

Knowledge co-production as a tool for promoting cooperative action for water security

Dr Jeanne Nel
jnel@csir.co.za

24 March 2015
Natural Capital Symposium

The Resilience and Development Programme (Swedbio)

Stockholm Resilience Centre
Research for Governance of Social-Ecological Systems



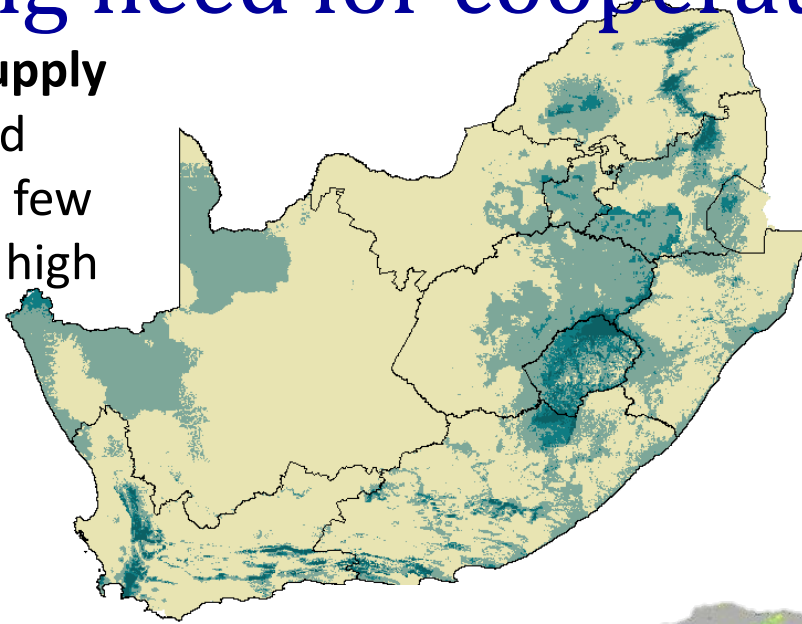
ProEcoServ
Project for Ecosystem Services



