Advancing Experimental Ecosystem Accounting in South Africa

Regional Training Workshop

Santiago, 13-16 April 2015

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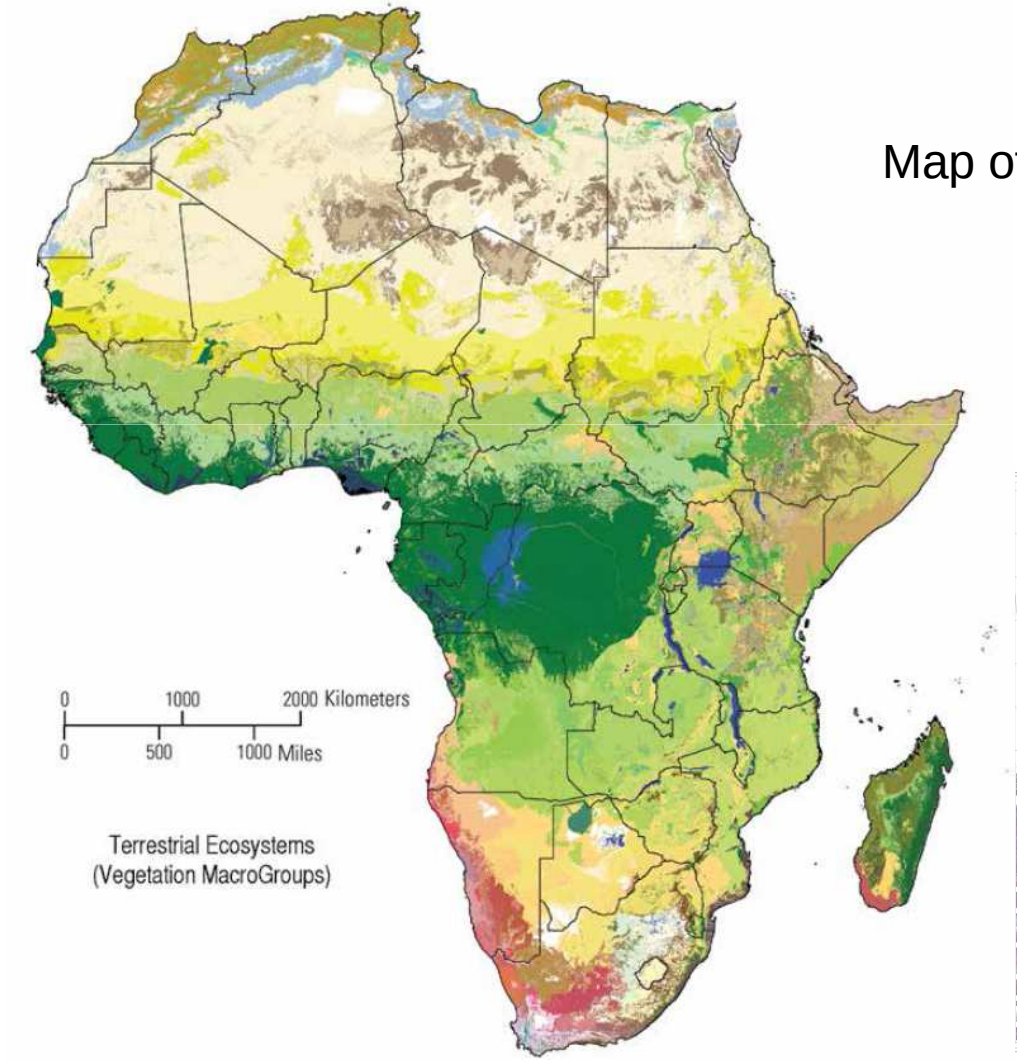
Outline

1. Ecosystem type classifications
2. Ecosystem condition
3. River condition accounts
4. Land accounts

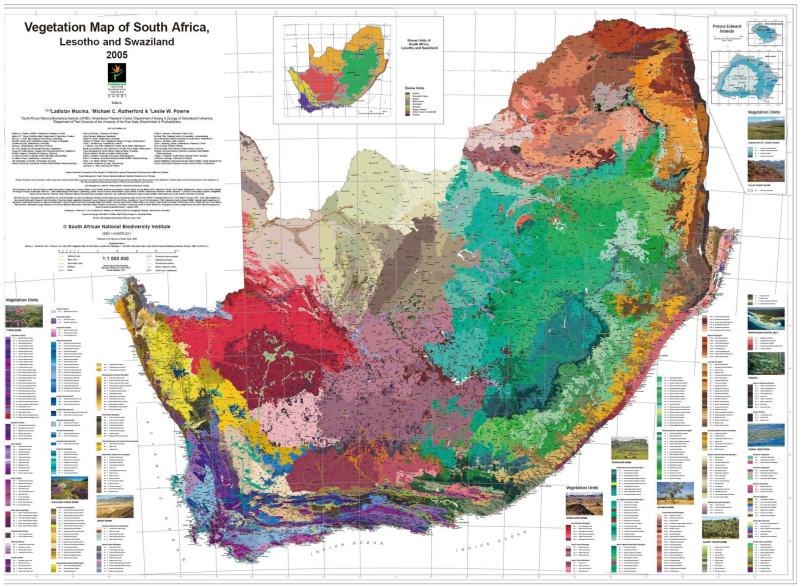
Ecosystem Type Classification in South Africa

- Ecosystem asset classes
  - Terrestrial
  - Marine and Coastal
  - Wetlands
  - Rivers

Ecosystem types can be mapped at different scales



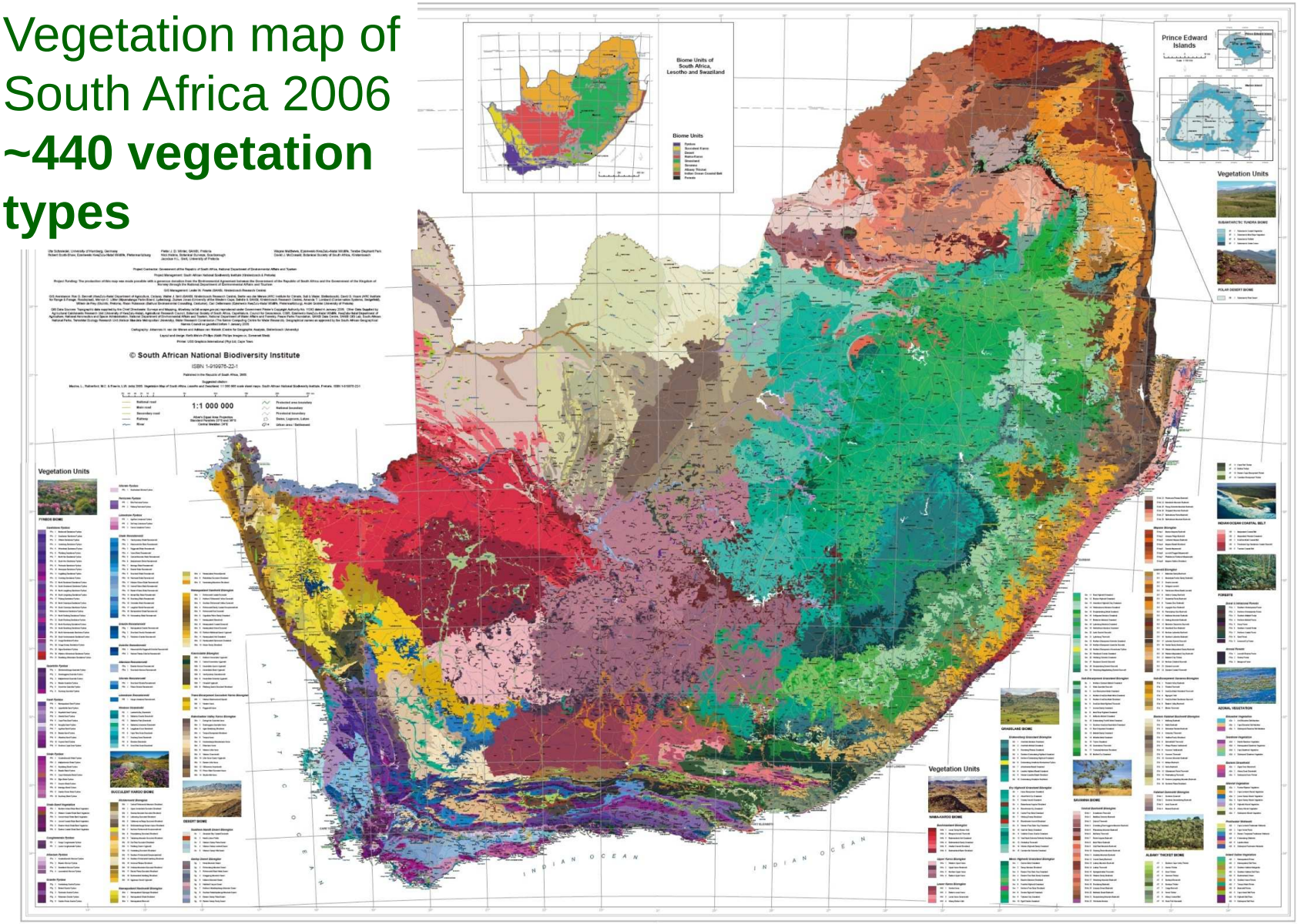
Map of terrestrial ecosystems for Africa



