Increasing competition for finite water resources: Options for the future

International Conference on Fresh Water Governance for Sustainable Development

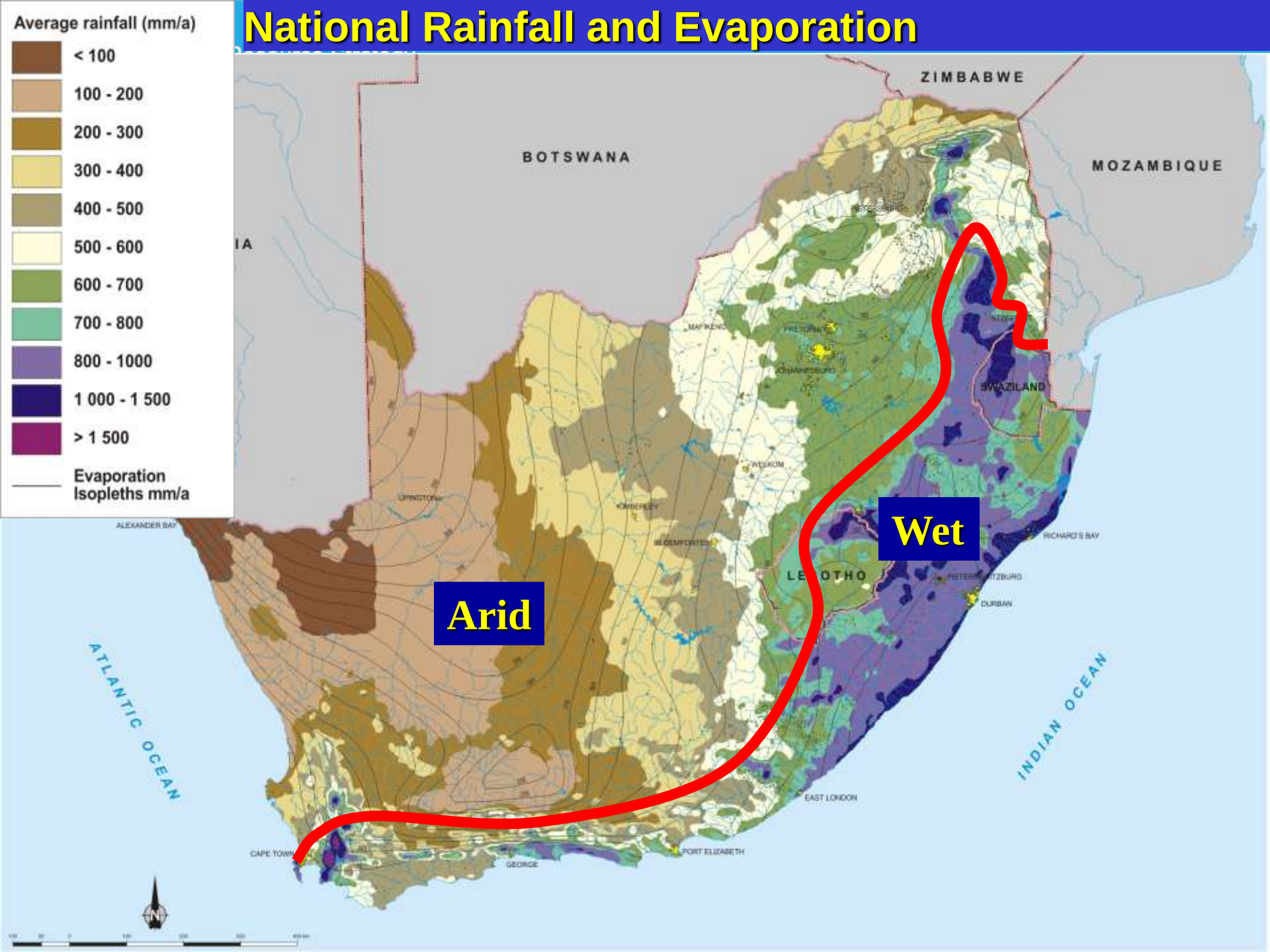
6 November 2012

Johan van Rooyen
Director: National Water Resource Planning
Department of Water Affairs

