

AN INTRODUCTION TO THE MANGROVE LAGOON

by  
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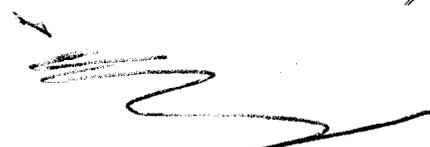
V.I. Department of Education

Since October, 1970, when the Environmental Studies Program began, more than 1500 elementary pupils have visited the Mangrove Lagoon Environmental Study Area in cooperation with the Caribbean Research Institute.

The 118 acre Mangrove Lagoon is a registered NESAs (National Environmental Study Area) and eligible to become a National Environmental Education Landmark.

Mrs  
Goslock

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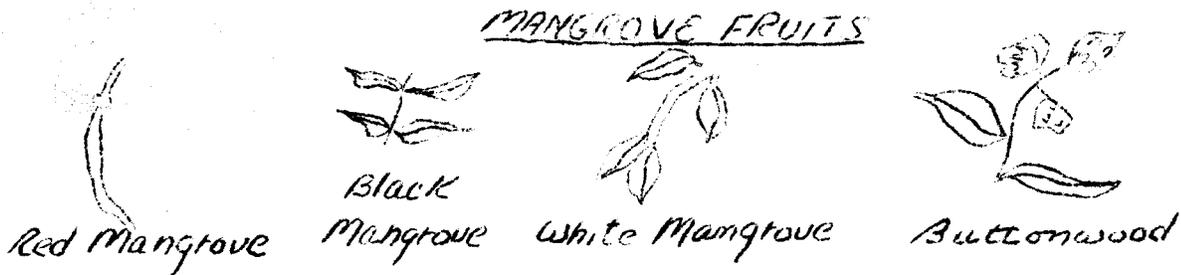


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## I. The Mangroves

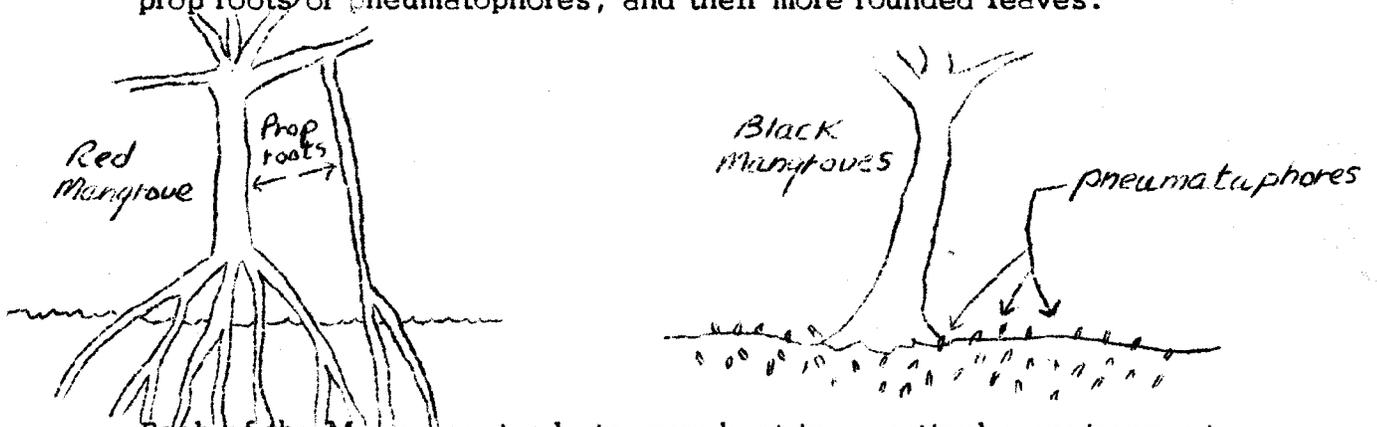
"Mangrove" is a loose term covering about 30 kinds of plants which grow in coastal areas throughout the tropics. The four most common species in the West Indies are the Red, Black, White and Button Mangroves. Each has a distinctive type of fruit, inedible to man, but eaten by birds, insects and the *Cyclura pinguis* Iguana who eats the Buttonwood fruits.