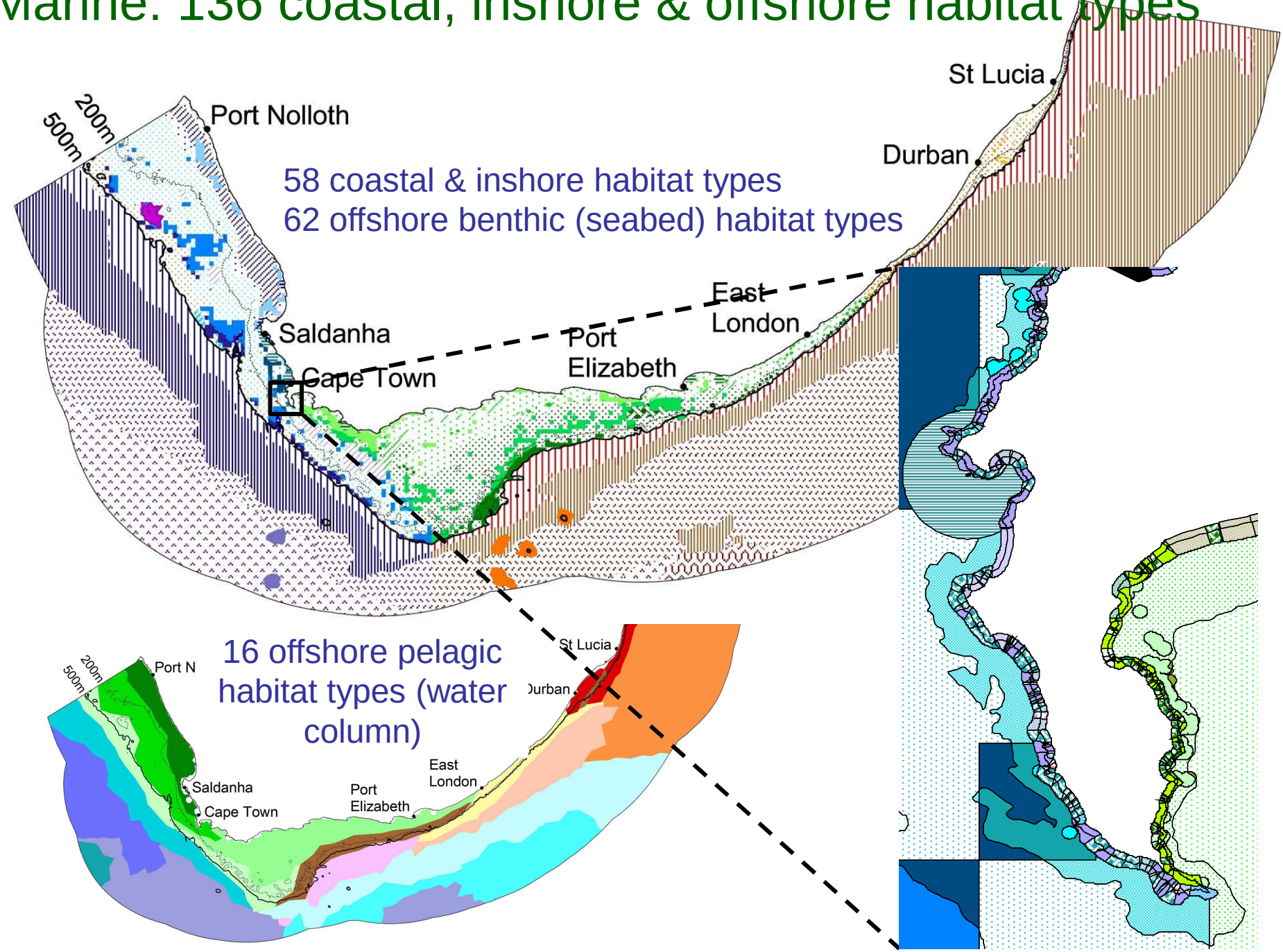
Terrestrial Ecosystem Types

Vegetation map of South Africa 2006

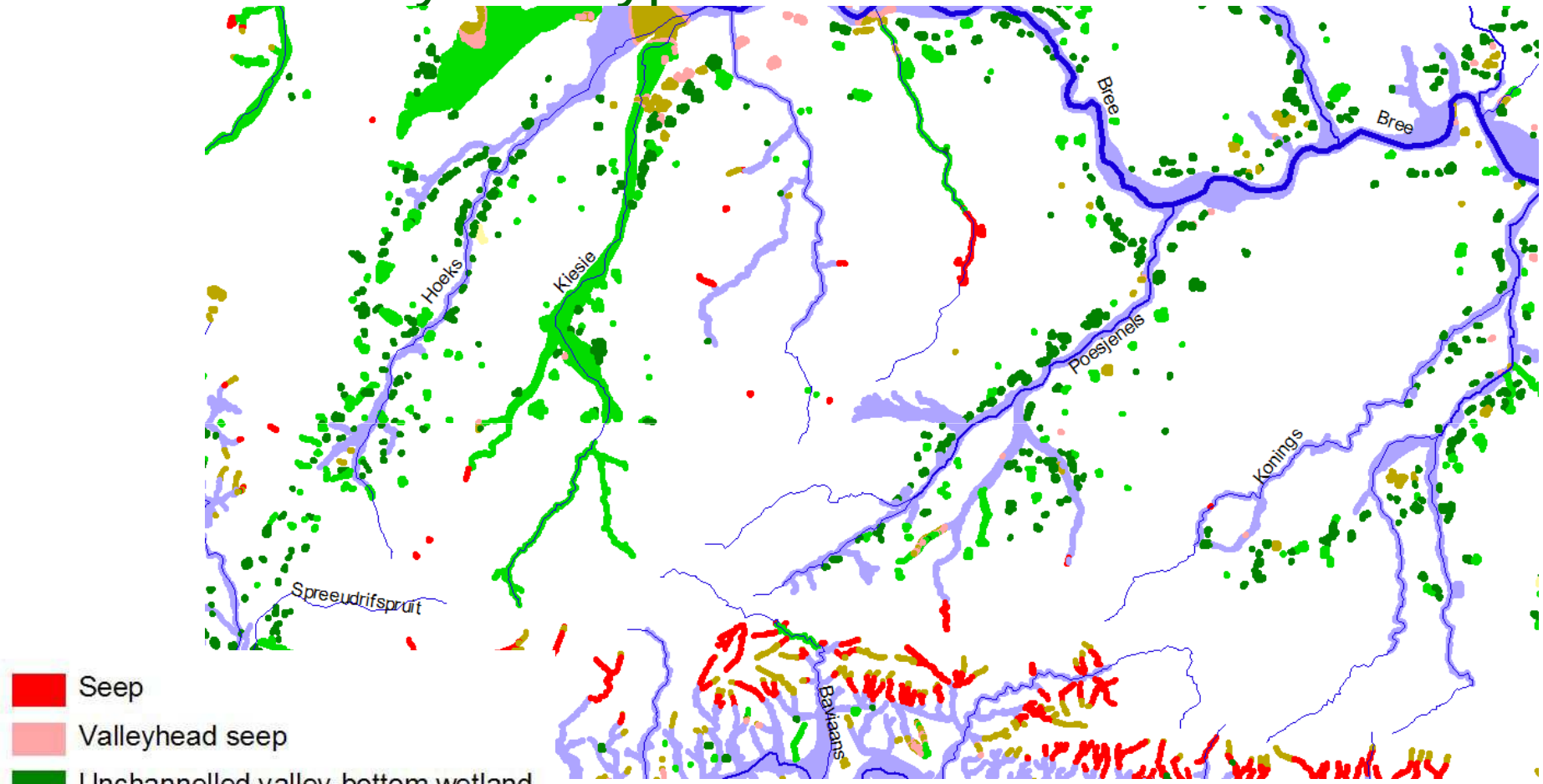
~440 vegetation types



Marine: 136 coastal, inshore & offshore habitat types

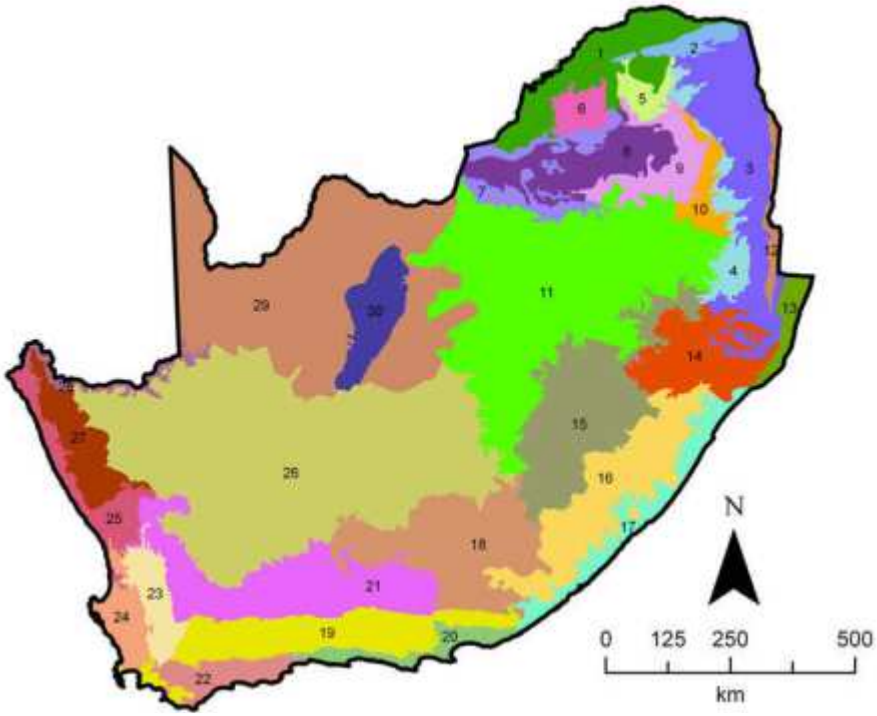


