

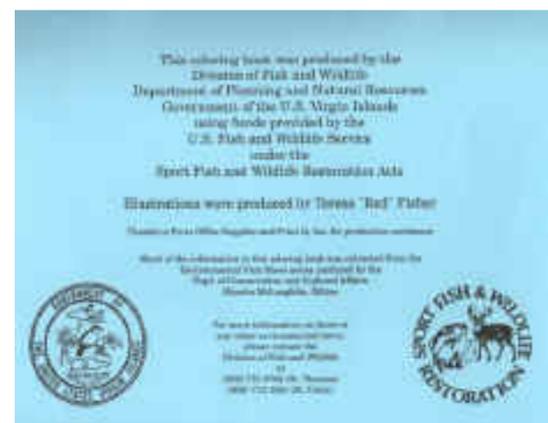
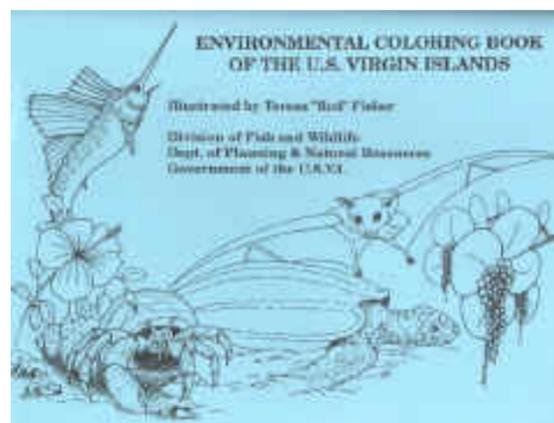


# Division of Fish and Wildlife Department of Planning and Natural Resources

## Government of the Virgin Islands



### ENVIRONMENTAL COLORING BOOK OF THE U.S. VIRGIN ISLANDS



Produced by the Division of Fish and Wildlife, Department of Planning and Natural Resources, Government of the U.S. Virgin Islands.

Illustrated by Teresa "Red" Fisher

Digitized by Christine O'Sullivan and William Coles

This coloring book has been produced to provide you with information on important processes, habitats, animals and plants that interact to create the natural environment of the U.S. Virgin Islands. Each and every one is vitally important in maintaining the balance of life which surrounds us. It is up to each one of us to make our islands a safe and healthy place for people, plants and animals. By learning about our natural environment you will be better able to make informed decisions and take proper actions to protect and conserve our valuable natural resources. The graphics were designed to illustrate examples of Virgin Islands' animals, plants and habitats. We hope that you enjoy coloring them and learn about our environment at the same time.

The pictures are found at the bottom of each text section. Select the small image to get a larger one to download for printing.

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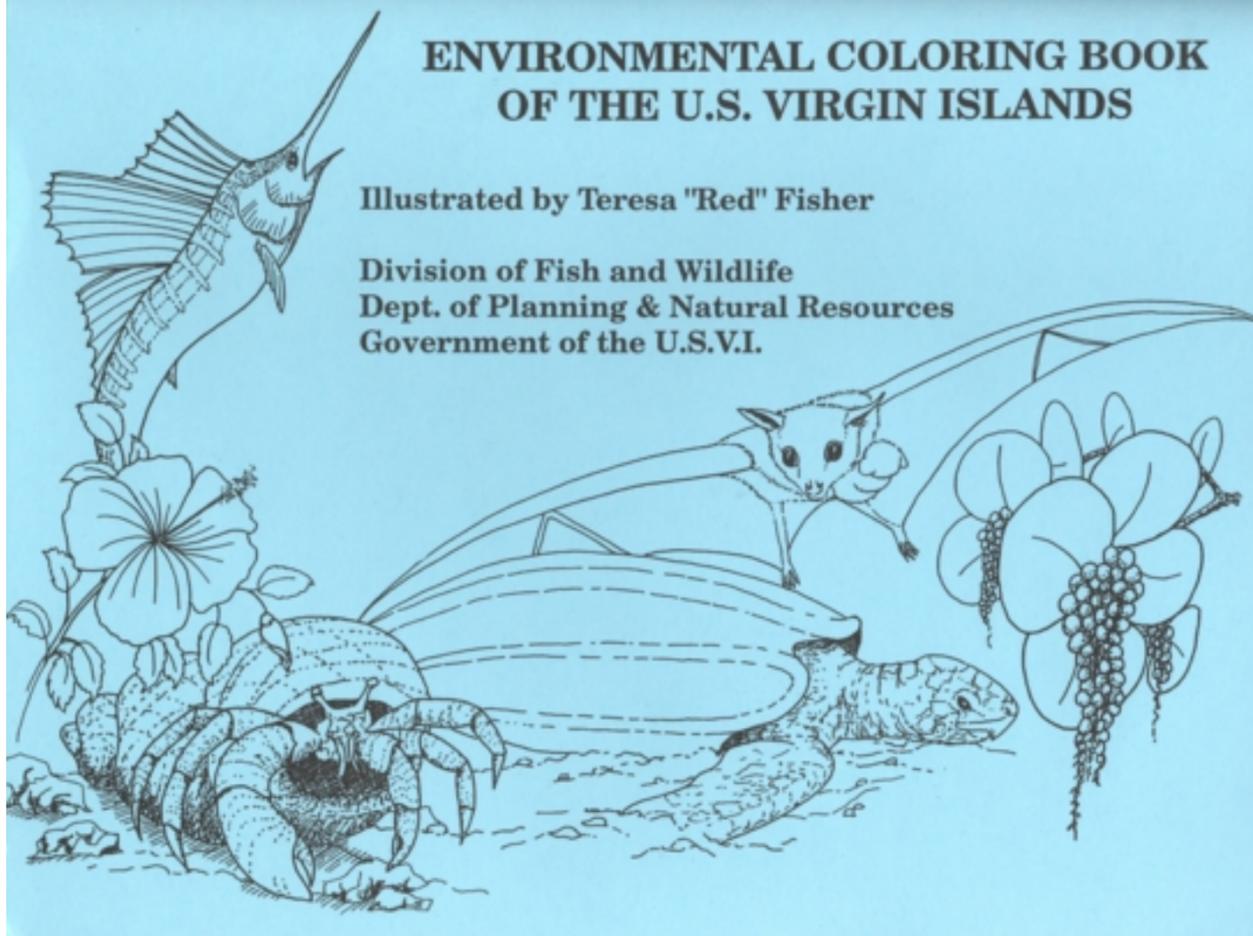
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# ENVIRONMENTAL COLORING BOOK OF THE U.S. VIRGIN ISLANDS

Illustrated by Teresa "Red" Fisher

Division of Fish and Wildlife  
Dept. of Planning & Natural Resources  
Government of the U.S.V.I.



This coloring book was produced by the  
Division of Fish and Wildlife  
Department of Planning and Natural Resources  
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Illustrations were produced by Teresa "Red" Fisher

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Much of the information in this coloring book was extracted from the  
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Marsha McLaughlin, Editor



For more information on these or  
any other environmental issue,  
please contact the  
Division of Fish and Wildlife  
at  
(809) 775-6762 (St. Thomas)  
(809) 772-1955 (St. Croix)





## Division of Fish and Wildlife Department of Planning and Natural Resources



### Government of the Virgin Islands

#### GEOLOGY OF THE VIRGIN ISLANDS

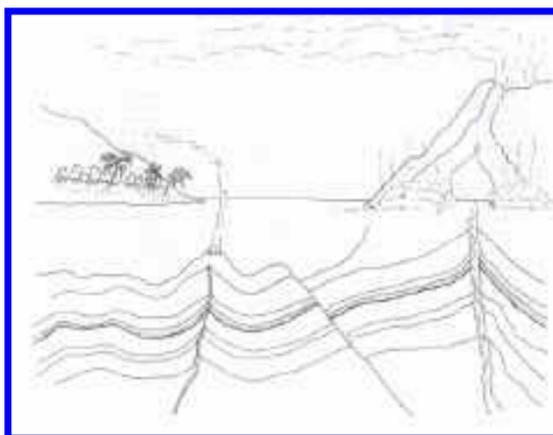
The surface of the earth is made up of a number of plates which "float" on the molten inner layers of the earth. These plates are always moving. When one plate slides under another, volcanic activity occurs along that boundary. Deep beneath the ocean, molten lava flowed from cracks between these undersea plates. As the lava cooled it became rock. This underwater process occurred at great depths and over a long period of time. Mountains formed underwater. After many years, the mountain peaks reached the surface. These processes, along with changes in sea levels and erosion have created the island profiles and formations we see today. St. Thomas and St. John are the exposed parts of a mountain range produced by the Atlantic plate sliding under the Caribbean plate. This great submarine mountain range extends from Cuba east and southeast through the curving chain of the Lesser Antilles to Trinidad, off the coast of Venezuela. St. Croix is set apart from this chain and was formed by different processes. Erosion processes acting on the exposed rock have formed the soil which supports life on these islands.

The volcanic action, which formed St. Thomas and St. John, appears to be still active among some of the "newer" islands like Guadeloupe and Martinique. There is still volcanic activity produced by plate movement in these areas of the Caribbean, causing occasional earthquakes. These earthquakes are small and do not seriously affect the Virgin Islands.

St. Croix was never a volcano, but volcanoes played an indirect role in its formation. The rocks underneath the mountain ranges on St. Croix were formed from the debris of volcanic activity that took place approximately 80 million years ago. The limestone exposed at the surface of Central Valley on St. Croix is considerably younger (approx. 20 million years), and is probably the remains of coral reef that formed in shallow water as the island was uplifted.

St. Croix is separated from the northern Virgin Islands by what is called the Virgin Islands Basin. Depths in this basin can be greater than 13,500 feet. The Puerto Rican Trench is located north of St. Thomas, and reaches depths of more than 27,500 feet. This is the deepest area of the Atlantic Ocean.

During lower sea levels, St. Thomas, St. John and the British Virgin Islands were connected to Puerto Rico. Presently, St. Croix is the largest U.S. Virgin Island (85 sq. miles) with the highest peak being Mt. Eagle (1,165 feet). St. Thomas has an area of 30 sq. miles and a height of 1,500 feet at Crown Mountain. St. John is the smallest at 19 sq. miles and an elevation of 1,277 feet at Bordeaux Mountain.



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#### MANGROVES OF THE VIRGIN ISLANDS

Mangroves are flowering trees which can live in salt or brackish (mixed fresh and salt) water, as well as salty mudflats near the shoreline. There are three types of mangroves; red, black, and white, each adapted to a different amount of salt and water they can live in.

Red mangroves grow from floating seedlings which may float miles from the parent trees. As these mature, the root ends become heavier and hang down. Eventually, the pods sink, taking root in the muddy or sandy bottom. The water must be shallow enough to allow the seedlings to reach air and sunlight. Red mangroves have long prop roots that reach down into the water. These roots serve as a nursery area for many coral reef fish and invertebrates (animals without backbones). Most fish caught by fishermen on reefs need this habitat to grow up in, safe from predators and with a good food supply. The roots also protect our shorelines from wave erosion during storms. They also filter sediment in runoff from the land. This helps to keep our ocean water clean and our coral reefs and seagrasses healthy. Black mangroves live behind the red, in saturated soil where the trees "breathe" using roots (called pneumatophores) that project out of the soil like snorkels. Black mangroves also help stop soil runoff, and it is believed that they may remove chemicals from the water, helping to reduce pollution. The leaves of the black mangrove are long and narrow. Excess salt is excreted through the leaves, where it can be seen crystallized on the leaves.

White mangroves can be found more inland, in moist sandy areas of lower salinity (salt content). Like the black mangrove, they also have the ability to excrete excess salt through tiny pores located at the base of each leaf.

Terrestrial (land dwelling) wildlife such as hummingbirds, pigeons, herons, and iguanas either nest, rest, or feed in mangroves. This provides them with protection from predation.

Mangroves have been found to be useful in a variety of ways. Red mangrove wood is heavy and durable. The bark is used for tanning and medicinal purposes. The bark, leaves, and shoots yield various dyes. The leaves, containing high amounts of protein, have been used for cattle feed. The flowers of most mangroves offer high-grade honey and the wood is used for charcoal production.

Locally, many of our mangroves have been replaced with shoreline development or marinas, or have been used as garbage dumping areas. If our mangrove areas are not preserved, our islands may lose vital fish and wildlife habitats. Without mangroves our oceans could become polluted.



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#### EXOTIC MAMMALS OF THE VIRGIN ISLANDS

"Exotic" mammals are defined as any species of animal that is not native to a particular area. Long ago, the only mammal living in the Virgin Islands was the bat. Every other animal, such as the deer, mongoose, donkey, rat, and mouse were brought to these islands by settlers.

The Black Rat or Tree Rat is thought to have traveled here with the original Indian inhabitants. The Norway Rat and common house mouse must have been stow-aways aboard European sailing ships.

The White-tailed Deer were brought here from North America as early as 1790 for food and sport. The deer population grew to high levels in the early 1900's. However, increased development and poaching (illegal hunting) have reduced its present population. Deer may still be found in the dense uplands and dry eastern sides of less populated areas on all three islands.

The original Caribbean Mongoose was introduced to Jamaica and the Virgin Islands from India in 1872. They were brought in to control rats in sugar cane fields. Unfortunately, the mongoose is diurnal (active during the day), while the rat is nocturnal (active at night). The plan didn't work, and both rat and mongoose populations grew. The mongoose's diet consists of lizards, grasshoppers, roaches, and other small insects. The mongoose loves eggs, and has had a negative impact on the bird populations on all three islands. Hated by farmers, it often steals eggs and young chicks from henhouses. The mongoose matures and breeds within one year. A female may have one to five young per litter, and may have more than one litter per year. The mongoose can carry rabies, although fortunately, rabies is not found in our islands.

Domestic animals, which have been allowed to roam free and establish their own populations are called feral animals. They include dogs, cats, goats, pigs, horses, and donkeys.

Long before modern technology was available, the donkey was used for transportation on the islands. Descendants of these original animals are found on St. John. These animals make trails on steep slopes which leads to soil erosion. Their grazing habits also disturb the natural vegetation patterns, allowing some plants to thrive while others are eaten.

Other feral animals such as goats can cause soil erosion by overgrazing, but have not caused any major ecological changes.



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#### CLIMATOLOGY OF THE VIRGIN ISLANDS

The Virgin Islands lie in the belt of "Easterlies" or "Trade Winds". The trade winds blow very steadily from the southeast, east, and northeast. These consistent winds make the Virgin Islands one of the finest sailing areas in the world.

The trade winds are often interrupted from December to February by "Northers", locally known as "Christmas Winds" which blow from the north or northwest. These winds are often accompanied by rain and large waves from the North.

During the spring months (March - May) the trade winds are reduced in speed and blow mainly from the east. In the summer months (June - August) the trade winds become strong again, blowing from east to southeast. July has the strongest winds of the entire year. During the fall (September - November) winds are usually their lowest, blowing from the east to southeast. The trade winds are sometimes interrupted during summer and fall by tropical storms or hurricanes that develop in the eastern tropical Atlantic and travel west to the Caribbean.