Spatial overlap and competing interests → strong need for cooperation

Water supply

Semi-arid country; few areas of high water supply



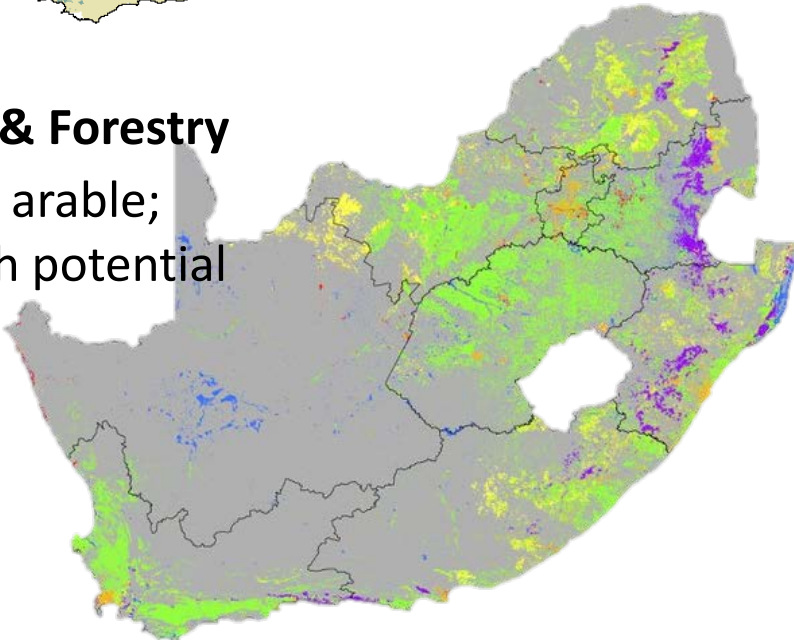
Coal Deposits

Overlap with best agricultural land & all sources of major inland rivers



Agriculture & Forestry

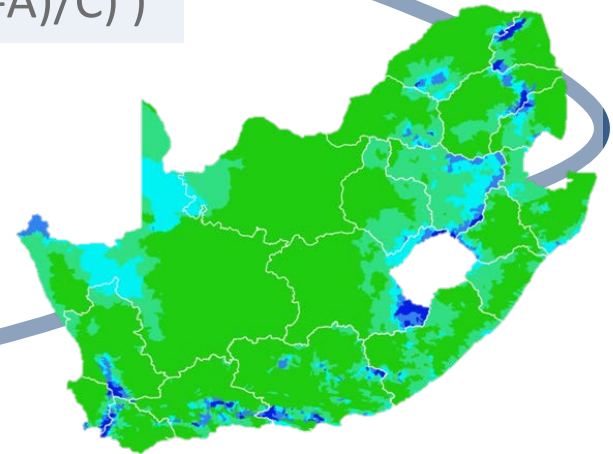
13% of land arable; only 3% high potential



Iterative knowledge co-production

Rainfall-Runoff curves:
$$MAR = (MAP - B + 3) + \left(C / \exp((MAP - A) / C) \right)$$

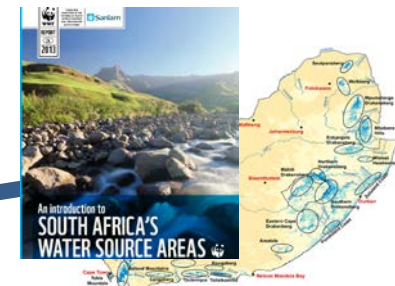
Water
engineer
data



Naming and
descriptions



water affairs
Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA



Characterised places



SOUTHERN DRAKENSBERG

Did you know?

- The three highest mountains in South Africa, Mafadi (3 482 m high), Njesuthi and Champsaga Castle are found in this area.
- The country's newest Ramsar site, the uMngeni Vlei, is found here.
- The longest free-flowing river, the Mkomazi, starts at this source.

Province: KwaZulu-Natal
Level of protection: 14%
Main rivers: uMngeni, Mool, Thukela, Mkomazi, uMzimkhulu
Free-flowing rivers: Mkomazi; Mkomazi; Mzimkhulu; Neonge
Interbasin Transfer Systems: Mngeni to Umtshakulu; Mool- uMngeni to Springvale dam
Dams: Midmar; Albert Falls; Wagendrift; Craigie Burn
Supplies water to: Parts of KwaZulu-Natal (Durban, Pietermaritzburg and Port Shepstone)
Ramsar Site(s): uMngeni Vlei
Protected areas: None
Threats: large-scale plantations; land degradation

