



**CITY OF CAPE TOWN  
ISIXEKO SASEKAPA  
STAD KAAPSTAD**

## **Integrated Coastal Management Lekgotla**

The River Club, Liesbeek Avenue, Observatory  
10 -11 September 2019

### **Coastal Spatial Planning: Successes and Challenges**

Dr. Darryl Colenbrander  
Head: Coastal Policy Development and Management Programmes  
Spatial Planning and Environment Directorate

**Making progress possible. Together.**

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- An aerial photograph of Cape Town, South Africa, showing the coastline, the sea, and the surrounding land. The image is used as a background for the text.
- **Largest coastal metro in South Africa in terms of sea frontage:**
    - 307km (including Table Mountain National Park)
  - Cape Town's coastline is one its **most important socio-economic and environmental assets**
  - **Central to Cape Town's identity, sense of place and global attractiveness**
  - Cape Town's coastline contributes approximately R40 billion per annum **to our local economy that is ±10.7% of the Gross Domestic Product** (Urban-Econ, 2017).
  - Cape Town's coastline **offers significant potential for economic growth and livelihood upliftment**
  - A well managed coastline is critical in the **development of a coastal city that is resilient to the impact of climate change**

# A Google SEARCH FOR "CAPE TOWN"?

The image shows a Google search interface for the query "cape town". The search bar contains the text "cape town" and is flanked by icons for image search, voice search, and a magnifying glass. Below the search bar are navigation links for "All", "Maps", "Images", "News", "Videos", and "More", along with "Settings" and "Tools". A "Sign in" button is visible in the top right corner. Below the navigation links is a row of circular image thumbnails representing different aspects of Cape Town: "south africa", "beach", "table mountain", "map", "waterfront", "city", "beautiful", "camps bay", "clifton", and "storm". The main search results area displays a grid of image thumbnails with captions and source information. The first row includes results from "tvl.co.za" (Tourism Month: 5 adrenaline adventures...), "travelstart.co.za" (Cape Town | Robben Island | South West...), "thesouthafrican.com" (Cape Town has been named Africa's...), "sapeople.com" (3 Cape Town Restaurants Offer "Come In..."), and "timeout.com" (Cape Town 2019 | The Ultimate Guide T...). The second row includes results from "tineplanet.com" (Cape Town travel | South Africa...), "travelstart.co.za" (Best Time to Visit Cape Town: Climate...), "property24.com" (Cape Town case study: Buying vs renting...), "travelground.com" (About Cape Town CBD in City Bowl), and "telegraph.co.uk" (An expert travel guide to Cape Town...). The browser's address bar shows the search URL, and the Windows taskbar is visible at the bottom.

cape town - Google Search

google.com/search?q=cape+town&rlz=1C1RUCY\_enZA8658&source=lnms&tbm=isch&sa=X&ved=0ahUKEwimw7n9o77kAhXXUJRUJHax2B2YQ\_AUIEygC&biw=1536&bih=706&idpr=1.25

Google

cape town

Q All Maps Images News Videos More Settings Tools

Sign in

SafeSearch

south africa beach table mountain map waterfront city beautiful camps bay clifton storm

Tourism Month: 5 adrenaline adventures...  
tvl.co.za

Cape Town | Robben Island | South West...  
andbeyond.com

Cape Town has been named Africa's...  
thesouthafrican.com

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travelground.com

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ICM\_Lekgotla\_Pro...pdf

Show all

10:25  
2019/09/07

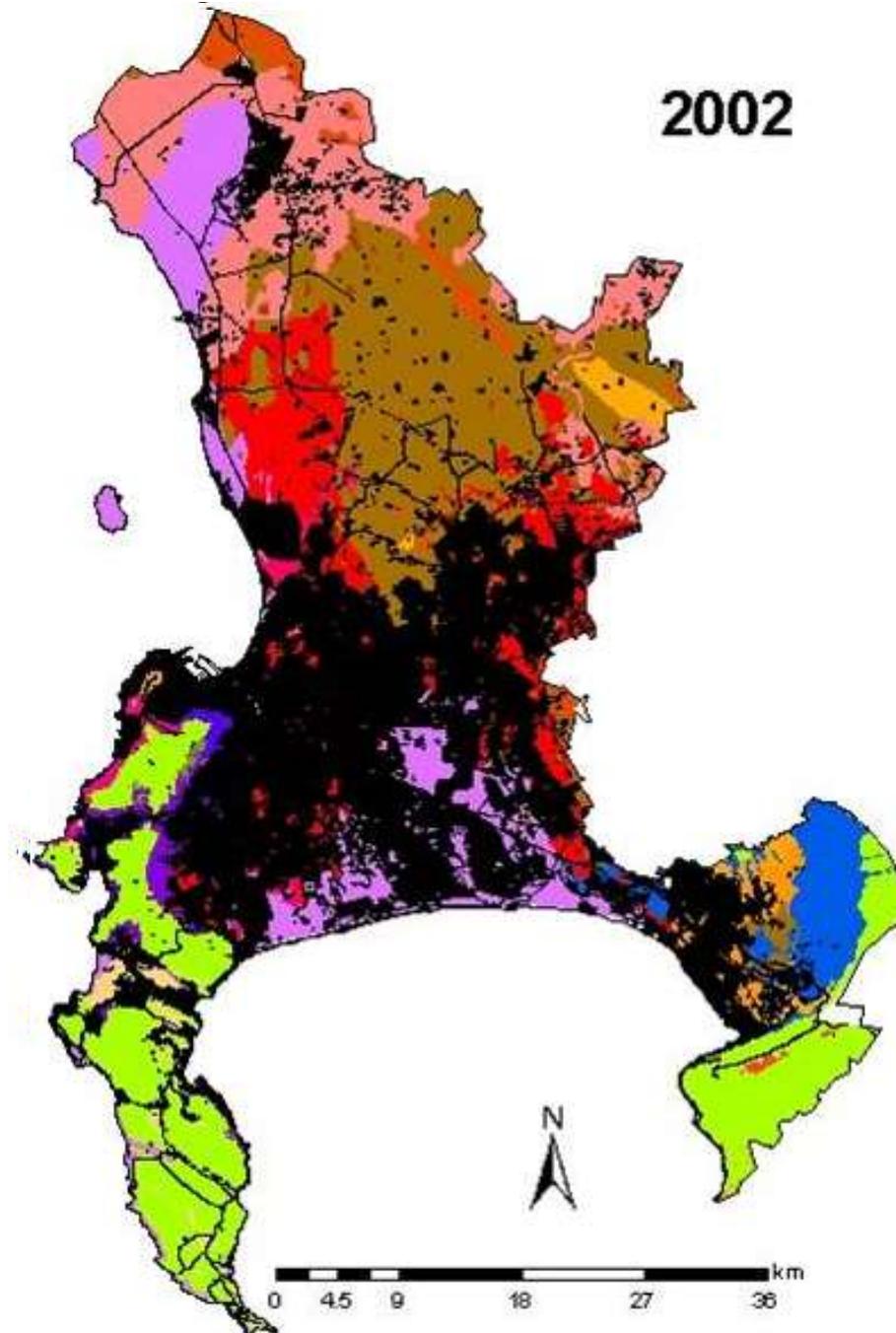
**We live in the Anthropocene: an age where human activity is the *dominant influence* on the climate and environment**

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# Urban development in Cape Town

## From a coastal perspective

Approximately 75% of Cape Town's coastline (excluding Table Mountain National Park) is developed within 100m of the high-water mark – a crude proxy for exposure to coastal risk



