Water resource classification as a mechanism for incorporating NFEPAs into water resource management

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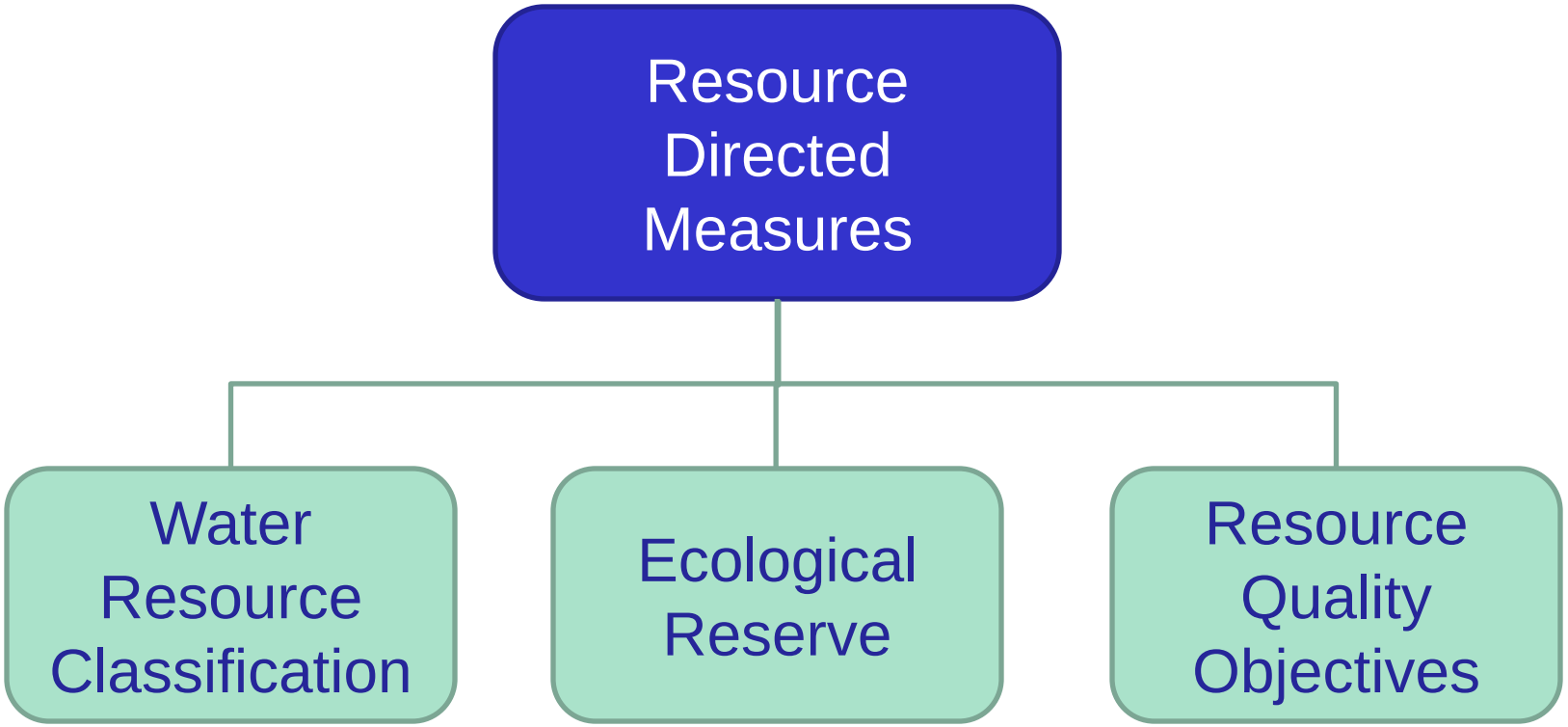
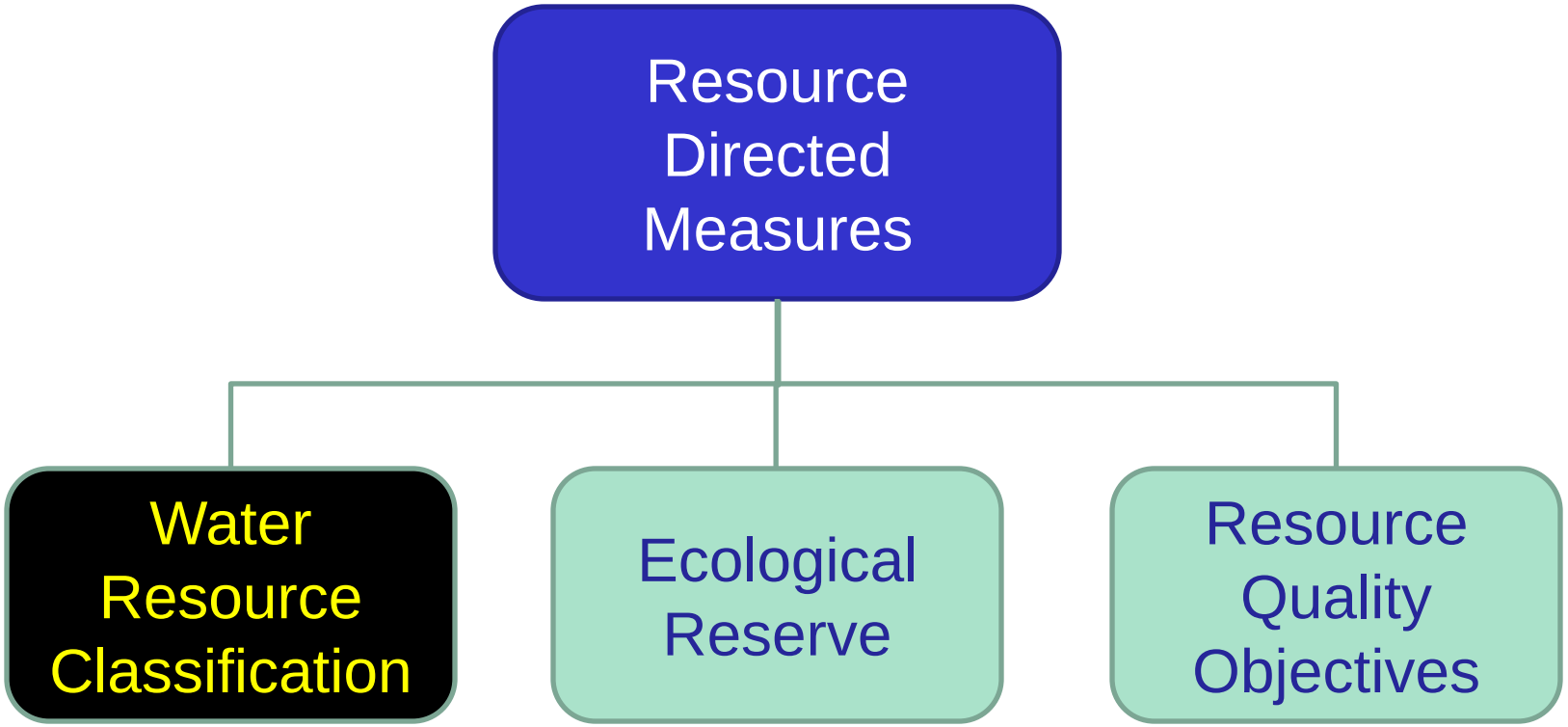
SANBI Biodiversity for Life