Hurricanes are tropical cyclones, or giant circular storms up to several hundred miles in diameter with wind speeds of 74 miles per hour or more. They blow in a large spiral around a relatively calm center, called the "eye". Hurricanes can generally occur in our territory between June and September. These storms usually carry a great deal of moisture. A combination of high waves and heavy rains can cause flooding in lowland and coastal areas. High winds can damage vegetation, homes and other buildings. While hurricanes can inflict severe damage on man-made structures, these natural events are important in thinning out vegetation and maintaining the diversity of plant life in our forests. Thunderstorms are localized wind storms associated with cumulus clouds (thick, dark clouds that look like domes). These clouds usually carry rain. The amount of rainfall in these islands varies, but we usually receive an average of about 41 inches a year. The more northern and mountainous areas may receive over 50 inches, while the eastern and southern lowlands may receive only about 35 inches of rain. The wettest months are September to December. The dry season is February to July, although we can often have a smaller wet period in April and May.



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#### SEAGRASS BEDS OF THE VIRGIN ISLANDS

Seagrass beds are frequently referred to as marine pastures or meadows. They are areas with a thick growth of seagrasses and algae, resembling pastures on land. Seagrass beds can be found in most inshore (near to shore) bays, and often in extensive deeper areas outside of bays.

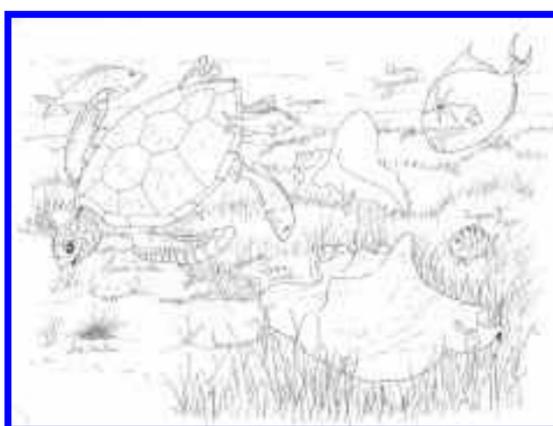
The location of seagrass beds is controlled by a number of factors, including the character and stability of the bottom, depth, water clarity, currents, and grazing by herbivores (plant-eating animals). Grasses only grow on sand bottoms. They do not grow well in areas of high wave energy where sand movement is great. Since the grasses require a lot of light, they usually do not grow below depths of 60 - 70 ft. deep.

There is usually a band of bare sand between grass beds and a coral reef. This is because the fish and sea urchins that live on the reef graze on the grasses in this area.

The dominant plant in local marine pastures is turtle grass, followed by manatee grass, and shoal or eel grass. They are unlike the majority of marine plants, which are algae, in that they are true flowering plants. They produce flowers and seeds annually. These plants produce a significant amount of the oxygen generated in local inshore waters. Several species of small fish live in the grass beds and a number of others come to feed on the plants and animals that live here. Seagrass beds are a habitat for Queen Conch and other molluscs and are feeding grounds for sea turtles. A diverse group of animals live in the sand between the plants, and the bottom is often heaped into mounds of sand burrowed by large worms and shrimp. The sea grasses use the waste from fish and other animals as fertilizer.

Grass beds help to stabilize sand bottoms, and act as a "footing" to retard loss of sand from the beach. They do this through an extensive root system which binds the sand together. They play an important role in erosion control in and provide food and shelter for many small animals near the reef.

Patches of grass that are removed by dredging or other means may not be replaced for years. Even small swatches of grass cut by a dragging anchor chain may remain bare for several years and result in erosion holes or "blowouts". Boaters should use caution when anchoring to avoid damaging these delicate grass beds.



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#### SHORE AND WATER BIRDS OF THE VIRGIN ISLANDS

Hérons and Egrets are members of a large family of graceful birds that wade in our swampy saltpond and mangrove areas. They use their long pointed bills to spear fish and crabs. These birds can remain completely still so as not to frighten their prey. Members of the Heron family can move their neck in the shape of an 'S'.

The Great Blue Heron is the largest heron in this area. It is named for its gray-blue color. The Little Blue Heron is smaller and is a dark gray color. Young Little Blue Herons are white with grey legs and a black tip on their beak.

Most egrets are white with long thin stick-like legs. The Snowy Egret prefers freshwater swamps, but can also be found along saltwater shorelines. It nests in colonies with other heron species, laying its eggs in a flat nest of sticks. The Cattle Egret can be found in livestock pastures. It gets its name from its habit of perching on the backs of cattle and other animals. It feeds on insects flushed by the grazing animals, and may even remove parasites such as ticks from the cattle's skin. The Cattle Egret is the only egret found inland from shore, although it roosts in the mangroves at night.

The Killdeer, also called the Soldier Bird, can be seen darting up and down our island's beaches, and along the edges of freshwater ponds. It can be identified by the two black bands on its breast and its shrill sound, "kill-deer, kill-deer".

The Black-necked Stilt is a wading bird with long pink legs and a slender black bill. Its habitat includes marshes and ponds. This bird is noted for its loud series of notes that sound like "wit, wit, wit".

The American Oystercatcher, locally known as the Whelk-cracker, is a large black and white shorebird with a bladelike red-orange bill. It uses its powerful bill to feed on whelks and snails. Oystercatchers are usually found in pairs. Sandpipers are usually found in flocks or small groups on beaches or near lagoons. There are many species of sandpiper; the Spotted Sandpiper is most common in our area. It is brown and white, with yellowish legs, and is noted for its small head and pointed beak.

A number of ducks inhabit the Virgin Islands, including the Green-winged and Blue-winged Teal. Most important is the White-cheeked Pintail. It once was common, but is now a locally endangered species. It is a small grayish-brown duck with white cheeks and throat, and a pointed tail. Pintails often nest on the offshore cays which offer greater freedom from predators, then swim their newly hatched chicks to freshwater or saltwater marshes or ponds found on the larger islands.

Coots are small water birds which resemble ducks. They are very good swimmers and divers, hunting for submerged plants in freshwater ponds.

Many other shore and water birds are winter visitors to our islands. Birds who travel to different locations with the change in seasons are called migratory birds. Our islands are important "rest stops" for many migratory birds traveling from North America to South America.



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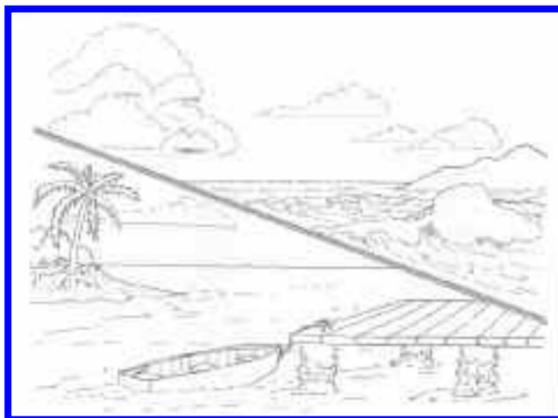
### Government of the Virgin Islands

#### OCEANOGRAPHY OF THE VIRGIN ISLANDS

Oceanography is the study of the physical characteristics of the oceans, including waves, tides, and currents. When the wind blows across the ocean it causes the water to move, creating waves. Waves come in various sizes, depending upon the amount of wind. Choppy waves are short and broken. They usually occur when wind blows over short distances, like between our islands. Swells are larger rolling waves. Swells form when wind blows for long periods of time over long distances of open water. Sea waves of unusual size are called tsunamis. They are caused by disturbances within the sea floor, like volcanic eruptions. They rarely occur in the Caribbean. Waves play a role in circulating and cleaning the water. Since our winds are usually from the east to southeast, our waves also come from that direction. They are usually 1 to 3 feet in size. Swells also come from the east to southeast at about 3 to 5 feet in size. In the winter, North Atlantic storms can cause swells as high as 12 to 16 feet. This we call a "ground sea". Hurricanes passing our islands can also cause extremely large waves.

Tides are the rise and fall of the ocean's water levels. Tides are caused by the sun and moon opposing the earth's gravity, creating a global wave system. This wave system produces tides as it moves around the earth. Because the position of the moon and the sun is always changing, so are the tides. There is one high tide and one low tide per day on the north (Atlantic) side of St. Thomas and St. John. There is a second cycle of high and low tides each day on the south or Caribbean side of St. Thomas and St. John, and on all coasts of St. Croix. In the Virgin Islands, the water level from high tide to low tide generally does not change more than a foot. As a result, the currents caused by tides are not very significant. Tides and waves help form our coastlines by causing the sand to collect on beaches and bypass rocky shores.

Currents are defined as the horizontal movement of water as the result of force. This force can be from a number of sources, including winds and tides. Tidal currents are the movement of water through bays or channels. Many other factors affect currents, including winds, waves, and depth and shape of the bottom. A rip current is produced when water pushed against a shoreline escapes back to sea through a break in a reef or sandbar. Swimmers who encounter a rip current should swim slowly across it towards shore. Currents help disperse nutrients through the water and keep the water clean. Currents also bring food to marine creatures that filter the water for food particles.



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### **CORAL REEFS OF THE VIRGIN ISLANDS**

Tropical coral reefs are complex associations of hundreds of kinds of plants and animals. Hard corals make up the basic physical structure of the reef. Corals are colonial animals, meaning they live together in a large group. The holes in a piece of coral each contain a small animal called a polyp. The word polyp means "many footed". Polyps are able to extract or remove a soluble (dissolves in water) type of calcium carbonate from the water. They use it to create a hard skeleton which surrounds the polyp. This skeleton takes many different forms, depending on the species of coral. Many of the most common hard corals, such as elkhorn, pillar, star, finger and brain corals are named for their interesting shapes.

In addition to hard corals, reefs are also made up of soft corals such as sea fans, sea pens, and sea whips. Soft corals, sponges, sea urchins, sea anemones, and many other creatures attach themselves to solid places on the bottom, usually the dead skeletons of hard corals. Other types of animals are drawn to the reefs to feed or find safety in the many hiding places within the reef structure. These include lobsters, crabs, eels, and octopus. Many types of fish are also found there including: parrotfish, snappers, grunts, surgeonfish, butterflyfish, angelfish, damselfish, squirrelfish, and groupers.

Coral polyps can reproduce by dividing (asexual budding). They can also reproduce sexually, by releasing sperm and eggs into the water. Microscopic coral larvae float on the currents. Many are eaten by fish or filter-feeding invertebrates. Some anchor on the sea floor and begin a new colony by budding.

Coral growth is slow. Healthy coral growth depends on the right environmental conditions: warm clear water, sunlight, proper salinity (salt content), a steady supply of oxygen, and the food-providing action of currents. A coral head one foot in diameter may be 30 years old.

Reefs provide perhaps the largest portion of seafood harvested in our waters. Most species of fish consumed locally either live on the reefs or depend on them in some way for food. Lobsters are also taken from coral reefs.

Many fish, such as the parrotfish, feed on algae growing on dead coral. They chew off small bites of the coral skeleton, which ultimately becomes sand when excreted by the fish. Coral reef skeletons may eventually break down, producing sand that is deposited on our beaches. Coral reefs also help protect the shoreline by breaking up and absorbing storm waves.

In addition to providing food and shelter for many different types of marine creatures, coral reefs are popular snorkeling and scuba diving sites.



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#### SEABIRDS OF THE VIRGIN ISLANDS

During the summer months, the offshore cays become transformed into noisy rookeries (nesting areas) for many migrant species of seabirds. Migrant birds are those that travel to different locations with the change of seasons. Terns constitute the largest group of breeding migrants here in the Virgin Islands.

All terns are similar in size and shape, but are colored differently. The Noddy is easy to distinguish due to its brownblack color and white patch on its head. The bridled and Sooty terns both have dark backs and heads with white underparts. The Bridled tern is somewhat lighter on the back and has a white eye patch farther back over its eye than the Sooty. The Roseate is light gray and white. During the breeding season, it has a red base on its black beak. The Sandwich tern has a black bill tipped in yellow.

Terns differ in their egg-laying habits. Sooty terns prefer areas shaded by tall grass. Bridled terns lay their eggs in crevices formed in rocky areas. Noddy terns nest on cliff ledges or in tree branches. The less numerous Roseate and Sandwich terns merely form a nest on open rocky ground. Most all of these birds lay a single egg.

The Laughing Gull is the only gull to nest in the Virgin Islands. It is larger than the terns and is white with grey wings and a black head and neck. These gulls nest in open areas or in the grass, laying two to three large green spotted eggs per nest.

Tropicbirds soar near rocky cliffs with their long white tail feathers streaming behind. Both the Red-billed and White-tailed Tropicbirds are colored black and white. Each lays a single egg in deep crevices among the cliffs.

The Frigatebird is a large black bird with a forked tail and V-shaped outline of the wings. Males have bright red throat pouches used to attract females during the mating season. They steal fish from other seabirds in mid-air fights, but are not good swimmers. They lack a protective oil coating to help waterproof their feathers. If a Frigatebird were to fall into the water, it could become waterlogged and drown. Frigates often follow fishing boats, scavenging on fish parts discarded over the side. They can be seen nesting in low trees on Great Tobago Cay, north of St. Thomas.

The Brown Pelican, familiar to most Virgin Islanders, is a Federally Endangered species. It is against the law to disturb, harm, or kill the pelican, its eggs, or offspring. These birds are expert fishermen, diving into large schools of fry, scooping them up in their beaks. Pelicans nest in large numbers at Congo Cay between St. Thomas and St. John.

Three species of Boobies nest in our area: the Brown, the Masked and the Red-footed. Their names point out their obvious differences, although juveniles of the species all look very similar. Boobies are also good fishermen. The Brown and Masked boobies nest on the ground. The Red-footed booby prefers to nest in trees. These birds usually produce two eggs, but only one chick is raised to maturity. The stronger chick is fed and cared for by the parents; the weaker is pushed out of the nest by its sibling, where it may starve or be eaten by predators.



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### TERRESTRIAL HABITATS OF THE VIRGIN ISLANDS

When the Virgin Islands first rose from the sea, they were only bare, uninhabitable rock mountains. Over many millions of years, the wind, rain, and sun beat on this rock, eventually breaking it down into soil.

The first plants to become established in the Virgin Islands came either by way of the wind, the sea (some seeds can float in the sea for months and still sprout) or in the droppings of birds. Animal life came also by the way of wind and birds, or by way of the sea on natural rafts of vegetation drifting from other Caribbean islands and the coast of South America. These original (indigenous) plant and animal populations were drastically changed by the introduction of exotic plants and animals - first by the Arawak and Carib Indians and later by the European plantation owners. The planters burned or cut down most of the original virgin forests to make room for the cultivation of sugarcane, cotton, indigo, tobacco, and other cash crops. They also shipped valuable hardwoods to Europe.

Although forests have grown up again in many areas, the islands generally bear little resemblance to the virgin forests of early days. With clearing, burning, diversion of water for irrigation, and severe loss of soil by erosion, much drier conditions now prevail. Extensive habitats have developed for xerophytic (dry-tolerant) species. The mesophytic (moisture-loving) plants have tended to disappear. No one will ever know how many indigenous plants have disappeared.

