



# NOAA in the Caribbean: Wetlands and other protected areas management in the U.S. Virgin Islands

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<https://dprn.vi.gov>

May 30, 2024





# Part 1: Landscapes & Protected Areas

# Part 2: Wetlands & Birds





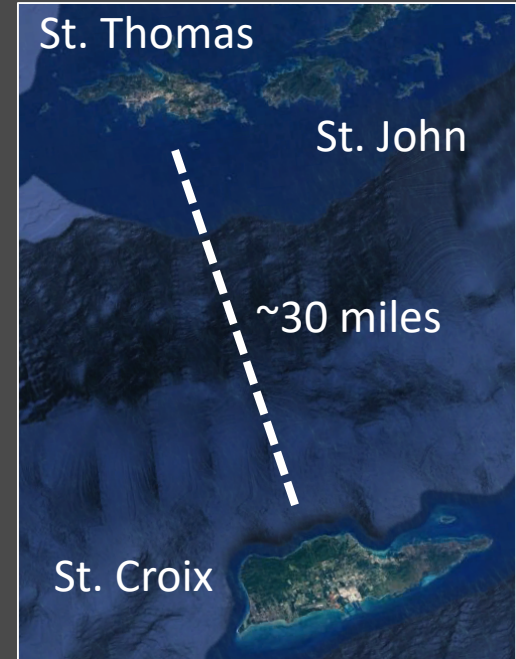


# Part 1: Landscapes & Protected Areas





# VIRGIN ISLANDS OF THE UNITED STATES





# BACKGROUND OF THE U.S. VIRGIN ISLANDS



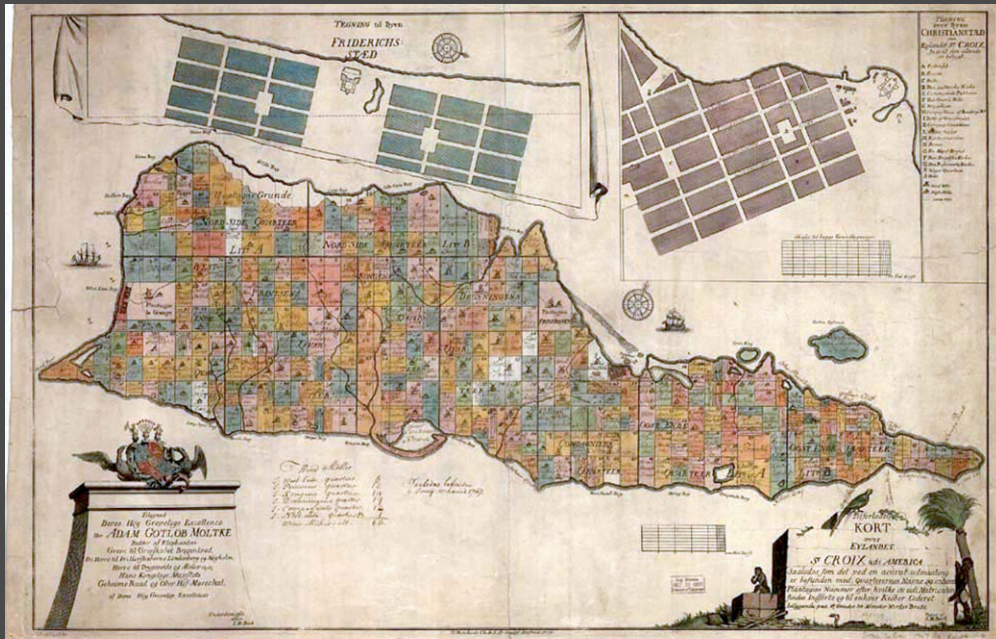
1493: Christopher Columbus voyage and massacre  
1641: English colonists arrive  
1643: Dutch colonists take St. Croix; some English remain  
1645: English uprising forces out Dutch colonists  
1647: Spanish claim St. Croix from Puerto Rico, give English three weeks to leave  
1647: Dutch attempt again to reclaim St. Croix but defeated by Spanish  
1650: French force seizes St. Croix  
1651: St. Croix ownership transferred to Knights of Malta (titular master, King of France)  
1665: French West India Company  
1695: Abandoned by French  
**1733: Danish West India Company**  
**1754: Danish Royal Colony**  
1917: Purchased by U.S.A







# BACKGROUND OF THE U.S. VIRGIN ISLANDS









# EFFECTS OF COLONIAL LANDUSE IN THE U.S. VIRGIN ISLANDS



## End of sugar cane economies in the Caribbean

- Transition from cotton to sugar ~1820
- End of sugar ~1950
- Today, only 4 countries export sugar

'Caribbean sugar is close to a sticky end'. Economist, 14 Dec 2017







# EFFECTS OF COLONIAL LANDUSE IN THE U.S. VIRGIN ISLANDS



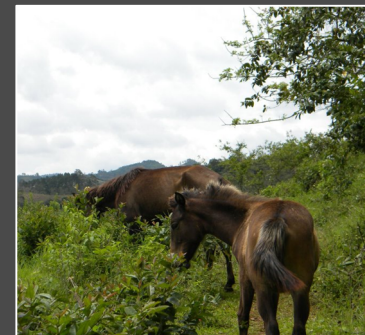
Caribbean islands are on average 345 km<sup>2</sup> with historic losses of 30 – 99% forest cover.



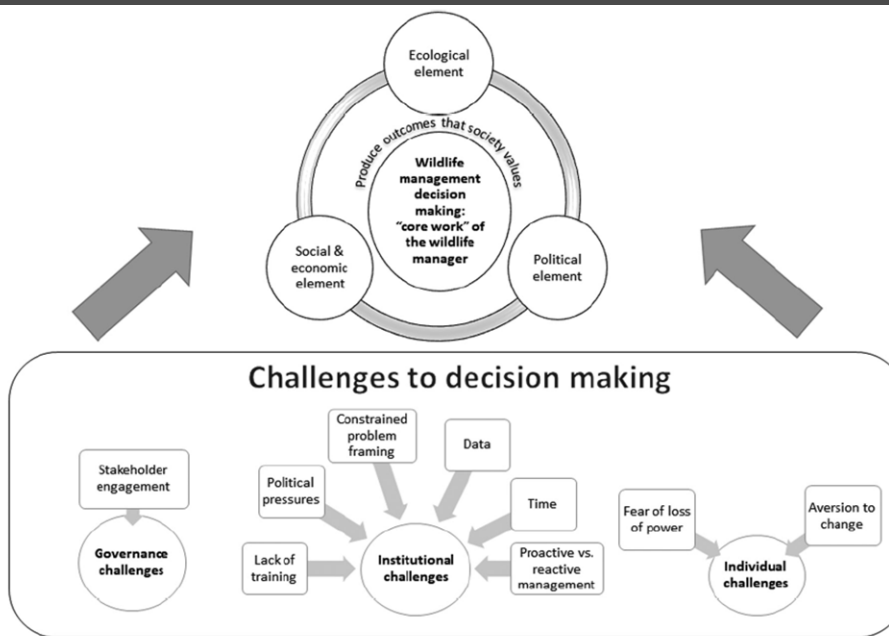
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ng



