



Duiwenhoks Estuary – Overview

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CSIR

Touching lives through innovation

Talk Outline



1: Estuarine space



2: Biodiversity & Conservation Importance



3: Pressures



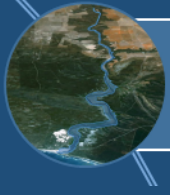
4: Estuary Health State & Ecosystem Function



5: Recommendations to improve/restore/protect



6: How do we increase protection measures??

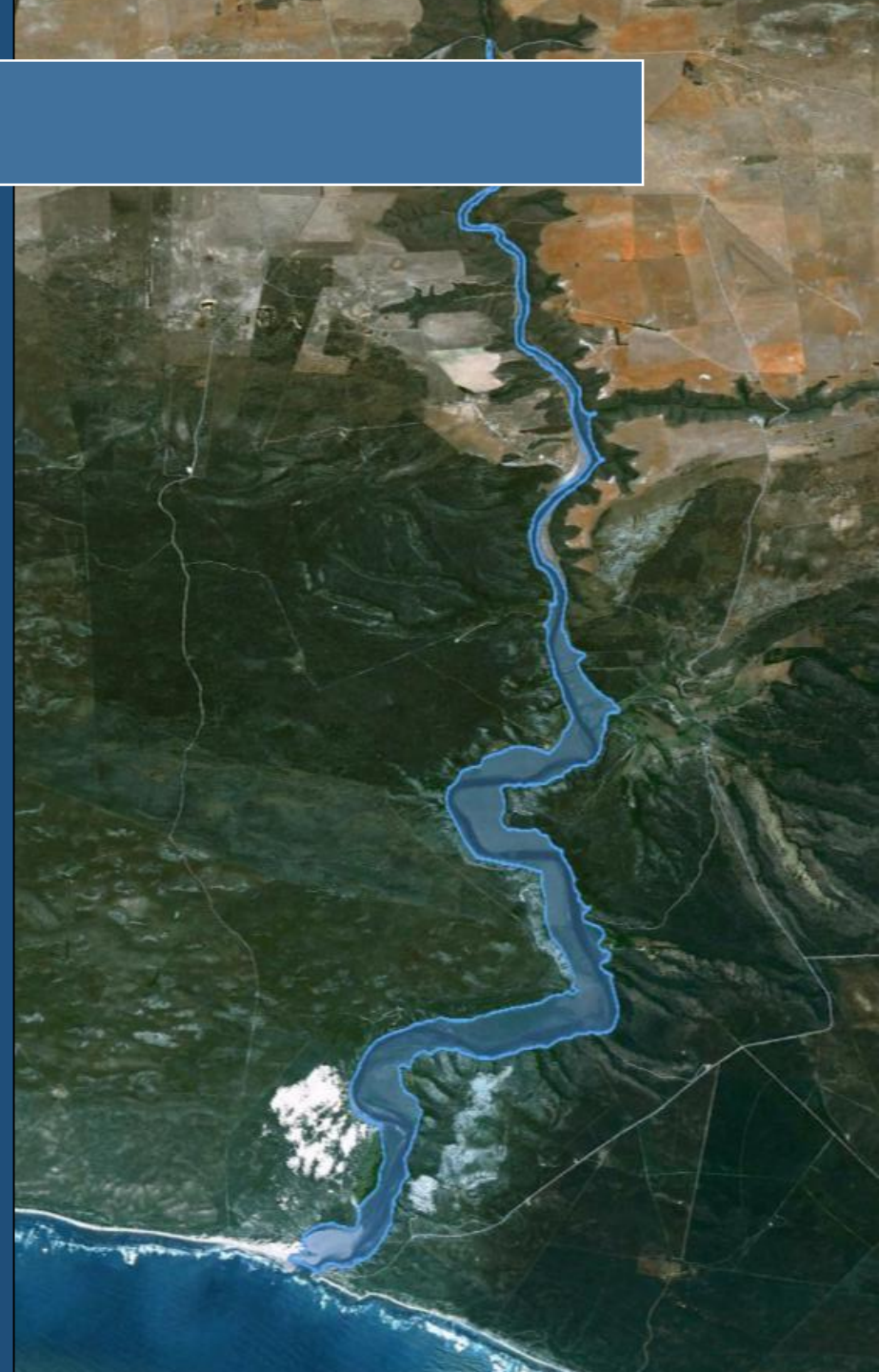


1: Estuarine space

- *Estuarine Functional Zone: capture* all physical & biological processes
- Key habitats, e.g. saltmarsh, submerge macrophytes, reeds and sedges
- Important physical habitats, e.g. water, mud banks
- Littoral active areas, e.g. steep dune face in lower reaches

Should also include..