# What does this mean from a Coastal Spatial Planning perspective?

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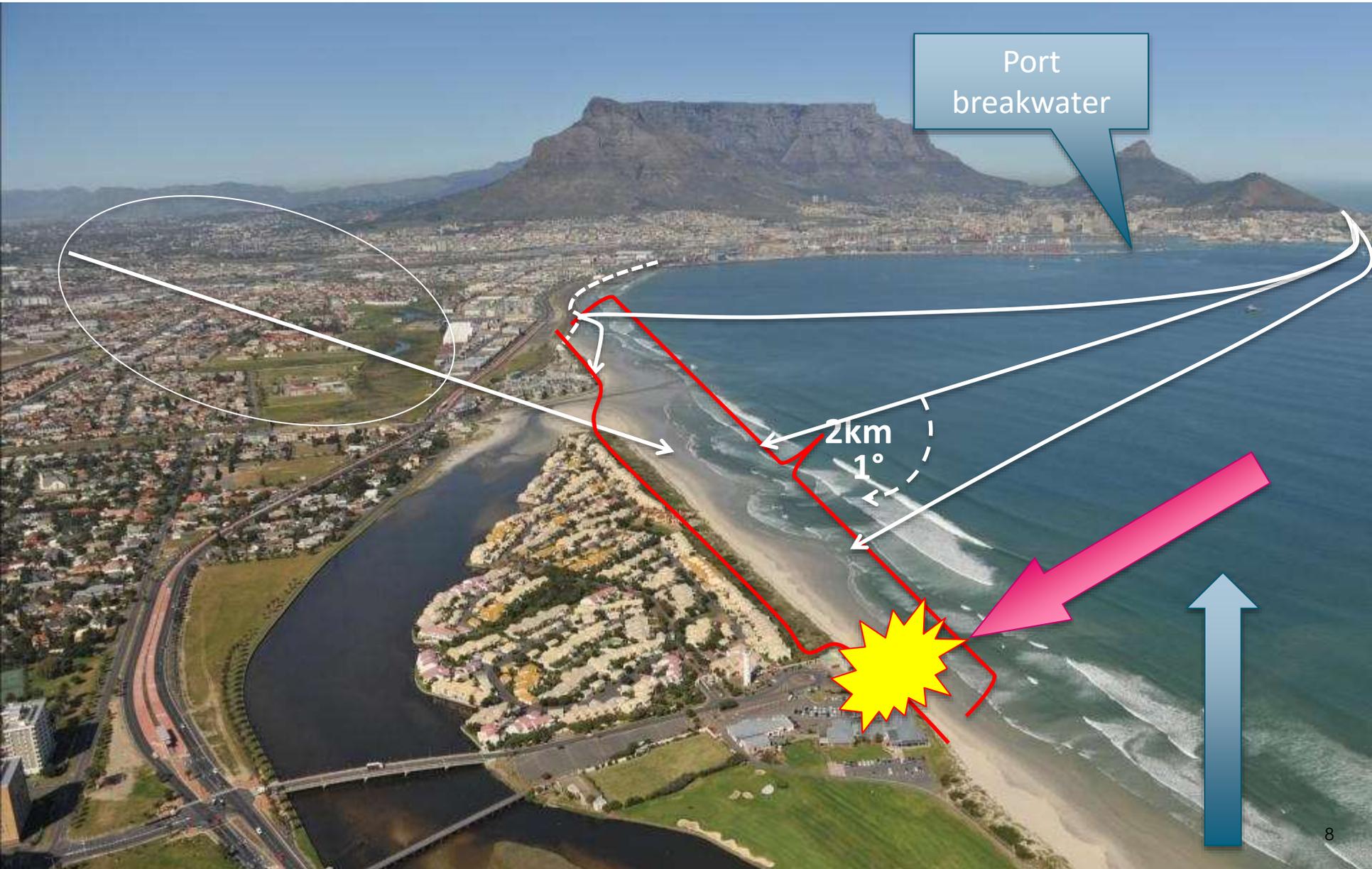
The coastal space is a **nexus** where various human activities, despite taking place across varying **temporal and spatial scales, converge upon, and impact on the coast as the transitional space between land and sea masses**

Activities occurring across different spatial and temporal scales may **coalesce to compound coastal risk and vulnerability**

# Case examples of how human induced impacts may coalesce to compound coastal risk and vulnerability

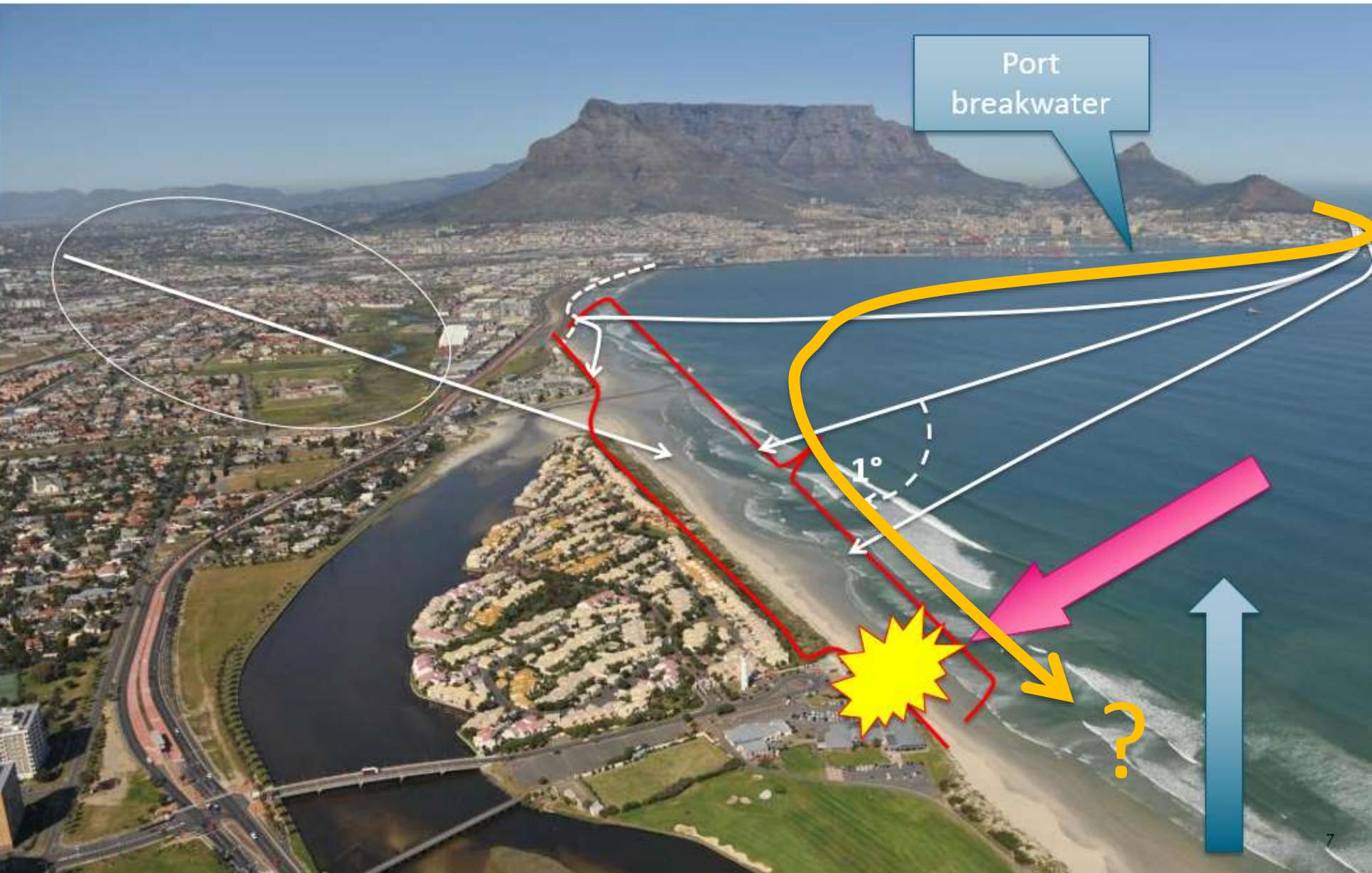
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# The case of Milnerton: multiple factors compounding coastal erosion