The seeds of the Mangrove float, and they may be carried out to sea and drift for several months before taking root on some faraway shore.

Red Mangroves have distinctive "prop roots" which extend out from the trunk and branches of the tree. These roots help to keep the tree from being blown over by high winds -- this is necessary because of the soft muddy bottoms in which the trees grow.

Black Mangroves produce many thin, finger-like "pneumatophores" from their underground roots. Projecting above the ground, they enable the roots to obtain oxygen, which is very scarce in the mud covering the roots. White Mangroves can usually be identified by absence of either prop roots or pneumatophores, and their more rounded leaves.



Each of the Mangroves tends to grow best in a particular environment. This tendency produces a zonation of the trees within the lagoon. In general, only Red Mangroves grow in the zone between high and low, i.e., where their roots are periodically submerged in seawater.

Behind the fringe of Red Mangroves we sometimes find a mixture of White and Black Mangroves and Button Mangroves, with the Whites tending to grow in drier, less marshy conditions than the Blacks. Black Mangroves at the Salt Pond on St. John are a good example of adaptation to a salty environment since pupils can taste the salt the leaves excrete. The zone of White Mangroves grades into the typical terrestrial vegetation of the island. Though they don't commonly occur there, Red Mangroves can be grown in fresh water.

#### 11. The Mangrove Community of Plants and Animals -- A Tour

The following numbered entries are intended to be used in conjunction with the map of the lagoon ( see Fig. 5) which shows correspondingly numbered stations; these site descriptions are merely background material to orient teachers not familiar with the lagoon and its creatures. Please feel free to innovate: Add or delete materials as you see fit, or make up your own tour -- you're running the show! Underlining indicates what I consider particularly relevant bits of information.

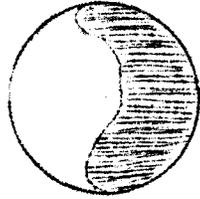
- 1) Board the Sea Slug at Benner Bay Lab -- this is presently the most developed part of the lagoon area, and consequently also the most polluted. Most of the mangroves here have been destroyed directly by bulldozing and filling to obtain more land. Where the Red Mangrove fringe has been left, you will see that the community of plants and animals growing on the roots of the mangroves is much less diverse compared to the roots in less disturbed parts of the lagoon. Note the dirty, grayish-green color of the water, due to dense growth of microscopic plants (plankton) and silt from soil erosion and dredging. Oil and gasoline spills are frequent. Circulation in Benner Bay is very slow so that pollutants tend to persist rather than be flushed out. The water becomes progressively clearer as you proceed towards Cas Cay.
  
- 2) Seagrass Meadows -- Seagrass beds are among the most productive and heavily populated environments in the sea. Many kinds of shrimp, crabs, sea stars, urchins (sea eggs), sponges, snails, clams, worms, fishes and algae live on and among the leaves of the grass. The sand beneath the surface is inhabited by vast numbers of burrowing animals. Grass beds and Mangrove Lagoons provide shelter and food for the young of many kinds of food and game fishes, as well as spiny lobsters. The value of such "nursery areas" to local fisheries is incalculable, and once destroyed they cannot be replaced. Like all green plants, seagrasses need light in order to grow--dirty water cuts off the light and kills the grass, destroying the home of the innumerable animals which live in the beds. Additionally, as the grass dies and decays, much fine mud once held firmly by its roots may then be suspended by wave motion to further muddy the water and decrease the light available to surviving organisms. Conchs and sea

turtles use the grass as food; they in turn are eaten by man. Sea turtles are being wiped out by excessive hunting and destruction of nests. Two kinds of sea turtles which live in the Virgin Islands -- the hawksbill and the leatherback or trunk turtle -- are on the Federal Endangered Species list because they are in danger of extinction. Though they are completely protected by this law, people in the Virgin Islands continue to hunt them -- probably mostly in ignorance of the law.

