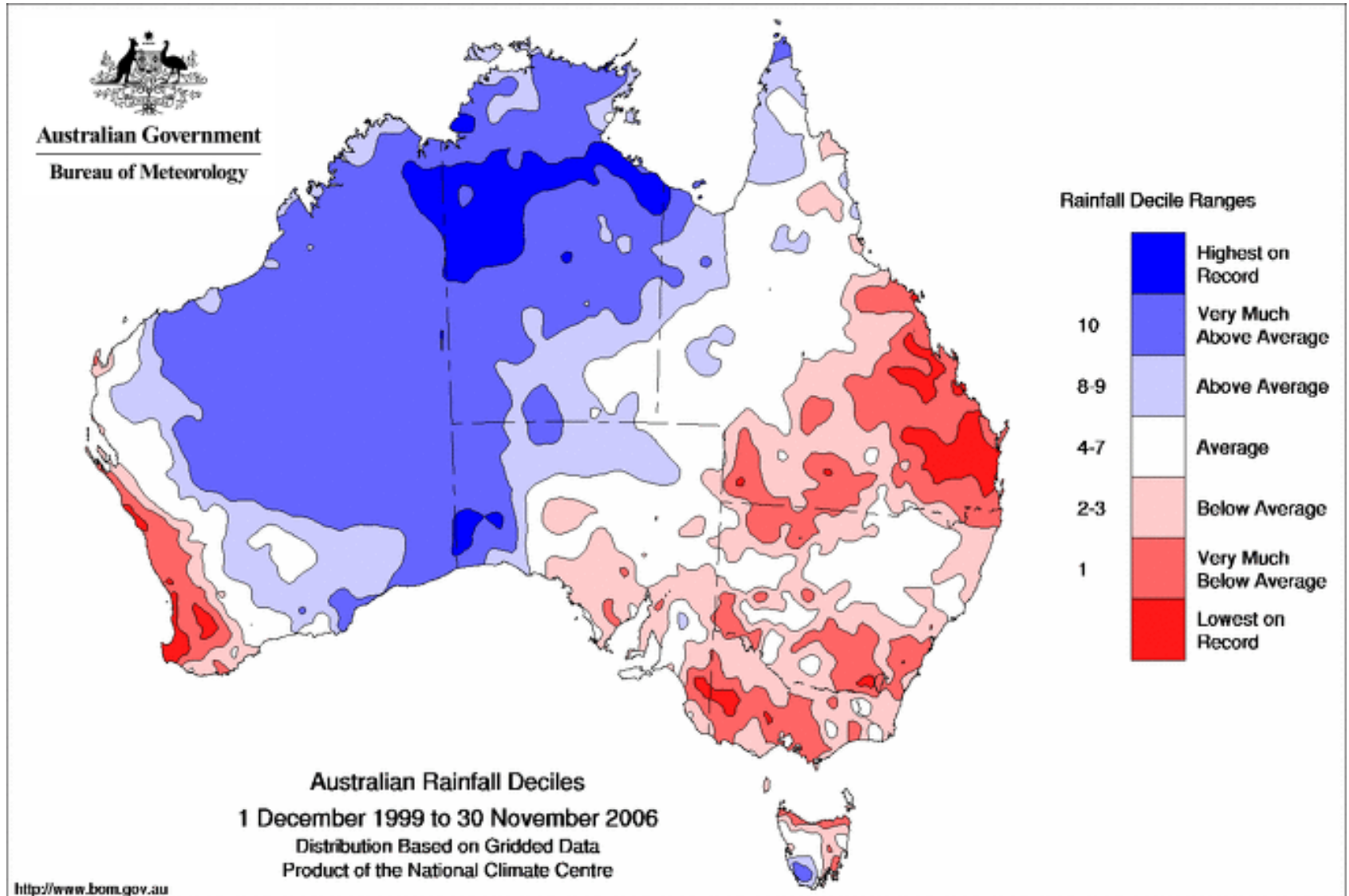


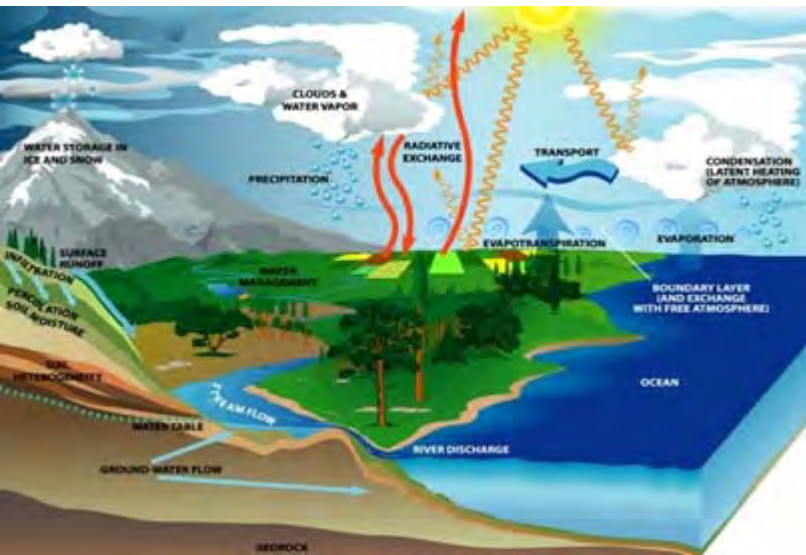
Issues in Urban Water Security

Paul Greenfield, Vice Chancellor, UQ
Chair, Research Advisory Committee, UWSRA