CSIR our future through science


Resource Directed Measures
Water Resource Classification
Ecological Reserve
Resource Quality Objectives


Resource Directed Measures
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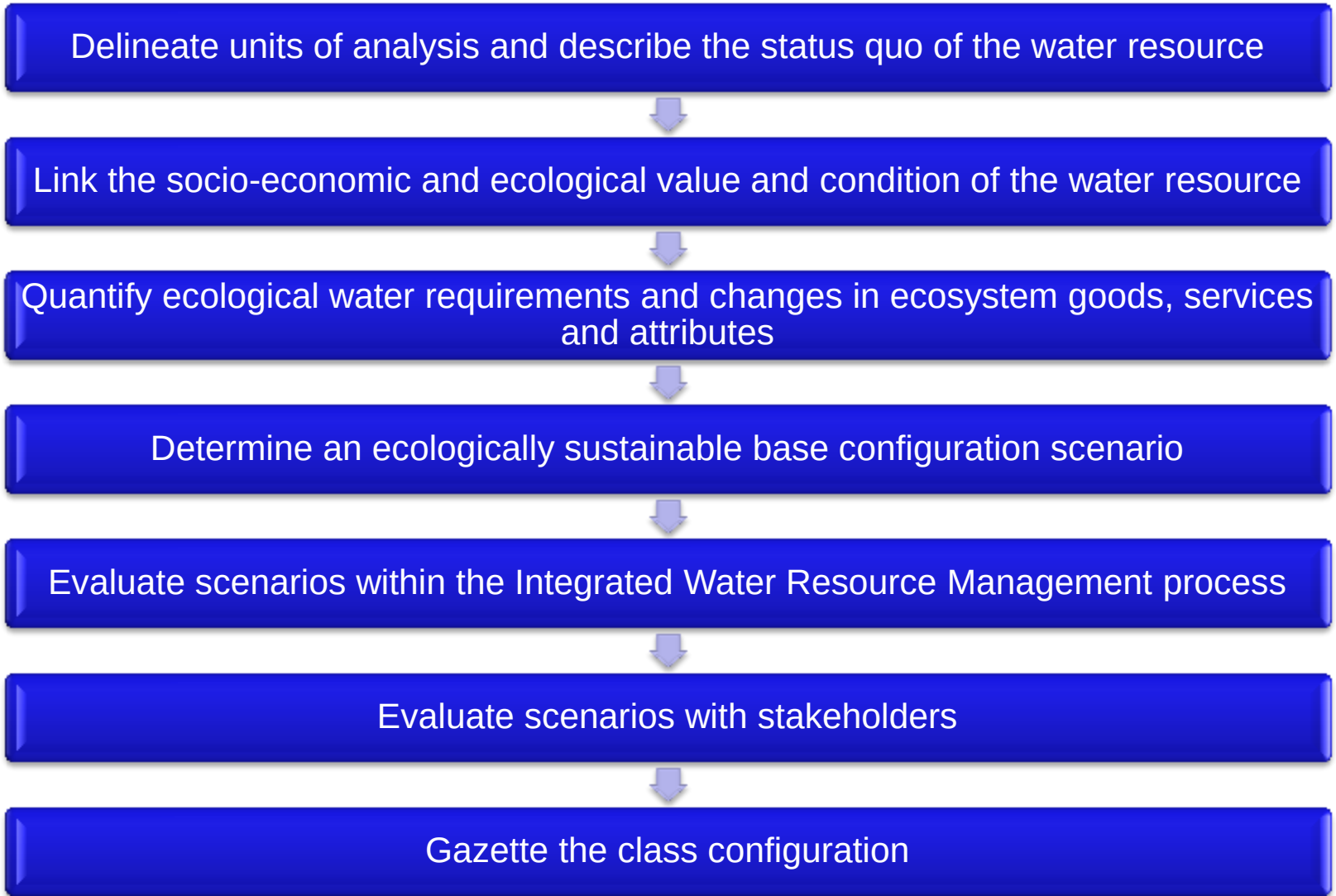
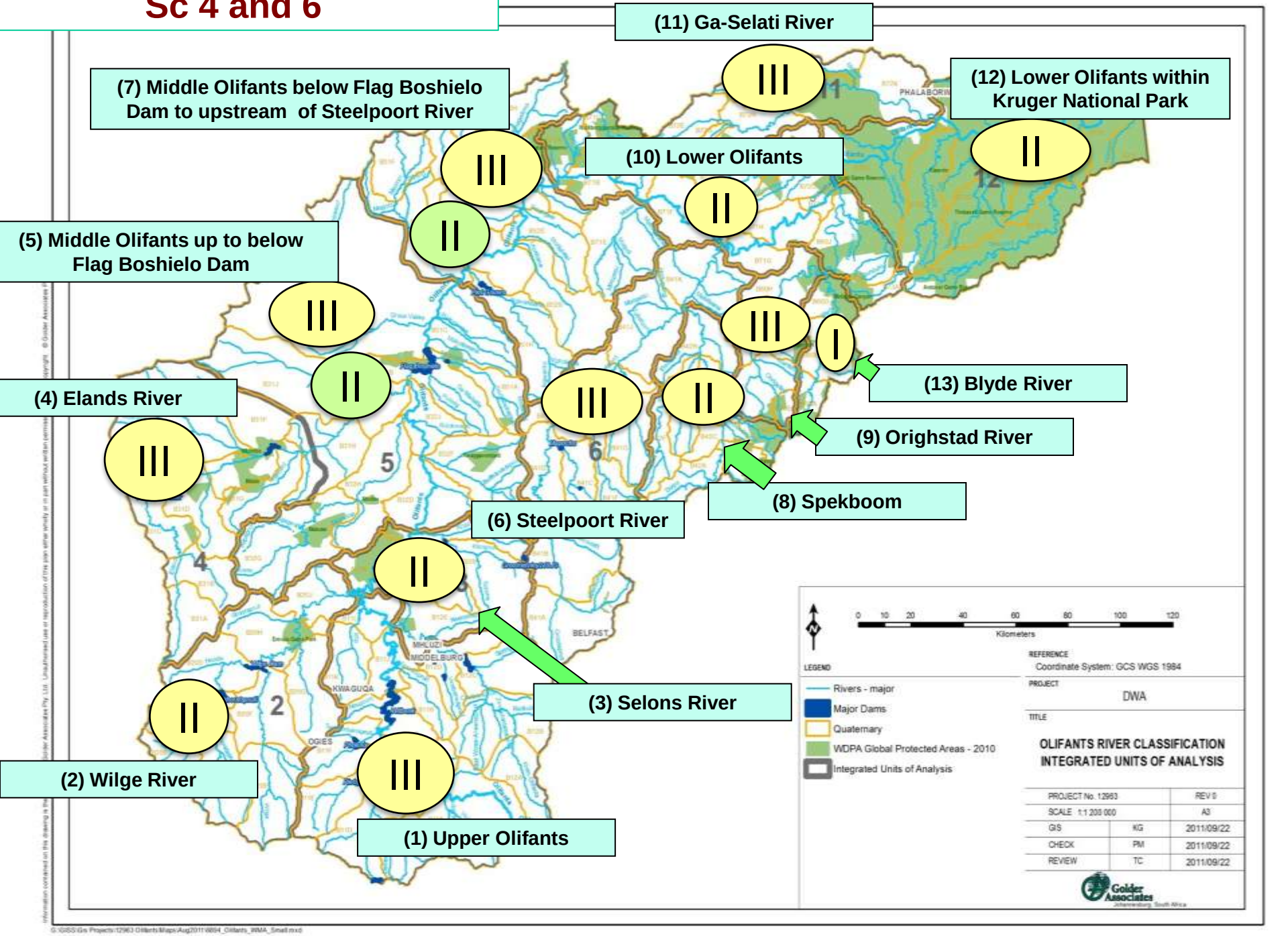
Management classes

