beach north of Frederiksted. The Department of the Interior included the St. Croix ground lizard on their list of rare and endangered species in 1968. On June 3, 1977, the St. Croix ground lizard was designated as endangered throughout its entire range.

Historically the lizard has been recorded only on St. Croix, U.S. Virgin Islands and its offshore islands and cays. Currently only Green Cay and Protestant Cay off the north coast and the manmade Ruth Cay off the south shore of St. Croix are sites where this lizard is found. Both Green and Protestant Cays have been designated as Critical Habitat for the St. Croix Ground Lizard, Ruth Cay is proposed to be listed as critical habitat. Today the population probably does not exceed 400 individuals on Green Cay, 30 on Protestant Cay, and 35+ on Ruth Cay. This places the survival of this species of lizard in a very precarious position.

There are 19 species of *Ameiva*, in tropical America and the Caribbean. The closest species to the St. Croix ground lizard is the *Ameiva exsul* found on the Puerto Rico bank. However it is more closely related to *Ameiva taeniura* which is found on Hispaniola.

Very little is known of the life history and behavior of the ground lizard. What we do know is that it is a heliothermic temperature regulator. This means that they are active during the middle portion of the day. On cooler and cloudy days the ground lizard tends to stay within its burrow. This lizard prefers partly exposed and open canopied areas with leaf or tidal litter, loose substrate, and crab burrows. They actively prowl, root and dig for prey. They are opportunistic hunters and will take virtually any prey items they can find. They are known to eat a variety of amphipods, moths, ants, small hermit crabs, and the hatchlings and eggs of anoles.

There is strong evidence that correlates the decline of *A. polops* with the introduction of the small Indian mongoose (*Herpestes auropunctatus*) to the Virgin Islands. The mongoose was introduced in 1884, at which time the decline of the ground lizard probably increased. The extensive development of coastal areas in St. Croix may have also contributed to the decline of this species. An extensive mongoose eradication program has taken place on Buck Island National Park. In 1968 it was believed that mongoose were eradicated and 16 *Ameiva* were introduced to the island. Two years later, 24 Ameiva were counted and they had expanded their range inshore and along the beach front from where they were released. This suggested that the introduction, or reintroduction, of *Ameiva* to Buck Island was successful. Unfortunately, the mongoose were not eradicated and when the trapping program stopped the population once again boomed. The ground lizard had again been extirpated from Buck Island by 1974. Part of the current recovery plan for the Ground lizard requires the National Park service to eradicate mongoose from Buck Island to allow the reintroduction of the lizard. Recently, DFW has coordinated a, first time ever, cooperative agreement between USFWS and a private Hotel (Hotel on the Cay) for the conservation and management of an endangered species. Currently students from several middle and high schools are helping restore and maintain the lizard's critical habitat on Protestant Cay.

What you can do to HELP

1. Please call the Division of Fish and Wildlife, 340-775-6762 St. Thomas/ St. John and 340-772-1955 St. Croix, if you see any St. Croix Ground Lizards.
2. The Saint Croix Ground Lizard is very valuable to us. They eat invertebrates and other insects that we consider pests. Several *Ameiva* have been observed hunting and eating cockroaches.
3. The only public location you can view the St. Croix Ground Lizard is Protestant Cay in the Christiansted Harbor. With help from local schools we hope to restore and maintain this lizard's critical habitat.
4. Please, if possible let them take care of themselves. They have been doing their job for millions of years and are a great benefit to us.
5. If we take care of this lizard, we may be able to attract more visitors to St. Croix. They could be a tourist attraction!
6. Remember it is illegal to, or attempt to; take, catch, possess, injure, harass, or kill any indigenous species. The only exceptions are for people holding valid permits from the Division of Fish and Wildlife.
7. For more information on this and other animals in the Virgin Islands please visit out website at: **www.vifishandwildlife.com**

Written by William Coles and Doug McNair
This publication was reprinted with funds from The State Wildlife Grant Program.

FOR MORE INFORMATION ON OUR NATIVE ANIMALS CONTACT

DIVISION OF FISH AND WILDLIFE

6291 ESTATE NAZARETH, 101,
ST. THMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

White Tailed Deer

Odocoileus virginianus

Classification

Kingdom	Animalia
Phylum	Chordata
Subphylum	Vertebrata
Class	Mammalia
Order	Artiodactyla
Family	Cervidae
Genus	*Odocoileus*
species	*virginianus*

Identification Characteristics

- Only deer in the USVI
- Small two toed prints
- Skull is similar to a cow, but much smaller.

General Description

The White-tailed Deer, *Odocoileus virginianus*, gets its name from the underside of its tail, which is bright white and exposed when it lifts its tail high in the air while running. The deer's body color varies geographically and seasonally, but is usually a soft reddish tan or yellowish brown with white undersides. The sexes are generally alike in color although older bucks (males) may become darker. The bucks grow antlers that are shed annually. The smaller fawns are speckled with white.

White-tailed deer vary greatly in size, averaging larger and heavier in northern latitudes where the reduced body surface to volume ratio helps prevent heat loss. Their weight varies from 300 pounds in the north to 50 pounds in the Florida Keys. The height and width range from 24 to 40 inches in height and 48 to 95 inches in length. Our local bucks weigh about 90 to 110 pounds and the smaller does weigh 70 to 90 pounds.

Distribution

RANGE – White-tailed Deer range from eastern North America southward through Central America to northern South America. They are thought to have been introduced to the Virgin Islands from the southern USA in 1790 or possibly earlier. The deer are noted for having a small home range, which has prevented them from becoming exterminated in many places. In the Northern Virgin Islands, deer swim among the smaller offshore cays and the main islands of St. Thomas and St. John. Their preferred habitat comprises rolling, semiopen country interspersed with heavier woodlands into which they flee from enemies. They readily adapt to areas near human habitation and activity, and quickly learn to distinguish the sounds and signals of friends and foes. Although the large eyes of a deer are adapted to twilight, their sense of hearing and smell are even more acute.

Natural History

FOOD/DIET- White tailed deer browse mainly on the leaves, twigs and fruits of vegetables, herbs, bushes and trees. Foraging usually occurs during the twilight of early morning or late evening. Grass is eaten only when there is a scarcity of other foods. Except during periods of severe drought, deer seldom face a shortage of food and can tolerate dry habitats. Deer can be very destructive to cultivated plants. Management measures may be required at times to reduce the damage incurred on private property.

Small amounts of salt are essential for development and growth, and are readily obtained from salt ponds and "licks."

REPRODUCTION - In temperate climates reproduction is highly seasonal. Mating is timed so that the fawns are born in early summer when the food supply is optimal. In the tropics, reproduction is less seasonal and tied to patterns of precipitation. Although fawns have been observed every month of the year in St. Croix, the rutting (mating) season generally begins in May and June, after the wet season commences, and runs through September. The gestation period of the doe runs from 205 to 212 days, so fawning commences in November and continues into February. Yearling and two-year-old does having their first young generally have only one fawn. Providing adequate food availability, a mature doe (three years old) has a pair of fawns every year. Food availability is the driving factor that decides how many offspring will be born in the following year.

Deer do not make nests. When a doe is ready to give birth, she chooses a safe place in heavy brush, high grass or a cane field where the fawns remain until they are well developed. Unlike sheep or goats, which huddle together, the fawns are always separated by a short distance. Fawns weigh about 3 to 3-1/2 pounds at birth. They are generally a brightly colored bay or reddish yellow, and spotted with white, which fades away at about four months. Combined with having very little or no scent, they are well hidden from possible predators. Mothers rarely stray far from the fawns, so **please do not "rescue" abandoned fawns**. The mother is usually nearby and is waiting until it is safe to come back. The mother visits them at least half a dozen times a day. Usually she rests some distance from them, apparently to reduce the risk of saturating them with her own body odor, yet close enough to hear any squeak they might make. At night she may rest with them to keep them warm.

Deer may be extremely prolific. When protected within a suitable habitat, there can be a rapid increase in population. Under the most favorable circumstances, deer populations may increase by as much as 25 to 30 percent of their number per year.

Only the males exhibit antlers, which are shed annually, during September-November. New antlers are soft and sensitive, and are susceptible to damage. When antlers mature, at about six months, they are covered with a hairy skin referred to as "velvet." To polish the antlers for fighting and rutting, the velvet is scraped off against small trees which are often damaged.

THREATS – Deer have no natural predators in the Virgin Islands, however they are sometimes hunted by humans, especially in the past (hunting deer is now illegal); attacked by dogs; and are occasionally struck by vehicles. They can host ticks that carry cattle fever.

Deer hooves and antlers can be very sharp and cause injury to others. They are also big enough to cause serious damage to you or your car if you accidentally hit one. Please drive with caution when in areas with a lot of deer especially during the fall rutting season.

What you can do to HELP

1. **DO NOT "RESCUE" ABANDONED FAWNS**. The mother is usually nearby and is merely waiting until it is safe to come back.
2. Deer hooves and antlers can be very sharp and can seriously injure to you if you try and assist an injured animal. Please call your local animal shelter for assistance.
3. Remember it is illegal to take, catch, possess, injure, harass, or kill any indigenous species The only exceptions are for people holding valid permits from the Division of Fish and Wildlife. It is currently illegal to hunt deer in the Virgin Islands.
4. For more information on this and other animals in the Virgin Islands, please visit our website at: www.vifishandwildlife.com

By Donna Griffin, William Coles, and Floyd Hayes
This publication was reprinted with funds from The State Wildlife Grant Program.

FOR MORE INFORMATION ON OUR NATIVE ANIMALS CONTACT

DIVISION OF FISH AND WILDLIFE

6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

U.S.V.I. Fact Sheet #06

American Kestrel and Nest Box

Falco sparverius

Male kestrel (right) feeding lizard to female (left).

Taxonomy

Kingdom	Animalia
Phylum	Chordata
Subphylum	Vertebrata
Class	Aves
Subclass	Neornithes
Order	Falconiformes
Family	Falconidae
Genus	*Falco*
Species	*sparverius*
Subspecies (Caribbean)	*caribbaearum*

Identification Characteristics

◆ Length	19 to 21 cm
◆ Wingspan	50 to 60 cm
◆ Weight (males)	102 to 120 gm
◆ Weight (females)	126 to 166 gm
◆ Facial bars	two
◆ Color of tail & back	rusty reddish
◆ Tail pattern	black band at tip

Description

The American kestrel, *Falco sparverius*, is a common falcon in the Virgin Islands. Although frequently called a "sparrow" hawk - in reference to its small size - these kestrels eat more than sparrows. Locally, the American Kestrel is also known as the killy-killy, probably because of the shrieking sounds they make.

The American Kestrel is the smallest raptor in our area. The size is comparable to a dove. The feathers are dark brown with black and white banding on the lateral feathers. The head has a distinctive facial pattern with two black bars, one beneath the eye like a black moustache and the other toward the back of the head. Males are much more brightly colored than females, a pattern known as sexual dichromatism. Feathers on the back and tail of males are splashed vivid rufous, and feathers on the shoulders are slate blue. Females wear more subdued colors. Their wings are rusty brown like their back and their tail is rusty reddish with a black band at the end.

Distribution & Habitat

The American Kestrel permanently inhabits (without seasonal migration) North and South America from near the tree line in Alaska and Canada, south to Tierra del Fuego. The bird can also be found in the West Indies, the Juan Fernandez Islands and Chile. It is largely absent from heavily forested areas, including Amazonia.

The American Kestrel is a secondary cavity nester meaning it does not excavate its own nest. It nests in tree cavities, woodpecker holes, crevices of buildings, holes in banks, nest boxes or, rarely, old nests of other birds. It is highly adaptable behaviorally and lives just about everywhere, as long as there is some open ground for hunting and conspicuous places on which to perch (e.g., telephone wires).

It is often seen sitting on exposed wires or perches while looking for its prey. American kestrels usually mate for life. Bird lovers adore them for their lightheartedness and playfulness. Unfortunately American Kestrel populations have declined greatly in the Virgin Islands due to the loss of nesting habitat (trees) from both development and hurricanes.

Diet

American kestrels hunt throughout the day, but may be more active in the early morning and evening. In the USVI, they eat mostly lizards, but are known to eat large insects (mainly grasshoppers), small mammals (mice and sparrow-sized birds) and amphibians. The American Kestrel has a large economic benefit to the islands – it helps control some of the animals we consider a nuisance such as mice and insects.

Reproduction

The breeding season in the USVI usually occurs from February through July. Double-clutching, or laying a second set of eggs is common.

For up to six weeks before egg laying, females are promiscuous, mating with two or three males. Once a female settles with one mate, the pair mate frequently until egg laying. Three to seven eggs are laid (usually 2 to 4 in the VI) over a period of 2 or 3 days. Eggs are white, cream or pale pink with an average size of 35 x 29 mm.

The female does most of the incubation, but males have been known to occasionally incubate. Both sexes have brood patches. Incubation lasts 29 – 30 days and hatched chicks are non-competitive. Once chicks have hatched, females beg food from males. The female, in turn, feeds the young for the first 20 days. After that period, chicks beg for food from males and feed themselves. After 30 days, chicks leave the nest. The family remains as a unit for some time. The survival rate of chicks is about 50% under natural conditions, but it is usually higher under better conditions (e.g., human-provided nesting boxes).

Kestrel Nest Boxes

The availability of nesting places (tree-cavities) may be biggest factor limiting populations of American kestrels. These miniature falcons usually do not build nests of their own but rely on natural sites or those created by other birds or animals, including man made nest boxes. When built properly, the kestrels will use their bird homes for life. Their numbers may be increased by the installation of nesting boxes. However, whether or not additional nesting boxes are introduced, the bird is common.

While many people enjoy having kestrels in the vicinity of their house, occasionally kestrel parents become aggressive towards humans. This is a protective response that generally occurs when older chicks get ready to fly. This aggressive behavior may result in human-kestrel conflicts. Remember it is illegal to harass these birds. Should this occur, please call the Division of Fish and Wildlife. Because kestrels reuse their nest sites, the DFW can work with the homeowner to reduce these conflicts in the future. We have a very limited number of nest boxes that we can install on an as-needed basis for people with serious problems.

For those interested in constructing their own kestrel nest box, a variety of nest box plans are available on the internet:
www.birdwatching-bliss.com/american-kestrel-nest-box.html;
www.npwrc.usgs.gov/resource/birds/kestrel/nestbox.htm
www.nectkestrels.com

Regardless of what plans you use, here are some suggestions:

1. Use a durable wood that weathers well and that is termite resistant. Rough-cut cypress, redwood or cedar are naturally rot and termite resistant and need no further treatment. If the wood is smooth, scratch the inside of the box (scoring) below the opening to allow the young to climb to the nest hole to leave the nest.
2. Never paint or stain the inside of the box.
3. Drill two 3/8 inch holes at the top of the sides for ventilation.
4. Drill five 1/4 inch holes in the flood for water drainage.
5. Since kestrels do not carry nesting material into the box, place an inch or two of wood shavings or coarse sawdust on the bottom to prevent eggs from rolling about. Do not use cedar or chemically treated shavings or sawdust because it is harmful to the young.
6. Be aware that bees might move into your box. To reduce the likelihood of bees or wasps occupying the nest box some suggest attaching aluminum foil to the ceiling of the box, coating the ceiling with vaseline, or rubbing the ceiling with bar soap.
7. Place the box on a pole, building or tree at least 15 feet above ground level. The area around and in front of the box should be free of branches and other vegetation to allow a free flight path into the box. The opening should be facing away from prevailing wind.
8. Monitor the box to keep pearly-eyed thrashers from taking up residence. If bees invade your birdhouse, contact a bee-keeper or other professional to remove the colony.
9. Be patient. It may take a year or more for your kestrels to use the nest box.
10. Periodic cleaning of nest material and repairs to the box may be necessary after the nesting season.

For more information on this and other animals in the Virgin Islands please visit our website at:

www.vifishandwildlife.com

By W. Coles and J. Pierce. 2010
This publication was reprinted with funds from the U.S. Fish and Wildlife Service State Wildlife Grant Program.
For more information on our native animals contact:

THE DIVISION OF FISH AND WILDLIFE
6291 ESTATE NAZARETH
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

U.S.V.I. Factsheet #07

Red Footed Tortoise

Geochelone carbonaria

Taxonomy

Kingdom	-	-Anamalia
Phylum-	-	-Chordata
Subphylum	-	-Vertebrata
Class -	-	-Reptilia
Order -	-	-Testudines
Family	-	-Testudinidae
Genus -	-	-*Geochelone*
species -	-	-*carbonaria*

- About 14 inches long
- Red, orange or yellow coloration on legs

The South American red-footed tortoise (***Geochelone carbonaria***) is no newcomer to our islands. The first tortoises probably arrived in the Caribbean hundreds of years ago with Pre-Columbian Indians. It is assumed that these Indians carried the tortoise along as a food source while exploring the islands. Indeed, the red-footed tortoise is still highly prized for its meat and harvested in some areas of the Caribbean to this day. These long-lived tortoises occur on St. Croix, St. Thomas and St. John.

Red-footed tortoises are protected under Appendix II of The Convention on International Trade in Endangered Species (CITES), meaning that this species may not be exported from its home country without a permit. Appendix II animals are not classified as threatened with extinction, but are considered sensitive to this danger if international trade is left unregulated. Although protection under CITES has some positive effects on the survival of this species, CITES regulations cannot protect the red-footed tortoise where it is most in danger, within the boundaries of its home countries.

The carapace of the red-footed tortoise usually grows to about 14 inches long, although a maximum length of 17.75 inches has been recorded. Adult males, at an average of 13.25 inches (30.4 cm) long, are somewhat larger than the females, which average 11.25 inches (28.9 cm) in length. They are sexually mature at a smaller size than the females. Males have a concave plastron (bottom shell) and have a lower, flatter, and a more pronounced hourglass shape to their carapaces than do females. Males also have longer, thicker tails than the females.

The species name for this tortoise, *carbonaria*, refers to the carbon-like color of its dark brown or black carapace. The dark scutes, or carapace sections, have lighter patches of yellow in the centers and around the outside edges of the shell. Although there is a lot of variation between individuals, the legs and head are often colored with patches of red, orange or yellow

They are generally found in drier forest areas, grasslands, and the savanna, however they have been observed in a variety of habitat types, including scrub brush, rain forest and even developed areas and roadsides. They generally roam during the early morning and evening, when it is cooler and during rainy periods. They generally seek shade during the middle of the day to escape from the midday heat.

Red-footed tortoises are primarily herbivorous, scavengers, eating a variety of vegetable and animal matter. Coprophagy (feeding on its own or another species feces) is not

uncommon. In its natural habitat, Red footed tortoise may go for long periods without a direct water source, deriving all necessary moisture from plants. These tortoises are quite fond of hibiscus (flowers and leaves), papaya, bouganvillea, cactus, aloe vera and many other naturally occurring Caribbean plants.

Breeding is synchronized with the onset of the rainy season. The mating ritual of red-footed tortoises involves some very distinctive head movements on the part of the male. He begins by standing side-by-side with another tortoise and moving his head suddenly to one side, then returning it to the middle, in a series of sideways jerking motions.

If the second tortoise is a female, she will not move her head in response. The male will move around to sniff at her tail, to confirm what he already suspects, before mating begins. Experiments have shown that in order for mating to proceed, not only do the movements of the head have to be precise, but also the coloration of the head has to be correct. Perhaps the most usual thing about their breeding behavior is that the male makes a clucking sound during courtship and mating. The clucks sound amazingly like a hen; however, they rise and fall in pitch according to a set pattern.

When the female tortoise is ready to lay, the nest-digging process begins. Nests are preferentially excavated near a wall or some other protective barrier. The tortoise excretes a liquid to moisten the soil as the nest is dug. The nest is dug down to the maximum reach of the hind feet. A female will quite often dig as many as 3 "false" or unused nests before actually laying her eggs.

Once laying commences, additional liquid is excreted. The round or oval, golf ball-sized eggs may then be deposited rapidly or several minutes apart, singly or two at a time. Clutch sizes vary from 2 to 8 eggs, with clutches of 3 to 5 eggs most common. Larger eggs and clutches are generally produced by larger and older females. After laying is completed, the female shovels soil over the nest with her hind legs. Nest excavation, egg laying and covering the nest may take as long as 3 to 4 hours. During the entire egg-laying period the female remains in a what might be described as trance-like state.