# EFFECTS OF COLONIAL LANDUSE IN THE U.S. VIRGIN ISLANDS: Novel landscapes and species assemblages







**Figure 1.** Decision making is the “core work” of the wildlife manager, who seeks to integrate the ecological, social, economic, and political elements of a decision to produce outcomes that society values. Many challenges to decision making exist at multiple levels: governance, institution, and individual.

Hobbs et al. 2006, “Novel Ecosystems: Theoretical and management aspects of the new ecological world order

Angeli and Fitzgerald 2020, “Reintroducing species when threats still exist: Assessing the suitability of contemporary landscapes for island endemics





## Species conservation in novel landscapes



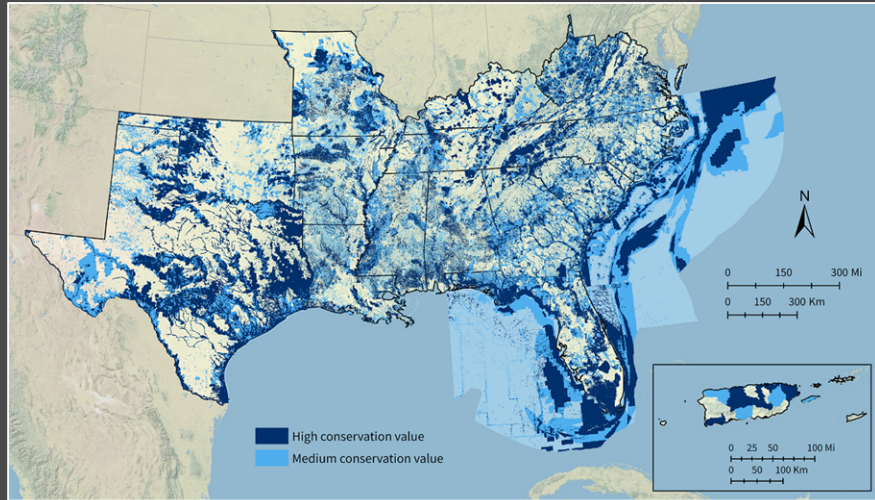
To persist, species must **move, acclimate, or adapt.**

Similarly, different types of repatriation models for Iberian ibex, Taiwan's Clouded Leopards, North Island Robins, and Saddlebacks exist





# Southeast Conservation Adaptation Strategy



## Southeast Conservation Adaptation Strategy





# Southeast Conservation Adaptation Strategy Blueprint



**Southeast Conservation Blueprint Explorer**

The Southeast Conservation Blueprint is the primary product of the [Southeast Conservation Adaptation Strategy \(SECAS\)](#). It is a living, spatial plan to achieve the SECAS vision of a connected network of lands and waters across the Southeast and Caribbean. The Blueprint is regularly updated to incorporate new data, partner input, and information about on-the-ground conditions.

For more information, visit the [Blueprint webpage](#). To view the Blueprint data and make maps, visit the [Blueprint page of the SECAS Atlas](#).

The **Southeast Conservation Blueprint Explorer** is an online viewer designed to help you understand the Blueprint and discover how your area of interest scores on the Blueprint priorities, hubs and corridors, indicators, threats, and more. Here, you can:

- **Summarize data** to show charts and information for a subwatershed or marine hexagon
- **View point data** to discover what is driving the Blueprint priorities and show values at a specific location for indicators, threats, and more
- **Filter the Blueprint** to find your part of the Blueprint by showing only areas that score within a certain range on indicators and other data
- **Upload a shapefile** to create detailed custom reports of the Blueprint, hubs and corridors, underlying indicators, and threats in your area

[Read instructions on how to use this viewer](#)

**Summarize data** | **View point data** | **Filter the Blueprint** | Select a subwatershed or marine hexagon to show details in sidebar

How to use this viewer | Upload a shapefile

Find a place

Little Mountain  
Virgin Islands

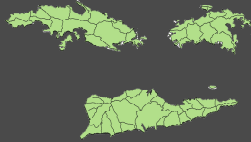
Virgin Islands

Blueprint priority for a connected network of lands and waters

- Highest
- High
- Medium
- Connections

mapbox

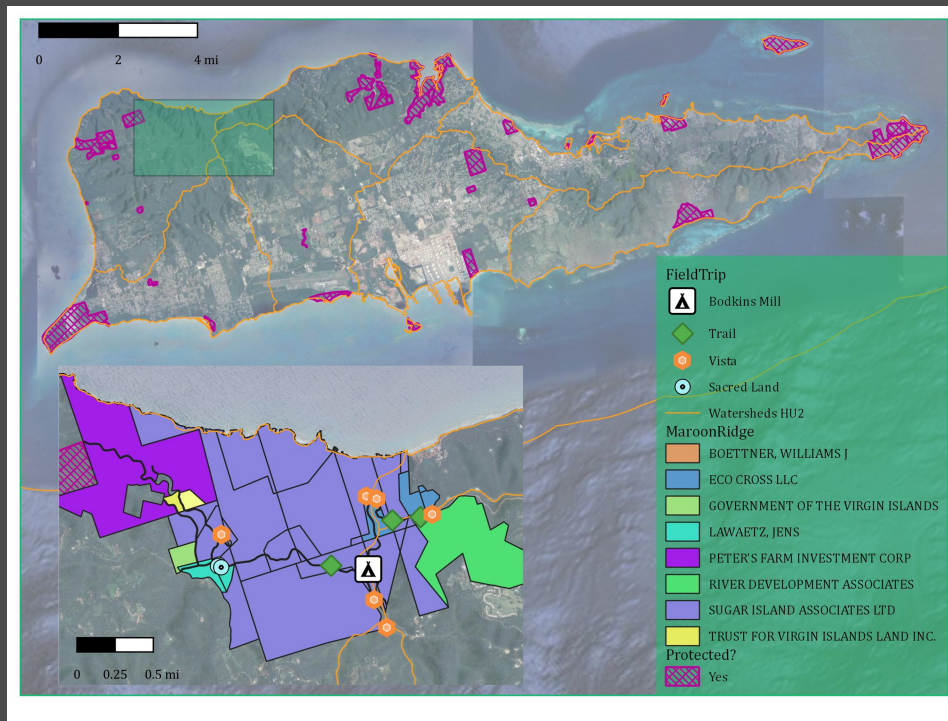
© Mapbox © OpenStreetMap. Improve this map





