Socio-economics approach

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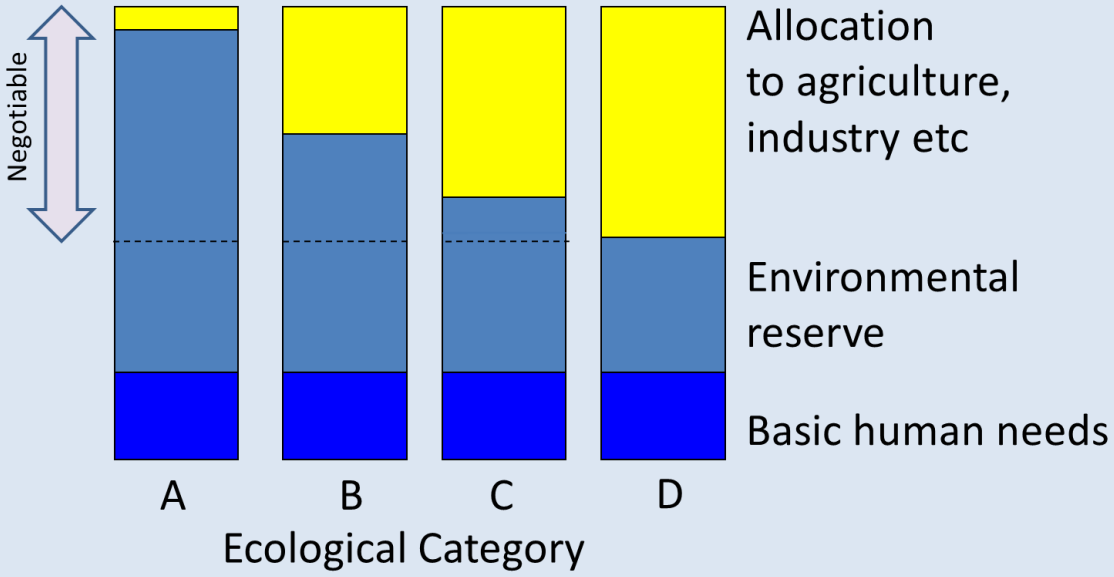
Spatial perspectives

- The target **Ecological Category** and matching Reserve was specified for each significant river reach and estuary in the WMA.
- This was summarised for 18 IUAs, which are areas that are relatively homogenous in terms of both ecological and socio-economic characteristics. The combination of ECs in that IUA determined the IUA's **Class** (I, II or III).
- The implications for biodiversity and socio-economics were calculated at the individual ecosystem level and summarised for IUAs, primary catchments (Breede, Gouritz) and the WMA (Breede-Gouritz)

Rationale

- In setting the Reserve for aquatic ecosystems,
  - Need to trade off the economic value of allocating water to ecosystems versus to other uses
  - Need to take non-monetary factors into account, including meeting biodiversity conservation targets



Increasing EC means have to either curtail water rights, or supply water from alternative sources (higher cost)

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Overall Approach

- Used a scenario-based approach, considering classification (EC) scenarios:
  - All Ds (ESBC)
  - Stay the same (PES)
  - All as recommended in RDM studies (REC)
  - No EC & CC
  - Mixed (Spatially-targeted)
- For each scenario, estimated
  - Changes in the value of aquatic ecosystem services
  - Change in costs of infrastructure needed to supply water demands over the next 25 years (2017-40)

Ecosystem services considered

- Provision of natural resources used for subsistence (reeds, shellfish, fish etc.)
- Tourism value
- Property value
- Nursery value of estuaries (contribution to inshore fishery values)

