water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

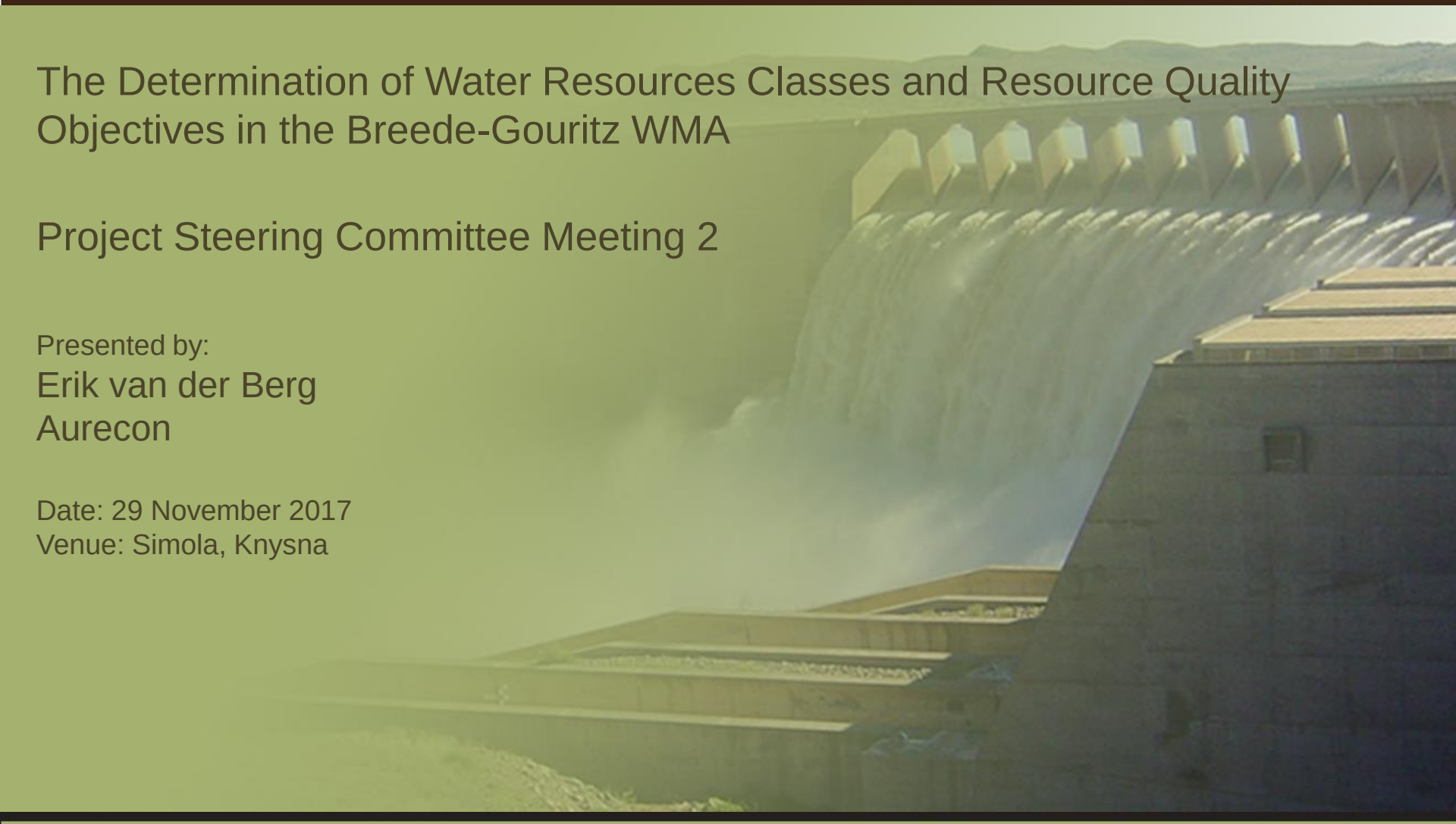
2030 NDP

The Determination of Water Resources Classes and Resource Quality Objectives in the Breede-Gouritz WMA

Project Steering Committee Meeting 2

Presented by:
Erik van der Berg
Aurecon

Date: 29 November 2017
Venue: Simola, Knysna



Study Objectives

- **Determine Water Resource Classes (WRCs)**
- **Determine Resource Quality Objectives (RQOs)**
- **Support Gazetting of Recommended Water Resources Classes and RQOs**

Meeting Objectives

- Present results from the evaluation of scenarios.
- Review proposed scenario.
- Review DRAFT Water Resource Classes.

Overview of Study Progress

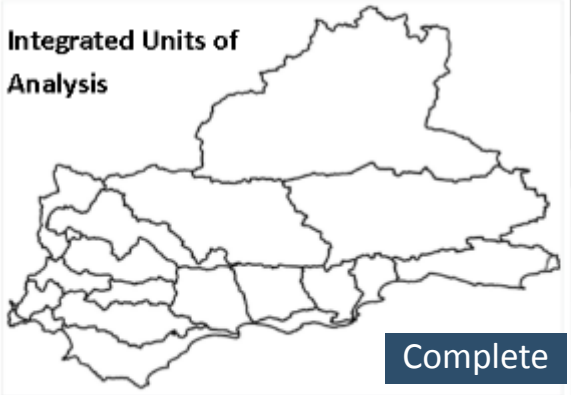
Study Status

STEP 1: DELINEATE CATCHMENT & DESCRIBE STATUS QUO

Outcome: Integrated Units of Analysis & nodes

Complete

Complete



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STEP 2: LINK ECONOMIC & SOCIAL VALUE

Outcome: How economic value & social wellbeing is influenced by ecosystem characteristics & use of water

SOCIAL WELL BEING

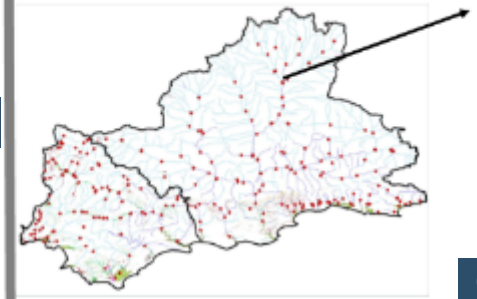
ECOSYSTEM INDEX

ECONOMIC PROSPERITY

Complete

STEP 3: QUANTIFY THE ECOLOGICAL WATER REQUIREMENTS AT EACH NODE

Outcome: Ecological Water Requirements



Complete

STEP 4: SET A BASELINE FOR ECOLOGICAL SUSAINABILITY

Outcome: Ecologically Sustainable Base Configuration

Complete

STEP 5-7

STEP 5: EVALUATE SCENARIOS WITHIN INTERATED WATER RESOURCE MANAGEMENT PROCESS

Outcome: Identified and evaluated scenarios

Draft

STEP 6: EVALUATE SCENARIOS WITH STAKEHOLDERS

Outcome: Recommended scenario and DRAFT Water Resource Classes

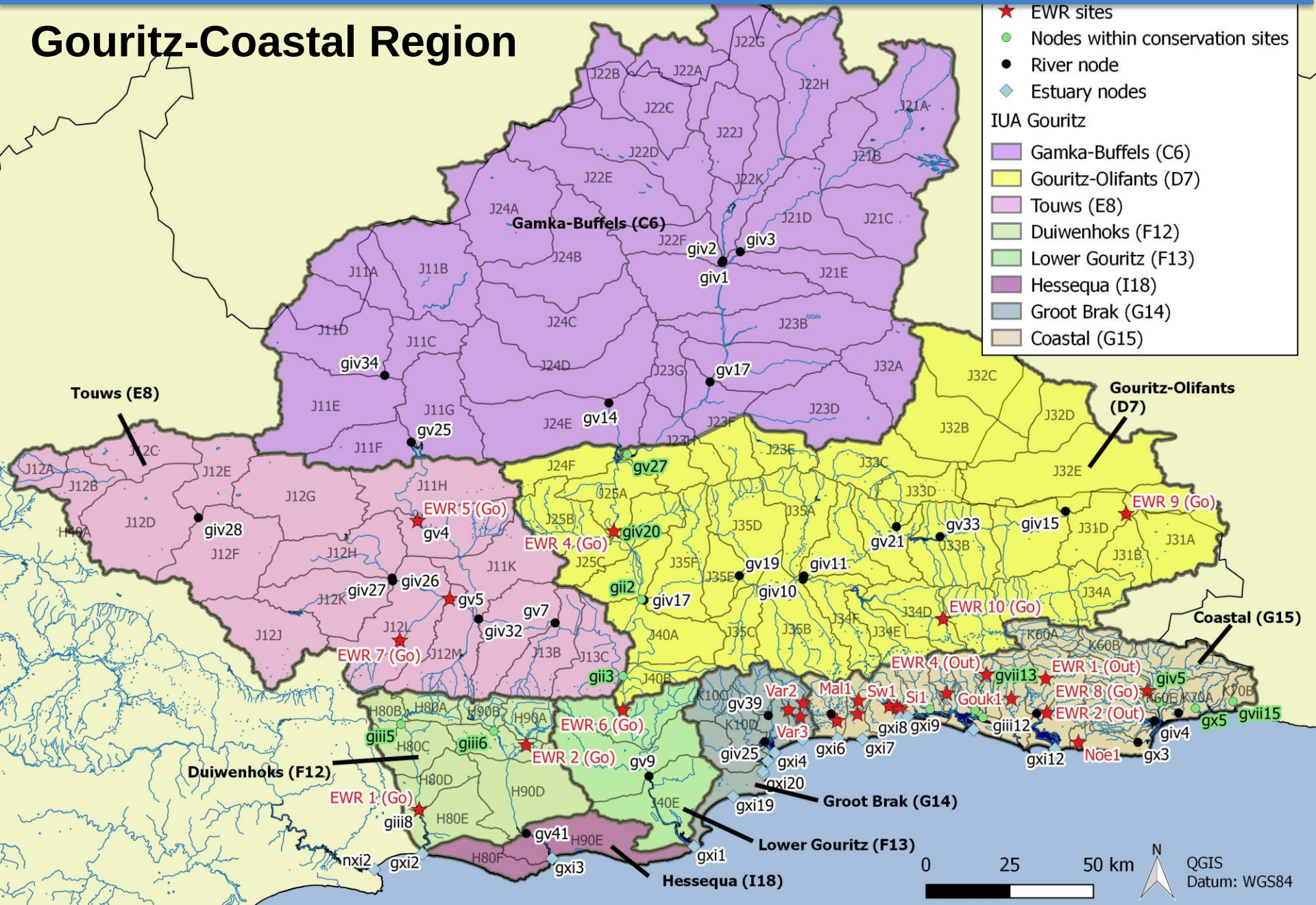
STEP 7: GAZETTE WATER RESOURCE CLASS CONFIGURATIONS

Outcome: Gazetted Water Resource Classes

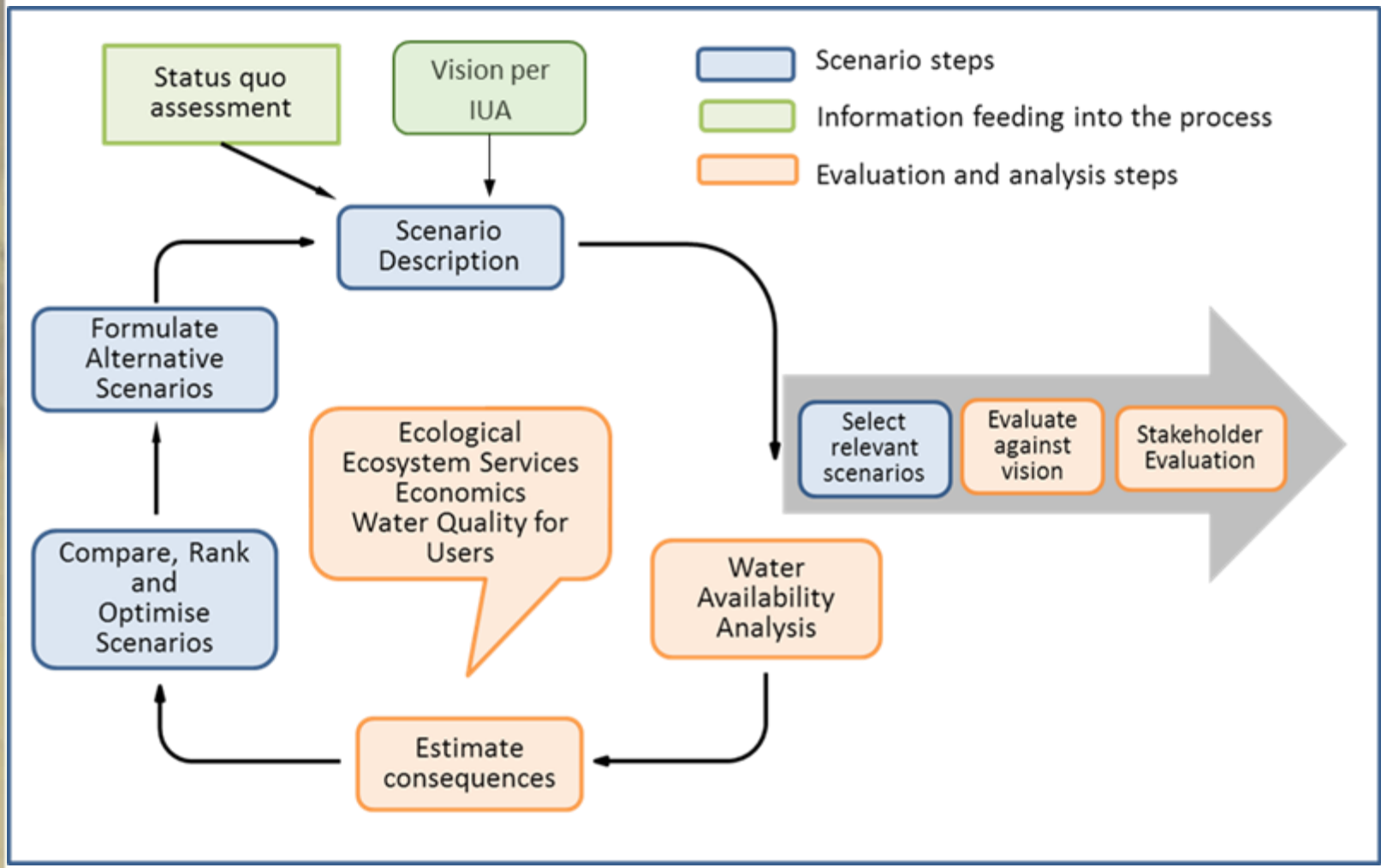
Methodology for Scenario Evaluation

Integrated Units of Analysis and Nodes

Integrated Units of Analysis and Nodes



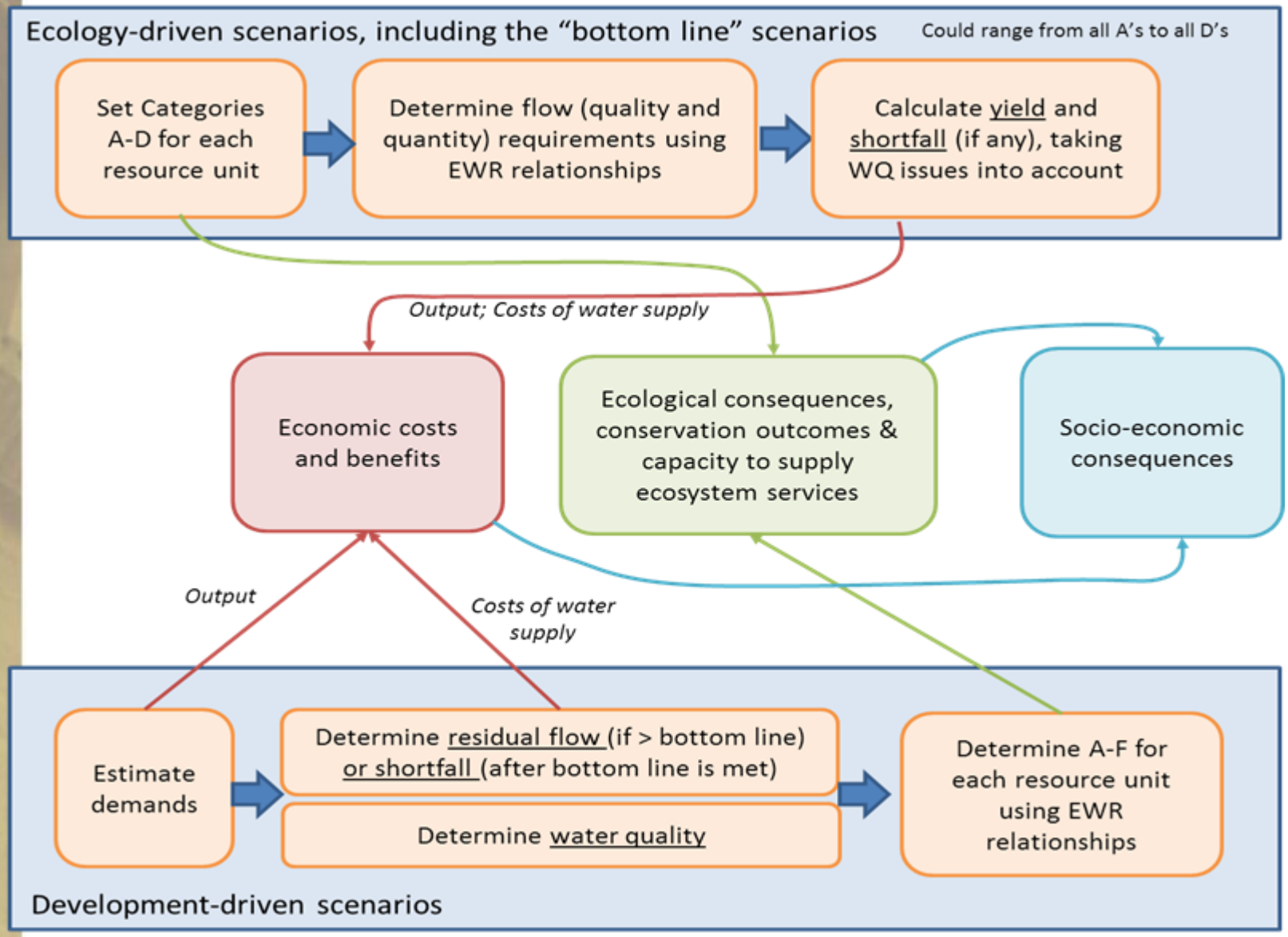
Methodology for Scenario Evaluation



Approach followed to evaluate scenarios

1. Define the scenarios
2. Describe surface flows and ecological condition (EC)
3. Quantify changes in flow and ecological condition
4. Estimate consequences for yield and water supply
5. Estimate consequences for groundwater condition
6. Estimate consequences for ecosystem goods, services and attributes
7. Describe overall socio-economic consequences

Scenario Development



Scenarios Considered

#	Scenario
1	Maintain Present Ecological Status (PES)
2	Ecologically Sustainable Base Configuration (ESBC) ("Bottom-line")
3	Recommended Ecological Categories (RECs)
4	High future demands met with no bottom-line constraint on ecological condition (i.e. No EC)
5	Climate Change (driest 10%)
6	Spatially Targeted ECs ("Mixed" scenario)

Note: Consequences of meeting the targeted ECs determined for current and future demands.