The incubation period is generally 105 to 202 days (mean 150) but may be as long as one year. Once hatching commences, it may take 2 days or more to complete, interspersed with frequent rest periods by the hatchlings. After hatching, shell fragments may adhere to the hatchlings' carapace but will eventually fall off. Hatchlings are 1 to 1-1/2 inches long. Although they may appear somewhat mis-happen upon emergence from the shell, the carapace will straighten within the first few days. They do not have any of the toothlike projections on the edges of the carapace, like those found in the yellow-footed tortoises. A pinkish or yellowish sack attached to the hatchling's plastron contains all the nutrients it requires for the first week, during which the hatchling will appear to sleep, or "hibernate," in some protected corner.

What you can do to help

- Reduce the number of chemicals and pesticides you use.
- Remember it is illegal to take, catch, possess, injure harass or kill any indigenous species. The only exceptions are for people holding valid permits from the Division of Fish and Wildlife.
- For more information on this and other animals in the Virgin Islands please visit our website at: www.vifishandwildlife.com

Written by Donna Griffin and William Coles
This publication was reprinted with funds from The State Wildlife Grant Program.

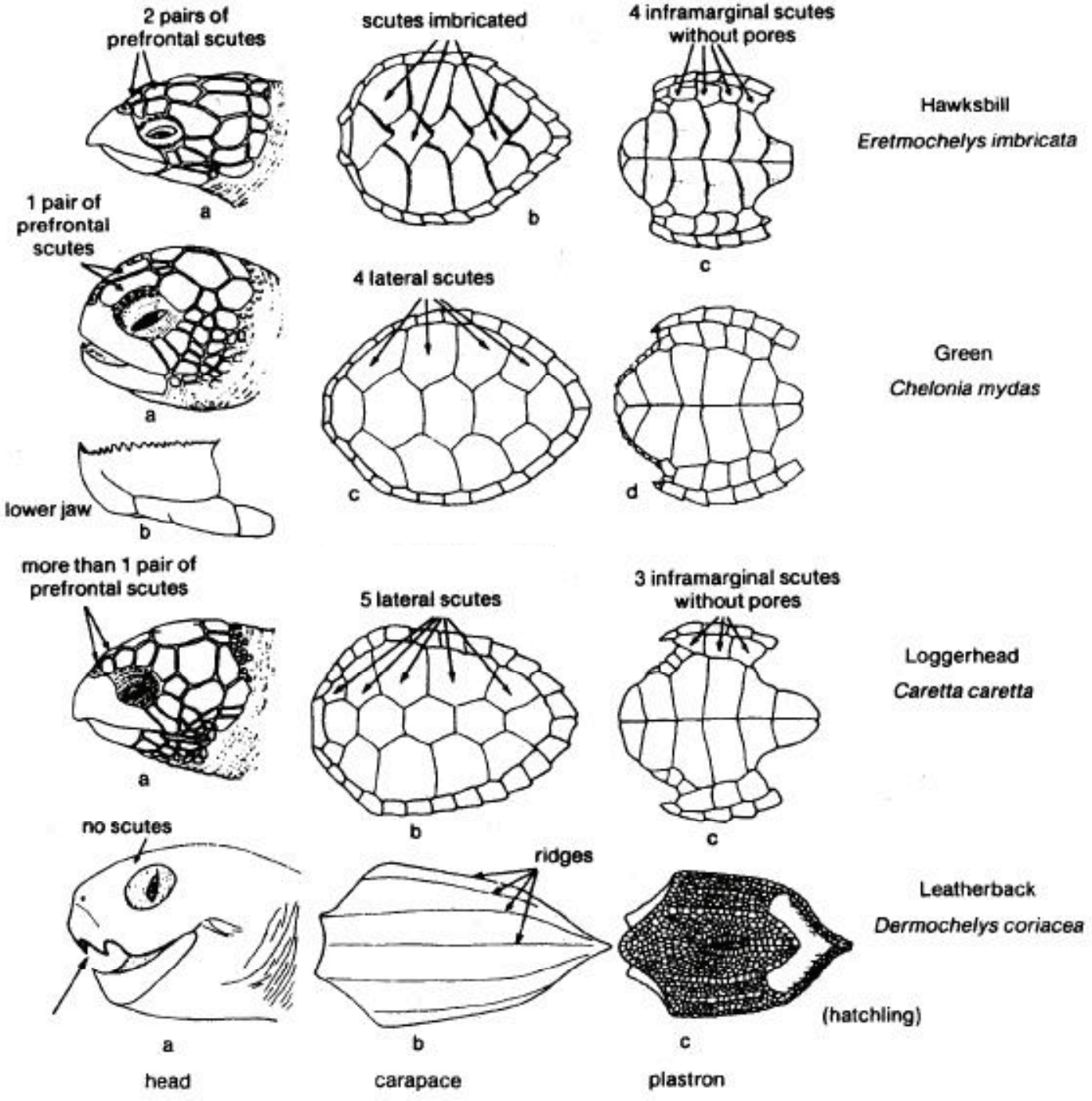
FOR MORE INFORMATION ON OUR NATIVE ANIMALS CONTACT

DIVISION OF FISH AND WILDLIFE

6291 ESTATE NAZARETH, 101,
ST. THMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

Sea Turtle Identification

PICTURE GUIDE TO SPECIES OCCURRING IN THE AREA



All sea turtles are reptiles. They spend almost their entire lives swimming in the ocean. The only time they are not in the ocean is when the eggs are developing in the sand on the beach (they leave land after hatching) and when the females return to shore to lay eggs. The quickest way to tell if a turtle is a sea turtle is to look at its legs. All sea turtles have flippers instead of feet. If the turtle has feet with claws or nails then it is not a sea turtle.

All sea turtles breathe air and need to come to land to lay eggs. They are cold blooded like all other reptiles, which is why they are found in warm ocean waters. All the hard-shelled turtles have a body temperature that is the same as the water in which they live. The Leatherback is the only soft-shelled sea turtle and is the only turtle that is found in colder waters. Because its body is so big and because it has special counter current heat exchangers in its flippers, it can maintain a body temperature higher than the surrounding water.

Table of basic biological parameters for sea turtles found nesting in the territory.

	Hawksbill	Green	Leatherback	Loggerhead
How big do they get?	34 inches 214 lbs	42 inches 485 lbs	72 inches 1,864 lbs	48 inches 608 lbs
Size at hatching	1.7 inches 0.5 oz	2 inches 0.8 oz.	2.4 inches 1.5 oz.	1.8 inches 0.6 oz.
Carapace	Hard	Hard	Soft	Hard

Four species of sea turtles exist in the U.S.V.I. Hawksbill, Green, Loggerhead and Leatherback. Hawksbills are the smallest, they have a hawk like beak, and their shell is elongated and slightly tear dropped in shape. The Green turtle's shell is much rounder and the shape of the nose is much blunter. Loggerheads are very uncommon in the Territory, but several have recently been seen. They are reddish in color and have a much thicker neck and head than the Hawksbill and Green turtles. They also have five lateral scutes, instead of the four seen in the others. Leatherbacks are the largest of the turtles and instead of having plate like scutes on their shell they have seven ridges that extend the length of the body. The shell is not hard like the other turtles it is made up of a thick fatty fibrous issue.

All species of sea turtles are protected under both Federal and Territorial laws.

What you can do to help

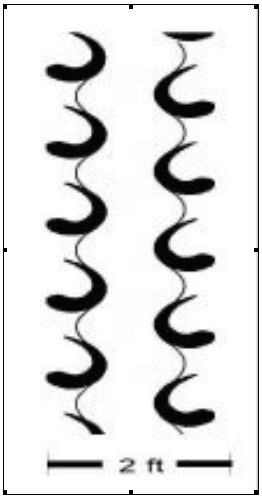
1. If you see any turtle nesting or hatching events, please write down the date, time and location you saw the turtles then call the Division of Fish and Wildlife at 340-772-1955 (on St. Croix) or 340-775-6762 (on St. Thomas/St. John) to report the event.
2. Please make an extra effort to keep plastic out of the marine environment.
3. Turtles, especially hatchlings, will head toward the brightest light source on the beach. This used to be star and moon light shining on the ocean, but today it may be street or building lights. If you have security or safety lights near the beach use low intensity sodium vapor lights and build shades around the light so the beach is not directly illuminated. If possible turn these lights off when hatchlings are emerging.
4. Do not take flash pictures or shine lights directly toward the turtles - it will disorient them. Like us, turtle eyes will maintain the ghost image of the flash, only the hatchlings see this as a bright area and will crawl toward it.
5. If you see a nesting turtle do not crowd around it and do not harass it. You may observe nesting from a distance. You need to stay behind the front flippers of the turtle so you don't disturb her. No flash photography.
6. If you see someone harassing a sea turtle or poaching a nest, call the local police (911) or the local Division of Environmental Enforcement STT 340-774-3320, STX 340-773-5774.
7. For more information on this and other animals in the Virgin Islands please visit our web site at: www.vifishandwildlife.com

Written by W. Coles
This publication was reprinted with funds from The State Wildlife Grant Program.
FOR MORE INFORMATION ON OUR NATIVE ANIMALS CONTACT

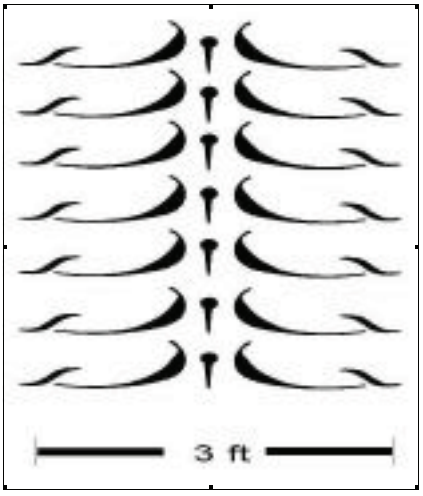
DIVISION OF FISH AND WILDLIFE
6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

Sea Turtle Nesting

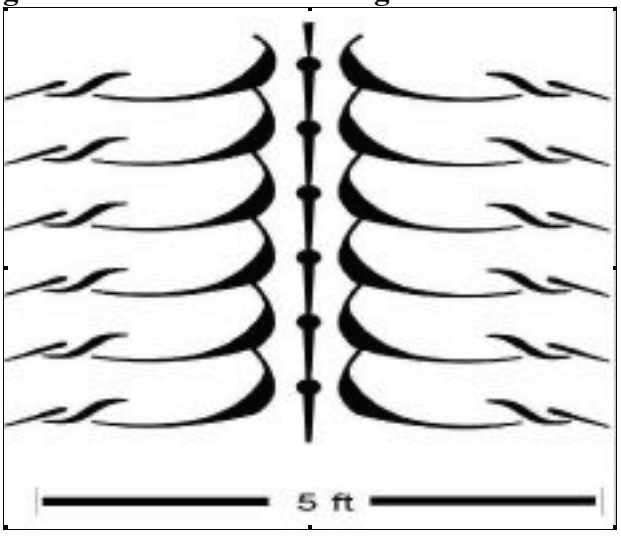
Tracks of sea turtles that commonly nest in the U.S. Virgin Islands and surrounding islands.



Hawksbill Tracks



Green Tracks



Leatherback Tracks

All sea turtles lay their eggs in nests that they dig on sandy beaches. The nests are dug with their rear flippers. The depth of the nest is dependent on the length of the rear flippers. When the female turtle can no longer reach the sand at the bottom of the nest with its flippers, the nest is deep enough. The turtle then begins to drop the eggs into the nest. The eggs are soft shelled so they do not break when they drop on top of each other.

When the female has laid all her eggs, she covers the nest with sand and returns to the sea. Turtles do not exhibit any parental care. They may never see their hatchlings.

The temperature at which the eggs are incubated determines the sex of sea turtles. Warmer temperatures mean more females hatch than males. Colder temperatures mean more males hatch than females.

The hatchlings emerge by breaking open the shell and "swimming" up through the sand covering the nest. They find their own way to the beach and into the water. The hatchlings instinctively head for areas with brighter light, which once was the open ocean. On beaches with no artificial lights or towns in the distance, star and moon light shining down and reflecting off the waters surface is brighter than the inland vegetated areas. Today, lights shining on the beaches guide hatchlings inland where they are run over by cars, eaten by cats, dogs and pigs as well as other animals looking for easy food. It is very important that the hatchlings make it to the water as quickly as possible. So please turn off lights that shine on and near the beach.

Sea turtles nest throughout the US Virgin Islands. They have been recorded nesting on nearly every sandy beach in the territory.

Leatherback turtles, the biggest of the VI turtles, nest in the middle of large sandy beaches, that are not blocked by reefs and have deep water nearby. Leatherback tracks are distinctive because of their large size. Tracks may be 5 to 7 feet wide. They actively disguise the location of their nests often making the beach look like a bulldozer had been driving on it.

Green turtle nests are found high up on the beach near the vegetation line. They frequently

dig nests in the short coastal beach vegetation. Their nests characteristically are large cone shaped pits about 1 to 1.5 feet deep.

Hawksbills nest far up on the beach. They generally nest underneath the branches of coastal trees and scrub. The Hawksbill is also the only turtle in the VI that uses an alternating gait (the same way a dog or cat walks) when on land. All other sea turtles pull-push themselves along the sand (all 4 flippers move at the same time). This can be used to determine if a turtle track belongs to a Hawksbill or Green turtle.

Table of basic nesting and reproductive parameters for sea turtles found nesting in the territory.

	Hawksbill	Green	Leatherback	Loggerhead
# Eggs	140	136	116	100-126
Days to hatch	60 ave.*	64 ave. (54-88)	63 ave. (55-75)	62 ave. (53-68)
Hatching Success	80%	~80%	55-75%	55-73%
Years between Nesting	2-3	2-4	2-3	2-3
Inter Nesting Interval	14 days	13 days	10 days	14 days
Nests per season	4.5 ave. (12 max)	2.5 ave. (7 max)	6 ave. (11 max)	4.1 ave. (7 max)

- ave. = average

What you can do to help

1. If you see any turtle nesting or hatching events, please write down the date, time and location you saw the turtles then call the Division of Fish and Wildlife at 340-772-1955 (on St. Croix) or 340-775-6762 (on St. Thomas/St. John) to report the event.
2. Hatchlings can crawl to the water themselves. If you see hatchlings making their way into the water, please let them complete the journey themselves.
3. Please make an extra effort to keep plastic out of the marine environment.
4. Turtles, especially hatchlings, will head toward the brightest light source on the beach. This used to be star and moon light shining on the ocean, but today it may be street or building lights. If you have security or safety lights near the beach use low intensity sodium vapor lights and build shades around the light so the beach is not directly illuminated. If possible turn off lights that shine on and toward the beach, when hatchlings are emerging.
5. Do not take flash pictures or shine lights directly toward the turtles - it will disorient them. Like us, turtle eyes will maintain the ghost image of the flash, only the hatchlings see this as a bright area and will crawl toward it.
6. If hatchlings emerge during the day and get caught in vegetation, you can help by keeping them safe from predators and if they are heading inland, guiding them to the waters edge.
7. If you see hatchlings at night in parking lots, roads and other places where they are heading away from the ocean, please gently pick them up and take them to a nearby dark beach and release them at the waters edge.
8. If you see a nesting turtle do not crowd around it and do not harass it. You may observe nesting from a distance by staying behind the front flippers of the turtle. No flash photography.
9. Occasionally turtles will nest during the day. If you see a daytime nesting sea turtle, please call the Division of Fish and Wildlife immediately.
10. If you see someone harassing a sea turtle or poaching a nest, call the local police (911) or the local Division of Environmental Enforcement, STT 340-774-3320, STX 340-773-5774.
11. For more information on this and other animals in the Virgin Islands please visit our web site at: www.vifishandwildlife.com

Written by W. Coles
This publication was reprinted with funds from The State Wildlife Grant Program.
FOR MORE INFORMATION ON OUR NATIVE ANIMALS CONTACT
DIVISION OF FISH AND WILDLIFE
6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

Department of Planning and Natural Resources
Division of Fish and Wildlife
U.S.V.I. Animal Factsheet #10

Long-Spined Sea Urchin

Diadema antillarum

Description

To the casual observer, the long-spined sea urchin, *Diadema antillarum*, appears to be little more than a collection of sharp black spines protruding from the seafloor. And the unwary swimmer will not soon forget a close encounter - the spines can easily penetrate the skin and break off, leaving a painful reminder. Despite this sea urchin's treacherous spines, it is a remarkable marine creature that plays a vital ecological role on the reefs of the U.S. Virgin Islands.

All those spines are attached to a hard shell known as a "test." The urchin's internal organs are located inside. The test of an adult is round, slightly flattened from top to bottom, and about 4 inches (10 cm) in diameter. True to its name, the spines can be very long – over 12 inches (30 cm) – and help defend the urchin against predators. The spines are movable, and urchins will wave its spines in the direction of anything that disturbs it. Among all those spines, and harder to see, are thin tube feet tipped with suckers that grasp the bottom. Urchins use their delicate tube feet and spines to move about, to gather food, and to maintain a firm grip. This enables the urchins to avoid being swept away by currents and surge in shallow wave-exposed waters.

On the underside of the test lies the urchins' mouth. The jaws of the mouth are made from 5 teeth held in a muscular sling. Together these jaws form a five-pointed beak called Aristotle's lantern that is very effective at scraping algae from rocks and other hard surfaces.

Identification

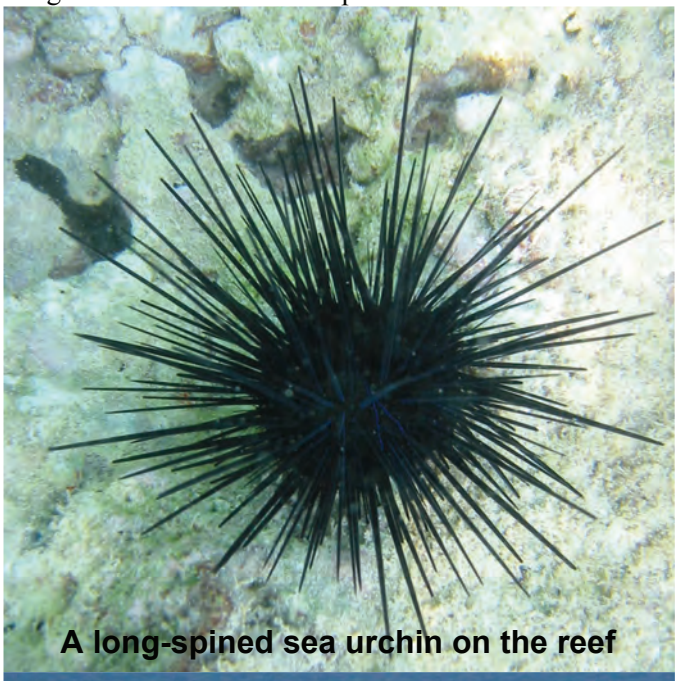
There are 5 different sea urchin species that commonly occur in coastal waters of the U. S. Virgin Islands. The long-spined sea urchin is easily recognized by its long slender spines and by its coloration. Adult long-spined sea urchins are usually completely black, although some adults may have a few gray or white spines. The young have white bands on their black spines.

Common Names

In the U.S.V.I., locals refer to all urchin species as *sea eggs*. The long-spined sea urchin is also known as the black urchin and erizo negro (Spanish).

Classification

Sea urchins are marine animals that belong to the phylum Echinodermata (meaning "spiny skin") – a group that includes sea stars, sea feathers, brittle stars, sea cucumbers and sand dollars. All sea urchins are in the class Echinoidea. Long-spined sea urchins belong to the genus *Diadema* and the species *antillarum*.



A long-spined sea urchin on the reef

The test of a long-spined sea urchin

Distribution & Habitat

Long-spined sea urchins occur throughout most of the tropical Atlantic Ocean. In the Western Atlantic, they range from Florida and Bermuda, southward throughout the Caribbean, to Brazil. In the eastern Atlantic, they occur in the Azores, Cape Verde Islands, Madeira Islands, and also in the Gulf of Guinea (Coastal Africa). They are not found in the Mediterranean Sea.

Long-spined urchins occur in almost all nearshore marine habitats, including rocky areas, coral reefs,

mangroves, sea grass beds, and sand flats. They are most common in shallow waters (usually less than about 30 feet deep) but may also occur in deeper habitats.

