Wise practices for coping with BEACH EROSION




St Lucia

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UNESCO Environment and Development in Coastal Regions and in Small Islands

FORCES TO BE RECKONED WITH

Beaches are continuously changing – from day to day, month to month and year to year – as the natural forces of wind and water meet the land. These changes, which have been taking place for millions of years, are linked to variations in wind, waves, currents and sea level height.

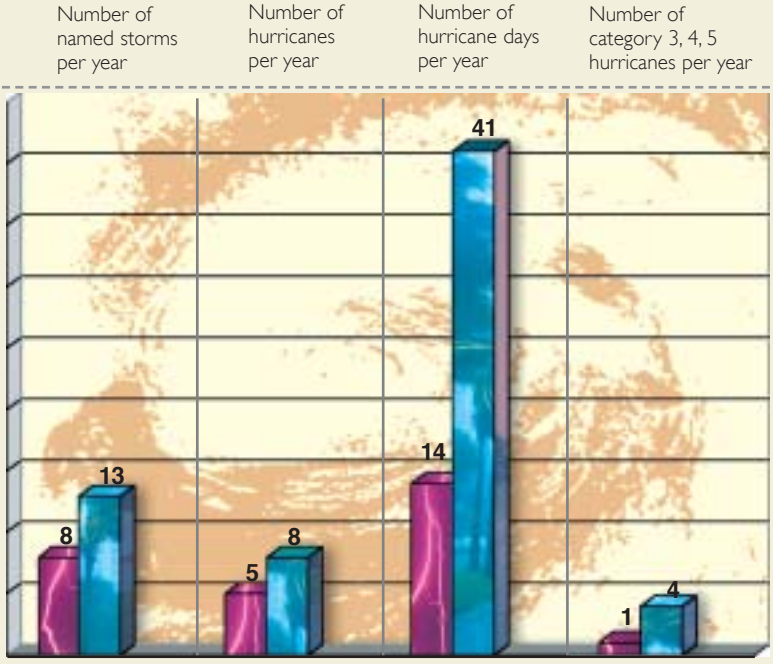
But it is not just the natural forces that change the beach, humans have a big role to play in this process as well, through mining stones and sand from the beaches and dunes, cutting and clearing coastal vegetation, polluting and damaging coral reefs, and constructing buildings and walls too close to the sea.

Changes in the beaches affect everyone. The coast is a place we are attracted to for recreation, sports and simple enjoyment. In addition, it provides a source of employment for many people. This constantly changing and hazard-prone coastal environment is also where the greatest financial investment is concentrated, as large tourism properties and establishments continue to be attracted towards St Lucia's shores. Tourism is a driving force in St Lucia's economy so the state of its beaches is of major importance.

Natural forces

- Hurricanes and tropical storms, occurring between June and November, cause dramatic beach changes usually resulting in serious beach erosion.
- High waves during 'winter' months resulting from storms in the North Atlantic Ocean, and known as swell waves, or locally as 'groundseas', often cause erosion, especially on the sheltered leeward coast.
- Sea-level rise, which is a long-term factor, taking place very slowly over decades causes shorelines to retreat inland.

Since 1995, the Atlantic Basin (including the Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico) has entered a more active hurricane cycle, which may continue for more than 20 years.



Hurricane frequency between 1990 and 1999 in the Atlantic Basin

Source: Gray et al http://typhoon.atmos.colostate.edu/forecasts/1999/nov99/

In the Atlantic Basin the number of really severe hurricanes (categories 3, 4 and 5) increased from one per year (1990 –1994) to four per year (1995 – 1999).

Human forces

- Removing sand and other materials from beaches and adjacent areas for construction purposes causes erosion and the loss of beaches and coastal lands, destroying the natural heritage of the coast and reducing the vibrancy of the tourism industry.
- Building too close to the beach interferes with the natural sand movement and may impede beach recovery after a serious storm or hurricane.
- Badly planned sea defences may cause the loss of the beach, and of neighbouring beaches.
- Pollution from human activities on the land may damage coral reefs and seagrass beds; these biological systems protect, and provide sand to the beaches.
- Removing vegetation from coastal areas destabilises beaches; and clearing sites inland results in increased soil and dirt particles being washed offshore and smothering coral reef systems.