Management Class	Description	Configuration guidelines
I	Minimally used, minimally altered from pre-development condition.	At least 60% of the freshwater ecosystems are in an A or B category.
II	Moderately used, moderately altered from pre-development condition.	At least 40% of the freshwater ecosystems are in an A or B category.
III	Heavily used, significantly altered from pre-development condition.	No requirement for A or B categories

Procedure for determining the management class of a water resource



Sc 4 and 6


(11) Ga-Selati River
III
(12) Lower Olifants within Kruger National Park
II
(7) Middle Olifants below Flag Boshielo Dam to upstream of Steelpoort River
III
(10) Lower Olifants
II
II
(5) Middle Olifants up to below Flag Boshielo Dam
III
III
I
(13) Blyde River
II
(4) Elands River
III
III
II
(9) Orighstad River
III
(8) Spekboom
(6) Steelpoort River
II
(3) Selons River
II
(2) Wilge River
III
(1) Upper Olifants
PHALABORWA
MIDDELBURG
BELFAST
KWAGUQA
OGIES
0 10 20 40 60 80 100 120
Kilometers
LEGEND
Rivers - major
Major Dams
Quaternary
WDPA Global Protected Areas - 2010
Integrated Units of Analysis
REFERENCE
Coordinate System: GCS WGS 1984
PROJECT
DWA
TITLE
OLIFANTS RIVER CLASSIFICATION
INTEGRATED UNITS OF ANALYSIS
PROJECT No. 12963
REV 0
SCALE 1:1 200 000
A3
GIS KG 2011/09/22
CHECK PM 2011/09/22
REVIEW TC 2011/09/22
Golder Associates

Resource quality objectives: hydrology

	FLOWS (m^3/s)											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
99%ile	42.17	28.76	21.52	37.04	24.33	7.43	95.80	153.56	471.91	470.40	210.01	149.81

Sub-component	Baseline data source	RQO
Wetland extent	CapeNature fine scale map (2008)	No expansion of agriculture or other landuses in to the remaining intact wetland areas
Woody alien vegetation extent		No further encroachment of woody alien vegetation into wetland areas
Wetland condition	Job *et al*. (2011)	No change in WET-Health scores (see Table 17.4)

Wetland Name	Wetland type	Area (ha)	WET-Health scores		
			Hydrology	Geomorphology	Vegetation
Arendskraal	Hillslope Seep	14	D	B	D
Biekos	Channelled Valley Bottom	10	C	B	C
Boschkloof	Channelled Valley Bottom	9.5	C	B	C
Hantam	Depression (pan)	0.5	A	A	B
Klein Arendskraal	Hillslope Seep	32	D	C	D
McGregor pan	Depression	0.8	A	A	B
Meulsteensvlei	Depression (pan)	5	A	A	B
Meulsteensvlei	Channelled Valley Bottom	50	B	A	C
Papkuilsfontein	Hillslope Seep	4	A	A	B

Resource quality objectives: water quality

Component	RQOs
River inflow at E3H004	
Temperature	< 20°C (summer)
pH	> 6.5 and < 8.5
Dissolved oxygen	> 4 mg /ℓ (1m from bottom)
Total dissolved solids	< 3500 mg /ℓ
Dissolved inorganic nitrogen concentration	< 0.5 mg /ℓ at flows ≥ 20 m3/s
Dissolved Reactive Phosphorous concentration	< 0.1 mg /ℓ at E3H004
Turbidity	--to be determined
>=8 km above mouth	
Turbidity	Secchi disc reading at the 8-km mark upstream of the mouth >1 m
Salinity	Salinity never > 35 ppt anywhere in the estuary Salinity in the estuary at the 8-km mark upstream of the mouth < 20 ppt Salinity in the estuary at the 16-km mark upstream of the mouth < 10 ppt