Approx 300 000 wetlands, grouped into 792 wetland ecosystem types



Based on:

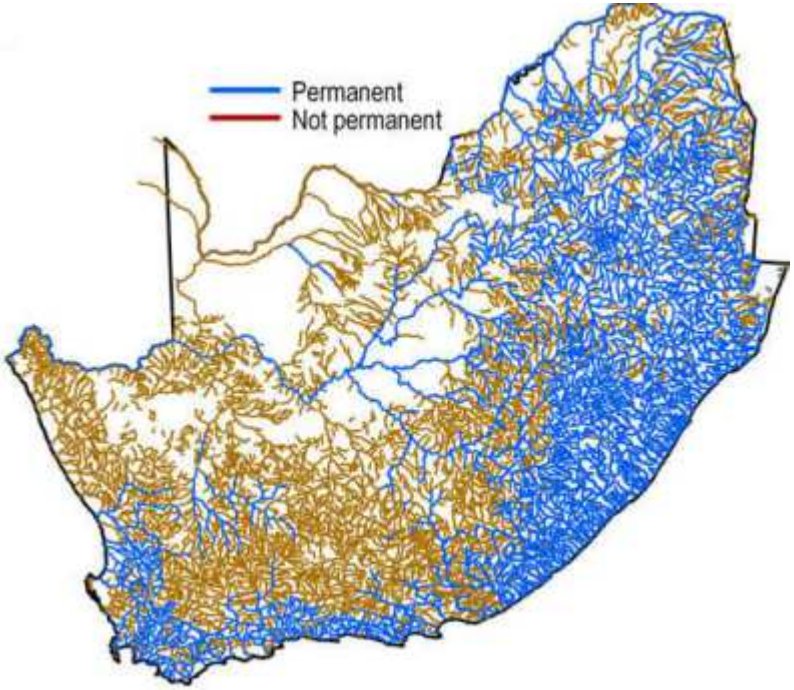
- 7 hydro-geomorphic classes (landscape setting)
- 133 wetland veg groups

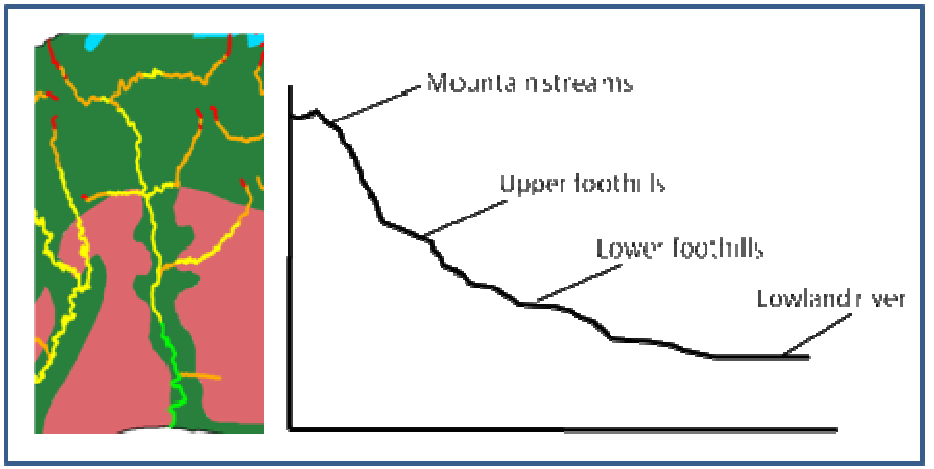


223 river ecosystem types

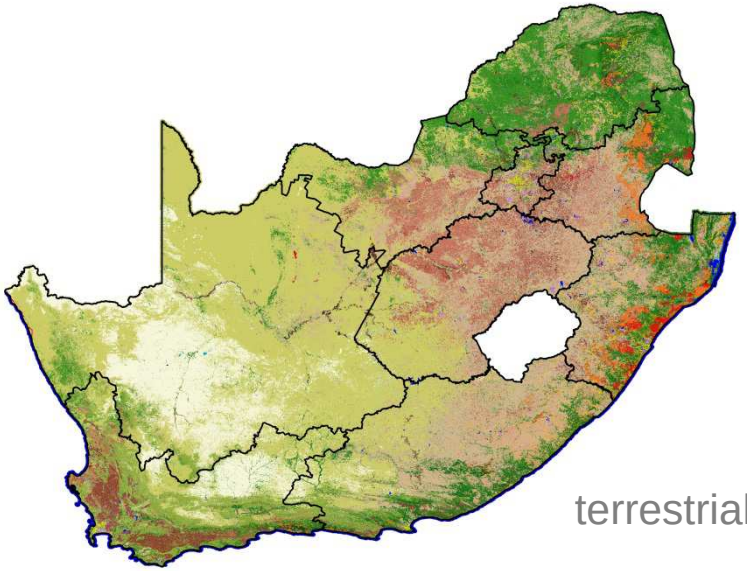
Based on:

- 31 freshwater ecoregions
- 2 flow regime categories
- 4 longitudinal zones

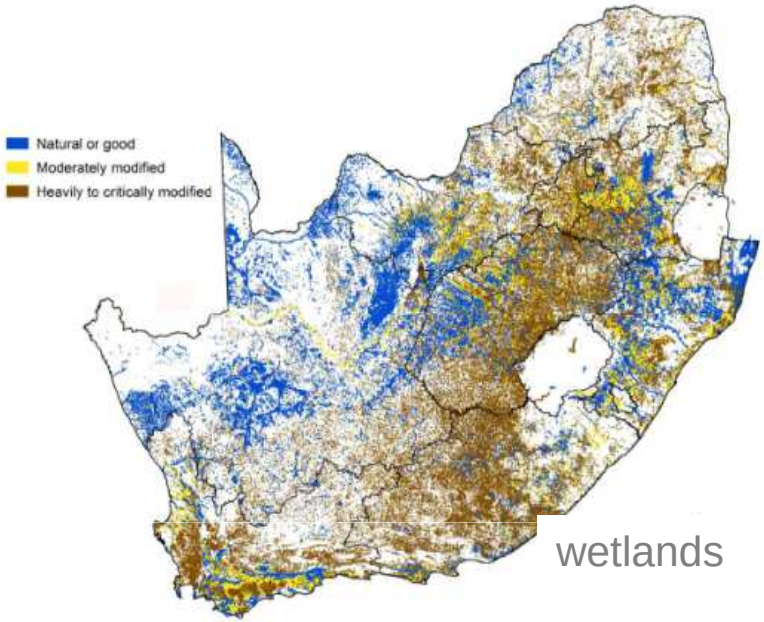




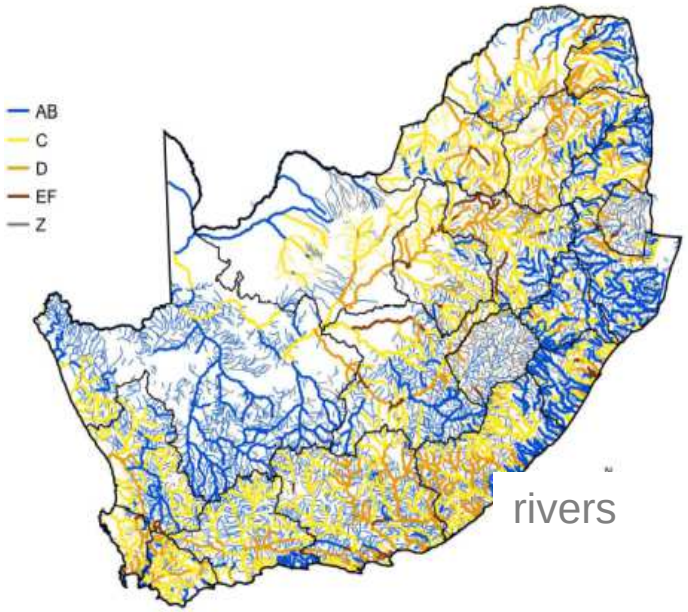
Maps of Ecological Condition



terrestrial



wetlands

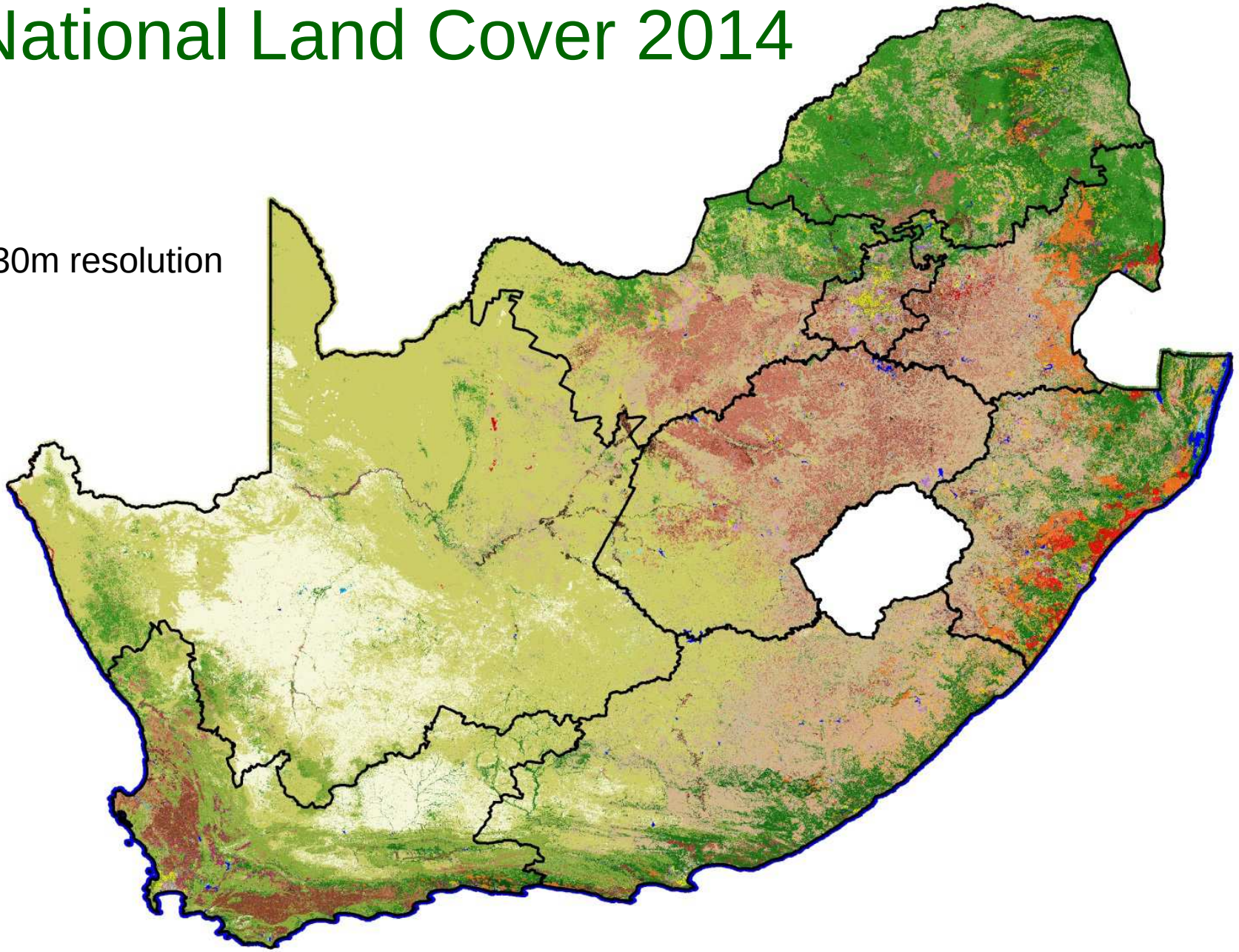


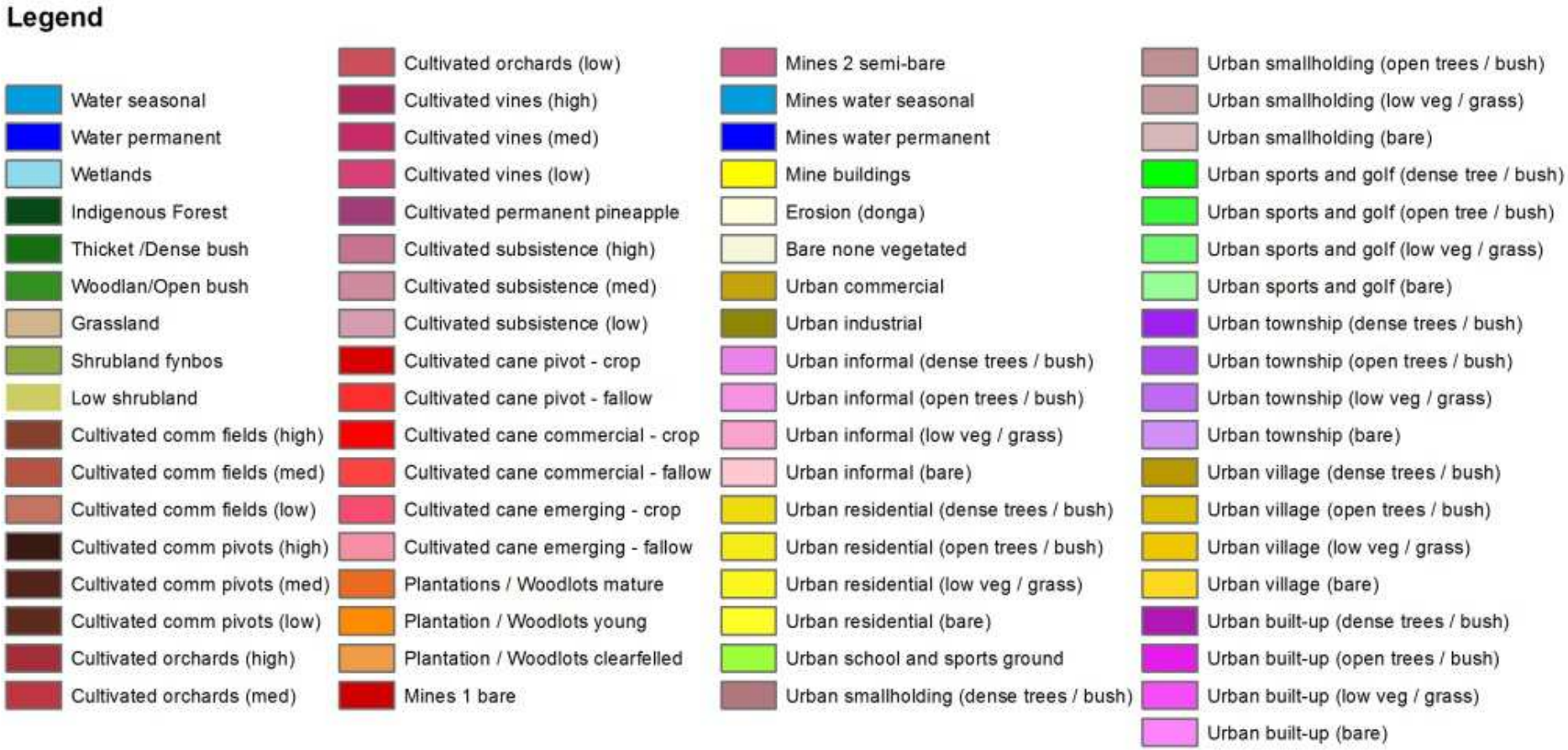
rivers

marine

National Land Cover 2014

30m resolution



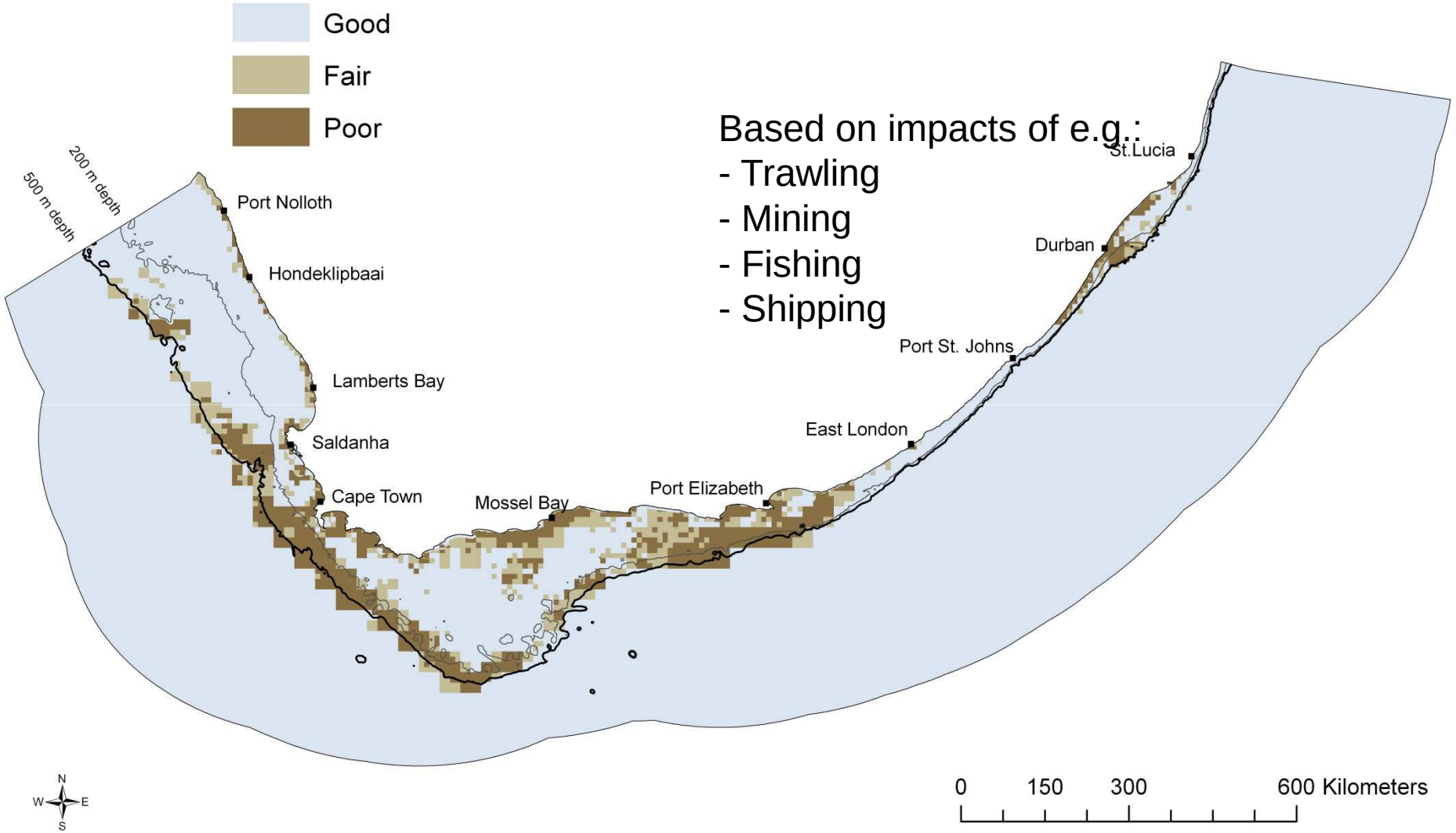


Natural habitat lost → Poor condition