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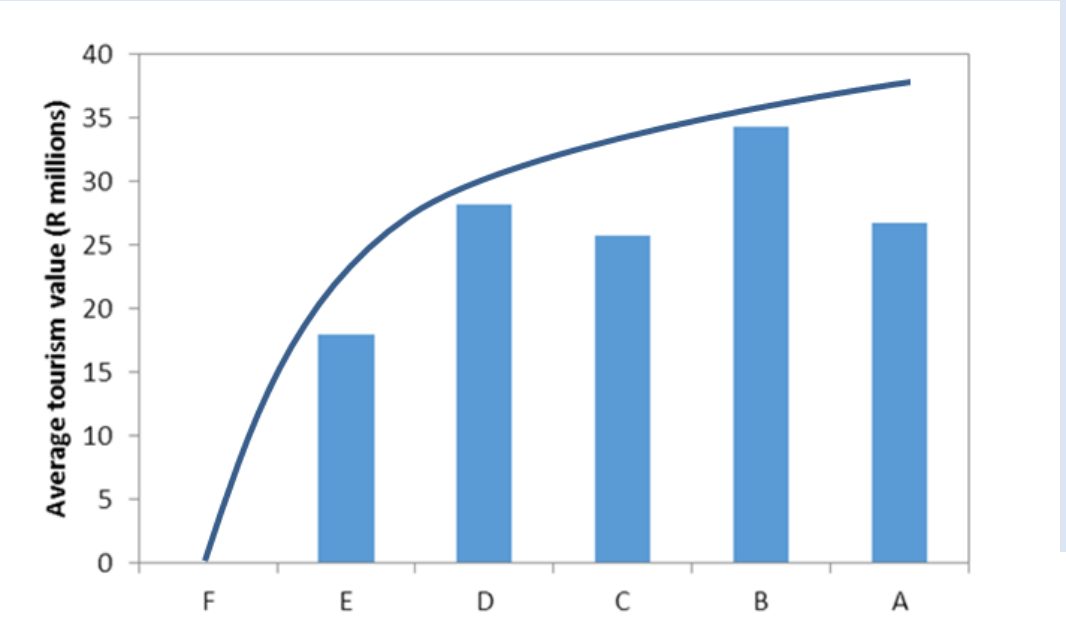
Assessing change in ES

- Baseline valuation of ecosystem services – spatially explicit, focusing on main ecosystem services
- Estimation of the relationships between aquatic ecosystem health and supply of ecosystem services – produced simple models
- Models used to estimate changes under each scenario, at the level of IUAs.

Tourism & property value

- Used a heuristic curve to generate a relationship between tourism value and estuary health, and from this, a matrix of % change from one EC to another (all possible combinations)
- Logarithmic curve used for property value
- Similar approach for other values



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Assessing socio-economic consequences

- Gains or losses in ecosystem services over the period 2017 to 2040
- Increases or decreases in the costs of meeting water demands over the period 2017 to 2040
  - Based on deficit/surplus at each node
  - When shortfall identified water supplied from next best, available option
  - Costs based on avg costs per m3 water supplied
- All costs/benefits are summarised as a discounted net present value ($\partial = 6\%$)

Socio-economic consequences

IUA	PES	ESBC	REC	High Growth	CC	STS
Overberg West Coastal	101.7	75.0	101.7	100.0	74.0	101.7
Overberg West	2.5	2.5	2.5	2.5	2.5	2.5
Overberg East Fynbos	398.1	344.8	456.0	398.1	344.8	413.4
Lower Breede Renosterveld	102.9	102.9	102.9	102.9	93.4	102.9
Duiwenhoks	12.9	10.8	12.9	12.9	12.9	12.9
Hessequa	113.5	95.4	113.5	113.5	113.5	113.5
Lower Gouritz	23.6	16.6	23.6	23.6	16.6	23.6
Groot Brak	69.3	63.3	70.4	39.7	32.1	69.3
Coastal	2848.2	2442.5	2849.1	2847.9	2847.8	2848.2
Total	**3672.8**	**3153.9**	**3732.6**	**3641.1**	**3537.6**	**3688.2**

