

Assessment and monitoring of ecological condition of wetlands and freshwater ecosystems

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URGENCY OF ASSESSING AND MONITORING WETLAND CONDITION



The freshwater blog

The voice of freshwater life

About BioFresh Archive

WWF Living Planet Report suggests 76% decline in freshwater species globally since 1970s

SEPTEMBER 30, 2014



The Freshwater Information Platform provides

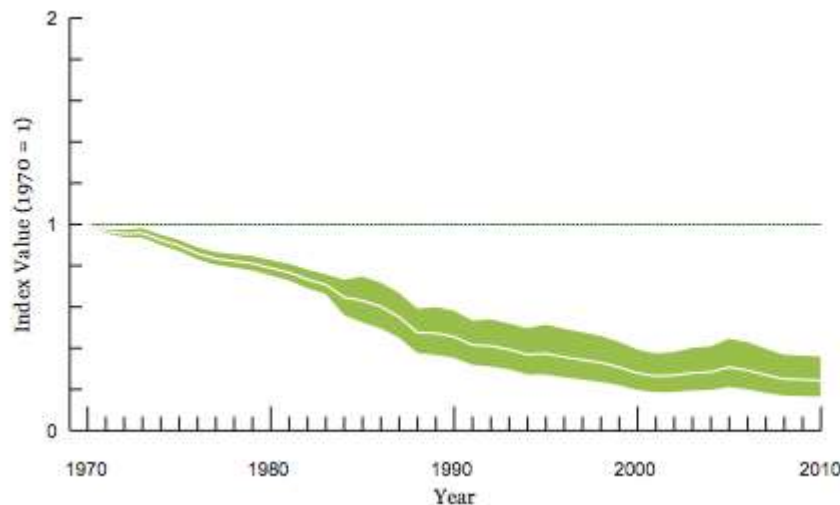
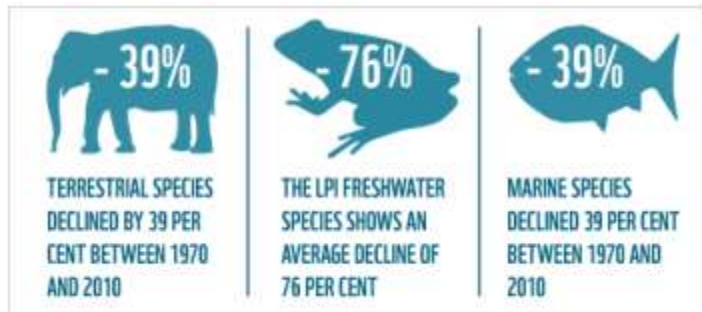


Figure 13: The freshwater LPI shows a decline of 76 per cent between 1970 and 2010
This is based on trends in 3,066 populations of 757 mammal, bird, reptile, amphibian and fish species (WWF, ZSL, 2014).

Key

- Freshwater Living Planet Index
- Confidence limits

HOW CAN WE PRACTICALLY INTERVENE AT THE SAME **RATE** AS THE LOSSES?