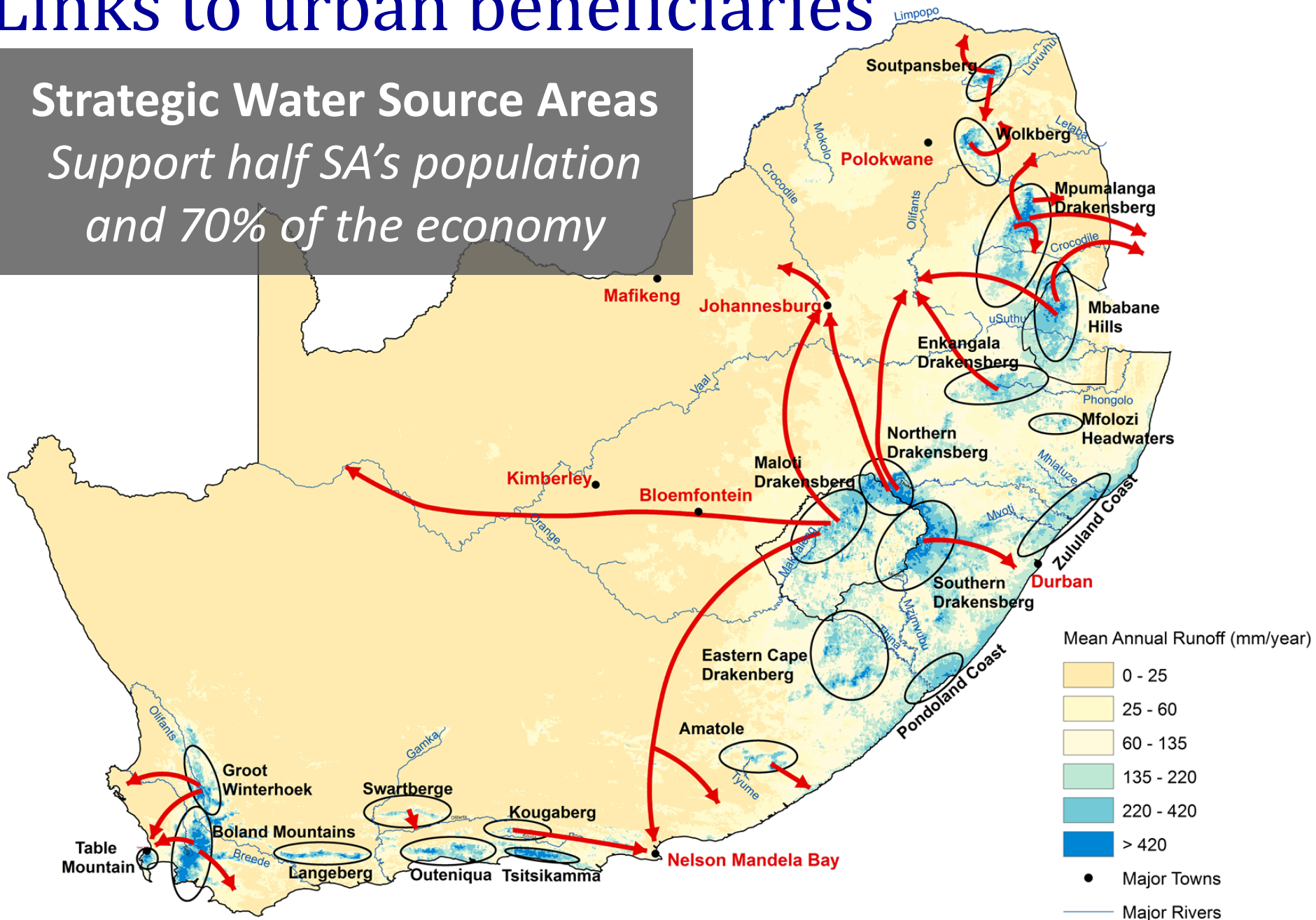
LAND USE (%)



ENABLES:

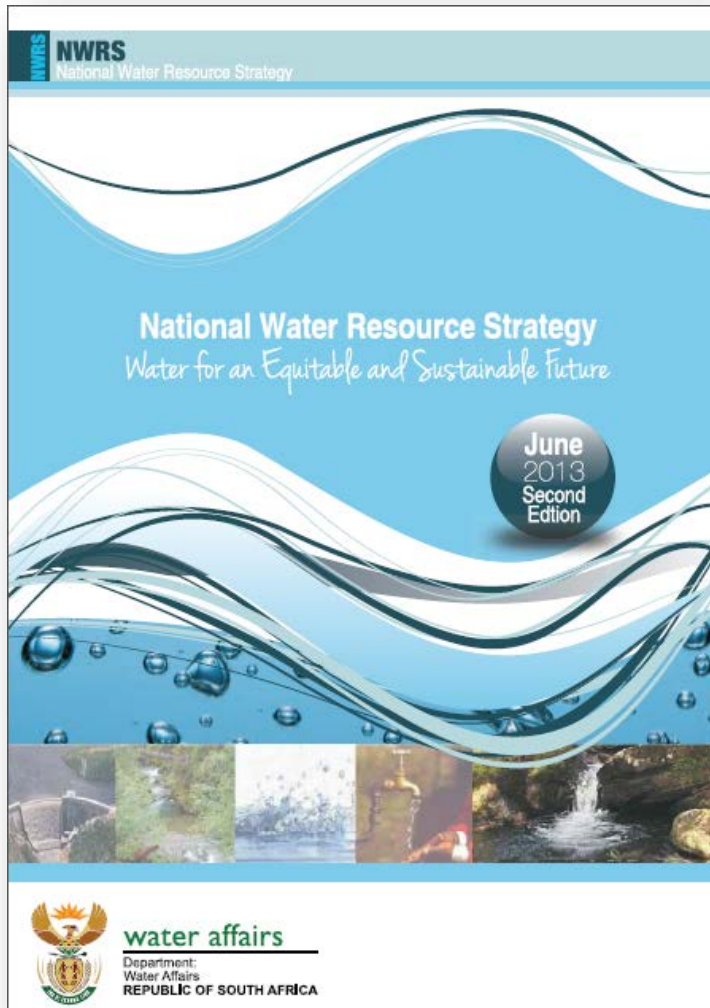
- Societal identity of place
- Links to beneficiaries
- Identification of key pressures
- Development of targeted interventions

Strategic Water Source Areas
*Support half SA's population
and 70% of the economy*



National policy uptake

Water focused governance:
National Water Act



Chapter 5:

.... “they form the **foundational ecological infrastructure** on which a great deal of built infrastructure for water services depends”

.....“**strategic national assets** that are vital for water security”

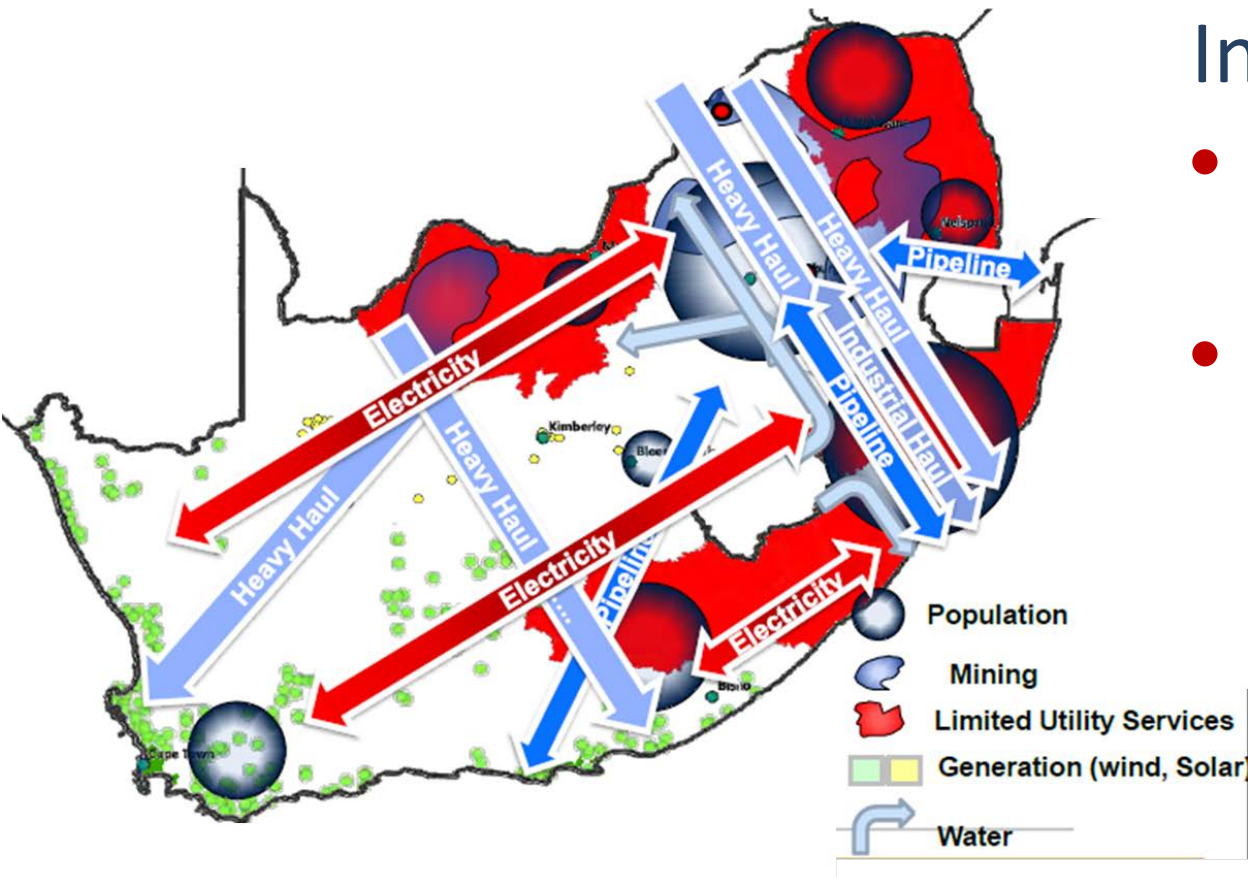
.....“need to be acknowledged as such at the highest level across all sectors”