# The case of Milnerton: coalescence of multiple factors leading to coastal erosion



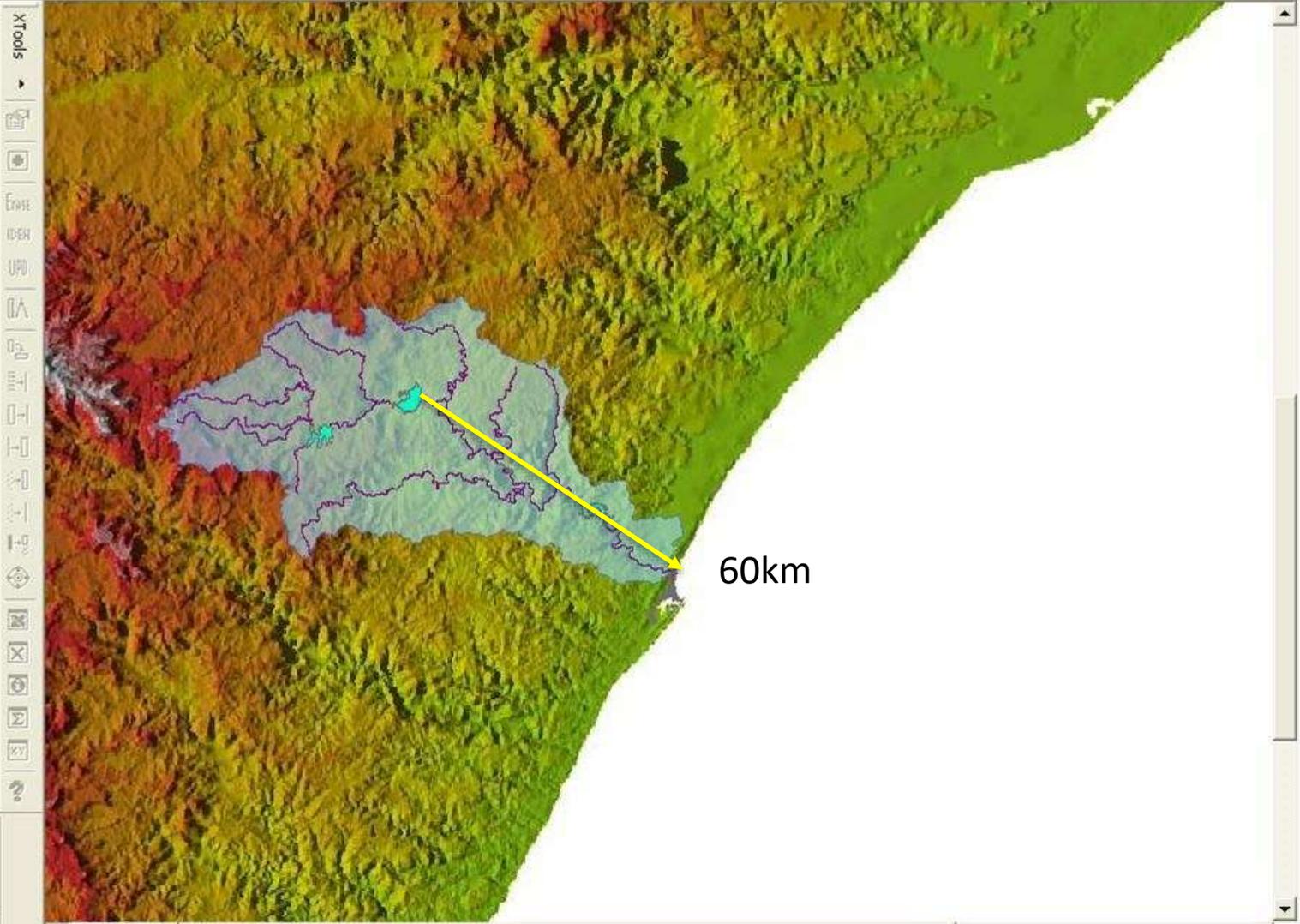
1:1,275,423 Layer: mrsid\_c.sid 500

Editor Task: Create New Feature Target:

53%

**Layers**

- Catchment\_Dams
- Umgeni\_Catchment\_Rivers
- Mgeni\_Catchment
- kzn\_hw\_dd\_fin2\_wgs84
- 10m\_contour
- Surveyed Erf selection
- mrsid\_c.sid
- balloon
- Surveyed Erf
- knimage.tif





# Illegal sand mining

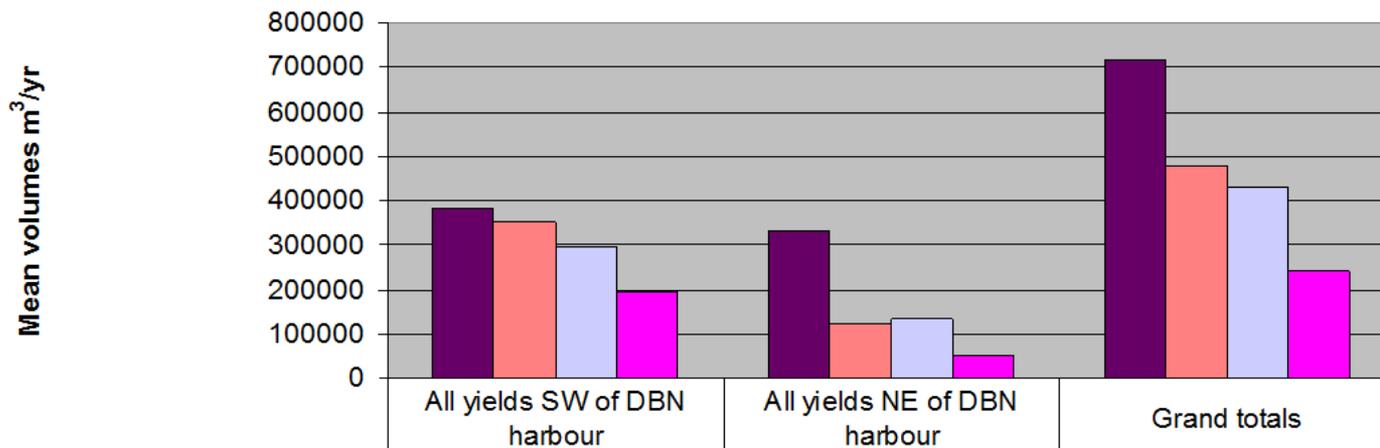
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Source: eNCA

- Total remaining sand yield from all 18 rivers only 140 000 - 240 000 m<sup>3</sup>/yr ≈ 1/3 of “natural” due to total yield reduction (dams + mining) of 66 -70%

**Ethekwini river sand yields**



	All yields SW of DBN harbour	All yields NE of DBN harbour	Grand totals
15% natural sand yield	382903	334235	717138
15% sand yield - dams	354243	123799	478041
Sand mining	298440	133840	432280
Remaining sand yield	192242	49600	241842

15% natural sand yield 15% sand yield - dams Sand mining Remaining sand yield

(Theron *et al.*, 2008)



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# The case of Big Bay: not what it appears to be

