

National Park Service
U.S. Department of the Interior



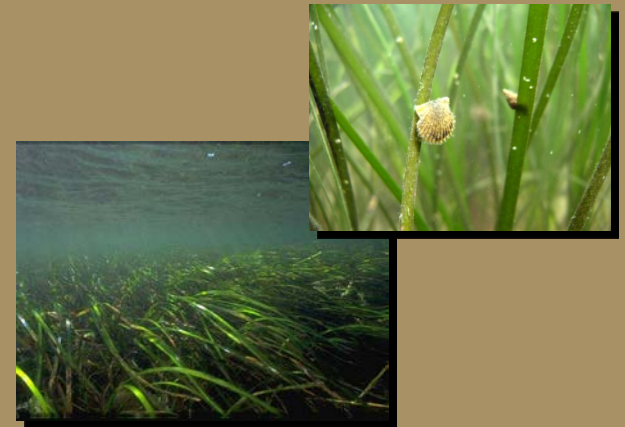
SERO NPS Oceans Program

Managing the non-native seagrass, *Halophila stipulacea*



Seagrass

- Contribute to primary productivity of oceans
- Efficient in nutrient removal
- Root system traps sediments and stabilize bottom
- Food source to herbivores (ecosystem, economics, etc)
- Shelter for multiple species (shaded, stable)
- Provide substrata for other spp, eg algal epiphytes
- CO² sink



Status and Threats

■ Status

- Disappearing at a rate of 110 km² per year since 1980*
- 29% lost since recorded in 1879*

■ Threats (examples)

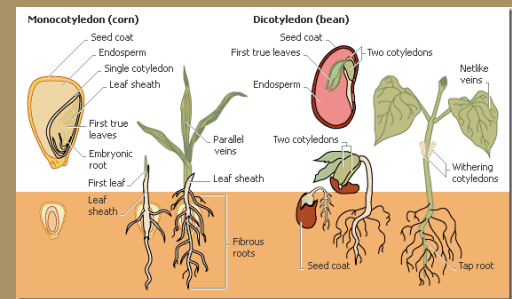
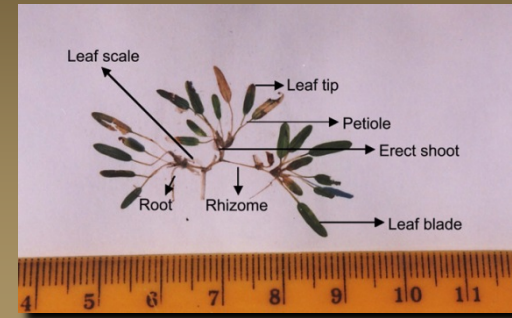
- Reduced water quality
- Physical damage
 - Prop scarring
 - Habitat loss (eg marinas → removal, shading, sediments, etc.)
- Removal of species via fishing pressure
- Invasive species



*PNAS (2009)

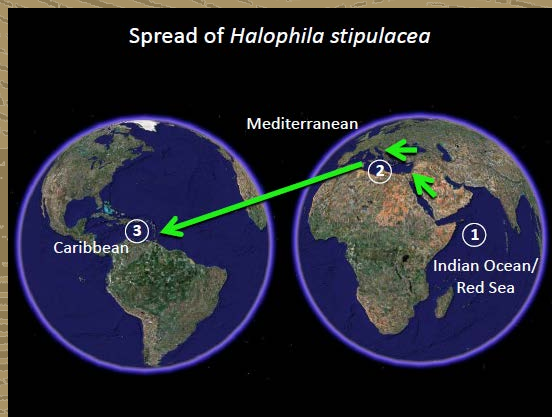
Halophila stipulacea

- Rhyzomatous
 - Dioceciuous (males and females)
 - Flowering
 - Monocotyledonous
 - Highly salt and light tolerant
-Halophila means salt loving