Resource quality objectives: plants

Component	RQO	Thresholds of potential concern

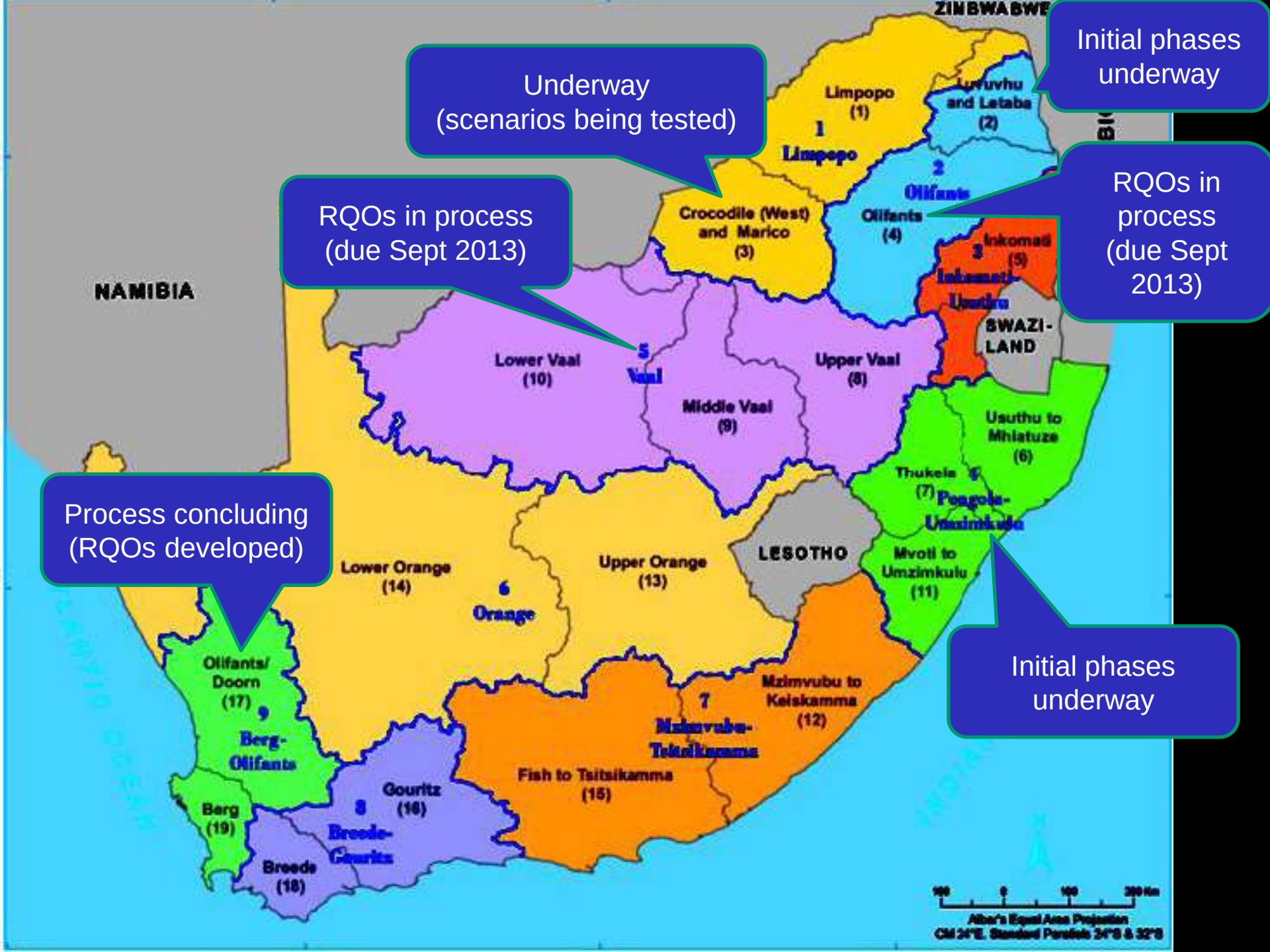
Area of plant communities	**Maintain (summer 2004) distribution and abundance over the entire estuary:
	Zostera capensis = 48 ha;
	intertidal salt marsh = 92 ha;
	supratidal salt marsh = 143 ha;
	floodplain salt marsh = 797 ha;
	reeds and sedges = 60 ha.**
		Greater than 20% change in areas

Area covered by invasive waterweeds (*Azolla filiculoides*); nuisance filamentous algae (e.g. *Enteromorpha*, *Ulva*, *Cladophora*); or pondweed (*Potamogeton pectinatus*)	**Reduce area by 50% (relative to summer 2004). i.e. to ≤ 30 ha (half of channel)**	**Upper 15k of estuary with > 50% of channel covered by waterweeds, algae or pondweed.**

Resource quality objectives: fish, birds

Component	RQO
Fish assemblages **Retain the following ratios of fish assemblages in the estuary:**	**estuarine species (e.g. estuarine round-herring, Cape silverside, prison goby, commafin goby, longsnout pipefish) (35%)**
	partially estuarine dependent species (e.g. harder, elf, blackhand sole, white stumpnose) (50-60%)
	obligate estuarine dependent (e.g. white steenbras, leervis, freshwater mullet, flathead mullet); (>1%)
	indigenous freshwater species, (e.g. Clanwilliam yellofish, sawfin and Cape galaxias) (>1%)
	exotic freshwater species (e.g.smallmouth bass, bluegill sunfish, banded tilapia and Mozambique tilapia) (<0.5%)
Demographics	**There should be a significant number of 0 -1 year old fish and no age classes missing**