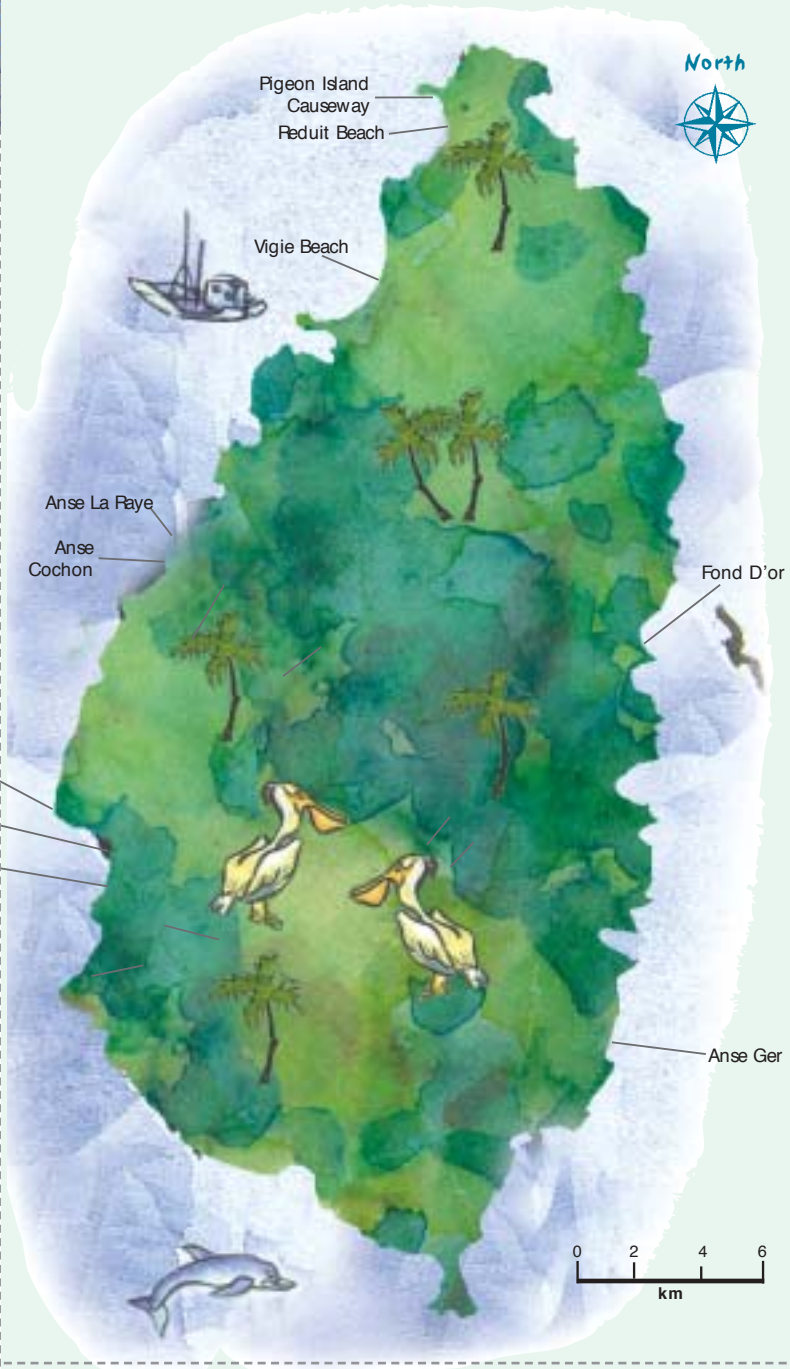
Building on the beach is an unwise practice which interferes with natural sand movement, Reduit Beach, 1990

WHAT'S HAPPENING WITH ST LUCIA'S BEACHES?

Beach monitoring in progress at Malgretoute, 1995

In order to manage these changes, St Lucia's beaches have been monitored since 1995 by the Fisheries Department, who measure the beach slope and width at regular intervals at numerous sites around the island

Location of monitored beaches in St Lucia



Winter swells at Reduit Beach seasonally erode the beach and threaten beachfront buildings, 1995