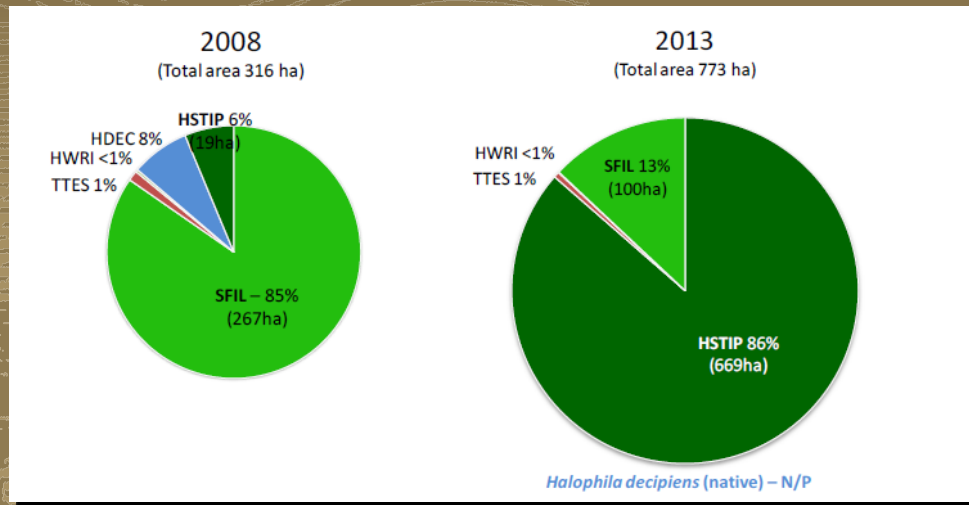


Invasion

- Native to the Western Indian Ocean – Red Sea and Persian Gulf, as well as coastal islands of Eastern Africa and Southeast coast of Indian subcontinent.
- In the 1800's it invaded the Eastern Mediterranean Sea via the Suez Canal
- Invades native seagrass beds via water column transport
 - Storms
 - Disturbance (anchoring)



Invasion capacity



Increase of 19 to 669 ha in 5 years

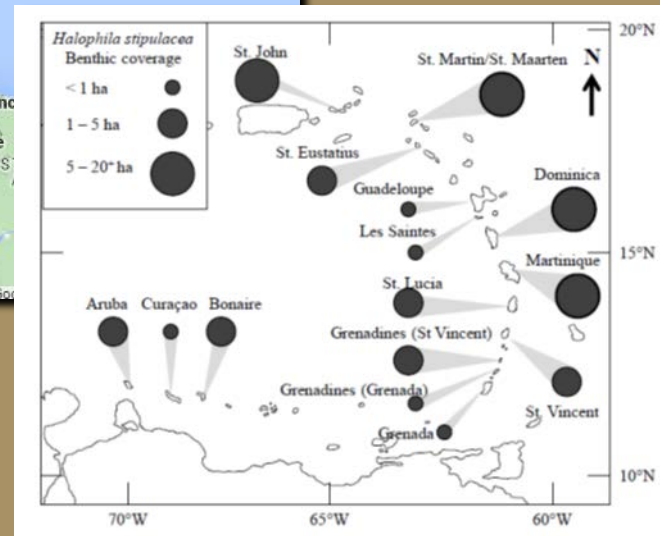
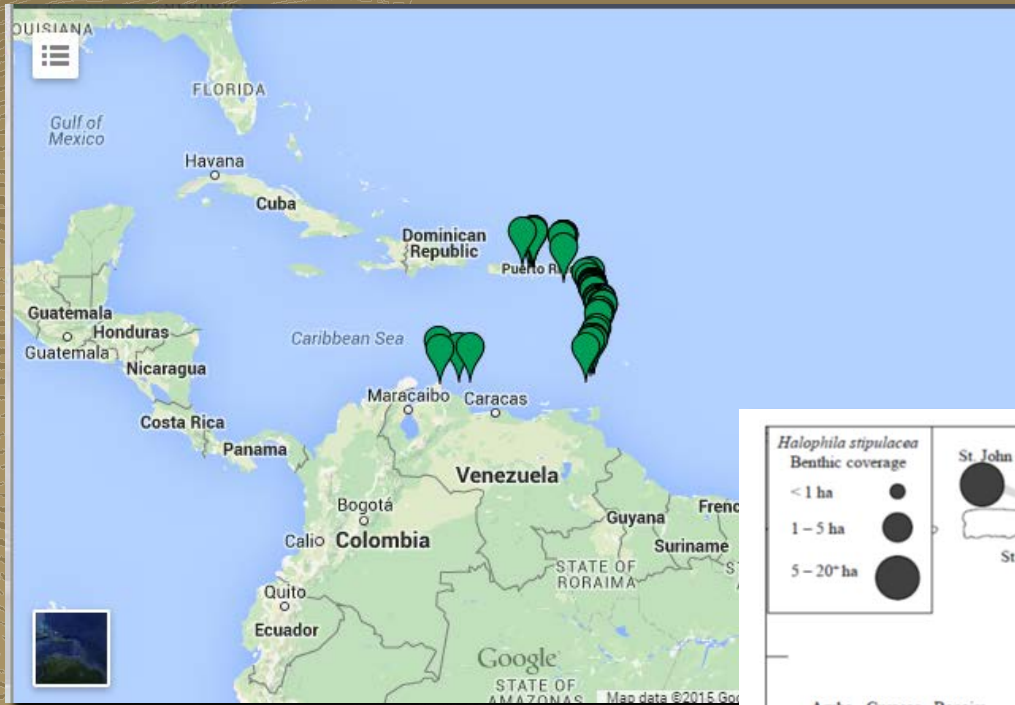
Dominica, Steiner and Willette 2014