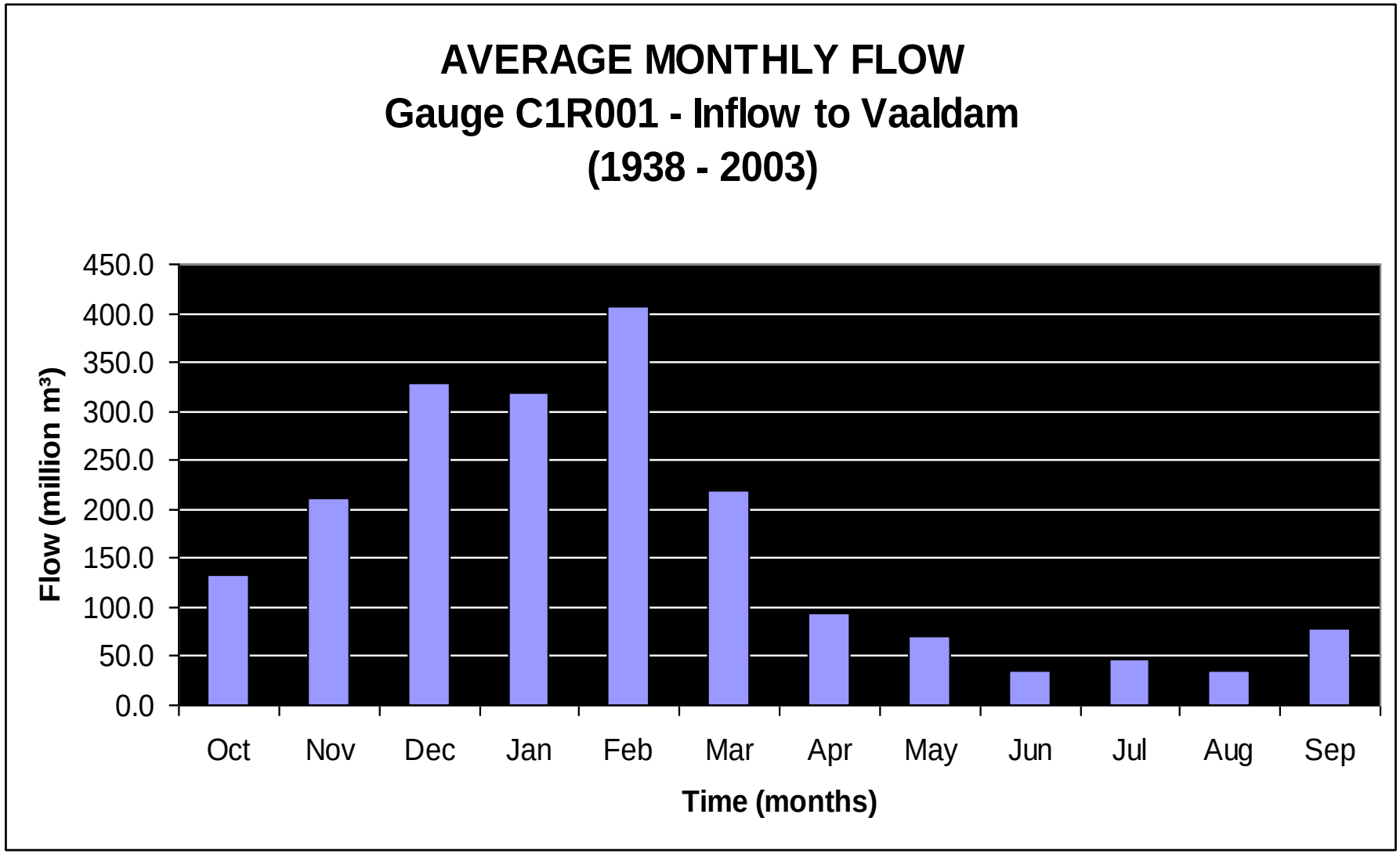
Recognitions

- Department of Water Affairs
- Colleagues in NWRP
- Professional teams
- Co-authors
  - Dr Thinus Basson
  - Dirk Versfeld

