Estuary training course for DWS Staff

Nov 2016 & Jan 2017

Introductory overview
Estuaries of South Africa and the Berg & Breede Gouritz WMAs

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1. Estuary definition
2. Numbers and sizes
3. Types
4. Biogeographical zones
5. Habitats & biota
6. Conservation value
7. Economic value
8. Threats and condition
9. Protection and management

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What is an estuary

- A partially enclosed, permanent water body, either continuously or periodically open to the sea, extending as far as the upper limit of tidal action or salinity penetration.
- During floods an estuary can become a river mouth with no seawater entering the formerly estuarine area, or, when there it little or no fluvial input, an estuary can become isolated from the sea by a sandbar and become a lagoon or lake which may become fresh or hypersaline.

NBA 2011

Sundays

Knysna

Mbashe

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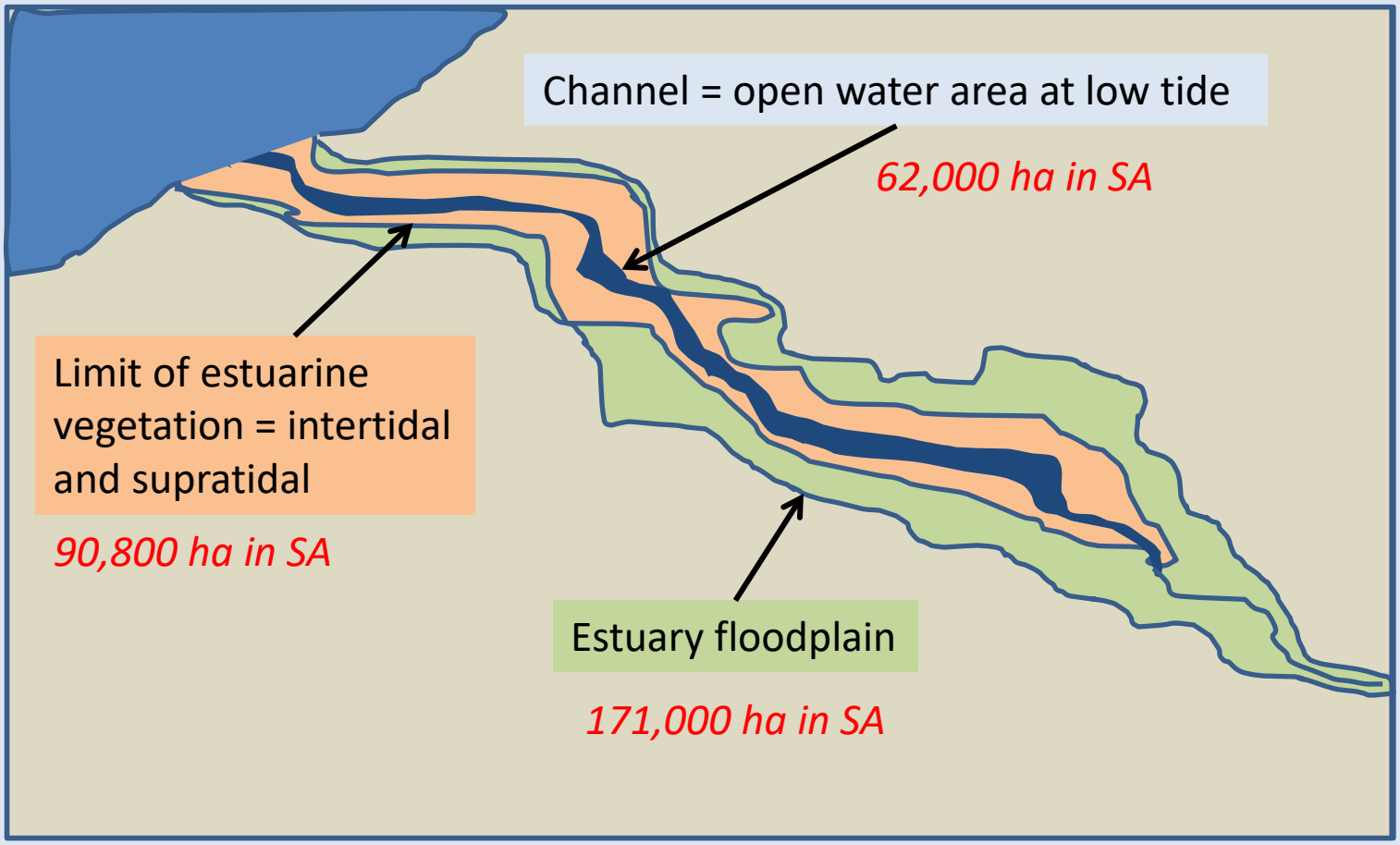
Estuary area

- Typically = limit of estuarine vegetation
- "Estuary functional zone" includes floodplain