Encroaches reef “halos”

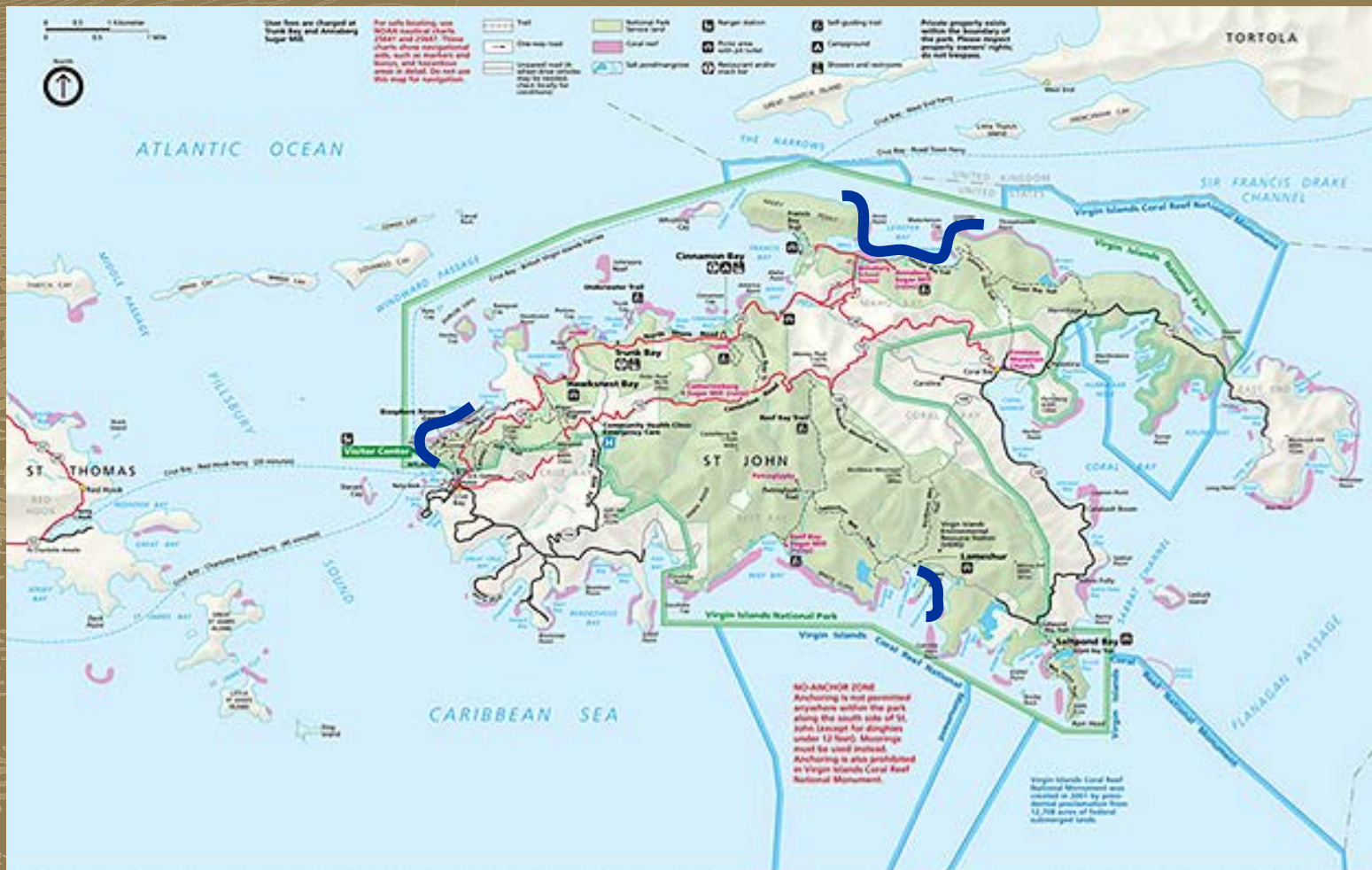


