GUTS

VIRGIN ISLANDS NATURAL TREASURES

CONNECTING LAND & SEA

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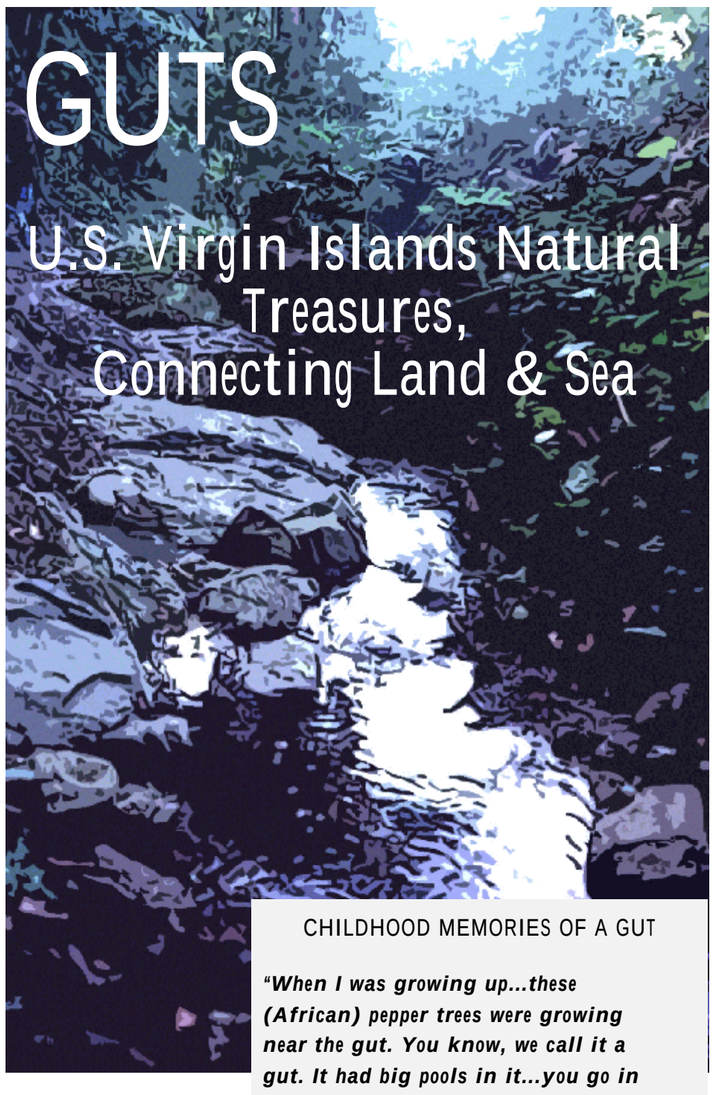
U.S. Virgin Islands Natural Treasures, Connecting Land & Sea



CHILDHOOD MEMORIES OF A GUT

"When I was growing up...these (African) pepper trees were growing near the gut. You know, we call it a gut. It had big pools in it...you go in there to bathe, in these pools. There were eels and langoustas, shrimp, the fresh-water shrimp, and there was the little one we call the cocuey... That place was like a forest, and leaves would constantly fall into the gut pools. Now, we would go down there and pick up these leaves, and they're full of those shrimp... All these cocuey would come up and be jumping, and we'd go and jump them right in the pot! And we cooked them in that very spring water. The spring started way up near the head of the land...well, that water was perfectly clean."

Idrena Millin Henderson, 1992

Large boulders are found in many Virgin Island guts, such as Neltjeberg Gut on St. Thomas.

GUTS... Formed By Weathering & Water

Many of the over fifty islands and cays in U.S. Virgin Islands group are mountainous with slopes (over 35 degrees) dissected by steeply descending guts. Virgin Islands guts are natural stream channels that formed as storm water eroded the steep terrain of the islands. Weathering and the effects of concentrated storm water runoff formed these guts by exposing rocks and washing or eroding away soil and small rocks in the water's path. Weathering and water also caused rock layers to peel and chip, and shaped rocks by rubbing and knocking them together. Penetrating tree roots fractured major rock faces. The distinctive large, rounded gut boulders we see today were broken away and rolled as storm water forcefully undercut them. These processes still continue today.

GUTS... Rainfall & Flow

Rainfall in the Virgin Islands averages between 30-60 inches per year and generally occurs during the rainy season in the fall. However, water is still a precious resource in the Virgin Islands where ground water supplies are limited. Over 95% of rainfall in the Virgin Islands is lost by either evapotranspiration *(evaporation and plant transpiration)* or surface water runoff to the sea. Only a small percent seeps into the ground to recharge guts and ground water. Rainfall increases with altitude. The highest rainfall levels occur along ridge lines and on the northern and western sides of the islands.