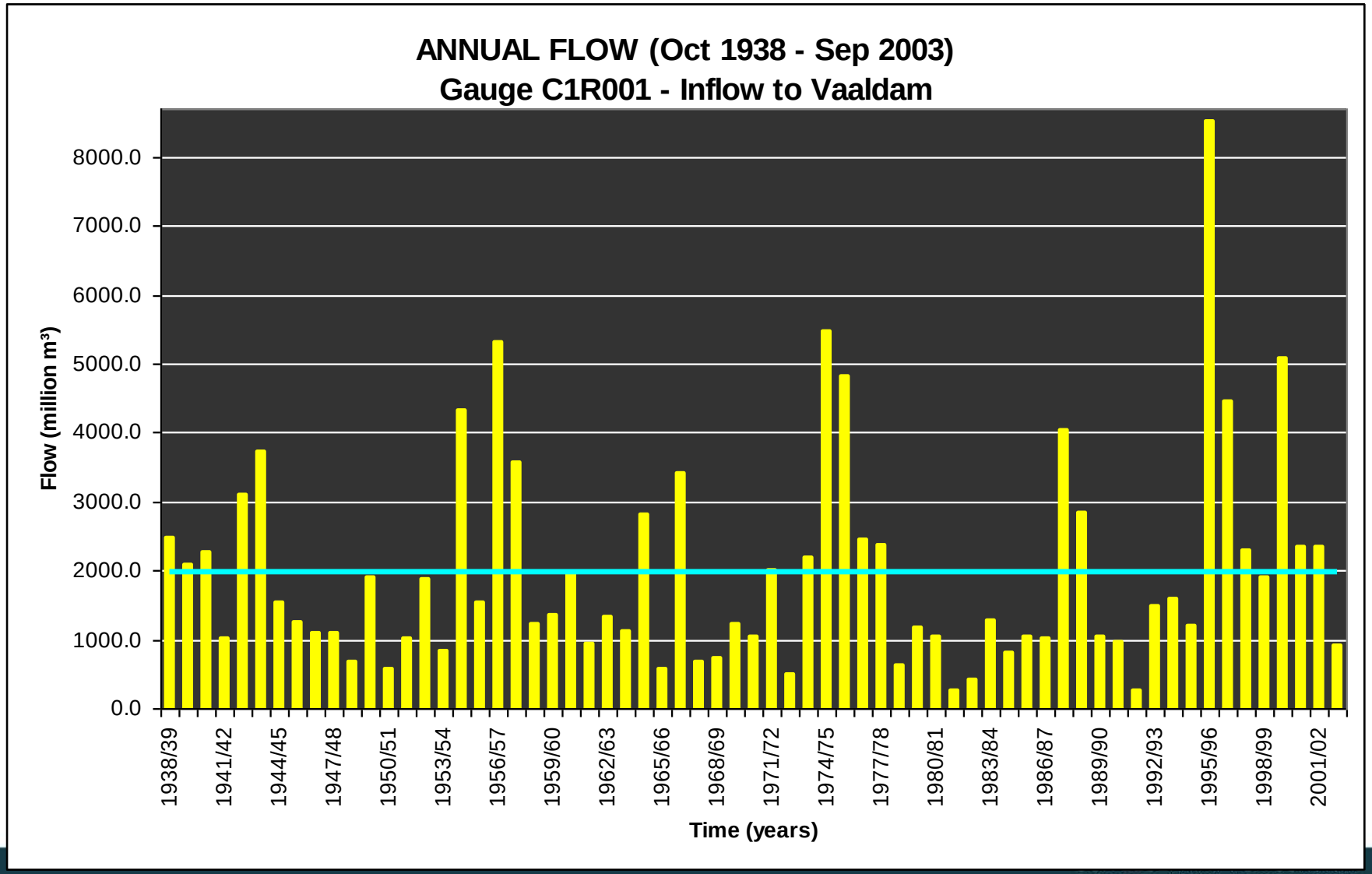
National Rainfall and Evaporation



Seasonal Variations in River Flow



Annual Variations in River Flow



Fresh water in SA is scarce

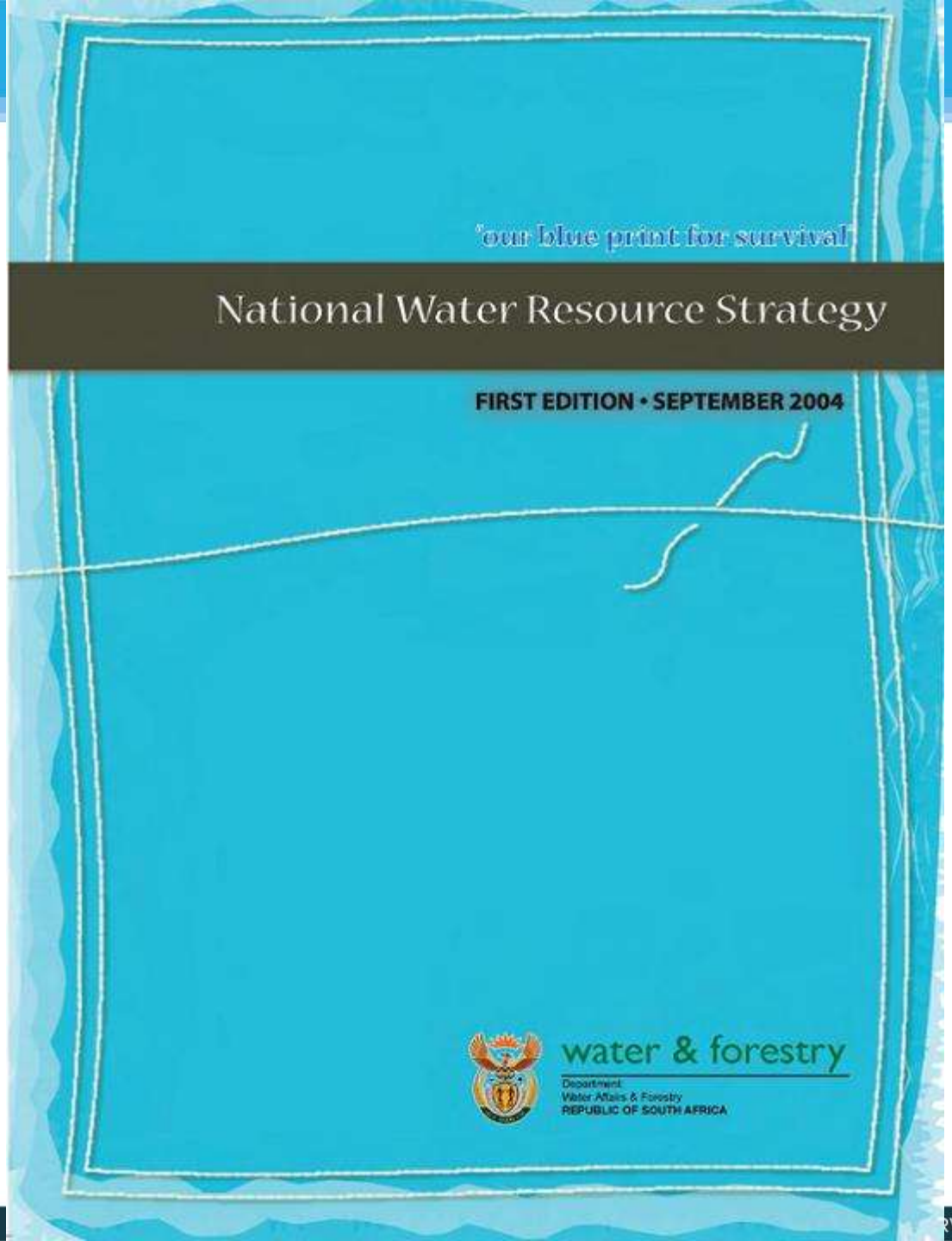
- Variability in rainfall and runoff meant very little water usable without infrastructure
- Competition for water from early on in SA's history
- Dams had to be built to store water
  - From rain season to dry season
  - Wet periods to dry periods
- Fountain flow small
  - Borehole development required to access groundwater
- Financial resources used to "create" usable water