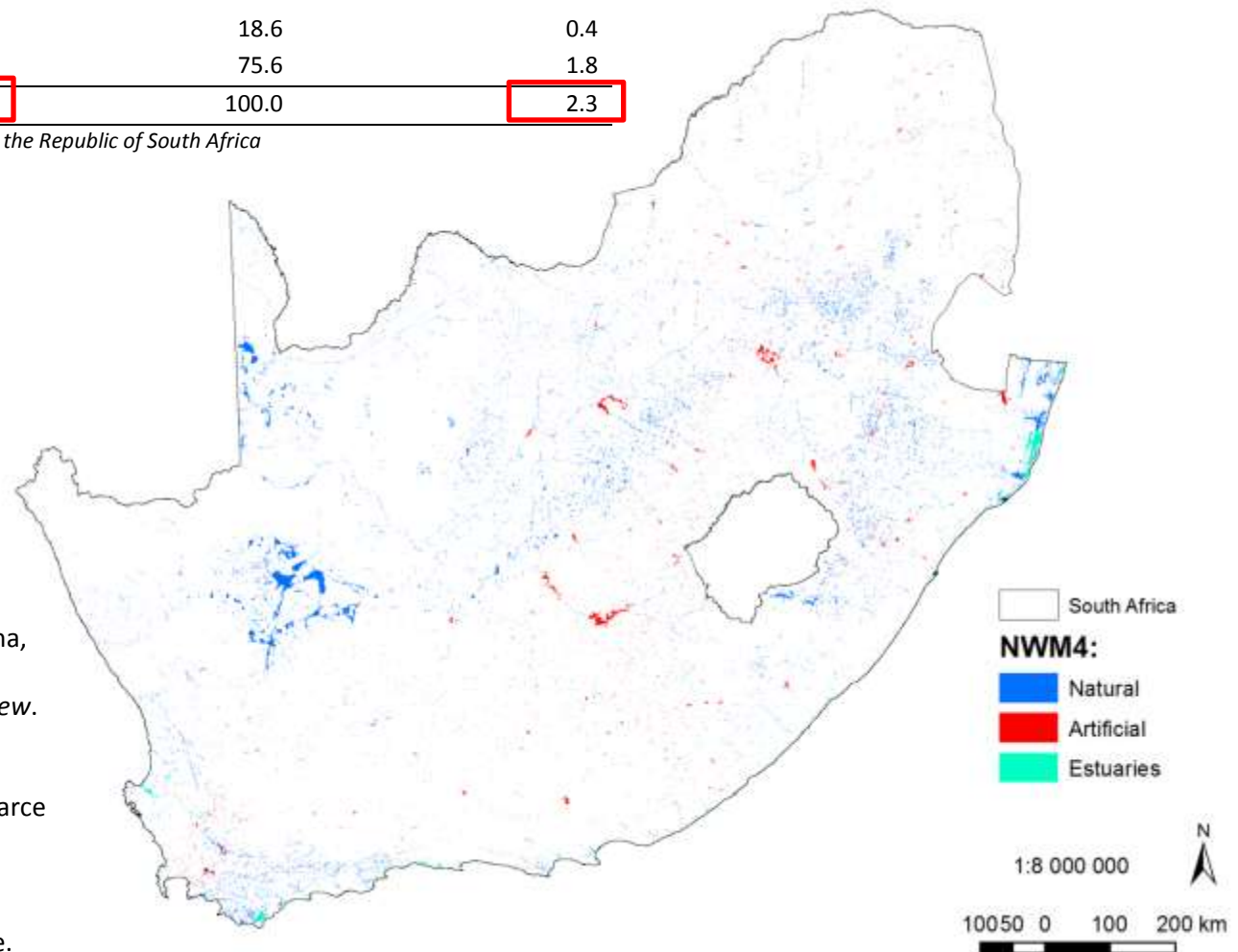
Table : Percentage surface area of inland wetlands proportional to all wetlands of South Africa.

Wetland class Level 1:	Total surface area (Ha)	Percentage of all wetlands	Percentage of South Africa *
Estuarine	165 952.8	5.8	0.1
Inland: Artificial	528 187.6	18.6	0.4
Inland: Natural	2 152 117.9	75.6	1.8
Total	2 846 258.3	100.0	2.3