Rainfall December 1999 to November 2006



Significant changes in the water cycle in the last few decades...



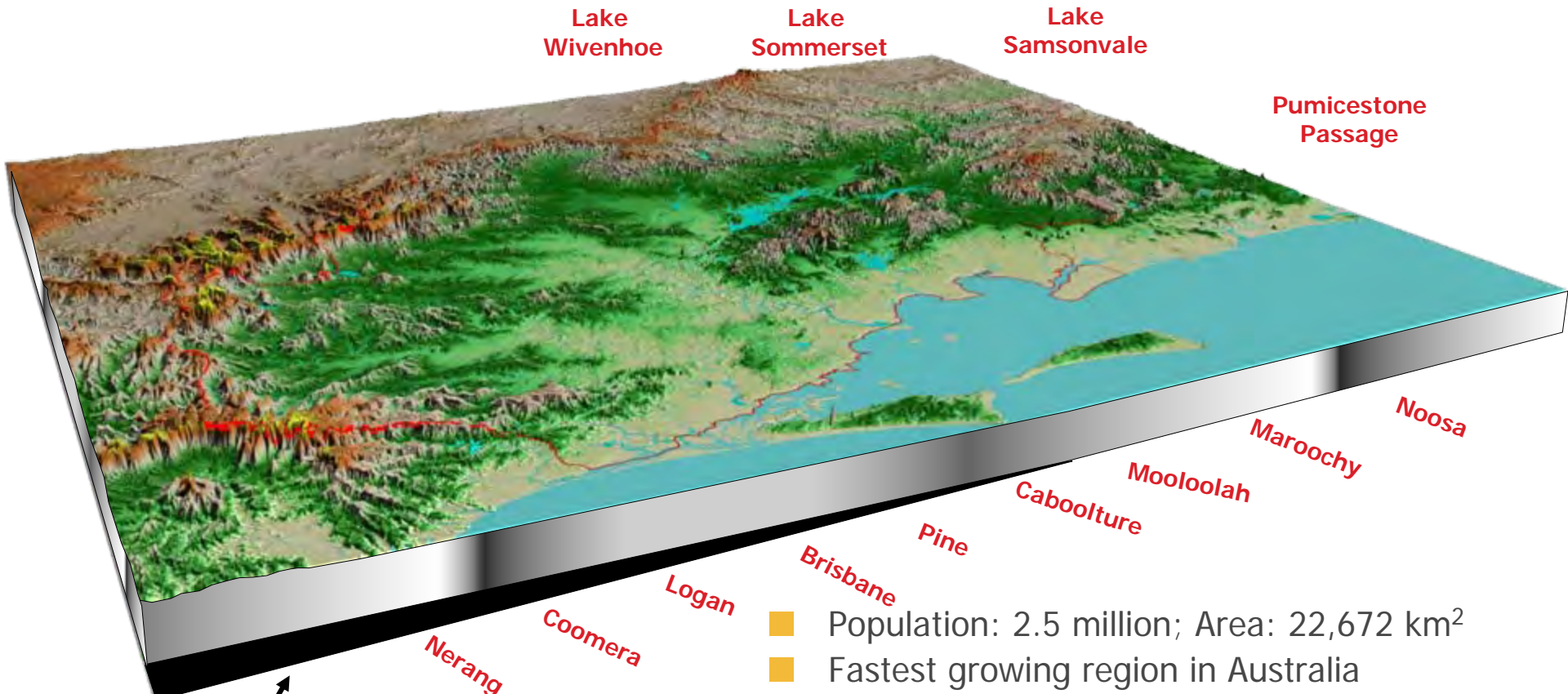
Water Cycle has been altered...