- 3) Coral Reef area between Patricia and Cas Cays -- we will not consider the reef in any detail, except to note in passing that it constitutes a completely different life zone, one which cannot survive without clean water. Notice how much clearer the water is here. Water passing over the reef circulates through the lagoon and exits through the Benner Bay area.
- 4) Channel between Patricia and Bovoni Cays (Short Stop) -- in the clear water here you may see many kinds of fishes. Large schools of "sprat", small barracudas, and Big Eagle or Leopard rays swim by. Notice how each type of fish has its own habits; sprat are always found in schools, never alone; barracudas and rays usually swim out in the open, by themselves; while back in the shadows among the mangrove roots hide a variety of brightly-colored fishes. Mangrove roots are a fascinating place to explore with face mask and snorkel. In looking there you will find that tiny barracuda (a couple of inches or so long) have somewhat different habits than the adults. They can be seen hiding motionless among the mangrove roots, sometime hanging vertically and looking like tiny, mottled brown twigs. Very often several jelly-fish can be seen on the bottom, lying on their backs with the tentacles turned up to the light. Within these tentacles live thousands of microscopic plants -- an example of symbiosis or living together. (Caution-- most jelly fish sting.)

Thick clumps of dark green algae grow among the roots on the right-hand side of the channel. These algae are unusual because they have a limey "skeleton." When the algae die their ground-up skeletons form a large percentage of the sand which makes up the floor of the lagoon. In time, this skeletal material will be re-used by other plants and animals. Everything in nature is part of a cycle.

- 5) Cove (Stop, turn off engine) -- this little cove is one of the prettiest parts of the lagoon. Even so, it is a pale shadow of the beauty that was Krause Lagoon in St. Croix -- now buried under the Hess and Harvey industrial complex. Sit motionless awhile and absorb the essence of the place, listen with your inner ear to its quiet harmonies--meditate on them...



"Be empty  
Watch quietly while the ten  
thousand forms swim into life  
and return to the source...."  
(T.L. from Tao Te Ching)

"With names, one should know where to stop" -- Lao-Tse

- 6) As you move away from the cove, reflect for a moment on the shriek of a jet's engines; where you are now is approximately where the planes will be landing if the jetport is built.