Today, we can generally find five different types of terrestrial habitats. These plant habitats occupy different areas due to their differing needs for water and their tolerance to sun, wind, and salt spray. These conditions change gradually across the islands, so no sharp boundaries exist to separate the different types of vegetation.

Dwarf Coastal Scrub (1) - found in isolated patches in windy, dry areas affected by salt spray. Include acacia, wild sage, bushy heliotrope, and crotons. Few animals except for insects and lizards live in this area.

Thorn Woodland (2) - very open areas of low, dry-tolerant vegetation. Include acacia, maran, prickly pear, pipe organ cactus, catch 'n' keep, century plants, tan-tan and frangipani. Small insect and many birds live here.

Deciduous Forest (3) - lower, more open forests. High plant diversity. Include cassia, tan-tan, frangipani, Ginger Thomas, manjack, tamarind, and limber caper. Birds and insects are abundant.

Semi-Evergreen Forest (4) - enclosed, hardwood forests consisting mostly of large, generally evergreen trees. Include kapok, mango, mahogany, saman, sandbox, genip, West Indian almond and strangler fig. Vines which hang or climb are abundant. Beneath the canopy are smaller shrubs and trees, including sweet lime, wild coffee, painkiller, and tyre palms. Lizards and birds are quite abundant.

Savanna (5) - open areas dominated by grasses and scattered trees. Guinea Grass is dominant. Trees include calabash, manjack, tamarind, acacia, tan-tan, and less-common tibet, guava, manchineel, fishing rod, and limber caper. These areas are cleared and used by man for agricultural production. Birds, lizards, and insects are abundant.

Removal of terrestrial vegetation results in loss of habitat for wildlife and contributes to soil erosion. When soil and debris is allowed to flow into the sea, grass beds and coral reefs can become seriously damaged.



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## Division of Fish and Wildlife Department of Planning and Natural Resources



### Government of the Virgin Islands

#### **SANDY BOTTOM HABITATS OF THE VIRGIN ISLANDS**

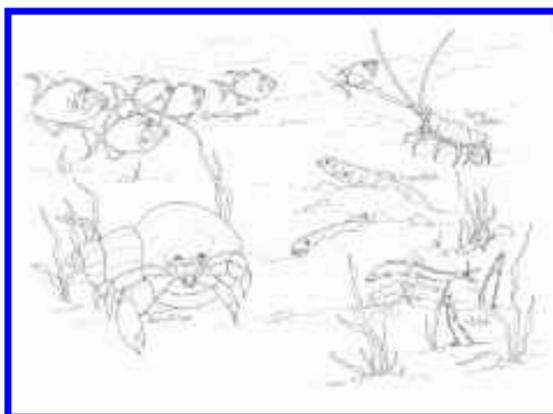
Sandy bottoms are areas with, at most, sparse seagrass or algae (marine plants). Large areas of sandy bottoms can be found around all three islands. Sometimes they occur in shallow bays where waves prevent anything from growing, although most shallow bays have vegetation. The largest areas of essentially bare sand occur below depths of 60 feet. This may be due to lack of enough sunlight. Another possible explanation may be that the sand is shifting frequently, preventing plant growth from becoming established.

Sand bottoms that are covered with algae are often called algal plains. These are usually found in deep water (60-100 ft.) on the submerged platform that surrounds our islands. Even though the algae may not cover large areas, many different species can be found. Some algae (calcareous algae) produce material which becomes a part of beach sand. Algal plains may be important habitat for the juveniles of Queen Triggerfish and Spiny Lobster.

Sandy areas in shallow water (30-60 ft.) are not barren. They usually support scattered algae and the flowering plant *Halophila*. Sponges and small corals are found in areas where there is some solid object - usually a piece of debris - for attachment. Bottom fishes such as the Lizardfish and Sand Tilefish can be found in the sand. Conch, including Queen, Milk, and the small fighting conch, and hermit crabs are also found. There are also many burrowing animals - mollusks, crabs, and shrimp - that live in the sand, and use it to hide from predators. Most of these animals are nocturnal, emerging at night to search for food.

In earlier years, sand was removed from local beaches and bays to be used for construction materials and to fill in salt ponds and wetlands. Large quantities of sand were removed, which caused large amounts of sediment to flow back into our waters, affecting the homes of many fish and marine creatures. In some bays, large dredge holes still exist which trap organic sediments and produce very turbid conditions in those bays. Filling of these dredge holes may allow these bays to restore themselves to a healthy condition.

In 1971, when the effects of mining beach sand were recognized, the Virgin Islands Government passed a law prohibiting the removal of sand from the territory's beaches and submerged lands. It is important to recognize that any major changes made by man to the environment may cause a chain of events to occur that could be harmful to the surrounding environment and ultimately to man himself.



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#### LAND BIRDS OF THE VIRGIN ISLANDS

The bananaquit is the Virgin Islands' territorial bird, sometimes hopping onto people's hands for a helping of sugar. Mostly black with a yellow breast, the bananaquit regularly feeds on small insects, fruit, and nectar. The bananaquit builds a globular nest with an opening on the side. Nests can be seen hanging from tree branches, with three to four speckled eggs inside.

The Pearly-eyed Thrasher is locally known as the "Trashy bird" because it is an aggressive bird, often seen scavenging in waste bins. The thrasher produces a number of loud, noisy call notes. They also have a beautiful song which can usually be heard late in the afternoon. It can be found all over the islands, from coastal areas to mountain tops. The Thrashers will eat almost anything, but insects make up most of their diet. They have been known to eat the eggs and young of other birds.

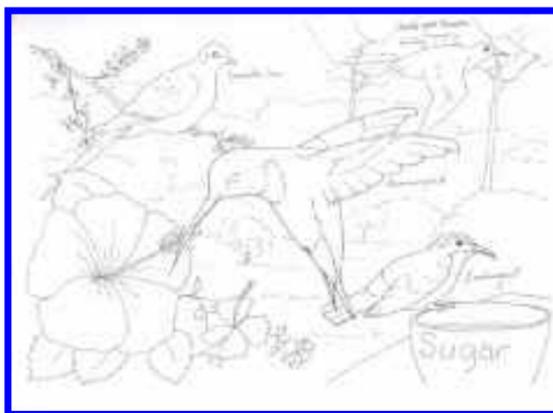
Members of the Hummingbird family are abundant in the islands. They include the Antillean Mango, Green-throated Carib, and Antillean Crested. Hummingbirds can be seen collecting nectar from flowers like the hibiscus. They usually lay two tiny eggs in a cup-shaped nest that is sometimes lined with spider webs and covered outside with lichens (fungus that grows on trees).

Four species of dove and two species of pigeon live and nest in the Virgin Islands. Doves and pigeons nest on the ground or in trees, and eat fruit and seeds.

The Rock dove is not an indigenous (native) species, but was brought here by man. This dove has thrived, and become a pest in many areas. It is the largest of the four species and is usually found in groups near human habitation. The Zenaida dove, often mistaken as a Mourning dove, may be hunted during the legally established hunting season. Smaller than the Zenaida dove is the Ground dove.

The Bridled Quail dove is the most rare dove in our islands, generally found at the base of larger valleys.

These doves are generally brown and tan in color. The Zenaida, Ground, and Bridled Quail doves have pink highlights on their heads. The Bridled Quail dove also has a black band on its head which appears to go through its eyes. The Scaly-naped pigeon is a large, dark, almost purple colored bird with red eyes and bill. The White-crowned pigeon has a similar dark body, with a white topknot. Both species are rare, with the White-crowned pigeon now considered locally endangered.



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#### SALT PONDS OF THE VIRGIN ISLANDS

Salt ponds are areas that were once part of a bay, but which have become gradually closed off by reef growth across the mouth of the bay. Storms then pile up coral rubble and sand in the back of the reef and this will form a barrier between the pond and the sea. Once the bay is closed off, mangroves usually grow around the edges and the salt pond begins to act as a trap for fresh water and sediment flowing from uphill. The salt pond acts as a natural strainer, preventing sediments and pollution from reaching delicate coral reefs and sea grass beds. The high concentration of natural and artificial pollutants and decaying organic matter in these ponds often produces strong odors, but it is just nature's way of attempting to neutralize this hazardous waste.

Many of our saltponds are separated from the sea by only a narrow berm made up of coral and sand. As the tide and falls, water seeps through the berm and causes the ponds to remain full of water year round.

Other salt ponds only receive salt water from the ocean during storms that produce high tides and waves that flow over the berm. Evaporation takes place quickly, causing the salinity of the pond to increase. In periods of drought, salt ponds may dry up completely, leaving a layer of crystallized salt on the parched surface. This salt can be harvested and used in cooking.

Despite the fact that conditions in these ponds change frequently due to erratic influxes of both fresh and salt water, salt ponds provide an important habitat for many different creatures. A number of wading birds (stilts, sandpipers, herons) feed on crabs, insect larvae, and small animals which inhabit the shallow water and muddy shoreline. Kingbirds, martins, and swallows feed on flying insects over the water. Our endangered Bahama Pintail duck lives and breeds around salt ponds. Large numbers of brine shrimp live in the salty waters. Iguanas can be seen lazing in mangrove trees adjacent to the salt pond. This abundance of animal life around salt ponds lets us know how important they are to Virgin Islands wildlife. Protection and preservation of these ponds is of great importance in protecting our coral reefs and seagrass beds as well as providing habitat for a wide variety of animals.



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#### OFFSHORE CAYS OF THE VIRGIN ISLANDS

Cays are small offshore islands. They vary from small rock pinnacles to islands up to 500 acres (Hans Lollick) in size. Most range between five and fifty acres.

Small rock pinnacles are often bare, but serve as roosting and nesting sites for sea birds.

The larger cays have beaches, rocky shores or cliffs, and some vegetation. Many have salt ponds and are surrounded by coral reefs.

There are 56 cays in the U.S. Virgin Islands. Fifty-three of these surround St. Thomas and St. John, while the other three are near St. Croix. Most of the cays belong to the Virgin Islands Government, although a few of the larger cays are privately owned, and ten belong to the Federal Government (eight are owned by the National Park Service and two are National Wildlife Refuges - Green Cay, St. Croix and Buck Island, St. Thomas).

The remote location of most of the cays provides a safe nesting site for many local birds, including migratory and resident seabirds. They are the last remaining rookeries (bird nesting areas) for several species.

Although there are rats on some of these cays, there are no mongoose. Mongoose feed on bird eggs and young birds, lizards, and snakes. The absence of the mongoose has allowed a few species of lizard and snake that have been wiped out on St. Thomas to thrive on the cays. Removal of rats from several cays has enabled more seabirds to nest with less predation of the eggs.

The most common predator to animals living on the cays is man. Poaching (illegal taking) of seabird eggs often occurs. Although hunting is prohibited on all publicly-owned cays, it is a difficult law to enforce due to the remoteness of the cays. All V.I. owned cays are wildlife sanctuaries and are off limits to lowflying aircraft and people without permits. This is to protect nesting seabirds.

Many cays also have well-developed reef systems. Located away from highly developed areas, they are safe from erosion, heavy freshwater runoff, and pollutants that may affect healthy coral growth. Most still attract large populations of fish. These are good areas for snorkeling and scuba diving.

In addition to providing important fish and wildlife habitats, the larger cays do offer some storm buffering for the main islands.



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### BIRDS OF PREY OF THE VIRGIN ISLANDS

Raptors are predatory birds with strong notched beaks and long talons (toe nails) that are adapted to seize and tear the flesh of their prey. There are two resident species in the USVI. They are here year-round and raise their young in the spring or summer.

The Red-tailed hawk is a strong flier. The Red-tail's keen eyesight allows it to spot its prey; lizards, mice, rats, and sometimes mongoose, while gliding high above the land. Also called the Chicken hawk, the Red-tail has been known to feed on chickens, angering local farmers. It soars through the air on thermal currents, which are masses of hot air rising into the sky. This saves the hawk a great deal of energy. Large nests of sticks are built high in trees, where the hawk lays two to three eggs.

The American Kestrel is a small falcon. It has excellent eyesight and is noted for speed, which it uses to catch its prey. The Kestrel feeds on lizards, grasshoppers, beetles, and other insects, as well as mice and small birds. Two to four eggs are laid in a tree cavity. The Kestrel is locally known as the "Killy-Killy", for the loud shrill sound it makes. We also have two species of raptors which spend time in the Virgin Islands during migration.

The Peregrine Falcon is considered the largest of the true falcons in the West Indies. It has long wings and a relatively narrow tail, and is primarily black, brown, and white, with a mask-like pattern on its head. The Peregrine feeds on shorebirds in lagoons and seabirds on the cays. This falcon is a swift flyer, but does not soar or glide like the hawk.

The Osprey is a large sea hawk with a white head and dark body and a black streak running behind its eyes. Also known as the Fish hawk, it hovers over the water, and can plunge into the water to capture fish with its talons. It has a specialized reversible outer toe that is helpful for hunting. The Osprey builds a stick nest along rocky cliffs. Osprey are found in small numbers nesting on St. Croix. They have been observed year-round.



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#### BEACH HABITATS OF THE VIRGIN ISLANDS

Beaches are shoreline areas that are covered by sand, gravel, and other debris which is deposited there by moving water. Some of these sediments come from the land (terrigenous) and most come from the sea. The terrigenous material typically consists of eroded minerals and tiny gravel which has been carried from shoreline cliffs or runoff from guts. Marine sediments are generally fragments of coral, shell, and algae carried ashore by wave action. The size and composition of the sediments will vary according to the source and rate of supply, as well as the wave and current processes acting on the beach.

Beach sediments are constantly being rearranged by waves, tides, and currents. As a result, beaches are always changing their shapes. Waves sort beach sediments. Fine sand builds up in calm areas, while coarser sands are left in areas with higher wave energy.

Most beaches are fashioned into a sloping foreshore and a flattened backshore or berm. The foreshore lies between the low water level and the berm crest; the berm lies between the berm crest and the part of the beach beyond the reach of ordinary waves. Beaches in the V.I. are generally backed by coastal vegetation whose roots stabilize the beach and prevent beach loss during storms.

Most Virgin Islands beaches are undergoing erosion and accretion (sand deposition) at varying rates. Erosion rates are usually greatest on exposed windward coasts, such as St. Croix's north shore. Protected beaches inside deeply indented bays, like those on St. Thomas and St. John are more stable.

Beaches adjacent to and protected by fringing reefs are usually growing as reef-produced sand is deposited by waves on the beach. Sand should never be removed from beaches as it can upset the natural stability of a beach and result in changes in erosion / accretion patterns.

Plant life along beaches consists of salt-tolerant plants that help stabilize the sand. Examples of these are goatsfoot, seagrape, bay cedar, sea purslane and coconut palms. Beaches and the plants that grow on them act as filters to trap sediment in runoff and prevent it from reaching the ocean.