Guts can be described as *perennial*, *intermittent* or *ephemeral*. *Perennial* guts have continuous, year-round flow. *Intermittent* guts have water flow for extended periods during the rainy season.

Gut pools form in St. John's Reef Bay Gut during the rainy season.

Ephemeral guts only flow briefly during and immediately after rain showers or flash floods, and then rapidly dry up. Most guts in the U.S. Virgin Islands are ephemeral. Larger guts with intermittent flow are in the islands' major drainage basins, and include: Reef Bay Gut, Fish Bay Gut (St. John); Turpentine Run, Bonne Resolution Gut (St. Thomas); Jolly Hill Gut, Creque Dam Gut, and Caledonia Gut (St. Croix). Turpentine Run and Caledonia Gut still have perennial flow in some areas, but these guts and others reportedly had permanent flow in the past.

In the U.S. Virgin Islands, water flow in guts occurs primarily during intense rain-storms. Rain flows quickly through a water-shed, via its guts, from upper mountain slopes to flat coastal areas, wetlands and to the sea.

A WATERSHED ***is the area of land that rainwater flows across and under to drain into guts, ponds, wetlands, and finally into the sea.***

The combination of steep slopes and relatively small, flat coastal areas generates rapid water flow in guts and large volumes of storm water runoff into the sea. Guts are well-worn, established channels that direct storm water to the sea, protecting surrounding land areas from the eroding effects of runoff.

GUTS... and Their Plant Communities Protect Land & Sea

Storm water is full of sediment eroded from newly cleared land unprotected by plant cover.

Native plant communities along guts hold soil, prevent soil erosion and protect water quality by filtering sediment and absorbing other pollutants from storm water runoff. When these pollutants enter coastal water they block the sunlight penetration, needed for healthy corals, fish and other sea life. Plants also transform excess nutrients in storm water, that come from sewage and fertilizers, and convert them to plant material or return them to the atmosphere as harmless gas. Nutrients cause excessive algal growth that uses up dissolved oxygen and blocks sunlight in water, decreasing fish, coral, and seagrass populations.

GUTS... Protected By U.S. Virgin Islands Law

It is vitally important to protect and maintain well-vegetated guts to prevent damage to the Virgin Islands environment.

U.S. Virgin Islands Law, *Conservation of Vegetation Adjacent to Watercourses* (V.I. Code Annot. Title 12. sections 121 to 125) prohibits *"...the cutting or injury of any tree or vegetation within 30 feet of the center of any natural watercourse, or within 25 feet of the edge of such watercourse, whichever is greater."* The law further defines natural watercourses or guts as *"...any stream with a reasonably well-defined channel, and includes streams which have a permanent flow, as well as those which result from the accumulation of water after rain falls and which regularly flow through channels formed by the force of the waters."*

This legislation is not widely known or obeyed. People unlawfully clear vegetation in guts.

GUTS...and Their Unique Plant Communities

Botanists have classified plant communities growing in and around guts as *gallery forest*, *gallery woodland*, or *gallery shrubland*. In this case, *gallery* means corridor. Guts often form corridors of vegetation that are more moist than the surrounding land areas. The tallest type of gut vegetation is classified as *gallery moist forest*. By definition, this community type is a forest, meaning that tree crowns form a closed canopy. Broad-leaf evergreen trees, the main tree type in *gallery moist forests*, are also dominant in tropical rainforests of the Amazon region and eastern Puerto Rico. These trees thrive in environments with enough moisture to allow them to grow and keep their leaves year-round.

Mother Bush *(Lepianthes peltatum)* **is an uncommon broad-leaved herbaceous shrub that may be found in the moist forest near guts. In the Virgin Islands, it was once used medicinally in a secret ritual to treat mothers during childbirth.**

The giant kapok ***(Ceiba pentandra)*****, one of the largest tree species in the Virgin Islands and tropical America, thrives in the gallery forest of a local gut.**

Gallery moist forests occur mostly in the northwestern parts of St. Thomas and St. John. On St. John, this forest type is more widespread in guts that fan out in all directions from the central mountains, except on the island's dry east end. *Gallery moist forest* is not found on Water Island where it is too dry. Most tree species in *gallery moist forests* are evergreen, but several of the tallest trees may be deciduous, shedding their leaves in response to the dry season, such as kapok or silk cotton tree *(Ceiba pentandra)* and hog plum *(Spondias mombin)*. The islands' tallest trees, some nearly 100 feet tall, grow in *gallery moist forests*. Trees reach the greatest heights where guts have the most moisture, gentle slopes and protection from storm winds. Unfortunately, human impacts are causing this forest type to decline.