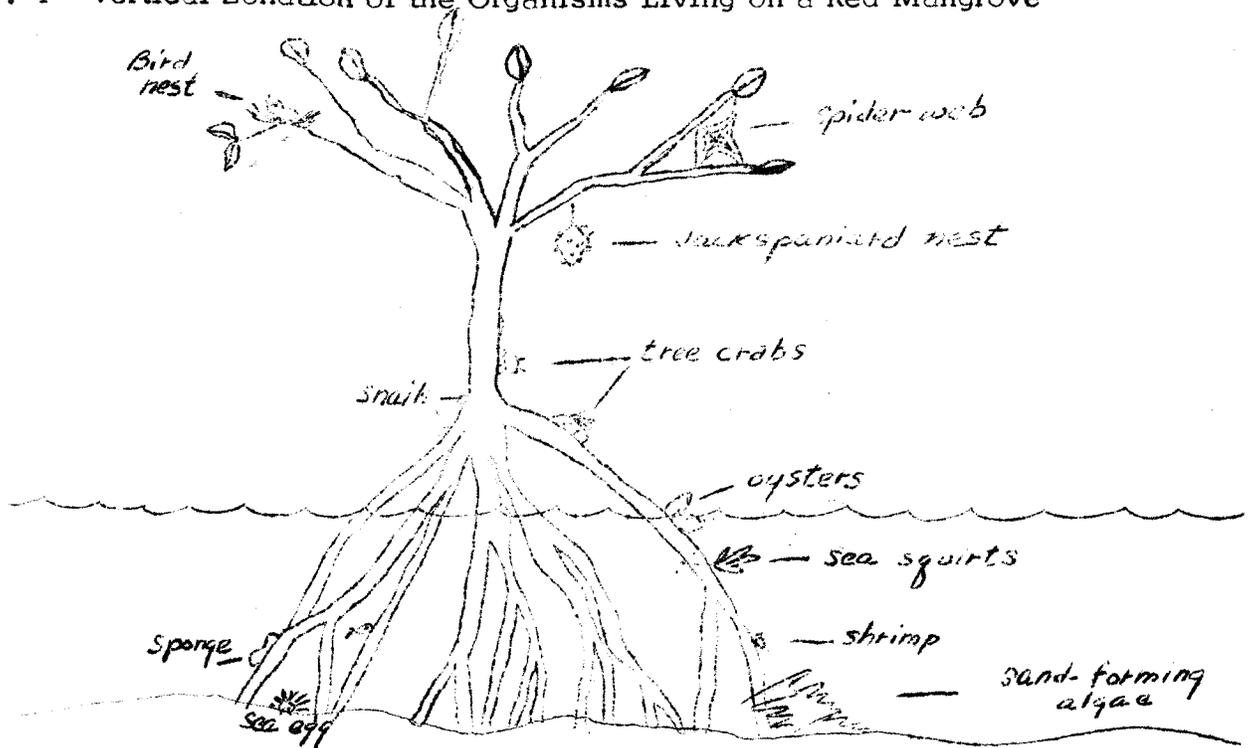
Next, stop along the mangroves on the right-hand side of the channel to take a closer look at what lives there. Every type of environment is inhabited by a characteristic association of living things. At first glance, the lagoon may seem to be populated only by the mangrove trees themselves, but further inspection reveals a host of animal and plant life, much of which depends upon the mangroves for shelter, concealment, or food. The majority of the creatures are either tiny or well camouflaged, and one must look closely in order to see them.

The bottom portion of the roots (the part under water) is usually covered by a furry mass of algae, sponges, sea squirts, etc. Take a root on board and examine it. It is probably alive with tiny shrimp, crabs, snails, and worms. Look closely, then please return the animals to the water. Near the surface of the water you may see oysters growing on the roots, and just above these, but out of water, large brown snails which are not found in any other habitat on the island. Running along the roots and branches you may see several, small, quick crabs -- there are two kinds, and they are both plant feeders.

Several kinds of birds nest and roost in the branches of the mangroves. Most of these are out foraging during the day, and only return to roost at night. However, you may see some pelicans and one or two kinds of herons. The pelicans dive for small schooling fish and the herons hunt individual fish by wading in the shallows of the lagoon.

Notice that there is a definite zonation of life forms from the bottom to the top of a mangrove tree with each animal or plant occupying its own specific niche (see Fig. 4). Most of the animals live underwater, but there are many others that live in the branches of the trees. Insects are common (uncomfortably so, in the case of mosquitos and sandflies), wasps (Jackspaniards) build nests, dragonflies chase each other and court among the branches. Spiders (not an insect) build webs in the trees to catch flies.

Fig. 4 - Vertical Zonation of the Organisms Living on a Red Mangrove



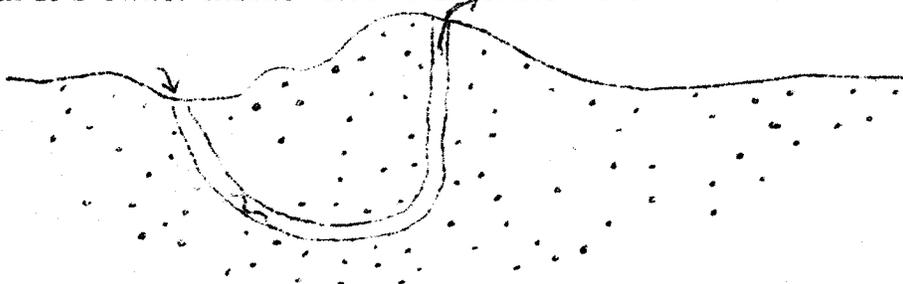
At night, insect-eating bats come out to hunt, while their fish-eating relatives skim low over the water in search of a meal.