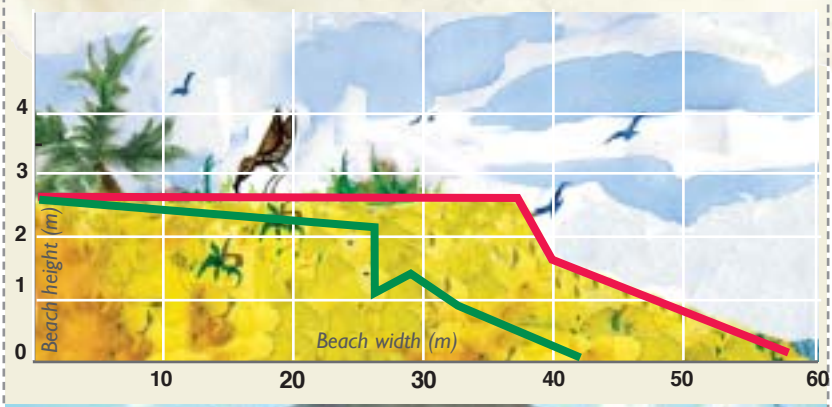
SAND IN, SAND OUT

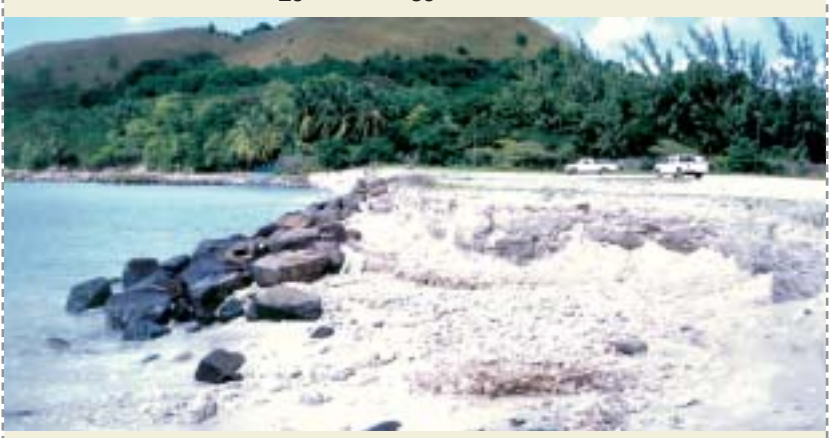
Beaches change from season to season and from year to year. For example along the western side of the Causeway which joins Pigeon Island to the mainland, erosion has been taking place since the Causeway was constructed in the 1970s. Monitoring results show that between 1990 and 1995 the edge of the Causeway retreated inland 10 m.

BEACH PROFILE
Pigeon Island Causeway.
Beach erosion

October 1990

August 1995





The western side of the Pigeon Island Causeway has been eroding since it was first constructed, (Dec. 1995)

The erosion is also evident at the adjacent Reduit Beach, Dec. 1995

DUNES AS RESERVOIRS OF SAND

Dunes are an important part of the coastal system and function as reservoirs of sand, supplying beaches during storms and protecting coastal land from flooding. Many dunes have been damaged or destroyed over past decades in St Lucia as a result of sand mining and the construction of buildings.

These vegetated dunes at Cas en Bas protect the land behind the beach from flooding, 1989

Detail of dune vegetation

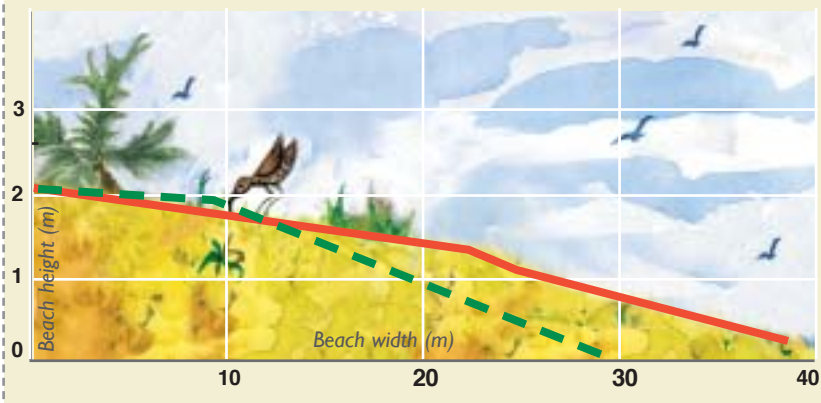
Clearing dunes and their vegetation destabilises the beach and the coastal system, Point Sable, 1989

Mining sand from dune systems here at Point Sable destroys the protective seagrape vegetation and causes erosion, 1989

HERE TODAY, GONE TOMORROW

St Lucia has been impacted by several tropical storms and hurricanes during recent years. These events cause considerable damage to coastal areas, as well as eroding beaches and dunes. In the months and years after the hurricane event, the beaches recover to some extent, but not usually to pre-hurricane levels.

In 1995, St Lucia's beaches were impacted by Tropical Storm Iris and Hurricane Luis. At Vigie Beach there was erosion and the beach narrowed by 11 m.