Small clams, worms and sand dollars live in the sand along the shore. The ghost crab is commonly seen foraging on the beach for food that has been washed ashore. Sand beaches also provide nesting areas for sea turtles and habitats for terns, oysters, sandpipers, and other shorebirds.

Local beaches offer a number of recreational activities including swimming, snorkeling and scuba diving, sunbathing, and picnicking. They are also popular as an access point to the ocean for small boats and windsurfers.



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#### FISH OF THE VIRGIN ISLANDS

Fish of every size and color live beneath our seas. Many of the fish that are caught and eaten locally, such as grunts, yellowtail snapper, grouper, and old wife are reef fish. Reef fish live near coral reefs and grass beds where food is plentiful and crevices and holes in the reef provide protection from predators.

Most reef fish are herbivorous (eat only plants), and do not pose a threat to the fish around them. Many of the smaller fish defend little plots of algae, while their larger neighbors graze on bigger areas of hard bottom for algae. Parrotfish can be heard crunching coral with their strong teeth, producing sand for our beaches.

Pelagic fish are larger fish who roam great distances, feeding on reef fish in many areas. Most pelagic fish are silver in color, which makes them harder to see in the open ocean. Examples of pelagic fish are jacks, mackerals, tuna and barracuda.

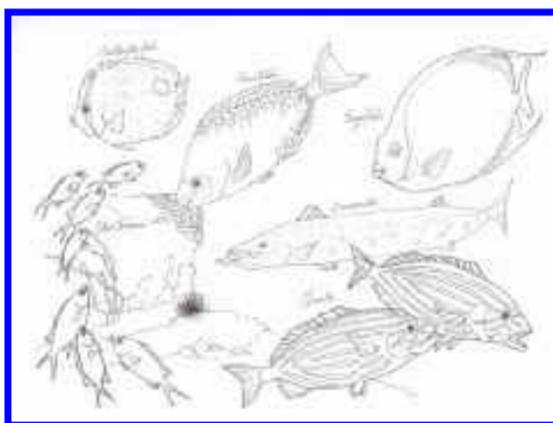
Coloration plays an important role in underwater communication and camouflage. Many fish have the ability to change or enhance their color pattern. Many colorful fish are dichromatic, which means the males are brilliantly colored, while the females are dull in color.

Colored stripes and spots are often used by fish to confuse predators. The butterflyfish has fake eyespots near the base of its tail. When a large and hungry fish chases after it, the butterflyfish can move back and forth in such a way that the larger fish loses track of it, allowing it to swim away safely. The Peacock Flounder can change color to match its surroundings. The long, thin Trumpetfish hides upside down among the soft coral, blending perfectly. These are examples of the use of color and shape for protection.

Many small reef fish rely on group defense for protection. The Blue Chromis lives in large groups, each defending a small territory of its own.

Predatory fish with great swimming speed prefer to hunt alone. They include pelagics such as jacks, blue runners, and barracuda. The barracuda generally does not pose a threat to swimmers.

Some fish in our area may be contaminated with Ciguatera toxin which can produce illness in humans. Hours after eating poisoned fish, symptoms including weakness, vomiting, diarrhea, abdominal pain and hot and cold flashes may occur. Severe cases may require hospitalization. It is not certain what causes the toxin, but a small algae eaten by the fish is suspected. Ciguatera is more common in larger, older fish among the jack, snapper, and grouper families.



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### RECREATIONAL FISHING IN THE VIRGIN ISLANDS

Recreational fishing is a very popular sport among Virgin Islanders. A successful fishing trip often provides edible rewards of fish such as snapper and grouper. There are also social benefits surrounding the sport. They can be as simple and relaxed as a beach-side fish fry, or as culturally important as a man passing on his fishing knowledge to his young son or daughter.

The types of fishing which are enjoyed locally include hand-line fishing, bonefishing, inshore fishing, deep sea fishing, and spearfishing.

Hand-line fishing requires only a spool of fishing line, a hook, sinker, and some bait. It is usually done from piers or docks, along rocky shoreline areas, or from small boats. Bait commonly used can include bits of meat or fish. Snappers, grunts, and parrotfish are often caught in this manner.

Bonefishing is done in shallow water near mangrove lagoons and other semi-enclosed bays. Fishermen usually wade into shallow water to cast their lines. Bonefishing gets its name from one of the fish most often caught this way, the bonefish. Other fish which may be caught in these areas using this method include snook, ladyfish, and tarpon. Most of these fish are caught for sport, and are not considered to be good eating. Artificial lures which are made to look like bugs or worms can be used when bone-fishing.

Inshore fishing requires the use of a boat. The boat allows fishermen to get to nearby cays and reefs where large fish populations are found. Some fishermen drag lines behind their slow-moving boats. Called trolling, it usually yields mackerel, jacks, bonito, or kingfish. Lures are most commonly used.

Deep sea fishing gets its name from the fact that it is done in deep waters far from shore. Fishermen, also called anglers, may travel 30 miles from shore in search of large fish like marlin and sailfish. This is also called sportfishing, because these fish are caught for sport, and not for food. The Virgin Islands are known for excellent Blue marlin fishing. Many Blue marlin which are caught in these waters are tagged so they may be identified and studied when they are caught again later.

Fishing from boats requires knowledge of boating, and several safety items. Lifejackets should be worn at all times. Emergency equipment such as flares, a fire extinguisher, and a bailing bucket should always be on board. It is good to have a radio on board, to call for help in case an emergency occurs.

Spearfishing involves snorkeling while hunting for fish with a speargun. Special care should be used when spearfishing to avoid accidentally injuring yourself or others with a loaded speargun. Fish should be removed from the water immediately to avoid attracting sharks.



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### ROCKY SHORELINES OF THE VIRGIN ISLANDS

Rocky shorelines are generally found at the base of steep coastal bluffs and cliffs. These are formed by weathering and wave action on rock outcrops. They are different from rocky beaches, which have a gentle slope and are covered with loose rock or coral rubble. These areas do not appear to be suitable habitats for many creatures, but are far from deserted. Rocky shores are composed of four zones: weathered outcrop, splash zone, hard coral zone, soft coral zone.

Along weathered outcrops, a few special zed salt-tolerant plants can be found such as Turk's head cactus and frangipani. Gulls and pelicans perch here. These areas may be important roosting areas for several species of sea birds. In areas of rock that are occasionally splashed by water, a few hardy marine animals such as periwinkles and crabs can be found.

Farther down, in the splash zone, oysters, sea urchins, and a wide variety of molluscs cling to the rocks, including whelks. Small fish swim in and out of the rock crevices. Here they are safe from most underwater predators, but may fall victim to hungry birds. Tide pools are often found in the splash zone. These are home to crabs, eels, small fish, urchins, and many snails, especially young whelk.

Underwater, the hard coral zone is perfect for coral attachment, with shallow, clear, turbulent water. Many different types of hard coral are found here, mostly growing on large, submerged boulders or rocky outcrops.

The soft coral zone may be found at the deeper undersea base of the rocky shore. This area consists of boulders which have fallen into the water, along with exposed bedrock and a thin layer of sand. This bedrock is ideal for sea fans, sea whips, and other soft corals to attach.

Further offshore, the sand layer becomes thicker, and beds of seagrasses and algae may develop if the water is not too deep. There is almost always a band of bare sand separating the rock and reef areas from the seagrass beds. This sand strip is maintained by fish and sea urchins who live on the reef and graze on the seagrasses and algae in this area. These rocky shoreline areas often protect other types of shoreline from erosion by breaking up waves and preventing sand from being carried away from beaches by currents. They are also good hand line fishing spots, and provide a scenic vantage point on many of our coasts.



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### BATS OF THE VIRGIN ISLANDS

Bats are the only mammals native to the Virgin Islands. Mammals are animals that have fur, give birth to their young live, and nurse them with milk. Every other mammal living in these islands was brought here by humans, including deer, mongoose, rats and mice, donkeys, rabbits, and all domestic animals. Animals that are not native are called "exotic".

There are four common types of bat in the Virgin Islands:

The Cave Bat lives in caves or other dark places such as abandoned cisterns, chimneys, or wells. It feeds on fruit, pollen and nectar and is important in pollinating fruit trees.

The Fruit Bat is a large, rather aggressive bat. It lives in abandoned buildings, hollow trees, and under palm fronds. It eats soft fruit like the papaya, sugar apple and mespal and is sometimes considered a pest by local farmers. In fact, the fruit bat helps control insects and pollinate many plants, actually helping farmers. The Fruit Bat also disperses seeds from the fruit it eats, helping the trees distribute themselves over our islands.

The Roof Bat inhabits attics and the eaves under roofs. It likes to eat mosquitos and other small flying insects. It is important in natural mosquito control.

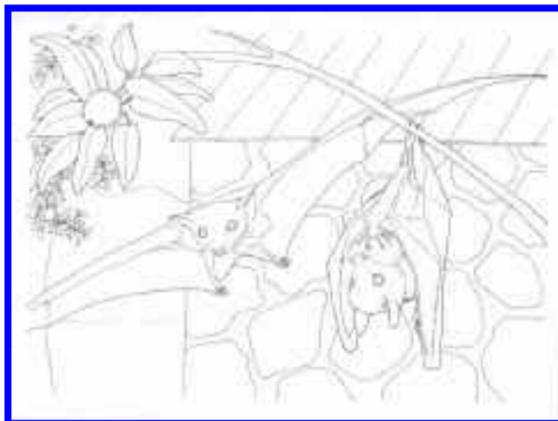
The Fish-eating Bat is the largest bat in the Virgin Islands. Its wing span can be up to 18 inches. It lives in hollow trees or sea caves. The Fish-eating bat's large hind feet have hook-like claws used to catch fish at night on the surface of the water.

Bats may travel several miles to feed. All are nocturnal, which means that they sleep all day and become active at night. However, the insect-eating Roof Bat has been seen hunting at dusk, just before sundown.

Humans should not fear being attacked by bats.

Bats grow rapidly, and can live on their own just three months after they are born. Some species have been known to live over twenty years. This long life span may be due to the fact that the bat has few predators.

With increasing development, rock caves, old trees, and other places of refuge for bats are becoming scarcer. Many of the wild fruiting trees are cleared and replaced with ornamental trees which have no food value for bats. These changes in the environment have resulted in a decline in populations of our only indigenous mammals.



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#### HUNTING IN THE VIRGIN ISLANDS

When most people hunt for food, they simply visit a grocery store or stop at a fast-food restaurant. Some Virgin Islanders enjoy the sport of hunting wild animals for food. These animals may include certain species of doves, ducks, and pigeons.

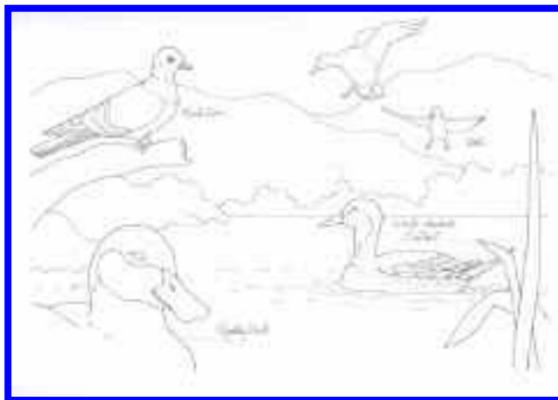
Hunting in the Virgin Islands is regulated by the Department of Planning and Natural Resources. Hunting is allowed only at certain times of the year and for certain animals. Open season is referred to as the period of time that hunting is allowed for a certain animal.

Recreational hunting is acceptable only if it is done using proper hunting methods and behavior. Our society today expects that hunters will:

**Hunt Legally - Be Licensed.** Hunt only when and where it is legal. Use only legal hunting methods. Hunt only authorized game. Obey bag limits which regulate how many animals may be taken. Do not trespass on private land. No rifles are allowed for hunting in the Virgin Islands.

**Hunt Safely - Be properly trained.** Wear bright clothing. Handle weapons safely and responsibly. Positively identify your target and make sure the background is safe. Do not consume alcohol while hunting or handling weapons. **Hunt Ethically - Treat all property with respect.** Only hunt to quickly and humanely catch your quarry. Use what you catch. Treat harvested game in a respectful and publicly inoffensive manner.

**Be A Good Citizen - Report those who violate conservation laws.** Be sensitive to and respect the feelings of those who choose not to hunt. Develop an awareness and concern for the total environment. Support wildlife conservation programs.



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### WILDLIFE FOOD RESOURCES OF THE VIRGIN ISLANDS

Animals in the wild must rely upon the plant life around them for food. Most animals eat a varied diet made up of whatever food source is available to them at the time. Many animals use flowers, seeds, fruits, and vegetation for food.

Hibiscus flowers are often planted for their beauty, but they are much more than a pretty flower to some birds. The hummingbird and bananaquit eat the nectar from these bright red blossoms. Deer eat the tender leaves and bark, while iguanas enjoy the flowers and leaves of the hibiscus. Iguana also enjoy the nectar from the yellow cedar, also known as the Ginger Thomas.

The Ginger Thomas is the official flower of the Virgin Islands. It is found on hillsides throughout the islands. It is a fast-growing evergreen shrub with yellow, clustered, trumpet-shaped flowers and thin, brown seed pods. Birds such as the Zenaida dove enjoy the seeds from the Ginger Thomas, which are thin, brown, and wing-shaped.

The pulp of the Tamarind pod is a favorite treat of many islanders. Wild burros also enjoy the seeds and fruit. Tamarind trees are found in dry areas. Pale yellow and red flowers can usually be seen in the spring.

Everyone loves a sweet, juicy, ripe mango on a hot summer day. Everyone includes the animals, too. Brown-throated parakeets, Green-throated Caribs, bananaquits, bats, even deer and mongoose feed on mangos.

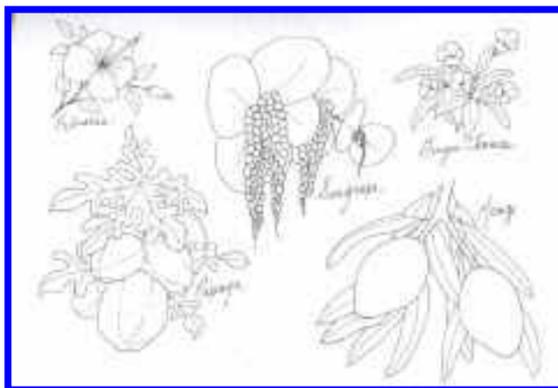
Another popular favorite is the papaya, which is consumed by thrashers, fruit bats, and even roof rats. The fruit of the papaya is melon-like, with thin skin that turns from green to yellow as it ripens.

The mespal is an aromatic brown fruit with a coarse, paper-like skin. Because the fruit is so sweet, it is usually harvested by fruit bats before the farmer can pick them.

