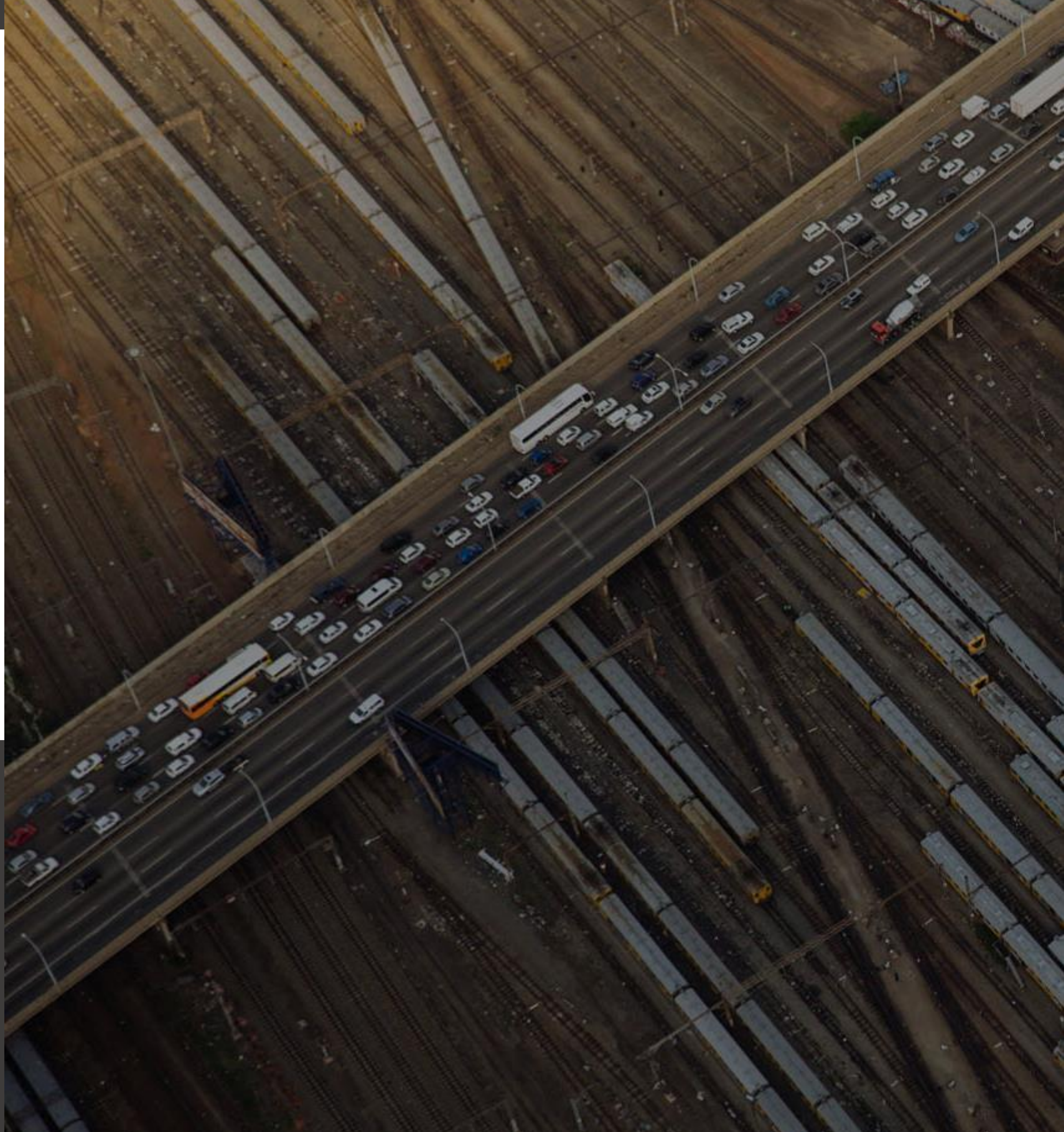
Planning for a water secure Gauteng City Region