International Rivers shared by South Africa

(4 basins shared between 7 countries)

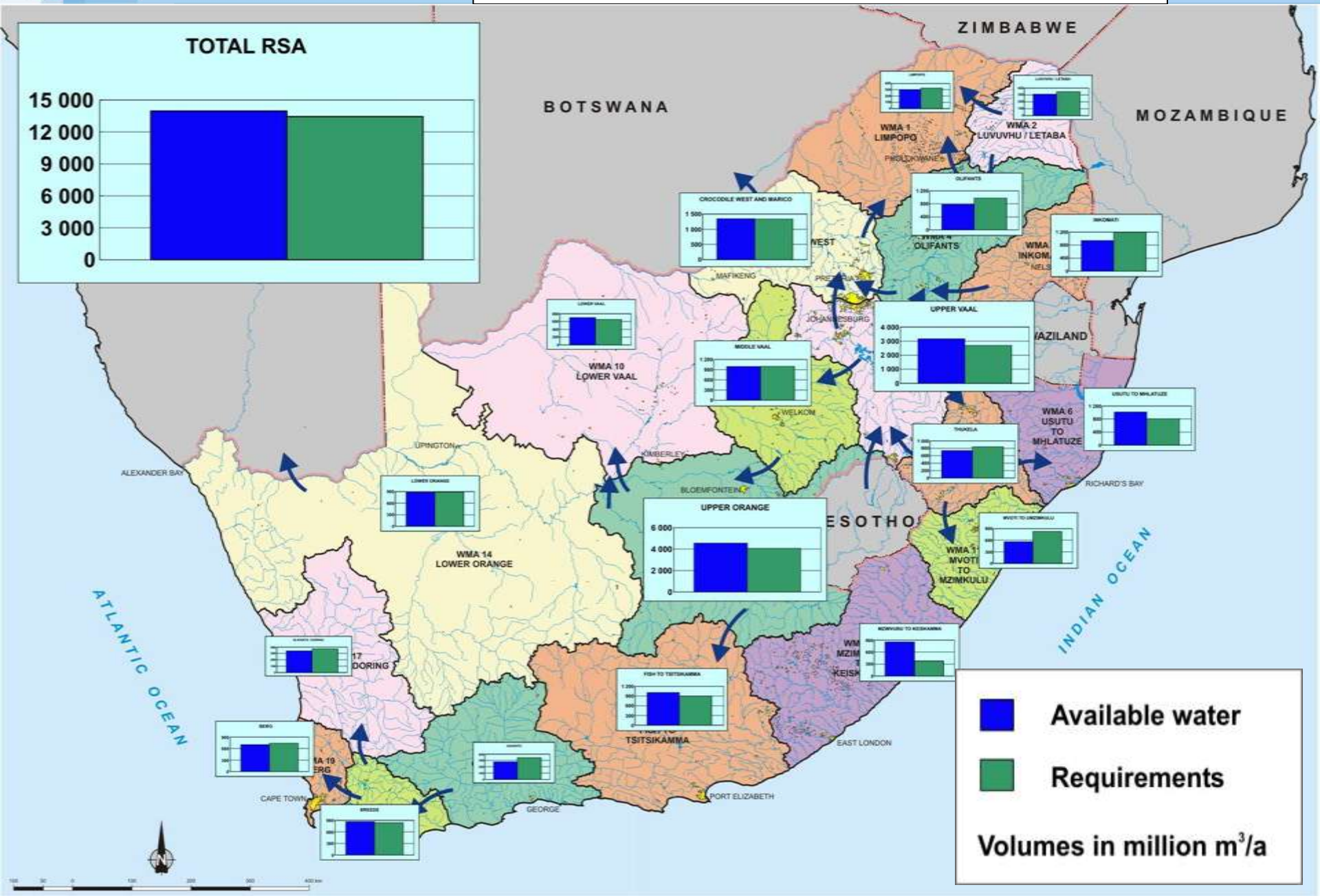
Water Quality

- Essential that water be of appropriate quality for intended uses
- Deteriorating water quality potential major threat in SA
  - can render water unfit for use
- Main sources of impact on water quality are:
  - discharge of urban and industrial effluent to rivers
  - high salinity irrigation return flows
  - wash-off and leachate from mining operations
  - wash-off from areas with insufficient sanitation
- Water quality fundamental element to water resource management
- Most problems could and should be solved at source