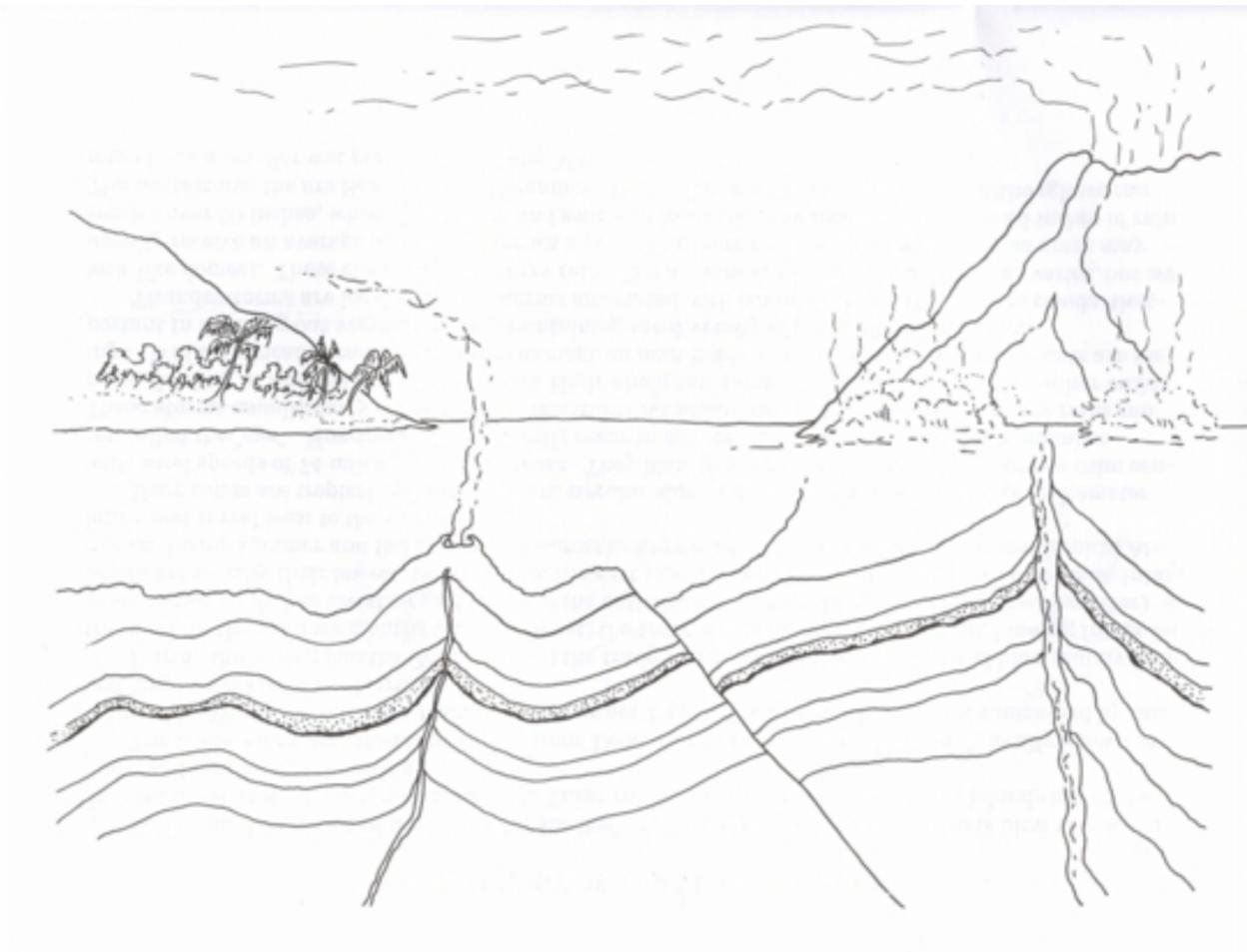
Seagrape trees grow along the sandy or rocky seashore, in coastal thickets. Their purple fruit, which is round with thin skin and a sour pulp, is a favorite of the White-crowned pigeons and Pearly-eyed thrashers.

In addition to flowers, fruits and seeds, some animals graze on the variety of grasses found in the islands. Bermuda grass, Wire grass and Guinea grass are a few favorites of deer and burros. Those animals which do not eat the blades themselves may feed on the small seeds. Goosefoot grass makes up a big part of the Grassquit's diet, and is enjoyed by other birds such as the Zenaida dove and Common ground dove. Grassy areas provide a habitat for small insects which are also a food source for many ground-feeding birds.

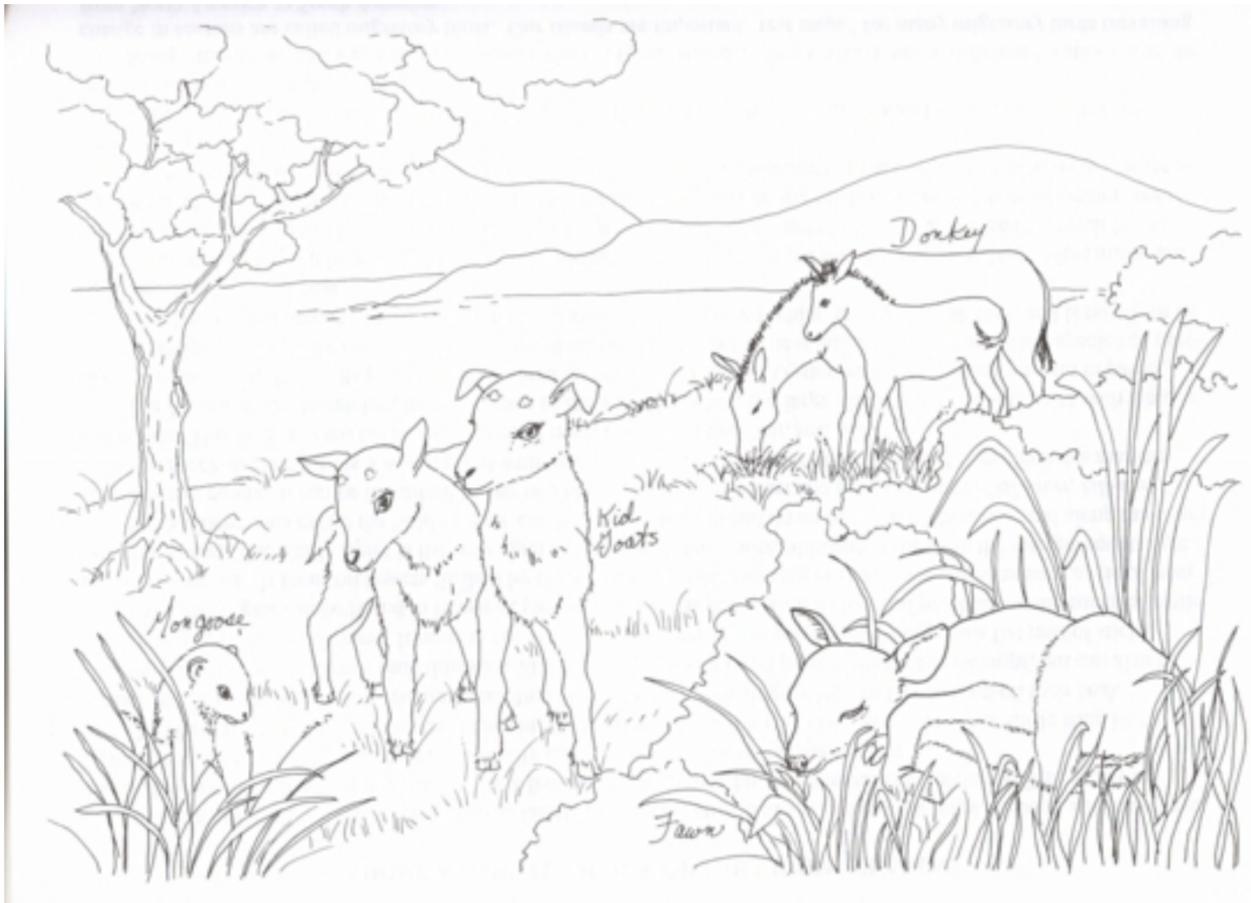
Animals that feed on fruits and many seeds are responsible for dropping the seeds far from the parent plant. This allows trees and plants to spread themselves over our islands.