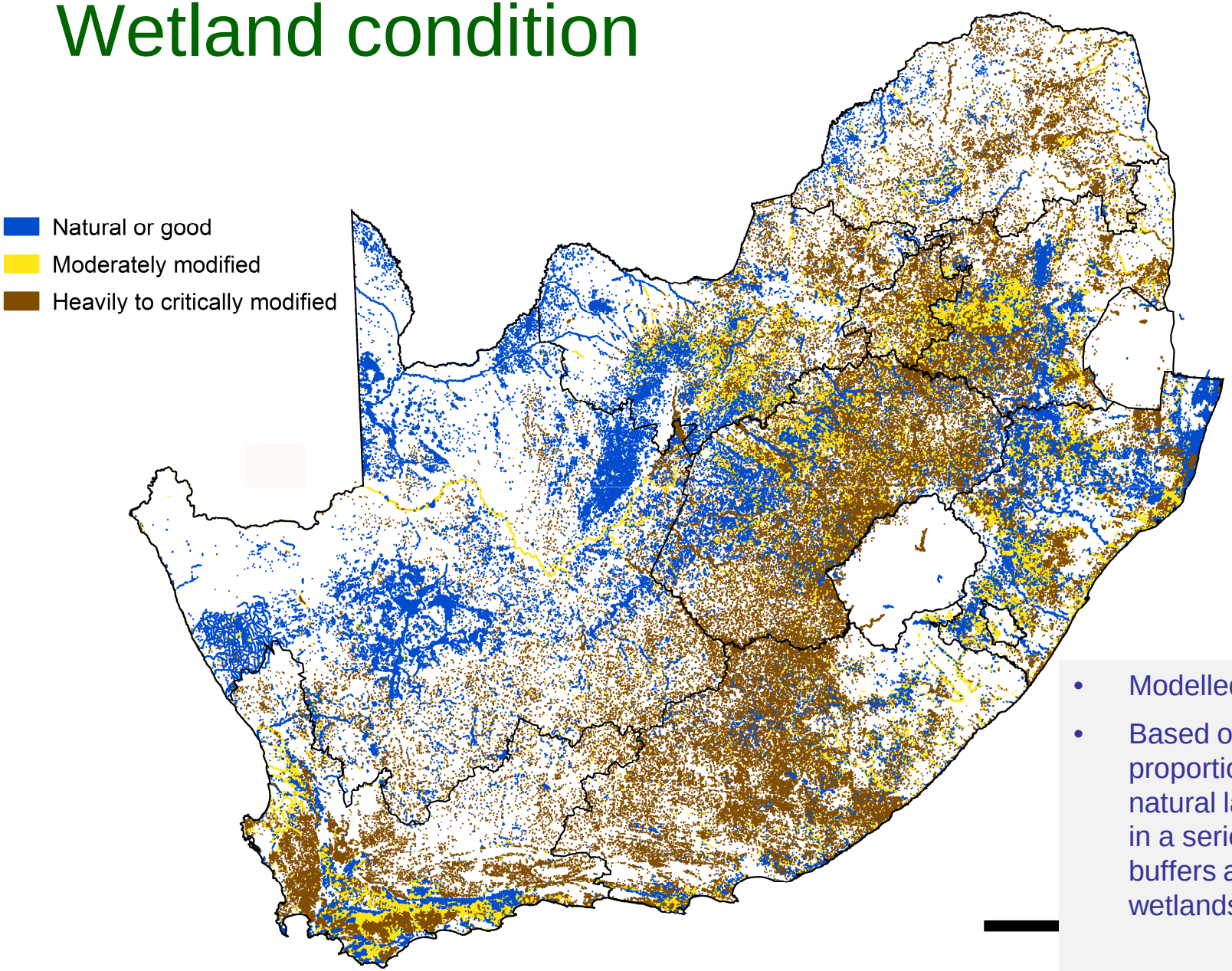
Natural habitat degraded → Fair condition

Natural/ near natural habitat → Good condition

Marine condition data



Wetland condition

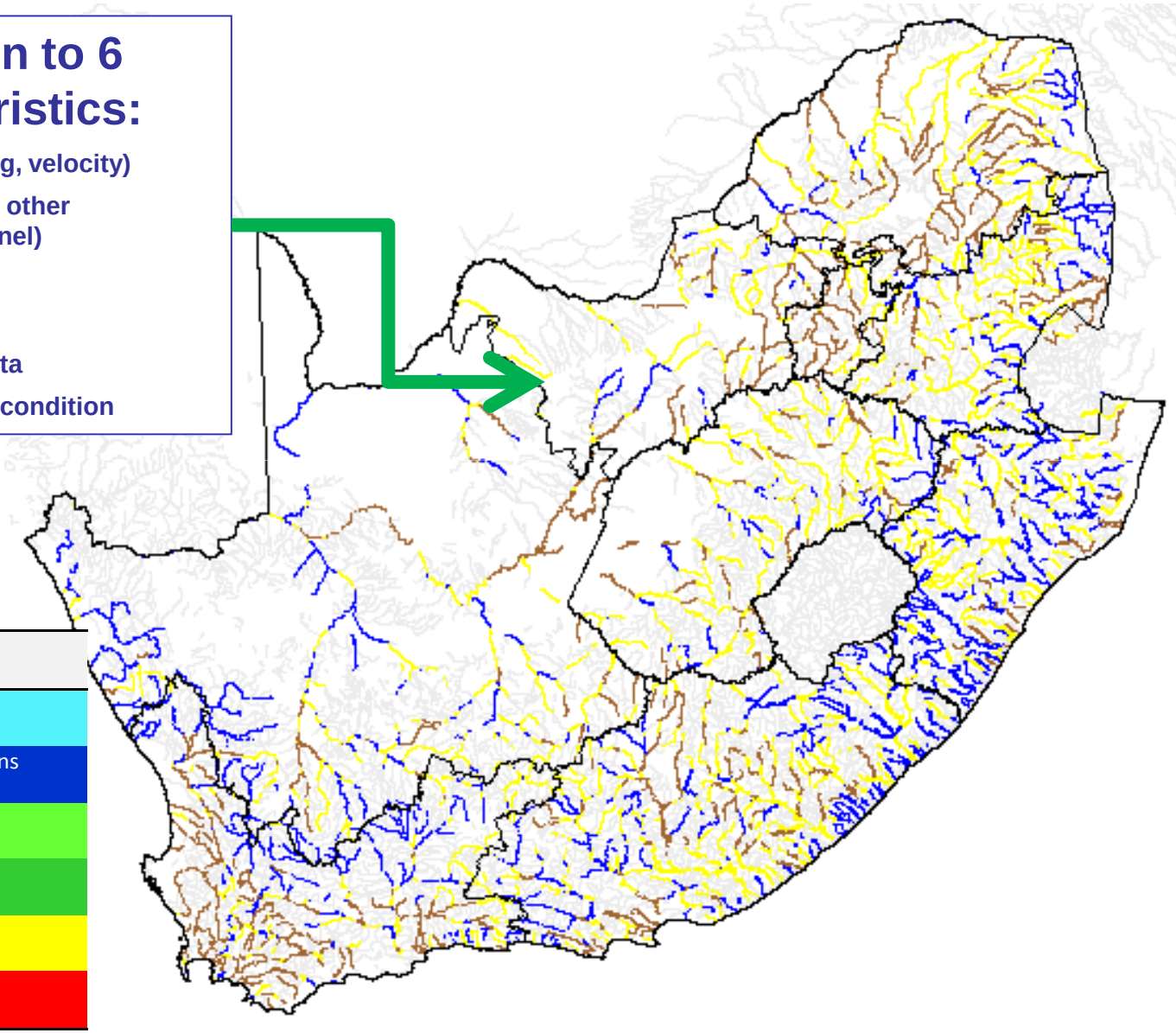


- Modelled data
- Based on proportion of natural land cover in a series of buffers around the wetlands

River condition

Level of modification to 6 indicators/characteristics:

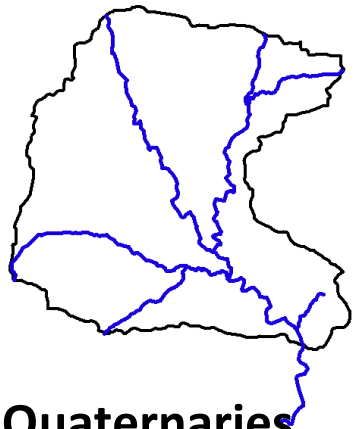
- Flow (e.g. quantity, timing, velocity)
- Inundation (dams, weirs, other obstructions in the channel)
- Water quality
- Stream bed condition
- Introduced in-stream biota
- Riparian or stream bank condition



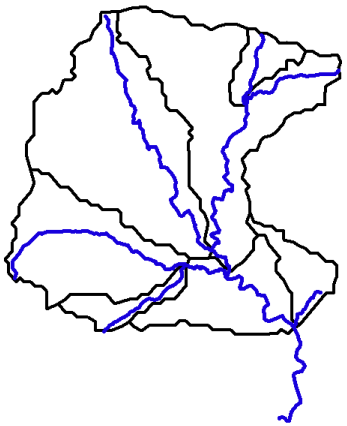
Ecological category	Description
A	Unmodified, natural
B	Largely natural, few modifications
C	Moderately-modified
D	Largely-modified
E	Seriously-modified
F	Critically/Extremely-modified

