BIOMONITORING INFORMING SOUND RIVER MANAGEMENT

Chris Dickens and Christa Thirion

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What is biomonitoring?

- Use of biological attributes of a water body to assess its environmental health condition.

History in SA

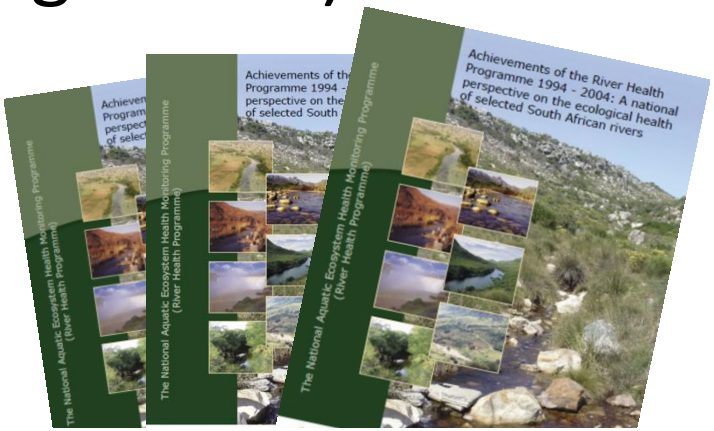
- 1950s - 1990
  - Oliff
  - Schoonbee and Kemp etc
  - Chutter 1972
- 1990s
  - Chutter 1994, 1998
  - River Health Programme
  - Instream Flow Requirements
- 2000s
  - Ecological Reserves
- 2010s
  - Classification of Water Resources
  - Resource Quality Objectives



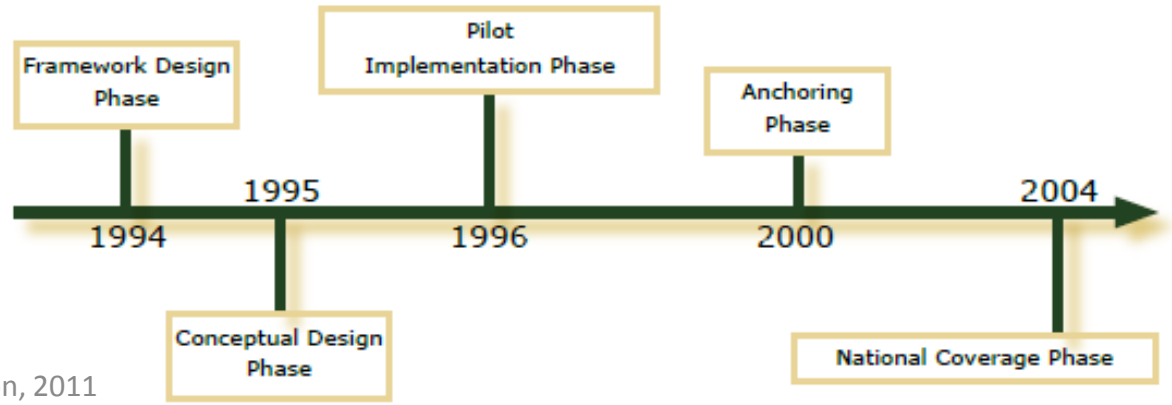


Present use in South Africa

NAEHMP (National Aquatic Ecosystem Health Monitoring Programme) – River Health Programme