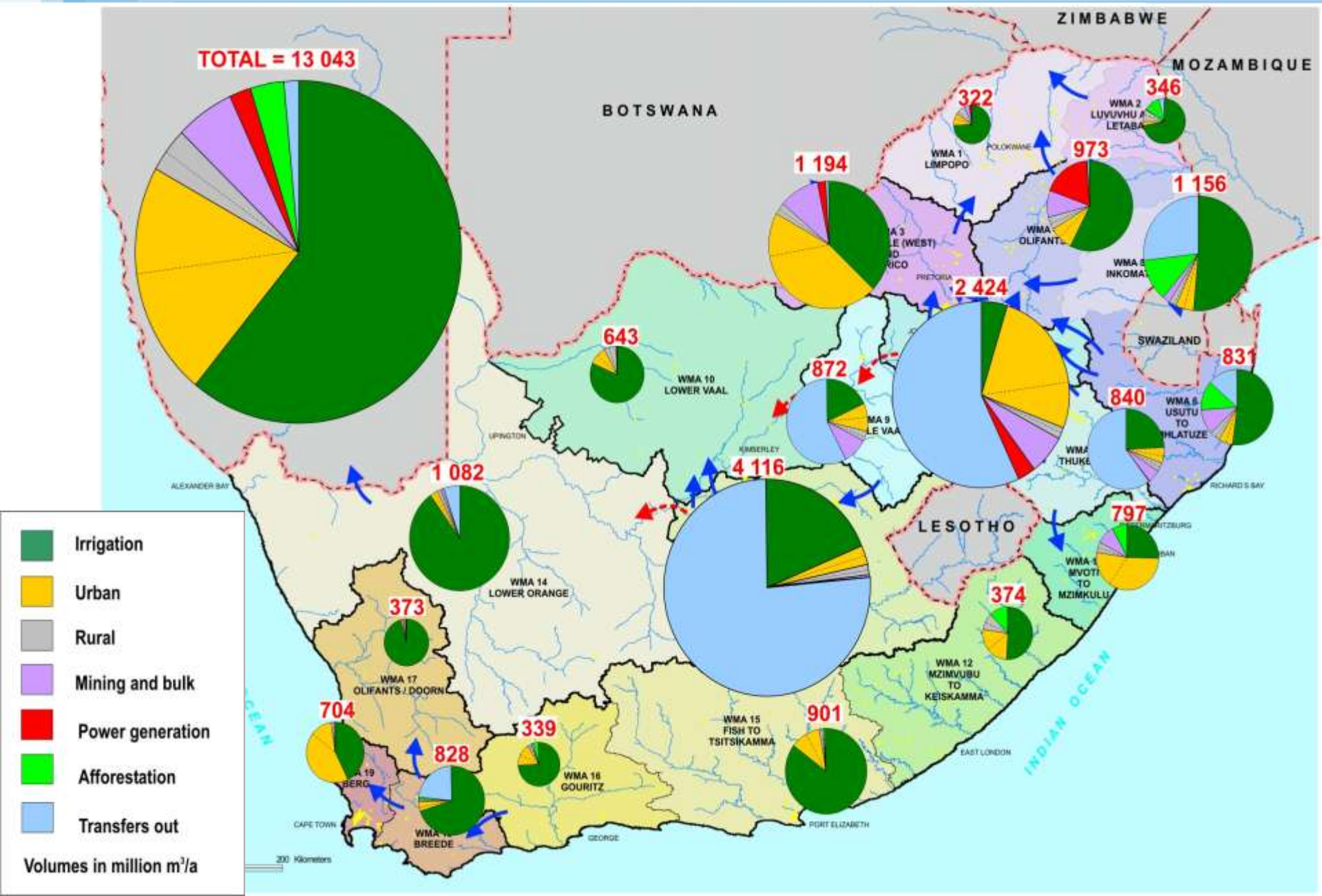

"our blue print for survival"
National Water Resource Strategy
FIRST EDITION • SEPTEMBER 2004
water & forestry
Department
Water Affairs & Forestry
REPUBLIC OF SOUTH AFRICA

NWRS
National Water Resource Strategy

Water reconciliation (year 2000)



Water requirements, year 2000



Growth in requirements

- Growth is inevitable
- SA population is nudging 52 million
- Economic growth target of 6%
- Translated to water requirement
- Not hard to see the source of competition

Rural

- Water to rural areas will not be neglected
- Thriving rural livelihoods provide food security to growth centres and take the pressure off urban migration
- This is an area of historic neglect – redress through
  - Improved water services (supply and sanitation) and
  - Livelihoods opportunities
- Can be met through
  - Local groundwater or other sources
  - Improved land management and rainwater harvesting for food gardens and food security
- These approaches keep water affordable in an environment where the ability to pay for water is very low

Agriculture

- Close to pegging the use of water by its major consumer – agricultural irrigation.
- The age of major new schemes is over
- Agricultural development can only come through
  - Increasing efficiencies
  - Taking up of unused allocated water
  - Few remaining potential projects, but at high cost
- Forestry
  - Tightly managed and
  - Overall use by this sector has, if anything, declined through the clearing of trees previous planted in riparian zones