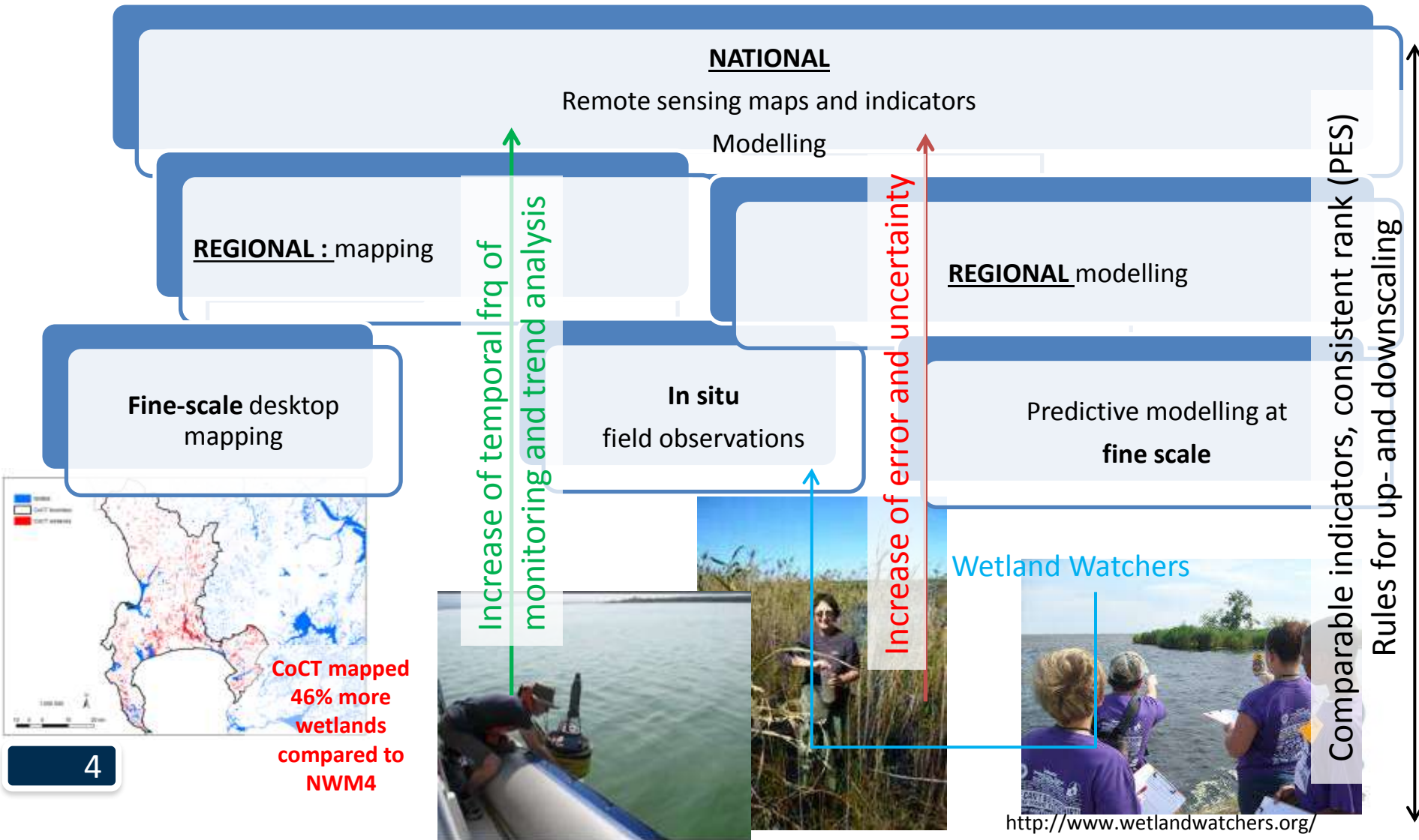
* calculated from a shapefile totalling 122 081 147.5 Ha for the Republic of South Africa

429 320 number of polygons mapped in NWM 4

Van Deventer, H.; Nel, J.L.; Mbona, N.; Job, N.; Ewart-Smith, J.; Snaddon, K.; Maherry, A.; *In review*. Desktop classification of inland wetlands for systematic conservation planning in data-scarce countries: mapping wetland ecosystem types, disturbance indices and threatened species association at country-wide scale.



SCALE-DEPENDENT FRAMEWORK OF COMPLEMENTARY INDICATORS AND METHODS



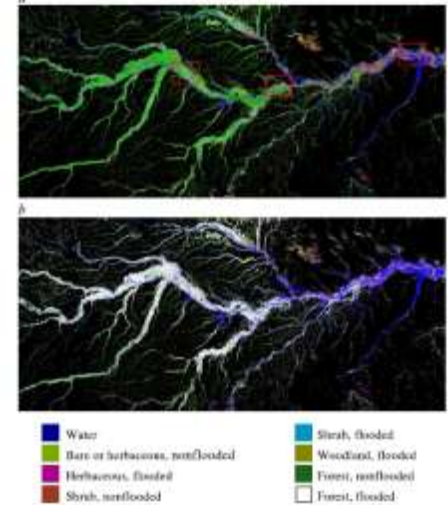
NATIONAL SCALE ASSESSMENT AND MONITORING

Main purpose = (time-series) monitoring

Should be indicators/ metrics or surrogates that :

- Can monitor trend over time (monthly frq?; capable of measuring deviation from baseline)
- Are quantifiable (accuracy of prediction, error and uncertainty)
- Comparable across habitats and over time (robust & consistent)