The River Health Programme History Time Line



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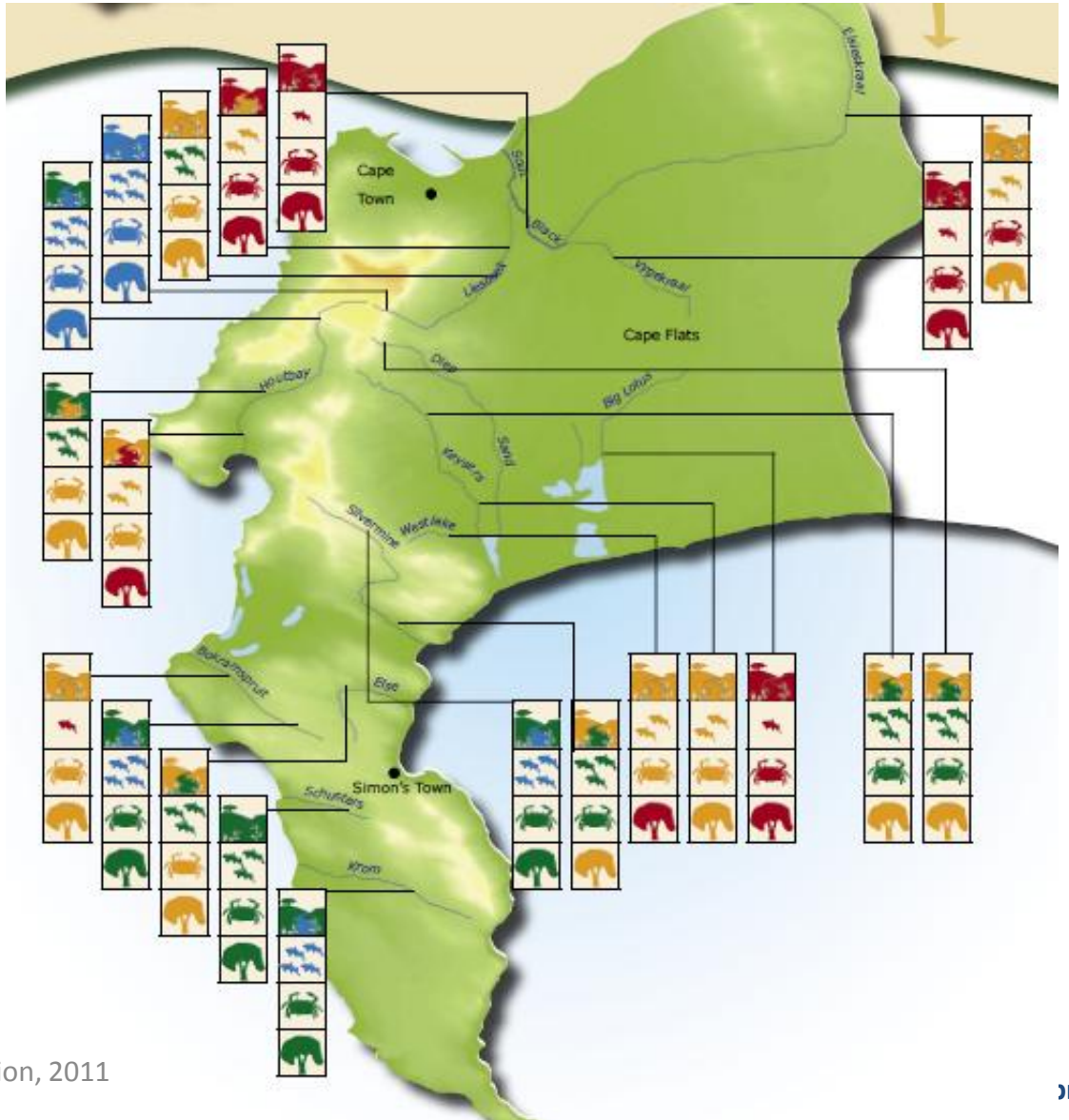
River Health in the W.Cape



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IFRs and the Ecological Reserve

The Ecological Reserve – an innovation in the Water Act (1998)

- Biomonitoring provides basis for;
  - Determine Present Ecological Status
  - Determine the Ecological Water Requirements
  - Determine the ecological consequences of operational scenarios





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Present Ecological State

Site Number: MzEWR3i							
IHI				**Driver**	**PES & REC Category**	**Trend**	**AEC Down**
Instream	B	**Riparian**	C	**Hydrology**	B	Stable	C
				Water quality	A/B	Stable	B
				Geomorphology	C	Negative	C
				Response component	**PES & REC Category**	**Trend**	**AEC Down**
				**Fish**	A/B	Stable	B/C
				Aquatic inverts	B	Stable	C
				Instream	B	Negative	
				Riparian vegetation	B/C	Negative	C/D
				Ecostatus	B	Negative	C

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Ecological Reserve / Water Requirements