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Seagull

JACOB V

DTC 166

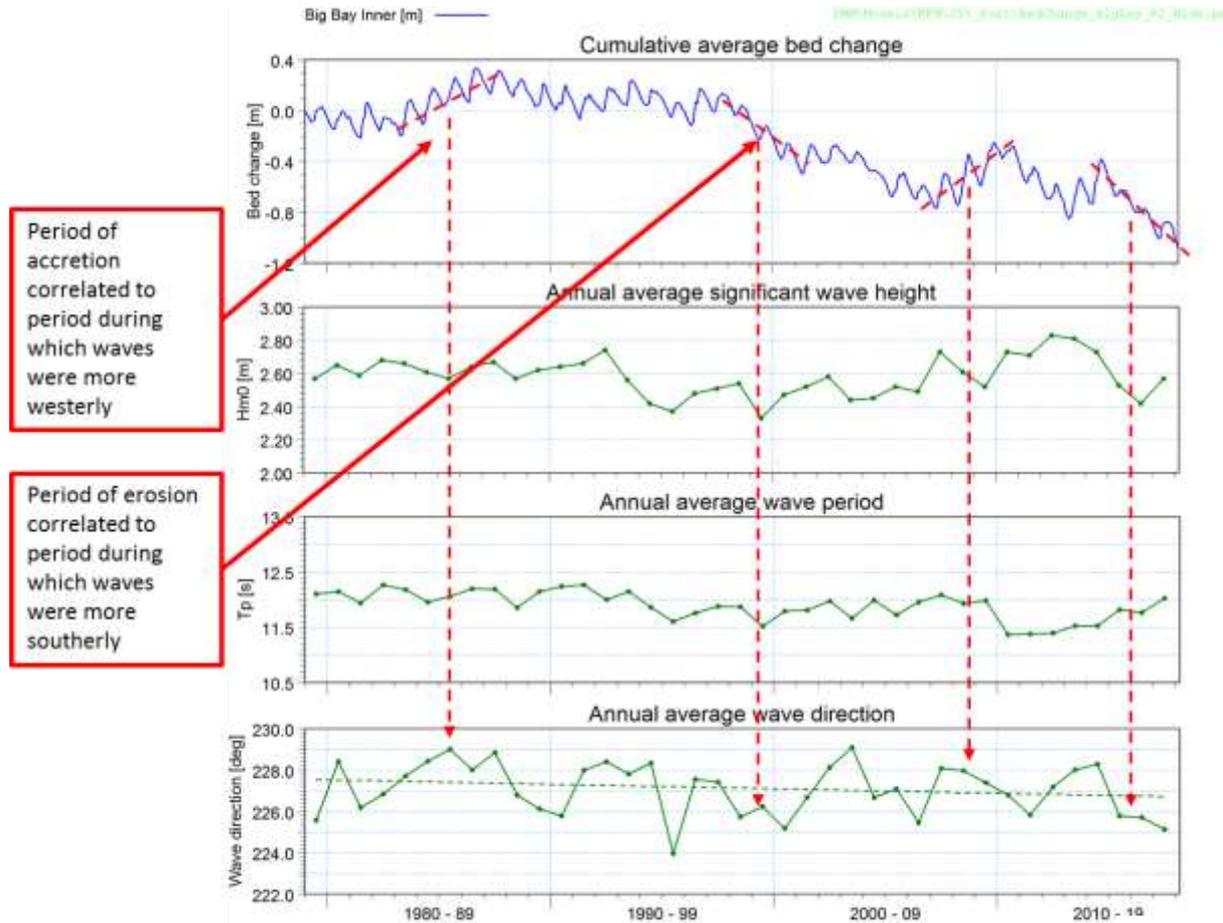
DTC 166





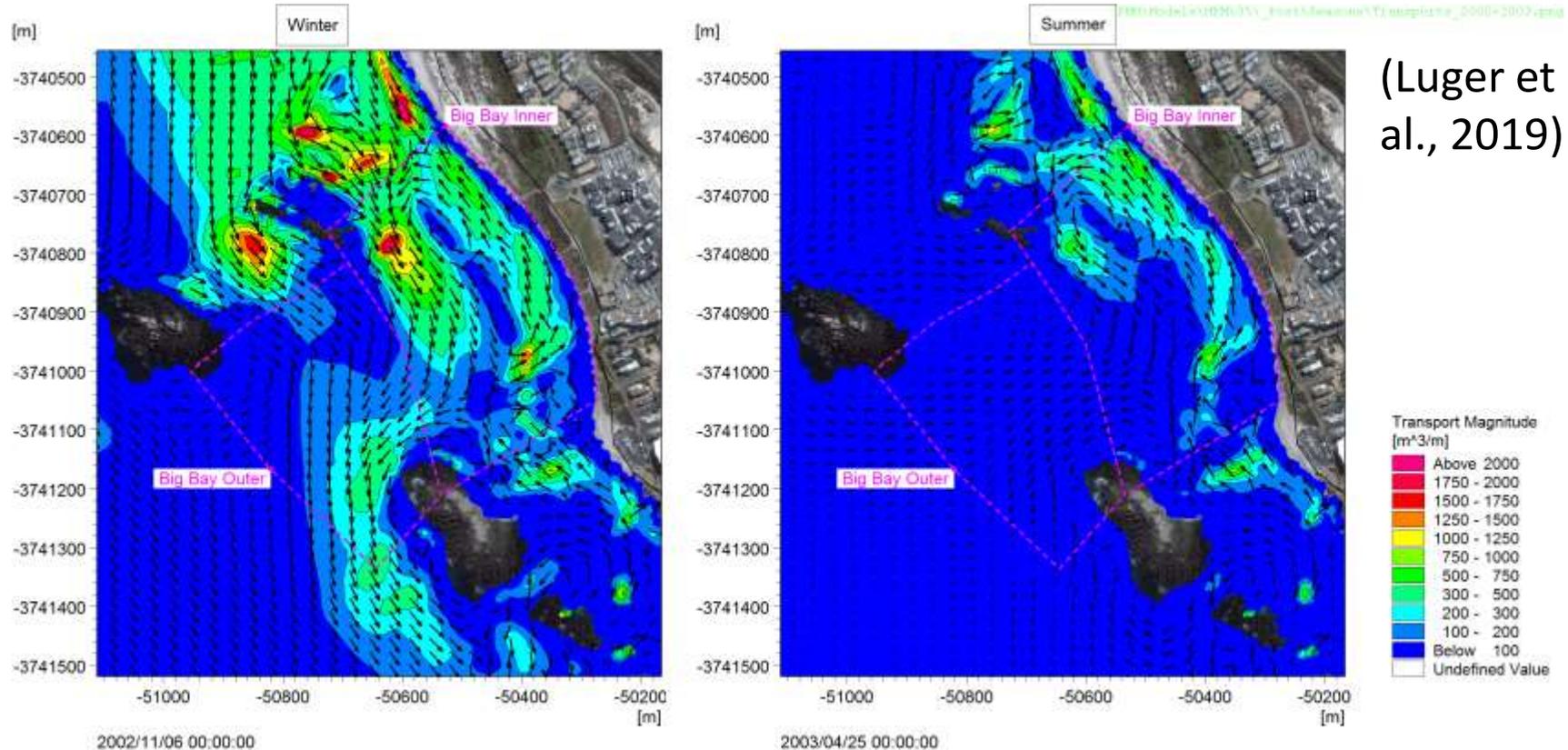


# Research undertaken by PRDW commissioned by the City revealed the unexpected: coastal erosion at Big Bay attributed to weaker cold fronts



(Luger and Hugo, 2019)