NBI Gauteng Water Alliance

5 December 2019

Gillian Maree

GCRO | Gauteng City-Region Observatory



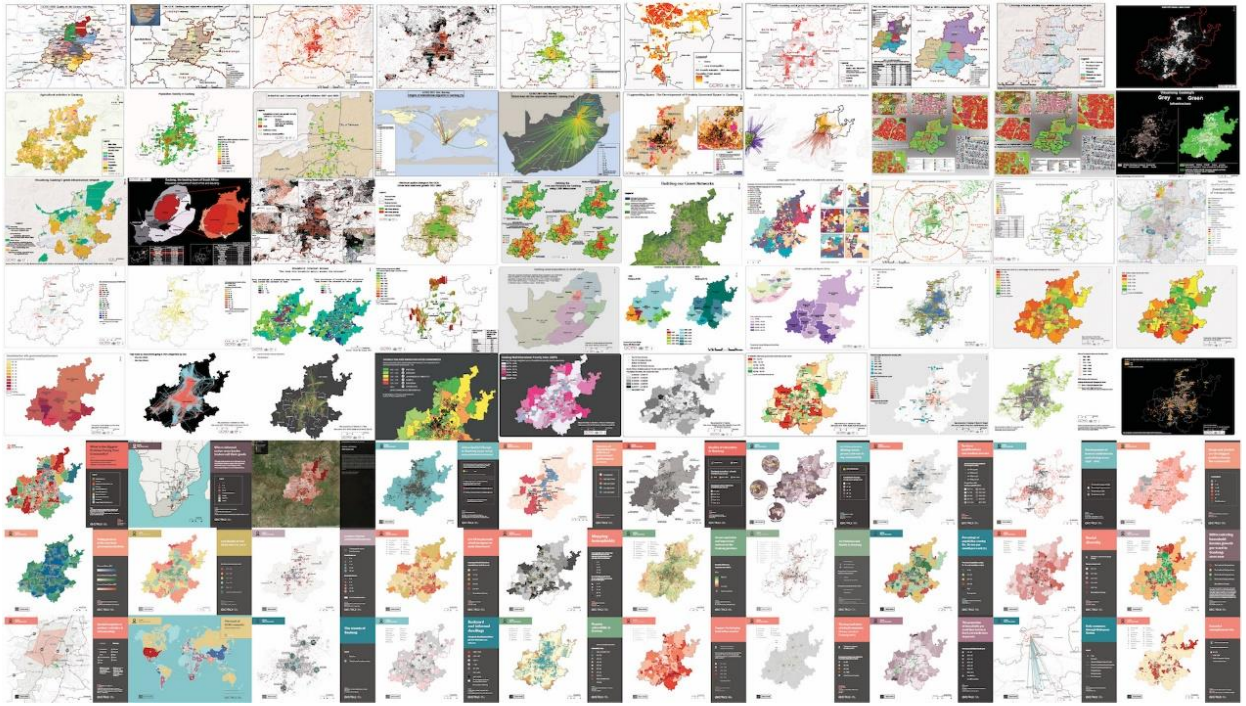
GCRO | Gauteng City-Region Observatory

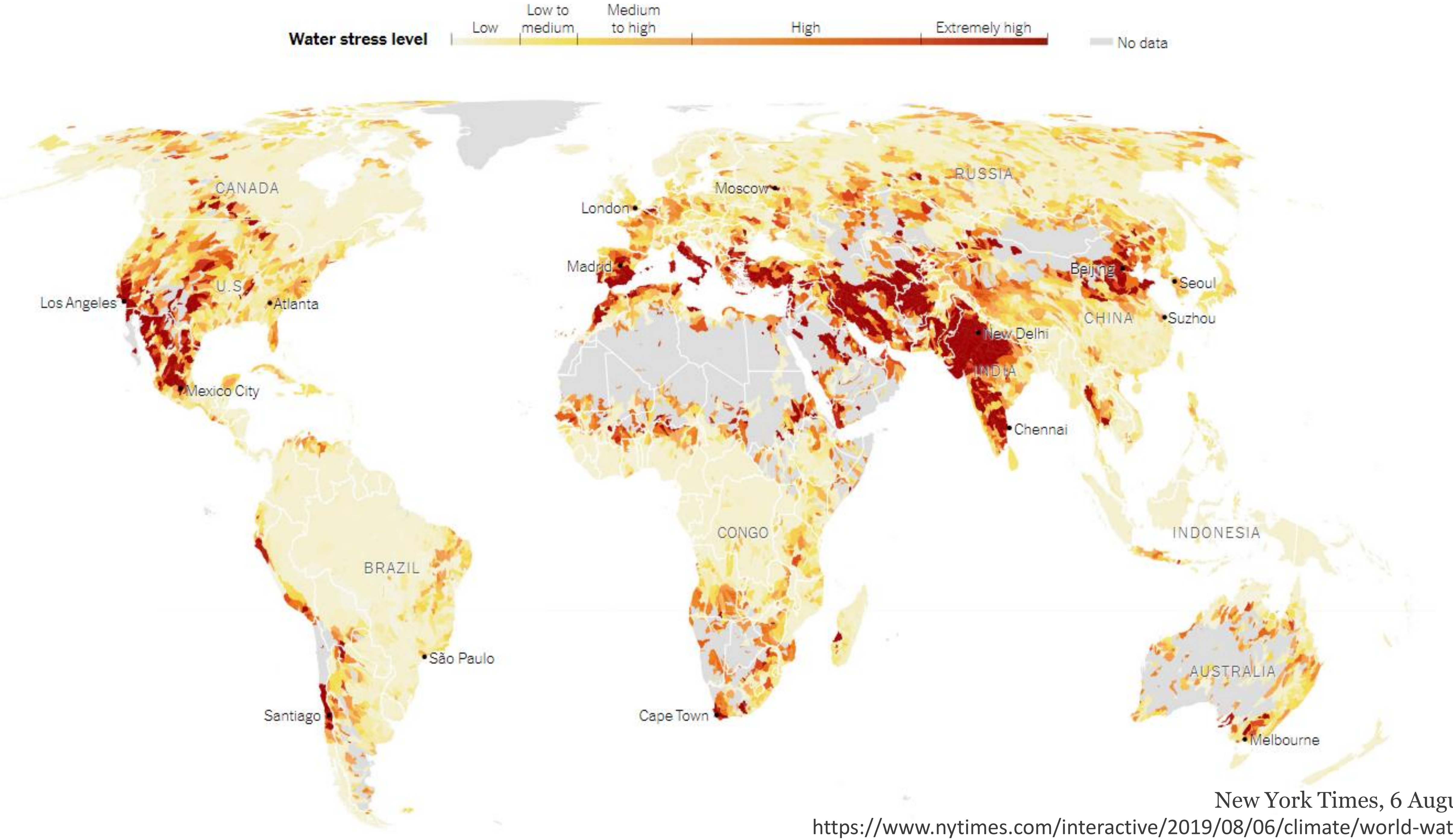
GCRO helps to build the knowledge base that government, business, labour, civil society and residents all need to shape appropriate strategies that will advance a competitive, integrated, sustainable and inclusive Gauteng City-Region.

The GCRO is an effort to generate scholarly work to inform public sector decision-making and policy.

- GCRO is an institutional collaboration between:
  - University of Johannesburg (UJ),
  - University of the Witwatersrand (Wits),
  - Gauteng Provincial Government, and
  - Organised local government in Gauteng

- A purpose-designed vehicle for policy-oriented research.

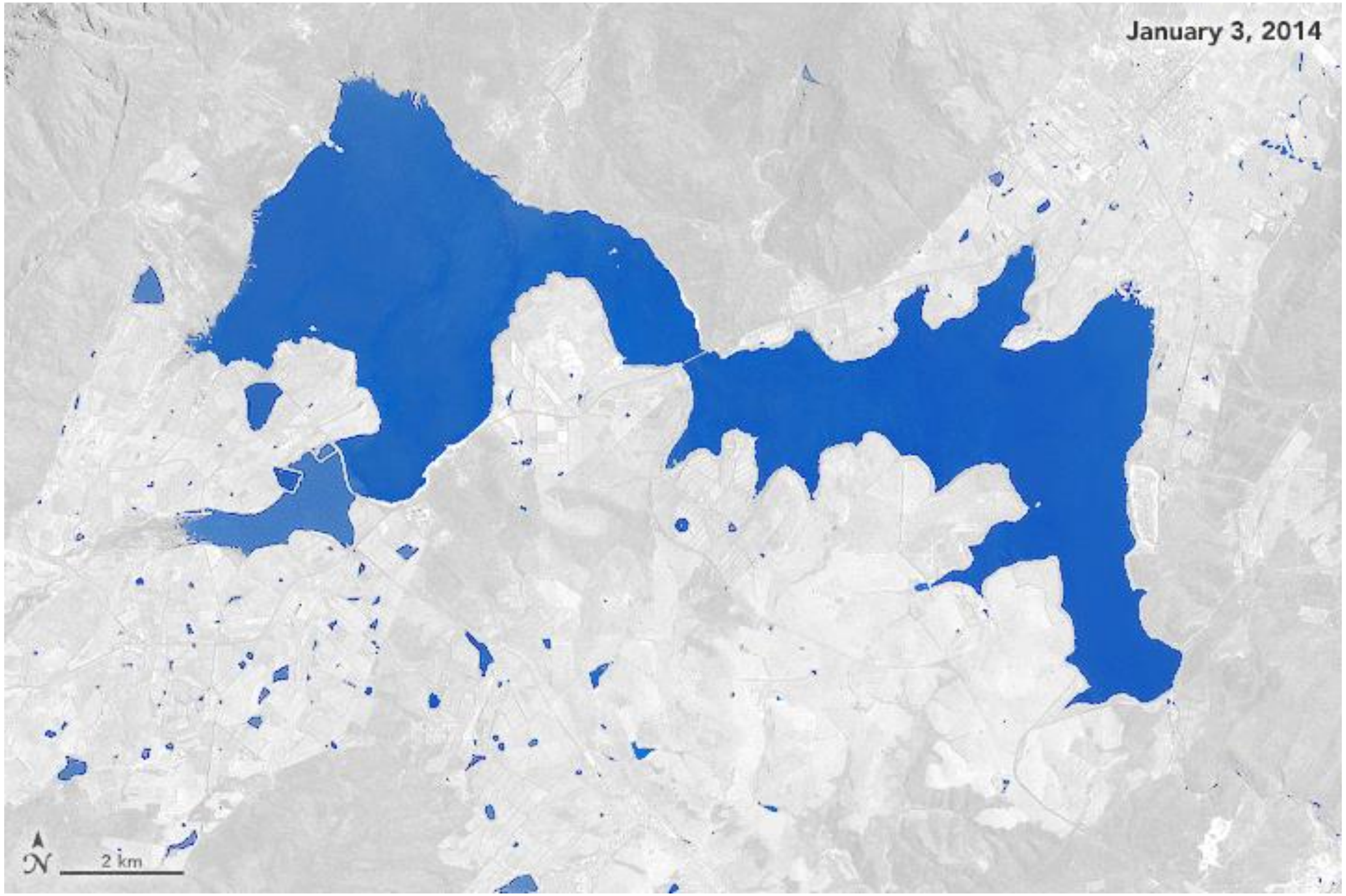




New York Times, 6 August 2019
https://www.nytimes.com/interactive/2019/08/06/climate/world-water-stress

“Never let a good crisis go to waste”

Theewaterskloof Dam –
January 3, 2014 - January 14, 2018



NASA Earth Observatory: https://earthobservatory.nasa.gov/images/91649/cape-towns-water-is-running-out

Gauteng can never take its water for granted

Water is everybody’s business and water security be a collective effort that involves all the Gauteng City-Region

Livelihoods and the economy depends on a common system and behaviour and actions will determine whether our water can meet our needs

You cannot build your way out of a crisis

We all need to understand how their water reaches their homes and workplaces, where their wastewater goes to and how their behaviour can keep that cycle working

What brought us to develop “the plan”