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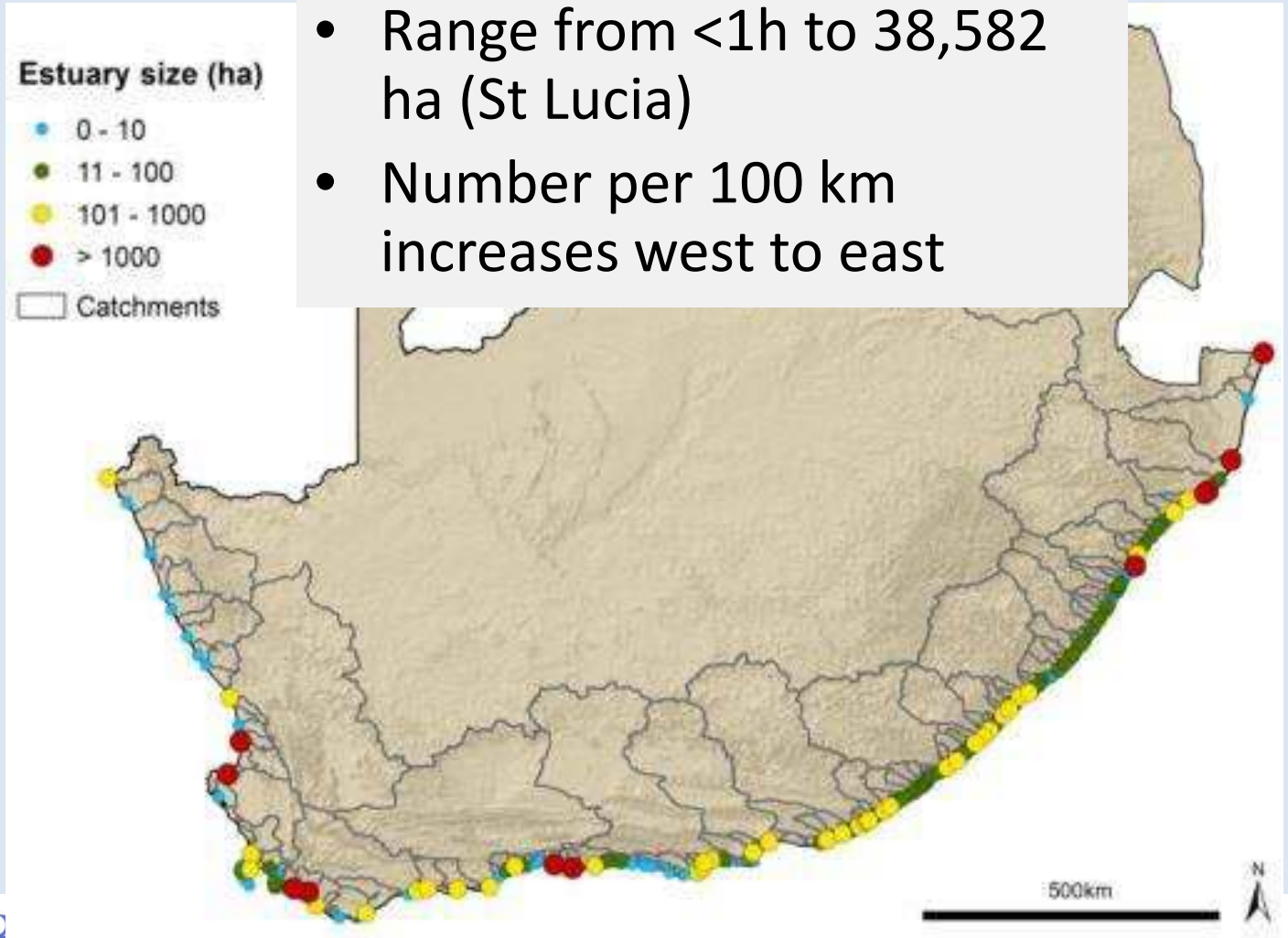
Numbers and sizes

- 291 estuaries in SA
- Range from <1h to 38,582 ha (St Lucia)
- Number per 100 km increases west to east



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Numbers and sizes

- Total Area of SA's estuaries = 90,845 ha
- With exception of a few large estuaries in KZN, a large proportion of SAs large estuaries fall in the Berg and Breede-Gouritz WMAs

	Number of estuaries	Area of estuaries (ha)	% of SA estuarine area	% of SA estuarine area excluding St Lucia
Berg WMA	17 (8)	9382	10.3%	21%
Breede-Gouritz WMA	38 (30)	7725	8.5%	18%