# Seasonal sediment transport in a balanced year: 2002-2003

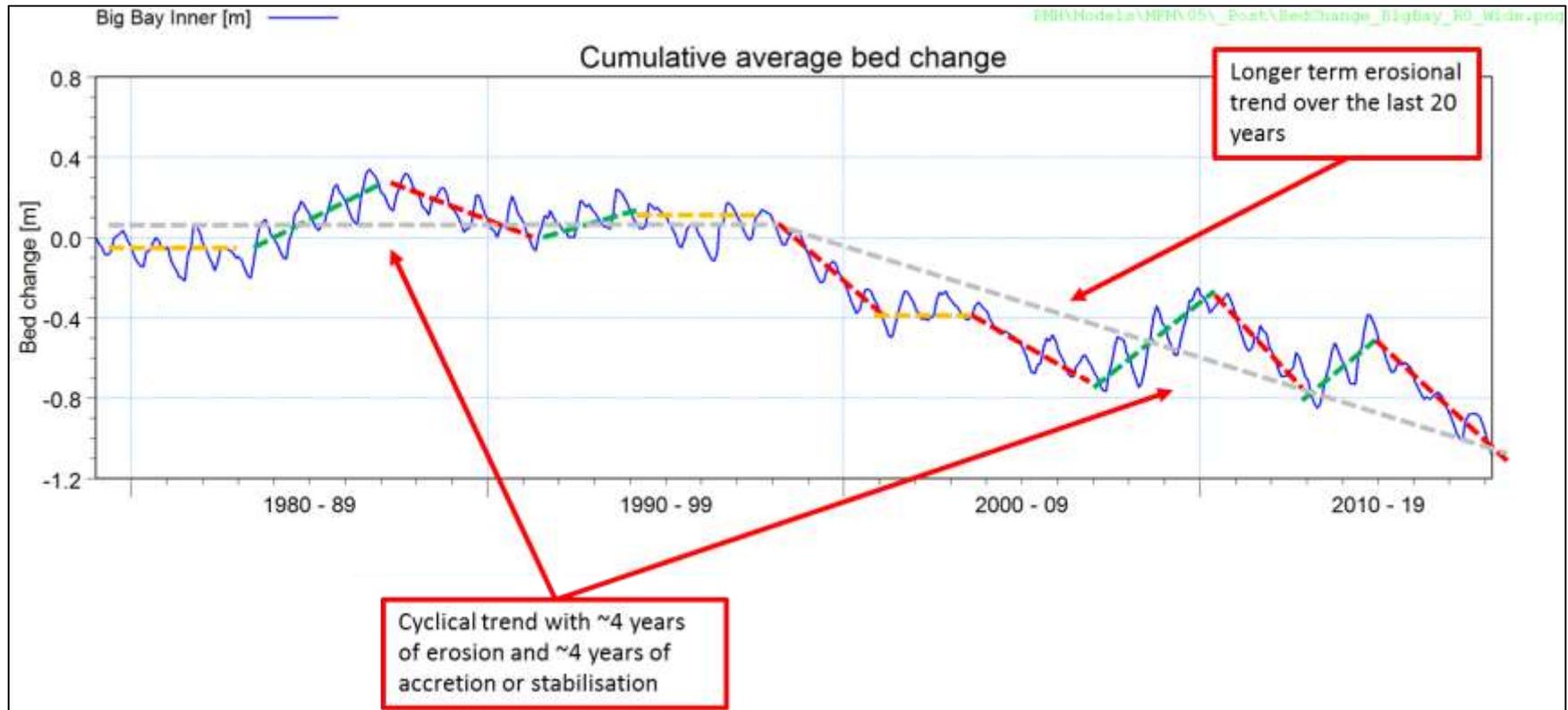


(Luger et al., 2019)

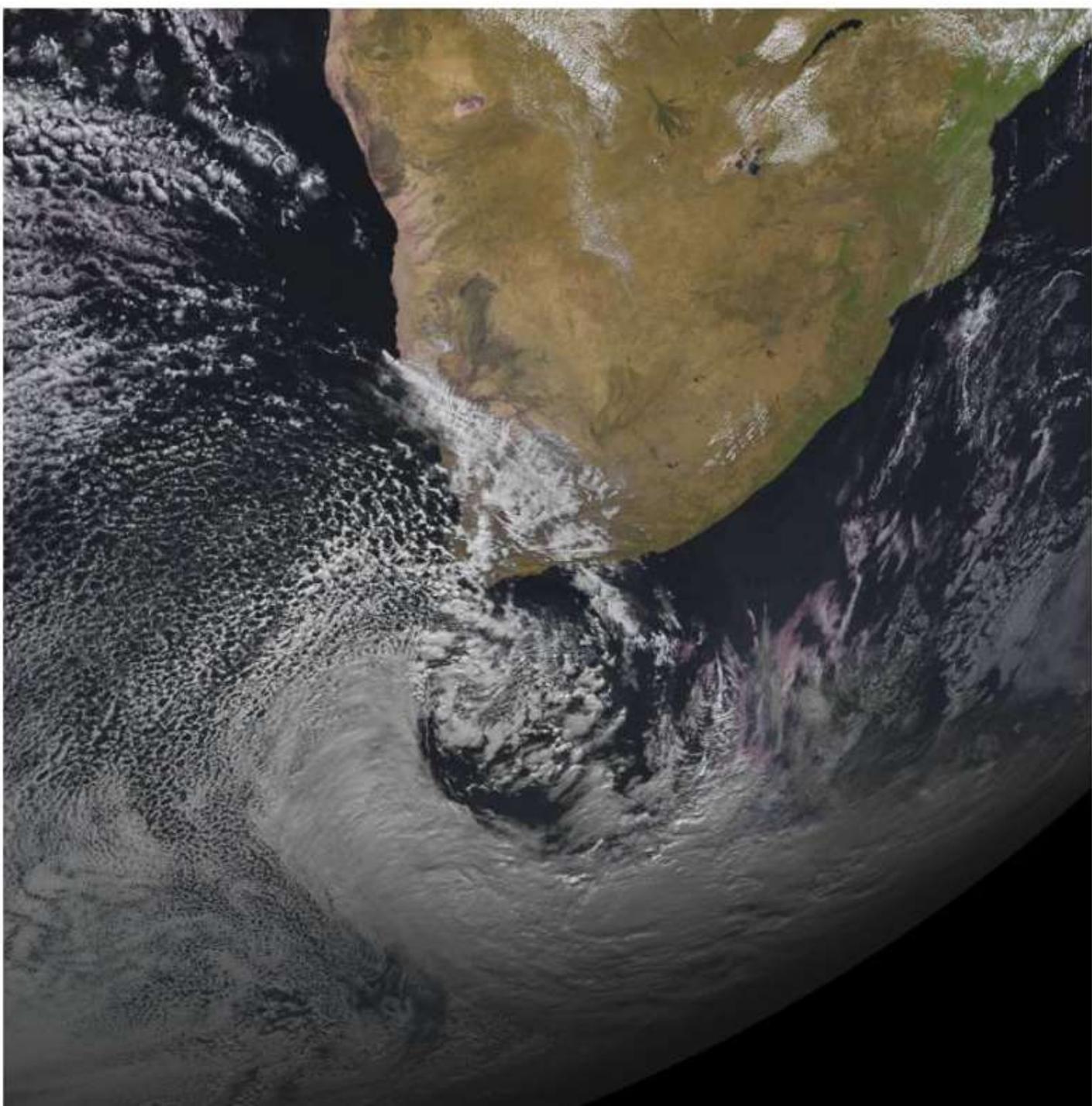


# Erosion at Big Bay continued

(Luger and Hugo 2019)



Is this erosion trend attributed to frontal systems shifting poleward due to climate change?