Ecosystem Condition Accounts for Rivers

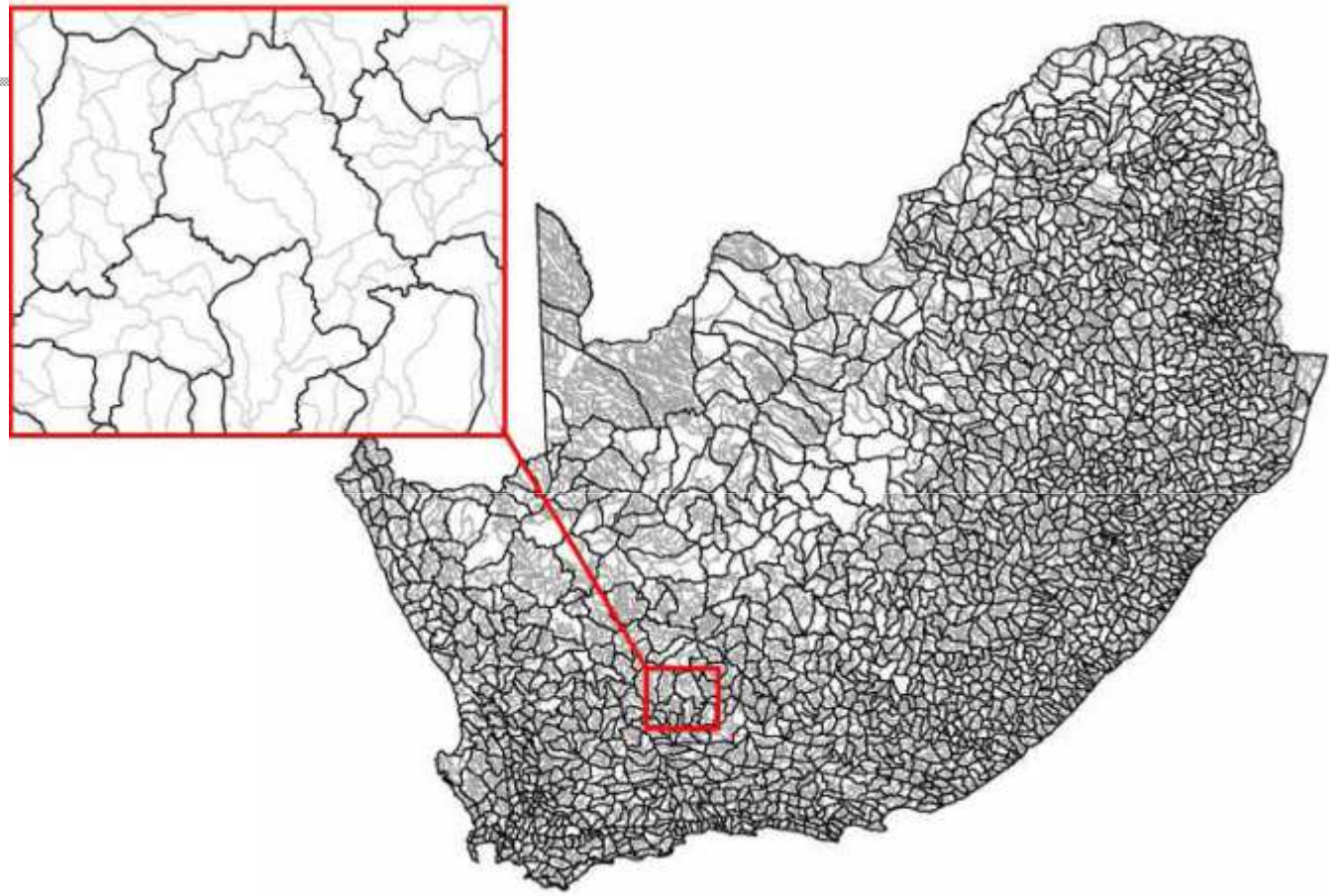
Spatial scale: sub-quaternary catchments