- Range of conversations and engagements on water in Gauteng over the time of Cape Town’s worsening drought
- Sequence of presentations followed:
  - Gauteng Province Lekgotla 2 February 2018
  - Premier’s Coordination Forum (PCF) 23 March resolved to adopt an **integrated approach (Water War Room)** coordinated by the Office of the Premier
  - GCRO approached to look into Water security
- Water Security Perspective developed by team of experts
  - Using team of specialists and expert inputs
  - Provincial inputs
  - Review panel

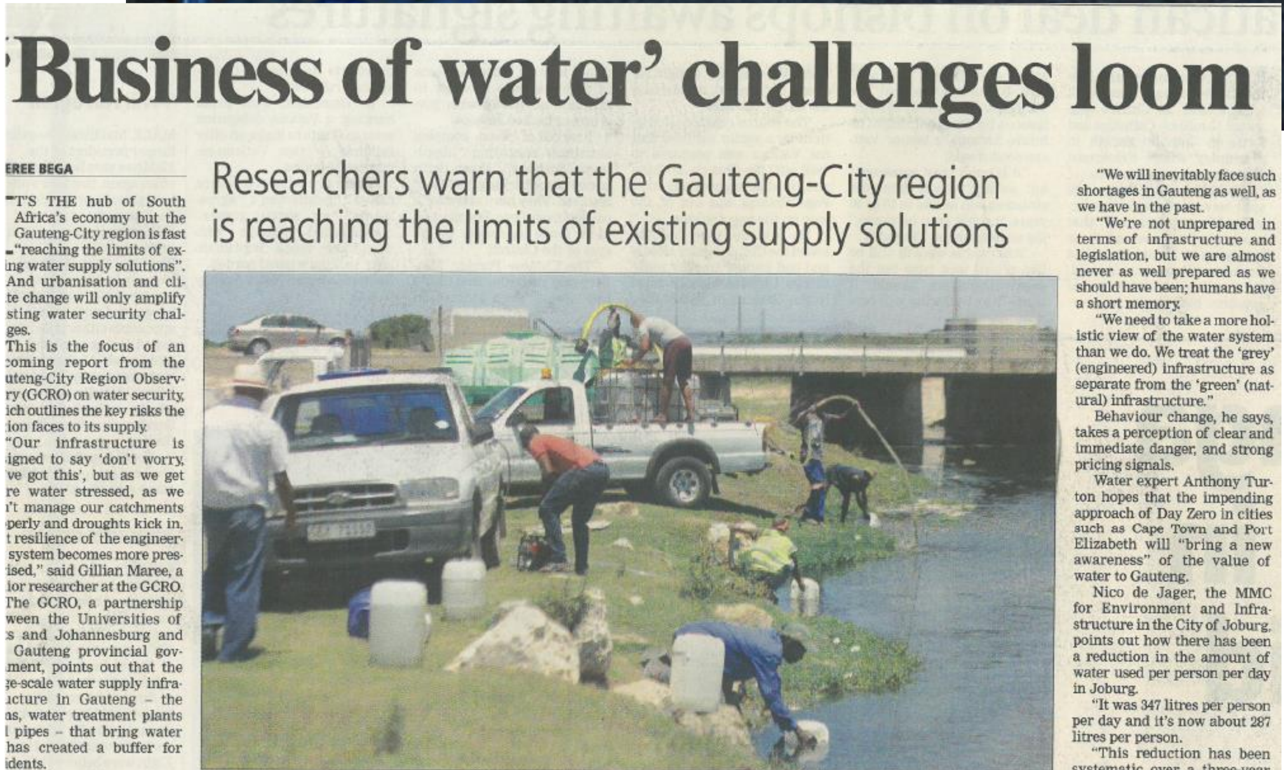
How did we get here?

Demand for water and restrictions in Gauteng have been a consideration since the 1960's
Between 1060 and 1983 we had 6 sets of restrictions – 34% of the time (Tempelhoff, 2003)

When do we see hidden infrastructure?

Photo credit: Esa Alexander


Picture: Intelligence Bureau SA Facebook page (2016)



'Business of water' challenges loom

EREE BEGA

Researchers warn that the Gauteng-City region is reaching the limits of existing supply solutions

T'S THE hub of South Africa's economy but the Gauteng-City region is fast "reaching the limits of ex- ing water supply solutions". And urbanisation and cli- te change will only amplify sting water security chal- ges.

This is the focus of an coming report from the uteng-City Region Observ- ry (GCRO) on water security, ich outlines the key risks the ion faces to its supply.

"Our infrastructure is igned to say 'don't worry, ve got this', but as we get re water stressed, as we i't manage our catchments perly and droughts kick in, t resilience of the engineer- system becomes more pres- ised," said Gillian Maree, a ior researcher at the GCRO.

The GCRO, a partnership ween the Universities of s and Johannesburg and Gauteng provincial gov- ment, points out that the ge-scale water supply infra- ıcture in Gauteng – the as, water treatment plants l pipes – that bring water has created a buffer for idents.

"We will inevitably face such shortages in Gauteng as well, as we have in the past.

"We're not unprepared in terms of infrastructure and legislation, but we are almost never as well prepared as we should have been; humans have a short memory.

"We need to take a more holistic view of the water system than we do. We treat the 'grey' (engineered) infrastructure as separate from the 'green' (natural) infrastructure."

Behaviour change, he says, takes a perception of clear and immediate danger, and strong pricing signals.

Water expert Anthony Turton hopes that the impending approach of Day Zero in cities such as Cape Town and Port Elizabeth will "bring a new awareness" of the value of water to Gauteng.

Nico de Jager, the MMC for Environment and Infrastructure in the City of Joburg, points out how there has been a reduction in the amount of water used per person per day in Joburg.

"It was 347 litres per person per day and it's now about 287 litres per person.

"This reduction has been

What is Water security?

"…the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies." (Grey, D and Sadoff, C.W 2007)

- Definition covers
  - Natural water resources
  - Water services
  - Covers the water cycle from the rain that feeds rivers, dams and underground reserves through to household taps and toilets and the treatment plants that purify used water before it is returned to the rivers or the ocean.
  - Addresses water-related risks such as floods and droughts as well as water quality and environmental protection

GCR water security informed by:

1. Rapid urban growth and how we build our cities
2. The architecture of our water supply

Continued increases in demand over time

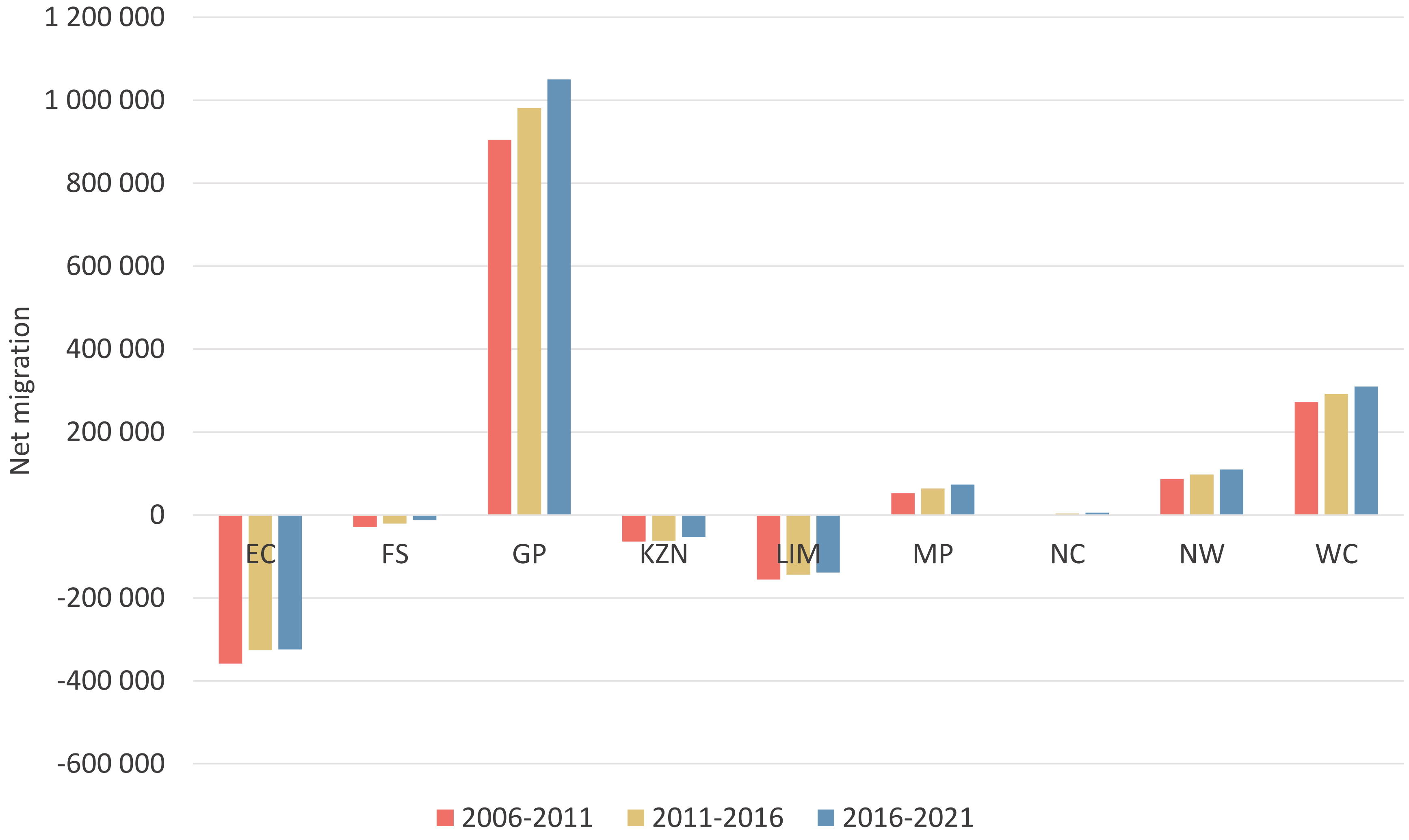
GCR demand includes
- Continued urbanisation
- Growing middle class
- Growing economy
- The way we build our settlements

1. Augmenting our supply
   - Lesotho Highlands phase II is critical but that won't make us water secure
   - Diversifying our supply
2. High and wasteful consumption
   - Have half the global average rainfall and yet consume at double the global average on a per capita basis (178 = world average, 225 SA average, 300 Gauteng)
   - Its not just households but business too
   - Fit for purpose water (grey water, rainwater harvesting)
3. Must invest in maintenance and operations of our infrastructure
   - Pipes and distribution
   - Waste water treatment works
4. Look after our catchments, rivers and wetlands
   - They secure us from flooding
   - Help manage pollution
   - Help mitigate for heat
5. How do we pay for this?

GCR Water in context

The context of growth

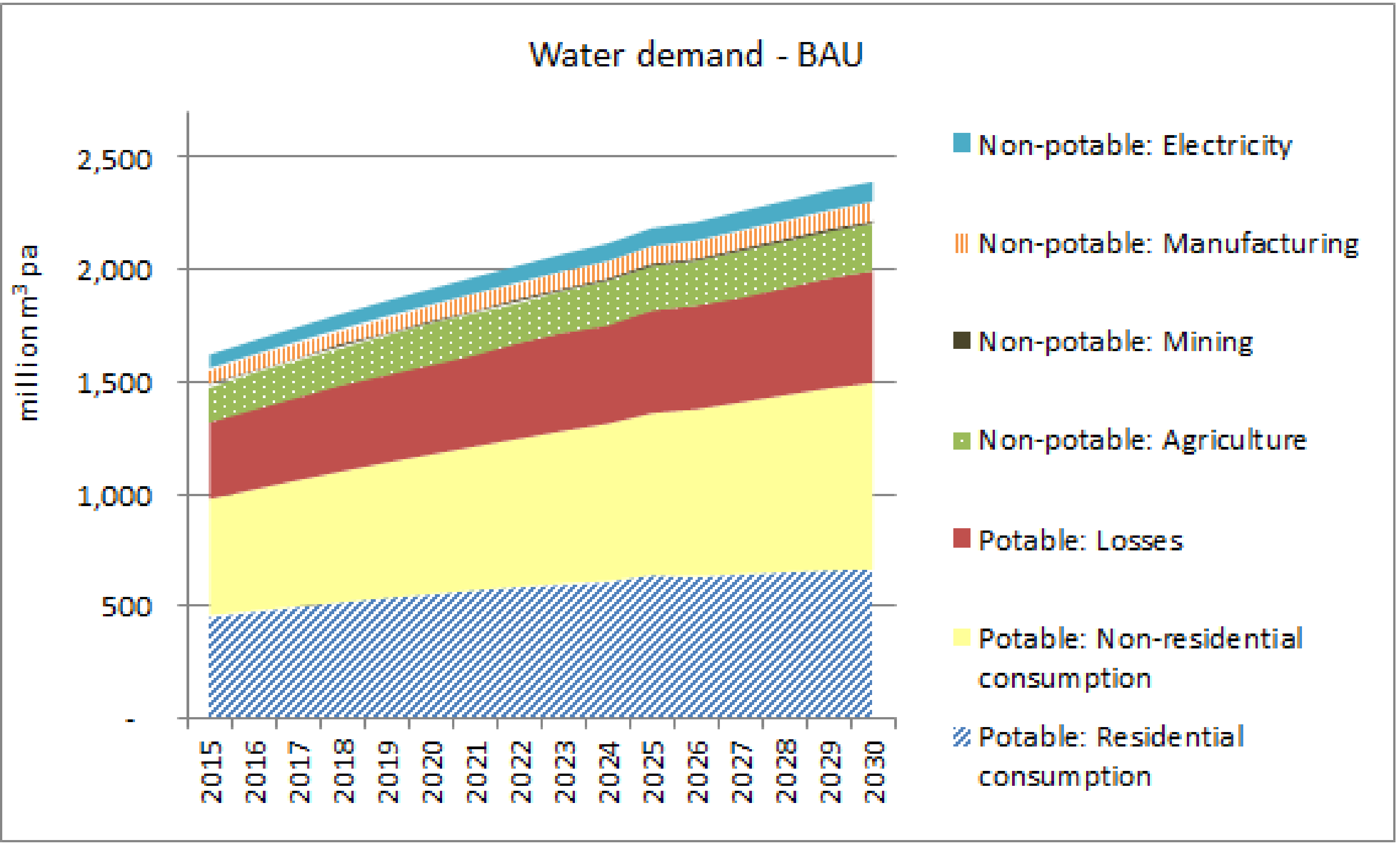
Urbanisation – the national picture



StatsSA Mid year population estimates

- Every 5 years sees an addition to the population **equivalent to the size of Soweto**
- A capped bulk supply until completion of LHP2, means that average consumption **must reduce by at least 3% per year to accommodate population growth**