Towns and cities

- Domestic requirements have increased
  - With population growth
  - Demographic and social change that has led to
    - More households with fewer people per household
    - Increased urban incomes
    - Growing expectations
- Bulk of SA industrial demand also in cities and towns important for economic growth
- But losses and inefficient use much too high

Mining

- Mining, despite the perturbations of the moment, remains the economic backbone of the country.
- The demands of the sector are relatively modest in relation to economic output
- But large part of future potential in areas of water scarcity
- In some areas water is already “flowing” from agriculture to mining
- The biggest impact of mines is to water quality – a threat to the resource that cannot be airbrushed away

Energy

- South Africa absolutely dependent on the reliable supply of electricity
- This requires water
- Strategic use after basic human and ecological requirement
- Efficiency crucial
- All new stations dry-cooled
- Same apply to concentrated solar stations
- Can not afford to grow biofuel crops under irrigation

Ecological Reserve

- Entrenched in law through the NWA of 1998
- To ensure viable ecosystems – providing the natural goods and services that ecosystems offer
- Sufficient water to remain in the system to retain ecological functionality, at varying levels depending on their classification
- Not all rivers can be “pristine”
- The value of rivers is not accorded to the rivers *per se*, but to the benefit that these rivers in turn provide to the society that uses them

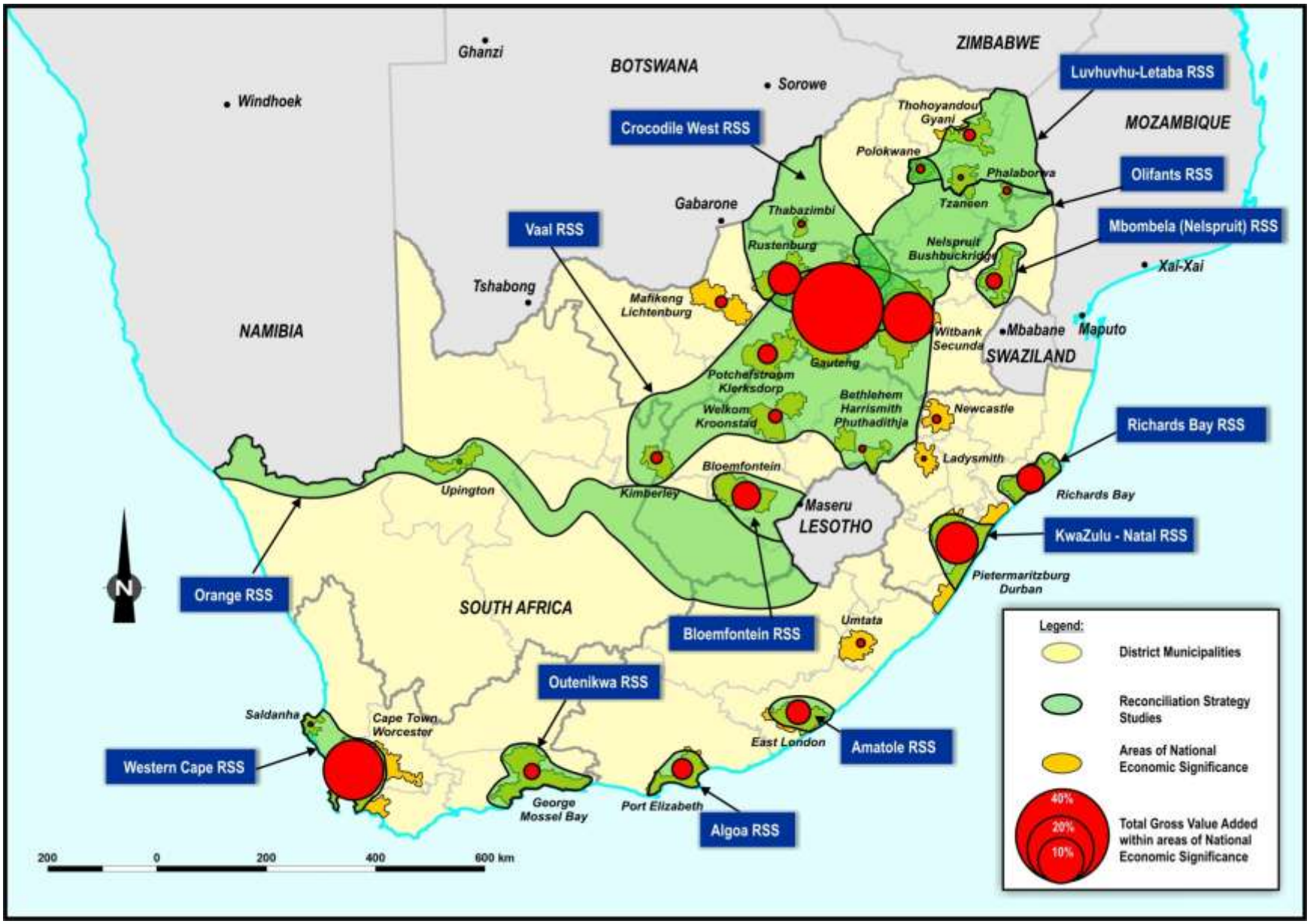
NWRS 1 Reconciliation Strategies

- Water demand management and conservation
- Surface water resource management (operation of dams) and conservation
- Managing and use of groundwater
- Re-use of water
- Eradication of invading alien vegetation
- Re-allocation of water
- Development of surface water resources (e.g. dams)
- Transfer of water