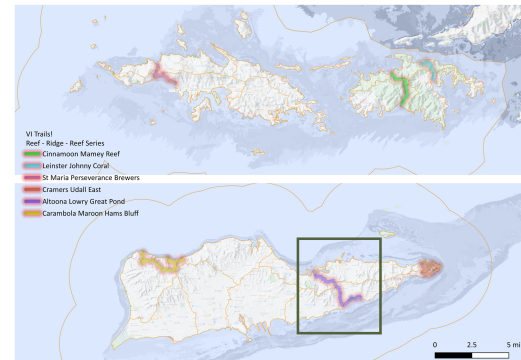
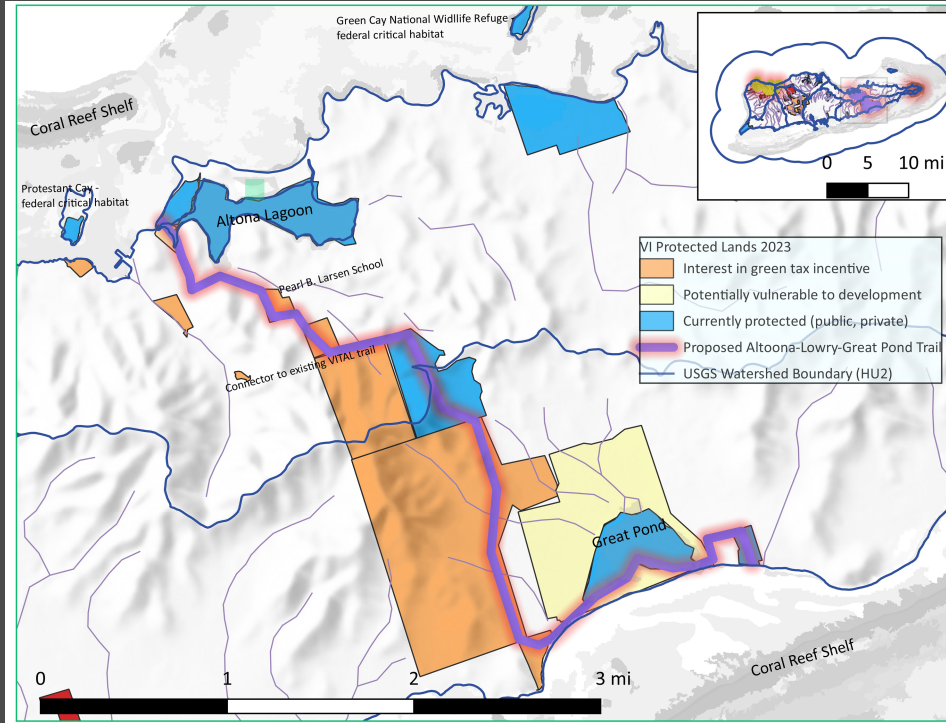


# New potential protected areas





# America the Beautiful first wildlife habitat corridor





## Offshore Cays

Booby Rock  
Bovoni Cay  
Capella Island  
Carval Rock  
Cas Cay  
Cockroach Cay  
Congo Cay  
Cricket Rock  
Dog Island  
Dutchcap Cay  
Flanagan Island  
Flat Cay & Little Flat Cay  
Frenchcap Cay  
Grass Cay  
Kalkun Cay  
Leduck Island  
Mingo Cay  
Outer Brass Island  
Perkins Cay  
Protestant Cay  
Ruth Cay  
Saba Island  
Sail Rock  
Salt Cay  
Savana Island  
Shark Island  
Steven Cay  
Sula Cay  
Turtledove Cay  
Water Island  
West Cay  
Whistling Cay

Shark Island  
Steven Cay  
Sula Cay  
Turtledove Cay  
Water Island  
West Cay  
Whistling Cay  
Compass Point Pond  
Cas Cay  
Mangrove Lagoon  
Frank Cay  
Salt River  
St. James  
Southgate  
Vessup Bay  
Long Point  
Mandahl  
Sandy Point  
Great Pond  
Red Hook  
Altoona Lagoon  
Coakley  
Lindquist