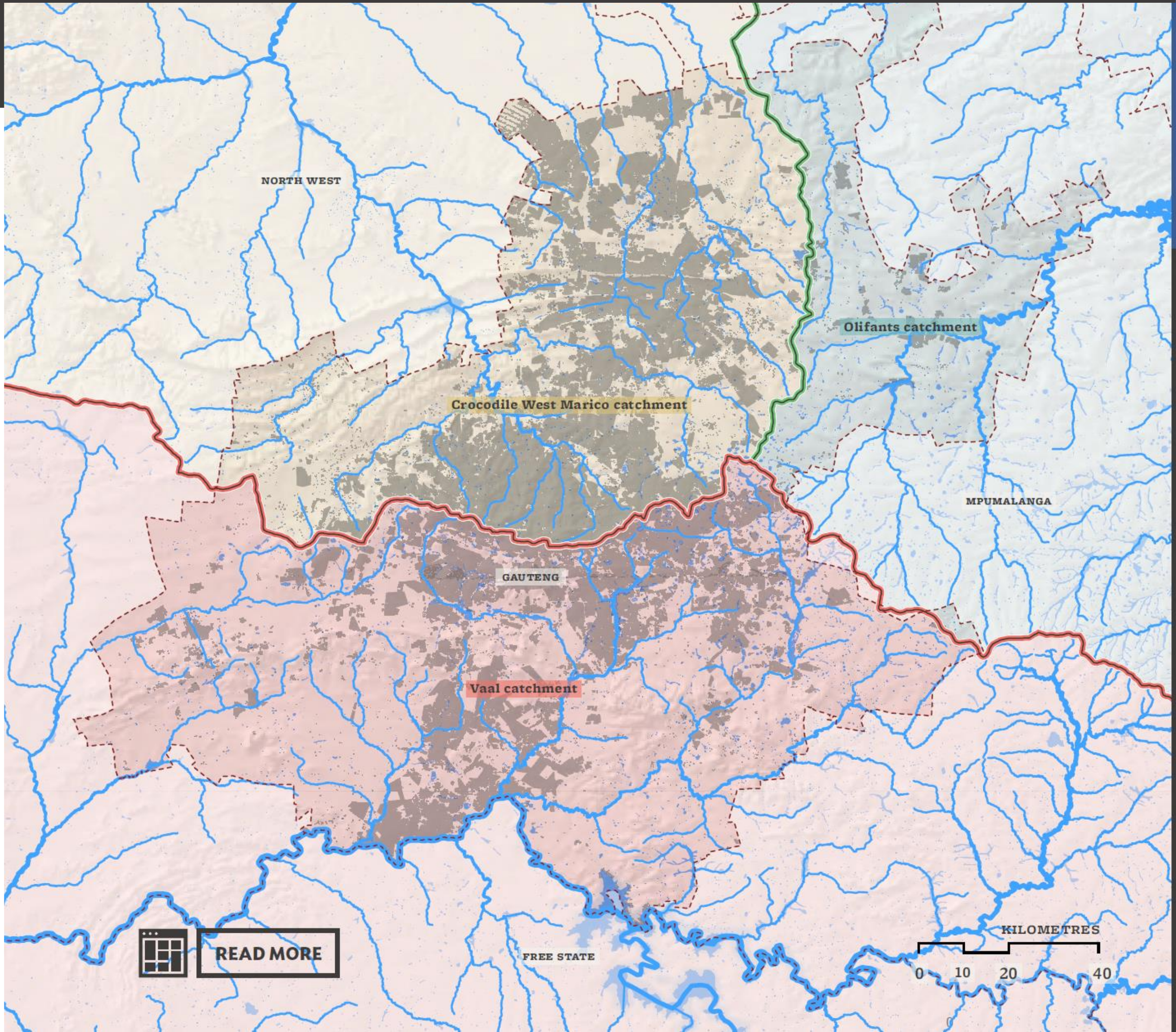
Rapidly rising demand for water



Projections on future consumption patterns show that demand will have to be reduced across all sectors and that loss reduction must become a more urgent priority

This while we consume far more water per capita than the rest of the world

Where does our water come from?



Watershed boundaries of the GCR

Click here for schematic cross section

Watershed between Vaal River and Limpopo tributaries

Watershed between Crocodile West Marico and Olifants Rivers

Provinces

Rivers

Wetlands and dams

Urban areas

Authors
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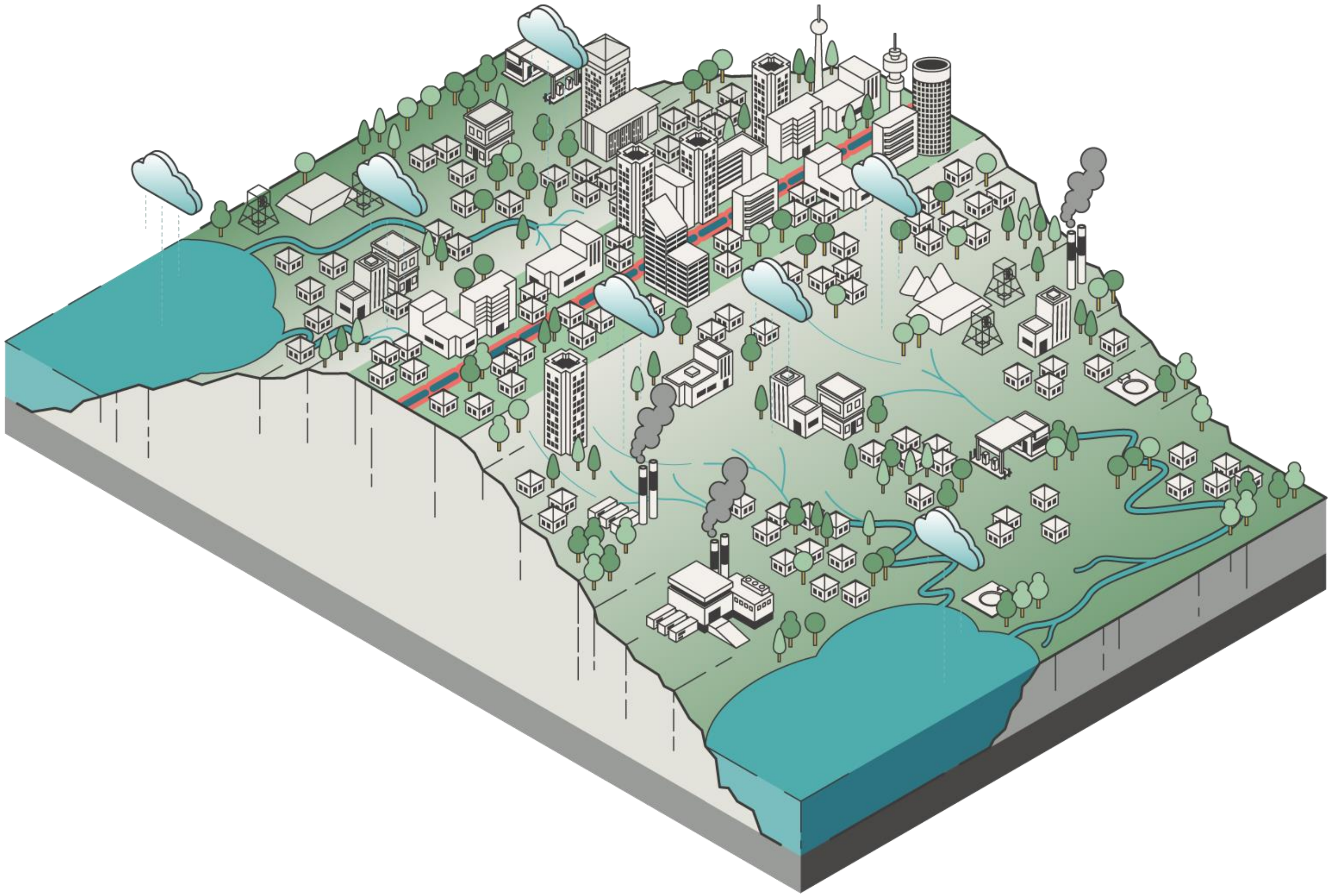
Data Source
Department of Water Affairs and Sanitation, CSIR 2011, ESRI, GTI land cover 2014