Future Demands and Water Supply Options

- Total 2040 water requirements in the Breede and Gouritz catchments (776.6 and 337.8 million m^3/a) are met.
- No additional allocation to agriculture except for increased allocations from Brandvlei Dam and Gamkapoort Dam.
- All planned surface water supply options implemented:
  - *Increased Brandvlei Dam Abstraction (51 million m^3/a)*
  - *Mitchell's Pass Diversion (36 million m^3/a)*
  - *Raised Buffels River Dam (2.8 million m^3)*
  - *Raised De Bos Dam (1.7 million m^3)*
  - *Raised Gamkapoort Dam (37 – 98 million m^3)*
  - *New Kombuis Dam (15 million m^3)*
  - *Off-channel Wadrift Balancing Dam (3 million m^3/a)*
  - *Raised Garden Route (2.5 million m^3/a)*
  - *New Malgas River Dam (7.0 million m^3/a)*
  - *Augmented Charlesford pump station (3.3 million m^3/a).*
- Additional measures included as necessary, e.g.
  - *Groundwater, recycling, desalination*

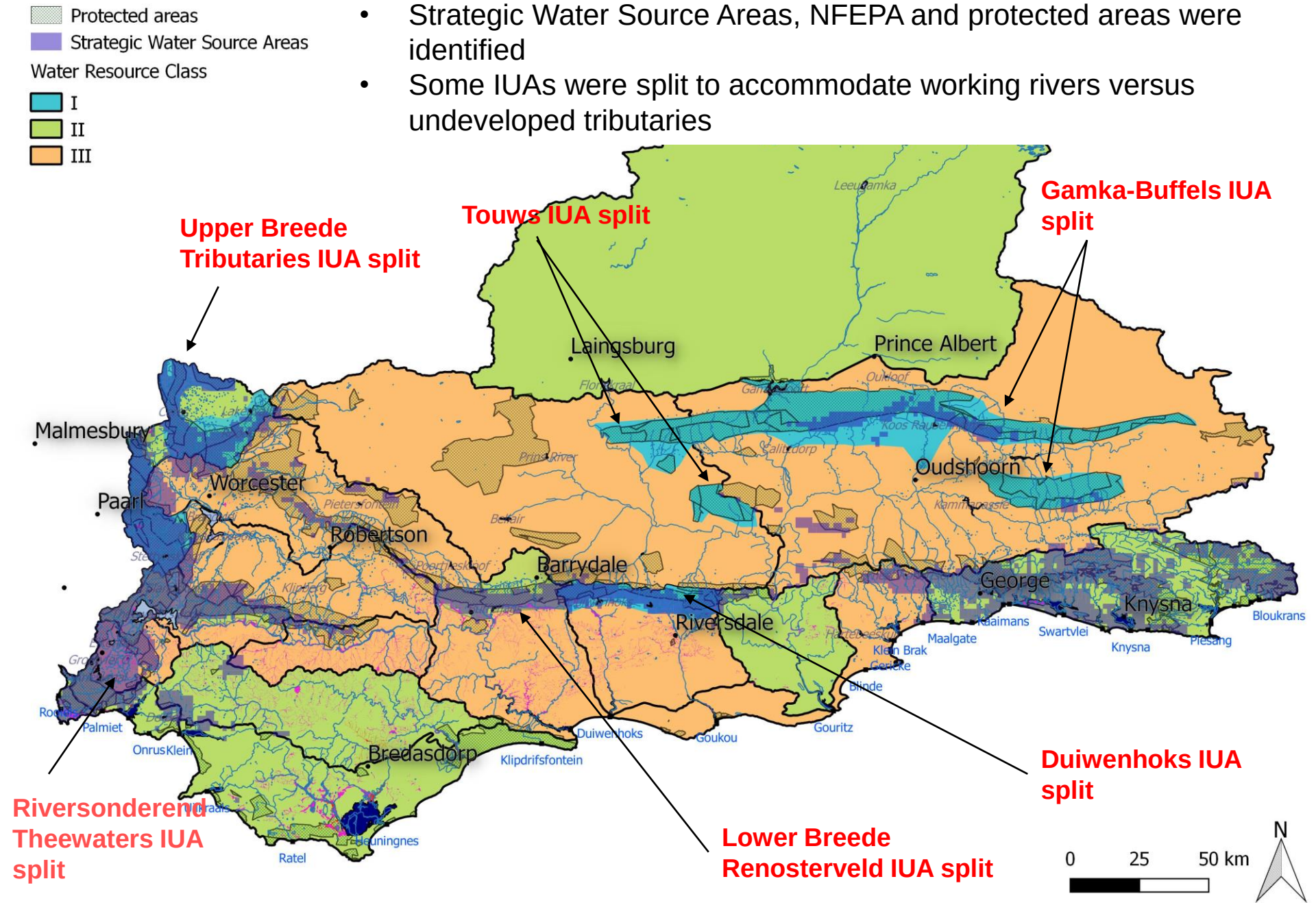
Spatially-targeted ("mixed") scenario

- Start with REC scenario
- **REC replaced with ESBC** (which has lower water requirements) for all nodes in each of the eight IUAs with the highest infrastructure costs to implement the REC under 2040 water requirements
- Unless that node was associated with **special conservation areas** (e.g. protected area, strategic water source area, NFEPA), in which case the REC water requirement values (EWRs) were retained.

IUA Name	IUA	Estimated total infrastructure costs to meet future demands and EWR requirements under each scenario.	
		ESBC	REC
Overberg West Coastal	H16	R 306 million	R 300 million
Overberg East Fynbos	H17	R 103 million	R 308 million
Upper Breede Tributaries	A1	R 75 million	R 303 million
Breede Working Tributaries & Middle Breede	A2 + A3	R 296 million	R 550 million
Riversonderend Theewaters	B4	R 3 million	R 197 million
Gouritz-Olifants	D7	R 383 million	R 771 million
Coastal	G15	R 394 million	R 672 million

Spatially targeted scenario: Biodiversity Rationale

- Strategic Water Source Areas, NFEPA and protected areas were identified
- Some IUAs were split to accommodate working rivers versus undeveloped tributaries



Modelling links between flow and ecological condition

1. Define the scenarios
2. Describe surface flows and ecological condition (EC)
3. Quantify changes in flow and ecological condition

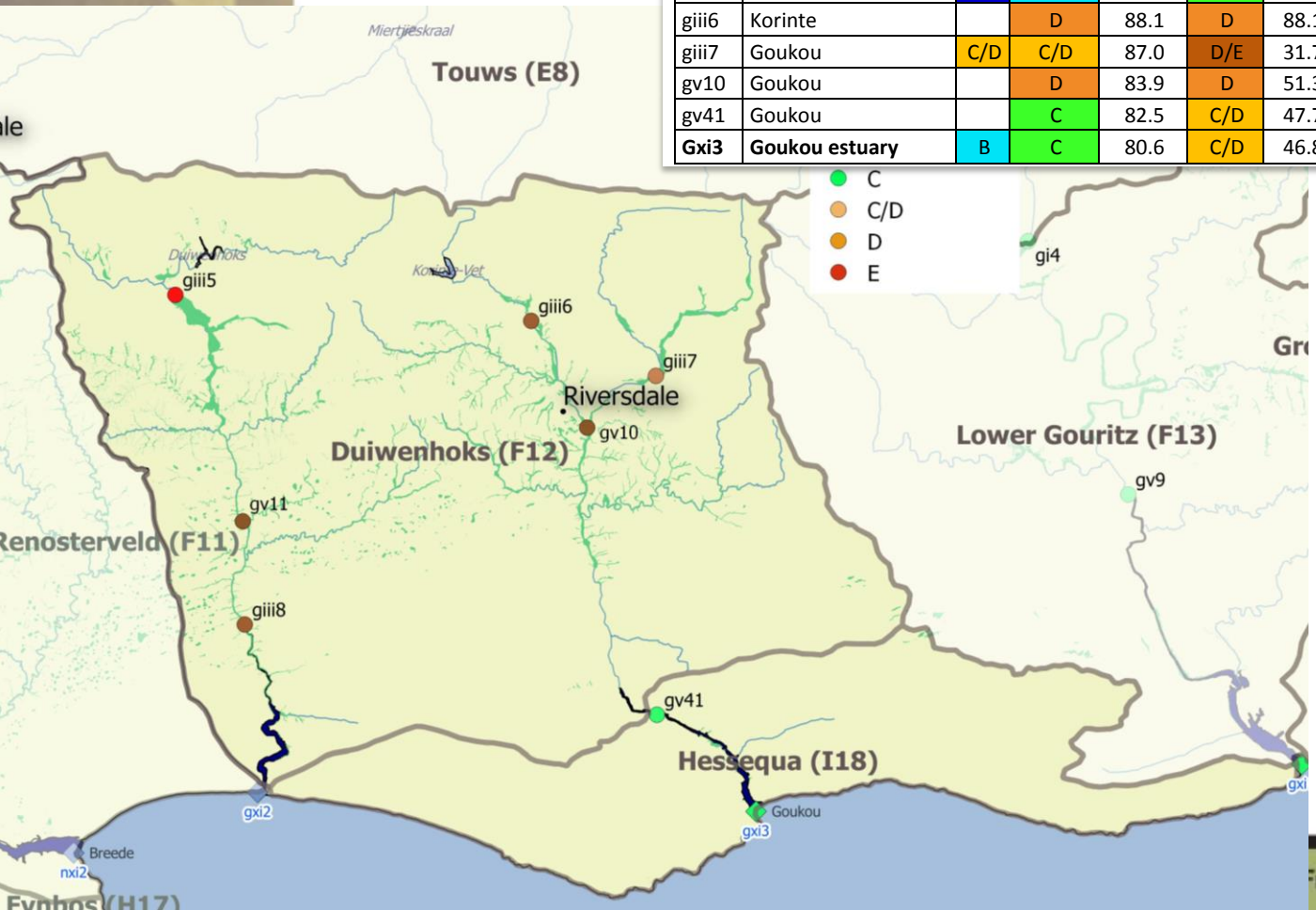
a) The balancing tool contains:
   i. Baseline ecological conditions for rivers and estuaries.
   ii. Modelled current day and natural flows.
   iii. Modelled Reserve flows for a range of ecological conditions, based on various Reserve studies.

b) Allows the user to toggle flow and see changes in condition.

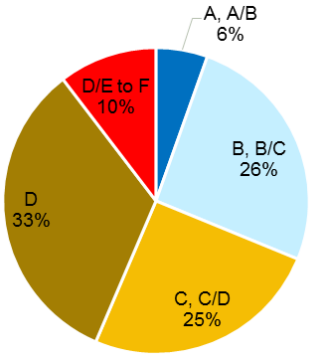
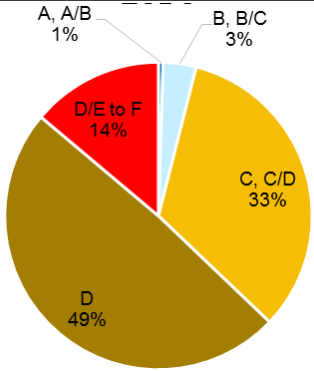
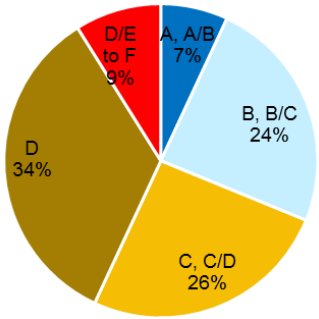
c) Reports surpluses of deficits in flow relative to current day.

Use of the “balancing tool” to determine ECs and nodal shortfalls (or surpluses) for Scenarios

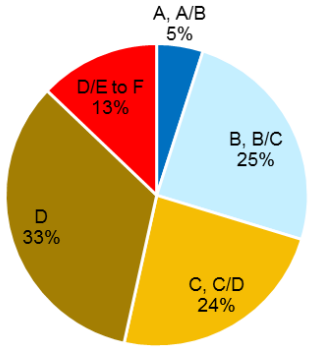
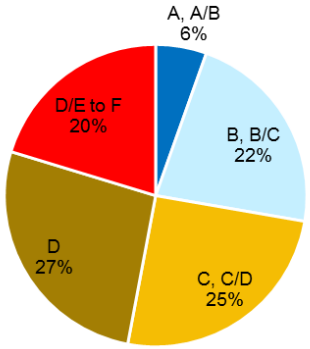
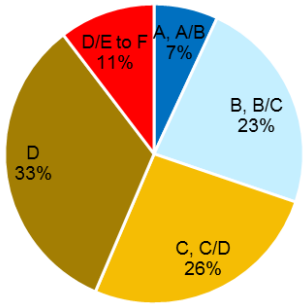
Node	River	REC	Current		Scenarios							
					ESBC		REC		HighDev		CC(10)	
			PES (2014)	% nMAR	EC	% nMAR	EC	% nMAR	EC	% nMAR	EC	% nMAR
giii5	Duiwenhoks		E	93.3	E	51.7	E	93.3	E	91.5	E	71.6
gv11	Duiwenhoks		D	93.2	D	51.0	D	93.2	D	91.7	D	70.3
giii8	Duiwenhoks	D	D	93.5	D	50.1	D	93.5	D	92.1	D	70.4
Gxi2	**Duiwenhoks estuary**	A	B	91.1	C	48.8	B	91.1	B	89.8	B	67.8
giii6	Korinte		D	88.1	D	88.1	D	88.1	D	80.6	D	62.5
giii7	Goukou	C/D	C/D	87.0	D/E	31.7	C/D	87.0	C/D	87.0	D	61.0
gv10	Goukou		D	83.9	D	51.3	D	83.9	D	81.1	D	58.9
gv41	Goukou		C	82.5	C/D	47.7	C	82.5	C	80.0	C	56.9
Gxi3	**Goukou estuary**	B	C	80.6	C/D	46.8	C	80.6	C	78.3	C	55.0



Scenario consequences on ecological condition

Ecological Categories	Consequences
	**PES – Baseline:** • The PES is the baseline condition
	**ESBC – Bottom line:** • Makes a surplus of water available and reduces river conditions • Little change to ecological conditions in the Breede region, large changes in condition of the estuaries in the Gouritz region
	**REC:** • Conditions similar to the baseline • Improvements to REC not always possible through changes in flow alone

Scenario consequences on ecological condition

Ecological Categories	Consequences
	**Future Growth – No EC:** • Similar conditions to the baseline with a small decrease
	**Climate change (10%):** • A greater reduction in condition compared to Future Growth
	**Spatially-targeted Scenario:** • A good balance of conditions, similar to baseline but with surpluses in flow made available

Use of the river and estuary nodes for assessment of water quality and wetland consequences