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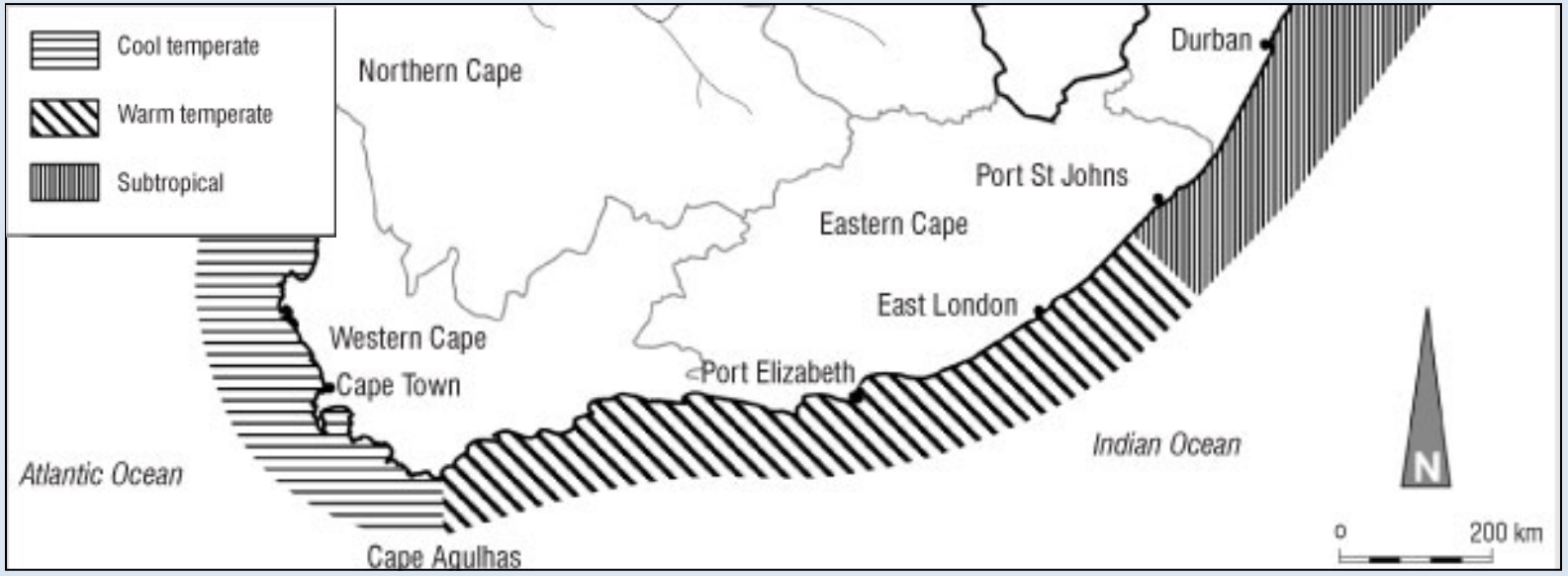
Biogeographic zones

- 3 zones in SA
- All Berg WMA estuaries are in the Cool Temperate Biogeographical Region;
- Most Breede-Gouritz estuaries are in the Warm Temperate Biogeographical Region



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Types

- Whitefield (1992) previously described 5 types of estuaries (estuarine bay, permanently open, river mouth, estuarine lake and temporarily open/closed)
- NBA (2012) divided estuaries into types based on biogeographical region, size, mouth state, salinity, catchment

			Cool Temperate			Warm Temperate			Subtropical		
			Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Open	Clear	Fresh									
		Mixed			x		x	x			x
		Marine						x		x	x
	Turbid	Fresh									
		Mixed					x	x		x	x
		Marine									x
	Black	Fresh	x			x					
		Mixed	x			x	x	x			
		Marine						x			
Closed	Clear	Fresh									
		Mixed		x	x	x	x	x	x	x	x
		Marine						x			
	Turbid	Fresh			x					x	x
		Mixed		x						x	x
		Marine									
	Black	Fresh	x	x		x			x		
		Mixed	x	x	x	x	x	x	x	x	
		Marine									

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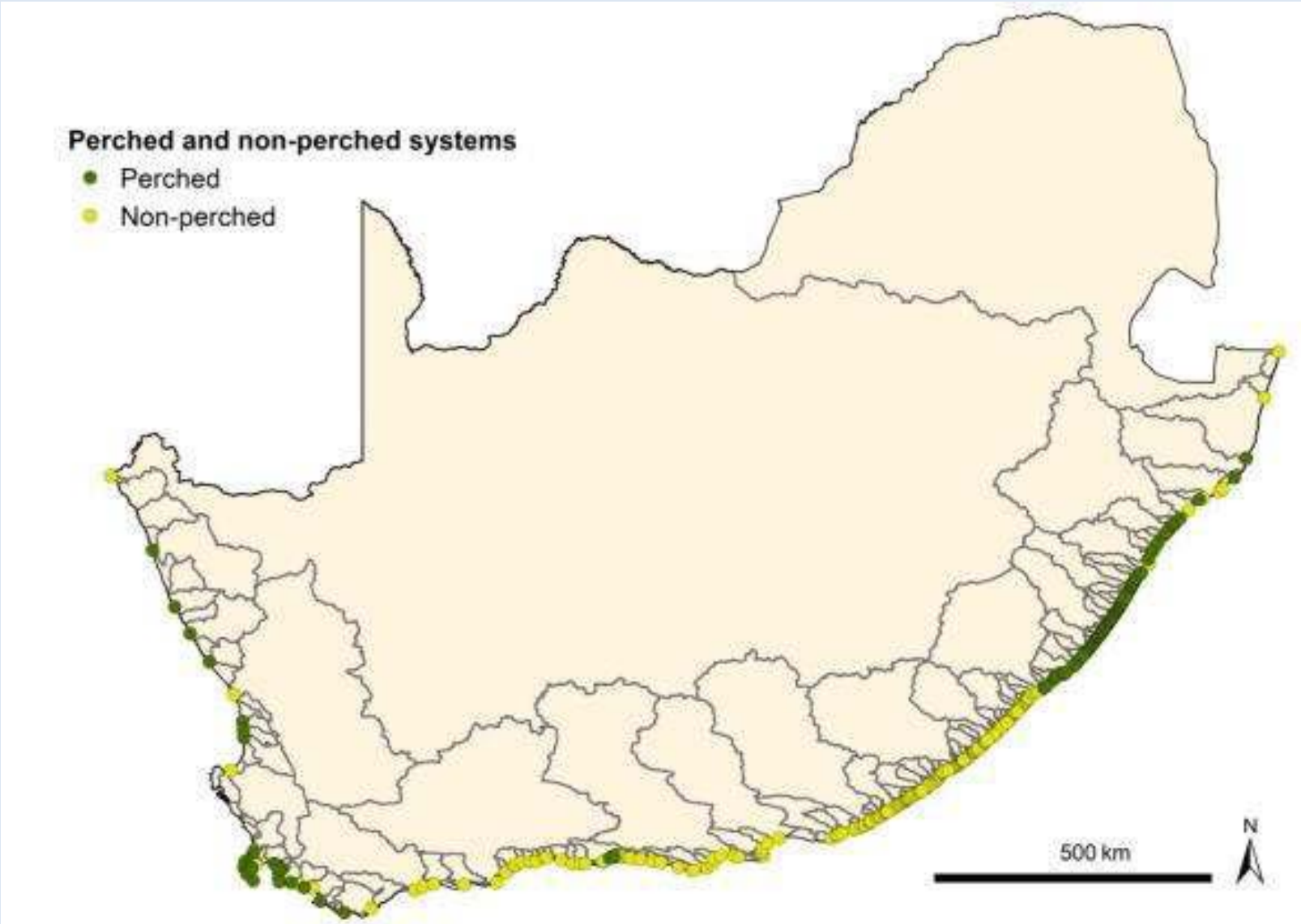