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# Planning for coastal risk and vulnerability: City of Cape Town's Coastal Edge/draft Coastal Management Line

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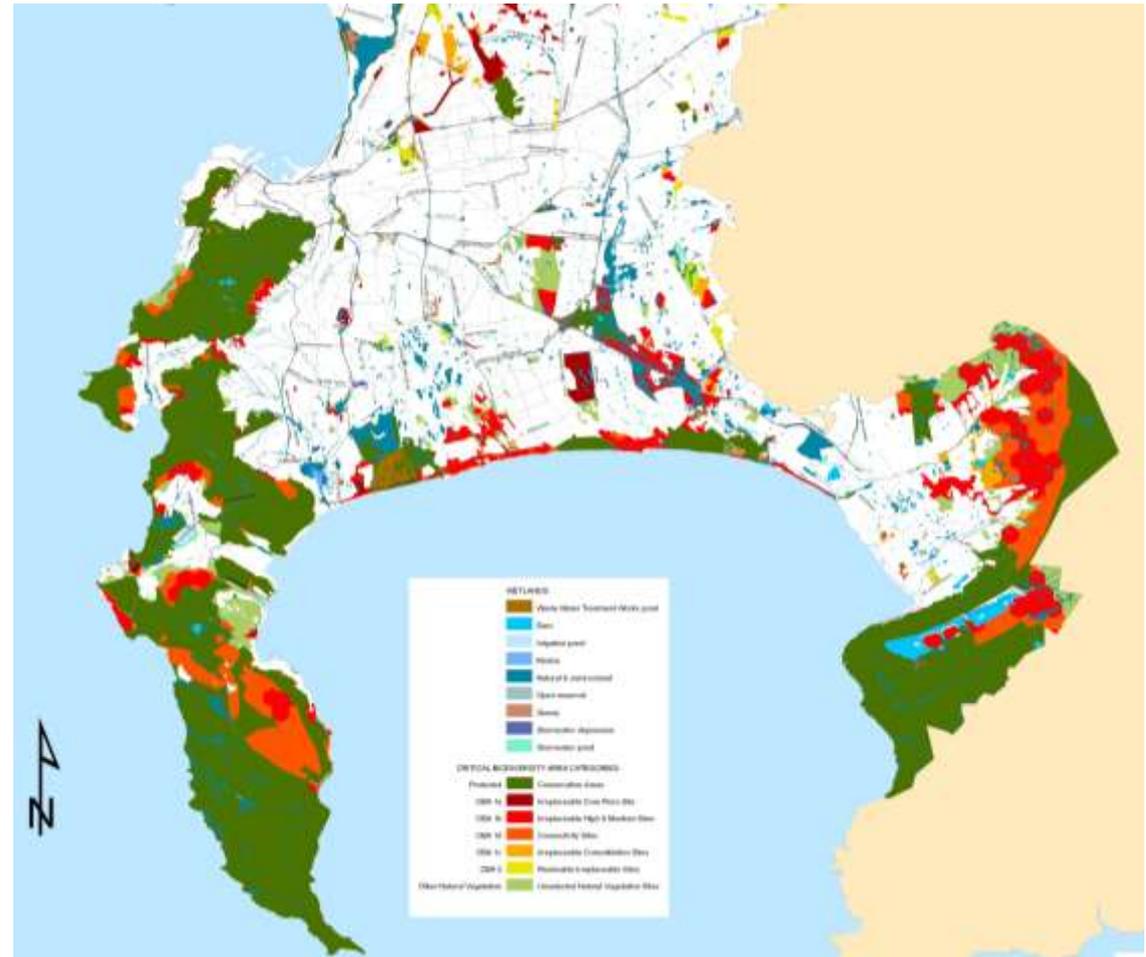
# Key principles in planning for coastal risk and vulnerability

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- Necessary to adopt a **systems orientated approach** to Coastal Spatial Planning initiatives
- **Plan for uncertainty**: where possible adopt interventions that enable **'option retention'** as opposed to **hard engineering structures** that have the potential to 'lock in' **undesirable and irreversible** scenarios
- **Trans-disciplinary approaches are critical** in respect of planning for coastal risk and vulnerability
- Process: legitimate **stakeholder engagement over meaningful periods of time**
- **Understanding and sensitivity of socio-political contexts**
- The principal of **restorative justice** is critical in developing and implementing Coastal Spatial Planning initiatives

# A systems and trans-disciplinary orientated approach to determining the City's Coastal Edge/draft CML

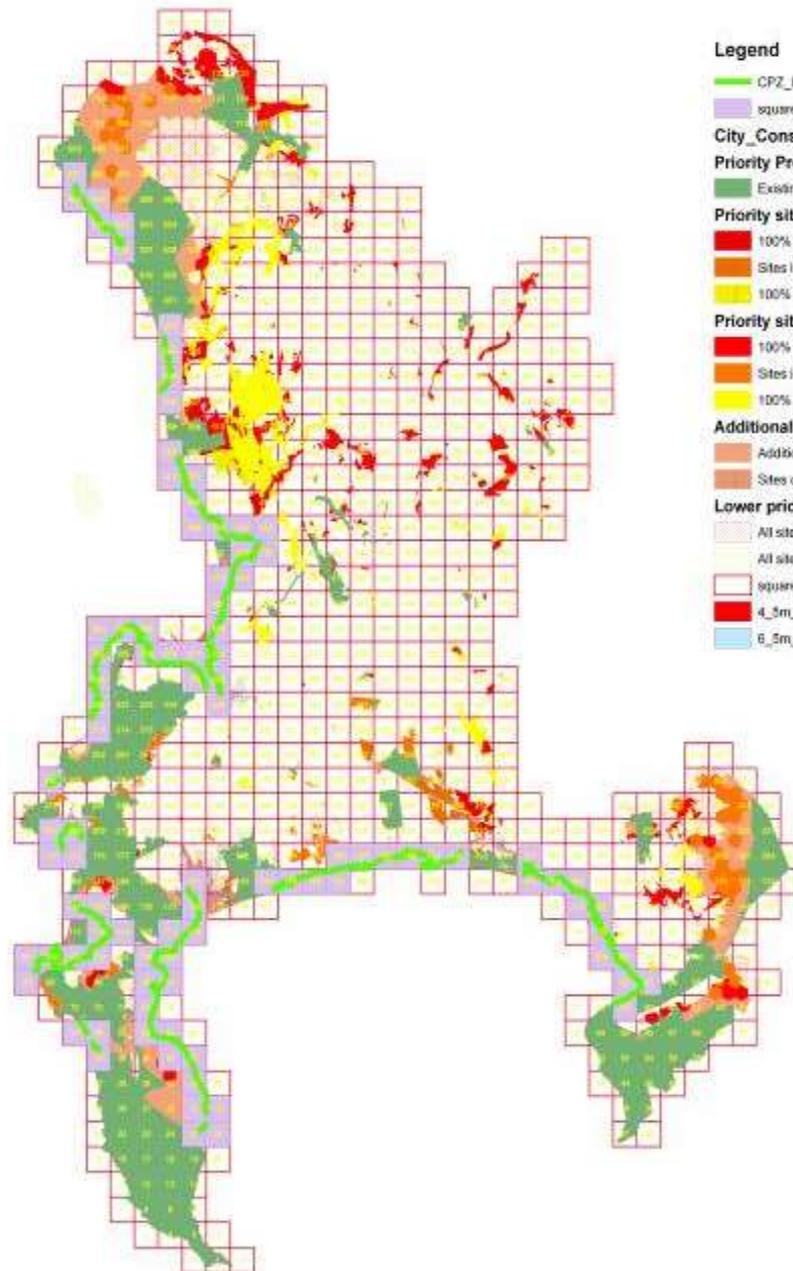
Inclusion of the City's biodiversity network and coastal 'green belts' within the CML