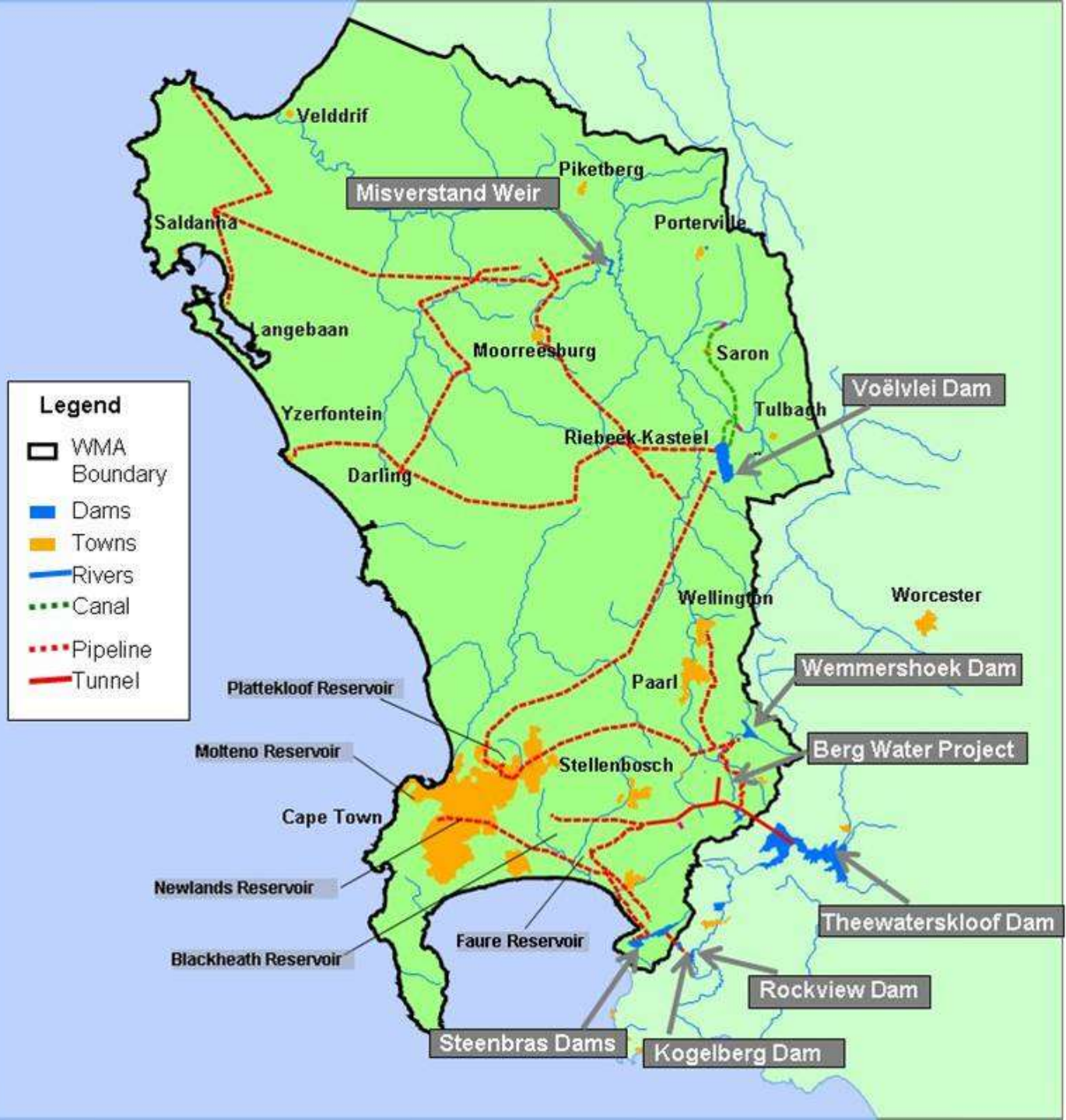
Building on NWRS 1

- NWRS 1 statistics on broad overview level
- Can for instance not be used to build infrastructure
- More detail required
- Reconciliation Strategies
  - Large systems supplying areas of large economic importance (8 completed, 4 in development)
  - Rest of towns covered in 814 “All Town Strategies”