Node	River	REC	Current		Scenarios							
					ESBC		REC		HighDev		CC(10)	
			PES (2014)	% nMAR	EC	% nMAR	EC	% nMAR	EC	% nMAR	EC	% nMAR
giii5	Duiwenhoks		E	93.3	E	51.7	E	93.3	E	91.5	E	71.6
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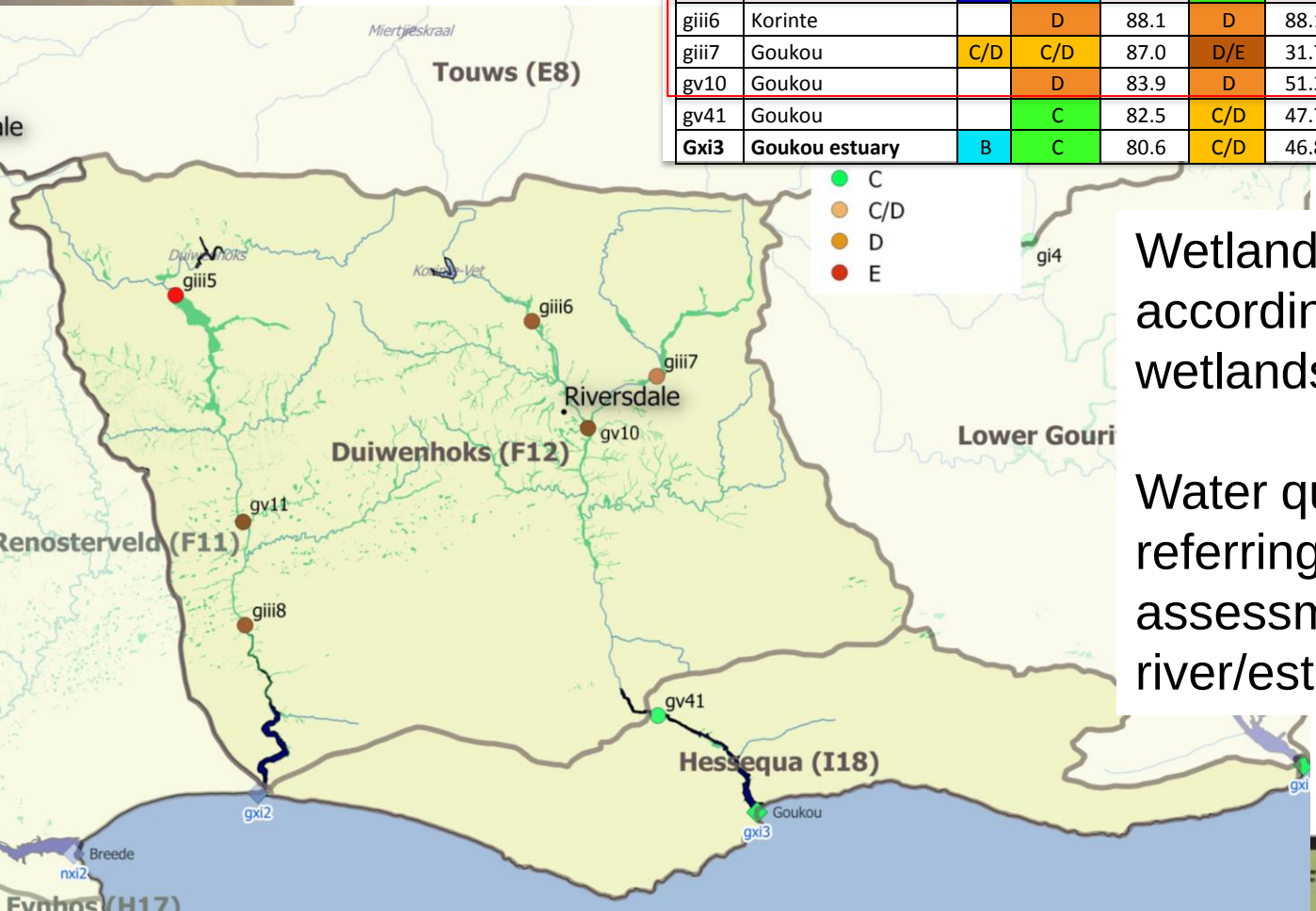


Wetland assessment according to river linked wetlands for surface water

Water quality assessment referring to the status quo assessment related to river/estuary node

Scenario consequences for water availability and supply

1. Define the scenarios
2. Describe surface flows and ecological conditions (EC)
3. Quantify changes in flow and ecological conditions
4. Estimate consequences for yield and water supply

    a) Determine deficits/shortfalls in meeting targeted ECs.

    b) Provisional cost estimates for additional water supply options to meet shortfalls when meeting targeted ECs.

Scenario consequences for water availability and supply

WMA portion	IUA	Future (2040) total water requirements (million m^3/a)	Net surplus/deficit (million m^3/a) under 2040 water requirements		
			Maintain PES	ESBC	REC
Breede	B5	60.4	-4.5	77.5	-4.5
	H16	32.7	-9.3	-8.3	-12.0
	H17	20.4	0.5	2.4	-17.1
	F10	9.8	-	44.9	-2.5
	A1	111.8	--34.1	67.1	-33.3
	A2 + A3	442.3	-70.9 (-105.0)	-24.8 (42.3)	-75.7 (-109.0)
	B4	42.0	-0.2	12.8	-19.2
	F9	17.7	-0.4 (-0.6)	16.0 (28.8)	-0.4 (-19.6)
	F11	39.5	-8.3 (-113.9)	-70.4 (1.71)	-8.3 (-136.9)
	Sub-total	776.6	-127.2	117.2	-173

Scenario consequences for water availability and supply

WMA portion	IUA	Future (2040) total water requirements (million m^3/a)	Net surplus/deficit (million m^3/a) under 2040 water requirements		
			Maintain PES	ESBC	REC
Breede	Sub-total	776.6	-127.2	117.2	-173
Gouritz	E8	50.4	-0.8	5.9	-0.8
	C6	23.3	-2.1	19.5	-2.1
	D7	151.0	-11.9	20.7	-36.8
	F13	4.6	-0.8 (-15.6)	77.9 (124.0)	-0.8 (-40.8)
	F12	13.1	-3.6	40.0	-3.6
	I18	4.7	-	0.5	-
	G14	22.3	-7.5	16.2	-7.5
	G15	68.4	-35.4	254.7	-42.4
	Sub-total	337.8	-62.1	435.4	-94
Total for WMA		1114.4	-121.1	552.6	-267

Groundwater condition

1. Define the scenarios
2. Describe surface flows and ecological condition (EC)
3. Quantify changes in flow and ecological condition
4. Determine impacts on available yield and water supply
5. Estimate impacts on groundwater condition

    a) Estimate impacts on groundwater status (related to stress), due to additional groundwater use to meet shortfalls.

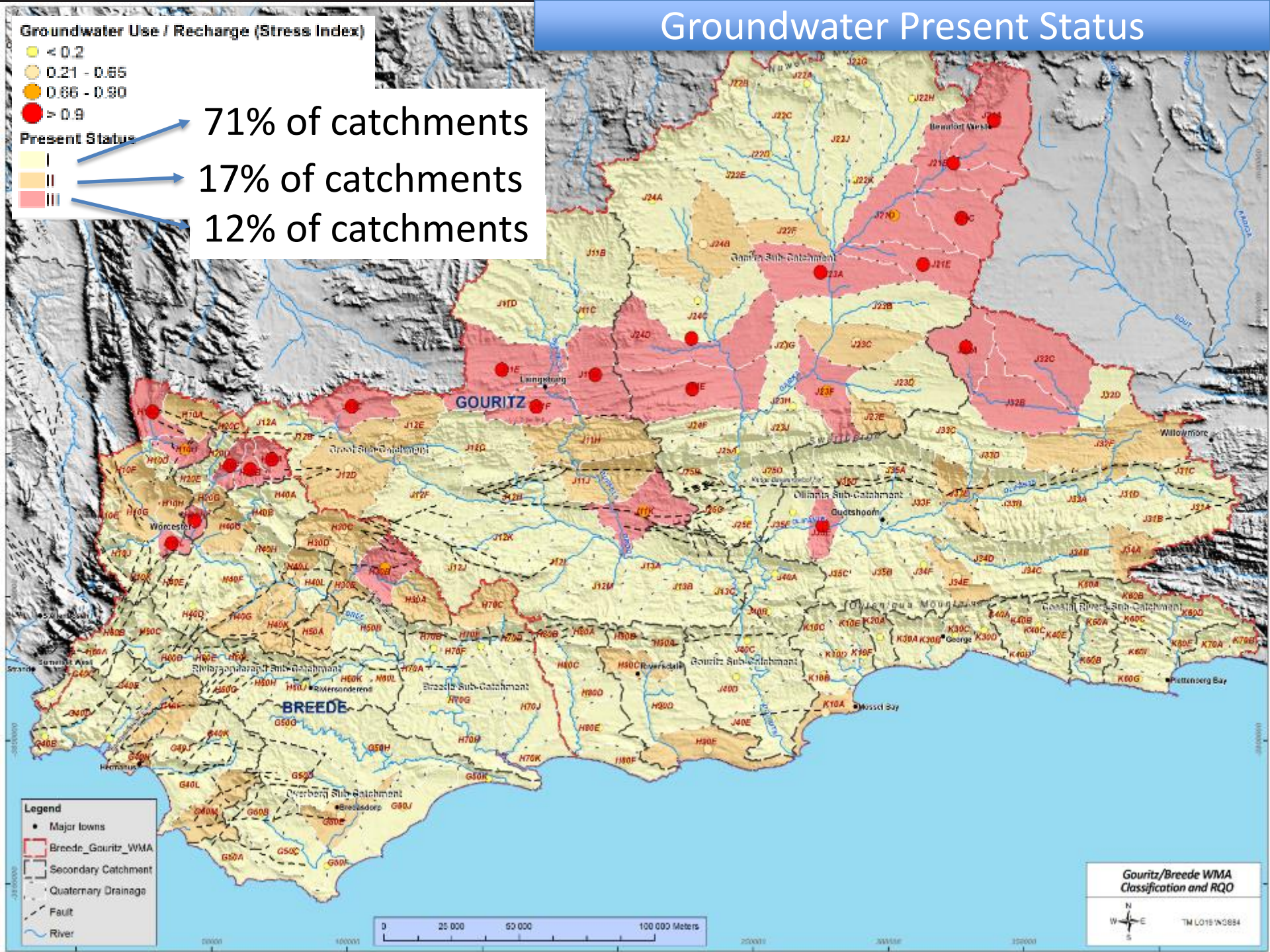
Scenario consequences on groundwater condition

- Definition for groundwater status relates to alteration from pre-development state: informed by use/recharge ('stress') ratio
- Level of 'stress' used to determine the resulting groundwater status per water resources classification scenario, resulting from increases in groundwater use for future development, or meeting surface water deficits

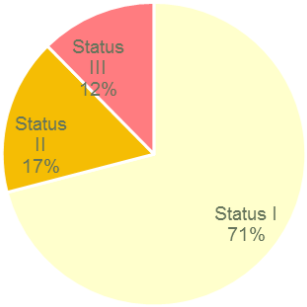
Groundwater Status Category		Generic Description	Use/ Recharge (Stress)
I	Minimally used	The water resource is minimally altered from its pre-development condition	≤20%
II	Moderately used	Localised low level impacts, but no negative effects apparent	20-65%
III	Heavily used	The water resource is significantly altered from its pre-development condition	>65%

(modified from Dennis *et al*, 2013)

Groundwater Present Status

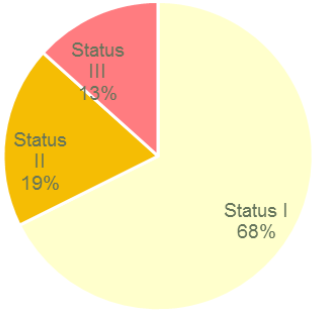


Scenario consequences for groundwater condition



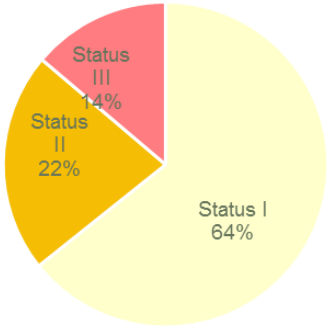
PES – Baseline:

- Total groundwater use 215 million m^3/a



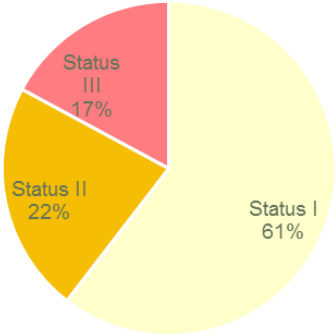
Future Growth – NoEC:

- Total groundwater use 293 million m3/a
- Increase in groundwater use 36%



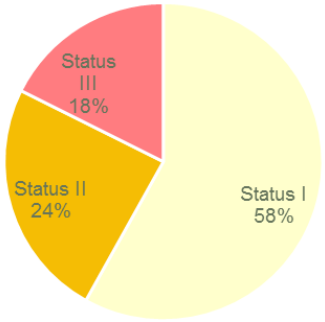
ESBC – Bottom line:

- Total groundwater use 338 million m3/a
- Increase in groundwater use 57%



Spatially targetted:

- Total groundwater use 429 million m3/a
- Increase in groundwater use 99%



REC:

- Total groundwater use 482 million m3/a
- Increase in groundwater use 124%

Socio-economic consequences

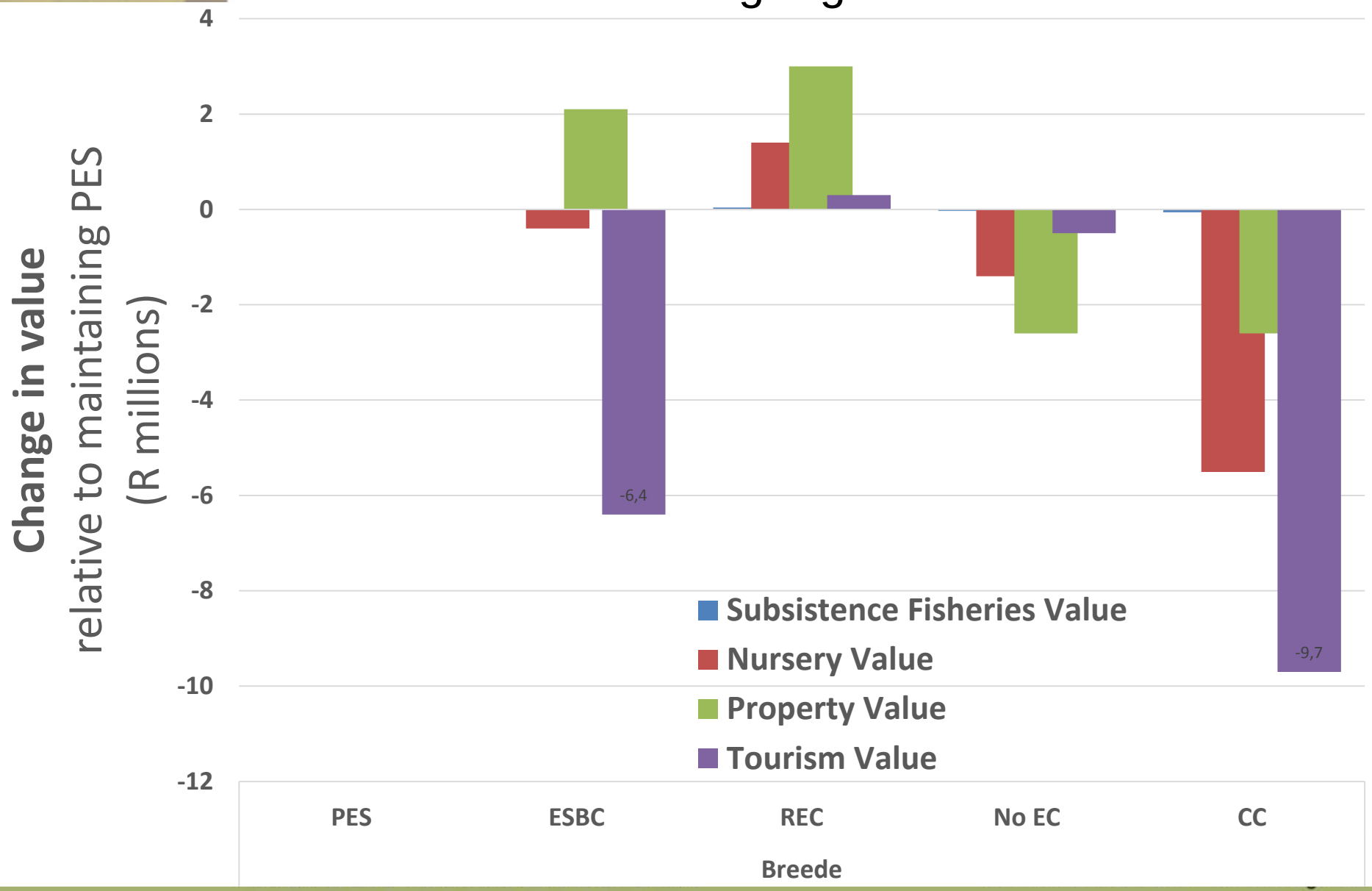
1. Define the scenarios
2. Describe surface flows and ecological condition (EC)
3. Quantify changes in flow and ecological condition
4. Determine impacts on available yield and water supply
5. Estimate impacts on groundwater condition
6. Quantify impacts on ecosystem goods, services and attributes
7. Determine overall socio-economic impacts

Ecosystem services considered

Category of service	Types of values	Description of EGSA	Independent variables related to estuary condition
Goods (Provisioning services) 	Subsistence fishing	Invertebrates and fish collected on a subsistence basis for consumption or bait	Invertebrate abundance Freshwater fish abundance Estuary line- and net fish abundance
Services (Regulating services) 	Nursery value	Contribution to marine fish catches due to the nursery habitat provided by estuaries	Abundance of estuary-dependent marine fish
Attributes (Cultural services) 	Tourism value & property value	A river, wetland or estuary's contribution to recreation/tourism appeal of a location	Overall health Line fish abundance Water quality