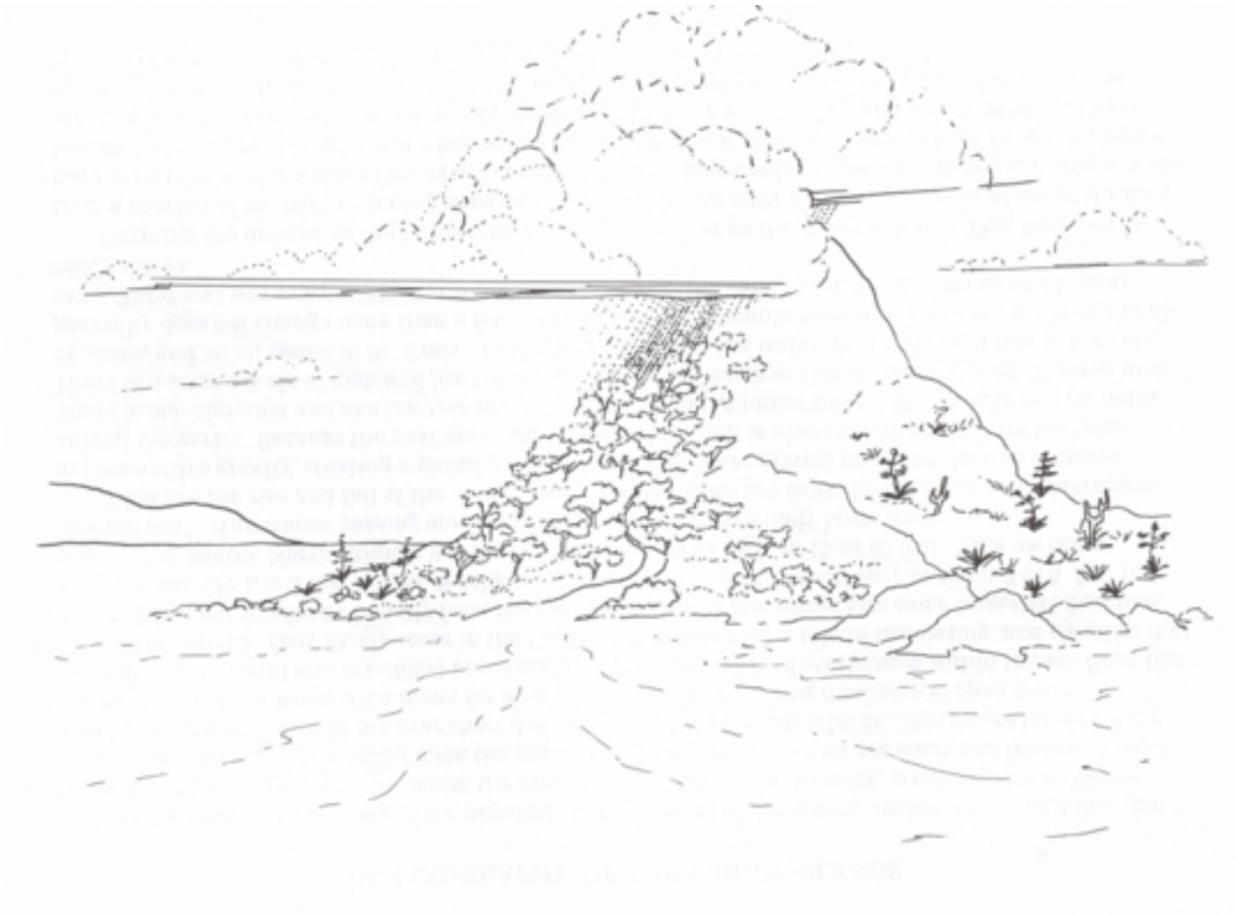


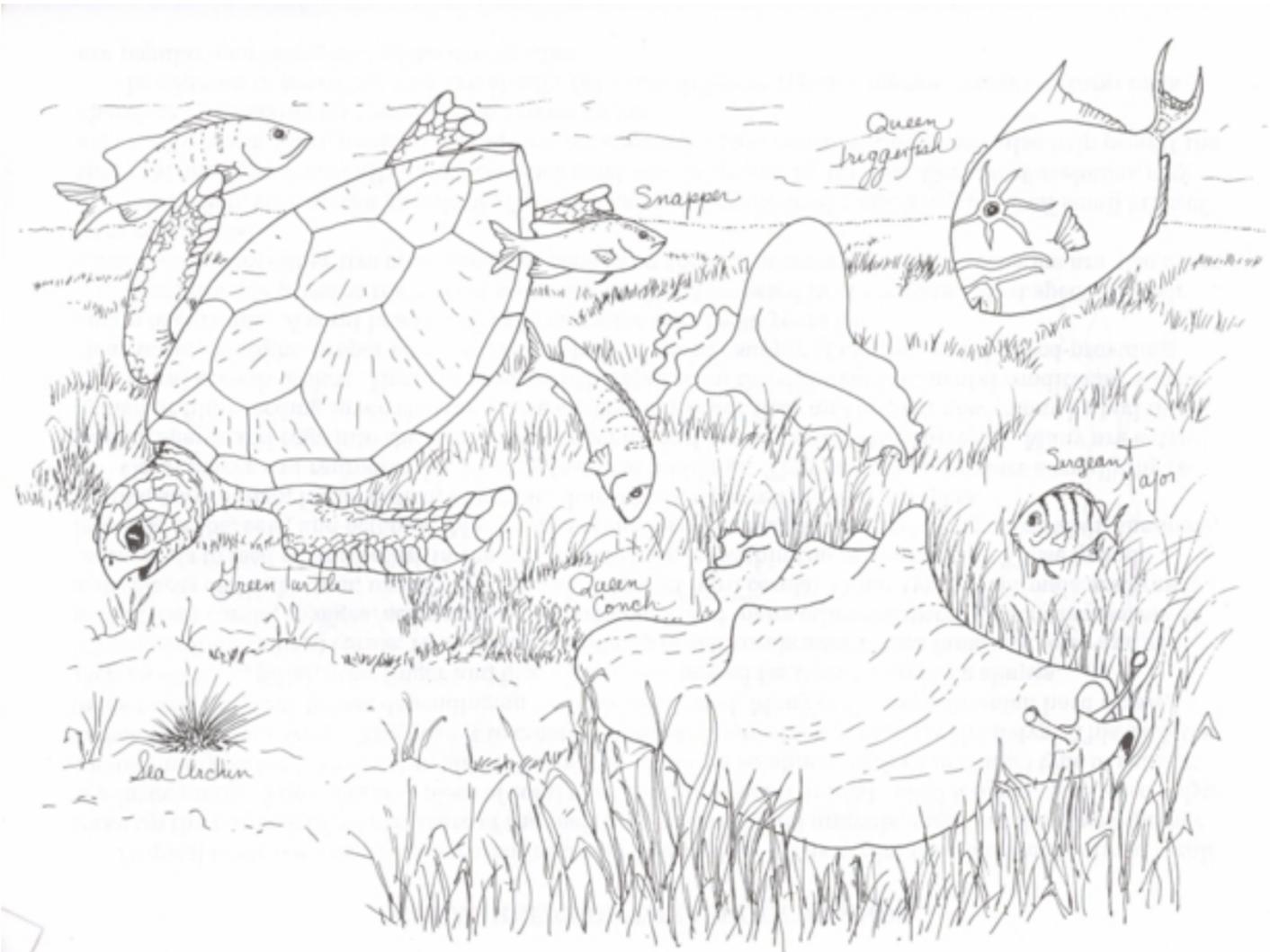
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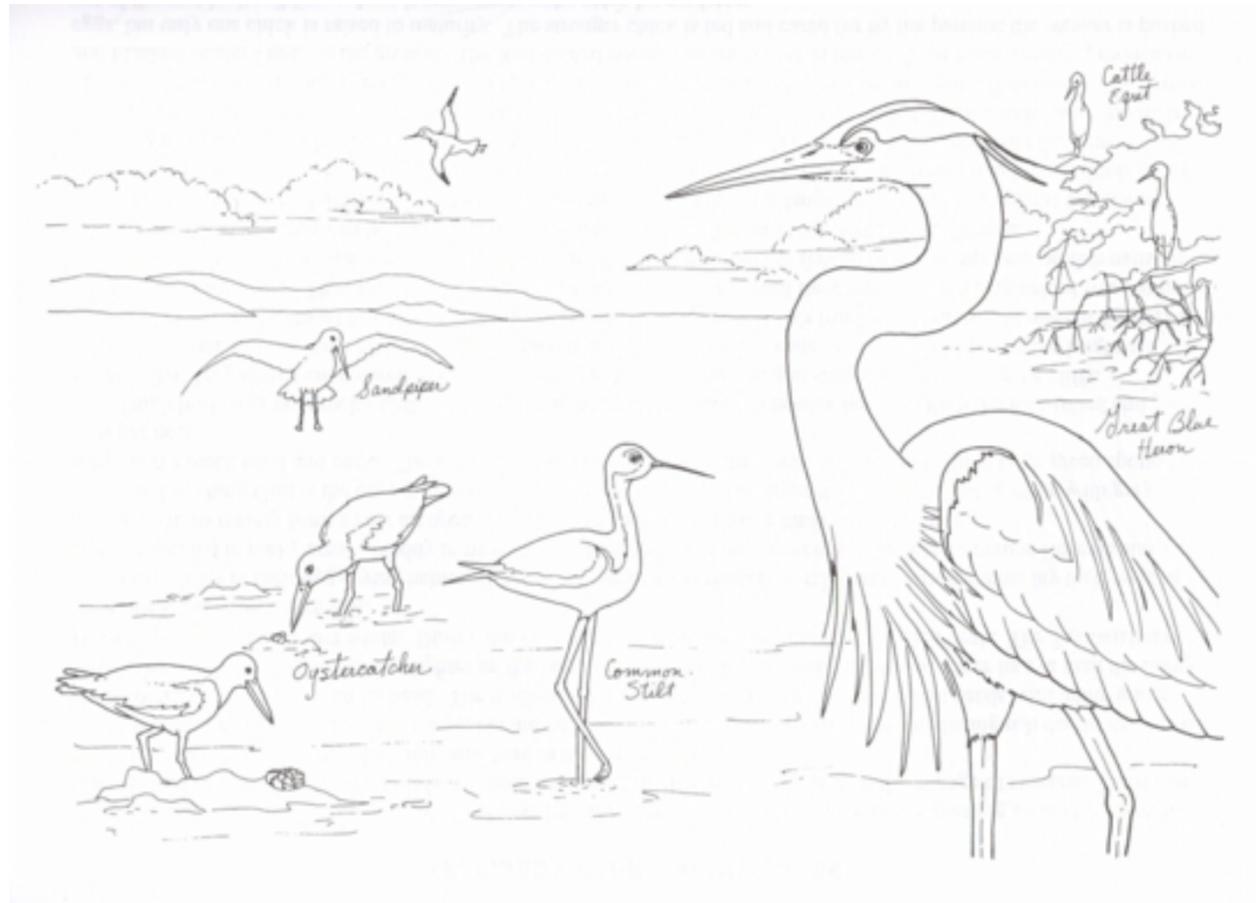