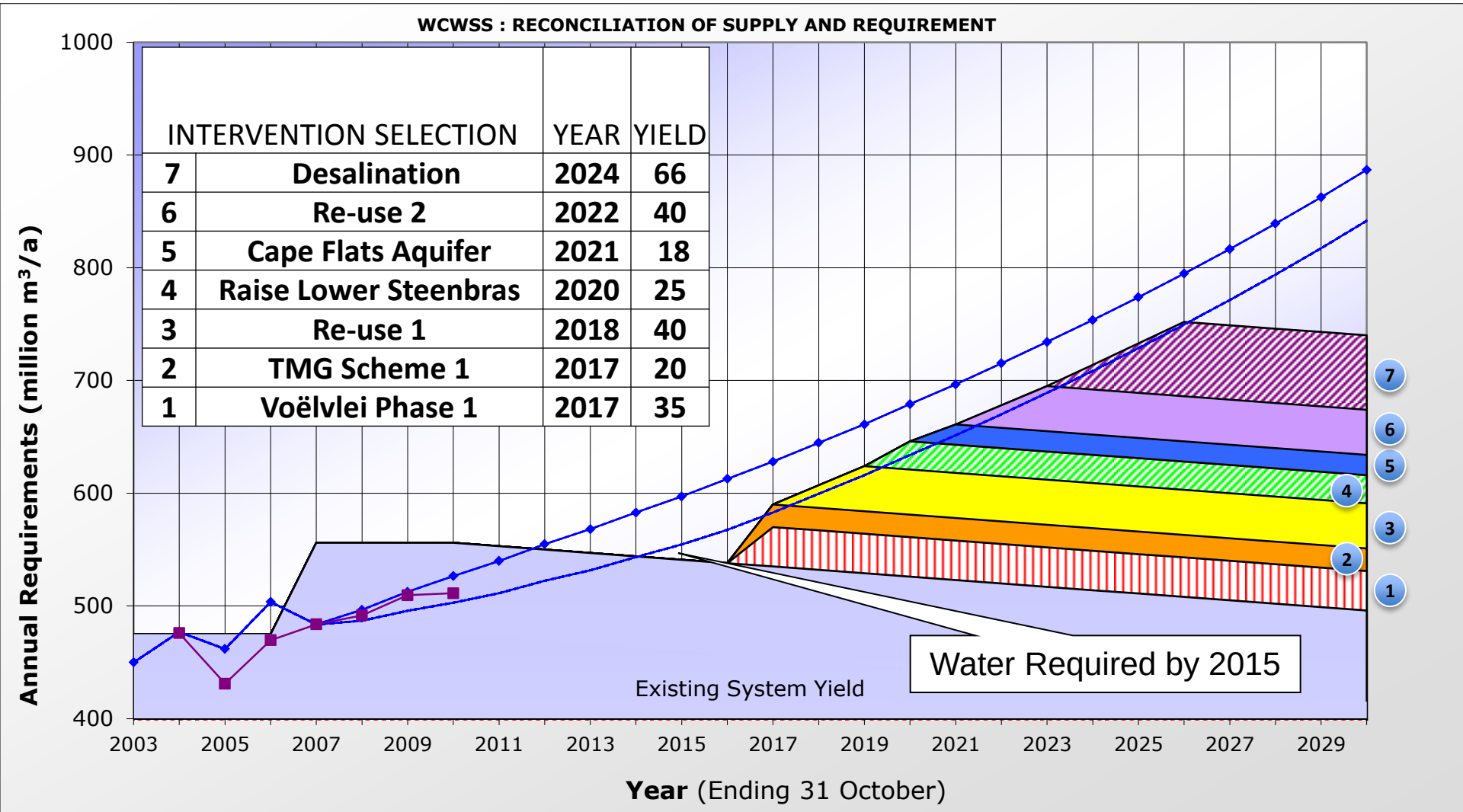
Large System Reconciliation Strategies



Western Cape Water Supply System



Climate Change and WC/WDM 50% Successful



W Cape strategy

- Implement WC/WDM
- Complete feasibility studies for three options
  - Surface water
  - Re-use
  - Desalination of seawater
- Strategy Steering Committee to recommend the next augmentation by Mid 2013
- To supply water by 2019

Cost of future supplies (URV)

Type	R/m³
Surface and groundwater (short transfer)	2 - 4
Re-use	8
Surface (large quantity, long transfer)	6 - 17
Surface (small quantity, long transfer)	18 - 45
Mine water treatment and desalination	8
Seawater desalination (at coast)	12
Seawater desalination (large, long transfer)	25
Seawater desalination (small, long transfer)	44

Key strategic messages from all strategies (1)

- Detailed work confirmed NWRS 1 broad strategies, but added desalination as a strategy
- Strategic planning has been done and the solutions are available
  - WC/WDM extremely important in all areas – SA can not afford to waste any water, anywhere, anymore
  - Groundwater important, currently under-valued and under-used
  - Huge potential for increase in re-use, at coast but also in inland systems

Key strategic messages (2)

- Limited opportunity for more dams and transfer schemes but inevitable in certain areas – very expensive
- Desalination
  - Small scale seawater desalination already being done
  - Mine water desalination important
  - Large scale seawater desalination imminent
- Catchment rehabilitation, clearing of invasive alien plants and rainwater harvesting important

Key strategic messages (3)

- Possible to make more water available anywhere in the country in the future, but at steeply rising costs
- Additional water for increase in irrigation in SA very limited
- Moving some water from irrigation to other use must already be considered in certain areas
- Debate about “virtual water” and importing food from neighbouring countries with high food production potential must be broadened

Key strategic messages (4)

- It is possible for SA to have water security
- But water management is complex involving the whole water sector
- **Implementation will be the key and the water sector needs**
  - **Much more financial resources**
  - **Appropriate human resources**
  - **Fully functioning institutions**

Thank you