# Historic & current data collection – since 1941

## Facility

Gallow's Bay

Hull Bay

Frederiksted

Altoona Lagoon

Vessup Bay

Molasses Waterfront

La Reine

Frenchtown

Tropical

Cays and Reserves

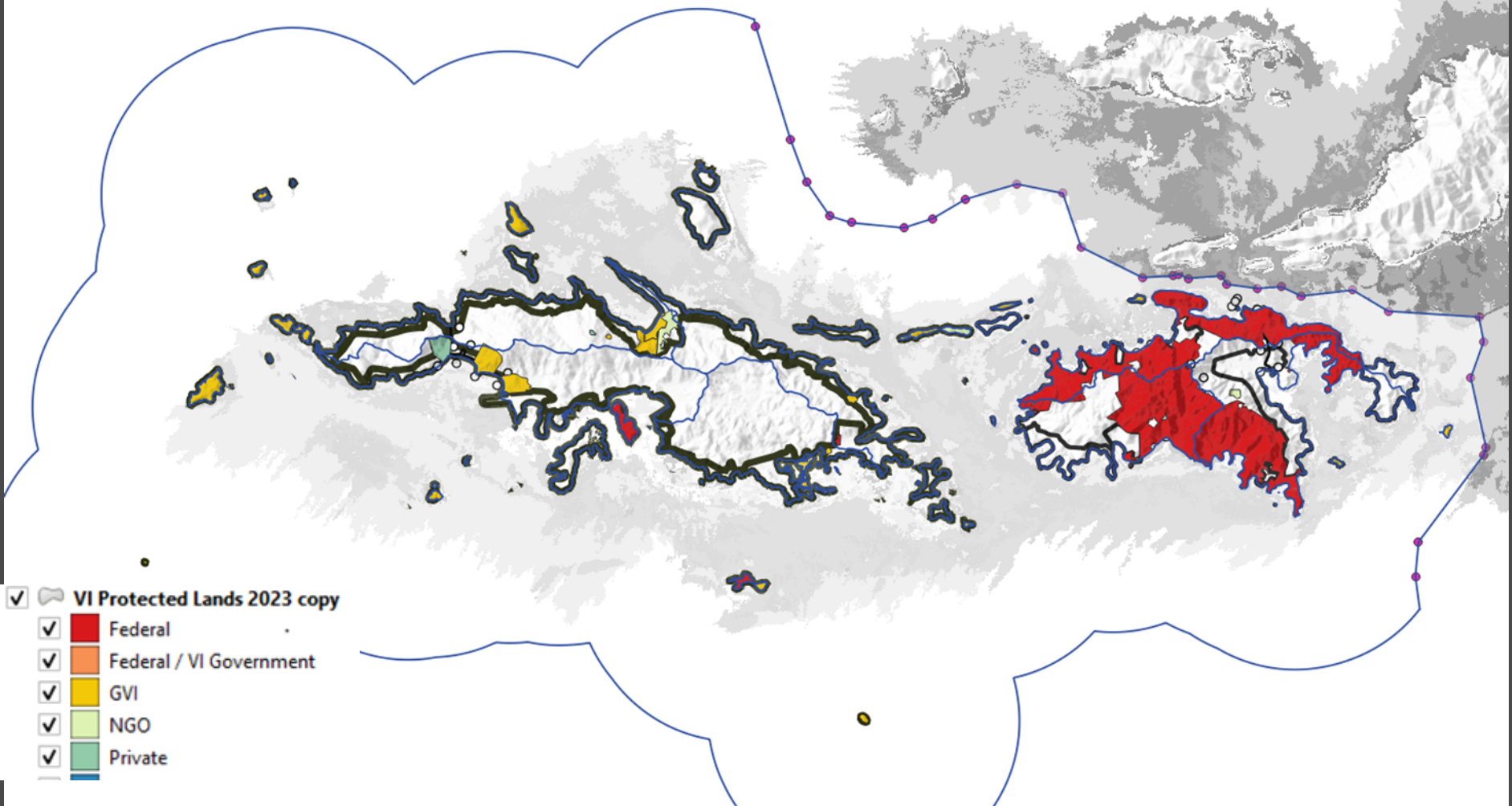
LaGrange Archery








Mars Hill

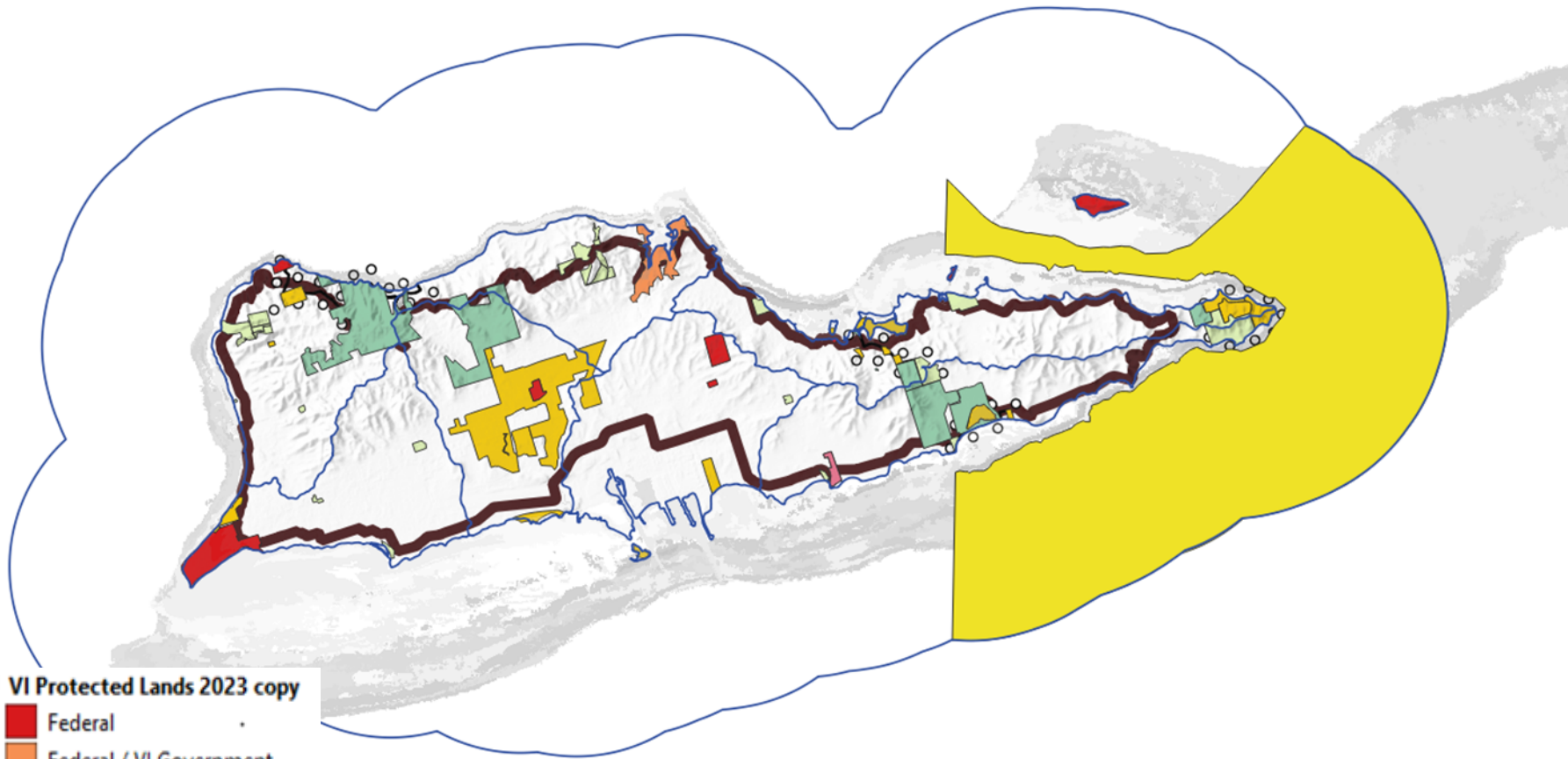
Coral Bay

Christmas Cove/St. James





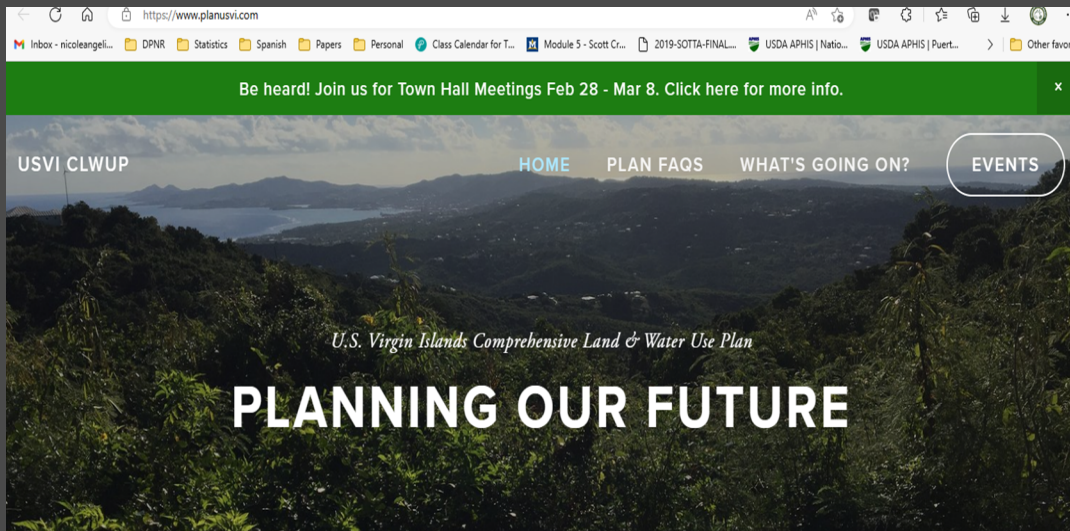
- ✓  VI Protected Lands 2023 copy
- ✓  Federal
- ✓  Federal / VI Government
- ✓  GVI
- ✓  NGO
- ✓  Private
- 



 VI Protected Lands 2023 copy

-  Federal
-  Federal / VI Government
-  GVI
-  NGO
-  Private





## Comprehensive Land and Water Use Plan







# 2025 State Wildlife Action Plan



Table 5.3. SGCN Priority Actions, listed by taxa. This table identifies actions that benefit SGCN along with indicators and potential partners for implementation.

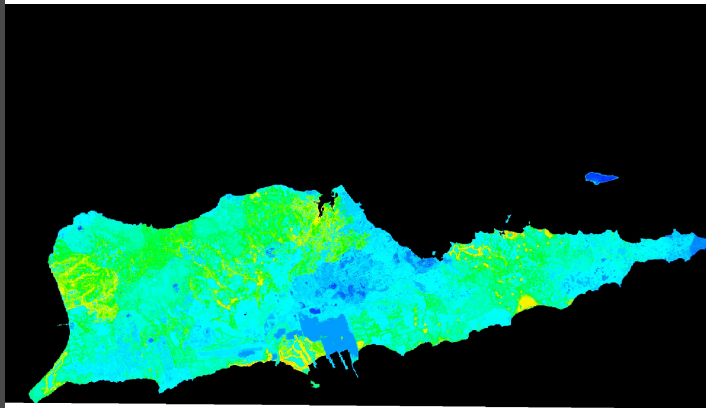
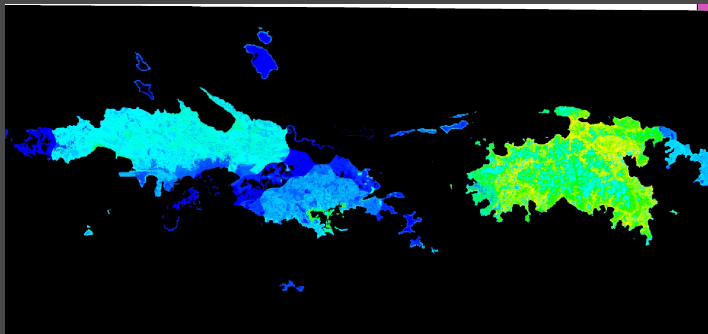
Priority Action	Goal	Indicators	Benefits to	Partners
<b>Multiple Species</b>				
Conserve <u>large forested</u> tracts with connectivity	Goal 1: Habitat & species protection	Extent and connectivity of native forest communities is $\geq$ current	Terrestrial Species; <u><i>Stenoderma rufum</i></u> , <u><i>Brachyphylla cavernarum</i></u>	DFW, CZM, CCZP, NPS, NGOs