Ecology

The long-spined sea urchin is perhaps the single most important herbivore (plant-eater) on Caribbean reefs. These urchins move about grazing rather unselectively upon a variety of different algae. Their feeding has two important consequences. First, urchin grazing reduces the total amount of algae on a reef, similar to a lawnmower keeping the grass short. This enables corals (which compete with algae for space and sunlight) to grow better. Second, when urchins scrape algae from rocks, they create vacant spaces that can then be colonized by the larvae of other marine animals (corals, sponges, gorgonians). This helps to keep the diversity of reef animals high. In the absence of urchin grazing, coral reefs may become overgrown with algae, and the diversity of reef animals may be reduced.

Scientists learned about the important ecological role of the long-spined urchins following a catastrophic die-off. During 1983-84, a disease outbreak struck the wider Caribbean and killed over 93% of the long-spined sea urchins. During the following years, corals decreased and reefs were covered with unprecedented levels of algal growth. Now after almost 20 years, the long-spined urchin appears to be making a recovery on reefs in the U. S. Virgin Islands and elsewhere in the Caribbean. Their comeback bodes well for our reefs.

By their nature, long-spined urchins are gregarious – that is, they occur in dense clusters. It is not uncommon to find groups of more than 100 urchins crowded into a space of about 5 square meters (roughly 16 square feet).

During daylight hours, long-spined urchins tend to remain in the protection of reef crevices or around coral heads. At night, they move out to forage over relatively small areas. Their nocturnal activity is thought to result from the threat of predation during daytime.

Several fish species eat long-spined sea urchins. For example the queen triggerfish (*Balistes vetula*, also known as the oldwife) can "blast" the urchins off the bottom. By overturning the urchin, the fish exposes its vulnerable underside. Porgies, grunts, wrasses, and one type of snail (the king helmet snail, *Cassis tuberosa*) also eat long-spined urchins.

Reproduction & Growth

Scientists can determine size and age of sea urchins by measuring the diameter of the test. Long-spined sea urchins reach a maximum size of about 4 inches (10 cm) test diameter. The urchins reach this size after about 4 or 5 years, and this is thought to be their maximum life expectancy.

Urchins begin reproducing during their 2nd year of life, when they reach a size of 1-2 inches (3-6 cm) test diameter. Urchin mating involves something known as *mass spawning*. During the late winter through early summer, all the urchins in an area will respond to some unknown trigger, simultaneously releasing their gametes (eggs or sperm) into the surrounding seawater. On occasion, the fortunate diver may observe clouds of whitish sperm (released by males) and yellow eggs (released by females) oozing from the tops of the urchins. The eggs are fertilized by sperm as they drift above the adults. Fertilized eggs develop rapidly into small swimming larvae that drift freely in the ocean for over a month.

Eventually, currents bring some of the sea urchin larvae back to the reefs. At this point, the young urchins are still very small (only about 1/8 inch long). They settle to the hard bottom, abandoning their ocean-going lifestyle, to take refuge in small crevices. There, they adopt the lifestyle of adult urchins, grazing on plants such as algae and seagrasses.

Precautions

Urchins don't attack people. But people can be injured if they accidentally come into contact with the spines of an urchin. Avoidance is the best precaution, especially in shallow waters with rocky bottoms. Look where you walk. Avoid walking or wading in shallows where sea urchins are plentiful. Wearing sneakers, slippers, or aqua socks may offer some protection, but beware - urchin spines are capable of penetrating the soles of shoes! When swimming, wear a mask or goggles – you will be able to see the urchins and avoid brushing against them.

What to do about an urchin injury

If you are "spined", the tips may break off under the skin. Remove the exposed spines with tweezers, but do not dig excessively into the skin to get at spine fragments. Instead, treat for infection, which is a bigger concern. Your tissues will naturally dissolve the spines over several weeks. Applying a weak acid, like vinegar, lemon juice, or ammonia may help. A purple color (pigment from the urchin) may linger under the skin but it is harmless. The spines carry a weak toxin that does not affect most people, but allergic reactions are possible. Seek medical attention if the injury is extensive or if signs of shock develop.

For more information on this and other animals in the Virgin Islands please visit our web site at:

www.vifishandwildlife.com

WRITTEN BY WES TOLLER

This publication was reprinted with funds from The State Wildlife Grant Program.

FOR MORE INFORMATION ON OUR NATIVE ANIMALS CONTACT

DIVISION OF FISH AND WILDLIFE

6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

U.S.V.I. Factsheet #11

Whelk

(also called the West Indian Topshell)

Cittarium pica

Description

Whelks are large snails that occur in shallow rocky habitats throughout the USVI. Their large size (to ~ 4 inches wide) and tasty flesh make them a popular and traditional meal. In fact, whelks were an important part of the island diet since before Columbus – the Taino Indians ate whelk quite frequently judging by their shell middens. These days, whelks are still eaten regularly and a modest recreational and commercial fishery makes whelks the second most important marine snail, behind the queen conch (*Strombus gigas*), in the USVI.

Whelk shells are hard and heavy – about ¾ of a whelk's weight is in its shell - making the shell quite durable. These sturdy shells resist destruction by waves and, as a result, are commonly found by beachcombers along our shorelines. In addition to delighting shell collectors, the attractive shell pattern with alternating white and black bands has inspired the use of whelk shells in Caribbean jewelry.

Although a whelk shell is easy to observe, the living animal found inside is harder to see – most of it is safely tucked deep inside the shell. Usually, only two parts are exposed. The first is a muscular foot, which allows the whelk to firmly grip onto rocks, resist crashing waves, and crawl around [when whelk are eaten, it is the foot that forms most of the meal]. The other exposed part is the head, which includes two stalked eyes and a snout (called a proboscis). At the end of the proboscis is a small, hard, tooth-like structure called a radula. A whelk uses its radula to scrape algae from rocks. When threatened, a whelk can withdraw completely into its shell, closing the opening with a trapdoor-like operculum.

Identification

Adult whelks are usually easy to identify. They are one of only a few shallow-water snails that reach such a large size. Shell color is a useful clue - heavy black or purple stripes on a white background color. Sometimes it is hard to see the shell pattern because of algal growth: blue-green algae give whelk shells a greenish tint and encrusting red algae may completely cover shells of older whelks.

Young whelks (3/4-inch wide) are common in the splash zone of rocky areas and are distinguished by having mostly white shells with regular black spots. Three ridges spiral around, following the path of shell growth. As young whelks grow, these ridges get smaller, turn to bumps, and are eventually lost completely. Color changes with growth too. The white color gets obscured as the black spots become larger and more zigzagged.

Common Names

Most locals in the USVI call them whelks. In other parts of the Caribbean, they are also called West Indian topshells or magpie shells. In Spanish, whelks are called 'Caracoles', 'Burgao', or 'Quigua' (Venezuela).

Classification

Whelks are marine invertebrates that belong to the phylum Mollusca. Like all snails, whelks are classified in the subphylum Gastropoda. They belong to the family Trochidae, a diverse group that includes many species harvested for food. Whelks are placed in the genus *Cittarium* and the species *pica*.

Distribution

Whelks are found throughout the Caribbean, ranging from the Bahamas to the central coast of South America. Occasionally, whelks are found in south Florida. In Bermuda, whelks were driven to extinction by over harvesting during the early 19th century (an effort to reintroduce whelks to Bermuda has been successful). In almost all places that whelks occur, people harvest them.

Life History & Habitat

Whelks live in rocky areas along the seashore in a habitat known as the intertidal zone. The intertidal zone is the shoreline that extends from highest high tide down to the lowest low-water line. Whelk habitat is like a narrow band running along the shoreline, and it does not extend very deep – most whelks are found immediately at the waters edge. Large adult whelks may occur slightly deeper, but generally not below about three feet deep. Like surfers, whelks seem to prefer areas with some wave action too. In such wave-washed rocky areas, whelks occupy a slightly greater depth range.

Food preference is the main reason whelks are restricted to the intertidal zone. Whelks like to eat filamentous algae – thin strands of seaweed - that grow abundantly on intertidal rocks, especially where surf prevents fish from feeding on the shallow beds of algae.

Whelks grow slowly. If there is plenty of good food, their shell width increases by about 1/16th-inch (1.5 mm) per month. It may take a whelk five years to reach the large size of reproductive adults and scientists still don't know how long whelk can live.

Whelks reproduce mostly in the late summer around the new moon. Females release small green eggs (~1/100th-inch wide) that are fertilized by the sperm released simultaneously by males. The fertilized eggs drift away in the ocean currents, developing rapidly into a larval stage called a veliger. Free-swimming veligers feed on microscopic algae called phytoplankton. After 3 to 5 days, ocean currents bring the larvae to suitable rocky shores where they settle and remain for the rest of their lives.

Ecology & Behavior

Whelks are generally sedentary, meaning they don't go far in their lifetimes. The longest trip recorded for a whelk was about 160 yards over 6 months – not a big trip! Most of their movements occur at night, when whelks actively crawl about in search of something to eat. By day, they tend to remain in holes or crevices. This stay-at-home attitude – plus slow growth and a short larval stage - makes local populations of whelks vulnerable to overfishing.

Surprisingly, whelks are sensitive to sounds, and when startled they will release their grip on the rocks, dropping down into the water. In calm conditions, a predator (or fisherman) can still grab the whelk, but if there are waves, the whelk may get swept away or wedged deep into a crevice.

Without doubt, people are the number one predators on whelks, but whelks have many natural predators too. Three shallow water snails prey upon whelk: the wide-mouthed rock shell (*Pupura patula*), the deltoid rock drill (*Thais deltoidea*), and the rustic rock drill (*Thais rustica)*. Some fish also eat whelk. The porcupine fish (*Diodon hystrix*) eats whelks like popcorn, as will larger puddingwife wrasses (*Halichoeres radiatus)*. Octopuses regularly prey upon whelks. If that weren't enough, a bird called the oystercatcher (*Haematopomus palliatus*) plucks whelks off of intertidal rocks.

Some organisms depend upon whelks. Dwarf suck-on limpets (*Acmea luecopluera*) can be found living on the undersurface of the whelk shells. After a whelk's death, their empty shells provide homes for hermit crabs. In fact, following whelk extinctions in Bermuda, purple-clawed hermit crabs (*Coenobita clypeatus*) began to die off. Lack of whelk shells apparently created a housing shortage for these hermit crabs.

Conservation

Territorial regulations protect whelks in the USVI. There is a closed season for whelk fishing that goes from April 1st to September 30th of each year - this closure protects whelk during their reproductive phase. There is a minimum harvest size of $2^{7}/_{16}$-inch shell width (62 mm). Fishers are encouraged to use a measuring loop [available from DFW] - if the whelk can pass through the loop, it's too small to keep. Whelk must be landed whole and in their shell. Otherwise, there is no harvest limit and no special license is required.

References for this article are available upon request from DFW. For more information on this or other animals in the USVI please visit our web site at:

www.vifishandwildlife.com

WRITTEN BY WES TOLLER
This publication was reprinted with funds from The State Wildlife Grant Program.
FOR MORE INFORMATION CONTACT
DIVISION OF FISH AND WILDLIFE
6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

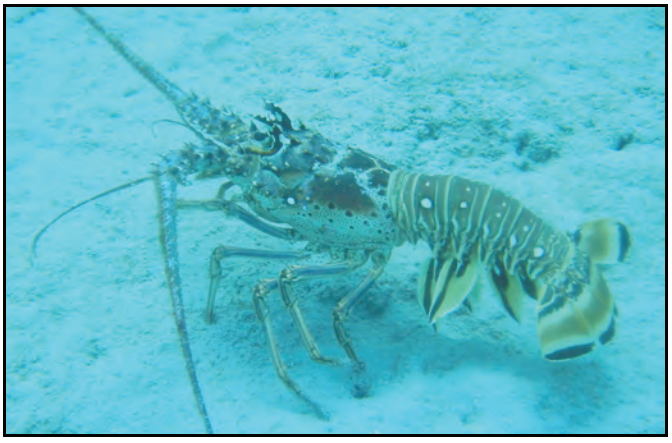
U.S.V.I. Factsheet #12

Spiny Lobster

Panulirus argus

Description

The spiny lobster, *Panulirus argus*, could easily be an emblem for the plentifulness of our Virgin Islands nearshore waters. Their large size (averaging 1 to 3 lbs but reaching over 15 lbs) and delectable taste make spiny lobsters a valuable food for locals and tourists alike. For this reason, spiny lobsters support an important local commercial fishery. Recreational fishers also pursue spiny lobsters. And pleasure divers enjoy them too - a close-up encounter with a big spiny lobster can add a memorable thrill to any dive.



True to their name, spiny lobsters are indeed spiny, with many stout spines arising from the hard shell that covers their body (called an exoskeleton). The two largest spines or "horns" project forward over their eyes. Spiny lobsters have five pairs of walking legs, but they lack the large claws of some other lobster species from colder climates. Generally, lobsters use their legs to move about the seafloor. When startled, however, a spiny lobster uses powerful flips of its muscular tail to make a rapid backwards escape. A large pair of antennae also assists with self-defense. Spiny lobsters will wave their antennae at intruders, often maintaining contact so as to keep the enemy at a safe distance. Two smaller forked antennae, called antennules, are used for taste, as are the tips of the legs (imagine tasting food with your feet!). Body coloration is variable, but is usually orange-brown on back fading to tan on the sides. The tail fan has distinct dark bands.

Scientists compare lobsters on the basis of size, typically using a measure called carapace length. The carapace is the fused and hard-shelled back portion of the lobster that extends from the eyes to the first flexible segment of the tail.

Identification

Although at least seven species of lobsters may be found in waters of the USVI, spiny lobsters grow the largest, and adults are usually easy to recognize. Spiny lobsters have two long antennae, whereas slipper lobsters (*Scyllarides, Arctides, Parribacus*) and copper lobsters (*Palinurellus gundlachi*) have short antennae. Occasionally, you might encounter one of two closely related species: the spotted spiny lobster (*Panulirus guttatus*) or more rarely, the olive-green colored smoothtail spiny lobster (*Panulirus laevicauda*). Both of these species have many more white spots than *Panulirus argus*, notably with spots extending onto their legs. In contrast, spiny lobsters have only stripes on their legs (no spots), and only a few white spots on their carapace and tail.

Common Names

There is no consensus on the best common name to use for *Panulirus argus*. Some scientists call them Caribbean spiny lobsters; others call them West Atlantic spiny lobsters or Florida spiny lobsters. Here, we call them spiny lobsters. Most locals simply use the name lobster, or in Spanish 'Langosta.'

Classification

Lobsters are invertebrates (animals without backbones) that belong to the subphylum Crustacea. This large and diverse group includes many familiar crabs and shrimps. All lobsters are classified in the order Decapoda (meaning ten legs). Spiny lobsters belong to the family Palinuridae, with about 49 species worldwide.

Distribution

Spiny lobsters occur in nearshore waters throughout the Caribbean Sea, the Bahamas, and Bermuda. They inhabit coastal waters of the Americas, from North Carolina southward to Brazil. Occasionally, spiny lobsters have been caught in the Gulf of Guinea (western Africa), but they don't seem to form stable populations there. In almost every place that spiny lobsters occur, they are harvested by fishers, thereby supporting fisheries and making a contribution to local economies. In Florida, for example, spiny lobsters are perhaps the single most economically important marine species.

Life History & Habitat

To appreciate the biology of spiny lobsters, one should first realize that their life history is a complex cycle with

five distinct phases: adult, egg, phyllosome larva, puerulus larva, and juvenile. Each phase occurs in a different habitat.

A female lobster becomes mature at 2-3 years of age (carapace length of ~3-1/4 inches). She mates with a mature male, who deposits two sticky gray patches of sperm (known as “tar spots" or tar patches”) on her belly. Eggs are fertilized as the female lays them, but she doesn’t release them. Rather, she holds the bright orange-red eggs in a bundle on the underside of her tail. After 2-4 weeks of development, the eggs, now brownish colored, are ready to hatch.

Females usually move to deeper waters for releasing their young. Tiny lobster larvae called phyllosome larvae (which means leaf-shaped body) hatch from the eggs. The phyllosome phase is pelagic - larvae drift in the open ocean at the mercy of currents. The phase may last from 6 months to over a year. Obviously, spending so much time adrift can result in larvae being carried a very long way - perhaps thousands of miles. This raises some serious questions about where our lobsters come from. Scientists are still trying to determine how far the larvae drift, and how often they return to their place of origin.

Phyllosoma Larva

Lobster Pueruli

At some point during their pelagic phase, lobster larvae change into a postlarval form known as a puerulus. Although still tiny (~ 1/4-inch carapace length) and mostly transparent, the puerulus phase actively swims towards shore, seeking out habitats that are heavily vegetated with algae or seagrass. They prefer one particular species of red algae called *Laurencia*. Because such vegetated areas occur in mangrove lagoons, estuaries, seagrass beds, and protected shallow water bays, these areas are critical nursery grounds for young spiny lobsters.

Shortly after settling into suitable habitat, the puerulus changes into a juvenile, now resembling an adult lobster in miniature form. As juveniles grow and mature, they move from shallow nursery habitats to hardbottom habitats in progressively deeper waters where they will live as adults.

During the spawning season, adult spiny lobsters are known to move towards deeper waters, such as shelf-edge reefs. In Florida and the Bahamas, spiny lobsters also make spectacular seasonal migrations (usually in the Fall), where hundreds of lobsters line up head-to-tail. With the antennae of the one behind touching tail of the one ahead, they move *en masse* towards deeper waters. Although reported in the USVI, such mass migrations appear to be only rarely observed here.

Ecology & Behavior

Adult spiny lobsters are nocturnal and gregarious. By daylight, they generally remain hidden in dens that are formed by caves, crevices, ledges, coral heads or large sponges. Lobster dens are shelters from predators, and spiny lobsters seem to prefer sharing their dens with others. At around sunset, they emerge from shelters to forage (feed) alone away from their dens. Sometimes, they can cover large distances (over 200 yards) in search of prey, their wanderings often taking them into nearby areas of reef, sand and seagrass habitats.

Ecologically, adult spiny lobsters are important “keystone” predators. That is, their feeding controls the populations of the many different species that they eat. Spiny lobsters feed primarily on snails, clams, small crabs and urchins, using their strong jaws to crush and open the shells of their prey. Sometimes spiny lobsters will also scavenge meals (such as a dead fish) but they generally prefer live prey.

Juvenile spiny lobsters suffer from high predation, falling victim to many different fish species, octopus, and crabs. However as they get larger, fewer predators can handle such a spiny meal. The most important predators on adult spiny lobsters are large groupers, like the goliath grouper (jewfish), sharks, moray eels, and loggerhead sea turtles.

Conservation

Federal and territorial regulations protect spiny lobsters. In the USVI, it is illegal to harvest spiny lobsters that measure less than 3-1/2 inch carapace length (89 mm). Divers may catch lobsters by hand or with a snare only - spearing or gigging is never allowed. Commercial fishers may catch lobsters in traps. Poisons (such as bleach) cannot be used to catch lobsters or any other marine species. Additionally, female lobsters bearing eggs cannot be harvested. Put “berried” females back so that they can hatch their eggs.

References for this article are available upon request from DFW. For more information on this or other animals in the USVI please visit our web site at: www.vifishandwildlife.com

WRITTEN BY WES TOLLER
This publication was reprinted with funds from The State Wildlife Grant Program.
FOR MORE INFORMATION CONTACT
DIVISION OF FISH AND WILDLIFE
6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

U.S.V.I. Factsheet #13

Queen Conch

Strombus gigas

The beautiful shell of the queen conch (*Strombus gigas*) is an enduring symbol for the USVI, as it is for the whole Caribbean. Among images, the foremost is the "call to freedom" that was sounded by the blowing of a conch horn, signifying an end to slavery during the Danish colonial era. But queen conchs, and their shells, have been utilized throughout the history of our islands. The earliest inhabitants - Arawak, Taino, and Caribe Indians - fashioned jewelry from conch shells, used them for tools, cookware, horns, and even as building materials. The first explorers returned home with the conch shells and they were quickly adopted as a standard decorative item for European homes. Today, the beauty of conch shells still captivates tourists who purchase them as mementos of their visit.

Because of their exquisite taste and large size, queen conchs have always been an important food in the USVI. Today, conch meat (derived from the conch's foot) is used in many traditional dishes like pates, fritters and chowders. Queen conch meat is in high demand, with a market price of about $6.00 per pound. For this reason, the queen conch supports a commercial fishery of scuba and free divers who harvest conch by hand. The queen conch fishery makes an important contribution to our local economy.