- **Seeps/springs???**





2: Biodiversity & Conservation Importance

Estuarine Importance:

Highly Important = 84

Functional importance = high

- Important fish nursery (number of Red data and exploited fish species occurring in high numbers)
- Very important conduit for eels - CITES listed species

CRITERION	WEIGHT	SCORE
Estuary Size	15	100
Zonal Rarity Type	10	20
Habitat Diversity	25	90
Biodiversity Importance	25	77
<i>Functional Importance</i>	25	100
Estuary Importance Score		84



2: Biodiversity & Conservation Importance : Nursery Function

- **Classified as a highly important fish (biodiversity, estuarine and marine fishery)**
- **47 species of fish from 26 families**
- **NB iconic species - Steenbras & Kob nursery**

Nursery Biodiversity

- Low
- Low - Medium
- Medium
- Medium - High
- High

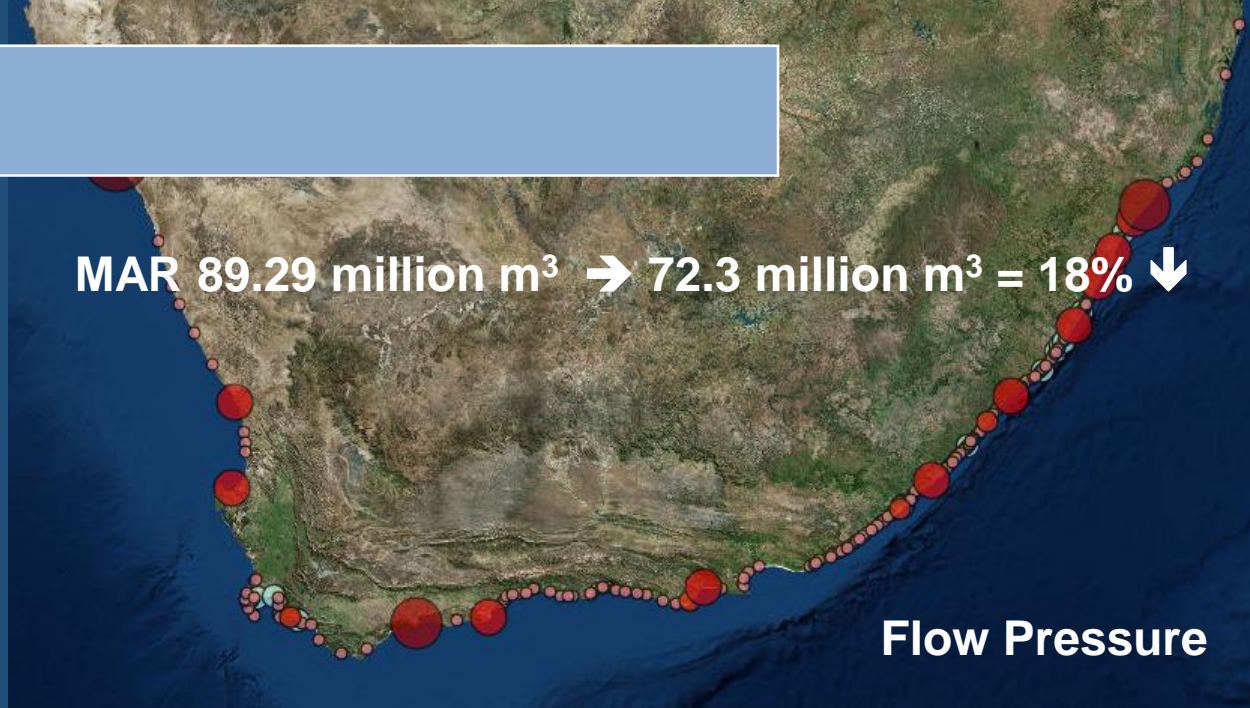




3: Key Pressures

PRESSURE DETAIL	PRESSURE LEVEL
Cumulative Pressure Level	M
Pressure: Flow modification	H