BEACH PROFILE
Vigie Beach.
Beach erosion

27/6/1995

11/9/1995

Vigie Beach after Hurricane Luis, December 1995

Debris covering the beach at Fond D'Or after Tropical Storm Debbie in 1994

WISE PRACTICES FOR A HEALTHY BEACH

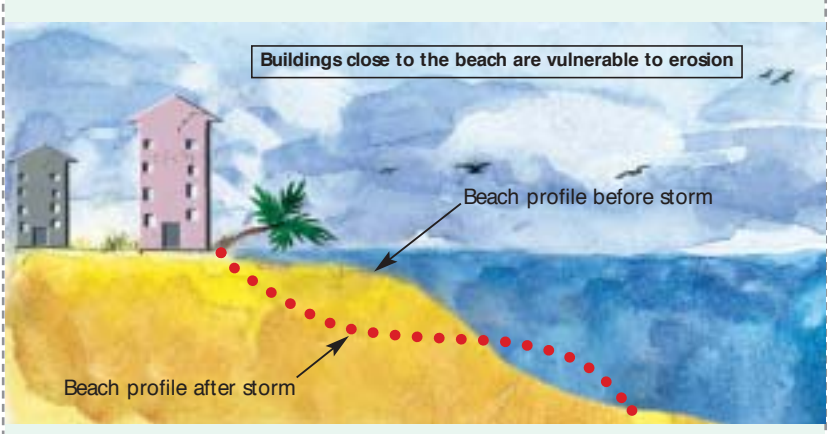
Grasses, vines and sea-grape here at Anse Ger help to stabilise the beach and dunes, 1994

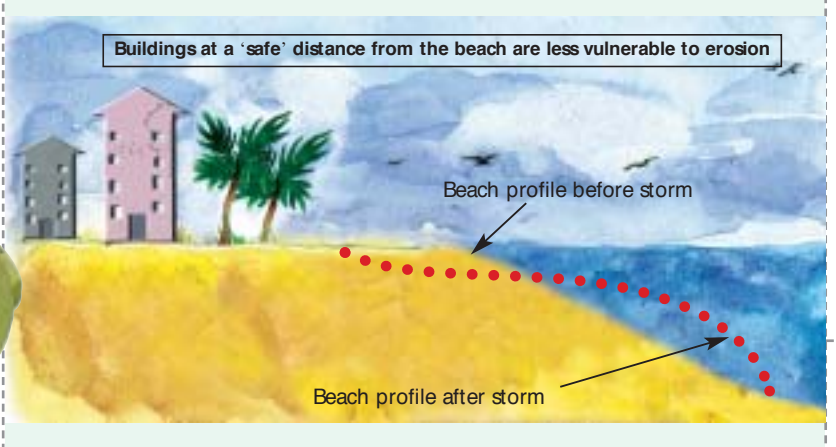
The state of the beach affects everyone's lives. There are no simple or universal solutions to shoreline erosion, since there are often several factors, both human and natural, contributing to the problem at a particular beach. Each beach behaves differently, so it is advisable to find out as much information as possible about a particular beach before taking any corrective action. It is necessary to consult the Physical Planning Department before undertaking any action at a beach.

Some forces of change, such as hurricanes and winter swells are natural, and there is little we can do to stop them, yet there are ways we can help to slow down the rate of erosion:

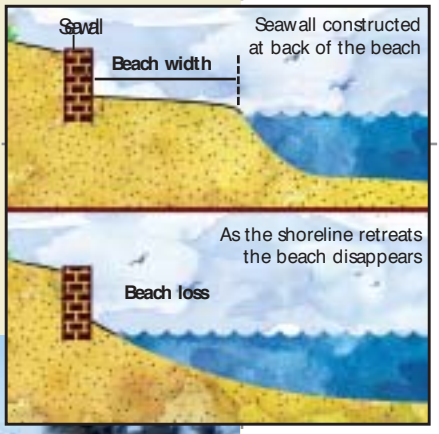
- Planning new development so that it is a 'safe' distance behind the beach will reduce the need for expensive sea defence measures in the future.
- Revegetating dunes with native vegetation e.g. grasses and vines, and planting beach areas beyond the reach of storm waves with salt-resistant, deep-rooting trees, such as sea-grape.

Ensuring new development is a 'safe' distance from the dynamic beach zone, helps conserve the beach and the buildings





Extracting pumice for construction material reduces the need to mine sand from beaches, Black Bay, 1989