Replant native forest and riparian trees to restore, enhance, and maintain ecosystem function, buffer the habitat from encroachment, maintain connectivity between forested areas, and mitigate negative effects of climate change.	Goal 2. Manage species and habitats	Wetland and riparian buffer are $\geq$ regulated minimum setback	Freshwater fauna, amphibians, birds, bats, all terrestrial species; Pollinators; <u><i>Stenoderma rufum</i></u>	DFW, VIDOA, USDA-NRCS, USFS, NPS, NGOs
Improve habitat through reforestation in areas that are protected but habitat has been degraded, such as the Southgate Coastal Reserve and Jack and Isaac Bay on St. Croix. Identify areas for potential habitat improvement on St. Thomas.	Goal 2. Manage species and habitats	Number of restoration projects for protected areas $\geq$ current	Bats, landbirds, amphibians, invertebrates, reptiles	DFW, VIDOA, USDA-NRCS, area managers
Address data gap needs for data deficient species to develop conservation actions	Goal 4: Increase knowledge	Reduction in number of data deficient species	All data deficient species: freshwater fauna, terrestrial invertebrates, reptiles, birds, marine species	DFW, NPS, UVI, NGOs
Conduct research on species response to ecosystem change	Goal 4: Increase knowledge	Increase in research addressing ecosystem change factors	Amphibians, bats, land/water/sea birds, reptiles, sea turtles, marine species	DFW, UVI, NPS, NGOs
Revise land use planning and permitting to protect habitat surrounding proposed development, with an emphasis on forest communities rather than single large trees.	Goal 3: Enhance capacity and regulatory mechanisms	Implementation of ecosystem approach to permitting	All terrestrial species; erosion control	DPNR