Pressure: Pollution	M
Pressure: Habitat loss	H
Pressure: Fishing Effort 2018 (DEFF)	H
Pressure: Invasive alien plants	M
Pressure: Alien Fish	H
Artificial Breaching	N/A
Pollution: WW volume (m3/day)	No
Pollution source: Catchment (diffuse)	Agric
Pollution Source: Riparian	Agric
Pollution: Plastic Stormwater	No
Pollution: Noise	M
DEFF Fishing Effort 2018	H
2018 DEFF Fishing Catches	20t
Bait collection	Yes
# alien or extralimital fish spec	6

MAR 89.29 million m³ → 72.3 million m³ = 18% ↓





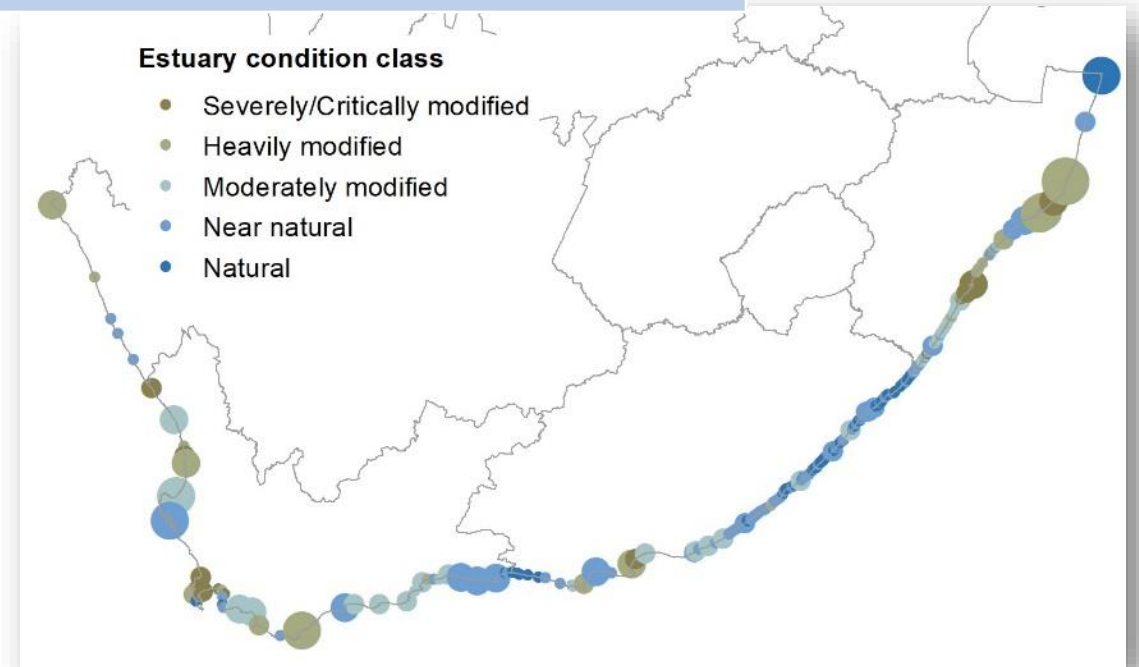
4: Estuary Health State

- SA: More than 60% of SA estuaries are relatively healthy, but only 24% of total estuarine area is healthy.

Duiwenhoks Estuary:

COMPONENT	RATING
NBA 2018 Condition Status	Moderate
Present Ecological State	<i>C</i>
Hydrology	<i>D</i>
Hydrodynamics	<i>A</i>
Water Quality	<i>C</i>
Physical habitat	<i>B</i>
Microalgae	<i>C</i>
Macrophytes	<i>D</i>
Invertebrates	<i>C</i>
Fish	<i>C</i>
Birds	<i>B</i>