Not so long ago, the iguana ('guana) was a common and fascinating denizen of these swamps, but it has become virtually extinct because of the destruction of its habitat by man, and wanton slaughter of the animals themselves. Ask your children how many of them have ever seen one, explain why it is worthwhile not to kill those that may be seen.

- 7) Group of Small Islands -- what you see here is the process of island building. Each of these small islands probably started out as a single mangrove tree. As time went on, silt and other debris accumulated among the roots, affording a place for other seedlings to take root, and the process continued. Eventually an island was born. Given enough time, all of these small islands may consolidate to form a much larger one, such as Patricia Cay.

Notice how the channels between the islands are carpeted with turtle grass and algae. On the bottom are also numerous mounds

of sand, like little volcanoes, and also many depressions or hollows. These are the signs that burrowing animals are present beneath the surface of the sand. Such "sand castles" may be inhabited by various kinds of worms, crabs, shrimp, or sea cucumbers. Here is a cut-away view of a worm's dwelling, with it's owner inside (arrows indicate water current):



- 8) Here you can see a good example of horizontal zonation. Look at the hill on your right and notice that it is covered by typical land plants -- frangipani (with white flowers), cactus, and low scrubby bushes. Mangroves do not grow in such an environment. Only near the water's edge do we find the mangroves--they are adapted to live in this habitat and not as successfully elsewhere.

The open expanse of water to your left is the largest bay within the lagoon. The bottom here is covered by turtle grass. This area is being polluted by effluent from the Nadir sewage plant, which dumps partially treated sewage into the water. The lagoon is also threatened by rapidly expanding housing development in the Bovoni area, and by a proposed racetrack at Nadir. This area is the exit of Turpentine Run into the lagoon and collects runoff from a large section of St. Thomas and with intermittent rains funnels a great deal of fresh water into the lagoon. The water in the gut behind Madison School feeds into the lagoon.