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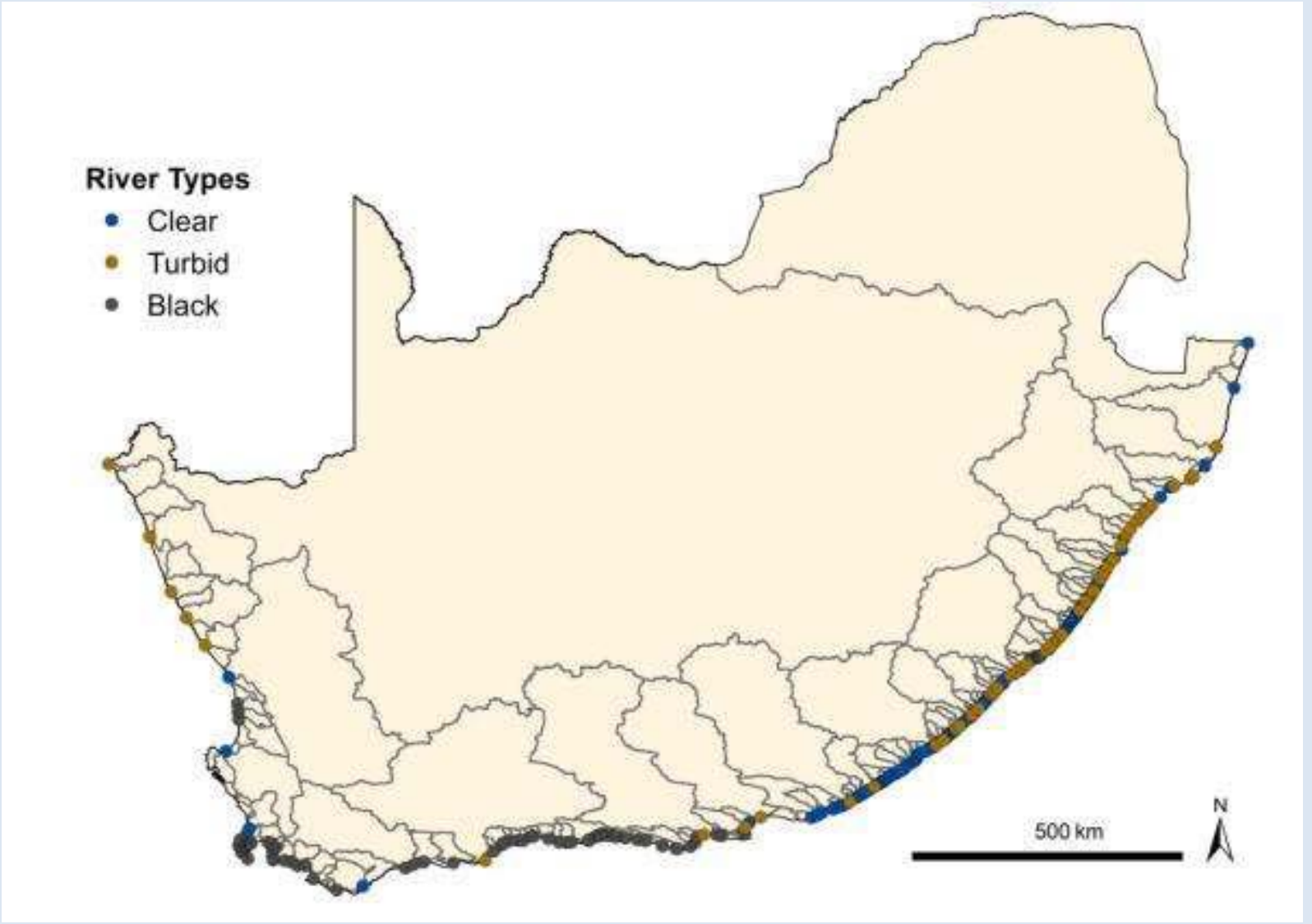