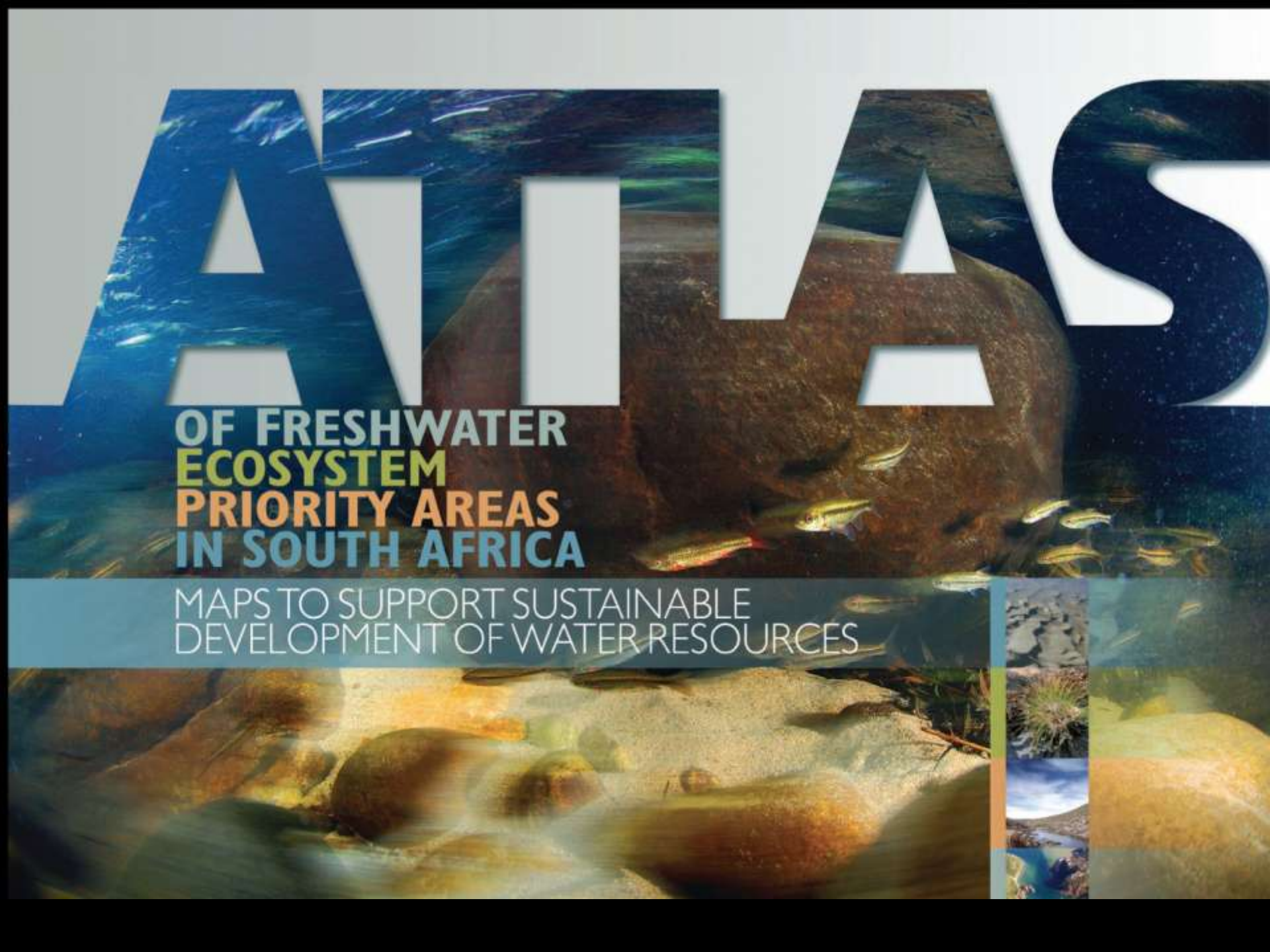
Component	RQO	Thresholds of potential concern
Birds	**Retain the species richness, abundance and diversity of the bird community, representative of resident and migrant waders, wading birds and water fowl as under the Present State, except for that there would be a *higher abundance of water fowl (increasing by about 10% from Present State numbers*)**	• **Community composition or bird numbers deviates by more than 50% of average seasonal baseline counts for two consecutive summer or winter seasons, focusing on waders, wading birds, terns & water fowl (summer and winter), and specifically red data species which are supported by the system (e.g. Pelican, Oyster catchers, Chestnut banded plover)** • **In the case of water fowl - densities decline by 20% of average seasonal baseline counts for two consecutive summer or winter seasons**


Initial phases underway
Underway (scenarios being tested)
RQOs in process (due Sept 2013)
RQOs in process (due Sept 2013)
Process concluding (RQOs developed)
Initial phases underway
NAMIBIA
ZIMBWABWE
LESOTHO
SWAZI-LAND
Limpopo (1)
1 Limpopo
Luvuvhu and Letaba (2)
2 Olifants
Crocodile (West) and Marico (3)
Olifants (4)
Inkomati (5)
3 Inkomati-Usuthu
Lower Vaal (10)
5 Vaal
Middle Vaal (9)
Upper Vaal (8)
Usuthu to Mhlatuze (6)
Thukela (7)
4 Pongola-Umzimkulu
Mvoti to Umzimkulu (11)
Lower Orange (14)
6 Orange
Upper Orange (13)
Olifants/ Doorn (17)
9 Berg-Olifants
Berg (19)
Breede (18)
8 Gouritz (16)
Breede-Gouritz
Fish to Tsitsikamma (15)
7 Mzimvubu-Tsitsikamma
Mzimvubu to Keiskamma (12)
Albers Equal Area Projection

