

# The Impact of Coastal Armoring on Sea Turtle Conservation in Barbados



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# Impacts of Climate Change & Development

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Sea level rise

Increased intensity and duration of swell events

More frequent/intense extreme weather events

Severe erosion

# Impacts of Climate Change & Development

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- Loss of lateral access
- Property vulnerability
- Unattractive beaches
- Narrowed beaches
- Impacted Tourism Industry
- Negatively impacted nesting/turtles







**WHAT DO WE WANT**



**COASTAL RESILIENCE**



**WHEN DO WE WANT IT?**



**NOWWWW**



# Building Resilience

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Barbados prides itself on managing its coast such that “the benefits of the different human uses of the coastal zone are realised in the interests of all Barbadians” (ICZM Plan Vol.1 Final Draft (July 2020). This has required adaptation to changing climate-related environmental conditions.



# Adaptations

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Adaptation has largely consisted of installing hard infrastructure:

- Boulder revetments/ gabion baskets
- Seawalls (property protection)
- Breakwaters / groynes – Beach maintenance
- Concretization of gully mouths to accelerate land run off and prevent flooding.

Applications commonly include proposals to renourish or recharge beaches with sand from external sources.



# Innovation – Boardwalks

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Two major coastal developments have been the construction of boardwalks on sections of the west and south coasts to increase lateral pedestrian access and protect coastal infrastructure.

Additions of headlands have created small, but highly dynamic pocket beaches along the Southern Boardwalk.

These beaches are not ideal for nesting but have attracted sea turtles.



# Challenges

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The management measures above are considered to be risk resilient strategies and are focused primarily on protection of infrastructure, especially for the tourism sector. **However, they have posed particular challenges for sea turtles and for their management by the Barbados Sea Turtle Project, which has been working for the past 30 years to recover sea turtle populations.**

# Seawalls



Narrow wet strips of beach between the sea and seawalls are a common sight, especially on the west coast (A, B). The ESTP has records of several beaches that historically had many nests and which now have none because there is no longer any dry beach.



# Seawalls



Eggs laid at the base of sea walls are exposed with high swells

Nesting females have fallen off sea walls and been severely injured or died. Construction typically happens in the nesting season and endangers nesting turtles



# Boulder based structures

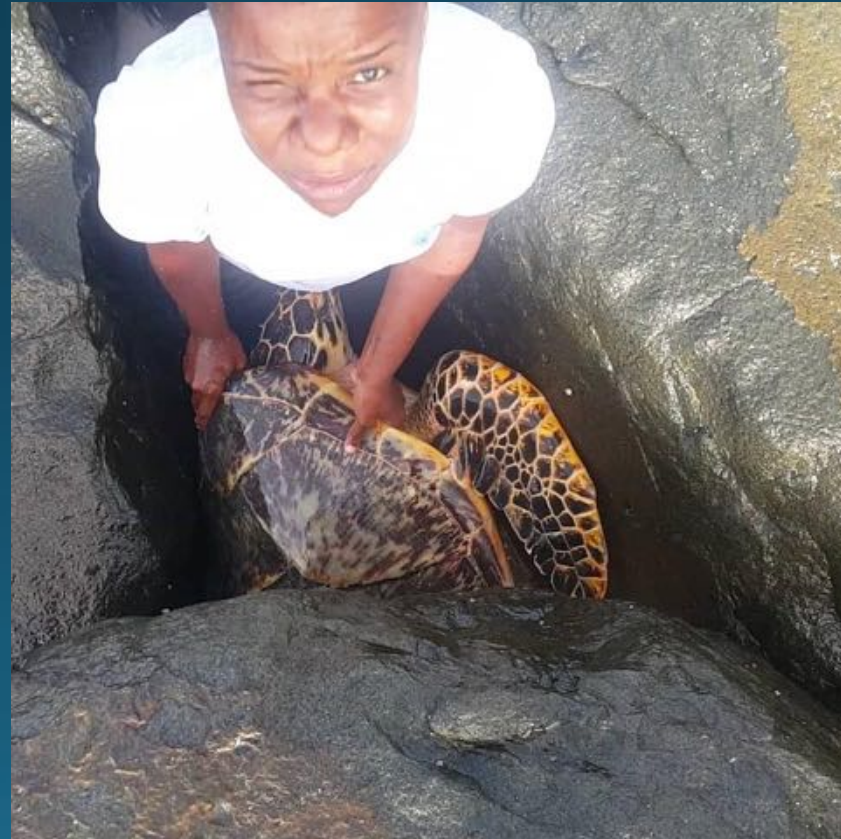




# Boulder based structures



The placement of large boulders abutting the beach has become an increasing threat to nesting turtles. Nesting females become trapped and drown/die of heat stress if not found and rescued.