Description

Reaching over 12 inches in shell length, but averaging 6-9 inches, the queen conch is among the largest marine snails in the world - older adults may exceed 5 pounds! The large, thick shell has blunt spikes that radiate from a central spire. The shell flares sideways into a "lip" on the shells of older conchs. Inside, the shell color is a lustrous pink to red. An orangish layer (called the periostracum) coats the shell's exterior, though it is usually hidden beneath a layer of algae and sediments. With age, the periostracum slowly erodes away, being absent from shells of the oldest conchs.

Hidden within the sturdy shell is the conch itself. The queen conch has a mottled gray head with large proboscis (mouth) for feeding on algae. Two well-developed yellow eyes rest on the ends of eyestalks, each stalk bearing one short sensory tentacle. Attached to the foot is a long claw-like operculum which is used for propulsion, much like a pole-vault. Through a series of awkward leaps and tumbles, the queen conch slowly moves forward. A yellow-orange mantle is pressed against the shell continuously polishing the surface and secreting more shell material. Rarely (about 1 in 10,000 conchs), the mantle secretes shell around an embedded object like a sand grain, forming a conch pearl.

Identification

The queen conch is one of five conch species found in the USVI. The queen conch is distinguished by its large size, blunt shell-spikes, orange mantle, and mottled gray head. Our four other conchs (all in the genus *Strombus*) are distinguished as follows: the milk conch (*S. costatus*) has a creamy color along the inside of its shell and a green head; the hawkwing conch (*S. raninus*) has a knobby brown and purple shell with a reddish interior; the roostertail conch (*S. gallus*) has a distinctive "roostertail" extending rearward from shell lip; the West Indian fighting conch (*S. pugilis*) is smaller (~4 inches) and the shell opening is deep orange.

Classification

The queen conch is an invertebrate from the phylum Mollusca (meaning soft body) - a group that includes snails, chitons, clams, octopuses, and squids. Conchs are classified together with all other snails as gastropods (stomach feet). The queen conch belongs to the subclass Prosobranchia and family Strombidae. Their genus name *Strombus* means "spiral shell" and their species name *gigas* means "giant."

Distribution and Habitat

The range of the queen conch extends from southern Florida and Bermuda to the Bahamas, stretching southward throughout the Caribbean. Queen conchs generally occur in waters less than 100 feet deep although they are occasionally found at depths greater than 200 feet.

Adult queen conchs occur in habitats where algae (their preferred food) abound such as hardbottom or sandy algal plains, rubble areas, and seagrass beds. Occasionally they forage in coral reef habitats too. Their habitat preference changes during the course of their lifetime (see below) and they migrate during reproduction. Despite their slow speed, conchs may travel large distances (tens of miles) during their foragings and migrations, making their exact locations difficult to predict from one year to the next.

Growth and Reproduction

Queen conchs have been reported to live for 40 years (in Bermuda), although 6-15 years may be more typical. The architecture of a queen conch shell reflects its age and sexual maturity. Young, sexually immature conch have thin shells that quickly elongate - up to 3 inches per year - but lack a flared lip. As a conch reaches sexual maturity (usually in its third year) and reaches a length of ~9 inches, shell growth changes permanently: energy is devoted to shell thickening, and the opening of the shell flares into a distinct lip. In mature conch, both shell and lip continue to thicken throughout life while shell length changes little.

In the spring or early summer, mass conch migrations from deep to shallow coincide with annual reproduction. After mating with males, the females lay 6-inch egg masses composed of thin tubes over 100 feet long. Within the egg masses, up to half a million conch embryos develop. The embryos hatch as tiny free-floating larvae called veligers, which drift in the open ocean for 3-4 weeks. Some veligers survive the voyage to settle down in quiet nearshore waters – especially shallow seagrass beds, algal plains, and sandy areas. There, they transform into small conch and spend much of their first year buried under sand and sediments, emerging at night to feed. In their second year, when conch have reached 3-6 inches in length, they emerge and move into shallow seagrass and sandy habitats. From here they may progress to deeper habitats with age.

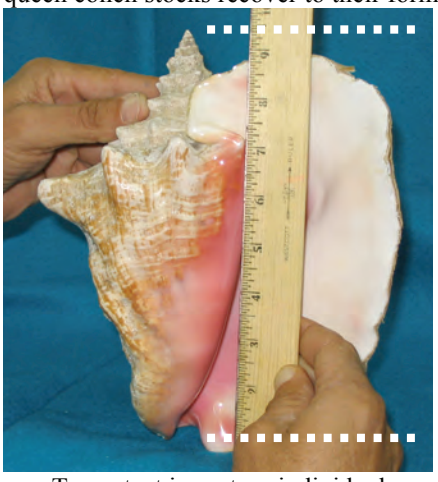
Ecology

Queen conchs are herbivorous, feeding primarily on algae, but also on decaying plant and animal material called detritus. Frequently, they graze in seagrass beds, eating algae that grow on blades of seagrass.

Among the predators of queen conch, man is clearly the most significant - in some places queen conchs have become rare due to over-harvesting. Quite a few predators eat juvenile conch: fish, such as porcupinefish (*Diodon hystrix*) and permit (*Trachinotus falcatus*), and spiny lobsters (*Panulirus argus*) prey on juveniles, as do a variety of crabs, sharks, rays and snails. Adult conchs, owing to their larger size and thicker shells, have fewer predators (aside from humans). These include horse conchs, octopus, and loggerhead sea turtles.

Conservation

In recent decades, declines in USVI conch populations have led to serious concerns about their conservation. Territorial and federal regulations have been enacted to help queen conch stocks recover to their former abundance.



To protect immature individuals, queen conch must be a minimum of 9 inches in shell length (from spire to distal end as shown above) or 3/8-inch lip thickness [a measuring gauge is available from DFW]. Commercial fishermen are limited to 150 conchs per day while recreational fishermen (for personal use) can take no more than 6 conchs per day. Conch must be landed whole in their shells. There is a closed season each year (July 1st to September 30th), when queen conch cannot be harvested, to ensure successful conch reproduction. Undersized conch shells and their meat cannot be sold. Imported conch must have a CITES export permit and clear at the port of Miami.

Awareness of and adherence to regulations is one means to preserve queen conch populations. Protection of essential habitats, especially the conch nursery areas found within our near shore waters, will be equally important to ensure conch for future generations.

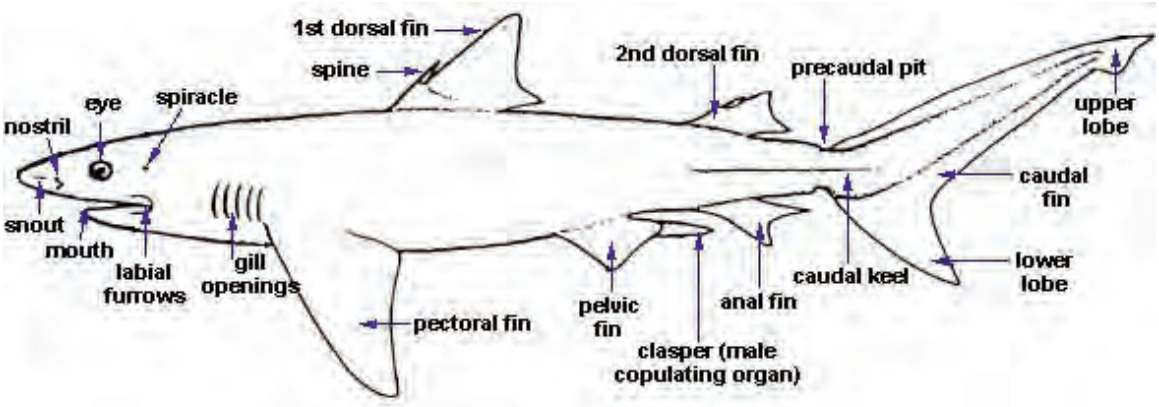
References for this article are available upon request from DFW. For more information on this or other animals in the USVI please visit our web site at:

www.vifishandwildlife.com

Written by Wes Toller and Kemit-Amon Lewis
This publication was reprinted with funds from The State Wildlife Grant Program.
FOR MORE INFORMATION CONTACT
DIVISION OF FISH AND WILDLIFE
6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

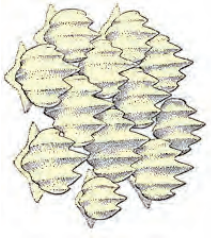
U.S.V.I. Factsheet #14

Sharks



General Description

Shark species comprise 1% of all living fishes. They are a member of the Chondrichthyes class and are collectively known as elasmobranchs. There are approximately 350 species of shark found worldwide and they occur in both tropical and temperate regions.



Their skin is covered with denticles, which are tooth-like projections from the skin. These denticles make the skin rough and give it the texture of sandpaper. They have five to seven gill slits and gill arches per side. They have no swim bladder. To maintain their position in the water column, sharks have an asymmetrical tail fin and flattened pectoral fins to propel them forward and upward in the water column. A very oily liver also provides buoyancy to compensate for the lack of a swim bladder. Elasmobranchs also have a cartilaginous skeleton rather than bones, making it difficult to find fossilized records of their existence.

In the Virgin Islands, 11 species of shark may be found. Of those 11, only two species have been recorded to attack man. Those species are the tiger shark (*Galeocerdo cuvier*) and the bull shark (*Carcharhinus leucas*). However, there have only been 3 recorded shark attacks in the Virgin Islands with the last one occurring in 1992. With one exception, these attacks were caused by harassing the shark. The incidence of shark attacks are globally so low that it is 900 times more likely for a person in New York to be bitten by another person than for someone to be attacked by a shark.

Feeding

Sharks have adapted to eating a wide variety of organisms. One of the most important adaptations is the loosely attached lower jaw. The jaw of a shark can be unhinged to open very wide while feeding. They also can have as many as 8 rows of teeth. Whenever a shark loses a tooth, another one moves up to take its place. A shark can go through up to 2,400 teeth a year.

Some shark species have adapted to bottom feeding and they are able to use their lower jaw to pick up prey from the floor bottom. Others such as the basking shark (*Cetorhinus maximus*) and the megamouth shark (*Megachasma pelagios*) are filter feeders. They strain plankton from the water using gill rakers. The largest shark in the world, the whale shark (*Rhincodon typus*), also filter feeds but


Whale Shark

does not use gill rakers. They instead strain plankton though spongy tissue supported by cartilaginous rods between the gill arches.

Most sharks are predators and, as such, most of them feed on other fish. Large sharks, such as the tiger shark and the great white shark (*Carcharodon carcharias*) feed on marine mammals such as seals, dolphins, sea-lions, turtles, birds and other fish.

Sharks are generally not very selective in the type of food that they eat. However, there are some exceptions. Hammerhead sharks seem to prefer eating stingrays, while bull sharks eat other sharks. Tiger sharks, on the other hand, will eat both live and dead animals and are known as the "garbage cans of the sea", since they will eat just about anything. This includes bony fishes, other sharks, marine mammals, sea birds and invertebrates.

Reproduction

Depending on the shark, reproduction may occur in one of three ways, they may lay eggs (oviparity), bear live young (viviparity), or the young may hatch from eggs within the mother (ovoviparity).

Oviparity

If the shark is oviparous, it means that the shark will lay eggs like birds and the sharks will develop within the egg. None of the sharks found in the US Virgin Islands are oviparous.


Great Hamerhead

Viviparity

In this reproductive method, sharks give birth to live young. Several of the sharks found in the US Virgin Islands reproduce using this method. They include the Silky (*Carcharhinus falciformis*), Bull (*C. leucas)*, Blacktip (*C. limbatus*), Oceanic Whitetip (*C. longimanus*), Reef (*C. perezi*), Lemon (*Negaprion brevirostris*), Great Hammerhead (*Sphyrna mokarran*) and the Dusky Smooth-hound (*Mustelus canis*) sharks.

Ovoviparity

Ovoviparity occurs when young hatch from eggs while still inside the mother. The embryos are nourished by a yolk sac. As they develop the young sharks will eat unfertilized eggs and other embryos. Ovoviparous species found within the USVI are the bluntnose six gill (*Hexanchus griseus*), the nurse (*Ginglymostoma cirratum*), and the tiger


Tiger shark

(*Galeocerdo cuvier*) shark.

Threats

Sharks are very vulnerable to overfishing and to shark fining (where the fins are cut off and the shark is thrown back into the water) sharks do not regenerate their fins.. Since sharks take between 8-20 years to reach sexual maturity, they take a long time to reproduce. Also, some species only produce a litter every two years. This reproductive strategy makes sharks vulnerable to overfishing, which can occur fairly easily and cause disastrous effects on the shark population. Harvesting more sharks than are actually being produced will eventually cause the extinction of shark species being harvested. Already several shark species are listed as being either endangered, critically endangered or vulnerable in several countries.

Shark attacks

While shark attacks are very rare, there are a few precautions that can be taken in order to reduce the risk of any attacks. They are:

- Do not swim, dive or surf where dangerous sharks congregate.
- Always swim, dive or surf with other people.
- Do not swim in dirty or turbid water.
- If schooling fish are behaving strangely or are grouping together in large numbers, leave the water.
- Do not swim near people line fishing or spear fishing.
- If a shark is sighted in the area, leave the water as quickly and calmly as possible.

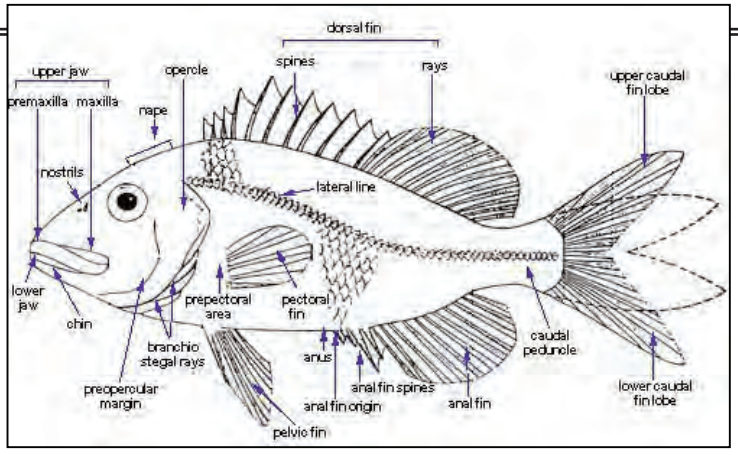
For more information on sharks and other local species please refer to our website at: www.vifishandwildlife.com

WRITTEN BY CHRISTINE O'SULLIVAN
THIS PUBLICATION WAS PRODUCED WITH FUNDS FROM SPORT FISH RESTORATION.

REFERENCES FURNISHED UPON REQUEST
FOR MORE INFORMATION CONTACT
DIVISION OF FISH AND WILDLIFE

6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

Fish



General Description

Fish make up more than 1/2 of all vertebrate species. Globally, there are 3 classes, Agnatha, Chondrichthyes and Ostiechthyes, with over 22,000 different species of fish. This is not too surprising, since over 71% of the planet is covered by water.

Fish are generally unable to internally regulate their own body temperature. The environmental temperature is used to regulate their body temperature. We refer to this as being cold-blooded.

We can split up the fishes into 6 general types, each of which can be used to identify the life style of the fish. These types are, the rover-predator (mackerel, tuna), lie-in-wait predator (barracuda, trumpet fish), surface-oriented fish (flying fish, mosquitofish), bottom fish (peacock flounder, goatfish), deep-bodied fish (butterfly fishes, tilapia), and snake-like fish (eels, loaches, and the agnatha).

Fish utilize many different techniques to move through the water, as can be seen in the different body types. Many propel themselves through the water by using wave like movements with their bodies and tails, using their fins to control their direction and for stability. While others, like sea horses and mola, have specialized dorsal and anal fins for moving through the water.

All fish have "slimy" secretions on their skin, which helps protect them from chemicals, decreases friction with the water and makes them more efficient swimmers. Other characteristics of fish are a lateral line system, used to detect pressure changes in the water (like hearing), and gills for respiration.

Classes of Fish

Agnatha

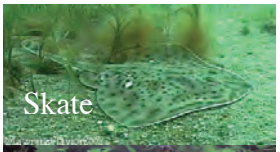
The fish found in the class Agnatha consists of two groups, the lampreys and the hagfishes. They are found in both fresh and salt water where they either act as parasites or scavenge on other dead animals for food. They have the simplest body shapes of all fishes. These fish have no hinged jaws, they lack scales and possess a skeleton made of cartilage. Cartilage is lighter than bone and is used by fish to reduce weight, especially in fish with no swim bladder. Instead of a jaw they have an oral sucker, which they use to attach to their food.

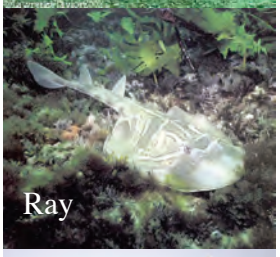
Chondrichthyes

These species include all the sharks, skates, rays, and ratfish. Like the Agnatha, they have a cartilaginous skeleton and no swim bladder. However, this is where the similarities end. The Chondrichthyes also have a cartilaginous jaw with a

loosely attached lower jaw. The jaw of a shark can be unhinged to open wider while feeding and can have as many as 8 rows of teeth. Whenever a shark loses a tooth, another one comes up. A shark may go through as many as 2,400 teeth a year.

Their skin is covered with denticles, which are tiny tooth-like projections. The denticles make the skin rough, giving it the texture of sandpaper. The denticles help the shark be more slippery in water so they are very efficient swimmers.


Skate


Ray

They have a large oily liver that helps maintain buoyancy. Sharks additionally have an asymmetrical tail fin, which along with flattened pectoral fins, provides lift, which compensates for buoyancy.

Ostiechthyes

The bony fish are the largest group of fish and are the most recognizable. They are called bony fish because their skeleton is calcified rather than the cartilage seen in the Agnatha and Chondrichthyes.


Coelacanth

The bony fishes are divided into two categories, the lobed finned and the ray-finned fishes. The ray-finned fishes make up over 95% of all living fish species. Only the lungfishes and coelacanths have survived as members of the fleshy-finned species. It is believed that the lobed fin fishes were the first vertebrates to settle on land, eventually becoming amphibians.

One of the other special adaptations that bony fish have is a swim bladder. The swim bladder is a gas filled sac found inside the abdomen. The majority of the gas found inside the sac is oxygen with some nitrogen and carbon dioxide present. Bony fish can regulate the amount of gas in the bladder to help them maintain neutral buoyancy, like a SCUBA divers B.C.D.

The fins of many bony fin fish have a web of skin supported by rays. Each ray is moved by a set of muscles allowing for great flexibility in the shape and position of the fin. As the most prolific fish group, they are the type of fish most likely seen while snorkeling in our waters.

Threats

About 950 million people rely on fish as their primary source of protein and 200 million people earn a living by fishing. To most people, the ocean seems to be an endless supply of fish and aquatic resources. This is no longer true. In some fisheries 3/4 of everything caught is "bycatch" and is thrown back into the water dead. As recreational fishing increases in popularity, so does the numbers of fish removed from the ocean.

Overfishing is a threat to many fish species. By practicing unsustainable fishing methods, such as net fishing (trawls, and tangle nets), fish populations can be rapidly depleted. It is very important to only take what is needed, and to take only fish that have had a chance to reproduce. If not, fish populations will decrease and there will not be enough fish for future generations.

Pollution and runoff from shore, sewage outflow and dumping at sea can all have negative effects on fish. Species may mistakenly consume plastic bags instead of jellyfish. They may also ingest chemical toxins released into their habitat. These may have negative effects on the health of the fish and the toxins will be passed on to people when the fish are consumed. For example, high levels of mercury have been found in tuna causing doctors to warn pregnant women against eating too much tuna.

Properly dispose of all garbage and contaminants so that our aquatic plants and animals are not negatively impacted. For more information on fish and other local species please refer to our website at:

www.vifishandwildlife.com

WRITTEN BY CHRISTINE O'SULLIVAN
THIS PUBLICATION WAS PRODUCED WITH FUNDS FROM SPORT FISH RESTORATION.