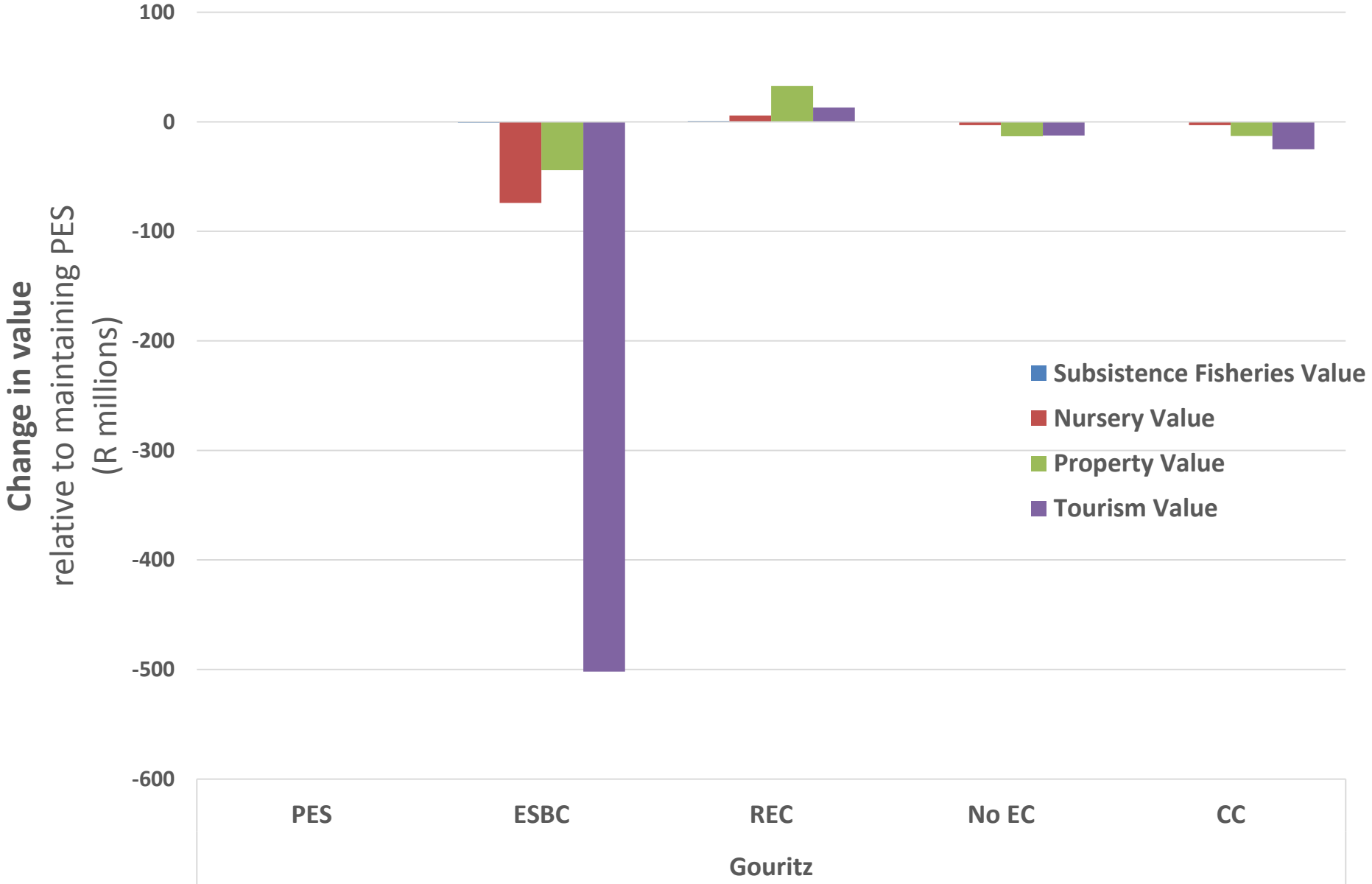
Changes to the value of aquatic ecosystem services

For the Breede-Overberg region:



Changes to the value of aquatic ecosystem services

For the Gouritz region:



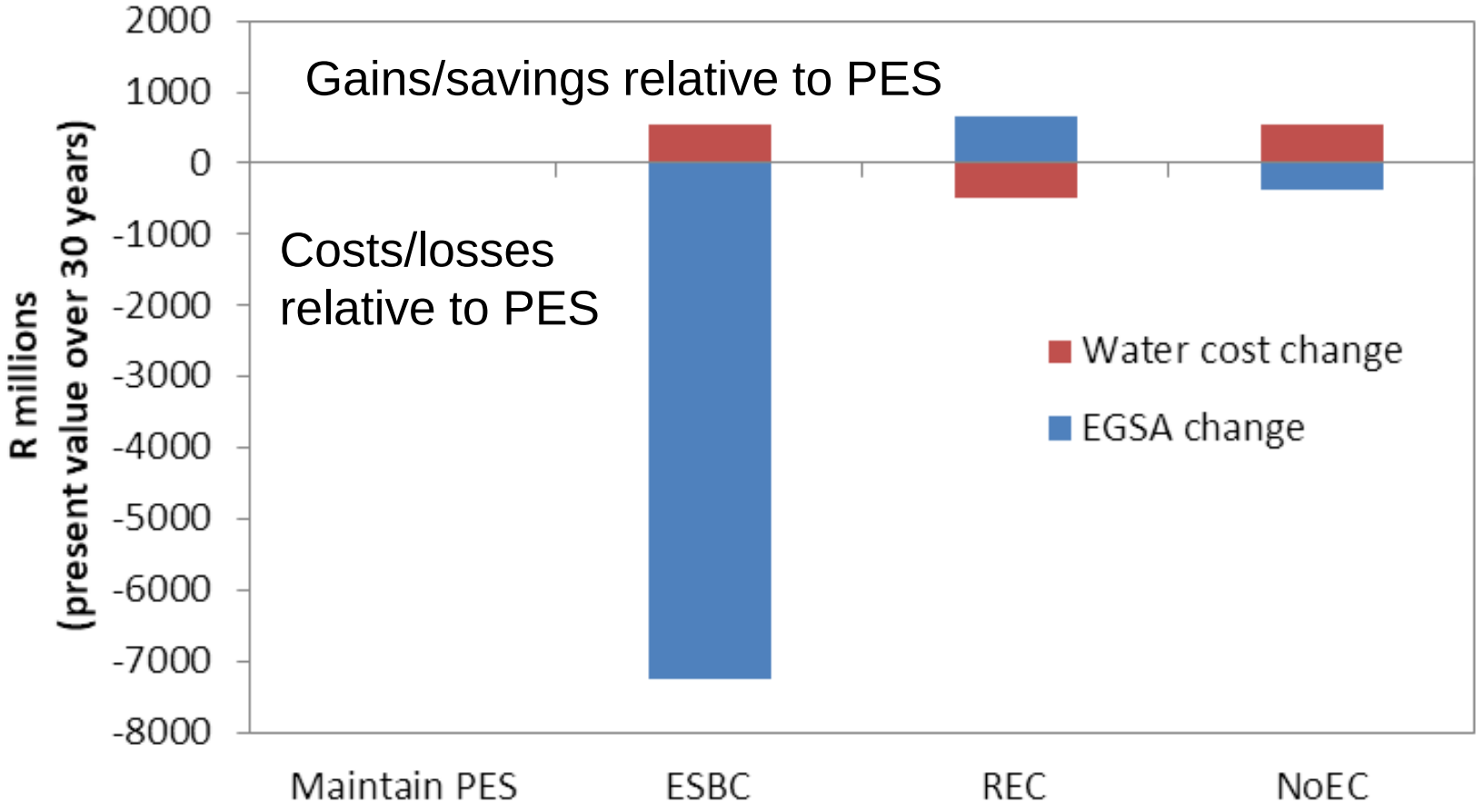
Additional water supply infrastructure costs

- Under current water requirements:
  - Maintaining PES does not incur any additional cost to meet water requirements.
  - ESBC incurs costs, since some areas will have to be restored from below a D, costs of R55 million.
  - REC needs allocating more water to the ecological Reserve, costs of R913 million.

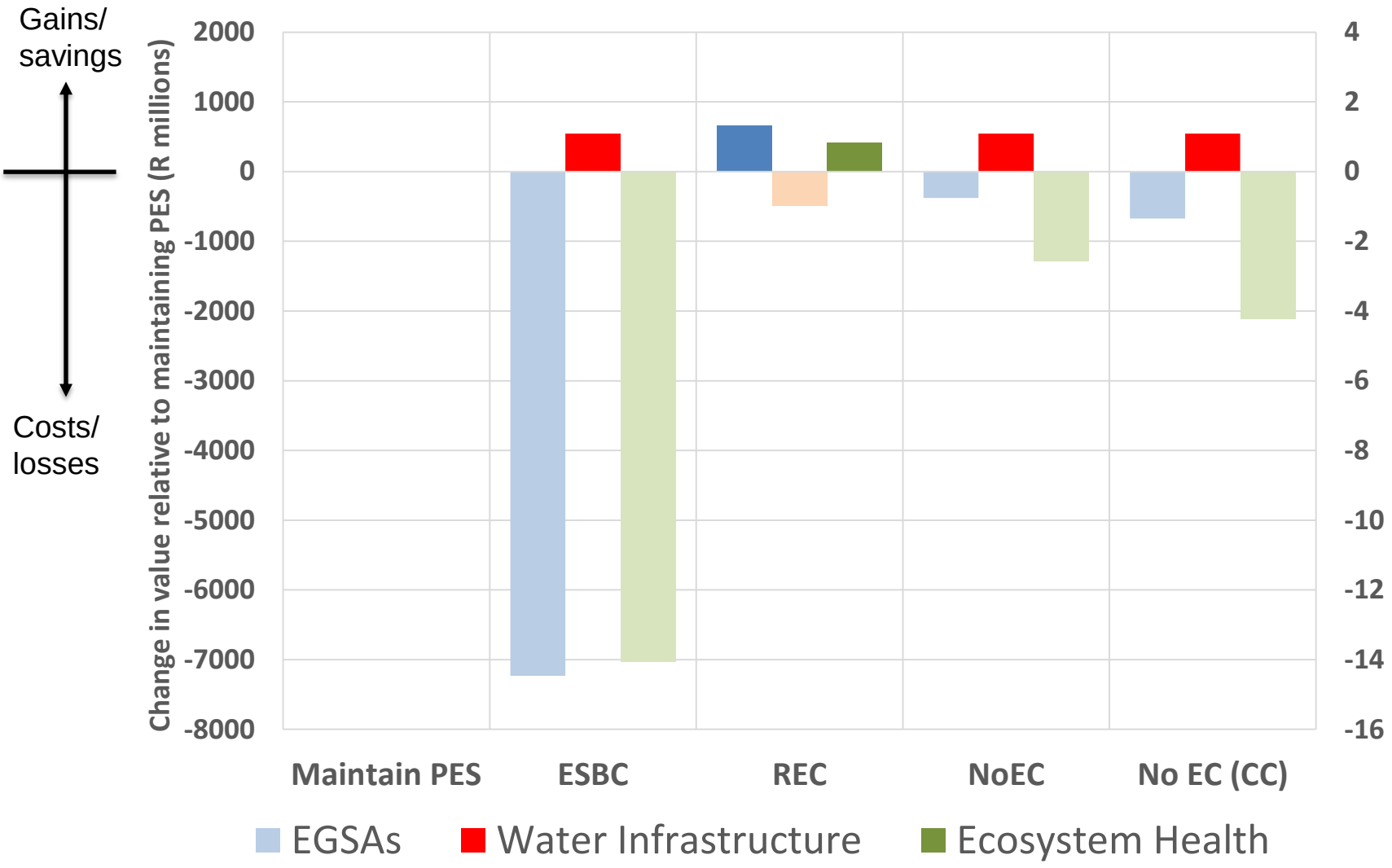
- Under future water requirements:
  - Maintaining PES requires the same water allocation as present. Additional infrastructure to meet the higher water requirements results in additional shortfalls, costs of R2 602 million.
  - ESBC to meet future water demands costs R1 674 million.
  - REC allocating more water to the ecological Reserve, costs of R3 442 million.

Overall socio-economic consequences

- Highest net benefit is under the REC scenario



Overall Scenario Comparison



Overall Scenario Comparison

Scenario	Ecological condition	Groundwater	Socio-economics
Spatially targeted	A balance of ecological conditions, similar to baseline.	Increase in groundwater use, alleviated in some cases.	Simiar improvement in EGSAs, moderate water supply costs
REC	Improvements in ecological conditions based on flow alone for some areas, others require other interventions.	Significant increase in groundwater use.	Greatest improvement in EGSAs, high water supply costs
No EC -Future growth	Reductions in ecological conditions, but not as severe as the ESBC scenario, downstream WQ deteriorates.	Although has biodiversity impacts it alleviates pressure on groundwater.	Significant decreases to EGSAs, lowest water supply costs
No EC - Climate change	Impacts of climate change worse for ecological conditions than the other scenarios. Reduced flow and increased evaporation will aggravate impacts on water quality.	Increase in groundwater use.	Largest decrease to EGSAs, relatively low water supply costs
ESBC	Reduced ecological conditions, severe impacts at Gouritz estuaries, downstream WQ deteriorates.	-	Very major decreases to EGSAs; low water supply costs

Comparison of Resulting Water Resource Classes

The results for each scenario were compared to determine the water resource classes for each IUA:

I. IUAs with a majority of A or B conditions
II. IUAs with a majority of B or C conditions
III. IUAs with a majority of C or D conditions

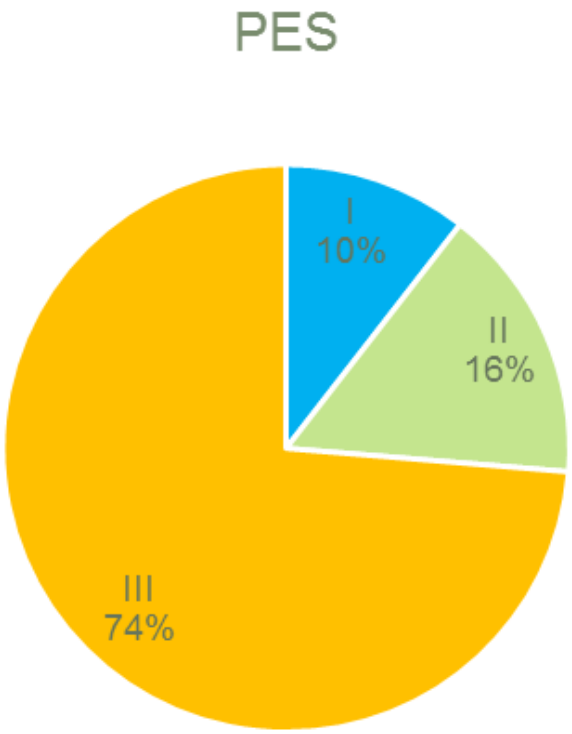
Minimally used

Moderately used

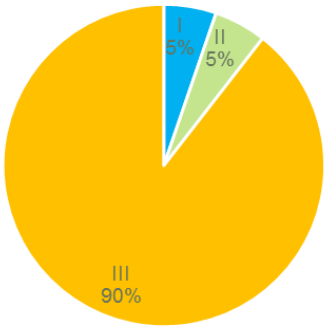
Heavily used

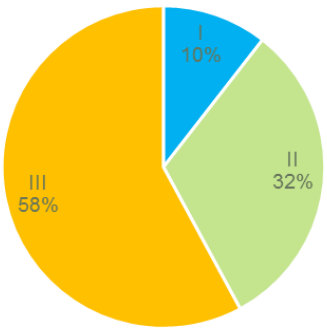
	Percentage (%) of nodes in the IUA falling into the indicated groups				
	A or A/B	B or B/C	C or C/D	D	< D
Class I	60	40	20	1	-
Class II		60	30	5	-
Class III Either:			70	20	-
Or:				100	-

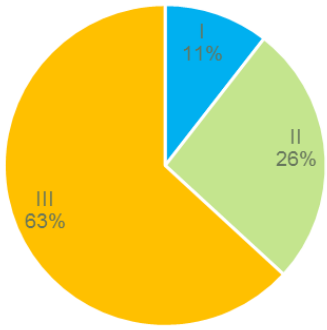
Comparison of Resulting Water Resource Classes

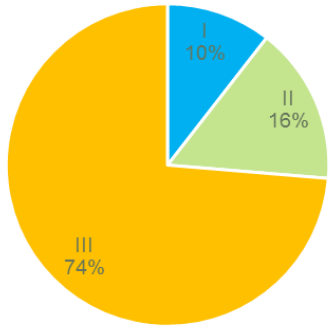


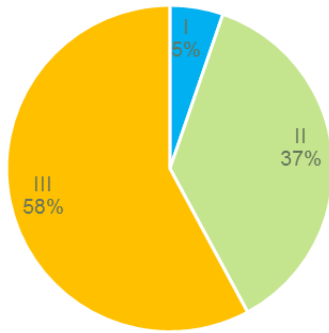
- All scenarios are mostly Class III
- ESBC is entirely Class III
- Spatially Targeted scenario is the most balanced for II and III but low I