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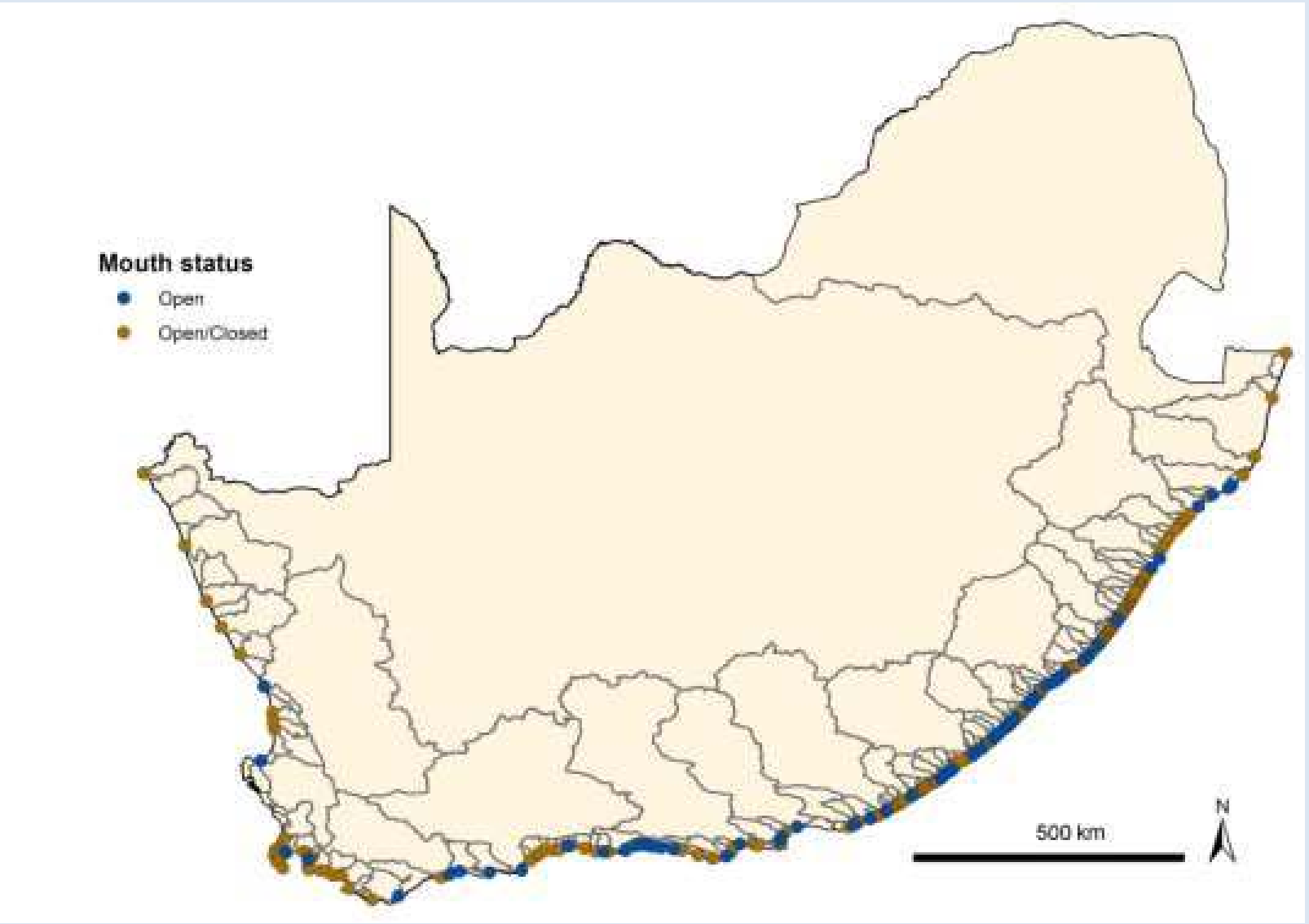