- **Recommended Ecological Condition = B (Near Natural)**



Condition (% of pristine)	≥91%	90-75	75 - 61	60 - 41	40-21	≤20					
Continuum	A	A/B	B	B/C	C	C/D	D	D/E	E	E/F	F
Ecological Management Category (DWS)	A Natural	B Largely natural / few changes	C Moderately modified	D Largely modified	E Highly degraded	F Extremely degraded					
NBA Ecological modification	Natural/Near natural		Moderate	Heavily	Severe/Critical						
Functionality	Retain Process & Pattern (Representation)		Some loss of Process & Pattern	Significant loss of Process & Pattern	Little Process & Pattern						
Restoration cost	None/Low		Low/Medium	High	Very high, potentially irreversible structural changes						



4: Estuary Health State & Ecosystem Function

- IUCN Red listing of Ecosystems approach: Across all realms (land & sea) estuaries are the most threatened ecosystem types in SA
- 86% of estuary types are threatened
- 99% of total estuarine area is threatened

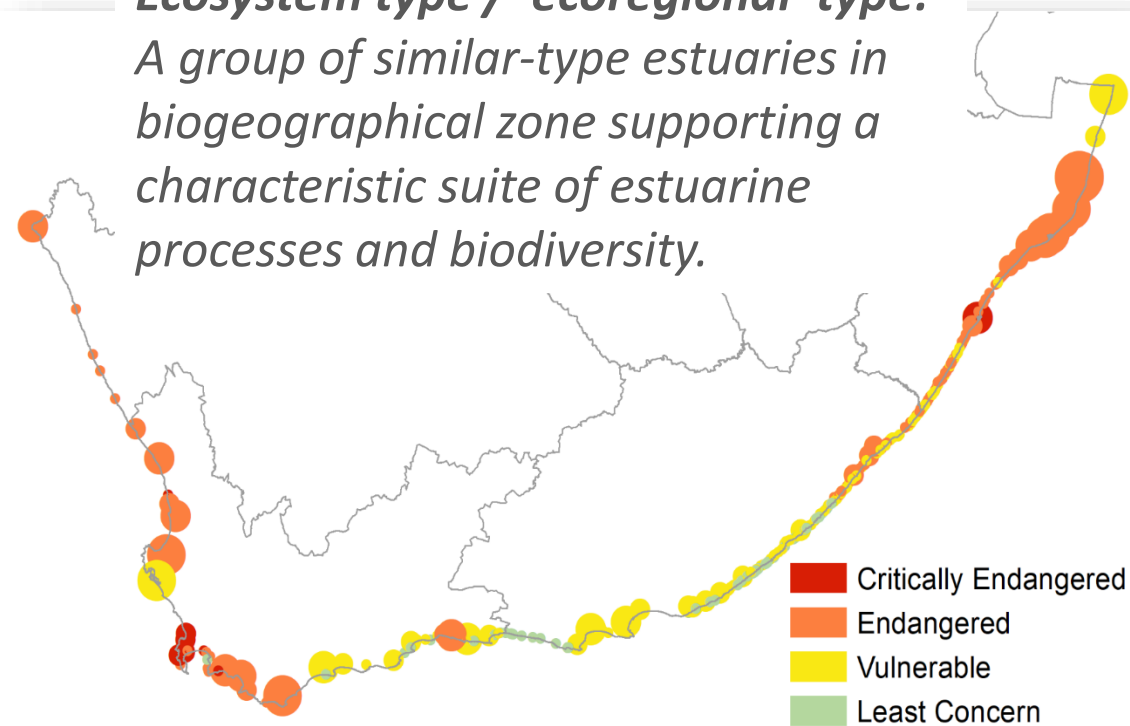
Duiwenhoks Estuary belongs to an ecosystem type that is:

NBA 2018: Ecosystem level indicators

Ecosystem Threat Status	<i>Vulnerable</i>
Ecosystem Protection Levels	<i>Poorly</i>

Ecosystem type / 'ecoregional' type:

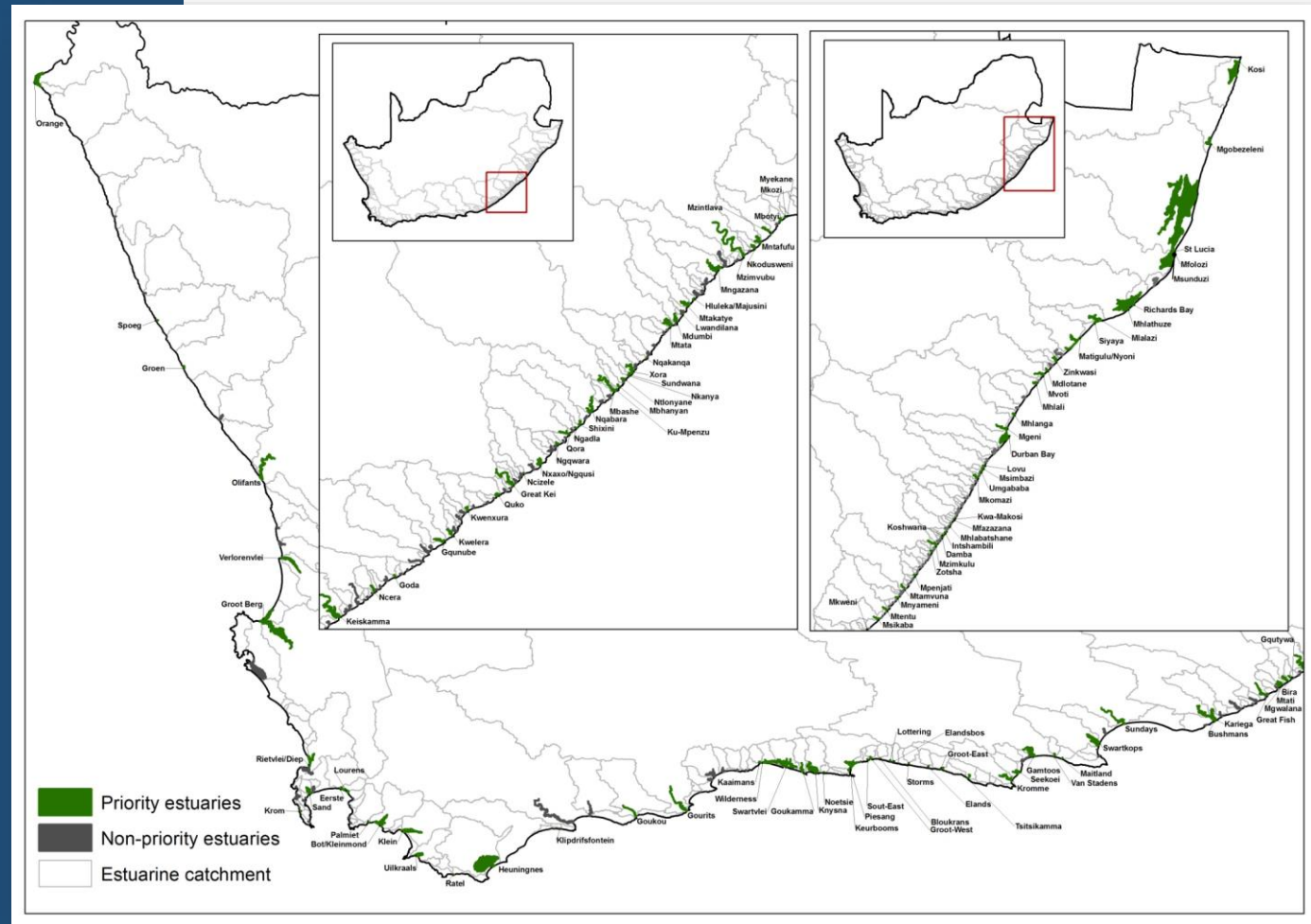
A group of similar-type estuaries in biogeographical zone supporting a characteristic suite of estuarine processes and biodiversity.