REFERENCES FURNISHED UPON REQUEST

FOR MORE INFORMATION CONTACT
DIVISION OF FISH AND WILDLIFE

6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

U.S.V.I. Factsheet #16

Lionfish

Pterois volitans/miles

Taxonomy

Kingdom - Animalia
Phylum - Chordata
Subphylum - Vertebrata
Class - Actinopterygii
Order - Scorpaeniformes
Family - Scorpaenidae
Genus - *Pterois*
species –*volitans, miles*

Identification Characteristics

- Reddish/ golden brown stripes across body
- venomous spine
- 38-45cm in length

Description

The lionfish and scorpionfish are both members of the family Scorpaenidae a large group of venomous fishes. Locally the scorpionfish are sometimes called a lionfish, we all need to understand the difference between these two fishes. The scorpionfish is native to our waters and our native fishes have evolved to live with them. The Indo-Pacific lionfish (Pterois volitans/miles complex) are invasive marine fish from the indo-Pacific.

The lionfish has a beautifully banded head and body with dark reddish or brown bands stretching across a white or cream colored background the bands are very distinct like the stripes on a Zebra. The dorsal and anal fins possess dark rows of spots. Some other noteworthy characteristics are a bony ridge across the cheek and the flaps that partially cover both the eyes and nose. They also possess a tentacle above each eye. In the Atlantic, they grow to 45 cm (18 inches) which is larger than their natural range size 38 cm (15”). Their maximum life span is approximately 8 years.

Distribution and Habitat

Lionfish are found in warm, marine water of the tropics. They prefers water temperatures of 22-28°C and have been found in tidepools, out to 175 m depth. Normally solitary, they are occasionally found in small groups. In shallow water (less than 50 feet) individuals are relatively inactive during the day, typically sheltering in reef crevices or dark holes. In deeper water they have been observed active all day long.

In the Atlantic the U.S. Geological Survey (USGS) identify lionfish status as established off the Atlantic Coast of the United States from Florida to Cape Hatteras, North Carolina (juveniles have been see as far north as Rhode Island). They are also established in Bermuda, the Bahamas, Columbia, Cuba, Dominican Republic, Jamaica, Puerto Rico, Turks and Caicos and the Cayman Islands. There are reported sightings

from Belize, Haiti, U.S. & British Virgin Islands, and Mexico.

Diet

Lionfish are one of the top levels of the food web in the tropical marine ecosystem. They are opportunistic and cannibalistic feeders. They are known to feed mostly on crustaceans (as well as other invertebrates) and small fishes, which include juveniles of their own species. Lionfish can consume more than 8 times its body weight per year. Individual lionfish eat large quantities of prey and large prey relative to their body size. It is not unusual for a lionfish to consume prey greater than 2/3rds, or even equal to their own length. Their stomachs can expand 30 times in volume, which allows the lionfish to withstand up to 12 weeks of starvation, without mortality.

Reproduction

Lionfish reproduce all year. They become sexually mature at 250 mm (9-7/8 inches). Females are mature within 7-8 months and usually spawn once a month. A mature female lionfish can release up to 30,000 eggs every 4 days.

Courtship begins at dark and extends into night and is always initiated by the males. A couple may descend and ascend the water column several times before spawning. On the final ascent the couple will swim around just under the surface of the water. The female will then release her spawn. These spawn are comprised of two buoyant egg masses, which are fertilized by the male as they float to the surface. The adhesive mucus binding the eggs disintegrates after a few days releasing the embryos and/or larvae. Eggs hatch in 4 days. Larval stage lasts between 25 and 40 days. This reproductive strategy is unlike any other Atlantic fish.

Why should we care?

The lionfish invasion in the Atlantic and Caribbean is the most rapid marine finfish invasion in history. It took less than two years for lionfish to spread throughout the Bahamas and become completely established (2004 to 2006). There is a predicted recruitment rate of Lionfish to be 24 fish per hectare per day. A recent report by Albins and Hixon (2008) has shown lionfish can cause a significant (79% average) reduction in the recruitment of native coral reef fishes on a reef via predation. A second study indicates that the loss of reef fish is closer to 85% in 5 weeks. Currently lionfish population growth is not resource limited. Lionfish are also a threat to swimmers, snorkelers/divers and fishermen, because they are venomous. They exhibit no fear of divers.

After the fish's spine punctures the victim's skin, the venom exuded from disturbed skin cells travels up a groove in the spine and into the wound. Severe pain, described as intense, sharp and throbbing pain occurring immediately is the predominant symptom. If untreated the pain reaches its greatest intensity in 60-90 minutes and can persist for 6-12 hours, although it may last for days or weeks. Even dead fish can result in serious wounds. The wound left by a lionfish sting may take months to heal. Hypersensitivity of lionfish venom may develop resulting in anaphylactic reactions. It may take several months for a full recovery and if the sting is left untreated, gangrene may develop.

First Aid

1) Remove the exposed person from the water to prevent drowning.
2) Immerse the wound for 30-90 minutes in water as hot as the poisoned person can tolerate. Repeat as necessary to control pain.
3) Scrub the wound with soap and water. Then flush the affected area with fresh water.
4) Do not apply tape to close the wound.
5) Seek medical attention.

What can we do?

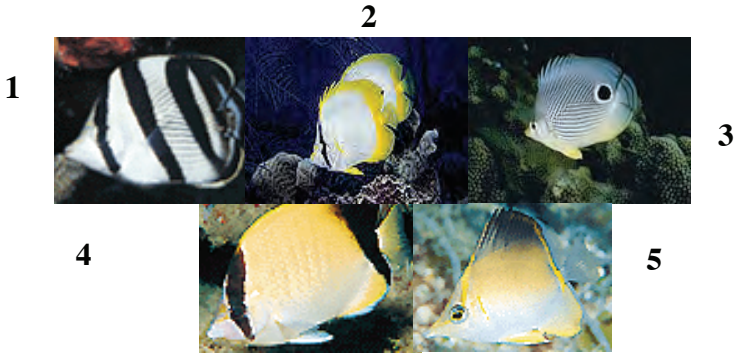
The Department of Planning and Natural Resources -Division of Fish and Wildlife (DFW) staff recognized that the introduction of lionfish into the Territory could have a devastating impact on the local marine environment. To reduce the possibility of an accidental introduction DFW does not permit the import of lionfish into the territory, after all, the first introduction of lionfish into the Atlantic was due to a private aquarium breaking an releasing 6 lionfish into Florida's waters. We do not want that to happen here.

To report a lionfish please contact your local dive shop, or Dr. William Coles, Fish and Wildlife at (773-1082). To report a lionfish outside of normal business hours please call Fish and Wildlife staff at 643-0800. Only with your help can we try and prevent the lionfish from destroying our fisheries.

U.S.V.I. Factsheet #17

Butterflyfish

Chaetodontidae



Of the 120 species of Butterflyfish found worldwide only seven are found in the Caribbean, with five of those found in the U.S. Virgin Islands. They are:

1) The Banded Butterflyfish (*Chaetodon striatus*)
2) The Spotfin Butterflyfish (*Chaetodon ocellatus*)
3) The Four-eye Butterflyfish (*Chaetodon capistratus*)
4) The Reef Butterflyfish (*Chaetodon sedentarius*)
5) The Longsnout Butterflyfish (*Chaetodon aculeatus*)

They are all found in the Chaetodontidae family, which include all the Butterflyfishes and some Angelfish. Butterflyfish are found in both the Atlantic and Pacific Oceans. They feed primarily on tiny worms, exposed coral polyps and other small marine invertebrates. Typical features shared by the Chaetodons are a highly compressed body, small mouths with a row of brushlike teeth and a dark band across the eye.

Description

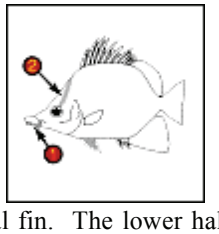
Butterflyfish are round, thin-bodied fish with slightly concave foreheads and are usually less than six inches in length. The species found in the U.S.V.I., however, differ in coloration making them easy to differentiate.

The Banded Butterflyfish (1) has two distinct wide, black midbody bands. Between each band their colors vary from silver to white and a black bar runs across the eye. There is a blackish border on the rear of the body and at the base of the rear dorsal and anal fins. They are usually 3-5 inches in length with a maximum length of 6 inches. They can usually be found in relatively shallow water between 10 – 60 feet deep.

The Spotfin Butterflyfish (2) is silver-white with a black bar on the head that runs across the eye. There may also be a darkish spot on the rear of the dorsal fin below a distinct black dot on the outer edge of the rear dorsal fin. All the fins, except the pectoral, are bright yellow. They are usually 3-6 inches in length with a maximum length of 8 inches. They can usually be found in relatively shallow water between 10 – 60 feet deep.

The Four-eye Butterflyfish (3) is silver-gray with several dark thin lines that radiate at a diagonal from the middle of their bodies. There is a dark bar on the head that runs across the eye with a yellow submarginal band on the rear dorsal, tail and anal fins. They have a distinctive black spot, which is ringed with white, on the rear of their body near the upper base of the tail. They are usually 3-4 inches in length with a maximum length of 6 inches. They can usually be found in relatively shallow water between 10 – 60 feet deep.

The Reef Butterflyfish (4) has a yellowish back and dorsal fins and a silver-white lower body. They have a yellowish-reddish to yellow tail and a black bar that runs across their eyes. There is a distinctive broad, dark bar on the rear of their body, which include the rear portions of the dorsal and anal fins. They are usually between 3-4 inches in length with a maximum length of 6 inches and can usually be found in both shallow and deep water between 20 – 120 feet deep.



The Longsnout Butterflyfish (5) has a long pointed snout and a dusky/yellow bar that runs from the top of the head across the eye but does not continue below the eye. The upper half of their bodies are yellow and gradually change to orange, darkening to orange-brown and black on the dorsal fin. The lower half of their bodies are white. They are usually solitary and are found in deeper reefs and walls between 30-200 feet deep. They tend to be more secretive than other members of the Chaetodontidae family and forage in dark recesses for marine invertebrates. They are usually between 2-3 inches in length with a maximum length of 3 ½ inches.

Distribution and Habitat

Butterflyfish are found throughout the Caribbean as well as the Pacific and Indian Oceans. Mated pairs live together inside large home ranges and may remain together for a lifetime. Territorial defense rarely occurs and then only late in the day, generally close to the courtship period.

Growth and Reproduction

Very little is known about the spawning behavior of butterflyfish. Most of the recorded activities have taken place

at sunset between February and May in the Caribbean. However, spawning activities have been recorded in the fall, particularly in areas such as the Red Sea. At each spawning event the males and females broadcast spawn and they release their gametes into the water column. The eggs hatch into larvae called tholichthys with large yolk sacs 24 - 48 hours later. As the larvae mature they develop deep, laterally compressed bodies and a series of clear armor-like plates covering their heads and forebodies. Once they reach 1.5 cm they settle on the bottom.

Most juvenile butterflyfish are creamy white with yellow fin highlights, distinctive ocellated eyespots and barred patterns. They usually inhabit shallow habitats, such as sand pockets, isolated coral and sponge formations, sea grass beds and around mangrove roots. They lead solitary lives until they reach sexual maturity after a year, and are approximately 4 inches long.

Ecology

The butterflyfish in the Caribbean feed on anthozoids, which are stationary polyps from hard and soft coral, and zoanthids, which are anemone-like animals that live in colonies. They also feed on tunicates, sessile marine animals that may be solitary or live in colonies, coral and other gametes. The Four-eye butterflyfish ranges widely over the reef platform while the Banded butterflyfish can be found along shallow reef crests and patch reefs. The Reef and Spotfin butterflyfishes live slightly deeper than their other counterparts near high-profile reefs, which allows them to feed on tubeworms, hydroids and small crustaceans. The Longsnout butterflyfish are found on deeper drop offs between 40-200 feet deep.

They are eaten by several nocturnal predators such as moray eels, sharks and other large piscivorous reef fish such as snappers and groupers feed on these fish.

Butterflyfish have been used to indicate the health of a coral reef. Since they feed on coral polyps the abundance of butterflyfish on a reef indicates the health of the reef in direct correlation with the distribution and amount of food available for them to eat. Also, butterflyfish respond to declines in coral quality and abundance with behavioral and spatial changes that can be observed easily making monitoring of these areas relatively easy. These species can therefore be used to help monitor changes in the health of a coral reef ecosystem and can allow for the rapid implementation of mitigation measures.

Adaptations

In order to avoid predators and live on the reef, butterflyfish have evolved certain adaptations that allow them to better do so. The size and shape of the fish also allows it to maneuver along the reef relatively easily. The compressed and discus-shaped fishes are designed for maneuverability in their habitats. Because of their small size and shape they are also able to lodge themselves between pieces of coral preventing predators from attacking them. They also erect fin spines which make it almost impossible for them to be dislodged.

Butterflyfish are very colorful and usually have dramatic colors and patterns. When predators are in the area, rather than run away they turn sideways and display their coloring. Within the patterns and colors are two typically cryptic patterns which include false eyespots and eye bands. Eyes are often a primary target for predators. The butterflyfish disguise their eyes with bands across them which help to disguise the eye from predators so that they are not easily attacked. This combined with false eyespots at the opposite end of the head help protect their most vulnerable area. The eyespots misdirect the predator allowing less vulnerable areas to be attacked first.

The mouths on butterflyfish are also adapted for the food that they eat. Butterflyfish with long snouts are able to use them to feed in narrow crevices. The small bristle-like teeth are also used to scrape and nip at invertebrates, living in the many cracks and crevasses on the reef.

Conservation

Occurrence in the U.S.V.I varies among species. The most common species is the Four-eye butterflyfish while the Reef and Banded butterflyfishes can also be frequently found. The least common species' are the Spotfin and Longsnout butterflyfishes.

Butterflyfishes are protected by both Federal and Territorial regulations. There is no harvest of individuals. You may not have, in your possession, any of these species, without appropriate permits from the Department of Planning and Natural Resources, Division of Fish and Wildlife.

References for this article are available upon request from DFW. For more information on this or other animals in the USVI please visit our web site at:

www.vifishandwildlife.com

Written by Christine O'Sullivan.

THIS PUBLICATION WAS PRODUCED WITH FUNDS FROM SPORT FISH RESTORATION.

FOR MORE INFORMATION CONTACT
DIVISION OF FISH AND WILDLIFE

6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

U.S.V.I. Factsheet #18

Grouper

Serranidae

Red Hind *(Epinephelus guttatus)*

Coney *(Cephalopholis fulva)*

Graysby *(Cephalopholis cruentatus)*

Taxonomy

Kingdom - Animalia
Phylum - Chordata
Class - Actinopterygii
Order -Perciformes
Family -Serranidae
Subfamily: Epinephelinae

Description

Groupers are members of the seabass family. They have heavy, stout bodies and large underslung mouths that harbor strong teeth. Many species have two canine teeth at the front of each jaw. Their small scales usually have a saw-toothed edge, and their fins are coarse and spiny.

They vary in size from the Goliath Grouper *(Epinephelus itajara)* that grows to seven feet to the one foot Coney *(Cephalopholis fulva)*. Many grouper species can drastically change color or darken. They are slow growing, but long lived. Groupers are not long-distance or fast swimmers but rather choose to lie, wait, and ambush their prey with a quick flash of their jaw.

Identification Characteristics

- Stout body
- Large mouth
- Coarse, spiny fins

Distribution and Habitat

Groupers can be found in every ocean on the planet. The specific habitat that groupers choose to live in, however, varies from species to species and depends on the age of the organism. Juvenile groupers are found closer to the shore and usually seek protection in seagrass beds or tidal pools until they reach maturity. Mature groupers, on the other hand, tend to reside on the bottom of tropical and subtropical waters and most species live on coral reefs. Groupers are rarely found in packs or schools.

Diet

Grouper are solitary bottom dwelling carnivores that live in the protection of reefs, ledges and wrecks.They swallow prey rather than biting pieces off it. Their mouth and gills form a powerful sucking system that sucks their prey in from a distance. Mature groupers generally feed on a variety of fish such as parrotfish, wrasses, damselfishes and snappers. In addition mature groupers are also known to prey on octopus, crab, lobster, and crustaceans. Juvenile groupers on the other hand tend to eat plankton, crustaceans, microalgae and other small microorganisms.

Reproduction

Reproduction in groupers is a very unique and interesting process and varies from species to species as well. They are known to be solitary creatures except during the spawning season. During spawning season groupers are well known for aggregating in very large numbers, some reported at 100,000 individuals, at specific areas during the winter full moon. They do this, in order to increase the probabilities of successful mating and chance of surviving.

Males are known to be able to spawn many times during the breeding period; however females on the other hand can only spawn once a year. Groupers tend to be protogynous hermaphrodite, meaning that the majority of juvenile groupers are female and transform to males as they grow larger. This change of sex can also occur by larger female groupers if there is a drastic decline in the amount of large sexually mature male groupers. However one a female has been changed to a male they are unable to change back. This interesting adaptation that has taken place with groupers is one of the many ways that groupers have adapted overtime to ensure that they reproduce and survive.

Behavior

Groupers use their mouth to dig into sand to form their shelters under big rocks, jetting it out through their gills. Their gill muscles are so powerful that it is nearly impossible to pull them out of their cave if they feel attacked and extend those muscles to lock themselves in.

Groupers try to avoid their predators by using their coloration to their advantage and hiding. They can do this by changing their coloration quickly according to the environment and mood that they are in, by moving into an area that is inaccessible by their prey and by using their coloration as camouflage.

Groupers try to clean themselves from parasites by frequently visiting “wrasse cleaning stations”. At these cleaning stations the grouper will open its mouth in a non-threatening fashion and cleaning wrasse will enter its mouth to remove parasites and dead tissues from the grouper gills and body.

Conservation

Of the 162 grouper species, 20 are threatened with extinction unless management or conservation measures are introduced. Groupers are under heavy fishing pressure. Measures have been put in place in many territories to protect them. These include closed seasons, establishing marine reserves and fishing prohibitions.

USVI Grouper Regulations

Species/ Area	Close Season
Goliath	No Harvest
Nassau	No Harvest
Black	Feb.1-April 30
Red	Feb.1-April 30
Tiger	Feb.1-April 30
Yellowedge	Feb.1-April 30
Yellowfin	Feb.1-April 30
MCD (Hind Bank)	Year Round
Red Hind Spawning Aggregation (Lang Bank)	Dec.1-Feb.28

Information gathered from:
www.breef.org
www.iucn.org
http://jrscience.wcp.muohio.edu/TheHabitatsBehaviorandiM.html

Snapper

Lutjanidae

Yellowtail Snapper (*Ocyurus chrysurus*)

Description

Snappers are comprised of medium to large sized predacious fishes which inhabiting mangroves and seagrass beds during their juvenile and sub-adult stages. When they become adults, they migrate to coral reefs or deep water to live out their lives.

The behavior of snapping their jaws when hooked gives snappers their name. They have an oblonged- shape body with a triangular head. A single continuous dorsal fin is also present. Snappers have large mouths and prominent canine teeth near the front of the jaw. The most difficult snappers to distinguish are the Dog, Cubera and Gray. These snappers are generally all gray with only subtle markings. Lane, Mahogany and Mutton snappers also look alike due to the dark spot located on their bodies.

Taxonomy

Kingdom – Animalia
Phylum – Chordata
Class – Actinopterygii
Order –Perciformes
Family –Lutjanidae

Identification Characteristics

- Oblong-shaped fish
- Triangular shaped heads
- Single continuous dorsal fin
- Forked tails

Distribution and Habitat

Snappers are tropical and subtropical in the Pacific, Atlantic and Indian oceans; a few are estuarine to entirely freshwater.Some snappers like the yellowtail snapper live over sandy areas near deep reefs at depths of 32-230 feet. Three Snapper species are predominantly deep-water fish, although juveniles occasionally occur in shallower reef areas: the Blackfin Snapper, the Silk Snapper, and the Red Snapper.

Diet

Snappers are carnivorous. They generally feed on crustaceans but the larger snappers are known to eat mostly fish. The larger fish eating snappers like the Dog and Cubera are known for ciguatera (fish poisoning if consumed) if taken from certain locations in the ocean. Juveniles primarily feed on plankton.

Reproduction

Spawning occurs year round, peaking at different times in different locations. Spawning snapper form offshore aggregations. All snapper are oviparous. This means that they lay eggs, with little or no other embryonic development within

the mother. Snapper's eggs and larvae are planktonic, dispersed by the ocean currents. Snapper are also known as serial spawners, meaning that they will spawn repeatedly during the breeding season. Juveniles reside inshore in seagrass bed or Mangrove nursery areas that offer protection from predation while they mature.