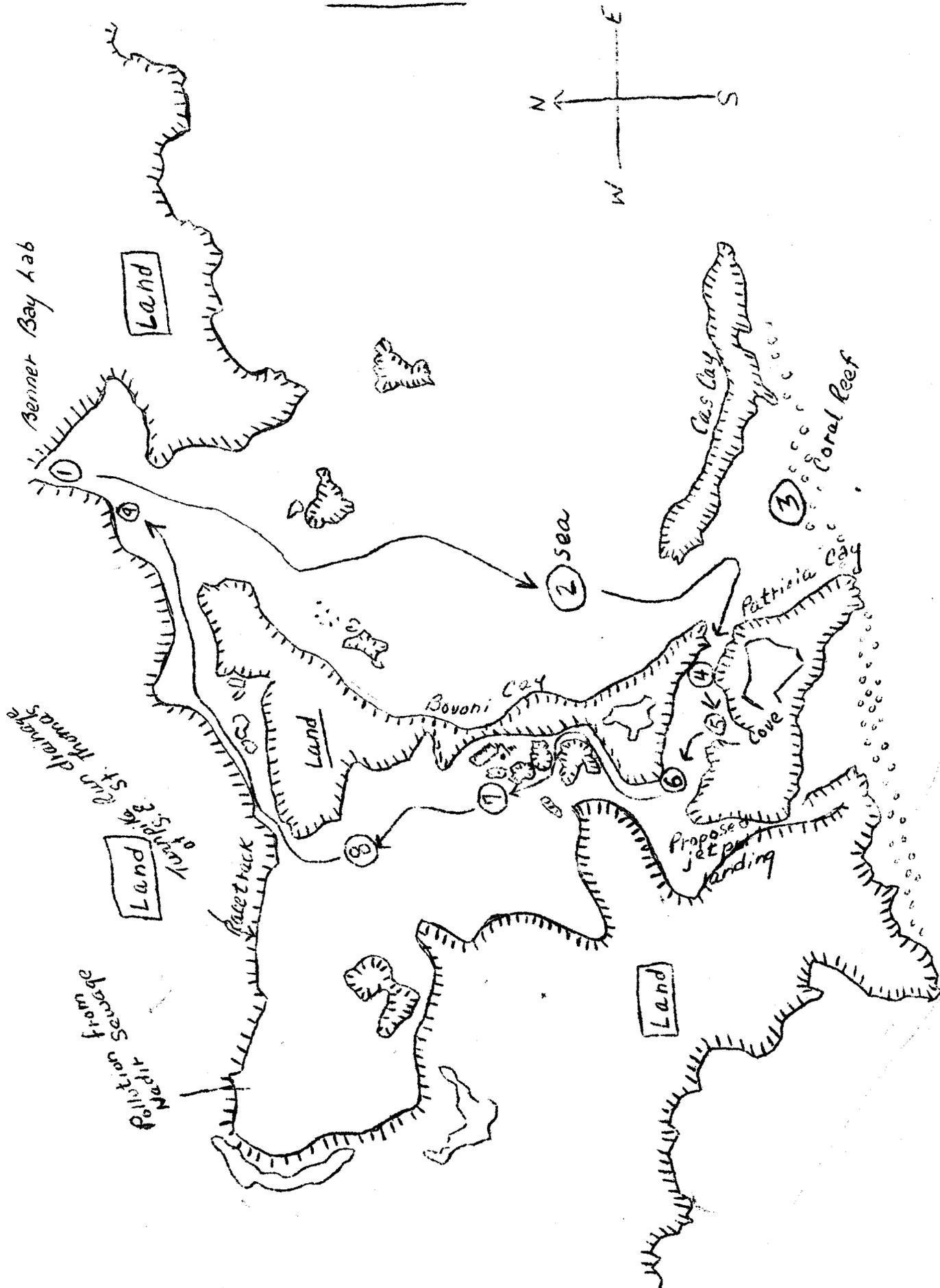
The water carries varying amounts of mud and other debris, the load depending these days on how much construction is going on upstream.

- 9) Back to civilization, noise, and dirty water ...

Figure 5 -- Map of Mangrove Lagoon showing Tour Route and Station Numbers--  
See Next Page

On St. John, students may visit a smaller mangrove area at Lameshur and a larger Mangrove area at Fish Bay. All four types of Mangroves grow along the shore at Annaberg.

FIGURE 5



SOME COMMON AND/OR INTERESTING TREES OF ST. CROIX (REVISED 4/11/63)

INSTITUTE OF TROPICAL FORESTRY, U. S. FOREST SERVICE  
Kingshill, Virgin Islands

<u>V. I. Common Name</u>	<u>Spanish Name</u>	<u>Scientific Name</u>
acacia	bayahonda	<u>Prosopis juliflora</u>
African-tulip	tulipán africano	<u>Spathodea campanulata</u>
almond, Malabar-almond	almendra	<u>Terminalia catappa</u>
Australian-pine, Casuarina	pino, Casuarina	<u>Casuarina equisetifolia</u>
avocado, pear	aguacate	<u>Persea americana</u>
bamboo	bambú	<u>Bambusa vulgaris</u>
baobab, Guinea-tamarind		<u>Adansonia digitata</u>
bay-rum	malagueta	<u>Pimenta raceomosa</u>
black mampoo	corcho	<u>Torrubia frangrans</u>
black mangrove	mangle prieto	<u>Avicennia nitida</u>
breadfruit	panapén	<u>Artocarpus altilis</u>
calabash, gobi	higuero	<u>Crescentia cujete</u>
cashia	acacia	<u>Acacia macracantha</u>
Chinaberry	alelaila	<u>Melia azedarach</u>
coconut palm	palma de coco	<u>Cocos nucifera</u>
custard-apple	corazon	<u>Annona reticulata</u>
dog-almond, water wood	moca	<u>Andira inermis</u>
fig, rubber, banyan	laurel de la India	<u>Ficus spp.</u>
flamboyant	flamboyán	<u>Delonix regia</u>
frangipani	alelí	<u>Plumeria spp.</u>
geiger tree	San Bartolomé vomitel colorado	<u>Cordia sebestena</u>
ginger thomas, yellow-cedar	roble amarillo	<u>Tecoma stans</u>