6: Conservation Targets & Ecosystems Protection Levels

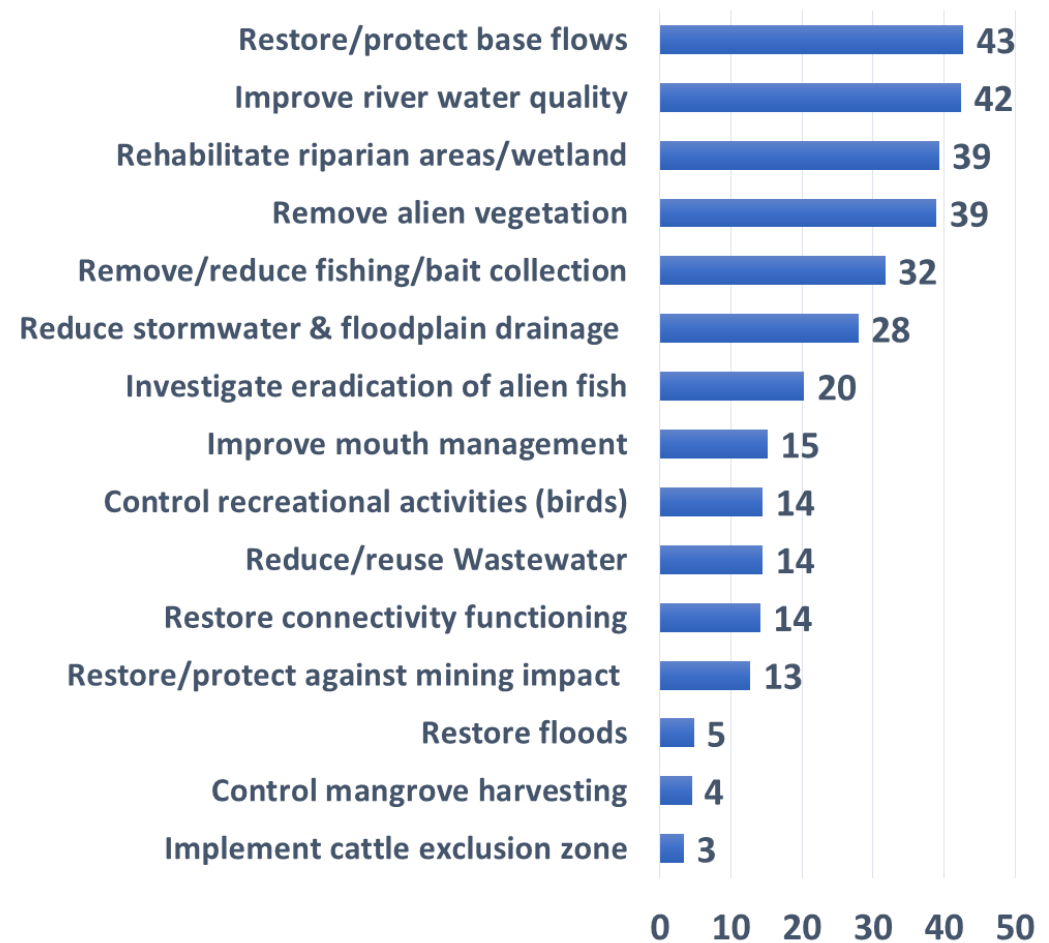
- 2011 National Estuarine Biodiversity Plan
- Not indicated as a conservation priority
- **However, the assessment did not consider that the Breede, Goukou, Duiwehhos and Gourits work as a cluster.**
- Significant linkages between De Hoop and these 4 system
- **Need to replan** – especially in the light of ongoing decline of Goukou, Gourits and Gouritz estuaries





5: Recommendations to improve/restore/protect

- Improve base flows to the system - restore Peatlands upstream of estuary - maintain REI zone (<10) for longer periods
- Manage/reduce drainage from floodplain & Improve river water quality
- Restore ~10% of degraded estuarine riparian zones & removal of alien vegetation
- Control/reduce fishing effort - improve compliance
- Alien fish control programme
- Control programme - reduce number of Egyptian geese in the surrounding habitat



‘UN Decade of Ecosystems Restoration 2021-2030’ makes restoration & protection of critical ecosystems an imperative at a global scale – Developing a National Plan (CSIR/NMU/DEFF)