National policy uptake

National infrastructure & development planning

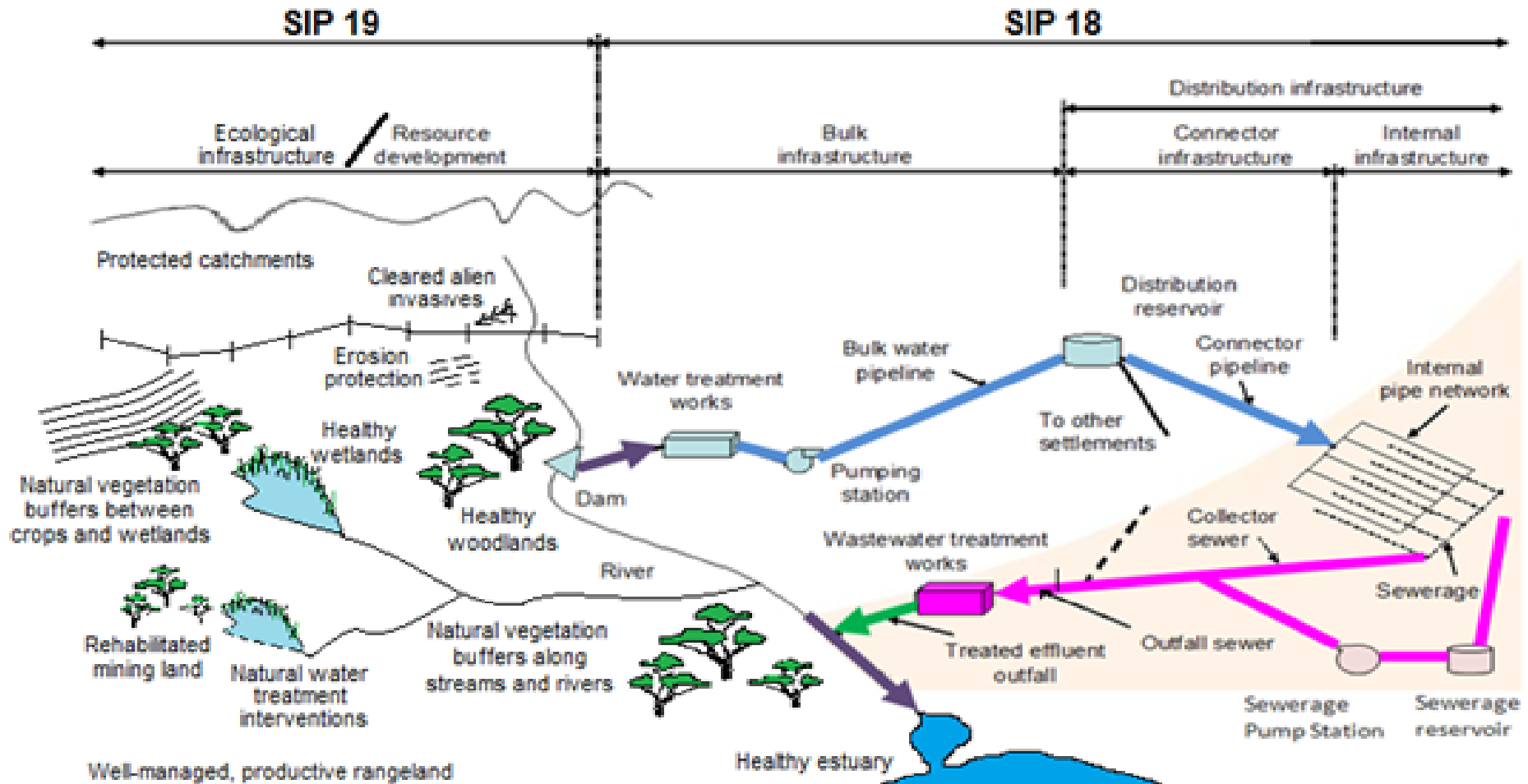
Presidential Strategic Integrated Projects