Behavior

Snappers are nocturnal predators. Snappers can be seen on reefs during the day. Dog, Cubera and Mutton Snappers tend to be loners, while Gray, Mahogany, and Lane Snappers prefer to swim in small groups. Deep water snappers (Red, Vermilion, Silk and Blackfin) are known for their red like tint and are seldom seen around reefs. They congregate in deeper waters.

Conservation

Natural predators of adult yellowtail snapper include sharks and other large predatory fishes, including barracuda, mackerel and grouper in addition to other snapper species. Snappers are popular food fish here in the Virgin Islands. Snappers are prized for their wonderful meat. Measures have been put in place to protect the population decline of these fish. This includes closed seasons and size limits.

USVI Snapper Regulations

Species	Close Season
Black	Oct. 1 – Dec. 31
Blackfin	Oct. 1 – Dec. 31
Lane	April 1 – June 30
Mutton	April 1 – June 30
Silk	Oct. 1 – Dec. 31
Vermilion	Oct. 1 – Dec. 31
Yellow Tail	Year Round (size limit 12in.)

Information gathered from:

Feeding Ecology of Juvenile Dog Snapper *Lutjanus jocu* Bloch and Shneider, 1801) (Lutjanidae) in Intertidal Mangrove Creeks in Curuçá Estuary (Northern Brazil)

Britannica.com

www.pir.sa.gov.au

coralreeffish.com

www.flmnh.ufl.edu

Blackfin Snapper
(Lutjanus buccanella)

Dog Snapper
(Lutjanus joci)

Cubera Snapper
(Lutjanus cyanopterus)

Lane Snapper
(Lutjanus synagris)

U.S.V.I. Factsheet #20

Triggerfish

Balistidae

Queen Triggerfish (*Balistes vetula*)

Description

Triggerfish are large, uniquely shape and brightly colored marine fishes that are often marked by lines and spots. The head is large compared to body size sometimes reaching to 1/3 their body composition. They have a small but strong- jawed mouth with teeth adapted for crushing shells. Their eyes are small, set far back from the mouth, at the top of the head. The family comprises of eleven genera of approximately forty species.

Triggerfishes are recognized and named for their flexible trigger spines. This fish has a top dorsal spike that can be put into an up or down position at will. At the bottom of the body there is another smaller, permanently extended type trigger that can be flexed as well. When these fish feels threatened, is ready for sleep at night, or wants to secure itself against strong surge-zone wave action, it will go into a hole and stick up its top trigger, flex the bottom one, and then lock them both into place.

Taxonomy

Kingdom - Animalia
Phylum - Chordata
Subphylum - Vertebrata
Class - Actinopterygii
Order -Tetraodontiformes
Family -Balistidae

Identification Characteristics

- Large head in comparison to body
- Usually brightly colored
- Deep, flat, oval body
- Flexible trigger spines

The force of the two triggers used in conjunction with one other firmly wedges the fish into place. Once a Triggerfish has "trigged in", it is next to impossible to remove it from its hiding place. Their family name "balistidea" which is latin for ballista, reflects this feature.

Distribution and Habitat

Triggerfish are bottom dwellers and usually live in the shallower, in shore areas of coral reefs that contain crevices and other hiding places. Few species are pelagic. They inhabit tropical and subtropical oceans throughout the world.

Diet

Triggerfish are carnivores that spend their days nibbling on a wide variety of echinoderms and crustaceans like crabs, shrimps, sea urchins, worms, and other invertebrates. They are not coral eaters, but they may have a tendency to pick at clams and other animals that may be attached to corals or live rock.

When looking for food in the sand, some Triggers will tip up on their nose and "blow" the

sand to uncover a potential meal. It is interesting to watch them eat a sea urchin. They will pick off all the spines, turn the urchin over to expose the more vulnerable area of the urchin, and with their front two bonded teeth and strong jaws, they break it open. Triggers do not attack other fish for the purpose of eating them, but they are opportunistic and will feed on the flesh of dead fish.

Triggerfish also will often lie on their side above the substrate and undulate their dorsal and anal fins, sending up a cloud of sand, detritus, and microfauna. This is another feeding behavior that allows them to expose buried animals, and they will swim through the cloud of debris picking out small benthic organisms that were flung into the water column.

Reproduction

Triggerfish reproduce sexually by laying eggs, and do not undergo sex change during reproductive development. During the breeding season, males establish territories roughly 10 m (33 ft) in diameter and attract several females. This is known as harem breeding. Nests are built by females in the sand by fluttering the fins or blowing water from the mouth near the bottom to create wide sand bowls into which eggs are laid following an unknown courtship ritual. Once the eggs are laid, they are fertilized by the male. Both parents defend an area described as an inverted cone above the nest, and they have been known to bite divers who come too close. Once the eggs hatch, the young disperse into the current. Reproduction is thought to occur year-round.

Behavior

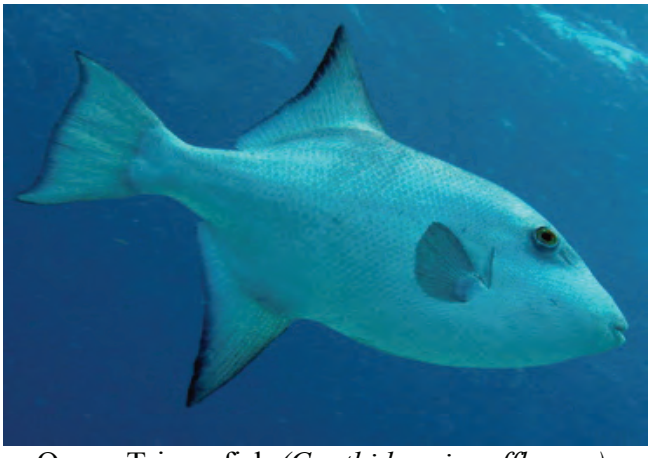
Triggers are extremely territorial and are on the move most of the time. They are aggressive and will deliver a large, painful bite if feeling threatened. Triggers will move and break pieces of rock and coral to find food, such as urchins and crustaceans. Spitting is another common triggerfish behavior. This is an adaptation of their natural feeding behavior. In the wild triggerfish will hunt by hydraulic jetting: they blow water out of their mouths and into the sand to uncover prey.

Conservation

Triggerfish are a major part of the aquarium trade because of their beautiful bright colors and unique body shape. This has prompted fishermen and divers to gather threatened species from the wild. Conservationists are working to raise triggerfish in captivity so that wild populations can be left alone.

Due to the recent invasion of the Indo-Pacific Lionfish the presence of Triggerfish as a natural predator is important to the coral reefs of the Virgin Islands. Triggerfish are experts at avoiding the venomous spines on lionfishes, and are able to attack and kill lionfish, avoiding the spines without being stung.

Black Durgon (*Melichthys niger*)



Ocean Triggerfish *(Canthidermis sufflamen)*

Information gathered from:
animals.nationalgeographic.com
Reefkeeping.com
Saltaquarium.about.com
Sheddaquarium.org

U.S.V.I. Factsheet #21

Grunt

Haemulidae

Margate *(Haemulon album)*

Bluestriped Grunt *(Haemulon sciurus)*

French Grunt *(Haemulon flavolineatum)*

White Grunt *(Haemulon carbonarium)*

Taxonomy

Kingdom - Animalia
Phylum - Chordata
Class - Actinopterygii
Order -Perciformes
Family -Haemulidae

Identification Characteristics

- Extremely forked tail
- Low mouth
- Some have reddish/pink lining inside mouth

Description

Grunts are members of the Haemulidae family. They obtained their name from the "grunt" sound produced when grinding their teeth deep within their throats is amplified by the air bladder.

They closely resemble the snapper family with the forked tail but lack the sharp canine teeth. Grunts are typically hard to distinguish between species with subtle differences such as lines and spots. Their mouths are located in a relatively low position on their heads. This thought to be

an adaptation which helps them snare their bottom dwelling prey.

Distribution and Habitat

Grunts are found in most oceans around the world. They usually have the largest species abundance on reefs in continental or insular shelf areas that contain large expanses of grass beds and sand flats.

Diet

Grunts are nocturnal feeders. At night they scavenge the flats and grass beds for crustaceans, small fish, shrimps and crabs.

Reproduction

Grunts spawn different times of year based on geographical location and type of species. There is currently no known spawning behavior or activity for grunts.

Behavior

Grunts congregate during the day in schools drifting through reefs. Some species are noted for a behavioral trait in which two individuals approach and "kiss." This happens when they face each other with their mouths open wide. Some grunts keep a small distance between and others make contact and kiss or push each other. Scientists believe that the behavior is either sexuality and courtship or territoriality.

Some grunts, when they perceive danger, open their mouths towards that threat. By doing so a pinkish/reddish lining inside their mouth is displayed. This behavior is taught to keep predators away.

Conservation

Like most species grunts are faced with pressures of fishing and habitat loss. Conservation of these fish species are strongly dependent on the conservation of their coral reefs, sea grass beds habitat and fishing laws. Currently, ACL's (Annual Catch Limits) are being set.

Sailors Choice *(Haemulon parra)*

Porkfish (*Anisotremus virginicus*)

References:
Deloach, N. and Humann, P., 2002, *Reef Fish Idnetification: Florida, Caribbean, Bahamas, 3rd Edition*, New World Publications, Inc., Jacksonville, FL, 510p.
Snyderman, M. and Wiseman, C., 1996, *Guide to Marine Life: Caribbean, Bahamas, Florida*, Aqua Quest Publications, Inc., Locust Valley, NY, 284p.

U.S.V.I. Factsheet #22

Parrotfish

(Gutu)

Scaridae

Stoplight Parrotfish *(Sparisoma viride)*
Initial Phase

Stoplight Parrotfish *(Sparisoma viride)*
Terminal Phase

Taxonomy

Kingdom - Animalia
Phylum - Chordata
Class - Ostreichthyes
Order -Perciformes
Family -Scaridae

Identification Characteristics

- Beak-like mouth
- Brightly colored
- Three phases

Description

Close relatives of the wrasse, parrot fish are abundant in and around the tropical reefs of all the world's oceans. There are about 80 identified species, ranging in size from less than 1 to 4 feet (30 to 120 centimeters) in length.

The parrotfish get their name from their beak-like teeth and wildly bright colors, like parrots. Parrotfish go through three different phases in their life which are juvenile, initial and terminal and changes color in each phase.

The initial phase include sexually mature females and in some species, immature and mature males. The terminal phase are always sexually mature males. Some parrotfish are hermaphroditic and go through a sex reversal to become terminal phase, while others simply mature, never changing their sex.

Distribution and Habitat

Parrotfish are all marine, mainly tropical spread throughout many parts of the world including the Atlantic, Caribbean, Indian and Pacific oceans. Tropical waters provide rich reefs, beds of seagrass or macroalgae which become excellent feeding and breeding grounds.

Diet

Parrotfish are considered to be herbivores. They eat the algae that grow on and around coral, biting off bits of coral skeleton with its strong, bird-like beaks. The beak is made of individual teeth that are fused together to form a structure like a beak. After biting off a chunk of algae-covered reef, pharyngeal teeth or powerful molar-like teeth in the throat, crush the hard limestone rocks. The fish's small,

stomach-like pouch extracts nutrients as it digests algae. When coral rock has traveled all the way through the fish's system, it comes out as the silky sand we see on many beaches. Waves and currents carry this sand to shore, where it helps build the beach.

Reproduction

Spawning happens at dusk. When courting the females, the color of all the males will become brighter and more brilliant. A supermale mates and spawns with its harem or small group of females. Sometimes there are so many parrotfish that initial phase males gather together with large groups of females to spawn. Whether they are terminal or initial phase males, the parrots will pelagic spawn, which means they will all gather in an area where the fertilized eggs will be taken away on the currents to drift into the open ocean. This ensures the species will be found in a wider range of areas. Once the eggs hatch, the larvae remain in the epipelagic zone or the zone in the open ocean near the surface. When the larvae reach about 5 to 6 inches (12 to 15 mm) long, they become juveniles and swim down to join the reef ecosystem.

After parrotfish become adults, they are called initial phase males or females. Those that were born male will always remain as an initial phase male and will never have a chance to be a dominant male. Some of the adult females will change into males. These males and the remaining females are also called initial phase parrotfish. But some of the larger females will become supermales. This usually happens when a supermale dies.

Behavior

Parrotfish in general are very sociable during the day, however, when night falls the fish separate from the school and search for dwellings. Every night, certain species of parrot fish envelope themselves in a transparent cocoon made of mucous secreted from an organ on their head. Scientists think the cocoon masks their scent, making them harder for nocturnal predators, like moray eels, to find.

Conservation

The relationship between parrotfish and coral is a somewhat symbiotic one in which both benefit from the others continued existence. The conservation of the parrotfish species is highly thought of as a way to save coral reefs. They are the main consumer of algae on corals that if left there will cut off the coral from sunlight needed to grow and compete for nutrients.

In comparison, the survival of the Parrotfish species depends on the conservation of the reefs in which they dwell and eat.

Redtail Parrotfish *(Sparisoma chrysopterum)*

Initial Phase

Terminal Phase

Information gathered from:
animals.nationalgeographic.com
Sheddaquarium.org

Coral Reefs

Fringing Reef :a reef that is directly attached to a shore or borders it

Barrier Reef
a reef separated from a mainland or island shore by a deep lagoon

Atoll Reef a circular or horse shoe barrier reef that loops all the way around a lagoon without a central island

Taxonomy

Kingdom – Animalia
Phylum – Cnidaria
Class - Anthozoa
Subclass:

- Octocorallia
- Zoanth

Description

Corals are tiny animals that generally group together in mass quantities, forming colonies that attach to hard substrates under the sea. These animals called Polyps, draw calcium carbonate from seawater and build skeletal structures in an array of shapes and sizes. Reef building coral produce massive skeletons that collectively form a limestone frame work that we call tropical reefs. All corals are a part of the Animal Kingdom. They are often mistaken for plants. Coral reefs are often called “rainforests of the sea”. They form some of the most diverse ecosystems on earth.

There are two types of coral Hard and Soft. Hard coral has polyps secrete calcium carbonate to form hard pockets to provide themselves protection. They are primary reef builders. Brain coral, stag horn coral, elk horn coral, are some examples of hard coral.

Soft coral lack hard rigid skeletons systems. They resemble branching trees with thick trunks. They have one primary base and branches out. They do not produce calcium

carbonate. Some examples of soft coral are sea fans, sea rods, and sea whips.

Distribution and Habitat

Coral reefs are estimated to occupy less than one tenth of one percent of the world ocean surface, about half the area of France, yet they provide a home for twenty-five percent of all marine species, including fish, molluscs, crustatians and sponges. They are most commonly found at shallow depths in tropical waters, in the Photic Zone no deeper than 160ft in the ocean. Shallow-water reefs can be found extending from 30° N to 30° S of the equator.

Diet

Some corals eat *zooplankton* (tiny drifting animals) or small fishes. Others consume organic debris. Many reef- building corals derive their nutrition from zooxanthellae (algae).
Zooxanthellae live symbiotically within the coral polyp tissues and assist the coral in nutrient production through its photosynthetic activities. Like a plant, coral needs the rays of the sun to gather food through photosynthesis.

Reproduction

Corals reproduce sexually by either internal or external fertilization. Externally fertilized eggs develop while adrift. After a few days, fertilized eggs develop into free-swimming larvae. Larvae settle within hours to days. Internally fertilized eggs are brooded by the polyp for days to weeks. Free-swimming larvae are released into the water and settle within hours. It takes about 8 years for a colony of reefs to reach sexual maturation

Conservation

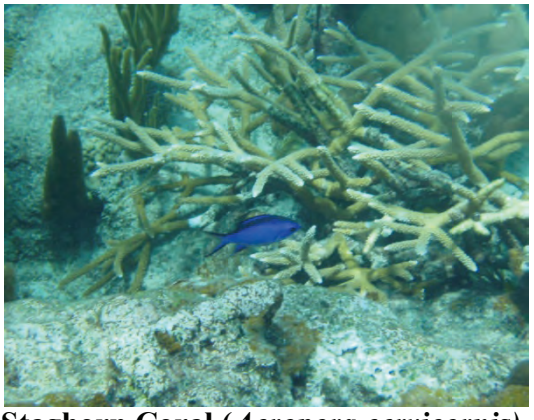
Coral Reefs provide protection and shelter for many different species of fish. They control how much carbon dioxide is in the ocean water
They also protect coasts from strong currents and waves by slowing down the water before it gets to the shore.
Coral is susceptible to damage whether it is natural or human. Coral Bleaching is one type of disease commonly affecting our coral reefs. When either the algae inside the coral die, or the algae leave the coral forms “bleaching”. This is one of the most obvious sign that a coral is not healthy. Bleaching can be caused by coral shading, rise in temperature of sea water, and/or over growth of harmful algae.

Man has also contributed to the demise of coral reefs through land development (run off) and improper dumping of waste products. We live on an island that is surrounded by beautiful water that attracts people to go swimming, boating and diving. These activities can harm coral reef. Improper anchoring of vessels can break fragile coral. Swimmers and divers that stand or touch coral also can cause damage.
We can protect our reefs by:

- Having boaters tie up there vessels to a mooring when possible.
- Avoid throwing waste in our oceans
- Never touch or stand on coral.
- Letting other people be aware of the importance of our reefs.

Federally Endangered Coral in the Virgin Islands

Elkhorn Coral (Acropora *palmata*)



Staghorn Coral (*Acropora cervicornis)*

Information gathered from:
Paul Humann’s *Reef Coral Identification Guide*
Reef.org
Coral Reef Wikipedia
VI Division of Fish and Wildlife

Department of Planning and Natural Resources

Division of Fish and Wildlife

U.S.V.I. Factsheet #24

Seabird bycatch in Fishing Line

DON'T CUT THE LINE

Seabirds and humans have a long history of association. Flocks of seabirds circling and diving over the water signal the presence of schools of fish, which are targeted by fishermen. Seabirds have traditionally been hunted and their eggs collected as a source of food. Overexploitation has led to declines of many species and even extinction of several species (e.g., Great Auk). In recent times, large-scale long-line fisheries and nets kill hundreds of thousands of seabirds each year, with albatrosses particularly hard hit.

Seabirds that are fishing near fishermen or trying to eat fish discarded from vessels often become hooked and entangled in fishing gear. Entanglement in fishing hooks and line is one of the leading causes of death and injury to seabirds in the U.S. Virgin Islands. Fishermen who cut the line cause death not only to individual birds but possibly to many more birds when an entangled bird returns and drags the line through the nesting colony, thereby entangling others. In the USVI, the species most often caught in fishing line are pelicans, boobies and frigatebirds.

Laughing Gull entangled by monofilament fishing line.

What are Seabirds?

Seabirds are birds that spend much of their lives at sea and depend upon it for food. They are highly adapted to life in a marine environment with long wings for soaring, webbed feet, salt glands located behind their eyes to excrete sodium chloride from seawater, and waterproof plumage.

Seabirds are long-lived—some reaching 40 years of age and older! Most nest in colonies on the offshore cays of St. Thomas and St. John, defer their breeding until they are at least 3 years of age, and raise one chick (exceptions include pelicans, laughing gulls and some terns).

Photo by Tom Lance

This entangled Brown Pelican died on a power line in St. Croix.

What You Can Do

If you accidentally hook a seabird while fishing:

DON'T CUT THE LINE!

- Slow the vessel down or stop.
- Slowly bring the vessel toward the bird. Do not pull on the leader; this could cause more damage to the bird.
- Lift the bird out of the water with a dip net, if possible, to support the bird's weight.
- Watch your eyes and control the beak to avoid injury to yourself; cover the bird's head with a towel if necessary.
- Gently grasp the bill, being careful not to squeeze too tightly or the bird may suffocate.
- Locate the hook and push the barb to the outside of the skin.
- Cut the barb and then back the hook out.
- Ensure that all fishing line has been removed and the bird is otherwise uninjured before releasing.
- Frigatebirds are not waterproofed like most seabirds and may need some time to dry out before releasing.
- If the bird is injured or you cannot remove the hook safely, bring the bird to a local veterinarian or to DPNR/Division of Fish and Wildlife in Red Hook, St. Thomas or Mars Hill, on St. Croix.