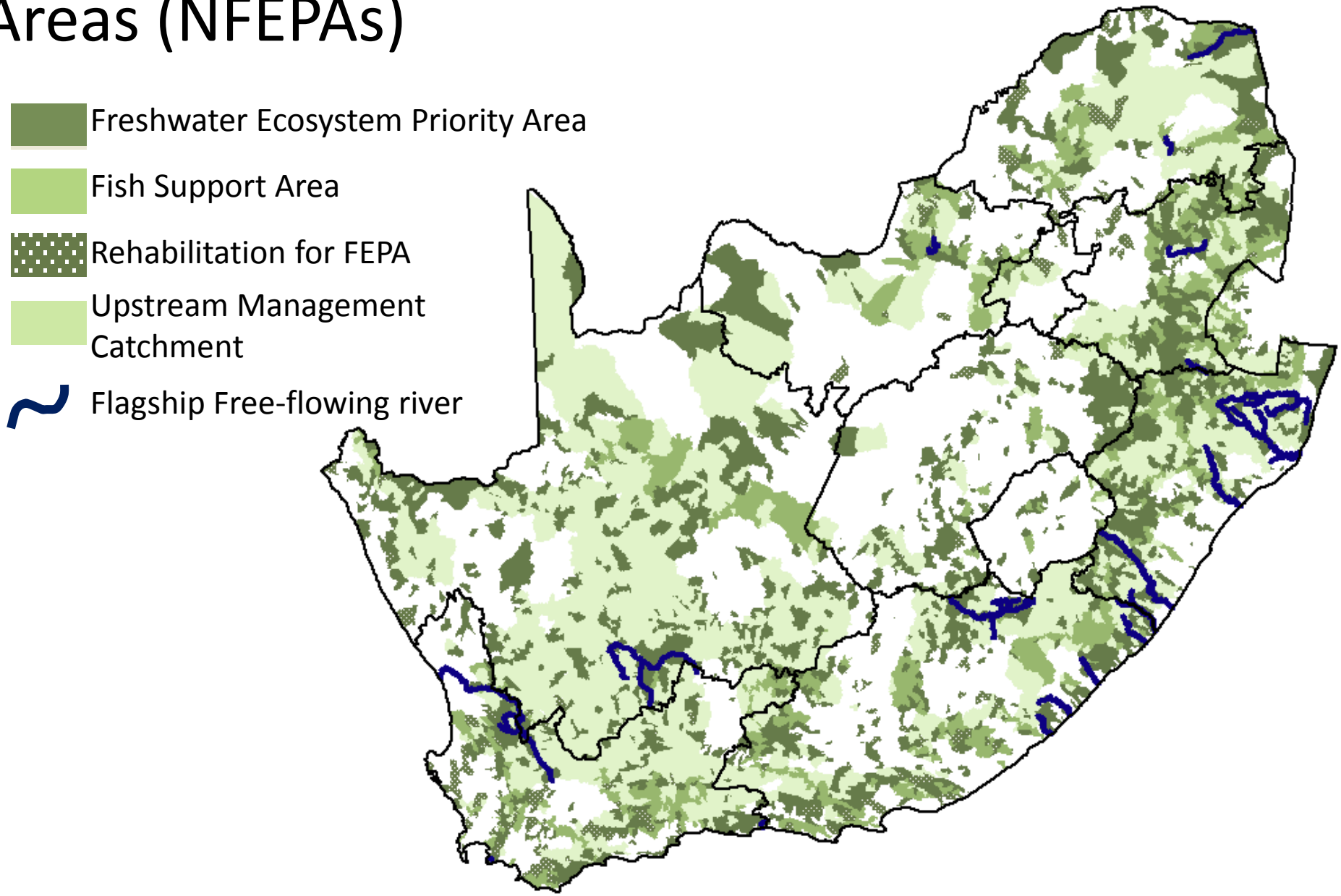
ATLAS

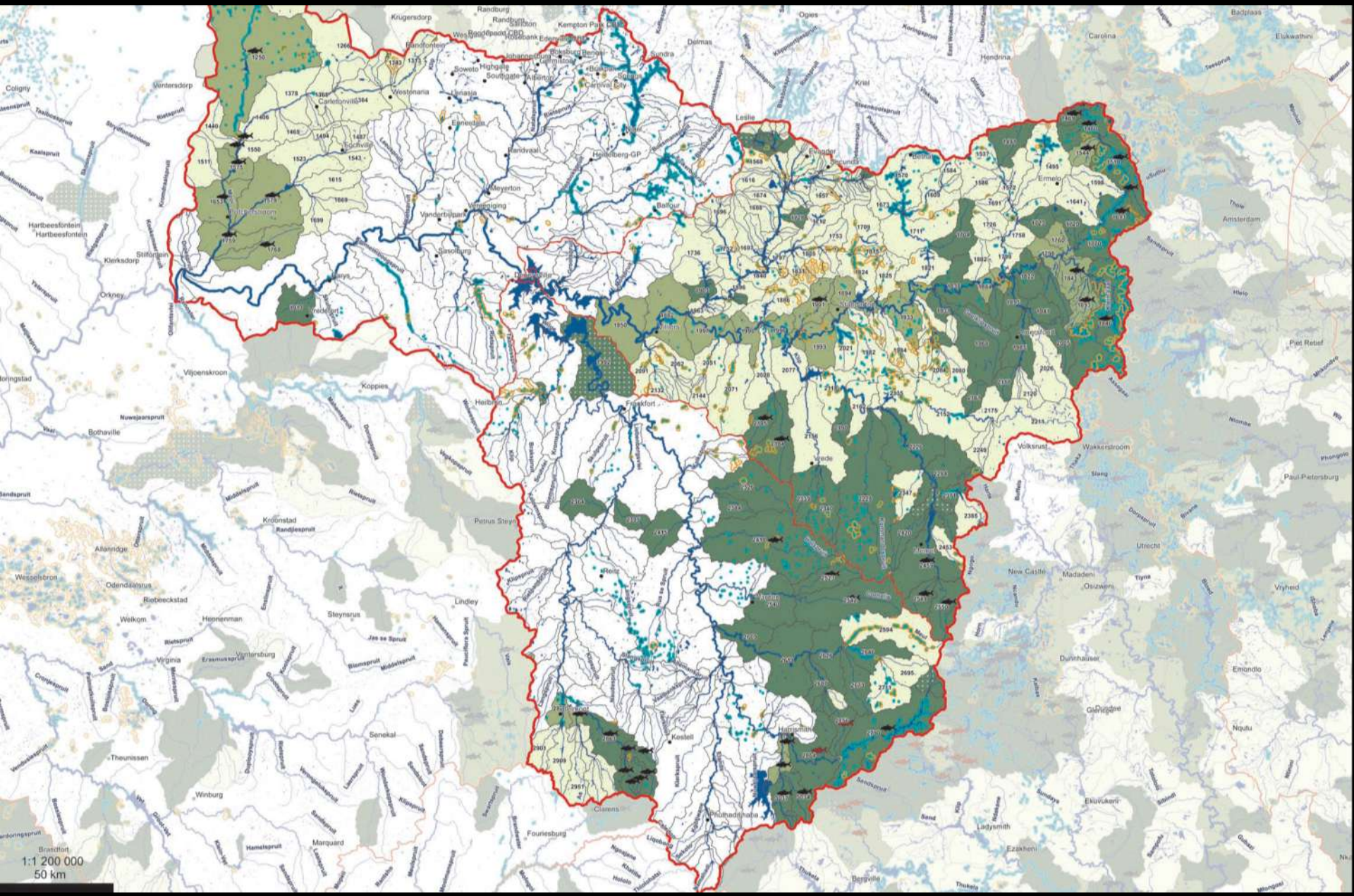
OF FRESHWATER ECOSYSTEM PRIORITY AREAS IN SOUTH AFRICA

MAPS TO SUPPORT SUSTAINABLE DEVELOPMENT OF WATER RESOURCES



National Freshwater Ecosystem Priority Areas (NFEPAs)




Randburg
Krugersdorp
Randfontein
Kempton Park
Ogies
Badplaas
Carolina
Elukwatini
Hendrina
Coligny
Ventersdorp
Westonaria
Leslie
Delmas
Kriel
Ermelo
Amsterdam
Hartbeesfontein
Klerksdorp
Orkney
Viljoensskroon
Koppies
Frankfort
Heilbron
Bothaville
Volksrust
Wakkerstroom
Paul-Pietersburg
Piet Retief
Kroonstad
Petrus Steyn
Utrecht
New Castle
Madadeni
Vryheid
Wesselsbron
Odendaalsrus
Riebeeckstad
Welkom
Steynsrus
Lindley
Virginia
Dunnhauser
Emondlo
Nqutu
Senekal
Theunissen
Winburg
Clarens
Harrismith
Kestell
Ladysmith
Ekuvukeni
Ezakheni
Bergville
Fouriesburg
Marquard
Brandfort
1:1 200 000
50 km

Experience to date

- NFEPA data is being incorporated in water resource classification to varying degrees
- Technical problems have been encountered when integrating NFEPA data with other data layers used in the analyses
- Some involvement by experts familiar with NFEPA data is thus necessary
- Lessons have been learned on best way to incorporate NFEPAs into scenario development

How do we optimise our participation?

- The biodiversity sector CAN and SHOULD be involved in classification
- Register as stakeholders in individual classification processes
- Formation of network, convened by SANBI, to support biodiversity sector participation