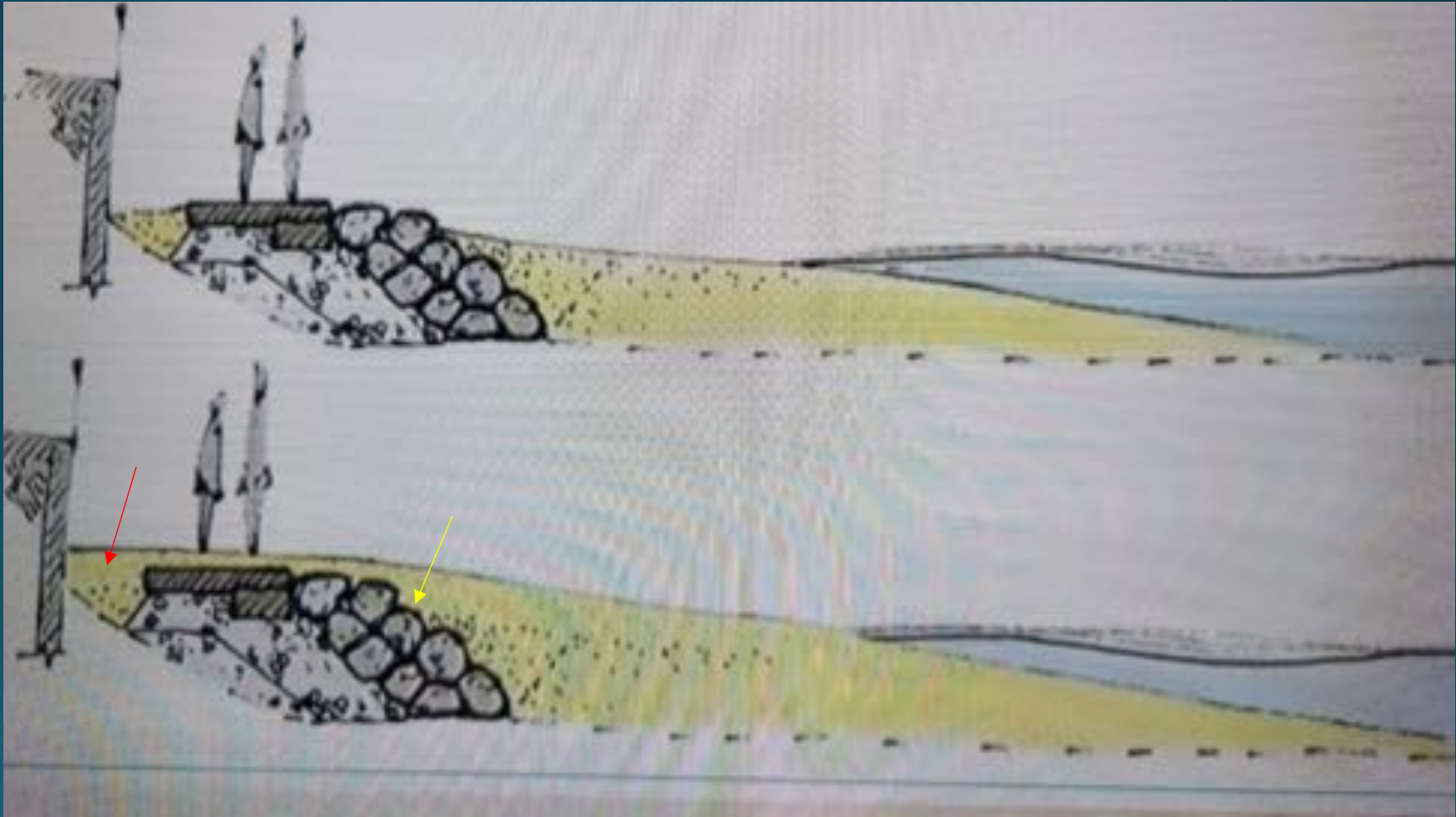




- Boulders have created habitat for and increased the effectiveness of invasive predators



# Buried Revetments/Walkways





# Boardwalks

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Boardwalks combine a number of coastal features including seawalls, revetments and headlands. This is the south coast's most prominent coastal engineering feature. At almost 1 km in length, the concrete and wood Boardwalk is protected by boulders that are exposed in some areas and covered in sand in others. A number of headlands were also constructed to create beaches where they did not previously exist. The new beaches have attracted turtles to nest, creating alternative habitat to the traditional nesting beaches nearby





- Eggs are often exposed by sand erosion or are suffocated by accreted sand overburden. Cleaning of the Boardwalk can result in sand being piled over nests to such depths that hatchlings cannot dig themselves out.







- Boardwalks provide the public easier access to turtles as they struggle to find nesting sites. This has led to increased instances of harassment and in extreme cases the killing of turtles. In recent times this behaviour has extended to hatchlings.