Need to understand:

- Water cycle, implications of climate variability & climate change & demand
- Implications of different flow and nutrient regimes on waterways, storages and Moreton Bay (linking quality and quantity);

South East Queensland Catchment



- Population: 2.5 million; Area: 22,672 km²
- Fastest growing region in Australia
- Since European settlement:
 - catchment significantly altered
 - dams and weirs regulate river flows
 - land clearing resulted in more flows, erosion and delivery of both nutrients and sediment
 - decline in aquatic species diversity

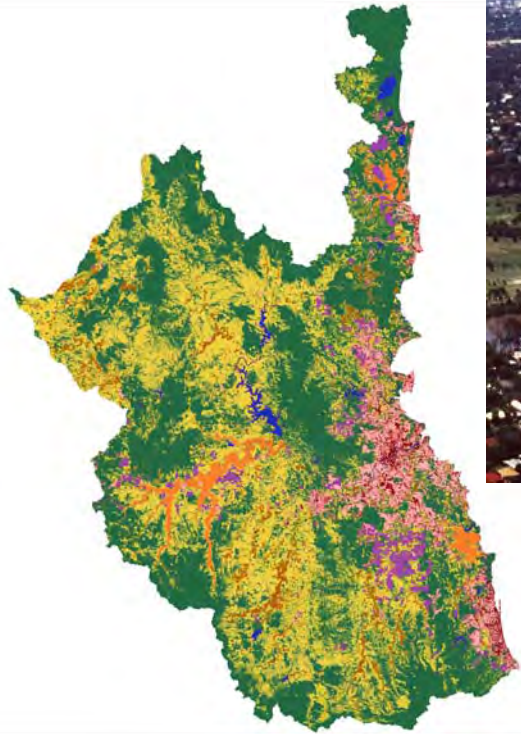
Queensland Water Commission

\$9 Billion – SEQ Water Grid



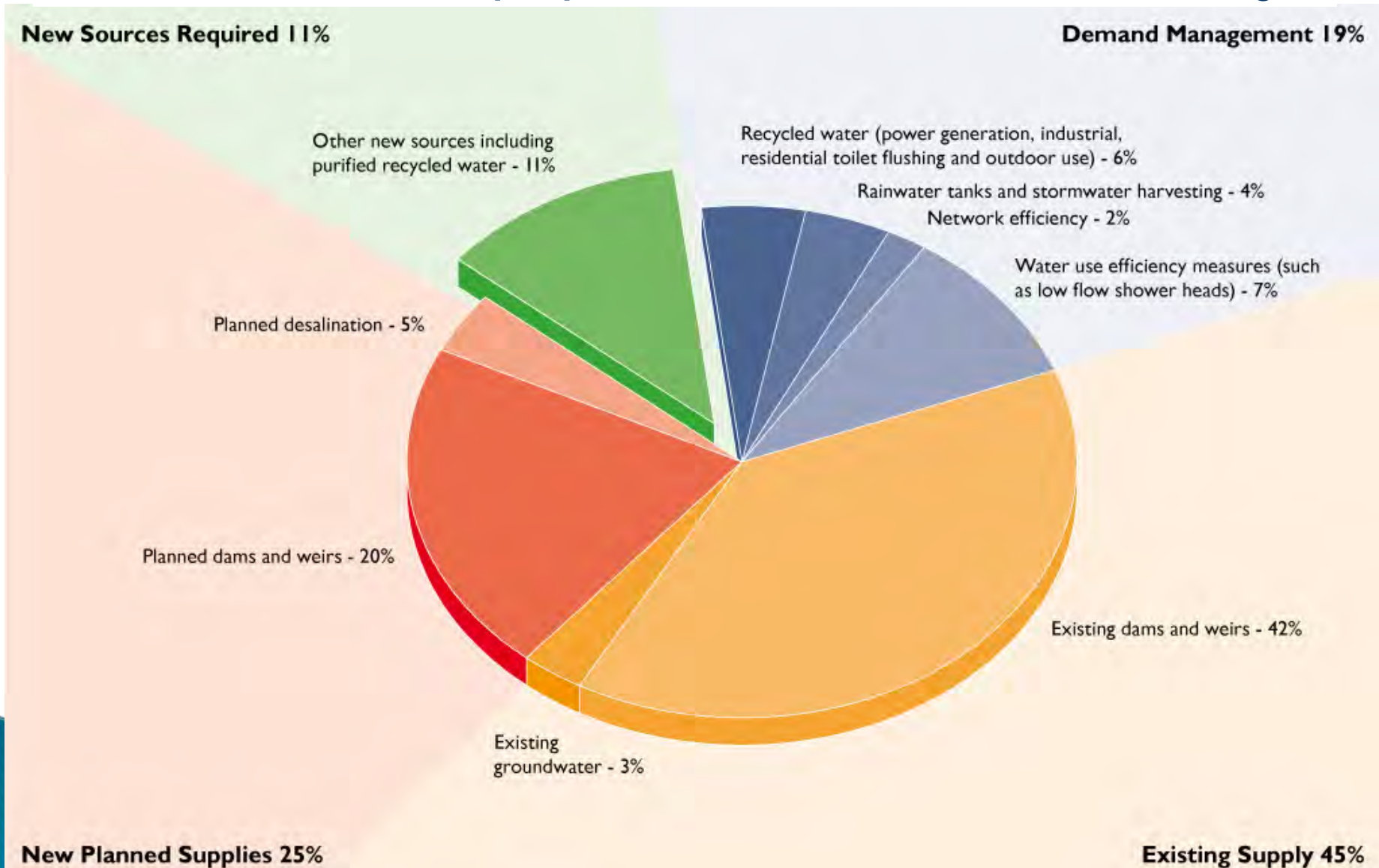
- Desalination at Gold Coast
- Western Corridor Recycled Water Scheme
- Southern Regional Water Pipeline
- New Traveston Dam
- Recommissioned dams
- Aquifer Production Bores in Brisbane

In the next 20 years, SEQ will grow by another one million people.



Focus around adequacy of good supply and the significant demands on water allocation, water quantity and waterways quality.