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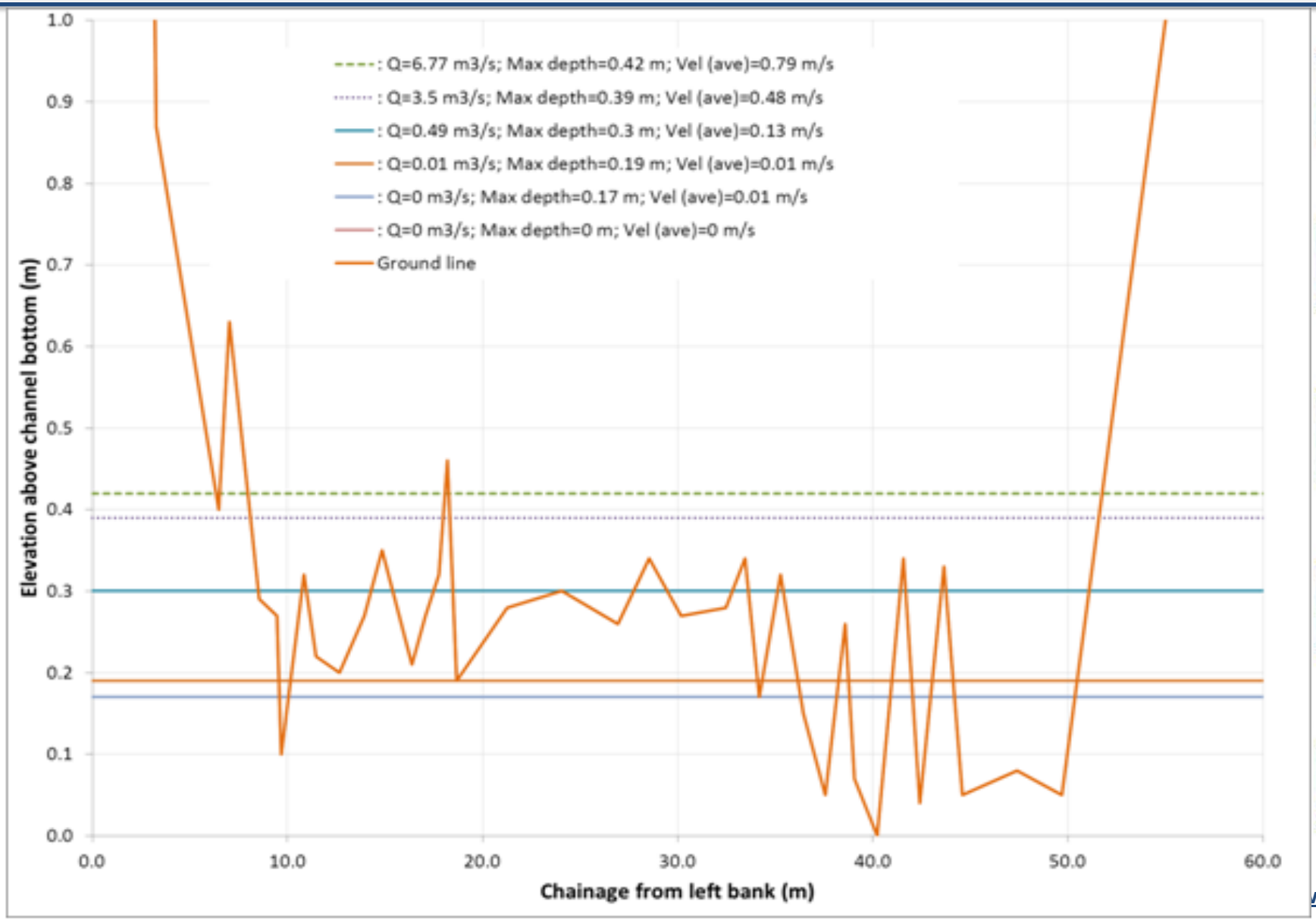
Ecological Water Requirements



EcoSpecs

EcoSpecs are clear and measurable requirements for ecological attributes

EcoSpec description	EcoSpec level (objective measure)	Confidence that this represents the point of transgression 1=low 5=high	Recommended method for monitoring	Frequency of monitoring and season	Justification for choice of this EcoSpec
Labeobarbus natalensis	12 fish At least 5 must be > 20 cm in length	4	Electrofishing 30 – 45 minutes Seine net in pools if flows allow	Annually in October to November	This species should be present in fair numbers (20 – 30) in the habitat at the site in the recommended survey time
Barbus viviparus	25 fish	4			The species is common in this part of the river

Water Resource Classification and RQOs

Biomonitoring to set high level objectives for the water resource

- Classification
  - Setting a Management Class (Class A-D)
- Resource Quality Objectives (RQOs)
  - essentially narrative and qualitative
    - *E.g. "the water quality from this Resource must be acceptable for irrigation of crops; the river must support fish stocks for local consumption"*
  - Numerical Limits
    - *"there should be 20 fish >300mm in length collected in a two hour collection effort using an electro-fishing apparatus"*





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License compliance

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License and impact management

- Location of point source impacts e.g. end of pipe impacts, sewer surcharges
- Identification of toxic impacts not otherwise monitored e.g. Wilge River problems revealed by invertebrates but not by water quality or fish monitoring

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Biomonitoring can be misused

- Misleading
  - The use of biotic indices results in a loss of detail
  - Biotic index results may fail to indicate a problem with a water resource e.g. a particular toxin.

- Not the whole story
  - Excessive faith can be put in biomonitoring results, allowing managers to relax their vigilance.
  - It is easy to use biotic indices as a “catch all”
  - Most indices used in water resource management are not suitable for use as biodiversity monitoring tools.

- Inappropriately used
  - Biotic indices have been used where they are not designed to work e.g. SASS has been used in wetlands and lakes.
  - Biotic conditions have been included in Water User License Conditions without considering if they are appropriate measures.

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The future of biomonitoring

- Refinement of methods including testing
- Capacity building and accreditation
- Evaluation of the relevance of indices – do they do as they are intended to do?
- Evaluation of the success of biomonitoring – is it providing the tools needed for management of water resources?
- Evaluation of appropriateness of biomonitoring and consideration of alternatives

The End