<u>V. I. Common Name</u>	<u>Spanish</u>	<u>Scientific Name</u>
gliricidia, quick stick	madre de cacao	<u>Gliricidia sepium</u>
gregre, gregory	úcar	<u>Bucida buceras</u>
guava	guayaba	<u>Psidium quajava</u>
guavaberry	hoja menuda	<u>Eugenia floribunda</u>
hogplum	jobo	<u>Spondias mombin</u>
Honduras mahogany (bigleaf)	caoba hondurena	<u>Swietenia machophylla</u>
horseradish tree	Angela, resedá	<u>Moringa oleifera</u>
immortelle, Lenten tree		<u>Erythrina corallodendrum</u>
Jerusalem thorn	palo de rayo	<u>Parkinsonia aculeata</u>
kenip, genep	quenepa	<u>Malicoccus béjugatus</u>
licorice, giant-thibet	Samán, dormilón	<u>Pithecellobium saman</u>
lignumvitae	guayacán	<u>Guaiacum officinale</u>
locust	algarrobo	<u>Hymenaea courbaril</u>
logwood	campeche	<u>Haematoxylon campechianum</u>
lucky-nut	cablonga	<u>Thevetia nereifolia</u>
mammee	mamey	<u>Mammea americana</u>
manchineel	manzanillo	<u>Hippomane mancinella</u>
mango	mangó	<u>Mangifera indica</u>
manjack	cerezas blancas	<u>Calyptrocordia alba</u>
maria	maría	<u>Calophyllum brasiliense</u>
mesple	nispero	<u>Achras zapota</u>
otaheite, seaside mahoe	emajaguilla	<u>Thespesia populnea</u>
painkiller tree, monkey-apple	morinda	<u>Morinda citrifolia</u>
pink-cedar, white-cedar	roble blanco	<u>Tabebuia heterophylla</u>
pitch-apple, strangler-fig	cupey	<u>Clusia rosea</u>

<u>V. I. Common Name</u>	<u>Spanish</u>	<u>Scientific Name</u>
red mangrove	mangle colorado	<u>Rhizophora mangle</u>
red manjack	muneco, cerezo	<u>Cordia nitida</u>
royal palm	palma real	<u>Roystonea boriquena</u>
sandbox, monkey pistol	Molinillo	<u>Hura crepitans</u>
seagrape	uva de playa	<u>Coccolobia uvifera</u>
silk-cotton, kapok	ceiba	<u>Ceiba pentandra</u>
soursop	guanábana	<u>Annona muricata</u>
Spanish-cedar, cigarbox-cedar	cedra espanol	<u>cedrela mexicana</u>
sugar-apple	anón	<u>Annona squamosa</u>
sweetpea	guáma	<u>Inga laurina</u>
tamarind	tamarindo	<u>Tamarindus indica</u>
tan tan	zarcilla	<u>Leucaena glauca</u>
thibet, woman's tongue	casia amarilla lengua de mujer	<u>Albizzia lebbek</u>
torchwood, black torch	tea	<u>Amyris elemifera</u>
trumpet tree	yagrumo hembra	<u>Cecropia peltata</u>
turpentine, gumbolimbo	almácigo	<u>Bursera simaruba</u>
West Indian-cherry	acerola	<u>Malpighia puniceifolia</u>
West Indies mahogany, Dominican mahogany (small-leaf)	caoba dominicana	<u>Swietenia mahogani</u>
white mangrove	mangle blanco	<u>Laguncularia racemosa</u>
yellow prickle	palo rubio, mapurito	<u>Zanthoxylum monophyllum</u>
yellow torch	alvarillo	<u>Exostema caribaeum</u>