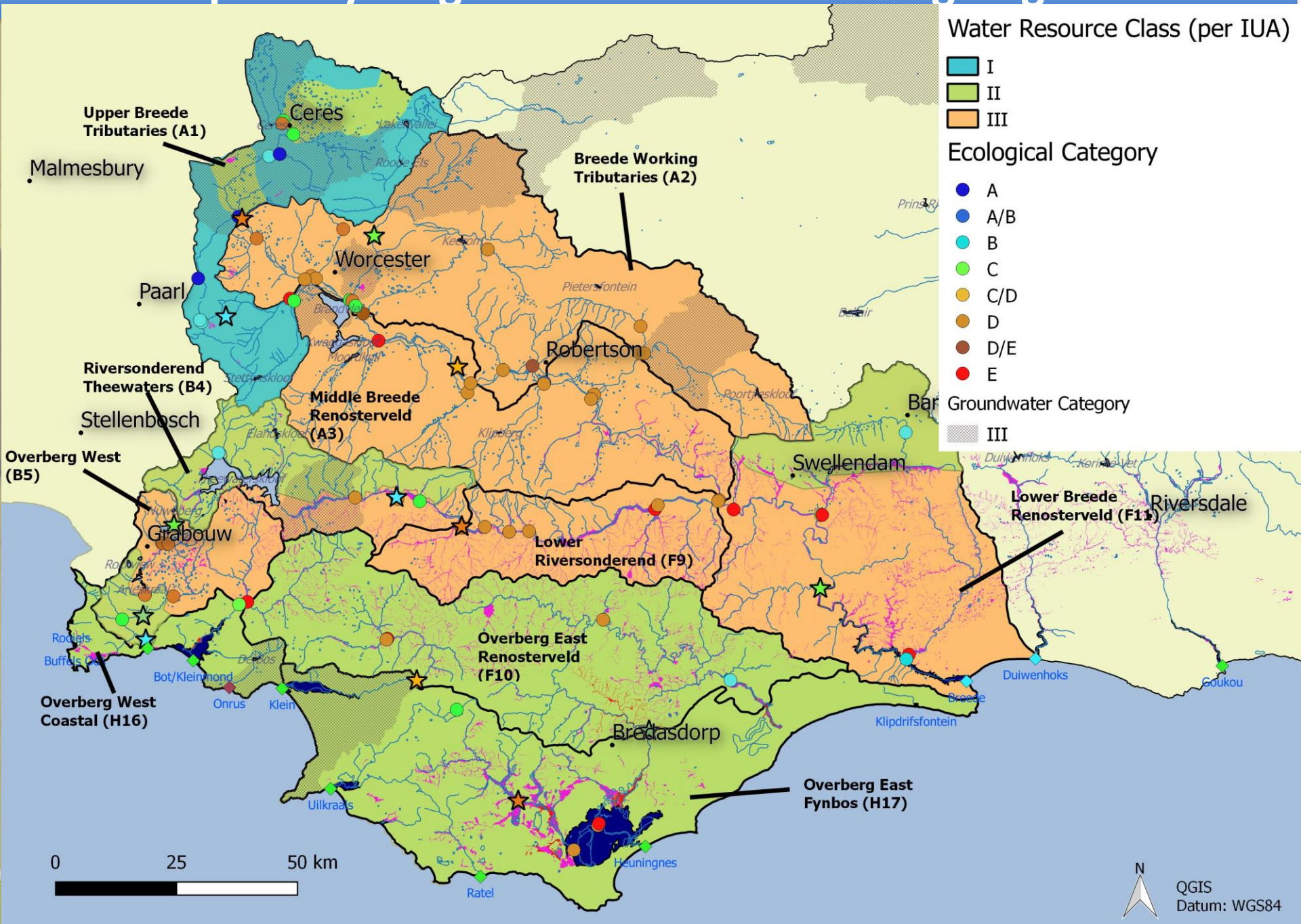


Consideration of the Spatially Targeted ("Mixed") Scenario

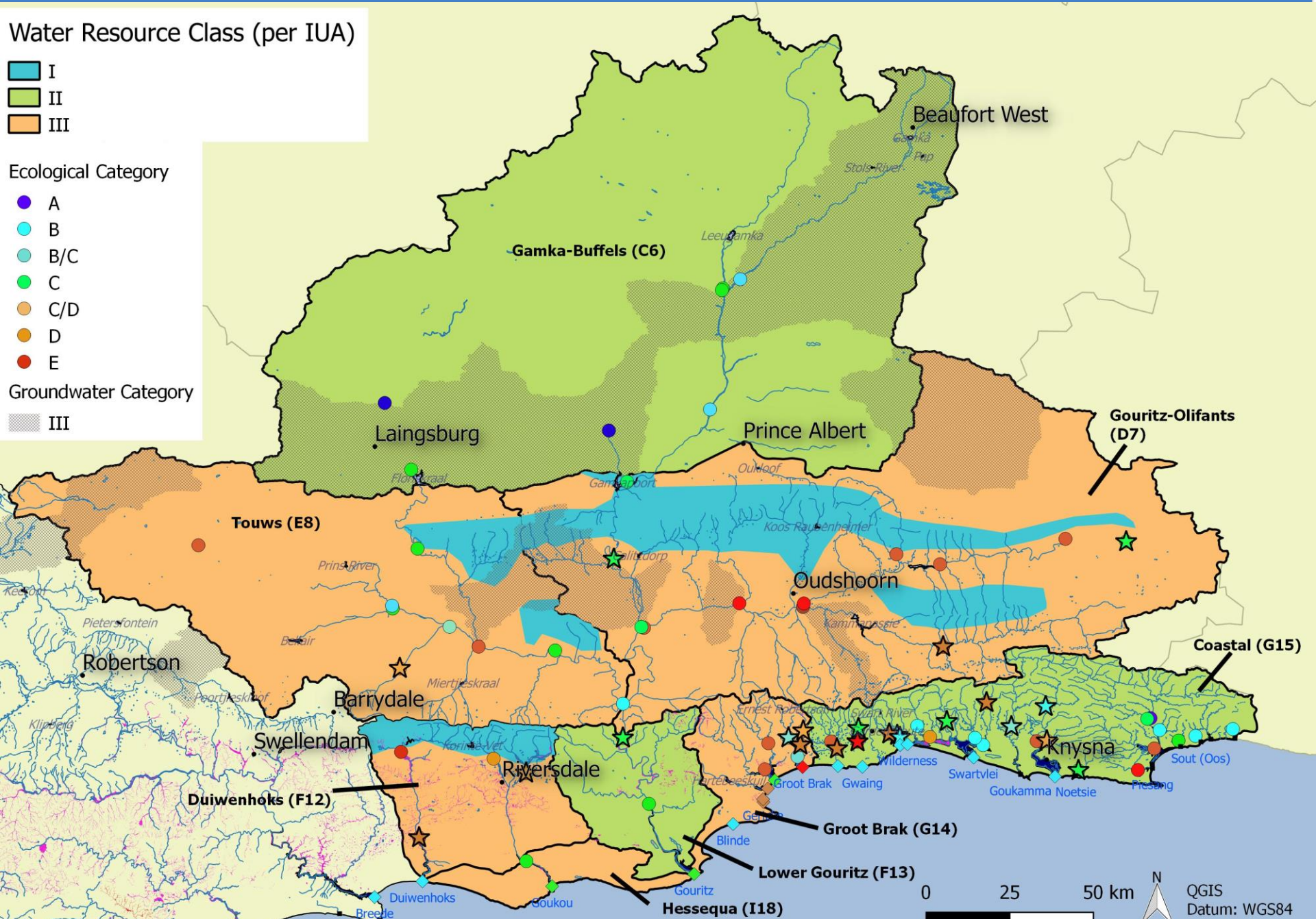
Comparison of Resulting Water Resource Classes

	IUA		PES - Baseline	ESBC - Bottom line	REC	NoEC (Future Growth)	Climate change (10%)	STS
Breede-Overberg	Upper Breede Tributaries	**A1a**	I	III	I	I	I	I
	Upper Breede Tributaries	A1b	III	III	III	III	III	III
	Middle Breede Renosterveld	A2	III	III	III	III	III	III
	Breede Working Tributaries	A3	III	III	III	III	III	III
	Riversonderend Theewaters	**B4a**	II	III	II	II	II	II
	Riversonderend Theewaters	B4b	III	III	III	III	III	III
	Lower Riversonderend	F9	III	III	III	III	III	III
	Overberg West	**B5**	III	III	III	III	III	III
	Overberg West Coastal	**H16**	III	III	III	III	III	II
	Overberg East Renosterveld	F10	III	III	III	III	III	II
	Overberg East Fynbos	H17	III	III	III	III	III	III
	Lower Breede Renosterveld	**F11a**	II	III	II	II	II	II
	Lower Breede Renosterveld	F11b	III	III	III	III	III	III
Gouritz-Coastal	Gamka Buffels	C6	II	III	II	II	II	II
	Touws	E8	II	III	II	III	III	III
	Gouritz-Olifants	D7	III	III	III	III	III	III
	Lower Gouritz	F13	II	III	III	III	III	II
	Duiwenhoks	**F12a**	III	III	III	III	III	III
		F12b	III	III	III	III	III	III
	Hessequa	I18	III	III	III	III	II	III
	Groot Brak	G14	III	III	III	III	III	III
	Coastal	**G15**	II	III	II	II	II	II

Spatially Targeted - Breede-Overberg Region

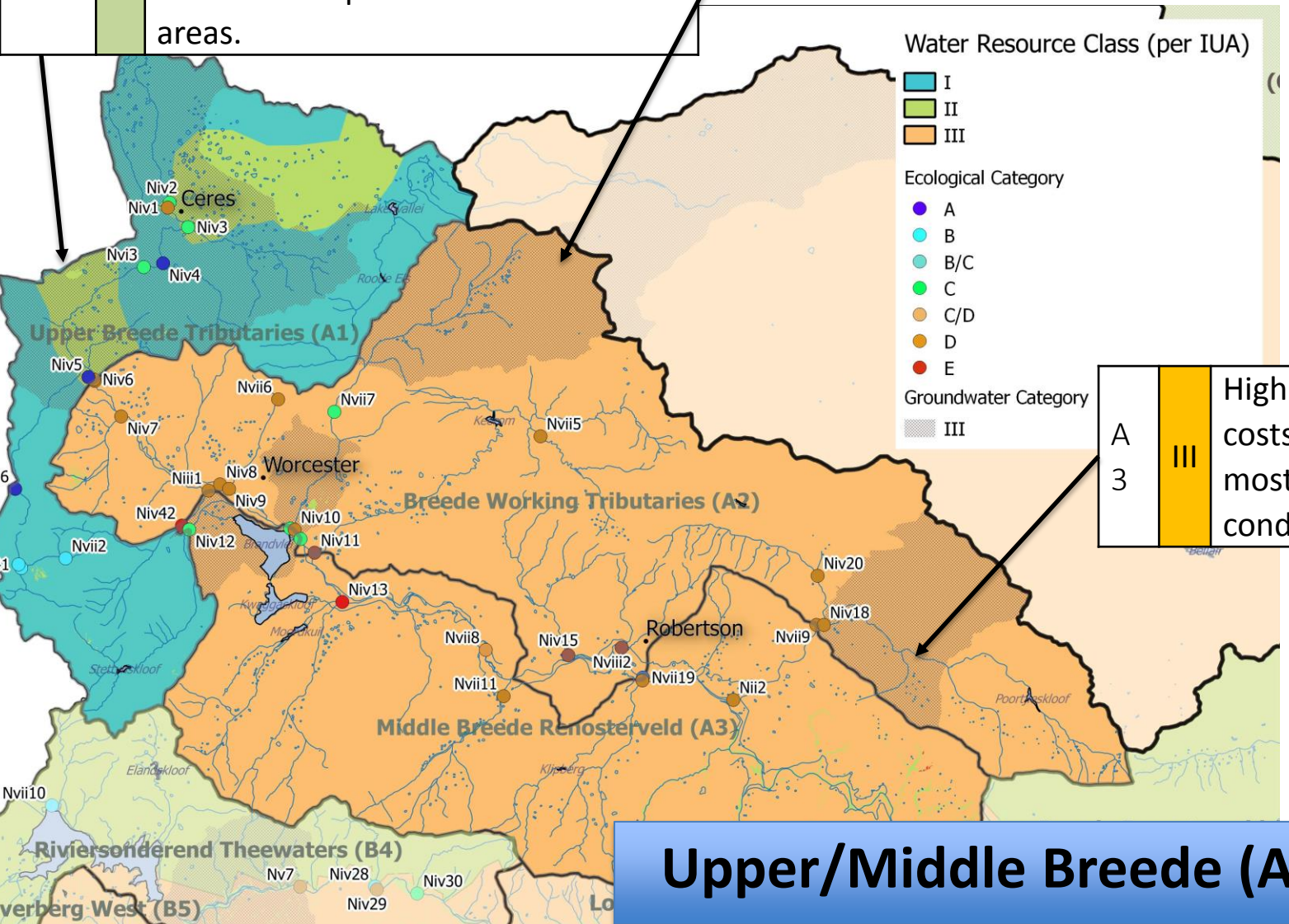


Spatially Targeted - Gouritz-Coastal Region



A1a	I	Source and nature reserve areas need to be maintained in a good condition.
A1b	II	High infrastructure costs to implement REC so apply ESBC outside of important conservation areas.

A2	III	High infrastructure costs so ESBC. Some river nodes are within strategic water source areas, but most in fair to poor condition.

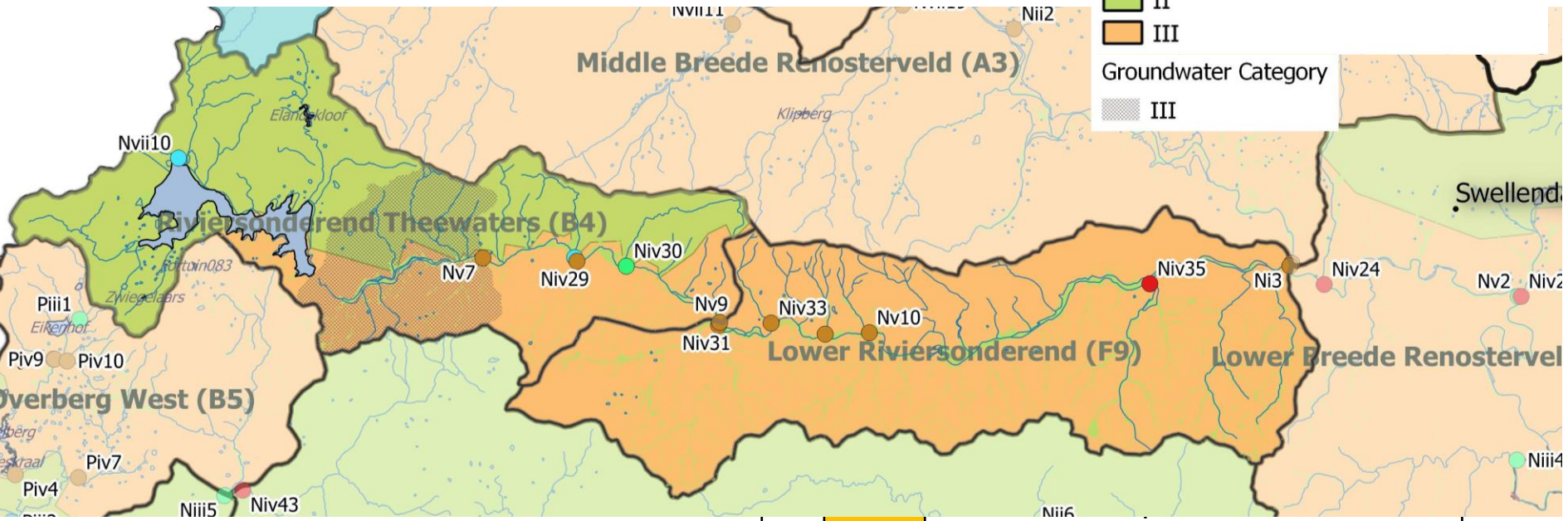


A 3	III	High infrastructure costs so ESBC. Rivers mostly in poor condition.