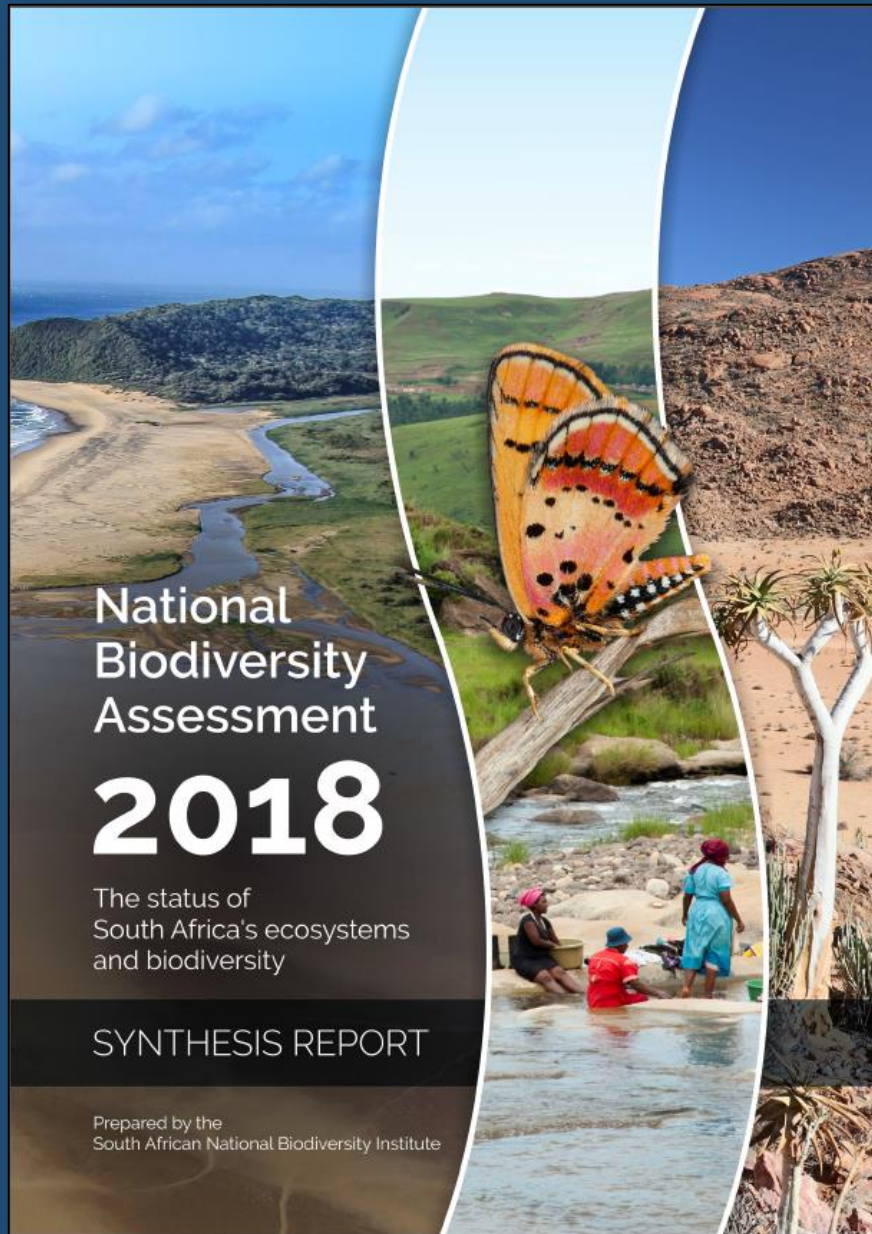
6: How do we increase protection measures??

Management of activities:

- Protect Estuary Functional Zone
- Estuary Manage Plans
- Eflow requirements (Reserve/Classification)
- Boating restrictions
- Compliance Management – fishing, discharges, agriculture
- Municipal Coastal Management Programmes & Integrated Development Plans

Basket of tools for increasing Estuarine Protection:

- Marine protected Areas/ Reserves (Protected Areas)
- **No-take zone/Closed seasons/ Night ban on fishing**
- **Stewardship programmes (CapeNature)**
- Ramsar sites
- Important Bird areas (IBAs)
- Ecological or Biologically Significant Marine Areas (EBSAs)
- Critical Biodiversity Areas/Ecological Support Areas



Van Niekerk, L., Adams, J.B., Lamberth, S.J., MacKay, F., Taljaard, S., Turpie, J.K., Weerts S. & Raimondo, D.C., 2019 (eds). South African National Biodiversity Assessment 2018: Technical Report. Volume 3: Estuarine Realm. CSIR report number CSIR/SPLA/EM/EXP/2019/0062/A. South African National Biodiversity Institute, Pretoria. Report: <http://hdl.handle.net/20.500.12143/6373>