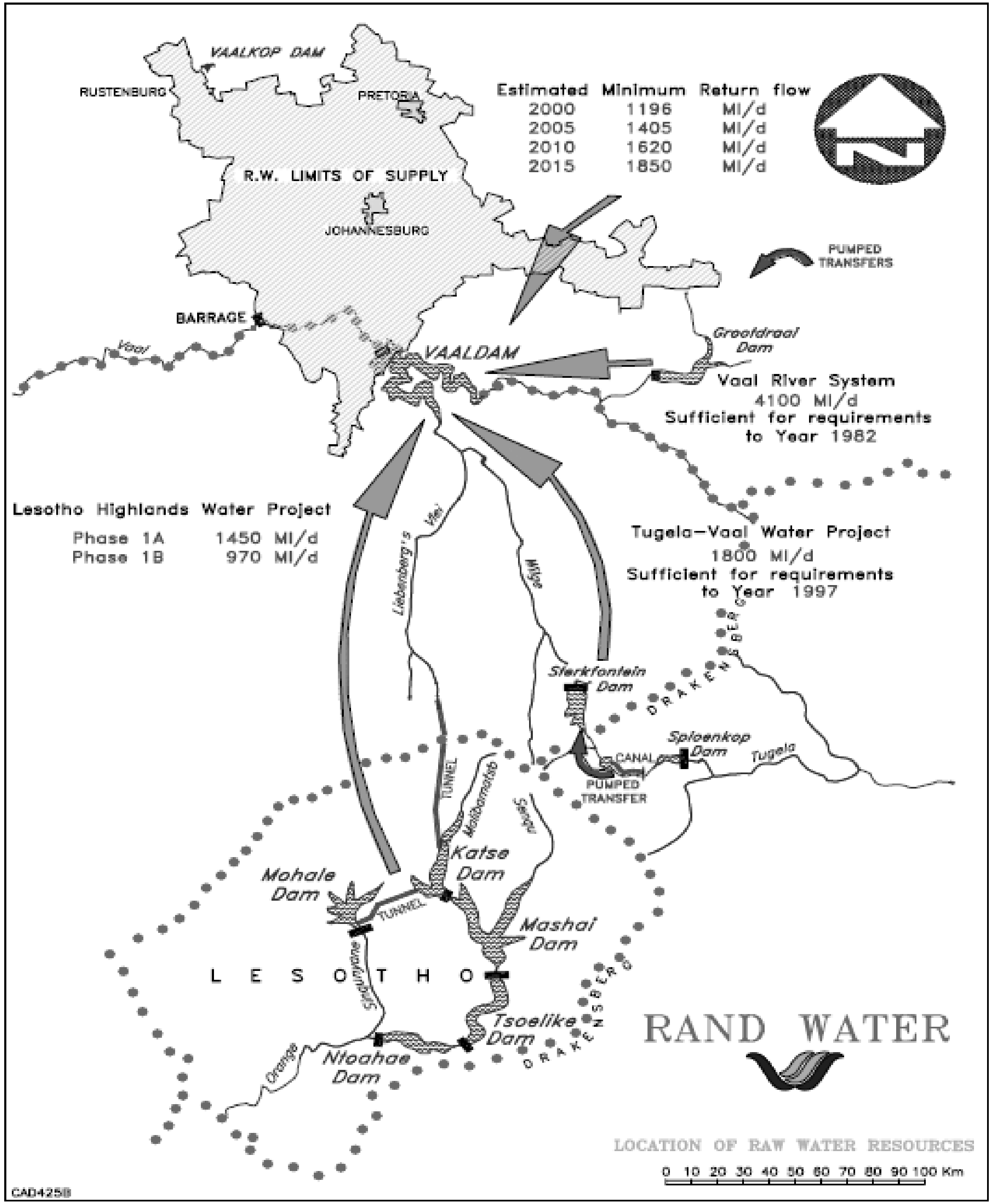
GCRO Gauteng City-Region Observatory

Gauteng at the top of the watershed

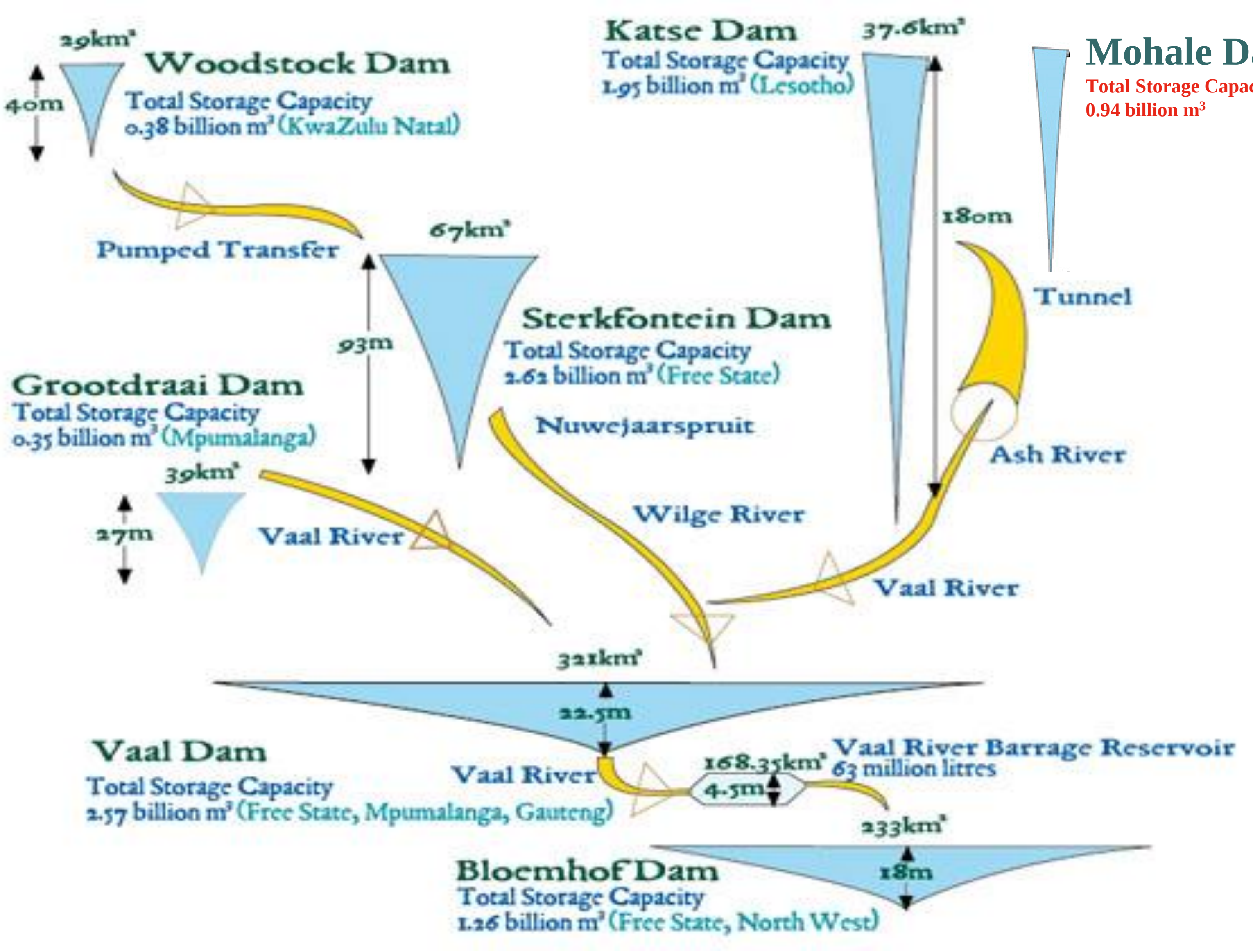
Both opportunity and challenge



Gauteng's raw water supply network

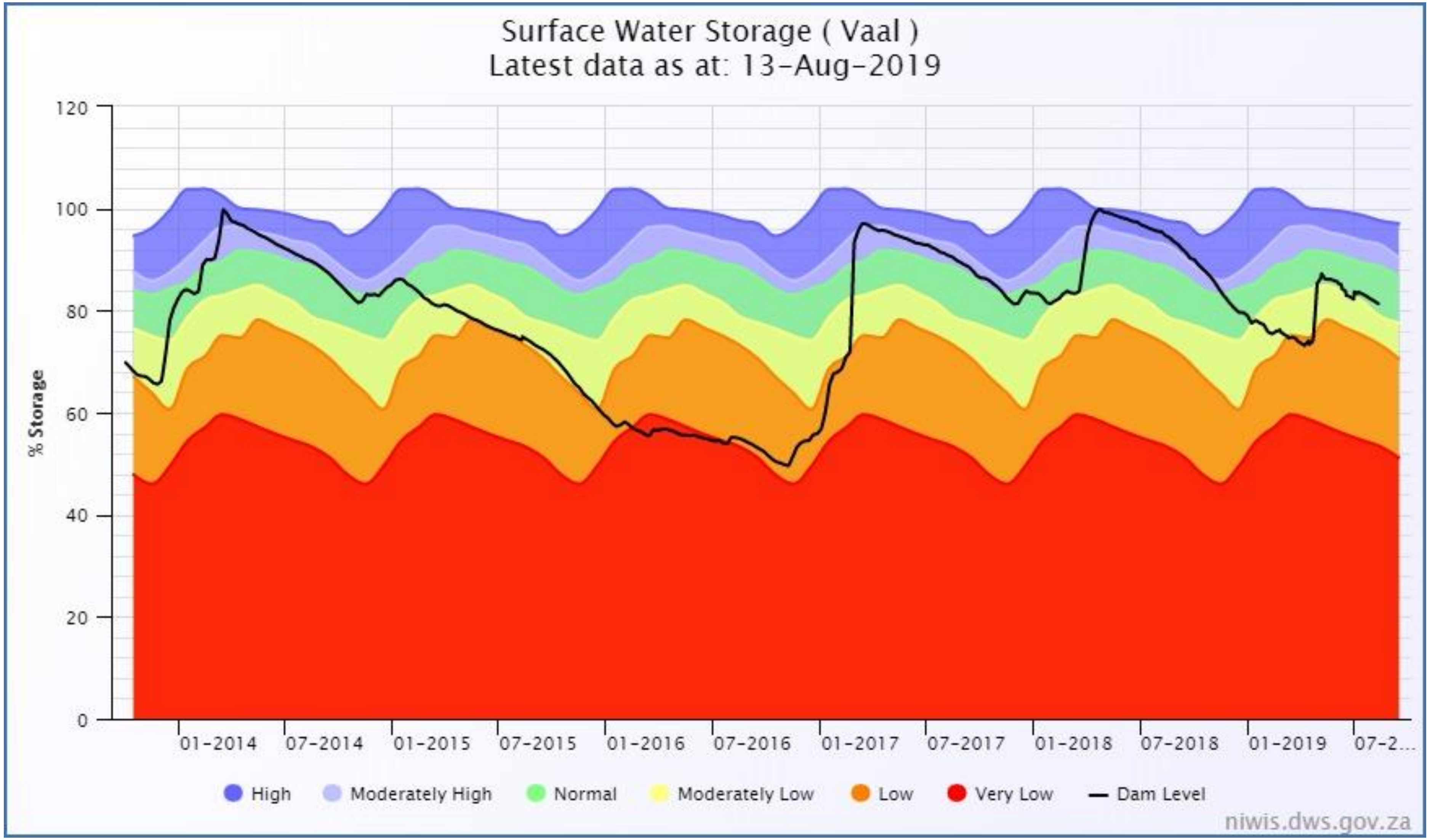


Supply system (Integrated Vaal River System)