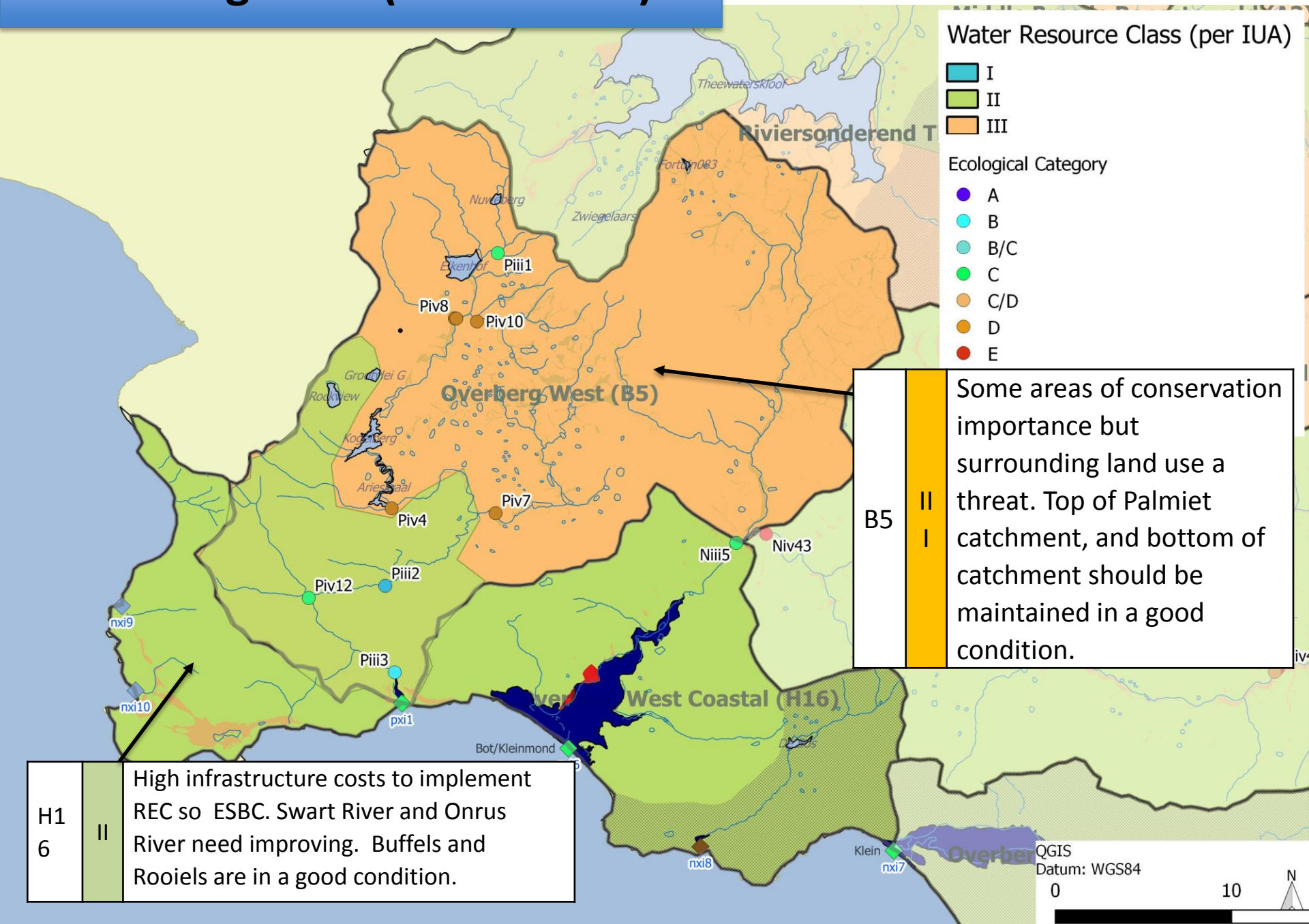
Upper/Middle Breede (A1, A2, A3)

Riversonderend (B4 & F9)

4a	II	Upper tributaries within strategic water source area and Hawequa NR so maintained in a good condition.
4b	III	High infrastructure costs to implement REC so ESBC. Most rivers in poor condition.



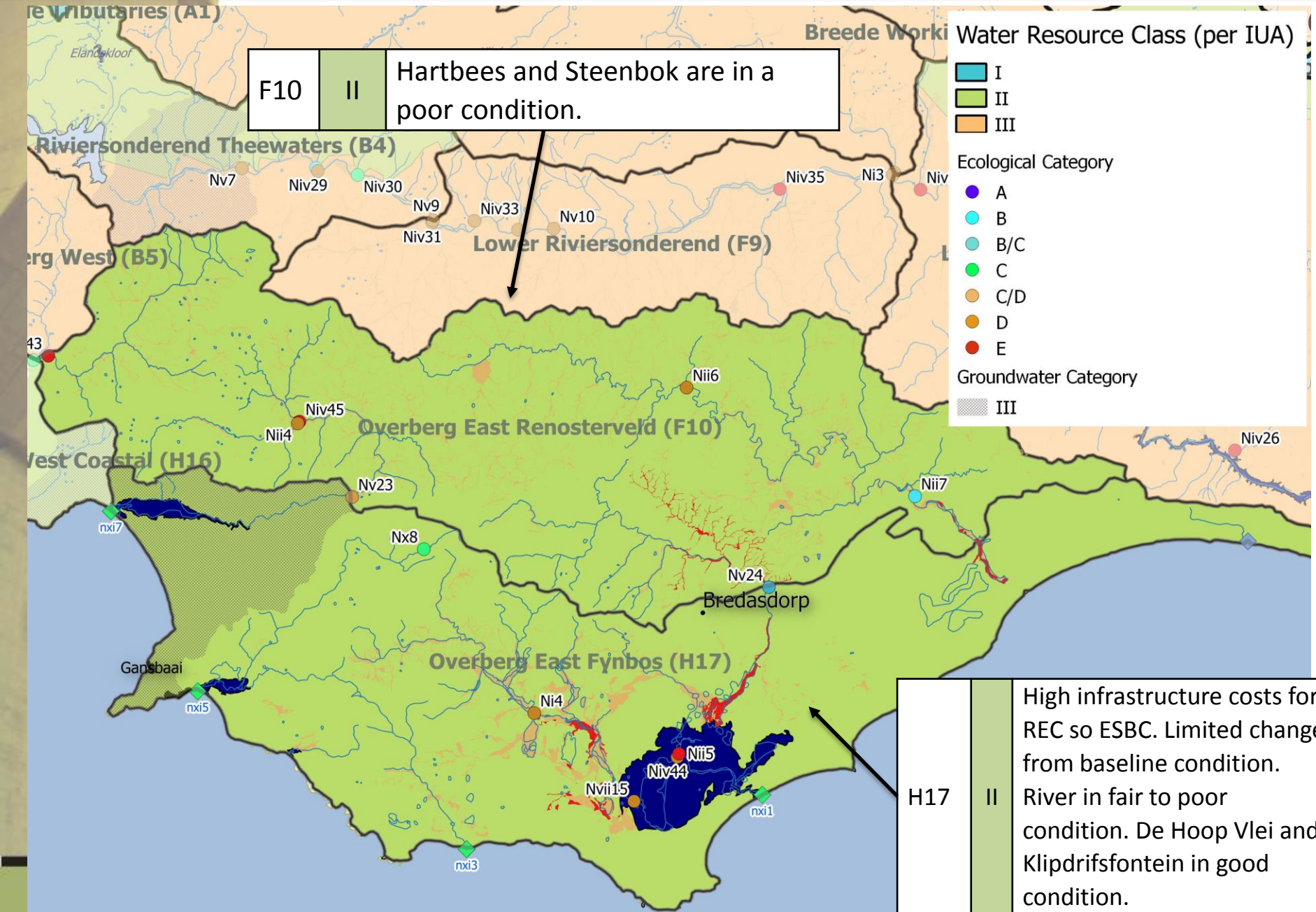
Overberg West (B5 and H16)



B5	II I	Some areas of conservation importance but surrounding land use a threat. Top of Palmiet catchment, and bottom of catchment should be maintained in a good condition.

H16	II	High infrastructure costs to implement REC so ESBC. Swart River and Onrus River need improving. Buffels and Rooiels are in a good condition.

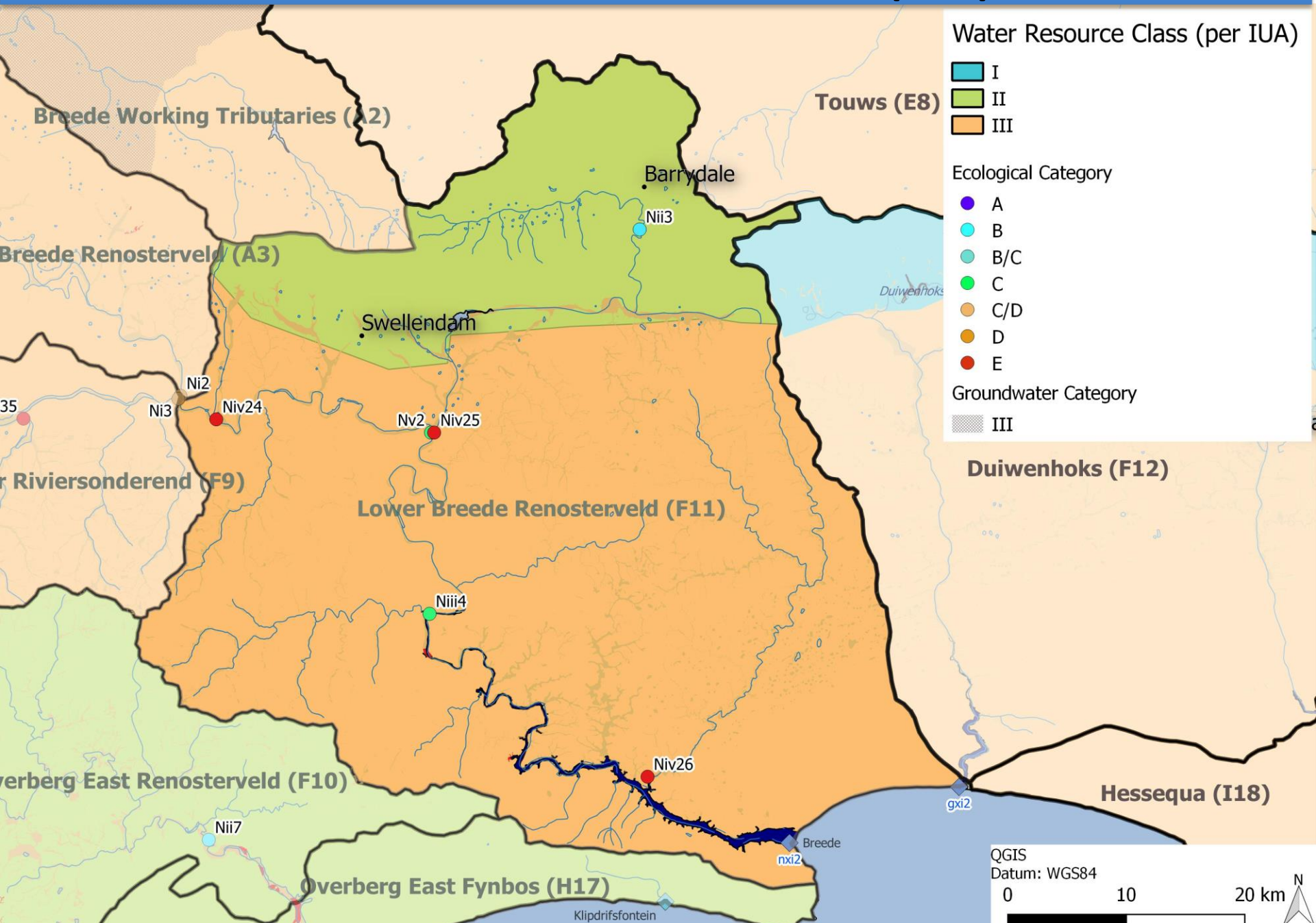
Overberg East (F10 and H17)



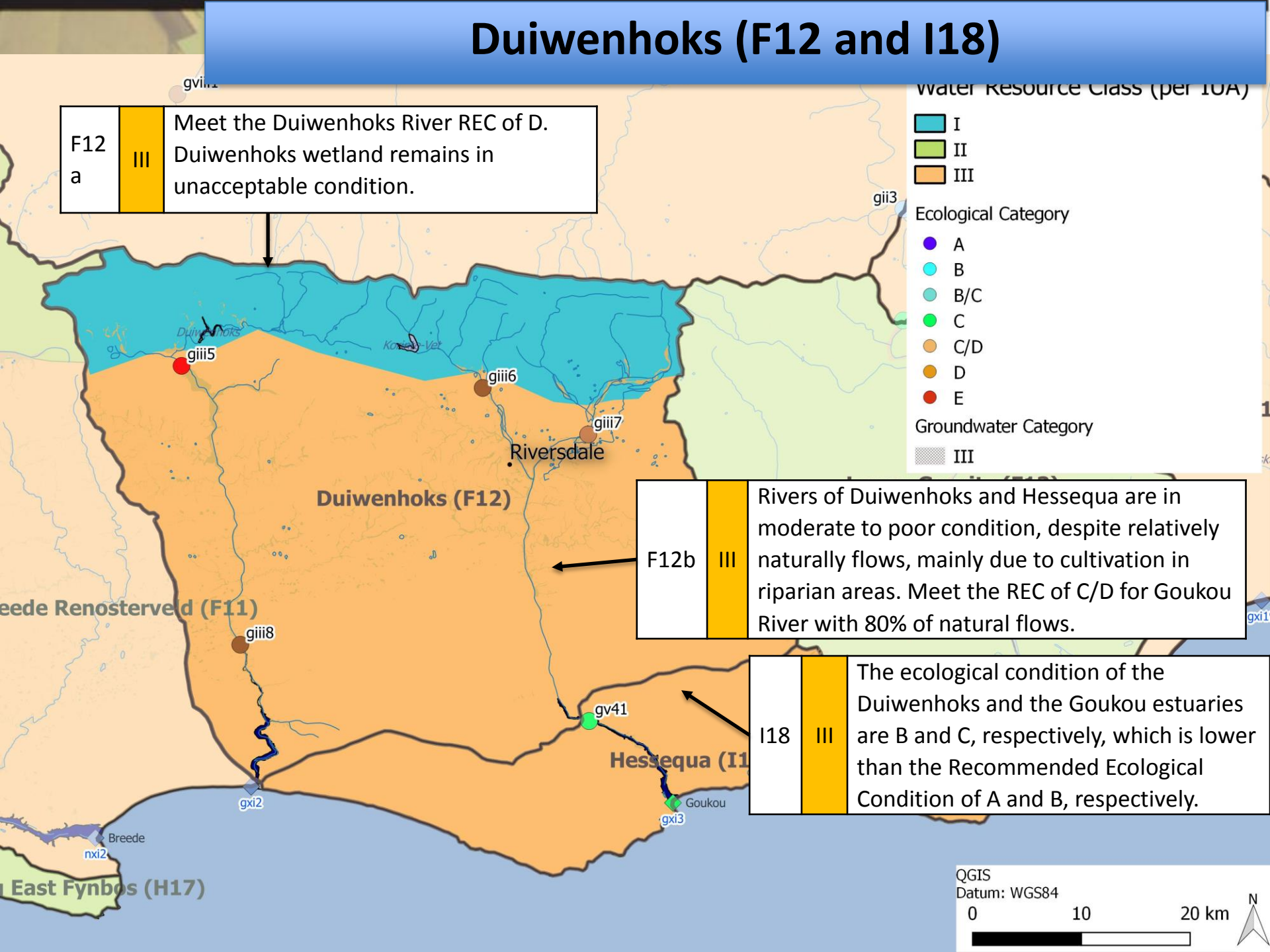
F10	II	Hartbees and Steenbok are in a poor condition.

H17	II	High infrastructure costs for REC so ESBC. Limited change from baseline condition. River in fair to poor condition. De Hoop Vlei and Klipdrifsfontein in good condition.

Lower Breede Renosterveld (F11)



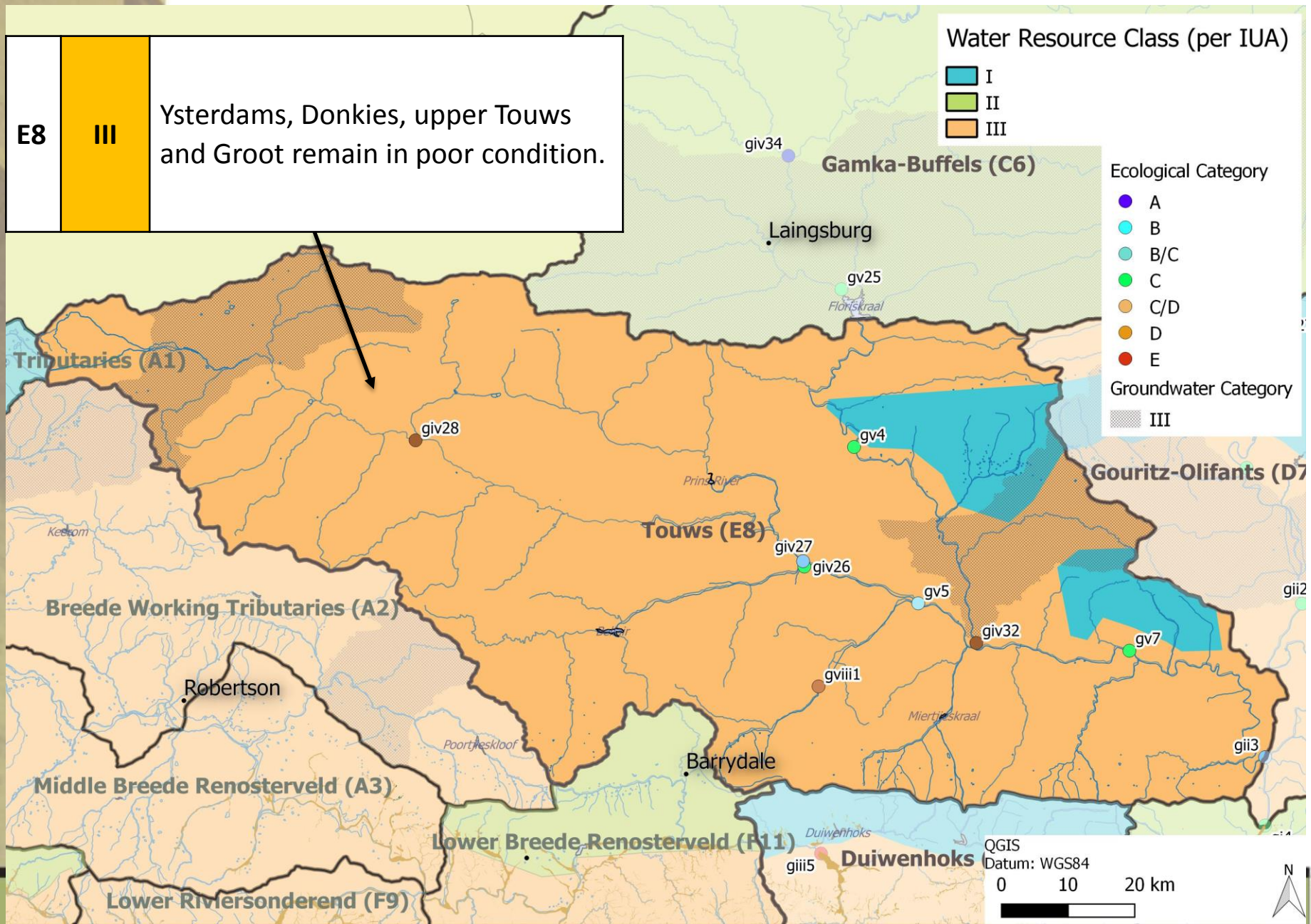
Duiwenhoks (F12 and I18)