- **Quaternaries**
  Average size ~650 km^2

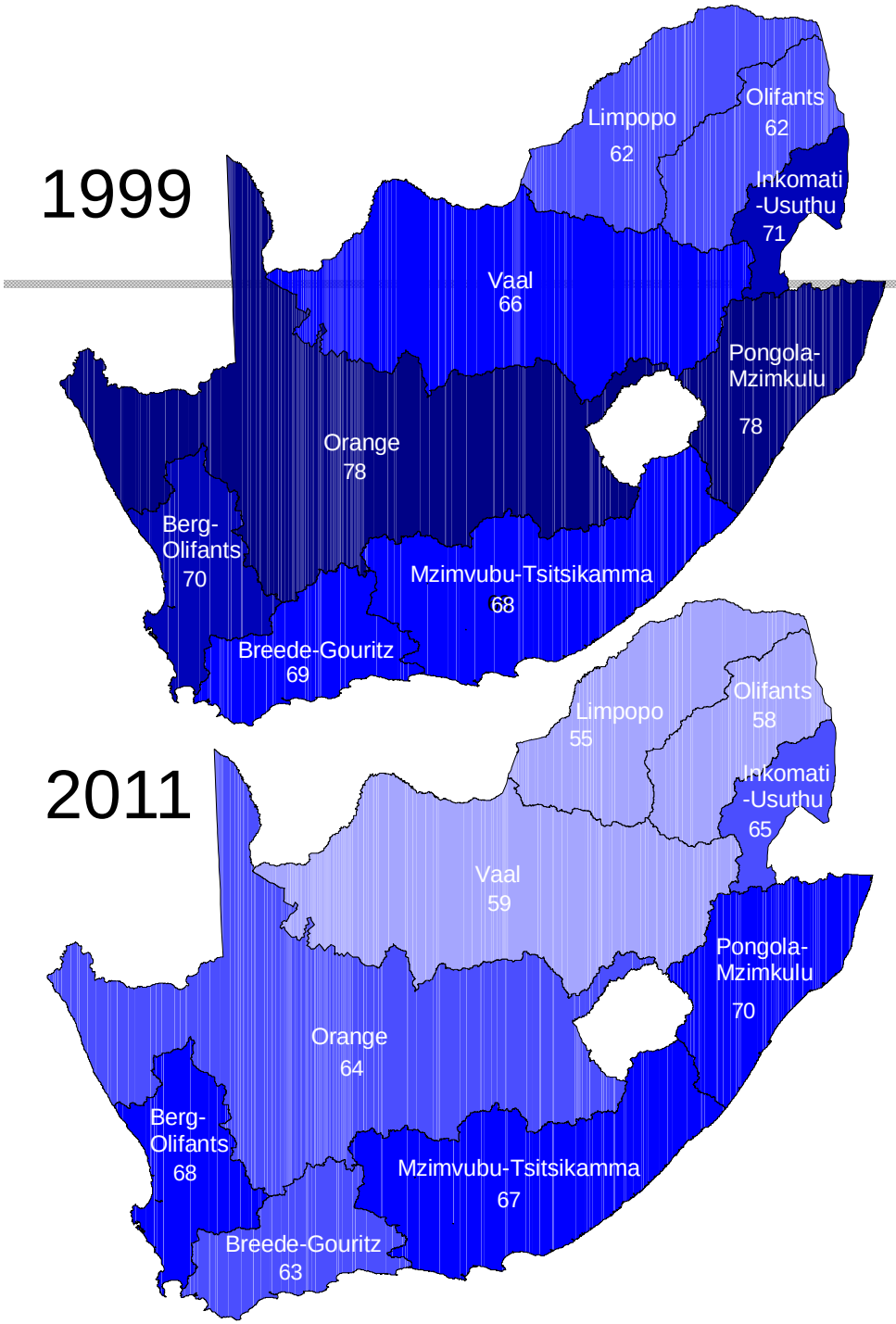


- **Sub-quaternaries** 8547
  Average size ~170 km^2



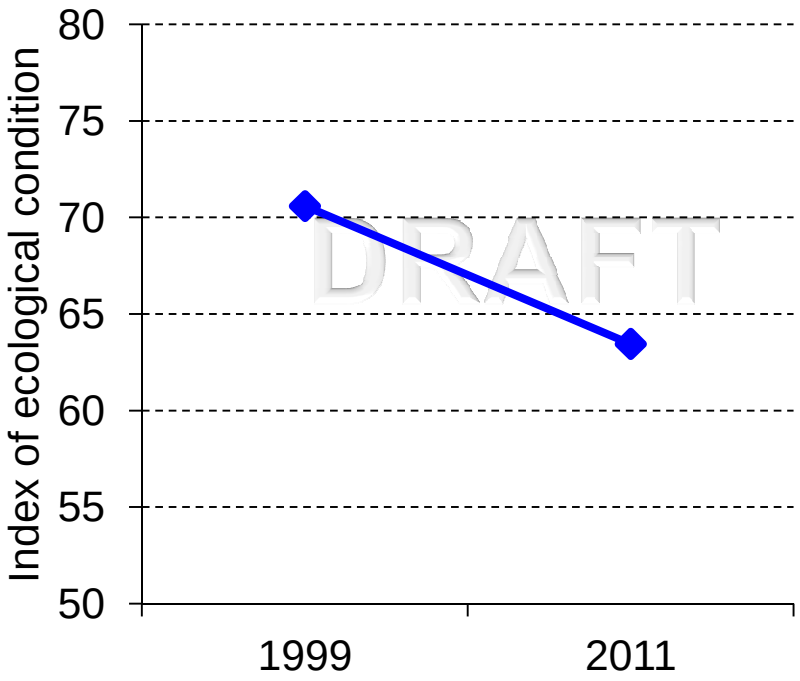
→Condition scores for river reaches converted to an index

Converted to an index of ecological condition



Index of ecological condition for rivers

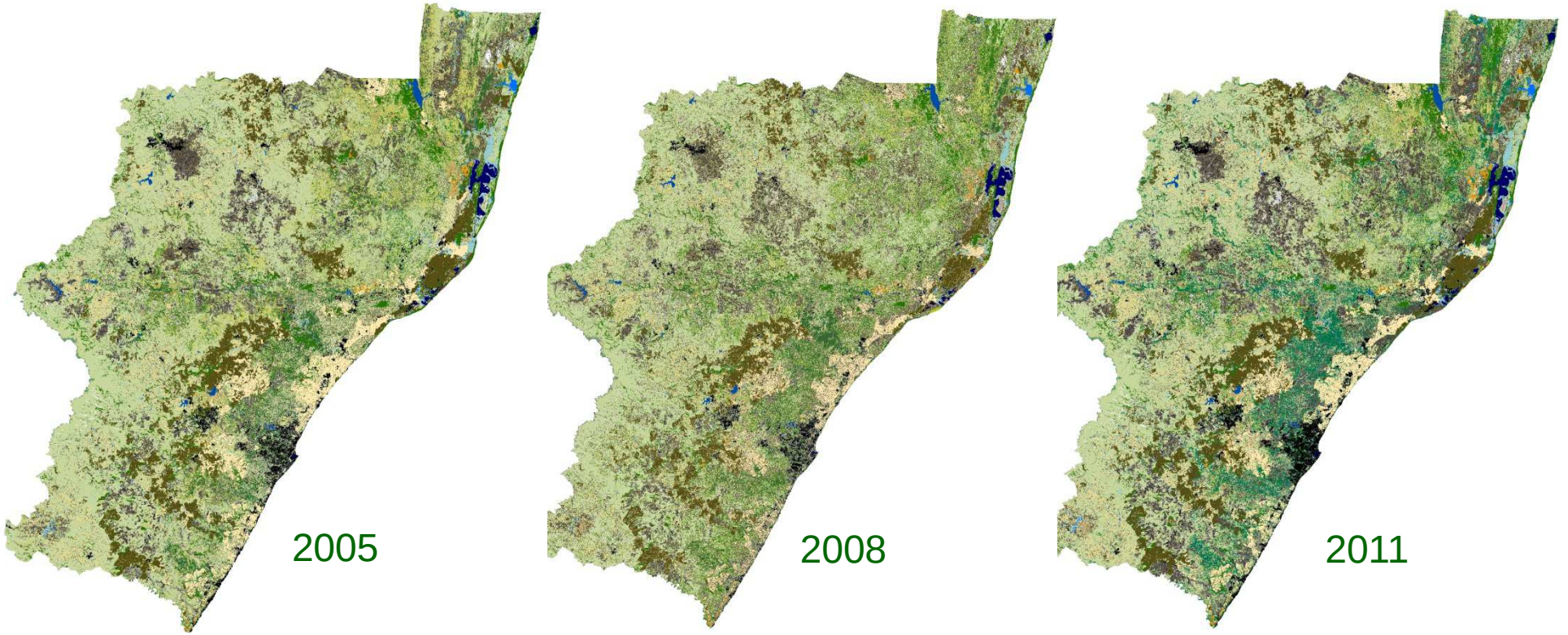
- 70-75
- 70-75
- 65-70
- 60-65
- 55-60
- 50-55



LAND COVER ACCOUNTS

Kwa Zulu Natal Province

KZN land cover – 20m resolution



- Water- natural
- Plantations
- Wetlands
- Permanent orchards
- Sugarcane farms
- Mines and quaries
- Urban/ built-up areas
- Golf couses
- Low density settlement
- Subsistence (rural)
- Annual commercial crops
- Dense bush
- Bushland
- Woodland
- Grassland
- Degraded vegetation
- Old culitvated fields
- Erosion
- Apline grass-heath
- Urban/ built-up areas
- Water- dams
- Water- estuarine
- Bare sand/ rock
- Forest
- Old plantations
- Rehabilitated mines

Land cover change

Change in hectares	2005	2008	2011	Overall
Natural	6 183 851	5 610 397	5 483 808	-700 043
Sugarcane	503 441	385 739	385 639	-117 802
Golf courses	3 084	4 259	3 917	833
Mines	4 516	6 044	6 862	2 346
Dam	52 548	60 478	65 567	13 019
Irrigated Agriculutre	119 430	138 521	132 771	13 341
Revegetation	43 116	68 874	66 598	23 482
Plantation	693 944	737 133	737 926	43 982
Degraded	707 545	791 643	767 888	60 343
Built up dense settlemt	268 225	314 152	330 967	62 742
Dryland Agriculture	250 744	308 671	345 398	94 654
Low density settlemt	499 020	904 341	1 002 899	503 879

% change per LC category	05 to 08	08 to 11	Overall
Sugarcane	-23	0	-23
Natural	-9	-2	-11
Plantation	6	0	6
Degraded	12	-3	9
Irrigated Agriculutre	16	-4	11
Built up dense settlement	17	5	23
Dam	15	8	25
Golf courses	38	-8	27
Dryland Agriculture	23	12	38
Mines	34	14	52
Revegetation	60	-3	54
Low density settlement	81	11	101

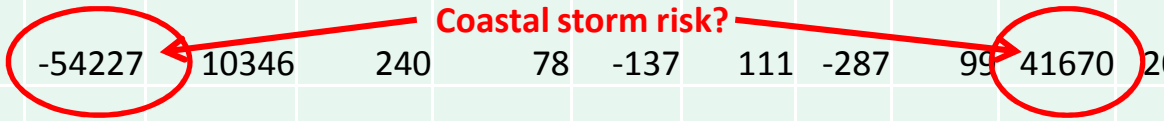
Big water resource impacts

- Natural and sugarcane biggest decreases
- Low density settlement by far the biggest increase
- Dryland agriculture increase second most in ha extent

Land Cover Accounts for Ecosystem Types: Vegetation types with highest change (2005-2011)

In hectares

VEG_TYPE	Natural	Degraded	Revegetation	Plantation	Dryland Agriculture	Irrigated Agriculture	Sugarcane	Dam	Low density settlement	Built up dense settlement	Golf courses	Mines
Amersfoort Highveld Clay Grassland	-62020	-3187	-210	95	3271	330	-9974	357	68056	2841	3	438
Drakensberg Afroalpine Heathland	-55606	6111	1662	2505	14867	750	2	1937	22788	4508	51	425
Subtropical Coastal Lagoons	-54227	10346	240	78	-137	111	-287	99	41670	2075	1	18
Basotho Montane Shrubland	-24974	-2579	120	2680	2128	773	34	250	19104	2413	35	16
Lesotho Highland Basalt Grassland	-21500	5635	14	4253	4373	-1214	0	284	6421	1648	6	80



Balito Bay Coastal Resort - 2009