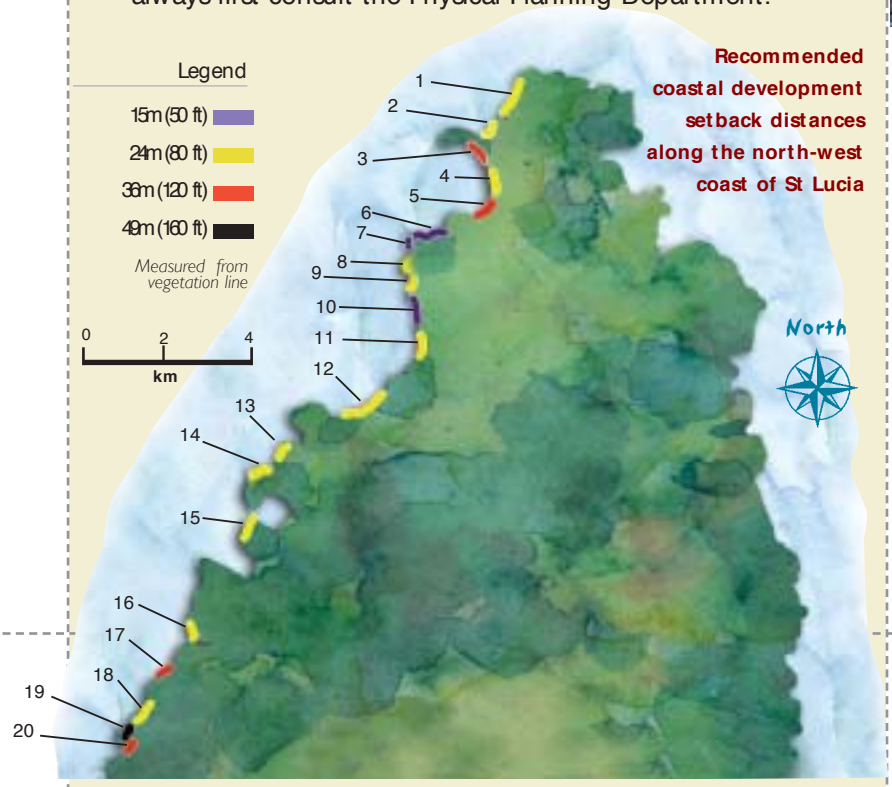


Only a narrow beach exists in front of this retaining wall at Reduit Beach, April 1998

Groynes, as seen here at Wyndham Bay in 2001, result in sand build-up on one side of the groyne...

...and erosion on the other side

- Resorting to 'hard' engineering structures such as retaining walls, seawalls, revetments and bulkheads, only when there is a need to protect beachfront property from wave action. Such structures, even with careful design, result in the loss or narrowing of the beach over time.
- Considering all other beach enhancement measures such as offshore breakwaters, groynes and beach nourishment (placing sand from the offshore zone or from an inland source on the beach) at a particular site. All such measures require careful design and environmental impact assessments, so always first consult the Physical Planning Department.



Recommended coastal development setback distances along the north-west coast of St Lucia

Key to the beach numbers

1. Le Sport
2. Anse Becune
3. Causeway
4. Gros Islet
5. Reduit Beach
6. Trou Gaston
7. Trou Ya
8. Cuti Cove
9. Labrellote Bay
10. Marisule Beach
11. Choc Beach
12. Vigie Beach
13. Tapion
14. La Toc Bay
15. Anse Fere
16. Marigot
17. Roseau Bay
18. Anse Pilori
19. Trou l'Oranger
20. Anse La Raye

WISE PRACTICES ✓ CHECKLIST

- **Plan for existing and future coastline change** by positioning all new development (large and small) a 'safe' distance landward of the vegetation line (consult the Physical Planning Department for information on 'safe' distances).
- **Ensure the physical planning process is fair**, equitable and transparent.
- **Review and carefully consider ALL options** when planning ways to slow down the rate of coastline change, these should include planning, ecological and engineering measures.
- **Monitor the rate of coastline change** and share the findings with all other stakeholders.
- **Coordinate an integrated approach to beach management**, by ensuring that individuals, groups and agencies work together.
- **Promote the concept of coastal stewardship** and civic pride.
- **Respect the rights** of all beach users.
- **Provide for dedicated public access lanes to all beaches**, and where appropriate provide facilities for beach users (e.g. parking, safety measures, sanitary facilities).
- **Stop the mining of sand from beaches and dunes**, ensure that mining sites are restored after use, and investigate alternative building practices.
- **Conserve and restore vegetative cover**, both adjacent to the beach in order to stabilise the sand, and further inland to reduce sediment reaching the reefs and sea grass beds.

For more information on shoreline change in ST LUCIA consult:

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For more information on shoreline change in the CARIBBEAN consult:

Coping with Beach Erosion
by Gillian Cambers
UNESCO Publishing, 1998
ISBN 93-3-103561-4

This booklet is a result of co-operation between UNESCO, the Caribbean Development Bank and St Lucia's Governmental agencies

To view this booklet on-line, please see:
www.unesco.org/csi/act/cosalc/brochluc.htm

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