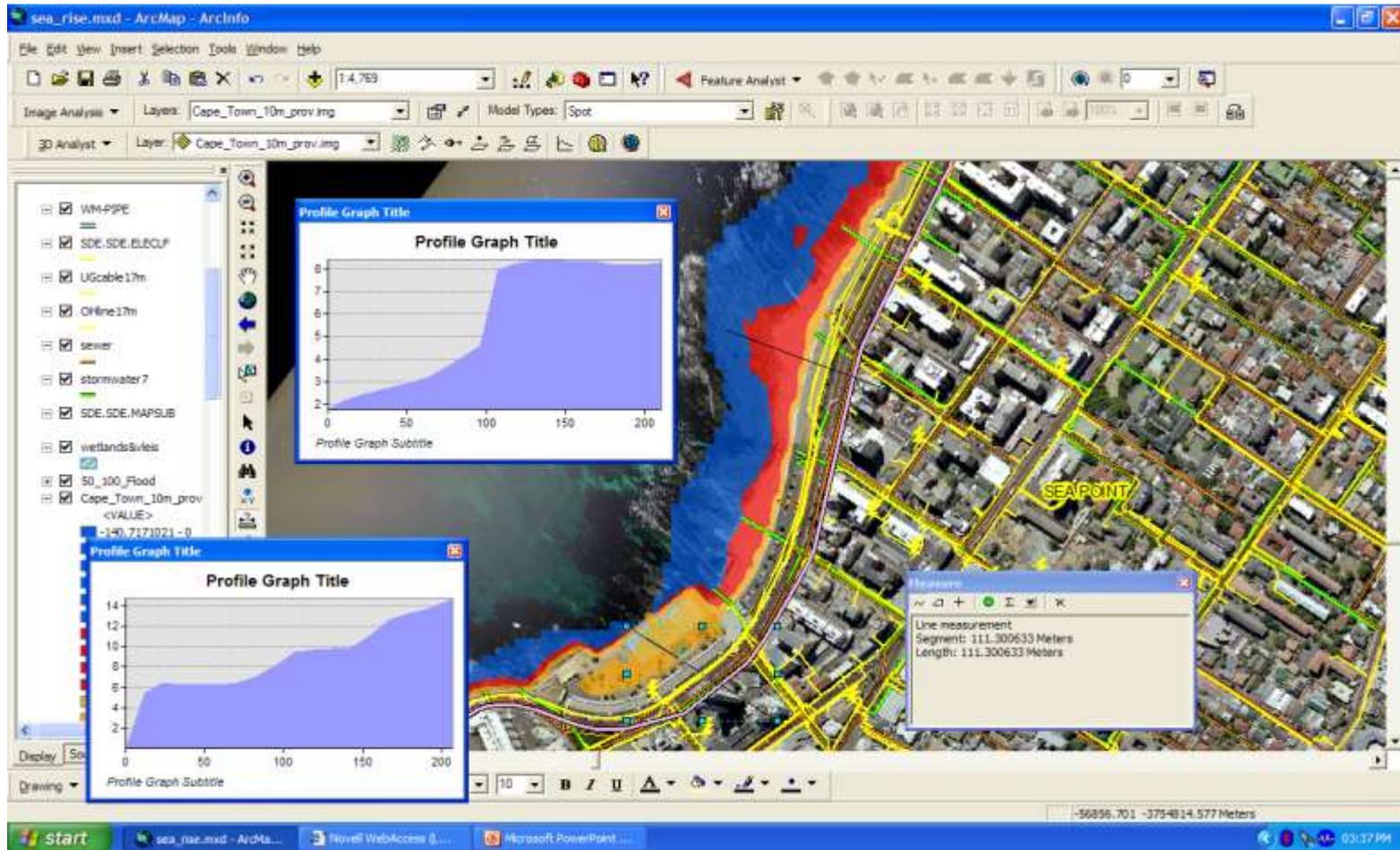
Coastal 'green belts' included within the Coastal Edge/CML

- Legend**
- CPZ\_Line\_2
  - Squares\_3\_selection
  - City\_Conservation\_Network\_Update**
  - Priority Protected Areas**
  - Existing Protected Areas & areas with conservation management
  - Priority sites within Corridors**
  - 100% Irreplaceable sites in pristine to good condition selected by C-plan
  - Sites in pristine to good condition selected by C-plan Minset algorithm
  - 100% Irreplaceable sites in restorable condition selected by C-plan
  - Priority sites outside Corridors**
  - 100% Irreplaceable sites in pristine to good condition selected by C-plan
  - Sites in pristine to good condition selected by C-plan Minset algorithm
  - 100% Irreplaceable sites in restorable condition selected by C-plan
  - Additional priority connectivity sites**
  - Additional sites of pristine, good or restorable condition selected by Maxson only
  - Sites occurring within the Corridors but not selected by C-plan, the Minset algorithm or Maxson
  - Lower priority sites with indigenous vegetation**
  - All sites in pristine to good condition not selected by C-plan, the Minset algorithm or Maxson
  - All sites in restorable condition not selected by C-plan, the Minset algorithm or Maxson
  - 2m\_Area
  - 4\_5m\_Area
  - 8\_5m\_Area



- Legend**
- CPZ\_Line\_2
  - squares\_3\_selection
  - City\_Conservation\_Network\_Update**
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  - All sites in restorable condition not selected by C-plan, the Minset algorithm or Marxan
  - squares\_3
  - 4\_5m\_Area
  - 6\_5m\_Area