- \$350 billion infrastructure
- \$57 million for water infrastructure



Ecological infrastructure for water security

Bulk water supply and water distribution infrastructure

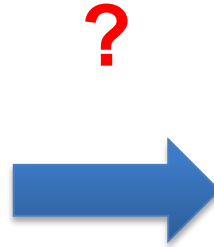


Local uptake: commodity production

- Main uses currently : timber, cultivation, mining

Coal-Water Futures

Strategic planning and strategic choices to protect our future and leave a legacy of worth



- > 70% of the Strategic Water Source Areas in Mpumalanga Province are under mining or application for mining

KWAZULU-NATAL WATER SOURCE AREAS

Kwazulu-Natal is home to strategic water source areas along the coast including the Northern Drakensberg – source of the Orange River which flows into the Orange Free State, a critical supply for the interior – and the Southern Drakensberg, extending into the Free State. The Drakensberg is one of the world's greatest rainforests. These are hard-working rivers, providing water to agriculture, forestry, food communities and industry around Durban.



Local uptake: community programmes



Local uptake

Protected areas expansion



SANParks management brief

Ecological Infrastructure, Ecosystem Services,
Strategic Water Source Areas and SIP 19

Dirk Roux, Stef Freitag and Jeanne Nel (April 2014)

Background and rationale

Ecological infrastructure comprises the functioning ecosystems that provide a range of valuable and often essential *ecosystem services* to society (e.g. intact river banks and riparian vegetation that filter pollutants and recharge aquifers; wetlands that filter and regulate catchment runoff and slow down flood waters; salt marshes and fore dunes that contribute to erosion control or absorb impacts of sea storms; forests that regulate atmospheric carbon and buffer against climate change effects). This concept offers a significant extension of the conventional biodiversity focus of protected areas to a more direct connection with the benefits that people derive from conservation. This is particularly relevant to SANParks' vision of "Connecting to Society".

Public awareness

WWF's
Journey of Water
campaign



www.journeyofwater.co.za

Main lessons

- Good data paired with an iterative knowledge co-production process
 - Enhanced credibility, salience and legitimacy
 - Leads to multiple impact pathways
- Maps are a good way of integrating diverse knowledge systems
 - Good 'boundary objects'
- Targeted use contexts