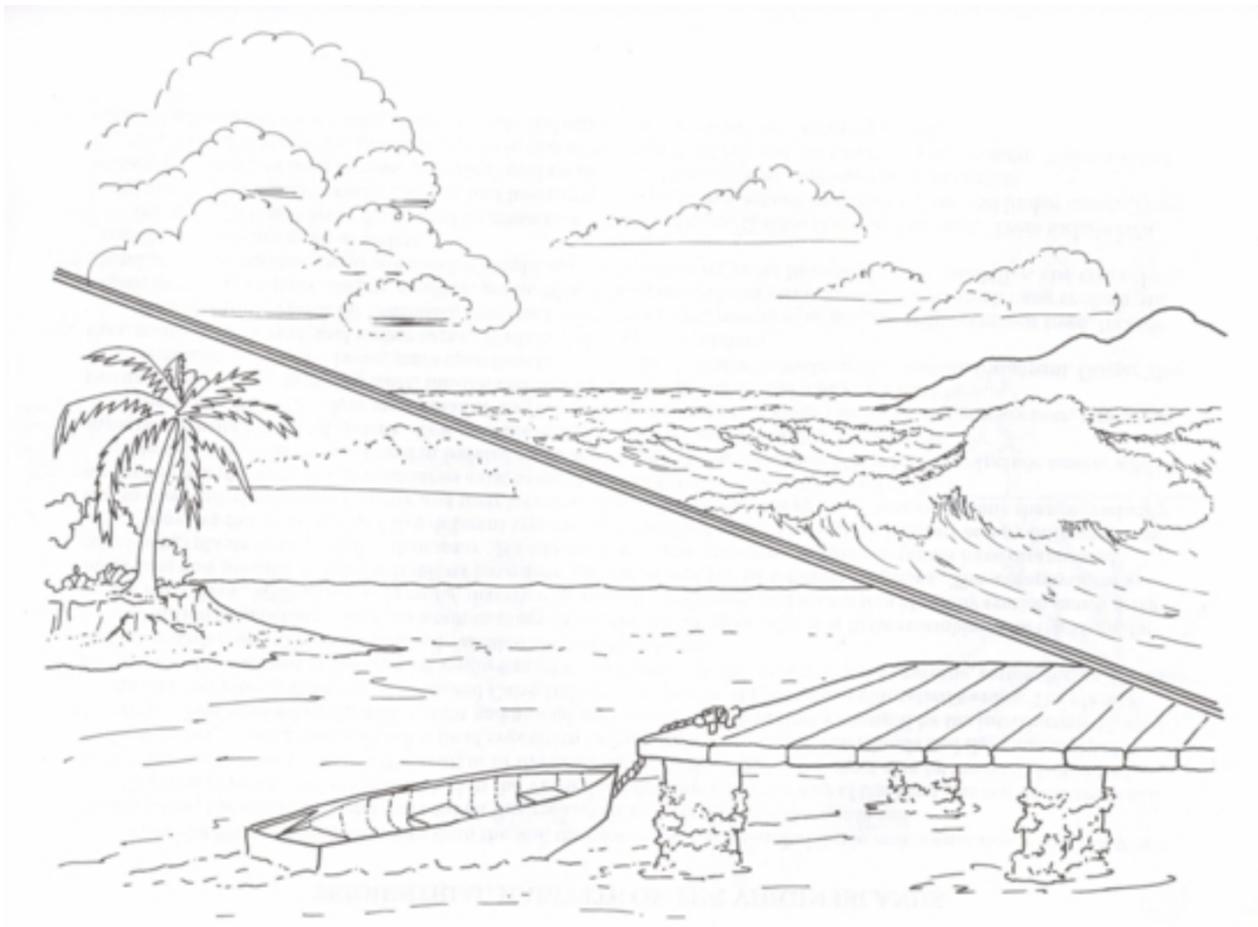


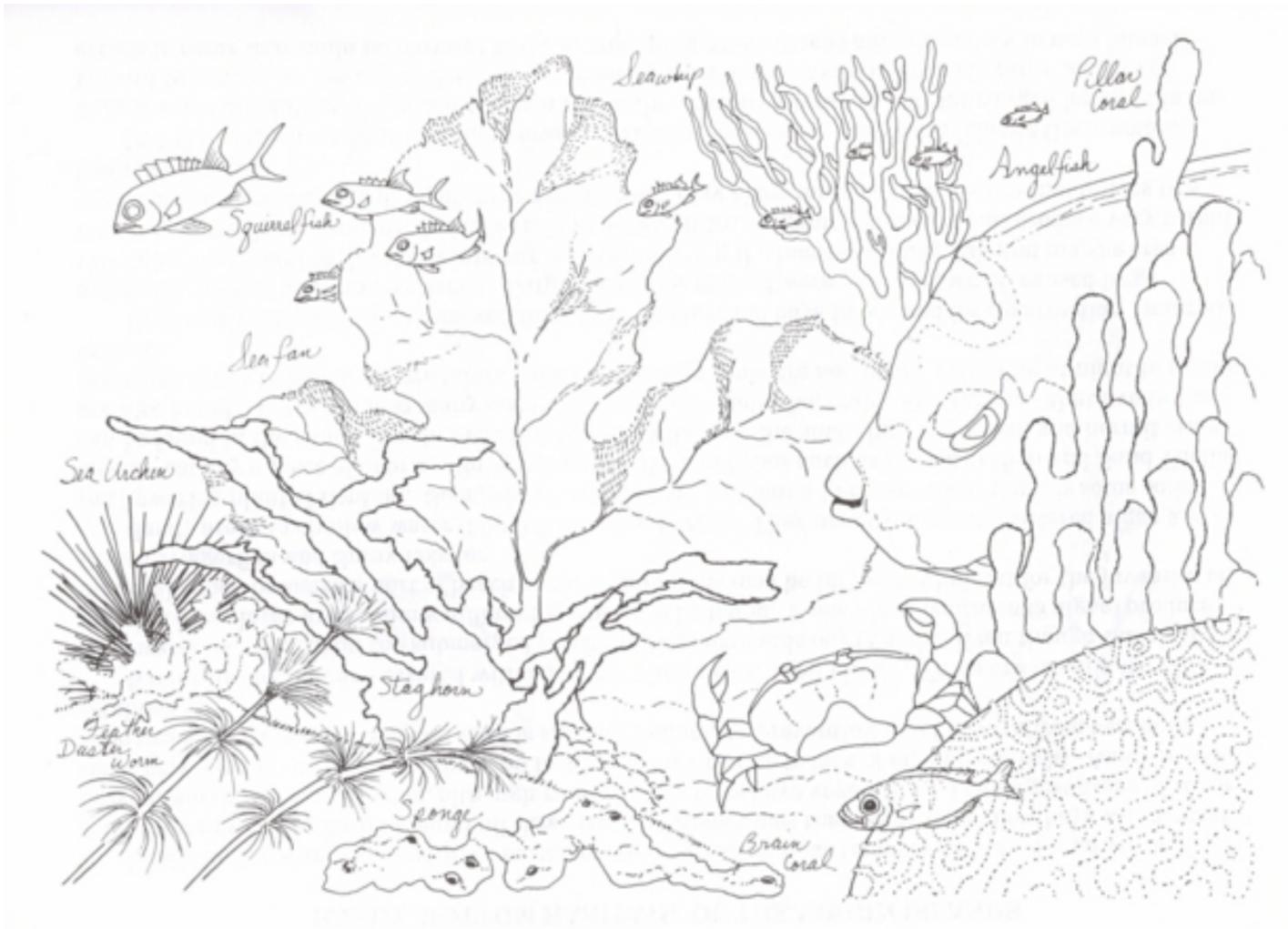


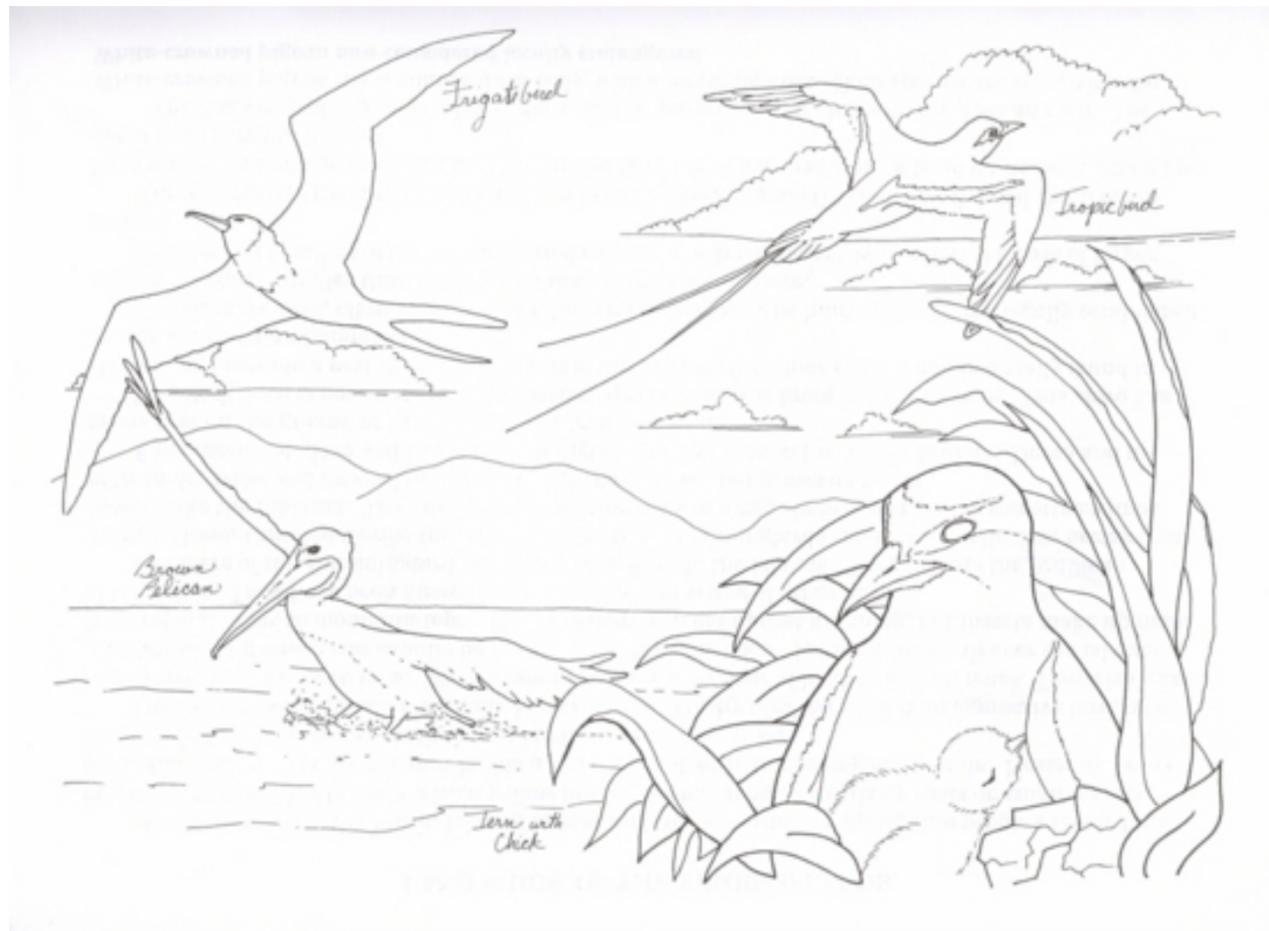


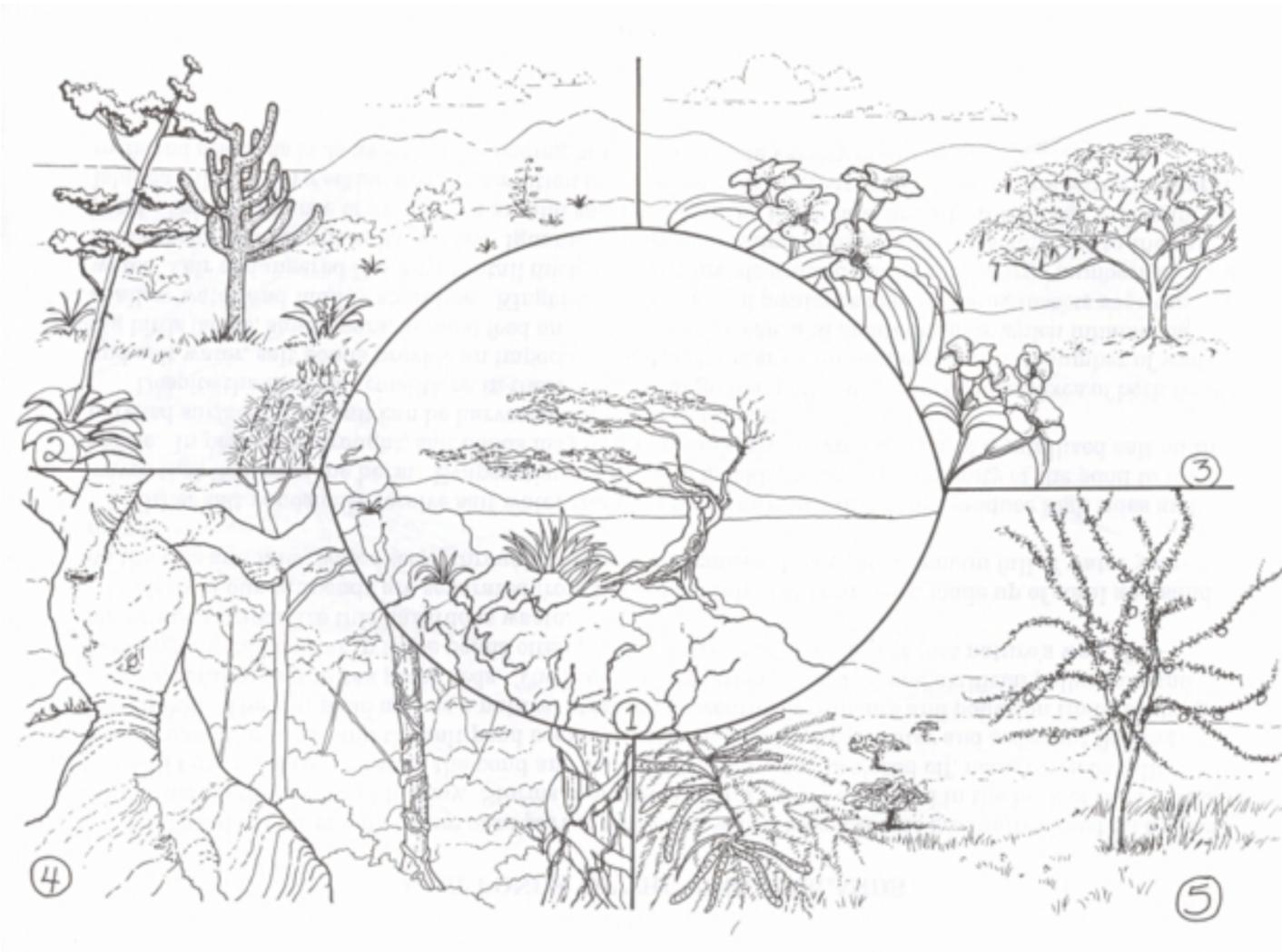


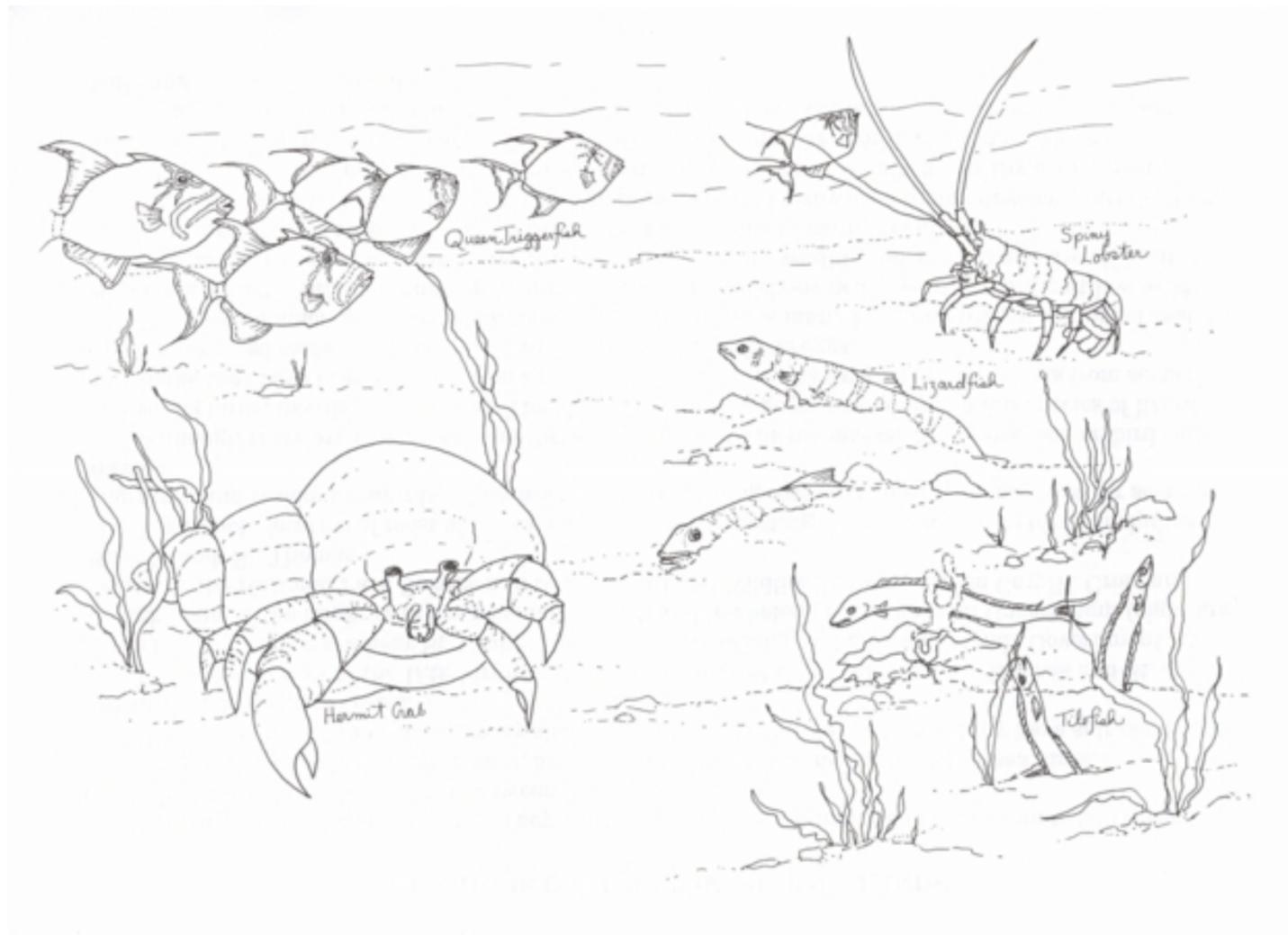


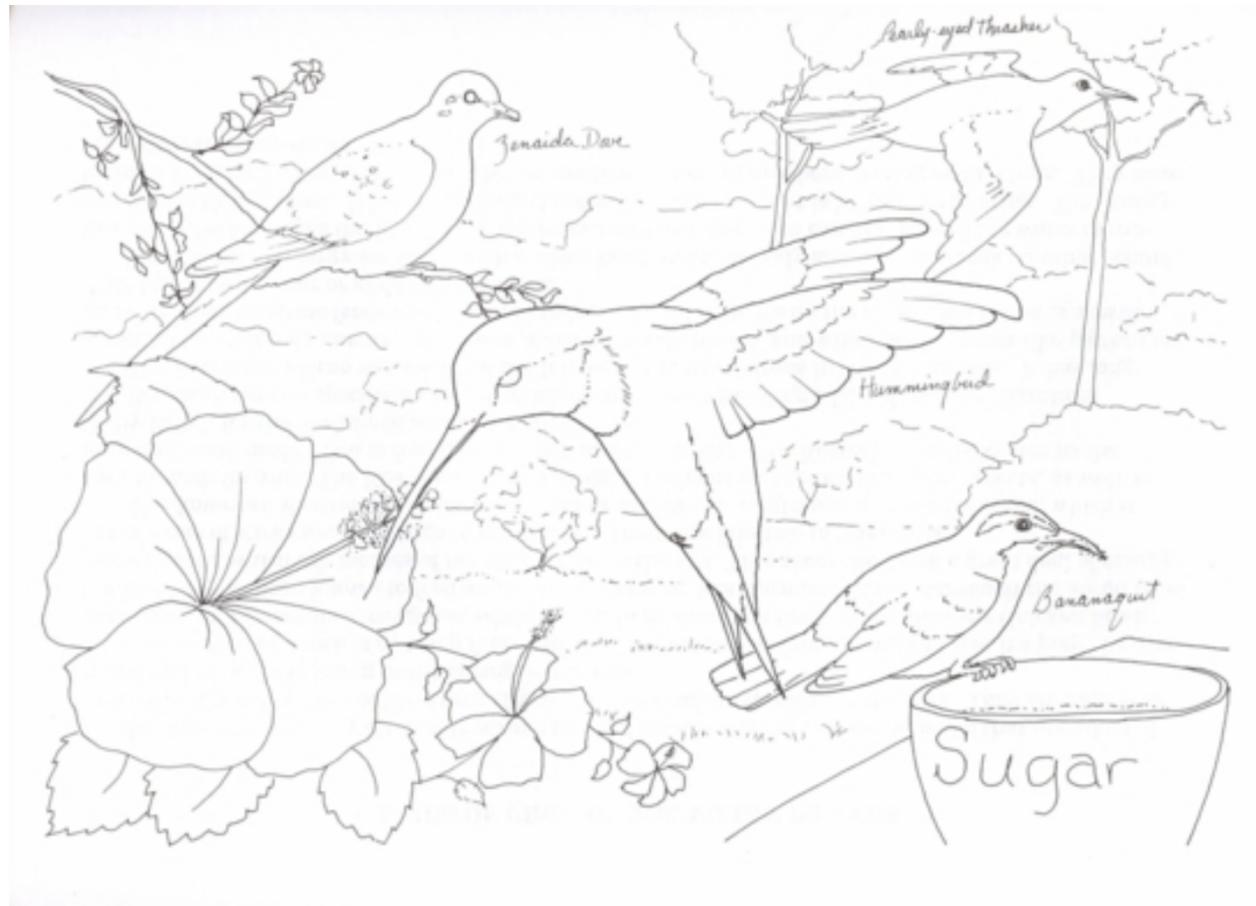






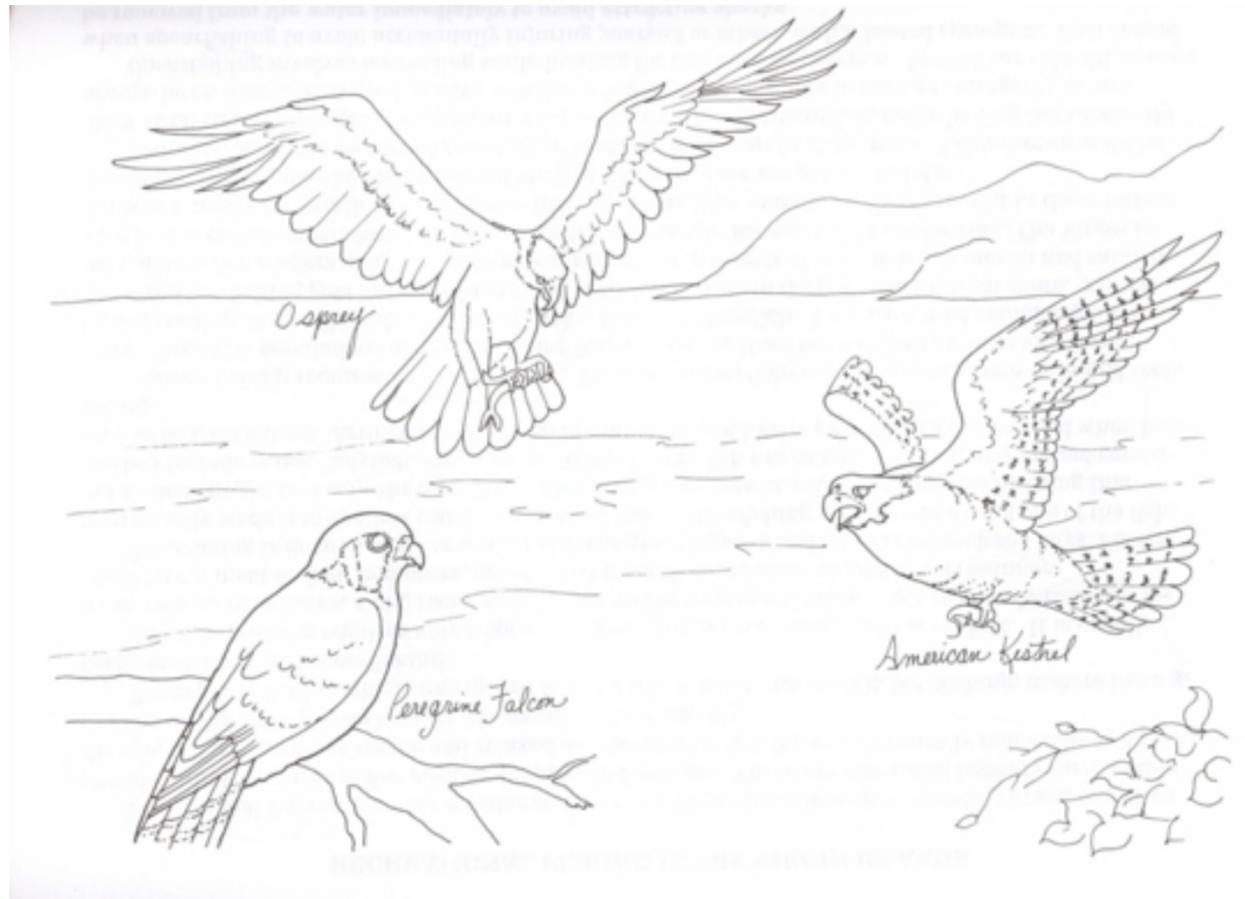