REMEMBER: if your line becomes entangled, be it on a bird or turtle or other structure, don't cut the line! Fishing line in the marine environment can chafe and harm corals and other reef structures and can entangle reef fishes and turtles. Help keep our marine environment clean and safe!

Brown Pelican's throat pouch severely damaged by a fishing line and hook.

When the bird has been captured, carefully remove the hook and collect all the fishing line. Frigatebirds need to dry out before they can be released.

By Judy Pierce and Renata Platenberg 2010.
This publication was produced with funds from the US Fish and Wildlife Service Wildlife Restoration Program.
FOR MORE INFORMATION ON OUR NATIVE ANIMALS CONTACT:

THE DIVISION OF FISH AND WILDLIFE
vi.wildlife@gmail.com
www.fw.dpnr.gov.vi

6291 ESTATE NAZARETH
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

Department of Planning and Natural Resources
Division of Fish and Wildlife
U.S.V.I. Factsheet #25

The Importance of Mangroves

Introduction

Mangroves are a group of salt-tolerant shrubs and trees that form coastal or estuarine forests. The main characteristics that are used to define mangroves are air and water temperature, type of substrate, ability to provide protection from wave energy, presence of salt water, tidal range, ocean currents and shallow shores. Globally there are 65 recognized species of plants classified as mangroves, belonging to 20 different families. Within the Caribbean, however, there are only four (4) types of mangroves, belonging to three families. Here mangrove species are generally delineated based on the moisture of the soil and how well they have adapted to tolerating salt levels. Mangrove trees found in the Caribbean are Red Mangroves, *Rhizophora mangle*, Black Mangroves, *Avicennia germinans*, White Mangroves, *Laguncularia racemosa*, and the Button Mangrove or Buttonwood, *Conocarpus erectus*.

These trees are found in different zones within the mangrove forest, depending on their ability to tolerate the salinity of the water. Red mangroves are found in the areas closest to the water and are usually permanently inundated with salt water. The next shoreward species are the black mangroves., which are the most widely distributed species within the mangrove forest since they can tolerate a wide-range of salinity. They are followed by the white mangrove which grows in brackish to salty mud and is only intermittently affected by tides. The buttonwood mangrove is the least affected by tides and is usually found on the landward side of the mangrove forest. They are not limited to saline environments and are sometimes found outside of the mangrove forest.

Mangrove forests serve many purposes including, providing habitat to many species, acting as nursery grounds, as wave buffers, protecting coral reefs and seagrass beds from sedimentation, and man-made events.

Species Habitat

The environmental benefits of mangroves as well as their commercial uses have made mangrove forests very important ecosystems. Many diverse species inhabit mangrove forests including fish, birds, reptiles, amphibians, mollusks, crustaceans and many other invertebrates. Algae, sponges, corals, and anemones can often be found attached to exposed roots. clams, sea snails and mussels can be found hidden in the crevices. Crabs can also be found inhabiting mangrove forests. Coastal birds such as pelicans, spoonbills, and osprey use the mangrove canopy for nesting, roosting and feeding.

Nursery Grounds

Mangroves provide juvenile fish with refuge from large predators because the exposed prop roots and pneumatophores provide ample hiding places for fish and plenty of food. Many commercially important fish species use mangroves as nurseries.

The juveniles remain in the mangrove habitat until they grow larger and are less vulnerable to predators. They then move to more open habitats such as seagrass beds and coral reefs. Studies on St. Thomas and St. Croix have shown that shorelines along mangrove forests are very important habitat for spiny lobster and other reef fish such as grunts and snappers.

Wave Buffers

Mangroves act as important buffers against wave energy. They are able to withstand occasional heavy wave impact and help to dissipate wave action from storms. It is because of this durability and protection that boats are often moored in mangrove lagoons during the hurricane season.

Mangrove forests are also important for protecting shorelines from tsunamis and other high wave events. People found, after the 2004 Boxing Day tsunami in Asia, the villages with mangrove forests intact survived the waves with a lot less damage than villages on open beaches. By acting as a buffer against wave action mangrove forests can reduce the impact of high energy storms.

Sediment Filtering

Mangroves help prevent sediments from reaching other critical marine habitats such as coral reefs and seagrass beds. The health of these habitats is dependent in part on clear water, so that sunlight is able to penetrate the water column.

The retention of sediments and nutrients by mangroves helps to prevent sedimentation on the coral reefs which could lead to the smothering of reefs and the growth of algae on the reef from increased nutrients in the water. Seagrass beds are also dependent on clear water and decreases in turbidity and sedimentation by the filtering of nutrients by mangrove forests help promote their health as well. The destruction of mangrove forests will lead to an increase in the amount of sediment discharged into the ocean thereby decreasing the overall health of adjacent offshore habitats.

The accumulation of sediment by the roots in mangrove forests also helps build land mass. As the new land stabilizes, mangroves move seaward leaving the new land to be colonized by other plants.

Commercial Uses

Mangrove forests have several commercial uses. Mangroves are cut and burned to produce charcoal. They are also used to fashion fish traps. They are used as harvesting areas for fish, shrimp (Altona Lagoon), lobster, mussels and other mollusks. However, the USVI has a “no net loss” regulation meaning there cannot be a loss of mangroves within the territory and permits are required to even prune mangroves.

Mangrove lagoons are highly valued for eco-tourism ventures. Kayaking and sailing tours take place in these areas since they are calm and provide a safe area for both novice and expert boaters. Also, because of the huge diversity of marine organisms found in mangrove lagoons, snorkelers may be able to see species that they may not otherwise be able to find.

Threats

The main threat to mangroves throughout the world is their over-exploitation by man. Globally unsustainable harvesting of mangrove trees for charcoal and lumber can lead to a rapid decline in the amount of mangrove forests present.

Development along the coastline often results in the removal of mangroves by dredging for marinas or filling for construction. This has damaging effects on adjacent habitats such as coral reefs and seagrass beds as well as on the fish and shellfish that rely heavily on mangroves for the completion of their different life stages.

The destruction of mangrove forests will decrease biodiversity within these areas, increase coastal erosion, storm impacts and decrease fisheries production. It is therefore very important that mangrove lagoons be protected and conservation methods be implemented to ensure their continued health.

WRITTEN BY CHRISTINE O’SULLIVAN
THIS PUBLICATION WAS PRODUCED WITH FUNDS FROM SPORT FISH RESTORATION.

FOR MORE INFORMATION CONTACT
DIVISION OF FISH AND WILDLIFE
6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227
or visit the website at www.vifishandwildlife.com

U.S.V.I. Factsheet #26

Black mangrove

Avicennia germinans

The Black Mangrove, *Avicennia germinans*, is a small evergreen shrub/tree that grows up to 15 m tall. The surfaces of the leaves are often covered with salt crystals while the thick, grey bark has a slightly salty taste. They are generally found behind the zone of red mangroves in a mangrove forest. Due to their close proximity to red mangrove trees, black mangroves have also adapted to being inundated with salt water on a regular basis. However, their adaptations differ from those found in red mangroves.

Adaptations

The most characteristic feature however, of black mangroves, is the pneumatophore. Pneumatophores are spongy roots which extend above the soil from the underground root system. They send oxygen to the roots while also trapping sediment and chemicals from the water, preventing them from going into the sea. These projections allow black mangroves to live in soils that are often flooded and do not have a lot of dissolved gases. Since the pneumatophores are found above the soil they are able to absorb oxygen from the atmosphere and transfer it to the roots below.

Black mangrove trees have two adaptations, which are used to extrude salt.

While the roots filter 30 – 90% of all salt found in the seawater, the remaining salt is sent to salt glands in the upper epidermis of the leaves. The

salt sent to these glands from the roots becomes the salt crystals often found on the leaves of this tree as the salt excreted dries during the day. Frequently salt crystals can be seen on the bottom of the leaf. The top of the leaves often appear to be sweating.

The black mangrove leaves are two-tone in color, with a dark green on the top and a silver green on the bottom.

Also in common with red mangroves, the seed of the black mangrove germinates on the tree before eventually falling into the water. They are able to survive for up to four months in sea water.

Species Habitat

Stands of black mangroves are used as habitat by a wide variety of birds including breeding residents and seasonal visitors. Bird species associated with mangrove stands in the US Virgin Islands include the spotted sandpiper (*Actitis macularius*), the great blue heron (*Ardea herodias*), the cattle egret (*Bubulcus ibis*) and the West-Indian whistling duck (*Dendrocygna arborea*).

The flowers of the black mangrove are pollinated by bees and generally bloom between June and July. During this season bees should be prevalent within the area.

Uses

While there have been no industrial uses for black mangroves they are used in making folk medicines, as a soap substitute, and in the

construction of piers, posts, utility poles, wharves and charcoal. Also, since bees pollinate the trees flowers, "mangrove honey" is also produced. The honey produced by mangroves is very high quality.

Threats

The unsustainable removal of these species, due to coastal construction, charcoal production and other uses may have detrimental effects on the mangrove ecosystem and other outer-lying ecosystems.

The number of migratory and resident bird species that rely on mangrove lagoons not only for food but also for nesting will also decrease as their nesting grounds and habitat decline.

WRITTEN BY CHRISTINE O'SULLIVAN
THIS PUBLICATION WAS PRODUCED WITH FUNDS FROM SPORT FISH RESTORATION.

FOR MORE INFORMATION CONTACT
DIVISION OF FISH AND WILDLIFE

6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

or visit the website at www.vifishandwildlife.com

U.S.V.I. Factsheet #27

Red mangrove

Rhizofora mangle

Red mangroves (*Rhizophora mangle*) are the mangrove trees usually found the closest to the sea. In the US Virgin Islands they tend not to get larger than 26 feet but in other regions can grow to 80 feet tall. They have dark green, elliptical leaves with smooth margins, pale yellow flowers and a leathery, rust-colored berry for fruit. They are the trees on stilts!

Adaptations

Red mangroves are the most able to tolerate salt water and have developed several adaptations that allow them to live in saline environments where they are almost constantly inundated with salt water. One such adaptation is the use of prop roots.

Prop roots are arching roots that are only partially submerged in the water. They supply oxygen to the plant through pores called lenticels which allow oxygen to diffuse from the air into the plant. They also aid in the support and stability of the tree. They also help to prevent the uptake of salt from the water. Prop roots are also used to collect sediment allowing for soil accretion and preventing sediments to reach seagrass beds and coral reefs. Prop roots are also important habitats for several species including mollusks such as mussels and clams.

Plant reproduction has also been adapted since these plants live along the shoreline. Hanging propagules are produced which are then dropped from into the water once they mature. If the area is shallow the propagule is able to remain where it has fallen. However,

the propagule, depending on the depth of the water may also float away to populate other areas.

Red mangroves are known to help create "fast land". Sediment settles amongst the prop roots and the area gradually gets shallower and shallower, eventually other mangrove plants start to take over, and so on until upland plants start growing and the land becomes solid.

Species Habitat

Red Mangrove plants provide habitat for several species. The prop roots are used as refuge areas for juvenile fish while algae and marine invertebrates such as sponges, corals and anemones can be found attached to the roots. Mollusks and crustaceans such as shrimp, clams and sea snails also use prop roots for shelter and as a feeding ground.

The tree canopy is used by birds such as pelicans, egrets, herons and osprey as nesting sites while they feed in the surrounding waters.

Uses

Red Mangroves have several important uses. The wood is used in construction for building pilings, posts, poles, cabinets and for use as charcoal. The bark is also used to produce dyes, tannins and medicines.

During hurricanes boats are placed in mangrove lagoons for protection since they are sheltered and the trees are able to withstand heavy wave action. However, once these trees are removed coastal erosion and a decrease in commercial fisheries may occur.

Threats

The unsustainable removal of these species, due to coastal construction, charcoal production and other uses may have detrimental effects on the mangrove ecosystem and other outer-lying ecosystems. Increases in the amount of sedimentation reaching seagrass beds and coral reefs may lead to the deterioration of these habitats. Coastal erosion may occur since the trees will no longer be present to trap soil and sediment allowing all accrued soil to wash away.

Species diversity may also decrease since Red Mangroves provide habitat to a wide range of species. Without the refuge areas provided by prop roots, juvenile commercial fish species may be more susceptible to predation reducing their population size. Fisheries dependent on commercial fish species as well as the collection of mollusks that live on prop roots may eventually decline.

The number of migratory and resident bird species that rely on mangrove lagoons not only for food but also for nesting will also decrease as their nesting grounds decline.

It is therefore very important that mangrove ecosystems be protected to ensure the continued health of other ecosystems and species.

WRITTEN BY CHRISTINE O'SULLIVAN
THIS PUBLICATION WAS PRODUCED WITH FUNDS FROM SPORT FISH RESTORATION.

FOR MORE INFORMATION CONTACT
DIVISION OF FISH AND WILDLIFE

6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227

or visit the website at www.vifishandwildlife.com

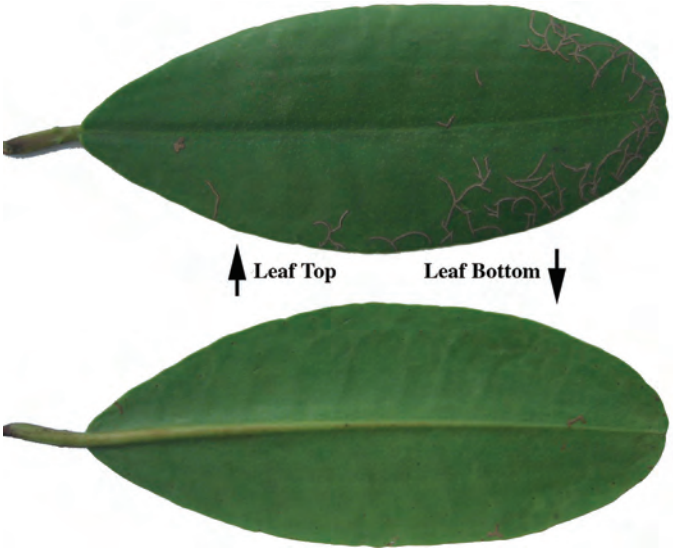
U.S.V.I. Factsheet #28

White mangrove

Laguncularia racemosa

The white mangrove **(*Laguncularia racemosa*)** is one of the four species of mangroves found in the Caribbean, and can be found in coastal regions of African from Senegal to Cameroon and from Florida to Brazil throughout the Caribbean and Gulf of Mexico. It is only distantly related to the other mangrove species in the Caribbean. The white mangroves are important for protecting and stabilizing low lying coastal areas, where they are frequently inundated by salt water.

The white mangrove is a low sprawling type of shrub, or small tree. The leaves are rounded compared to the red and black mangroves. They are thick and have a waxy feel to them. At the base of the leaf are two glands called nectaries. There are also a series of small pores along the bottom edge of the leaf.



Adaptations

Freshwater is a precious commodity for both desert plants and mangroves, and they both have special morphological and physiological features to conserve freshwater.

They have a thick waxy leaf that helps them to minimize water loss through evaporation and increases the ability to store water inside the leaves themselves.

The white mangrove spends a significant amount of its energy to get rid of the salt in the water they intake. White mangroves will also sequester salt in leaves, usually the leaf closest to the stem of the plant. As the level of salt increases the leaf turns a yellow color, and when the level of salt reaches a critical point the leaf drops off, taking the salt with it. Another way to rid the plant of salt is

through a series of small glands found close to the outer edge of the leaf.

Depending on the habitat conditions white mangroves can exhibit proproots and/or pneumataphores, similar to the other mangroves.

The seeds of the white mangrove can germinate on the tree, so that when they fall they can start growing immediately.

Species Habitat

White mangrove are found in areas that are frequently inundated by salt water they tend to grow on the landward side of read and black mangroves.

The root system helps to prevent soil from being eroded by tidal and storm surges. The mangroves slowly help to generate soil by trapping sediment, dead leaves and sticks which decompose at the base of the trees. As the layers of mud and decomposing organic material increase the soil conditions improve, allowing other plants to root. The mangrove root systems also help to reduce the damage caused by storms and tidal waves. Studies show that areas in Asia with intact mangrove systems survived the 2004 tidal wave better than those areas without mangroves.

Uses

A high grade honey has been attributed to the flowers. The white mangrove has been reported to be astringent and tonic, its used have been described as a folk remedy for dysentery and the bark is used for oral ulcers, fever, and scurvy. There may be anti-tumor activity of the bark extract, attributed to its tannin content.

Threats

The unsustainable removal of these species, due to coastal construction, charcoal production and other uses may have detrimental effects on the mangrove ecosystem and other outer-lying ecosystems.

The number of migratory and resident bird species that rely on mangrove lagoons not only for food but also for nesting will also decrease as their nesting grounds and habitat decline.

WRITTEN BY CHRISTINE O'SULLIVAN
THIS PUBLICATION WAS PRODUCED WITH FUNDS FROM SPORT FISH RESTORATION.

FOR MORE INFORMATION CONTACT
DIVISION OF FISH AND WILDLIFE
6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227
or visit the website at www.vifishandwildlife.com

U.S.V.I. Factsheet #29

Buttonwood

Conocarpus erectus

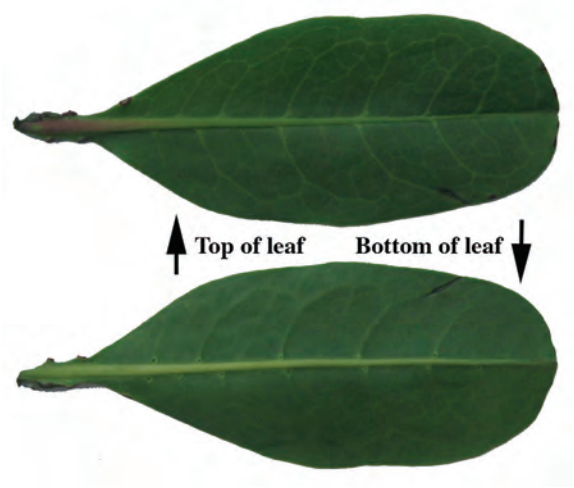
The buttonwood mangrove (*Conocarpus erectus*) is one of the four species of mangroves found in the Caribbean. The name buttonwood comes from the button-like appearance of the dense flower heads that grow in branched clusters, forming cone-like fruit. It

is usually found in coastal tropical regions of western Africa and North and South America. It is found throughout the Caribbean and Gulf of Mexico. One sub-species of buttonwood has been found as high as 745 meters in the Costa Rican forest. Outside of its native range (primarily in Hawaii) the buttonwood is considered an invasive weed.

It is a dense, multi-trunked shrub that can grow into a small tree. The buttonwood leaves are the smallest and least robust of our local mangroves. The underside of the leaf has rows of small pores along either side of the axis of the leaf. The leaf tends to have a darker green color on the top of the leaf. The underside may have silvery hairs.

Another identifying characteristic is that the other three mangrove species (Red, Black and White mangroves) have leaves that occur opposite of each other along a branch, the buttonwood leaves alternate.

The leaves also have two salt-excreting glands located at the base of each leaf, similar to the white mangrove.



Adaptations

Buttonwood are salt tolerant both in the soil and as an aerosol. Like other mangroves it is also drought tolerant.

Species Habitat

Buttonwood can grow to the size of a small tree, but is usually small and shrub-like. It is highly tolerant of full sun, sandy soils, salty conditions.

Often found in the upland transitional zone, the buttonwood (*Conocarpus erectus*) is often associated with mangrove communities. They are frequently found on the edges of salt flats, borders of fresh and brackish marshes, and sometimes on spoil and other disturbed areas.

The root system of mangroves help to prevent soil from being eroded by tidal and storm surges. The mangroves slowly help to generate soil by trapping sediment, dead leaves and sticks which decompose at the base of the trees. As the layers of mud and decomposing organic material increase the soil conditions improve, allowing other plants to root. The mangrove root systems also help to reduce the damage caused by storms and tidal waves. Studies show that areas in Asia with intact mangrove systems survived the 2004 tidal wave better than those areas without mangroves

Uses

Buttonwood is often used for landscaping due to its tough and long lasting. It can withstand the rigors of urban settings and makes a durable street or parking lot tree. It is also a popular tree for bonsai.

The wood has been used for, cabinets however, it is difficult to work but takes a smooth finish. It has also been used for firewood and making a high qualitycharcoal. It is very strong wood and ideal for smoking meats and fish because it burns slowly and releases generous quantities of heat.
It has been reported to be astringent, styptic, and tonic. The buttonwood mangrove is a folk remedy for anemia, catarrh, conjunctivitis, diabetes, diarrhea, fever, gonorrhea, headache, hemorrhage, orchitis, pricklyheat, swellings, and syphilis. The leaves are eaten, or their decoction drunk, for fever.