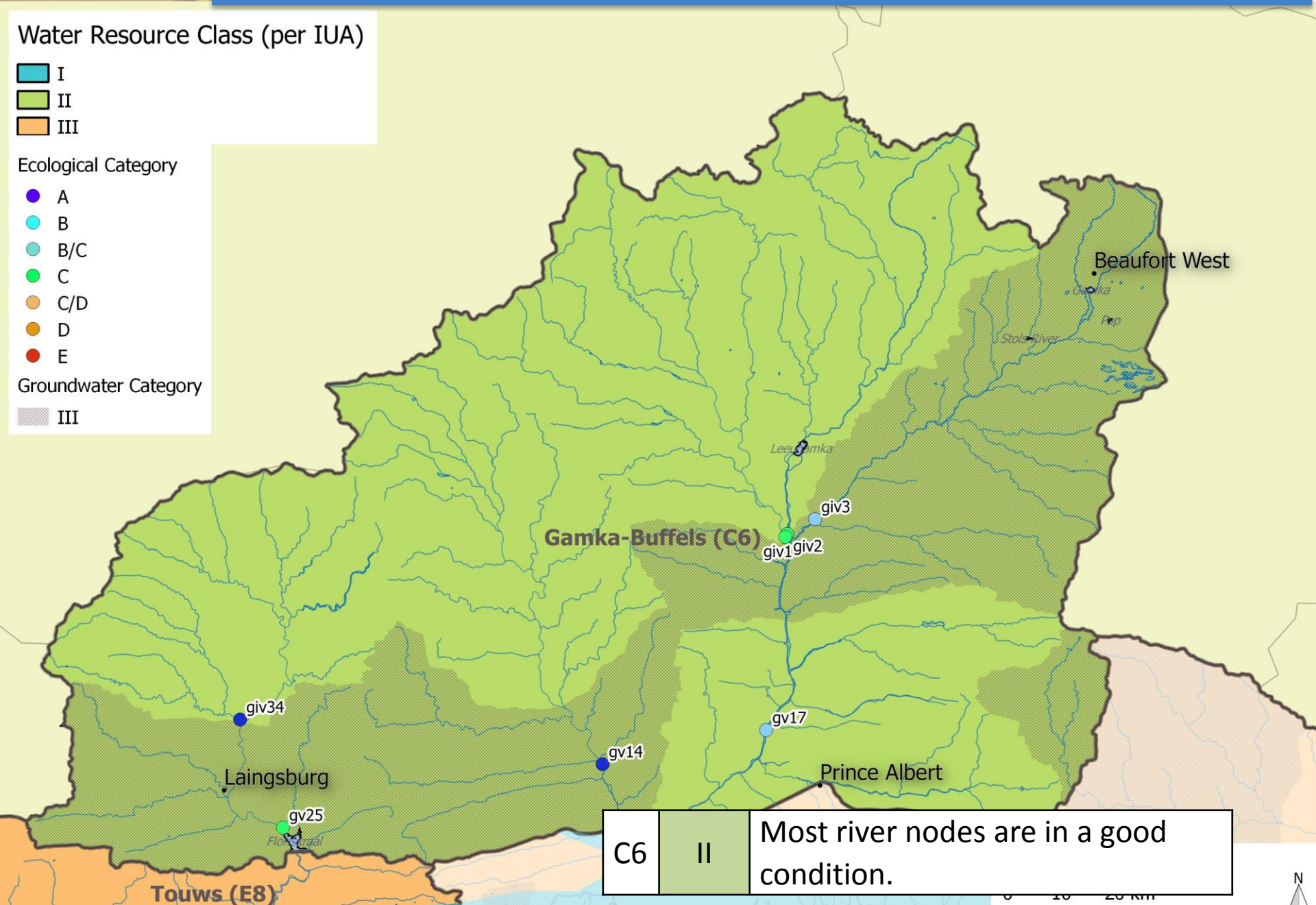
F12 a	III	Meet the Duiwenhoks River REC of D. Duiwenhoks wetland remains in unacceptable condition.
F12b	III	Rivers of Duiwenhoks and Hessequa are in moderate to poor condition, despite relatively naturally flows, mainly due to cultivation in riparian areas. Meet the REC of C/D for Goukou River with 80% of natural flows.
I18	III	The ecological condition of the Duiwenhoks and the Goukou estuaries are B and C, respectively, which is lower than the Recommended Ecological Condition of A and B, respectively.

Touws (E8)

E8	**III**	Ysterdams, Donkies, upper Touws and Groot remain in poor condition.



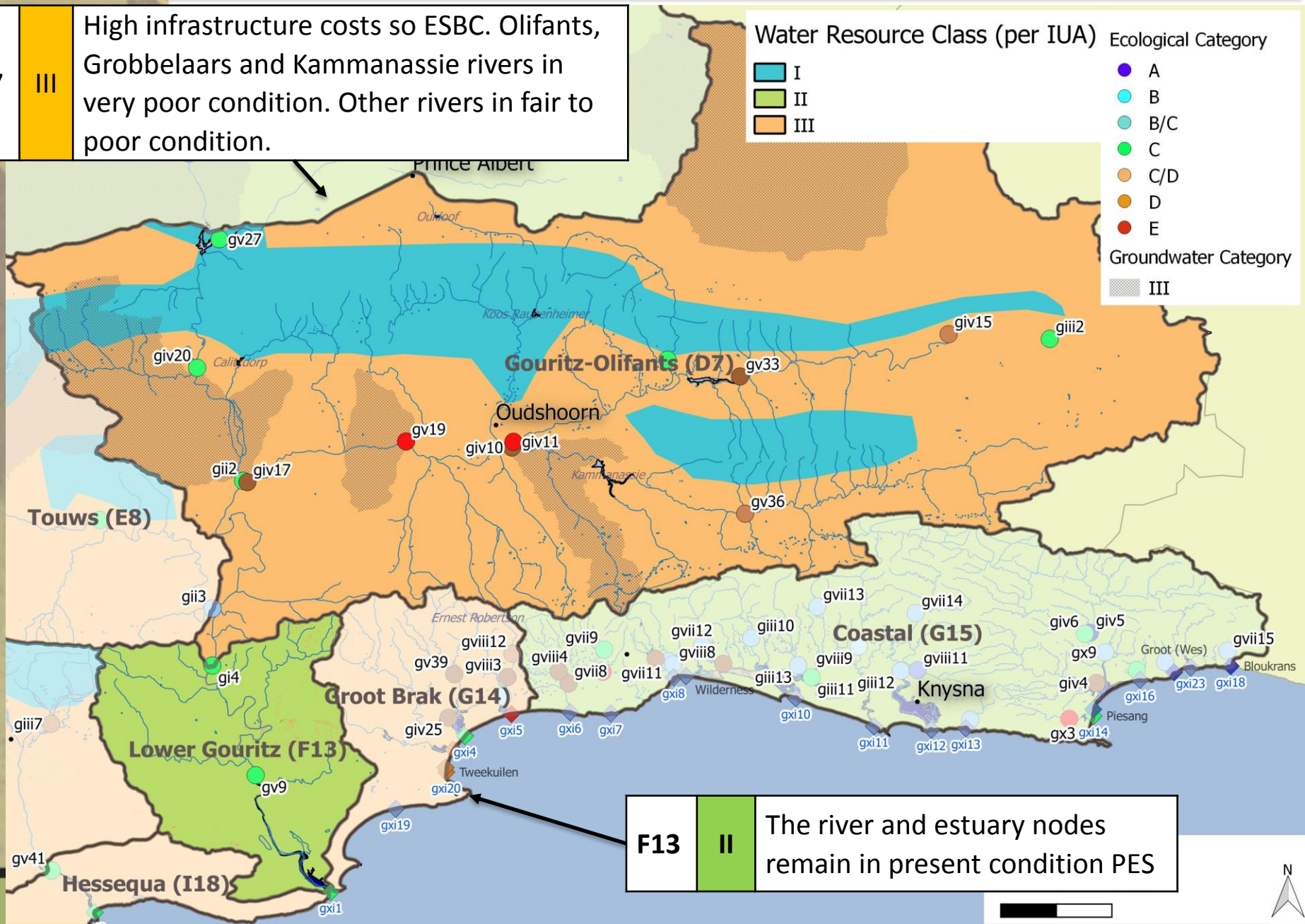
Gamka-Buffels (C6)



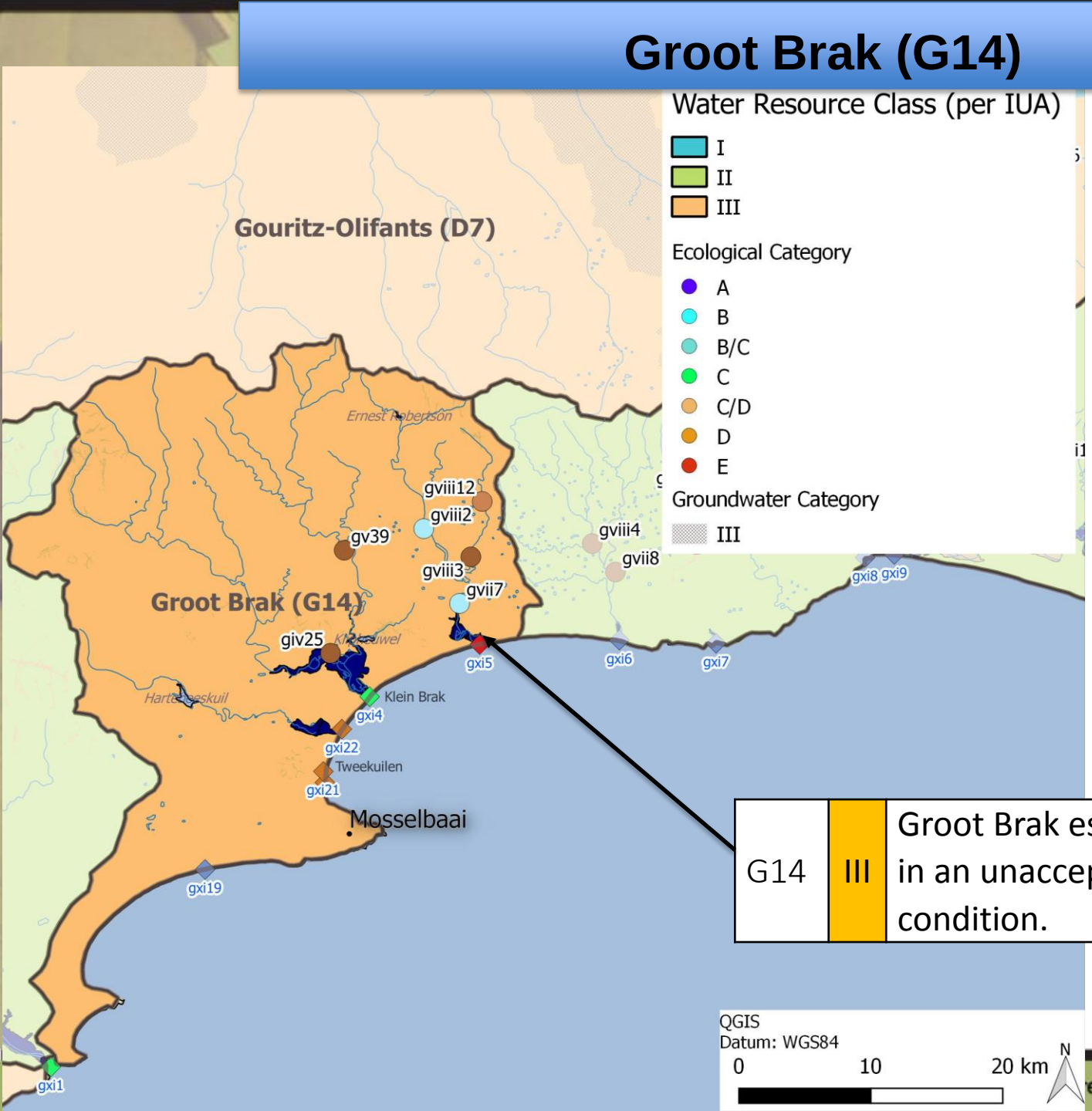
C6	II	Most river nodes are in a good condition.

Gouritz (D7 and F13)

D7	III	High infrastructure costs so ESBC. Olifants, Grobbelaars and Kammanassie rivers in very poor condition. Other rivers in fair to poor condition.



Groot Brak (G14)



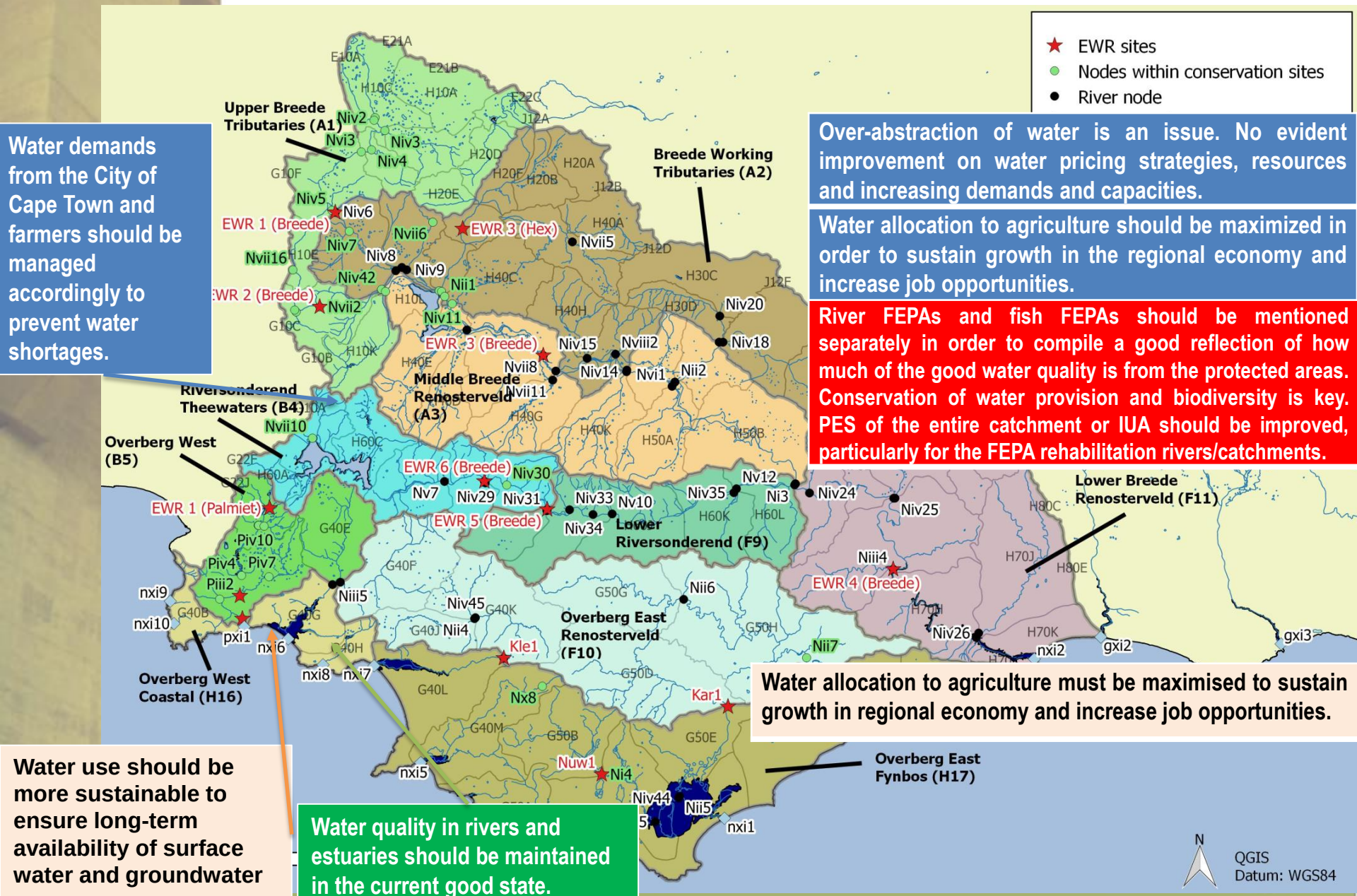
G14	III	Groot Brak estuary remains in an unacceptably poor condition.