The structure of *gallery* vegetation changes in drier areas or areas disturbed by clearing and storms. In these areas, plant communities in guts can have open canopies *(gallery woodlands)* or be shorter and have more shrubs than trees *(gallery shrublands)*. These drier *gallery* types may be semi-deciduous, with up to 75% of the trees shedding their leaves during the dry season. *Gallery* vegetation in drier areas responds to the lack of moisture in different ways. Some plants go into a dormant phase and become deciduous, a strategy to save energy and water by eliminating photosynthesis in leaves. Other plants remain evergreen and do not drop leaves. Many evergreen plants in dry areas thicken leaf tissue and reduce leaf size to prevent moisture loss. These *gallery woodlands* and *shrublands* are naturally found on the drier east and south sides of the main islands and Water Island. On St. Croix, extensive land clearing for agriculture converted many of the *gallery forests* to drier woodland or shrubland. In fact, throughout the Virgin Islands, vegetation in guts is carelessly and unlawfully cleared for building construction. Clearing disturbs and changes the natural composition of *gallery forests*, *woodlands* and *shrublands* by making them less diverse.

GUTS... Dangerous Places For Plants

For plants, life in guts is survival of the fittest. Guts can be very unstable places for plants to grow and survive. Flash floods routinely destroy and damage trees and other vegetation in guts and discourage seedling growth; fewer trees may survive to full maturity. Because of flooding, differences in the forest layers may not be as distinct, and there may be fewer herbs, shrubs, epiphytes (air plants) and vines than in other forest zones. Gut soils are often very thin or non-existent; so plants must establish themselves in rock, as well as survive frequent flooding. Human impacts have been even more damaging to gut vegetation in the U.S. Virgin Islands. Careless and illegal land clearing and channeling or paving of guts has drastically diminished native plant

Plants grow precariously in dry gallery forest. They adapt to growing in fissured rock or thin, dry and rocky soils that are prone to erosion during heavy rainstorms.

communities and altered the islands' hydrology and microclimates.

Guts...Unique Freshwater Habitats

A large freshwater shrimp collected for research by UVI Marine Biology Assistant Professor, Dr. Steve Ratchford.

Guts are also fresh water habitats. Caribbean freshwater fish and shrimp can be found in gut pools and streams, including mullet, sleeper, eel and goby fish species, as well as shrimp species *(Macrobrachium heterochirusf, Atya lanipes,* and *Atya innocous)*, known locally as *langousta*, *cocuey*, *gut lobster* or *kribishee*. They have complex life cycles, migrating between downstream marine waters and upstream freshwater habitats, and they fill unique ecological niches. For example, some freshwater shrimp *(Atya spp.)* filter storm water by trapping organic debris with their modified claws. Various freshwater fish may either feed on small shrimp and insects or scrape algae off rocks. Eels *(Anguilla rostrata)* hunt at night because they have weak eyes but well-developed senses of smell. The existence of fresh water fish and shrimp in Virgin Islands guts is seriously threatened by projects that modify stream channels and discharge sediment and other contaminants into guts.

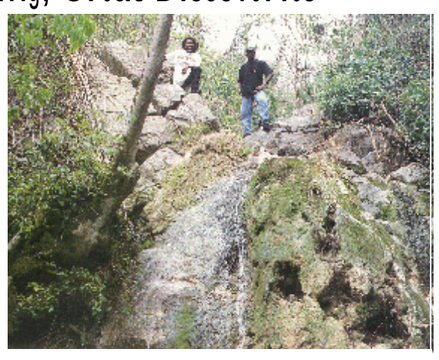
GUTS...Threatened Habitats

Unfiltered polluted water and debris collect in paved and channelized guts and threaten coastal waters .

Land clearing and conversion of forested and other natural areas to housing, road building, commercial and industrial development are part of a growing trend towards urbanization in the U.S. Virgin Islands. These land-use activities, including vegetation clearing, road and driveway paving, concrete paving and channelization of guts, severely threaten natural gut habitats by changing the *hydrology*, or natural water flow paths and drainage patterns of guts. This results in:

- Flooding, soil erosion, landslides, road obstructions, and property damage;
- Increased soil loss, and pollution of ground water, wetlands and the sea;
- Less water flow in guts and a drying trend in island microclimates;
- Loss of species and biological diversity in gut habitats including bird populations, freshwater shrimp and fish, and moist forest communities.

GUTS...Great Hiking, Great Discoveries



Dramatic gut landscapes such as Creque Dam Gut on St. Croix attract hikers who want explore and enjoy the islands' unique natural features.

Guts are often concealed from view by plants. Pass beyond the vegetation cover and the gut landscape opens up. Some of the U.S. Virgin Islands' most dramatic and hauntingly beautiful land-scapes can be found within gut boundaries. Most guts are rocky with minimal vegetation in the channel. For this reason, hikers usually to not have to blaze trails through dense thickets. Rocky guts can be enjoyable to climb and moderately challenging. It is hard to get lost in a gut because they usually lead to a coastal outlet. *(Many guts are on private property; so it's advisable to contact the owner before hiking.)*

Explore and Enjoy the Guts, Virgin Islands' Natural Treasures

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