# Storm surges and sea-level rise modelling



# Restorative justice





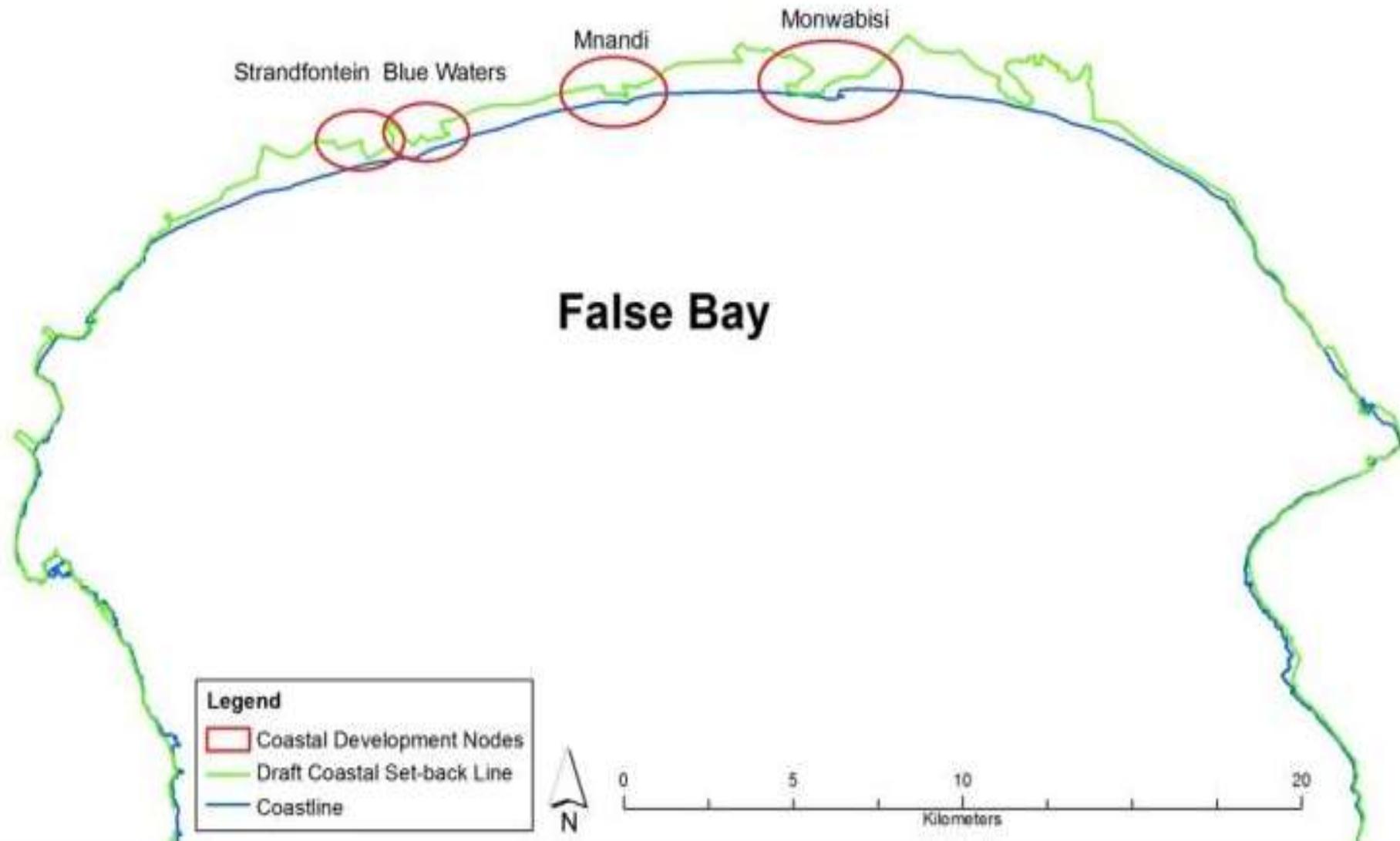


Nodal development

Legend

- Coastal\_Protection\_Zone
- Coastal\_Risk\_0\_2m
- Coastal\_Risk\_2\_to\_4\_5m
- Coastal\_Risk\_4\_5\_to\_6\_5m

# FALSE BAY NODAL GROWTH POINTS



# Coastal dynamic processes



# Dune systems



# Striving towards systematic and consistent decision making in respect planning decisions along the coast

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- **Coastal Edge embedded in the City's Spatial Development Framework (2012)**
- CT:MSDF approved in terms of the **Spatial Planning and Land Use Management Act**
- **Municipal Planning By-law** provides the **regulatory framework for the CTMSDF**
- CT:MSDF contains a number of **development directives** applied in land use and building plan applications as it relates **coastal development applications**
- **Development directives** contained in the CTMSDF focus on the following aspects
  - The need to build resilience
  - Promote risk averse decision making
  - Protect POS and CPP
  - Enhance the recreational and amenity value of the coast
  - Optimise socio-economic and environmental value of the coast
- **Provides a formal, structured and legal framework from which to achieve coastal planning principles for the City**
- Next step: **formalise the Coastal Edge** as the Coastal Management Line in terms of **Integrated Coastal Management Act**

# Best practice prescripts of planned retreat in response to coastal risk and vulnerability?

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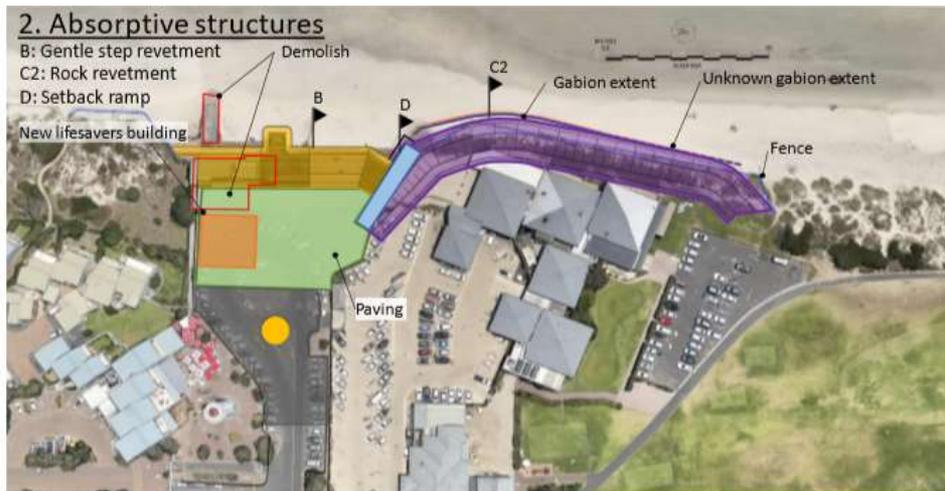
### 1. Hold the line

- A: Concrete step revetment
- C1: Sleeping seawall
- D: Setback ramp



### 2. Absorptive structures

- B: Gentle step revetment
- C2: Rock revetment
- D: Setback ramp



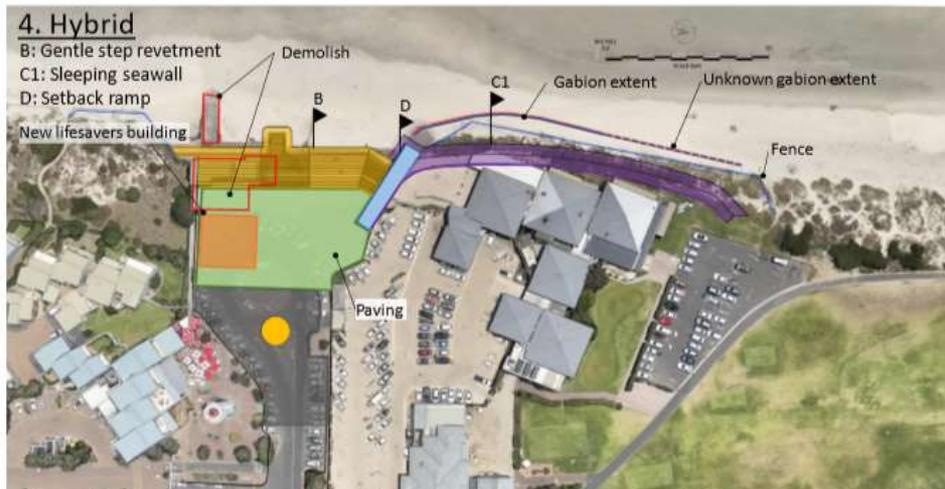
### 3. Full retreat

- C3: Rehabilitated dune



### 4. Hybrid

- B: Gentle step revetment
- C1: Sleeping seawall
- D: Setback ramp



# Innovative funding mechanisms required

- **Biggest single obstruction** to climate change adaptation: **budget constraints and/or absence of innovative finance mechanisms**
- Most sustainable risk averse option: planned retreat – **opportunity to engage with DEFF on Green Climate Fund and climate financing as a ‘pilot study’?**
- **Do nothing: lose lose scenario and transfer of risk to the general public**
- **Innovative funding mechanisms required** as without such funding, **‘do nothing’ approach will prevail**



The image is a screenshot of a news article from the Thomson Reuters Foundation. The header includes the logo and navigation links: Home, Women's Rights, Climate, Trafficking, Property Rights, Humanitarian, LGBT+, Food, Social Innovation, and More. The article title is "Insurance turns to coral reefs and mangroves as ocean risks surge". The author is Emma Farooq, and the date is Monday, 14 May 2018 14:25 GMT. The main image shows a close-up of a coral reef with various species of coral. On the left side of the article, there are social media sharing icons for Facebook, Twitter, LinkedIn, and Email. At the bottom of the screenshot, a Windows taskbar is visible with the time 21:14 and the date 22/05/2018.



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**Thank You**

[Darryl.Colenbrander@capetown.gov.za](mailto:Darryl.Colenbrander@capetown.gov.za)

**Making progress possible. Together.**