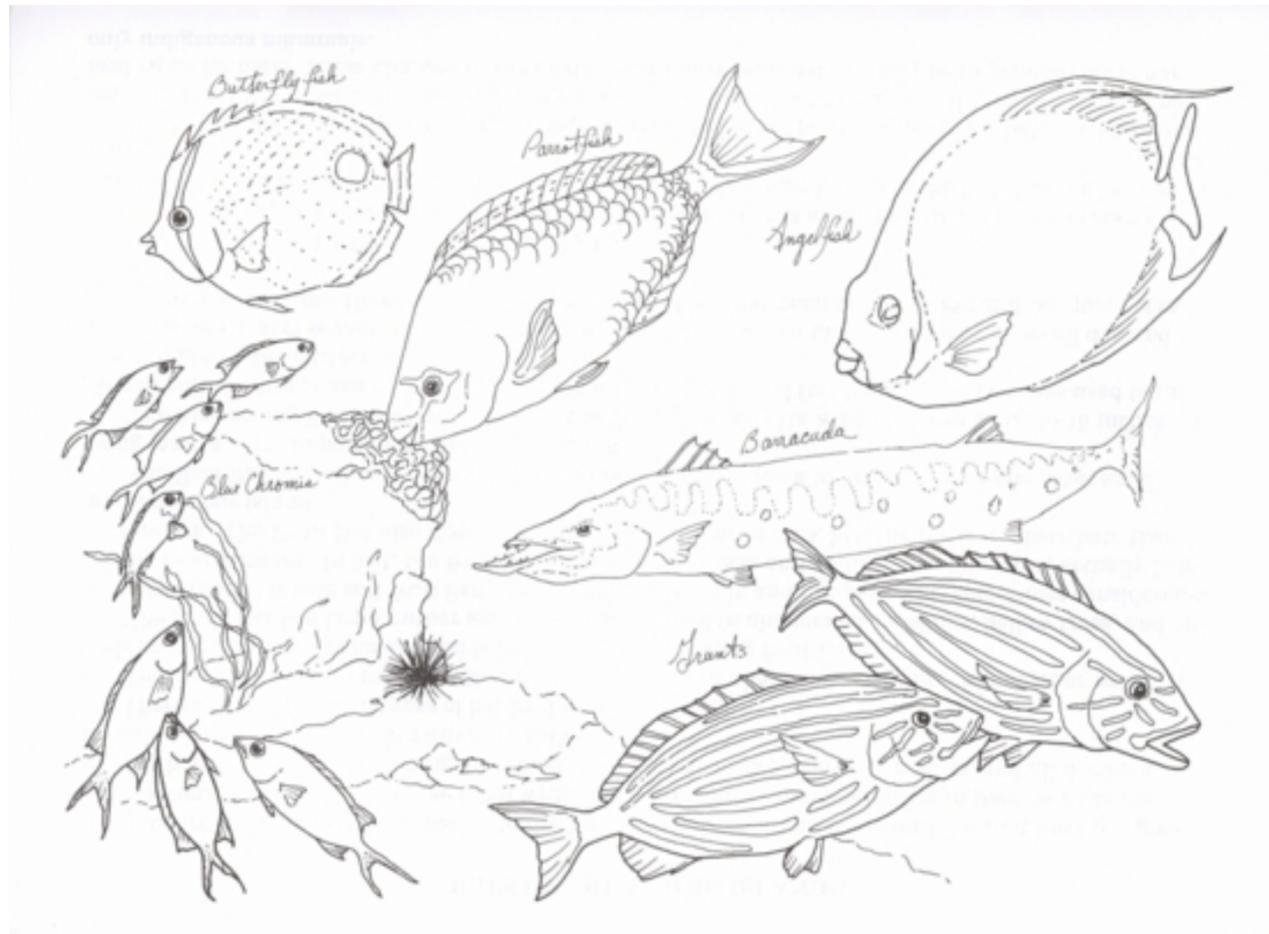


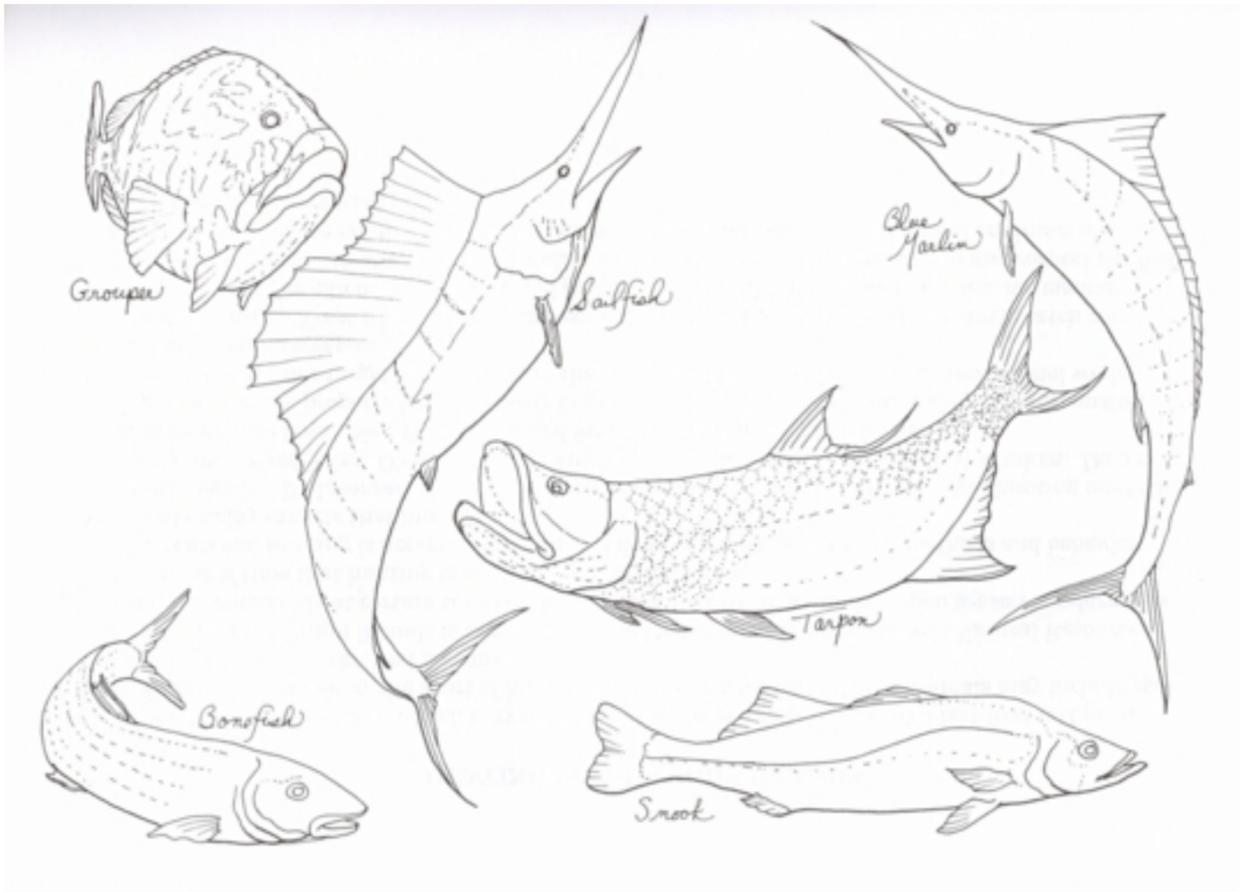




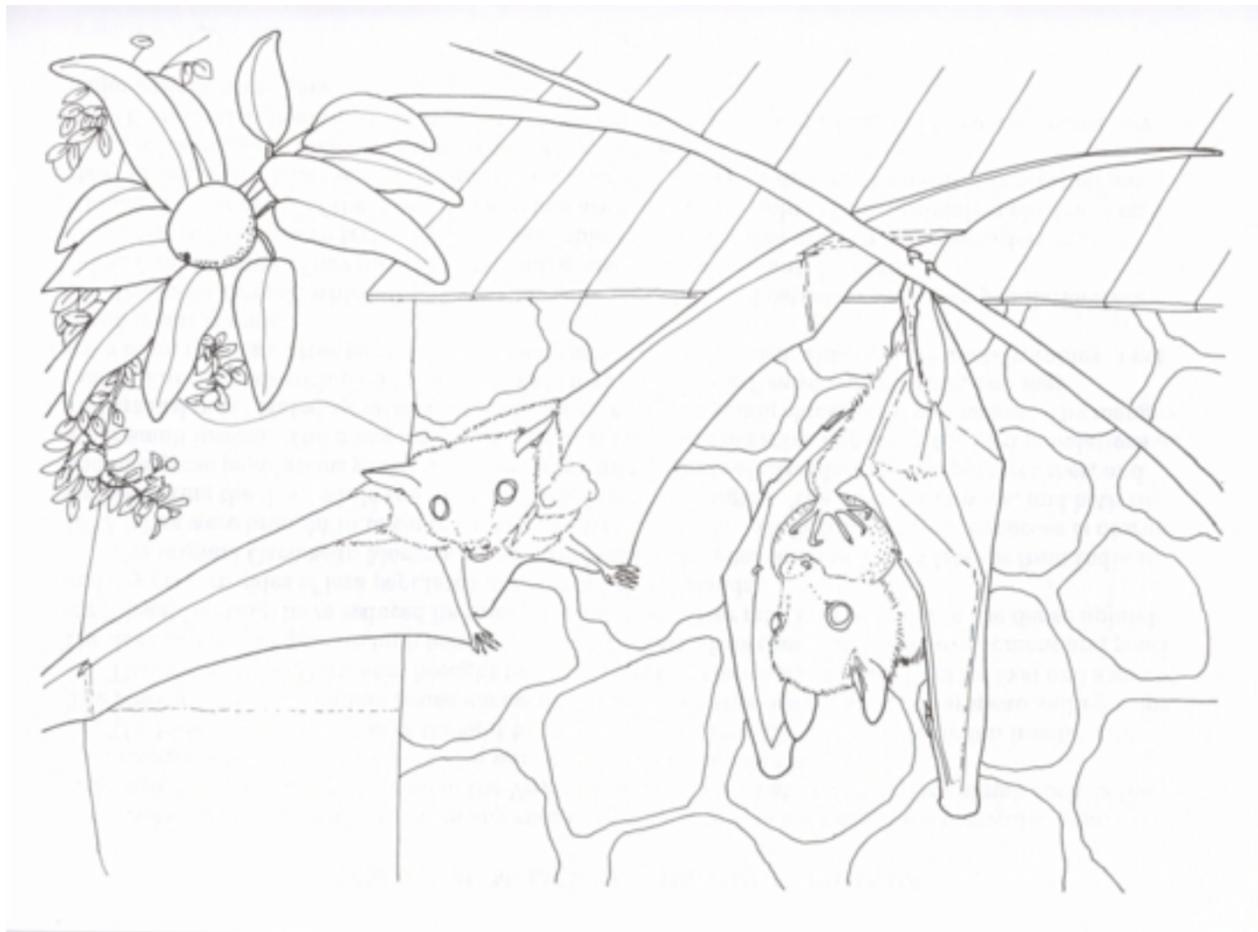


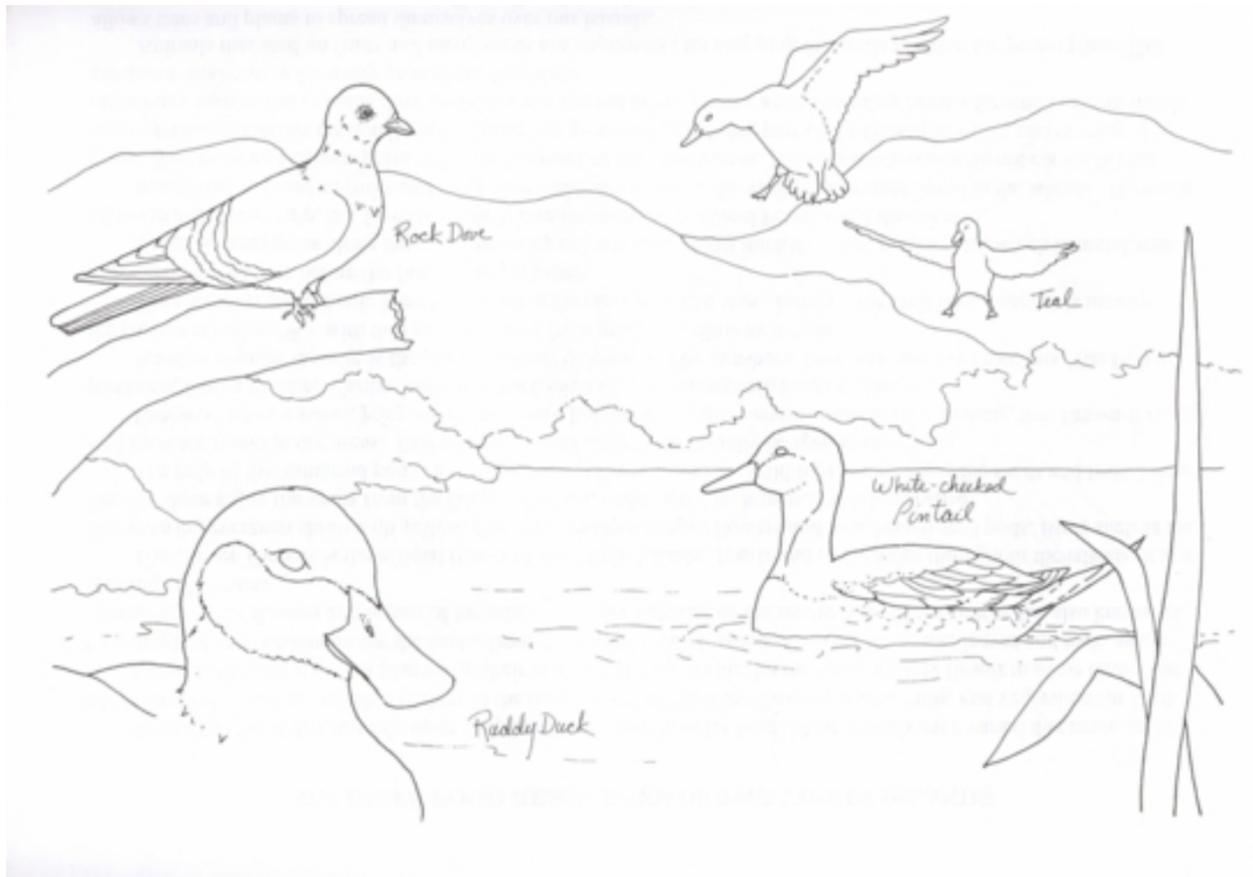












NOTES



Hibiscus



Seagrape



Singu Thomas



Papaya



Mango

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