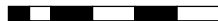


## Part 2: Wetlands & Birds

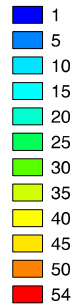




2.5 0 2.5 5 7.5 10 km

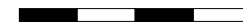


Bird species richness



N

0 500 1000 1500 2000 m



On average, most places in St. John have 30 – 40 bird species

Bird Richness Models

- PR GAP Analysis, Gould et al. (2007)





# Historic & current data collection



Purple Gallinule



Little Blue Heron

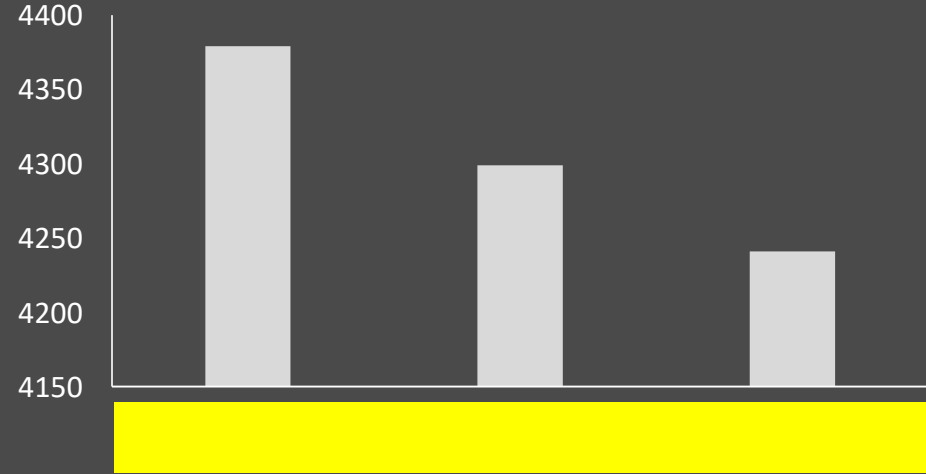
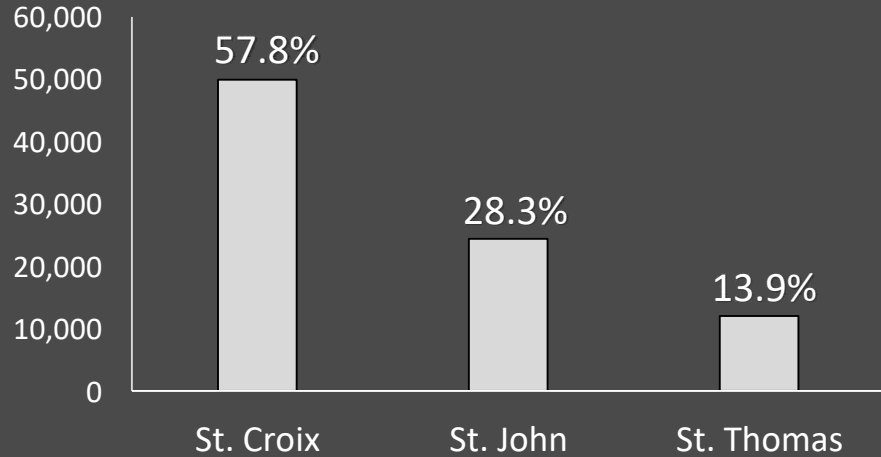
- Christmas Bird Count
- Caribbean Waterbird Census
- Offshore Cays
- Black Birder's Week
- Global Big Day





# CITIZEN SCIENCE DATA IN THE USVI

86,343 observations in eBird going back 83 years  
247 species observed

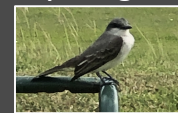
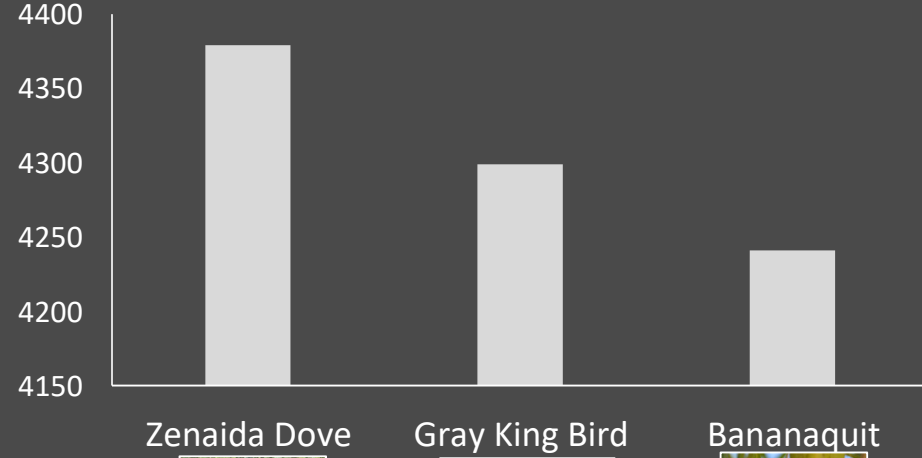
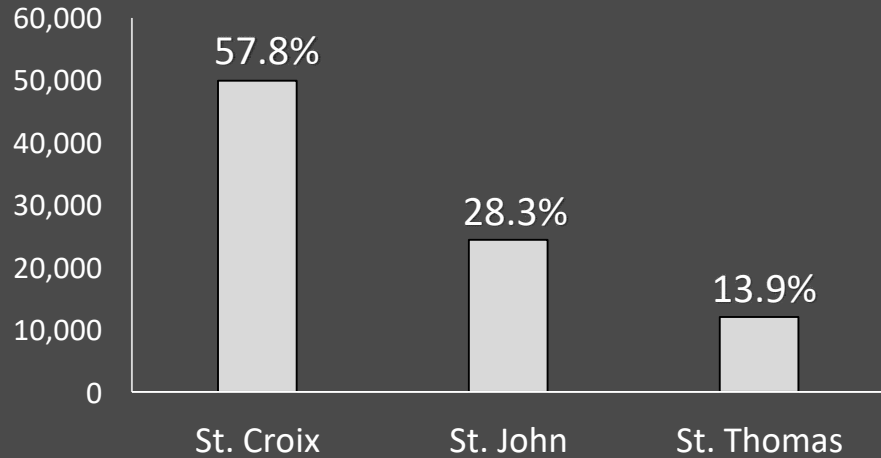


most common species?