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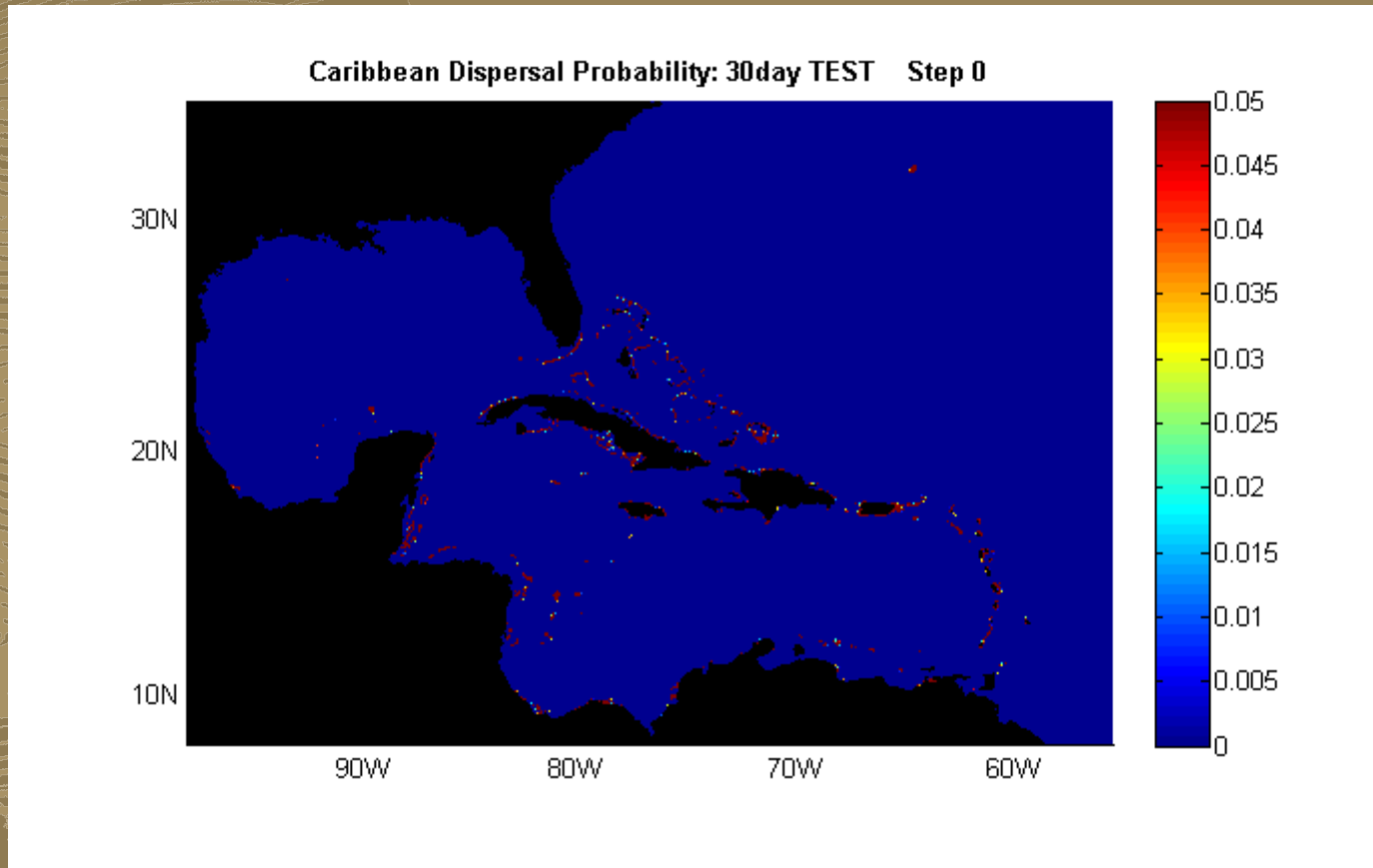
Caribbean Distribution