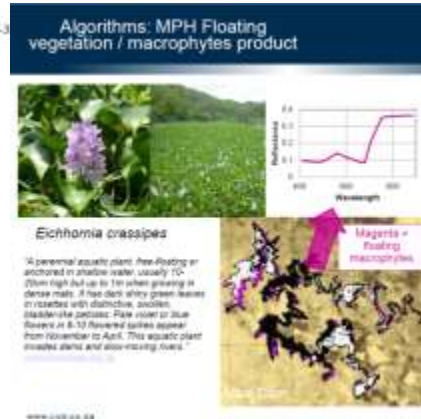
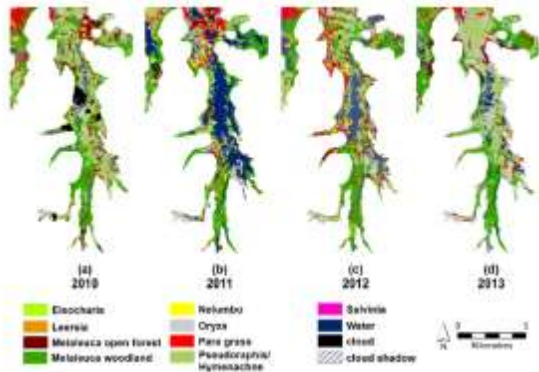
Inundation



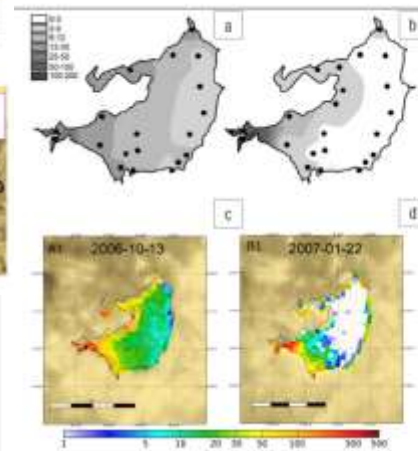
L.L. Mao et al. / Remote Sensing of Environment 117 (2015) 484-498

Fig. 7. Mapping of wetland vegetation and inundation at (a) low-water stage (September–October 1995), and (b) high-water stage (May–June 1996). Floodplain outlines obtained in Fig. 4 are shown in red.

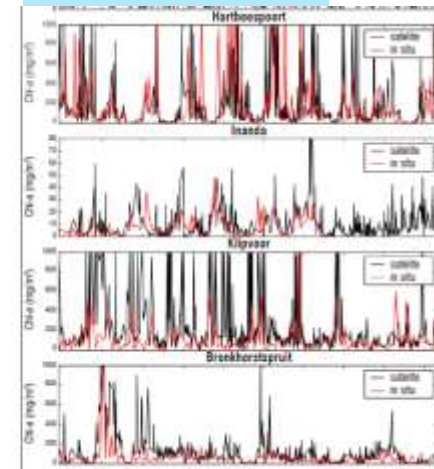
T.G. Whittaker, R.E. Barrio / International Journal of Applied Earth Observation and Geoinformation 42 (2015) 24–31



Alien invasive species



Water quality



5

Freshwater habitats

REGIONAL MODELLING OF WETLAND CONDITION

Main purpose of modelling = understanding regional processes

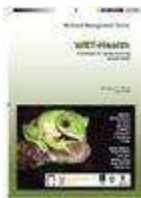
- Research shows important correlations:
 - Percentage natural land (Land use /cover surrogates) are useful
 - (Mao et al. 2007, Nel et al 2011, Rivers-Moore & Cowden 2012 - WRC KV298/12, review of Ollis and Malan 2014 – WRC TT608/14)
- Condition modelling is scale dependent
 - Different buffer distances for different types of areas – not clear what these are for all regional settings in South Africa
 - (Rivers-Moore & Cowden, 2012 - WRC KV298/12; review of Ollis and Malan 2014 – WRC TT608/14)
 - Map wetland condition at catchment level as opposed to individual wetland for better consistency and predictability (Rivers-Moore & Cowden, 2012)
- Selection of thresholds are subjective
- Approaches differ (deterministic or probabilistic)

FIELD MEASUREMENTS OF WETLAND CONDITION

Main purpose: detailed knowledge on sites and processes

Require: A Wetland Observation Network with monthly measurements

- Long-term monitoring of detailed observations at selected locations
 - Should be consistent quantifiable parameters
 - Must have link with regional-national indicators (e.g. veg habitat)
- To inform understanding and modelling at local to regional scale
- Scoring systems subjective and inconsistent
 - Practitioner can't always estimate the extent of features accurately
- Support with reference data at regional – national scale
- Continuous improvement of methods required to link across scales



Ollis and Malan 2014

KEY MESSAGES

- Plant and test a monitoring system for wetland (condition)
 - To implement in 5 / 10 yrs? What to do?
- Select sites and start with observation network & monitoring
- Development and implementation of a sensible framework for the mapping, assessments and monitoring of i.a. wetland condition across the country
- Understanding limitations of scales
 - Improve knowledge where lacking (scales)
 - Centralise data for assessment and monitoring

Thank you

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