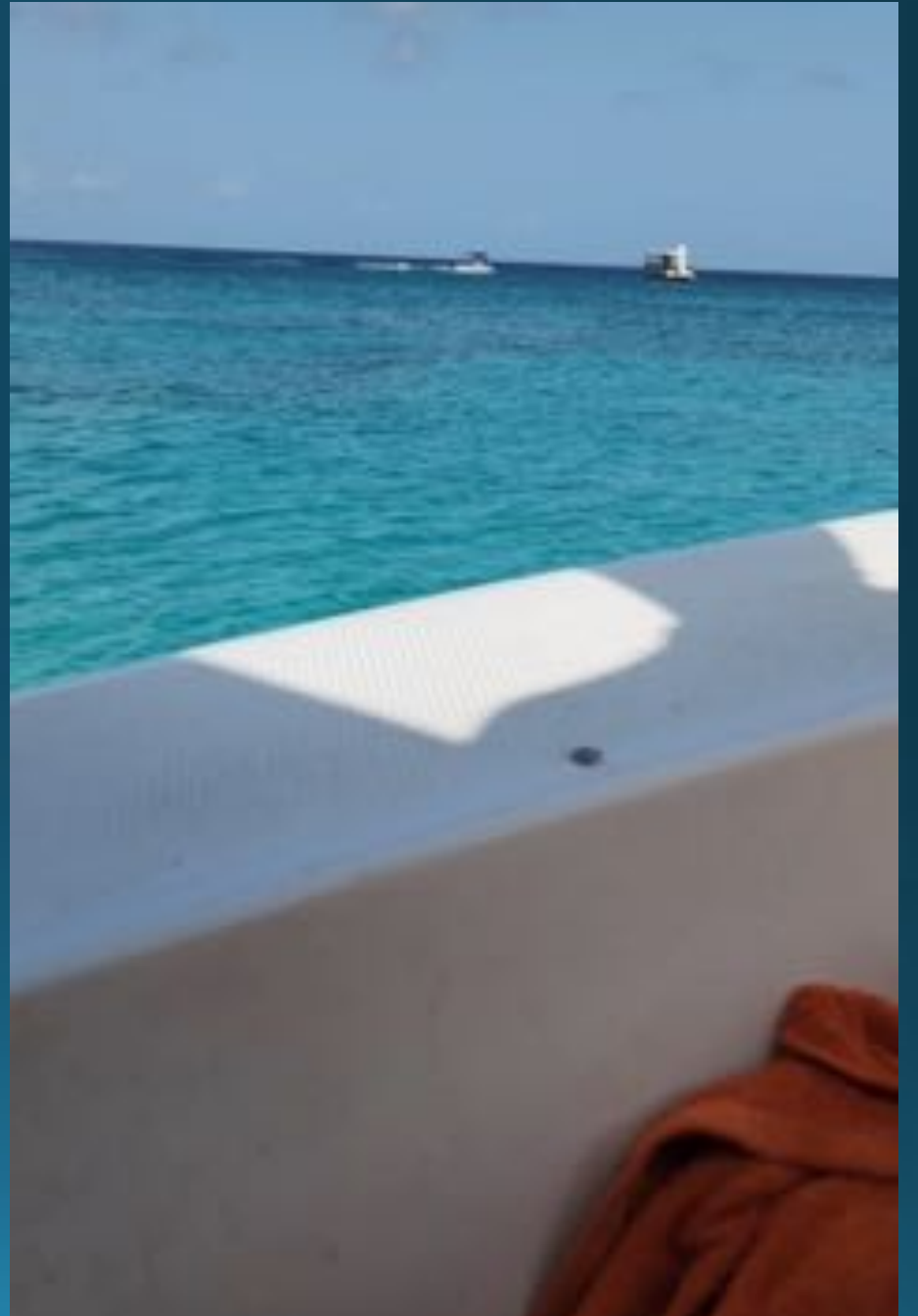
- Increased presence of people has lead to additional lighting and increased populations of rats

# Concretizing Drains

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In recent decades, it has become common policy to concretize gullies to speed up water flow and reduce flooding. Many of these channels emerge on west coast beaches and have led to deaths of numerous nesting hawksbills. The drains are often cleared of accumulated sand at the beginning of the hurricane season to clear the path of run off to the sea. Turtles nesting on the adjacent beaches fall over the unguarded edges of these drains and crack open their shells, fracture their skulls or break their necks on the hard substrate. In other drains, turtles have become stuck and starved to death.







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17 minutes





# RECOMMENDATIONS

- Structures placed on beaches, whether to protect properties, increase along-shore public access, or create beaches, are not beneficial, and indeed are not even benign for sea turtles. They have negative impacts and therefore these impacts must be taken into consideration in any decision to build a seawall, a boulder revetment or a Boardwalk. If the benefits of building these structures are deemed to outweigh the costs to sea turtles, then efforts must be made to mitigate their impacts.
- Any new Government-sponsored or Government-supported coastal development or coastal protection actions, should come with a financial commitment to ensure the presence of trained persons to address the dangers that coastal engineered structures pose to sea turtles and other wildlife using the affected beaches.



A large sea turtle is swimming in clear, vibrant blue water. The turtle is positioned in the upper right quadrant of the frame, moving towards the left. Its shell is a mottled brown and green, and its flippers are visible. The water's surface is visible at the top, with some ripples and reflections. The overall scene is serene and natural.

# THANK YOU

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