Coastal (G15)

G15	II	High infrastructure costs to implement REC so water requirements for ESBC used. Most rivers and estuaries maintained in good condition.

Additional Slides

Vision for the Breede-Overberg region



Water demands from the City of Cape Town and farmers should be managed accordingly to prevent water shortages.

Over-abstraction of water is an issue. No evident improvement on water pricing strategies, resources and increasing demands and capacities.

Water allocation to agriculture should be maximized in order to sustain growth in the regional economy and increase job opportunities.

River FEPAs and fish FEPAs should be mentioned separately in order to compile a good reflection of how much of the good water quality is from the protected areas. Conservation of water provision and biodiversity is key. PES of the entire catchment or IUA should be improved, particularly for the FEPA rehabilitation rivers/catchments.

Water allocation to agriculture must be maximised to sustain growth in regional economy and increase job opportunities.

Water use should be more sustainable to ensure long-term availability of surface water and groundwater

Water quality in rivers and estuaries should be maintained in the current good state.

Vision for the Gouritz-Outeniqua region

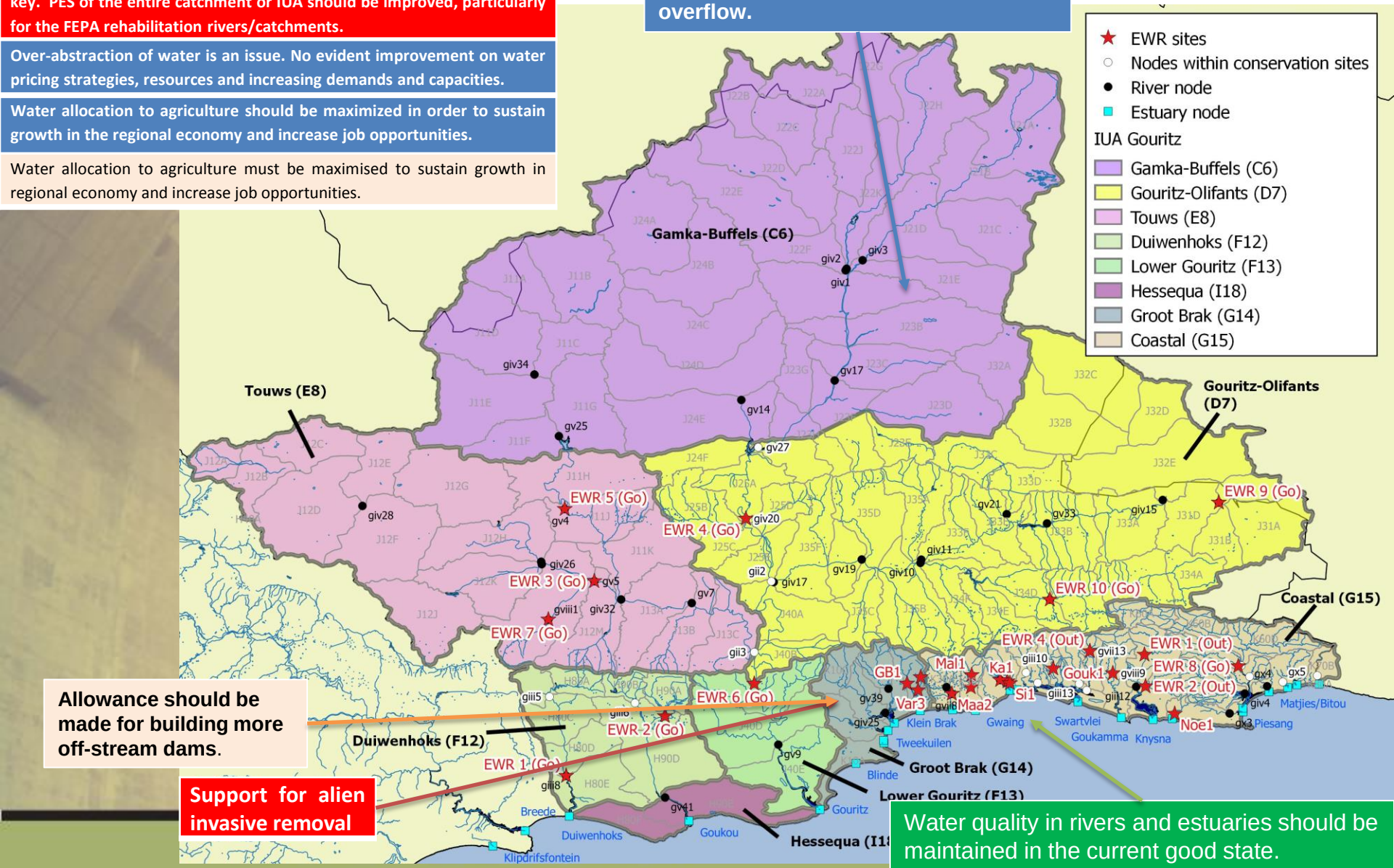
River FEPAs and fish FEPAs should be mentioned separately in order to compile a good reflection of how much of the good water quality is from the protected areas. Conservation of water provision and biodiversity is key. PES of the entire catchment or IUA should be improved, particularly for the FEPA rehabilitation rivers/catchments.

Over-abstraction of water is an issue. No evident improvement on water pricing strategies, resources and increasing demands and capacities.

Water allocation to agriculture should be maximized in order to sustain growth in the regional economy and increase job opportunities.

Water allocation to agriculture must be maximised to sustain growth in regional economy and increase job opportunities.

Maintenance in riverbeds where the dam is built. Riverbed should be kept clear of obstructions in case of dam overflow.



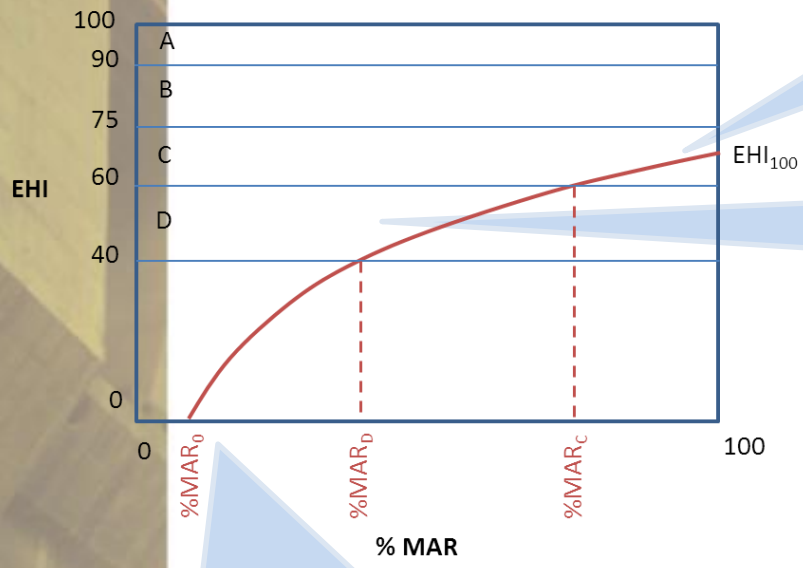
Allowance should be made for building more off-stream dams.

Support for alien invasive removal

Water quality in rivers and estuaries should be maintained in the current good state.

Ecological Category	PES % Score	Description of the habitat
A A/B	92-100% 87-92%	Still in a Reference Condition
B B/C	82-87% 77-82%	Slightly modified from the Reference Condition. A small change in natural habitats and biota has taken place but the ecosystem functions are essentially unchanged
C C/D	62-77% 57-62%	Moderately modified from the Reference Condition. Loss and change of natural habitat and biota has occurred, but the basic ecosystem functions are still predominantly unchanged
D D/E	42-57% 37-42%	Largely modified from the Reference Condition. A large loss of natural habitat, biota and basic ecosystem functions has occurred
E E/F	22-37% 17-22	Seriously modified from the Reference Condition. The loss of natural habitat, biota and basic ecosystem functions is extensive
F	0-17%	Critically/Extremely modified from the Reference Condition. The system has been critically modified with an almost complete loss of natural habitat and biota. In the worst instances, basic ecosystem functions have been destroyed and the changes are irreversible

ESTUARIES



3. It is often not possible to restore health to 100% of natural through restoration of flow alone due to other non-flow related impacts

1. Relationship between health and flow is logarithmic – health declines increasingly rapidly as %MAR declines

2. The ability of an estuary to support estuarine biodiversity drops to zero before MAR drops to zero

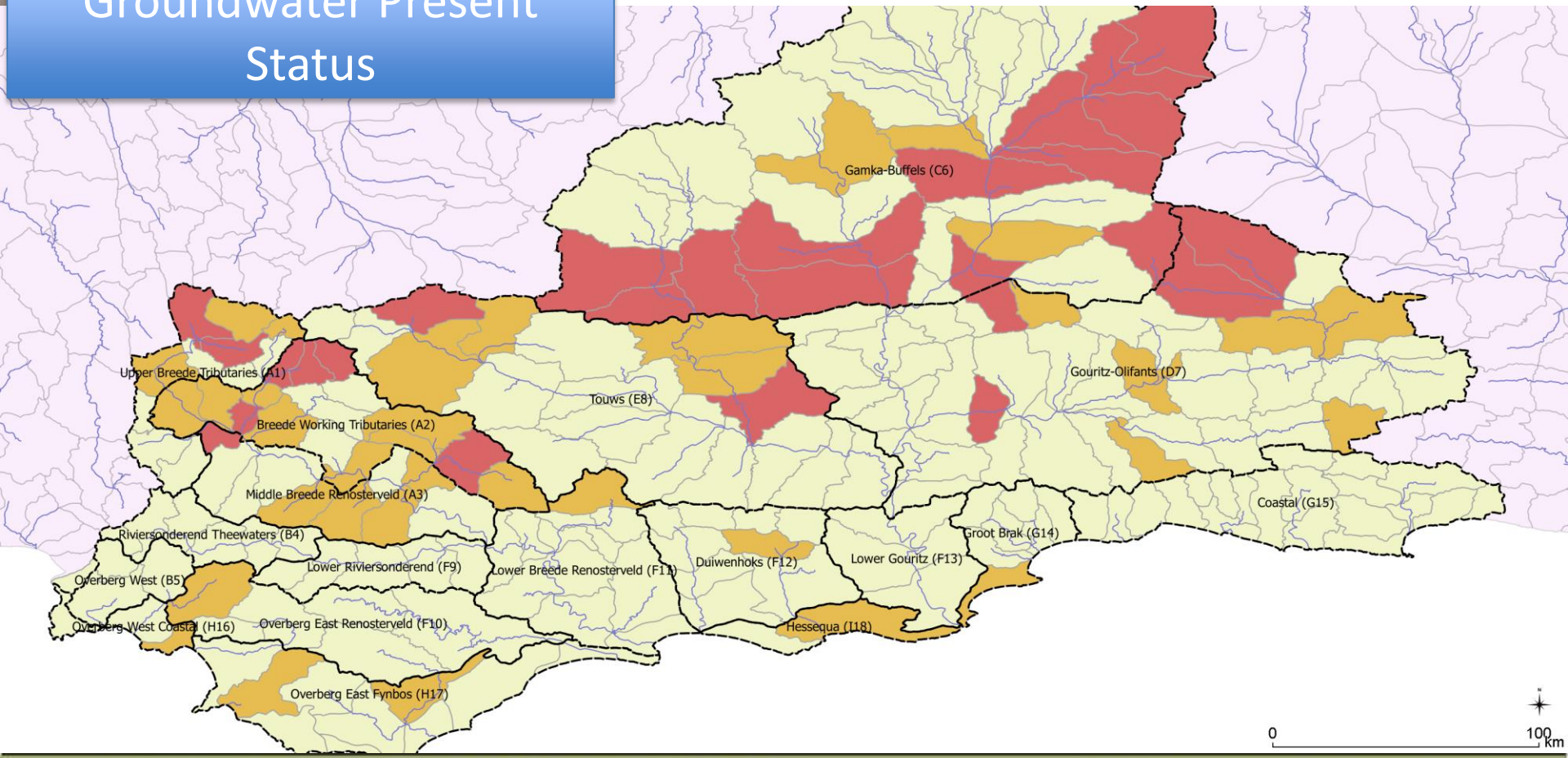
A. Models were developed which allowed us to project likely changes in estuary health from A to E category as flows decline based on data from Reserve determination studies for individual estuaries

B. Proportional changes in the size of macrophyte, invertebrate, fish and bird populations were also estimated using matrices developed using data from Reserve determination studies for individual estuaries

		Assigned Ecological Category					
		A	B	C	D	E	F
PES	A	1.0	0.9	0.7	0.5	0.3	0.1
	B	1.2	1.0	0.8	0.6	0.4	0.1
	C	1.4	1.2	1.0	0.7	0.4	0.1
	D	1.9	1.7	1.4	1.0	0.6	0.2
	E	3.2	2.8	2.3	1.7	1.0	0.3
	F	10.4	9.0	7.3	5.4	3.2	1.0

Spatially Targeted and Mixed : consequences for groundwater condition

Groundwater Present Status

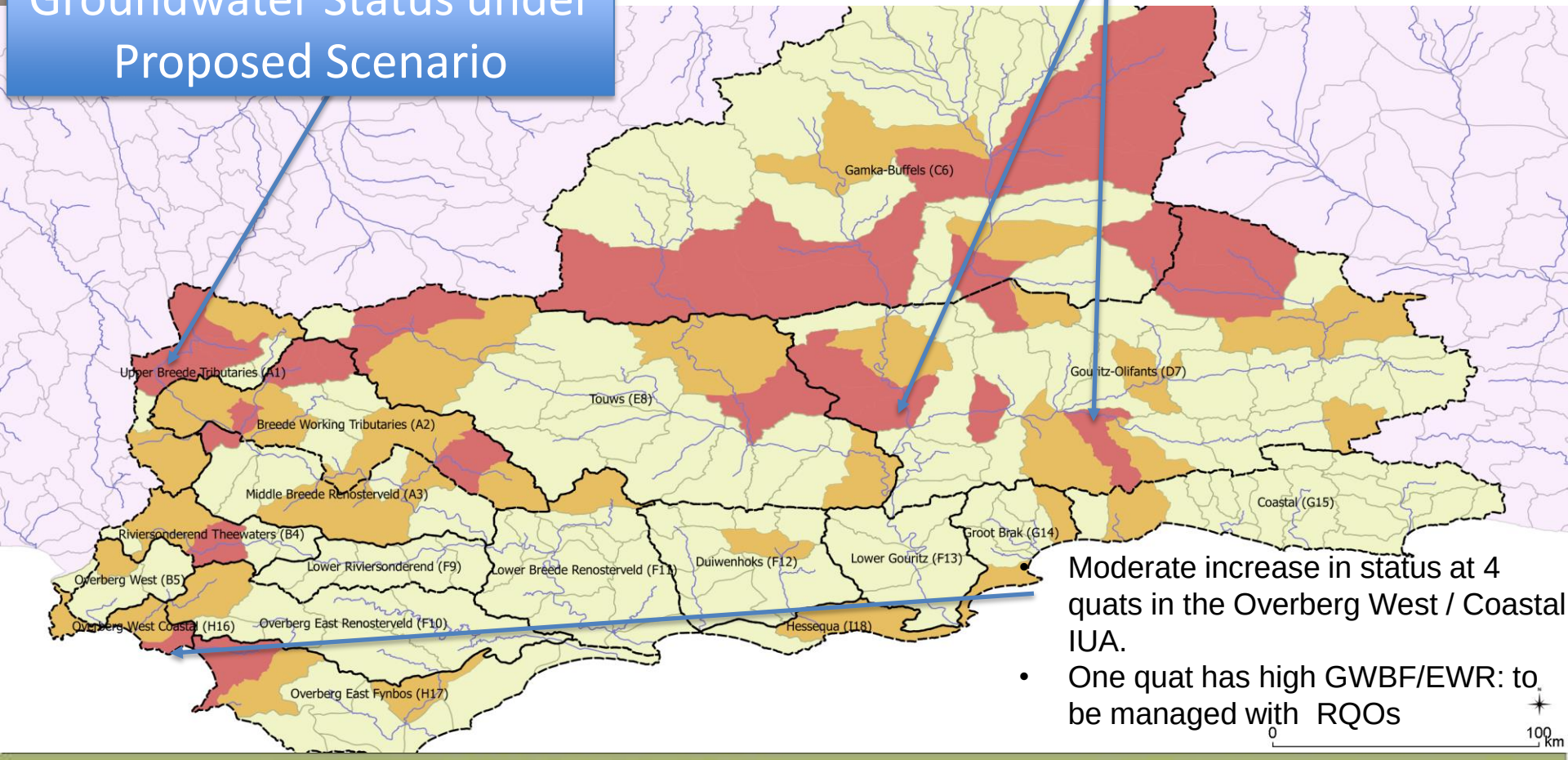


Spatially Targeted and Mixed : consequences for groundwater condition

- Increase in status at 4 quats in the Upper Breede Tributaries IUA.
- 2 of these have significant increase.
- None are high GWBF/EWR.

- Moderate increase in status at 7 quats in the Gouritz-Olifants IUA.
- 4/7 change from I to III
- None are high GWBF/EWR.

Groundwater Status under Proposed Scenario



- Moderate increase in status at 4 quats in the Overberg West / Coastal IUA.
- One quat has high GWBF/EWR: to be managed with RQOs