# CITIZEN SCIENCE DATA IN THE USVI

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247 species observed







Project	Funding Source
Mist Netting Sandy Point NWR	USFWS Wildlife Restoration
Offshore Cays Bird Counts	USFWS Wildlife Restoration
Roseate Tern	Endangered Species Program
Baitfish Bird Resources	USFWS Sportfish Restoration
Cay Bioblitz	USFWS Wildlife Restoration
St. John Bird Baseline	USFWS Wildlife Restoration
Wetlands Mitigation Bank	USFWS Wildlife Restoration
Altoona Lagoon Mitigation	USFWS Coastal Wetlands Conservation Program, Endangered Species Grant
Birds Caribbean Workshop	USFWS Wildlife Restoration
National Wetlands Inventory Update	EPA Coastal Grants
Ecosystem Models	CFMC
Land and Water Use	DPNR-CZM
Southeast Conservation Adaptation Strategy	USFWS Wildlife and Sportfish Restoration
eBird	Our Community!



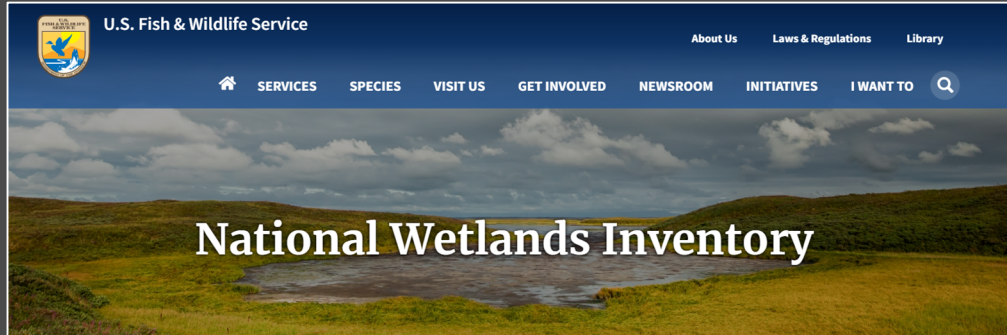


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Land and Water Use	DPNR-CZM
Southeast Conservation Adaptation Strategy	USFWS Wildlife and Sportfish Restoration
eBird	Our Community!





# National Wetlands Inventory Update







# ALTOONA LAGOON RESTORATION FUNDING



~ Additional Coastal Wetlands Conservation Grant and Endangered Species Section 6  
-Southgate & Sandy Point bird blinds







Island	2016 (bps)	2017 (bps)	2018 (bps)	2019 (bps)	2021 (bps)
Booby Rock	0	0	6	0	0
Carval	0	40	26	0	0
Congo	40	60	20	0	0
Cricket	10	0	0	0	0
Dog Island	491	0	0	0	0
Flanagan	0	0	0	11	0
Flat	37	31	50	10	46
Flat Rocks	0	0	0	50	0
Kalkun	0	131	0	0	8
LeDuck	437	494	295	0	176
Pelican	0	10	0	371	0
Saba	30	0	0	0	0
Sandy Cay	0	0	0	60	0
Shark	98	23	439	31	165



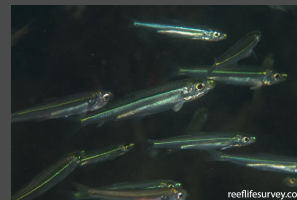


# Baitfish & Bird Research in the USVI

- *Jenkinsia lamprotaenia* – Fry/Dwarf Round Herring
- *Harengula clupeola* – Sprat/False Herring/False Pilchard
  - Found to be important forage for the roseate tern
- Anecdotal evidence of baitfish population declines within the USVI
- How does this impact health & populations of roseate terns and other endangered shore/coastal/pelagic birds?



<https://www.rspb.org.uk/birds-and-wildlife/wildlife-guides/bird-a-z/roseate-tern/>





# BIRDS CARIBBEAN WORKSHOPS (Bird Sleuth & Caribbean Waterbird Census)



Government of the Virgin Islands  
Department of Planning and Natural Resources

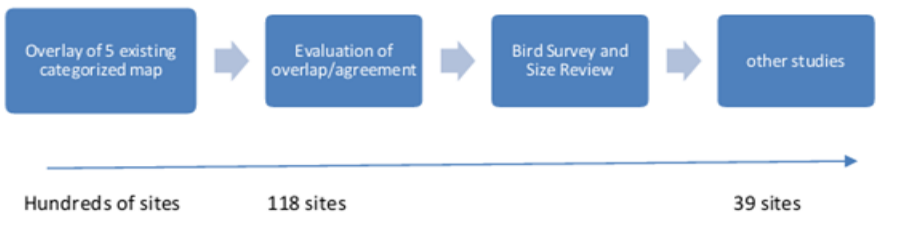


# WILDLIFE MITIGATION BANK

Intent for developers, conservation orgs, and agencies to have access to concepts for mitigation & resiliency



- CONCERNS (existing Conditions)**
- 1 Sediment also unimpeded road
  - 2 Odorous gas & underground culvert
  - 3 Pollution from developed areas & roadway to west
  - 4 Trash from road
- SOLUTIONS**
- 1 Bank along road
  - 2 Stabilize section in access road & add walls
  - 3 Stabilize slope
  - 4 Improve culvert & gas coving
  - 5 Access options for improved stormwater management in urban area
  - 6 Access options for oil / water separator and trash rack
  - 7 Capture & treat adjacent road runoff
  - 8 Clean up bank & prevent further dumping



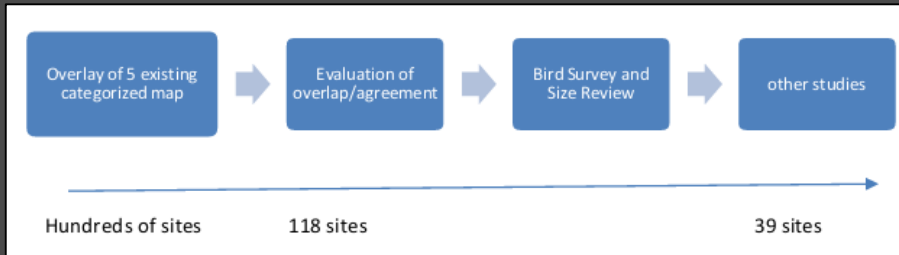
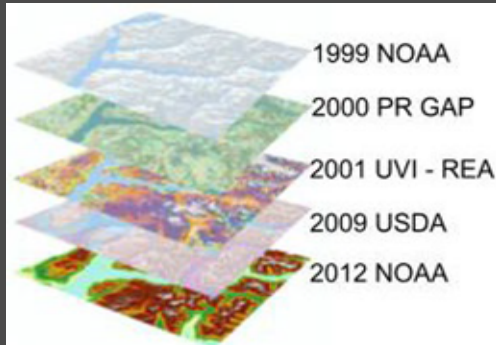
DRAFT Redhook Existing Conditions & Concept  
 Habitat Restoration  
 USVI  
 December 2022  
 ECOLOGIC CONSULTING