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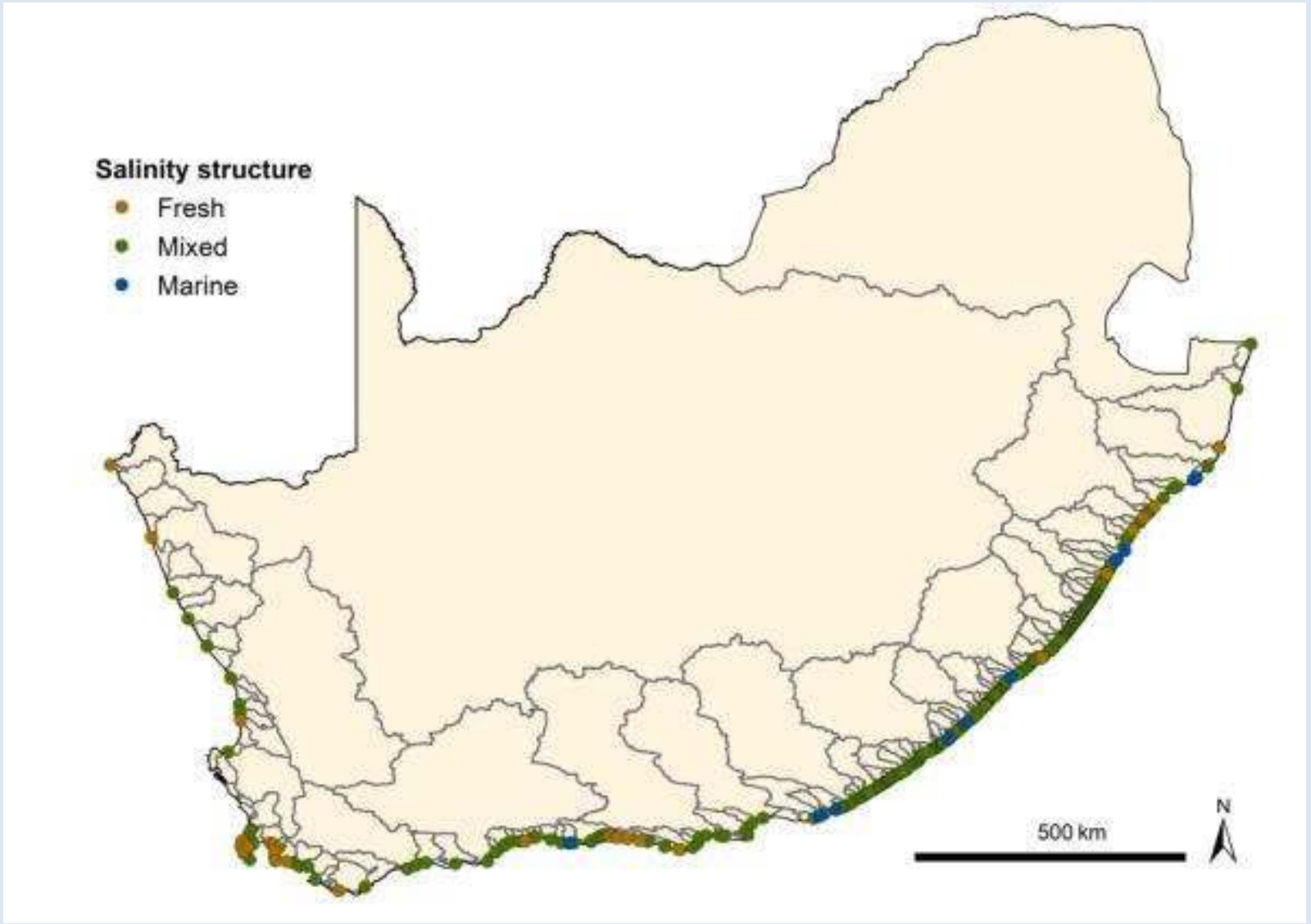

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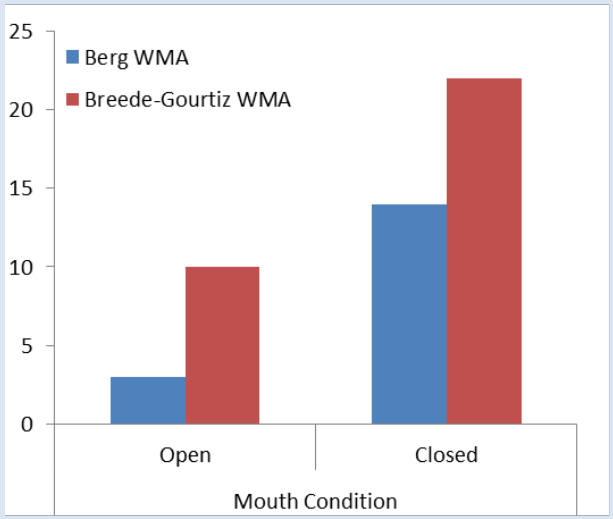
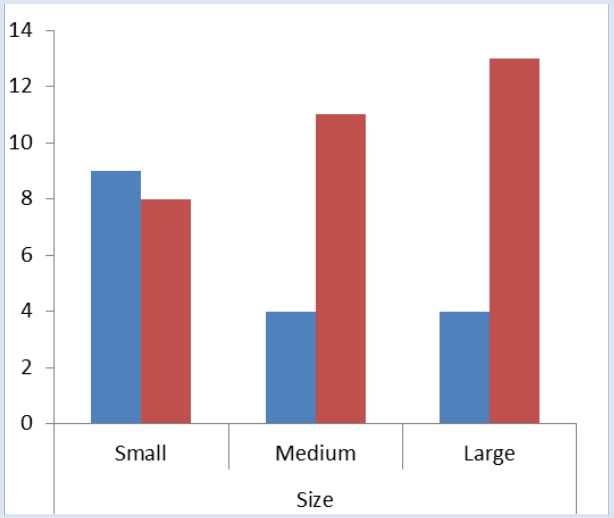
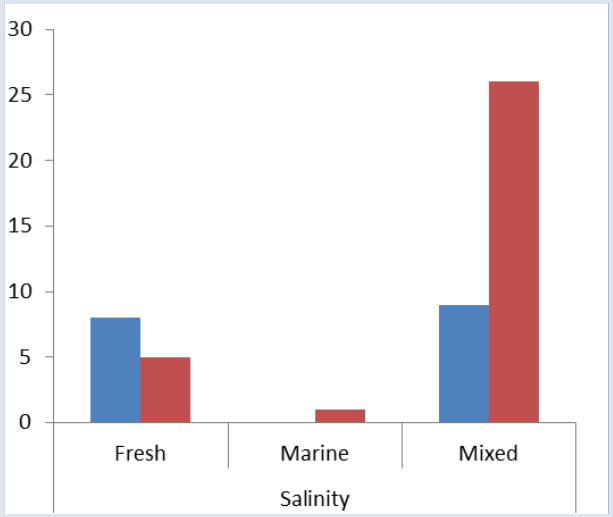
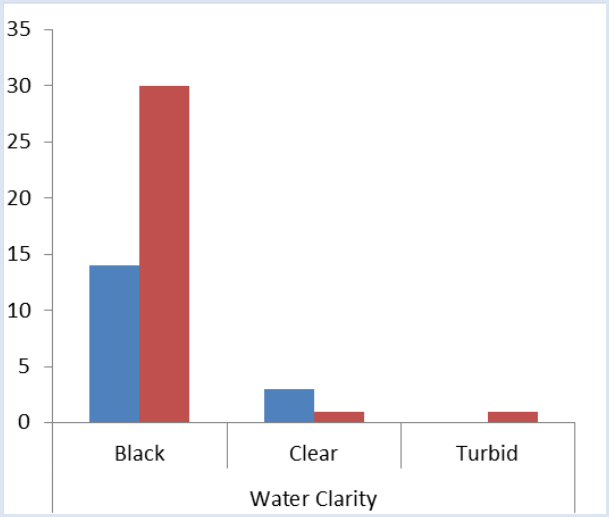
Types in study areas