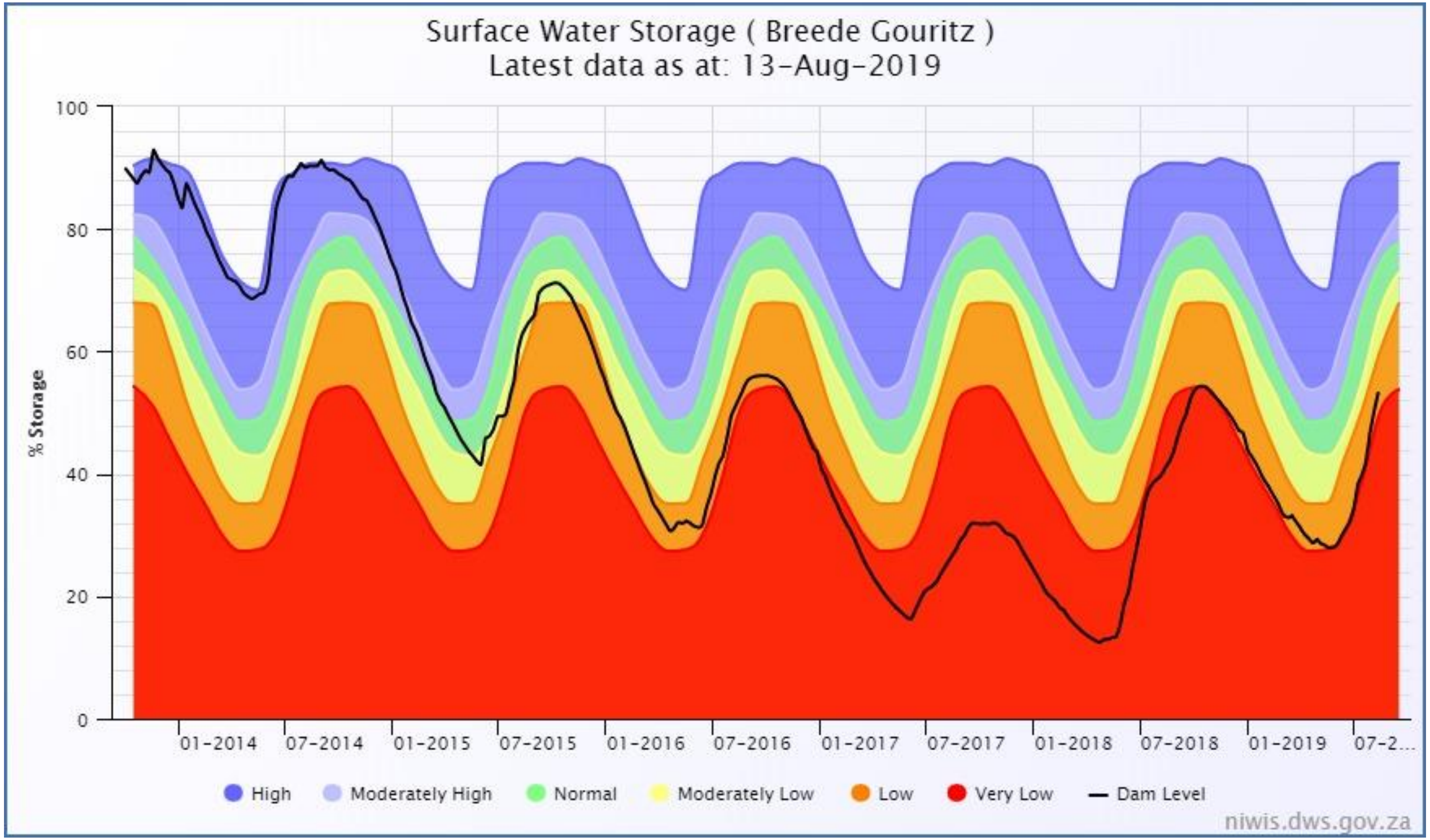


Extraction limit has been reached until Mohale Dam is built

Hydrological variability in water storage

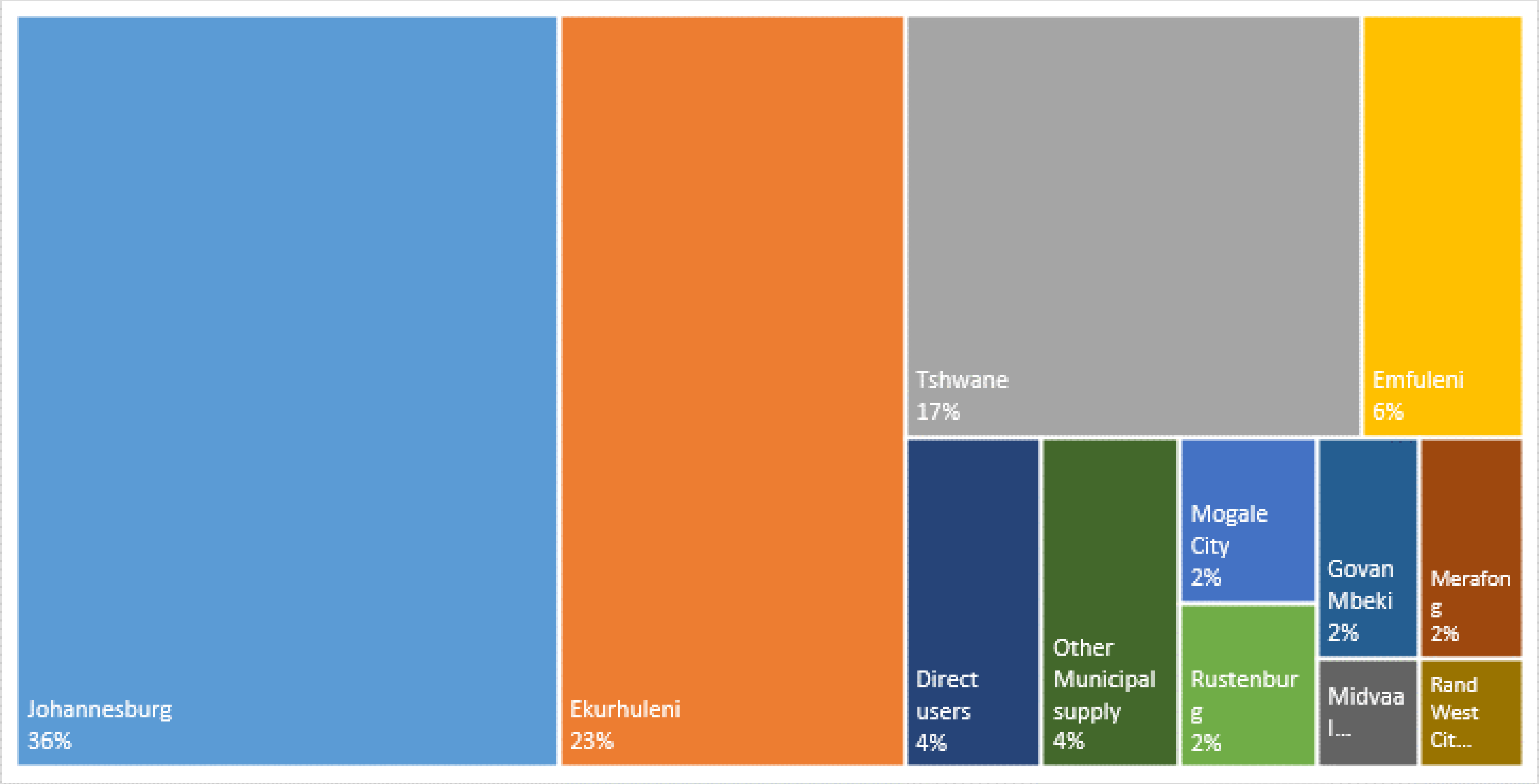


Compared to Breede Gauritz Catchment

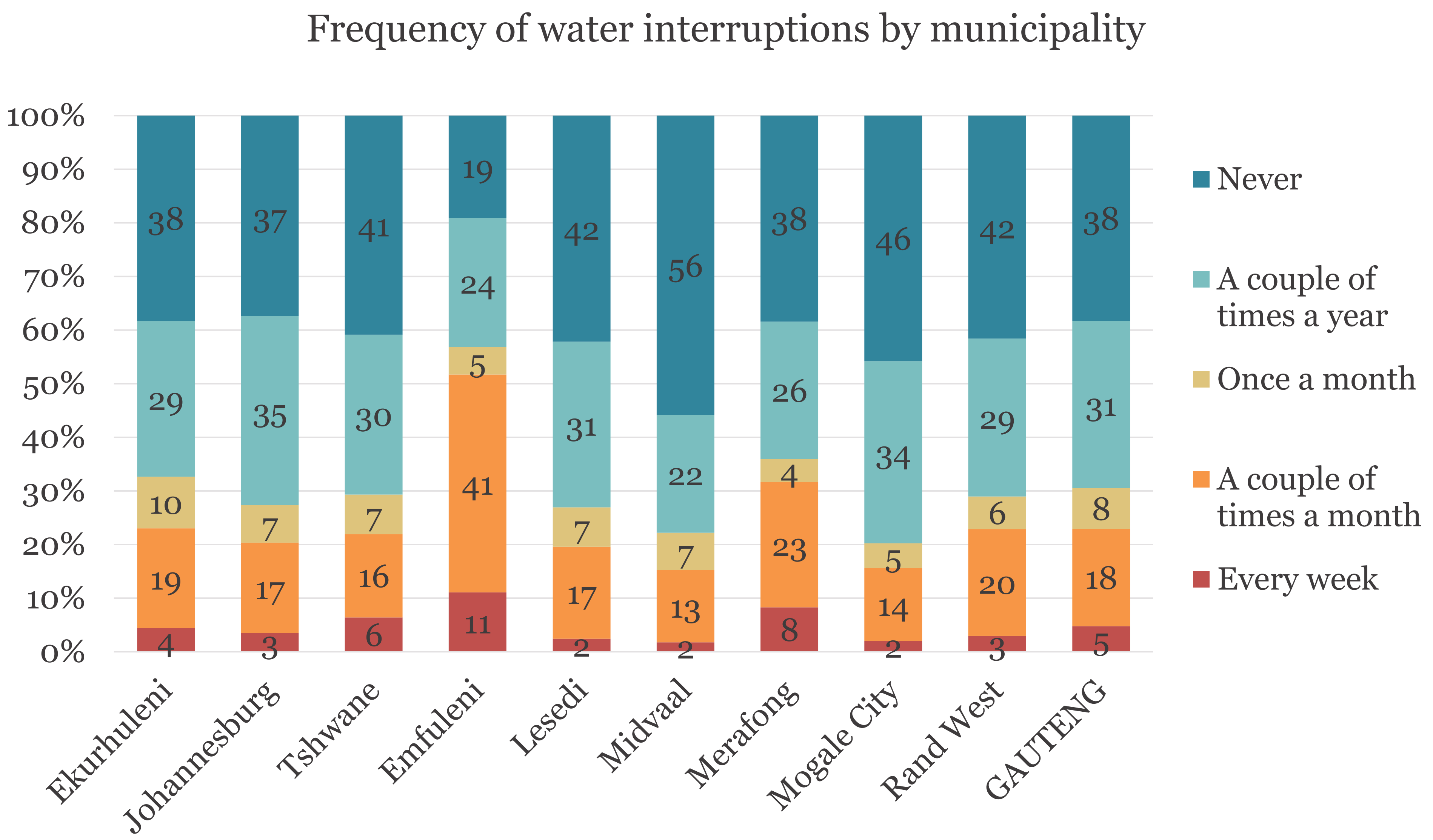


Rand Water distribution

Rand Water, which supplies 83% of the province, **has reached its extraction limit** imposed by DWS until LHP 2 is completed



QoL V: Reliability of water supply



Our pollution has implications for water supply

Waste water, solid waste, AMD etc.

Vaal River visitors warned against sickness due to serious pollution

November 8, 2017 | Liezel van der Walt

Climate variability and change

- Water does not come from a tap or dam (Our water comes from another country)
- We have less capacity to measure and record key variables data today than we had in 1920

BUT drought and climate change will also affect us

  - Learn from past droughts but because of changing climate, the past may not be a good indicator of future risk
  - Drought and flood can happen together
  - While there may be overall increase in rainfall in Lesotho there will be a change in how it falls
  - Temperatures will rise:
    - Increases evaporation
    - Increased consumption
    - Increased concentration of pollutants


Picture: Intelligence Bureau SA Facebook page (2016)

Gauteng Water Perspective critical Issues:

- Water security is a never-ending challenge – it will always be on decision makers agendas.
    - This requires effective institutions and collaboration
    - No easy or single answer/solution
- All users depend on a common resource and set of infrastructure
- Gauteng's high water use must be reduced, but must also deal with high urban growth
- Need additional supply for growing population & economy, plus we need to manage our existing supply properly
- Will have to diversify water mix
- Fix waste water management and improve water quality
- Improve storm water management

5 programmatic areas for intervention

1. Reduce water demand
2. Manage variability to prepare for drought and/or water scarcity
3. Invest in alternative water sources and water conservation
4. Manage water quality to limit pollution and achieve environmental goals
5. Effective intuitions for water security

Visit www.gcro.ac.za to access our publications

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