The bark is high in tannin, for which it has been harvested commercially.

Ecologically the buttonwood is an important host plant for epiphytes.

Threats

The unsustainable removal of these species, due to coastal construction, charcoal production and other uses may have detrimental effects on the mangrove ecosystem and other outer-lying ecosystems.

The number of migratory and resident bird species that rely on mangrove lagoons not only for food but also for nesting will also decrease as their nesting grounds and habitat decline

COMPLETED IN 2009. THIS PUBLICATION WAS PRODUCED WITH FUNDS FROM SPORT FISH RESTORATION.

FOR MORE INFORMATION CONTACT
DIVISION OF FISH AND WILDLIFE
6291 ESTATE NAZARETH, 101,
ST. THOMAS, VI 00802
PHONE 340-775-6762 FAX 340-775-3972
or
45 MARS HILL, ST. CROIX, VI 00840
PHONE 340-772-1955 FAX 340-772-3227
or visit the website at www.vifishandwildlife.com

Salt Pond

Nature's Continental Basin

Salt ponds offer a rare wetland habitat to fish, birds and other creatures of the Virgin Islands. These coastal ponds were once small bays or inlets open to the sea that became land-locked over time as storm-deposited material, such as rubble, formed berms across their entrance. These enclosed water bodies usually maintain a connection to the sea through tidal seepage or berm overwash. They also receive freshwater from upland storm drainage. Through evaporation, the water in these ponds is usually several times more salty than seawater (=hypersaline), although the salinity, temperature, depth, and oxygen content of these ponds vary widely throughout the year. Most salt ponds dry up completely during the year-this provides a mud flat habitat that many animals, like bugs, birds, crabs, and others, move into! These ponds are usually surrounded by mangroves, which also provide important habitat for a variety of species.

Salt ponds have always held high value to the local human population. Areas around these ponds often show evidence of human habitation from prehistoric Indian communities to Danish plantation ruins. Salt ponds provide an important food source of birds and crabs, and channels through the berm were often created to allow entry (and subsequent trapping) of fish. Salt ponds and associated mangroves are still a major source locally consumed crabs (*Cardisoma guanhumi)*. Salt has also been harvested from the hypersaline ponds, which at one time was a valuable source of income.

One of the most important roles of these ponds, however, is to contain sediment and other contaminations carried in run-off, preventing it from entering the marine environment. Storm surges are also buffered by these ponds, protecting inland areas from flooding.

The two salt ponds on Saba Cay provide an important breeding habitat for white-cheeked pintail ducks.

What you can do?

- Clean up trash in guts and around salt ponds
- Properly dispose of household detergents and chemicals so these don't enter the wetlands.
- Plant underground (grass or other herbaceous plants) on bare spots around your house to prevent erosion.
- Keep your car well maintained and immediately fix any oil leaks: runoff from roads can contaminate salt ponds.

Which Pond?

Some salt ponds are most accessible than others! On St. Thomas, check out the ponds at Compass Point, Red Hook, Bolongo and Smith Bay Park; on St. John, Frank, Francis, Europa, Grootpan and Salt pond bays offer easy access to healthy salt ponds; on St. Croix try southgate Pond or Great Pond.

Before you go: contact the property ownerbefore visiting because there may be ground nesting birds that are vulnerable to disturbance. Contact SEA (773-1989) for southgate Pond and the East End Marine Park (718-3367) for Great Pond. The National Park Service (776-6201) can provide more information on the ponds on St. John. Be sure to stay on marked trails or boardwalks to avoid disturbing fragile habitats.

Salt ponds look very different at different times of the year! They naturally undergo periods of drying and flooding; some ponds are completely dry most of the year. The resulting mud flat is usually teeming with invertebrate life, such as flies, other insects and crabs, offering an important food resource for birds. The photos of this pond at Fortuna were taken during the dry (left) and rainy (right) seasons.

Fact sheet information by Dr. Renata Platenberg

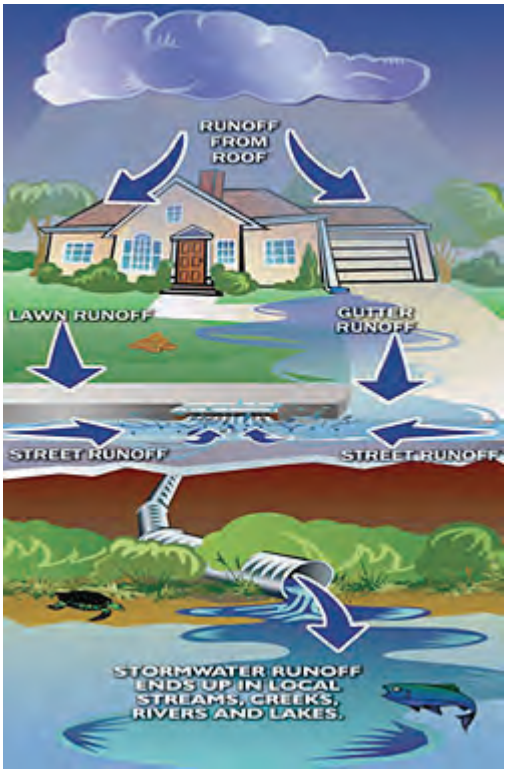
Non-Point Source Pollution

What is non-point source pollution?

Non-point source pollution is water contamination that stems from a diffuse source or different sources that cannot be traced to a single discharge point.

What causes non-point source pollution?

Non-point source pollution results from rainfall runoff, particularly during storms. As water flows over land it picks up human and natural pollutants and moves them into rivers, lakes, estuaries, beaches and groundwater. Common sources of pollution include runoff from debris, litter, oil and grease on road surfaces, silting from urban developments and construction sites, pesticides and lawn and garden care products, animal waste from farms and septic system malfunctions.



After rain, gut water runs off into local waterways.

Silting from construction site.

What can we do?
According to the Division of Environmental Protection nonpoint source pollution is the major containment of surface water in the Virgin Islands. Here are some ways we can reduce non-point source pollution:

- Install silt control during construction.
- Dispose of oil, paints, pesticides and other household chemicals properly.
- Clean up spilled oil, brake fluid, grease and antifreeze. Do not wash with water.
- Keep litter, pet wastes, leaves and debris out of street gutters and storm drains—these outlets drain directly to lake, streams, rivers and wetlands.
- Apply lawn and garden chemicals such as herbicides, pesticides and fertilizers sparingly.
- Control soil erosion on your property by planting ground cover and stabilizing erosion-prone areas.
- Have your septic system inspected and pumped, at a minimum every three to five years, so that it operates properly.
- Purchase household detergents and cleaners that are low in phosphorous.
- Remove litter from ground before washing down surface with water.
- Remove debris and scrape paint off building prior to power washing.
- Wash cars at a commercial car wash.


Ground cover used to prevent soil erosion.


Silt fencing-used to prevent soil from leaving area and entering waterways.

Information gathered from:
www.dpnr.gov.vi/dep
www.epa.gov
Pictures from:
www.cityftmyers.com/Departments/PublicWorks
www.councilonsoilandwater.org
www.hanesgeo.com/
www.notesfromtheroad.com/westi

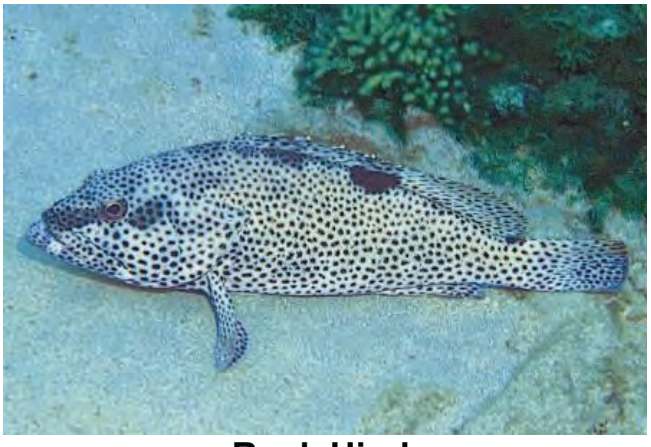
Appendix I
Groupers in the VI

Nassau Grouper
(Epinephelus striatus)

Yellowfin Grouper
(Mycteroperca venenosa)

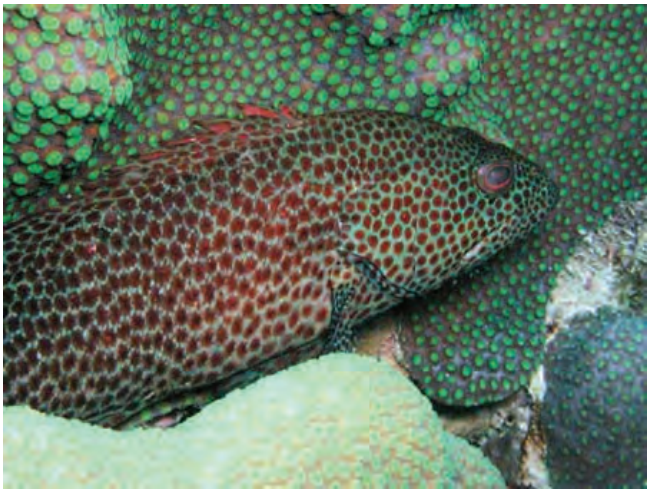
Red and white variations shown

Goliath Grouper
(Epinephelus itajara)

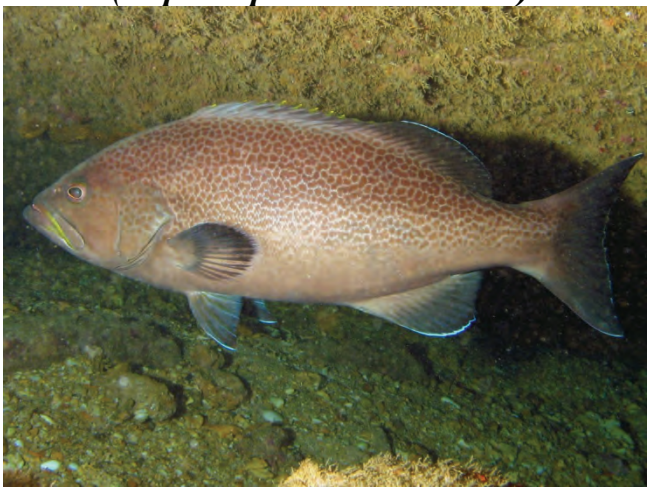


Rock Hind
(Epinephelus adscensionis)

Coney
(Cephalopholis fulva)
Bicolor and Golden variation shown



Graysby
(Cephalopholis cruentatus)



Yellowmouth Grouper
(Mycteroperca interstitialis)

Information gathered from:
reefguide.org
breef.org
jungelwalk.com

Appendix II
Snappers in the VI

Dog Snapper
(Lutjanus jocu)

Mahogany Snapper
(Lutjanus mahogoni)

Cubera Snapper
(Lutanus cyanopterus)

Schoolmaster
(Lutjanus apodus)

Vermilion Snapper
(Rhomboplites aurorubens)

Gray Snapper
(Lutjanus griseus)

Mutton Snapper
(Lutjanus analis)

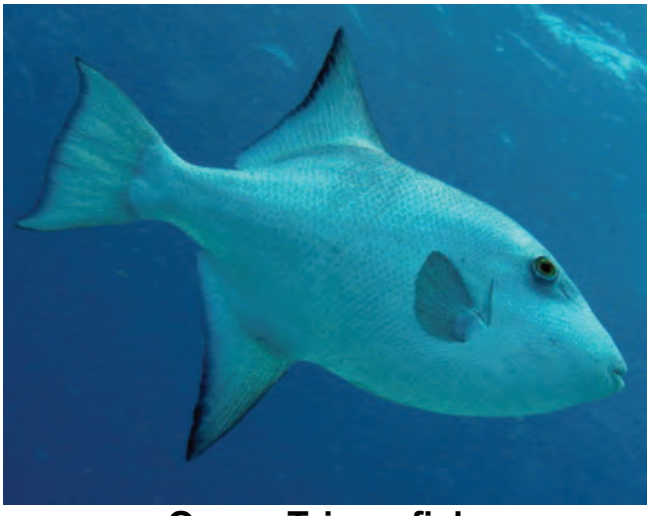
Schooling Red Snapper
(Lutjanus campechanus)

Schooling Snappers

Information gathered from:
eyephathom.com
reefguide.org
dnr.sc.gov

Appendix III
Triggers in the VI

Queen Triggerfish
(Balistes vetula)



Ocean Triggerfish
(Canthidermis sufflamen)

Gray Triggerfish
(Balistes capriscus)

Black Durgon
(Melichthys niger)

Sargassum Triggerfish
(Xanthichthys ringens)

Whitespotted Filefish
(Cantherhines macrocerus)

Information gathered from:
reefguide.org
breef.org
flicker.com
eriereefclub.com

The above shown fish is sometimes reffered to as a “bastard olewife”. This fish is typically confused with a triggerfish when in actuality it is not. This type of fish falls in the category of Filefish.

Appendix IV
Grunts in the VI

Tomtate
(Haemulon aurolineatum)

Cottonwick
(Haemulon melanurum)

Ceasar Grunt
(Haemulon carbonarium)

Spanish Grunt
(Haemulon macrostomum)

Black Margate
(Anisotremus surinamensis)

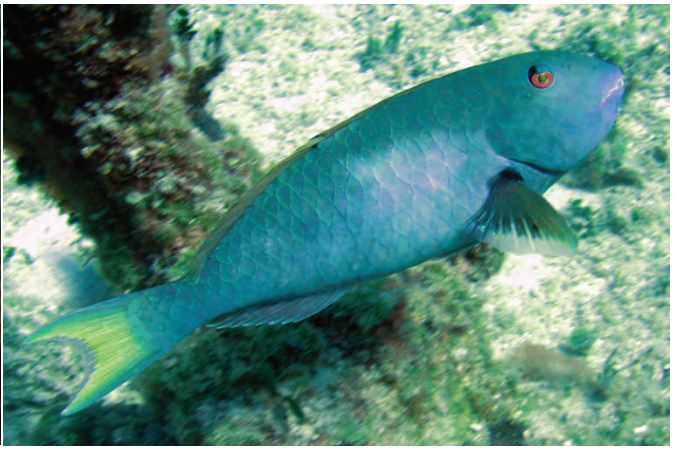
Margate (White)
(Haemulon album)

Information gathered from:
www.aug.edu
reefguide.org
bigelowsociety.com
richard-seaman.com

Appendix V
Parrotfish in the VI

Redfin Parrotfish
A.K.A Yellowtail Parrotfish
(Sparisoma rubripinne)

Initial Phase



Terminal Phase

Red Band Parrotfish
(Sparisoma aurofrenatum)

Initial Phase

Terminal Phase

Princess Parrotfish
(Scarus taeniopterus)

Initial Phase

Terminal Phase

Queen Parrotfish
(Scarus vetula)

Initial Phase

Terminal Phase

Information gathered from:
reefguide.org
underwater.org
reefngom.com

NOTES

NOTES

Funds Provided by USFWS State Wildlife Grant (SWG) for the following factsheets:

Virgin Islands Tree Boa
Virgin Islands Amphisbaena
American Kestrel and Nest Box
Virgin Islands Blind Snake
St. Croix Ground Lizard
White Tailed Deer
Red Footed Tortoise

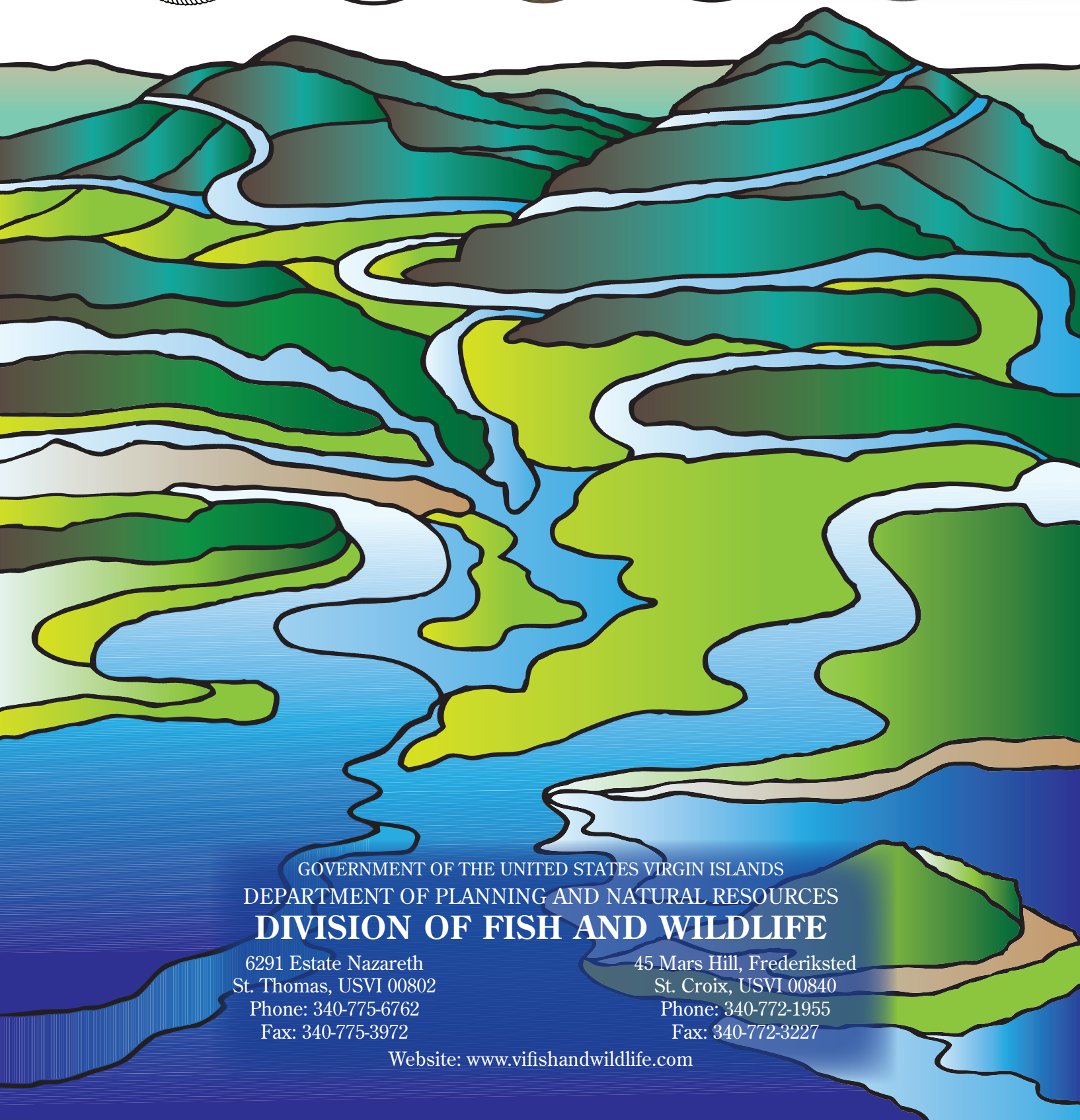
Sea Turtle Nesting
Sea Turtle Identification
Long Spined Sea Urchin
Spiny Lobster
Whelk
Queen Conch
Seabird Bycatch in Fishing Line

Funds Provided by USFWS Sport Fish Restoration Fund for the following factsheets:

Butterfly fish
The Importance of Mangroves
Black Mangrove
Red Mangrove
White Mangrove
Buttonwood
Non-Point Source Pollution
Salt Ponds
Coral Reefs

Lionfish
Fish
Sharks
Grouper
Snapper
Triggerfish
Grunt
Parrotfish
Appendix I-V

Funds Provided by USFWS State Wildlife Grant and Sport Fish Restoration Fund



GOVERNMENT OF THE UNITED STATES VIRGIN ISLANDS
DEPARTMENT OF PLANNING AND NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE

6291 Estate Nazareth
St. Thomas, USVI 00802
Phone: 340-775-6762
Fax: 340-775-3972

45 Mars Hill, Frederiksted
St. Croix, USVI 00840
Phone: 340-772-1955
Fax: 340-772-3227

Website: www.vifishandwildlife.com