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Habitats

- Estuarine habitats include supra- and inter-tidal saltmarsh, reeds & sedges, swamp forest, mangroves, sand & mud banks, submerged macrophytes, open channel and rocks.
- More than half of South Africa's estuarine salt marsh (50% supratidal and 62% intertidal) and submerged macrophyte habitats (64%) exist within these two WMAs.

salt marsh habitats

Conservation importance

- Estuaries characterised by generalist, euryhaline species, but there are some specialists, e.g. Knysna sand goby and Knysna seahorse which only exist in estuarine habitats.
- Important corridor between marine and freshwater systems for species (e.g. eels) which utilise these different habitats at different stages of their life-cycle.
- Provide critical habitat that is sheltered from turbulent wave action and cold water.
- Can support a large proportion of their populations, and can be important for maintaining regional populations.

Economic value

- Estuaries play a critical role in maintaining line fish stocks through their nursery function.
- Approximately 60% of the value of South Africa's commercial line fisheries come from the coastline along the Berg WMA and 20% from Breede-Gouritz WMA

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Economic value

- Estuaries are of particularly high recreational value for example Knysna (estuary angling and water activities) and Langebaan lagoon (kitesurfing and nature-based tourism).
- Estuary-angling (updated from Clark & Turpie 2007)
  - Berg WMA > R20 million/year
  - Breede-Gouritz WMA >R380 million/year
- Nature-based tourism value (updated from Clark & Turpie 2007)
  - Berg WMA estuaries > R18 million/year
  - Breede-Gouritz estuaries > R3 billion/year

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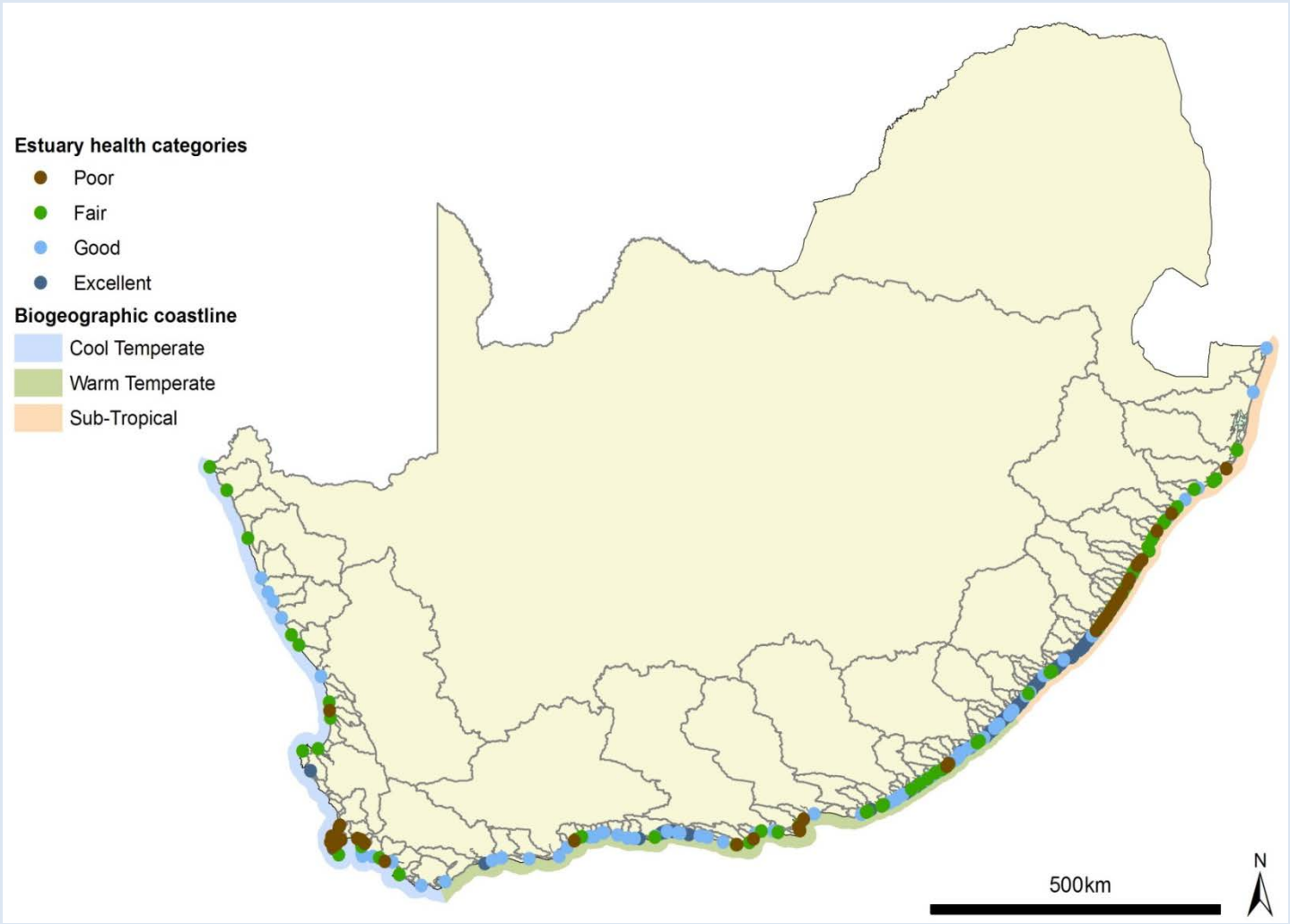
Threats to estuaries