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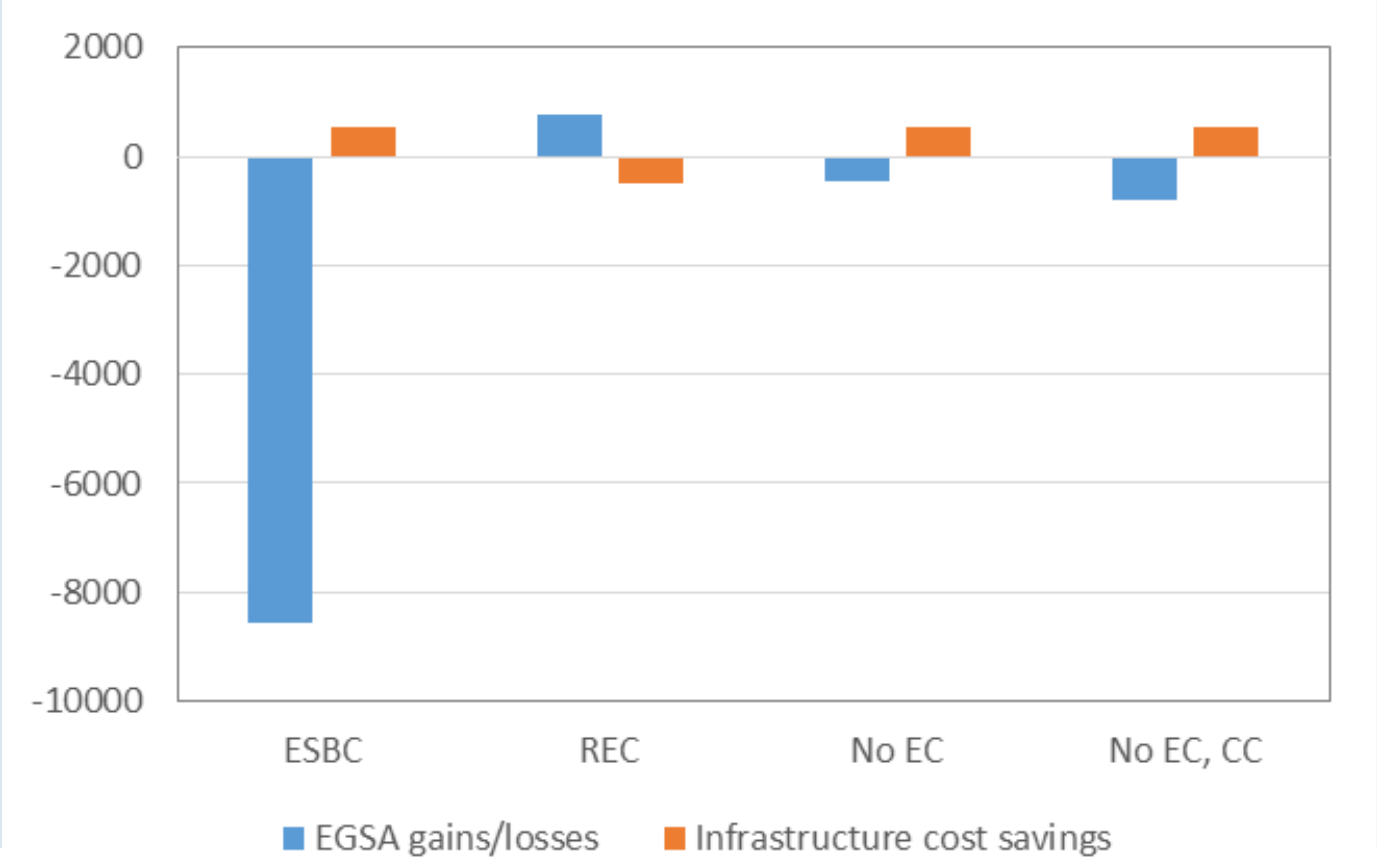
Socio-economic consequences

- Estimated changes summarised relative to PES scenario



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Socio-economic consequences

- Bottom line scenario is best for water supply, but welfare losses are highest
- No EC scenarios have similar water cost savings but don't incur such high losses, because the ECs are higher than under the ESBC
- Maintaining PES leads to second best outcome
- REC scenario results in EGSA gains, but it will cost you in water supply. Nevertheless this is the only scenario with a net gain.
- The difference between REC and spatially-targeted scenario is minimal
  - Value of EGSA slightly lower but costs of supplying water also lower
  - Overall economic impact expected to be similar to REC

Thank you

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Socio-economic consequences

	Estuary Ecosystem Service	Scenario			
		ESBC	REC	No EC	CC
Breede	Subsistence Fisheries Value	-0.002	0.04	-0.03	-0.06
	Nursery Value	-0.4	1.4	-1.4	-5.51
	Property Value	2.1	3	-2.6	-2.6
	Tourism Value	**-6.4**	**0.3**	**-0.5**	**-9.7**
	Total (Rm/yr.)	**-4.7**	**4.7**	**-4.5**	**-17.9**
Gouritz	Subsistence Fisheries Value	-0.96	0.71	-0.37	-0.37
	Nursery Value	-74.1	5.8	-3	-3
	Property Value	-44.1	32.6	-13.3	-13
	Tourism Value	-501.9	13.1	-12.6	-25.1
	Total (Rm/yr.)	**-621.1**	**52.2**	**-29.3**	**-41.5**
	Total (Rm/yr.)	**-625.8**	**56.9**	**-33.8**	**-59.4**

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	Change in EGSA value (R millions) relative to		Change in water supply infrastructure costs (R		Overall gain/loss (NPV @ 6%)
	Annual change in current terms	Overall change (PV)	Difference in value of infrastructure requirements	Difference in PV costs over 20 years relative to Maintain PES	
ESBC	-625.8	-8551	-927.5	532	-8019
REC	56.9	777	840.3	-482	296
NoEC	-33.8	-462	-927.5	532	70
No EC (CC)	-59.4	-812	-927.5	532	-280

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