# WILDLIFE MITIGATION BANK

## Wetland habitat restoration plans for water birds: Site Selection





### LEGEND

#### EXISTING CONDITIONS

- Area of Interest
  - Buffer habitat - (Approx.)
  - Mangrove habitat - Healthy (Approx.)
  - Mangrove habitat - Damaged (Approx.)
  - Gut / stream
  - Water flow direction
  - Ocean connection
  - Sea level rise 2100 (Approx. elev. 4.3)\*
- \*Based on Supplemental Sea Level Rise (SLR) Scenario "1.26m Climate Scenario" by NOAA National Center for Environmental Information

#### PROPOSED IMPROVEMENTS

- Mangrove habitat restoration
- Educational signage
- Protect for retreat
- Shade tree

#### CONCERNS & SOLUTIONS

##### CONCERNS (Existing Conditions)

- 1 Slow regeneration of habitat / mangrove
- 2 Potential impacts from future development.
- 3 Watershed derived impacts to water quality & hydrology.

##### SOLUTIONS

- 1 Plant test plots of new mangrove species to compare / monitor habitat regeneration, and compare regeneration between removing and maintaining dead.
- 2 Ensure wide buffer for protection or land acquisition.
- 3 Implement water recommendations (Smith Bay Watershed Management Plan 2017)



Existing: Slow regeneration of habitat  
**PHOTO 1**



Proposed: Mangrove Tree Planting, image - USDA  
**PHOTO 2**



**BLOW UP PLAN**

DRAFT Lindquist Existing Conditions & Concept

December 2022

Habitat Restoration  
USVI





**LEGEND**

**EXISTING CONDITIONS**

- Area of Interest
  - Buffer habitat (Approx.)
  - Mangrove habitat - Healthy (Approx)
  - Mangrove habitat - Damaged (Approx)
  - Gut / stream
  - Water flow direction
  - Road / parking
  - Sea level rise 2100 (Approx. elev. 4.3)\*
- \*Elevation is approximate for intermediate high scenario in "State Climate Summaries" by NOAA National Center for Environmental Information

**PROPOSED IMPROVEMENTS**

- Boring transect (Phase 1)
- Wave Buoy
- Upper limit of shoreline and flood plain restoration
- Mangrove habitat restoration
- Buffer / gut habitat restoration
- Drainage structure
- Road/parking improvement
- Protect for retreat

**CONCERNS & SOLUTIONS**

**CONCERNS (Existing Conditions)**

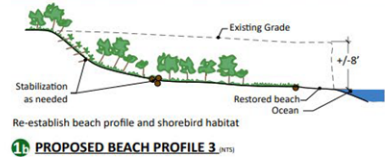
- 1 Actively retreating shoreline with highly erosive soils.
- 2 Lack of fringing reef to dampen water action.
- 3 Altered watershed hydrology.

**SOLUTIONS**

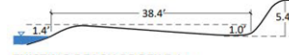
- 1a Studies / data collection.  
Stabilize retreating shoreline with "soft" stabilization technique while creating additional wetland and beach habitat for bird.
- 2a Create artificial reef / breakwater.
- 3a Explore opportunities for stabilizing guts.

**PHASES**

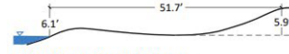
- 1 **PHASE 1:** Understand existing conditions:
  - Soil borings (substrate) to evaluate depth of erosive soils.
  - Bathymetry to near shore circulation & benthic habitat
  - Wave buoys
  - Hydrodynamic & circulation patterns.
- 2 **PHASE 2:** Install artificial breakwater / barrier / mangrove island.
- 3 **PHASE 3:** Regrade, stabilize slope and restore habitat.



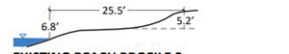
1 PHOTO 1 - Existing eroding shoreline (2022)



EXISTING BEACH PROFILE 1



EXISTING BEACH PROFILE 2



EXISTING BEACH PROFILE 3



2 PHOTO 2 - Underwater Breakwater



DRAFT Long Point Existing Conditions & Concept

December 2022

Habitat Restoration  
USVI







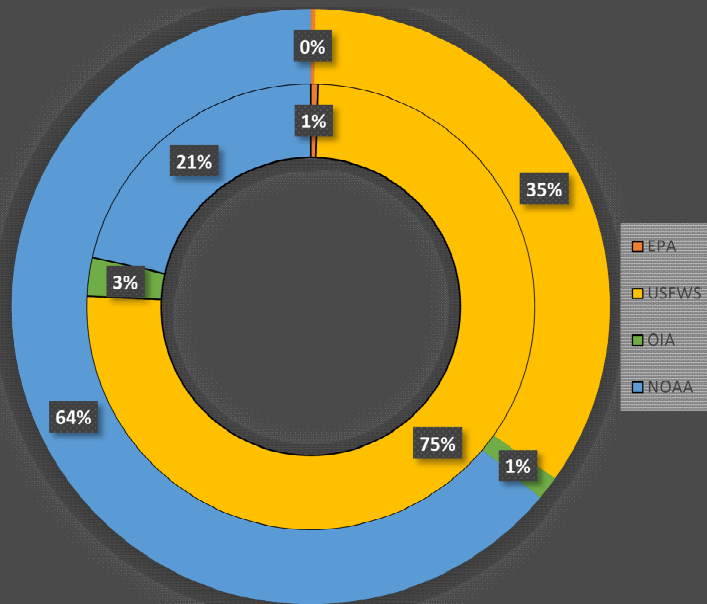
Thank you!







# How do we best prepare in a rapidly changing world?



- What priorities will become independent programs?
- How will existing programs shift?
- Who should state agencies hire?
- Will we need programs to fund new types of permanent state hires (economists, public assistance specialists)?
- What will our goals look like?
- What outcomes will we measure?





# Strategic Plans



## DFW Strategic Goals