- Freshwater flows
  - inflow to the 20 largest catchments in South Africa reduced by nearly 40% from natural
  - Freshwater flows vital not only to estuarine health, but also to productivity of nearshore coastal environment.
- Fishing
- Pollution
- Coastal development
- Alien species

Zeekoevlei

Estuary health



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Estuary health

- Only 1% of the total estuarine area in SA is considered in excellent condition, 14% is in good condition, 31% fair and 54% poor.
- Berg WMA - most estuarine area is in fair condition and
- Breede-Gouritz - mainly in good/fair condition.

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Ecosystem Health Index

- The average Ecosystem Health Index (EHI) score for the estuaries weighted by size across South Africa is 54% (D category).
- The average EHI score weighted by estuary size in 2012 for the Berg WMA is 57% and the Breede-Gouritz is 72%

Condition	≥91%	90-75	75 - 61	60 - 41	40-21	≤20
Category	A Natural	B Largely natural with few changes	C Moderately modified	D Largely modified	E Highly degraded	F Extremely degraded
State	Excellent	Good	Fair		Poor	
Functionality	Retain Process & Pattern (representation)		Loss of Process or Pattern		No Process & Pattern	

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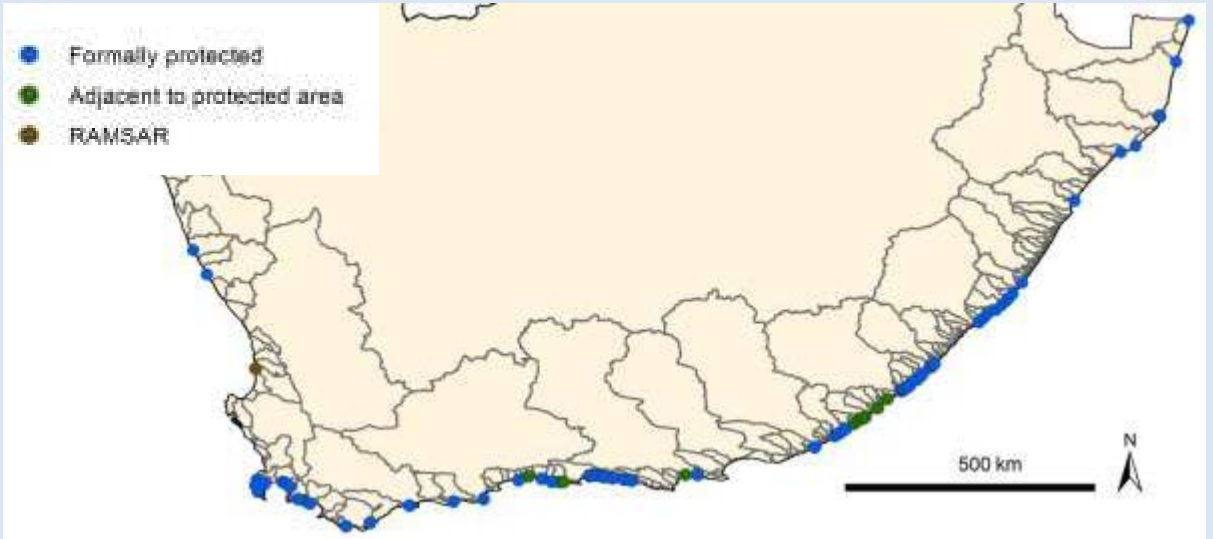
Protection and management

- 71 estuaries in SA have some form of protection status
- Within the Berg WMA 3 estuaries are protected (2 SANParks + 1 municipal)
- Within the Breede-Gouritz WMA 11 estuaries are protected (7 SANParks + 4 CapeNature)



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