Northernmost portion of range



Halophilia spread

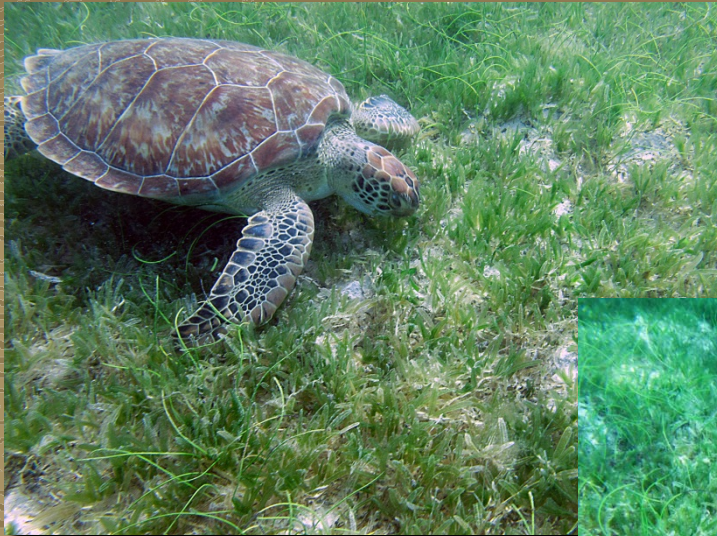


Invasive Threats



- Rapid growth
- Density eg up to >10000 shoots / M²
- Invades occupied seagrass beds and bare sand
- Has been observed in reef halos and up on to reefs
- Overlaps with sea clover (*H. baillonii*) an IUCN red list (vulnerable spp) as well as: *Siringonium filiforme* (manatee grass), *Halodule wrightii* (shoal grass), *Thalassia testudinum* (turtle grass),
- Potential for overlap with Johnson's seagrass (*Halophila johnsonii*) and ESA listed endangered species
- Not an equivalent substitute for native fish (prelim data)
- Lower species abundance and diversity than native seagrass (prelim data)
- Nutritional value to sea turtles, fish, etc unknown
 - Preliminary work ongoing (C, N, P analysis)

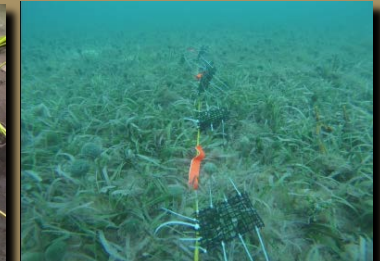
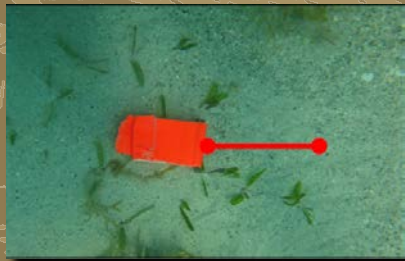
Sea Turtle Foraging on *H. s.*



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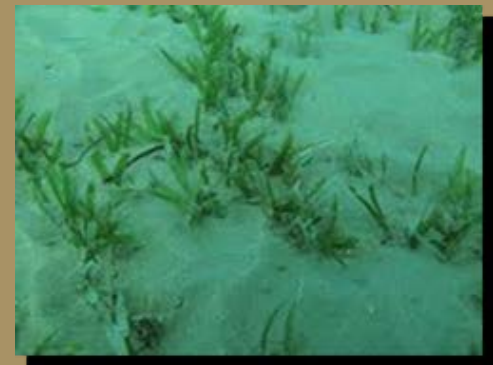
Research

- Fish use of habitats (native vs non-native seagrass)
- Growth rates at seagrass edge
- Growth rates of tank-planted/floating seagrass
- Herbivory by native fish
- Invertebrate analysis
- Nutrient analysis (C, N, P)



Results

- Yields larger fish, but half as many juveniles
- Supports lower fish species richness
- Lateral growth up to $> 6\text{cm} / \text{day}$
 - $\sim 2\text{cm} / \text{day}$ VIIS (preliminary data)
- Up to 50% increase in biomass in 7 days
- Fish and invertebrates preferentially grazed on native seagrasses
- *H.s.* litter bags harbored fewer organisms



Management

- Education and Outreach
 - Have for Dominica, will modify for VI
- Mapping and monitoring
 - Web page for reporting
 - www.invasiveseagrass.org
 - Some local mapping for VIIS
- Control
 - Working with park and partners



Report a Sighting

Name: Email:

First: Last:

Your Affiliation:

Location of Sighting

Country: Nearest City or Municipality:

Bay, Beach or Habitat: Coordinates: Latitude: Longitude:

Description of Sighting

Depth: Coverage: (small patch < 5 x 5 meters)

Growing: Other Seagrasses:

☐ in sand ☐ none

Please include any additional descriptive information about your sighting.

Control

- Identify options
 - **Chemical** —done elsewhere for other species
 - Expensive
 - Area per unit effort is small
 - **Physical**
 - Likely our best bet
- Contact partners
 - Territories NR
 - NOAA
- Understand permit needs
 - NEPA, ESA



Suggested Option



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Current Actions

- Met with park
- Contacted NEPA coordinators
- Working with invasive NPS staff
- Working with UCLA partners
- Seeking funds
 - Need permits
 - Need budget



New invasive to follow?

- Sea hare – *Syphonata geographica*
- Reported occurring with *H. stipulacea* in Mediterranean