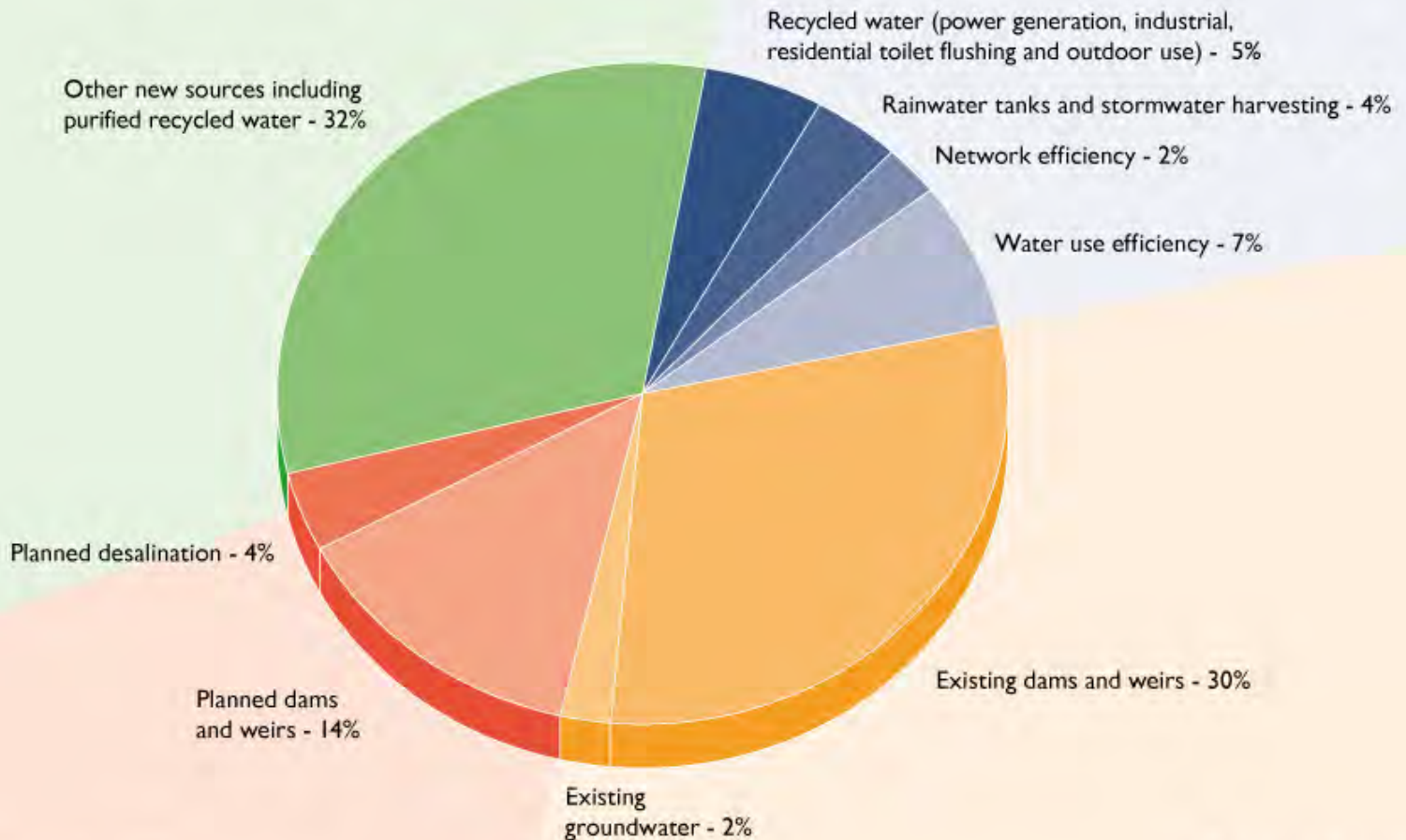
Long-term water balance 2050 (medium series population, climate variability)



Long-term water balance 2050 (high series population, climate change & variability)

New Sources Required 32%

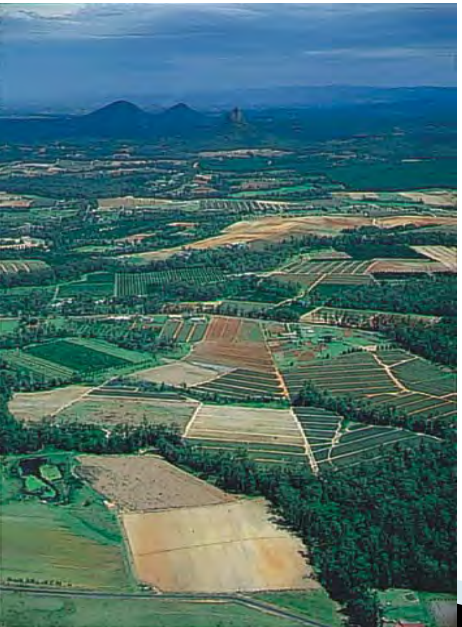
Demand Management 18%



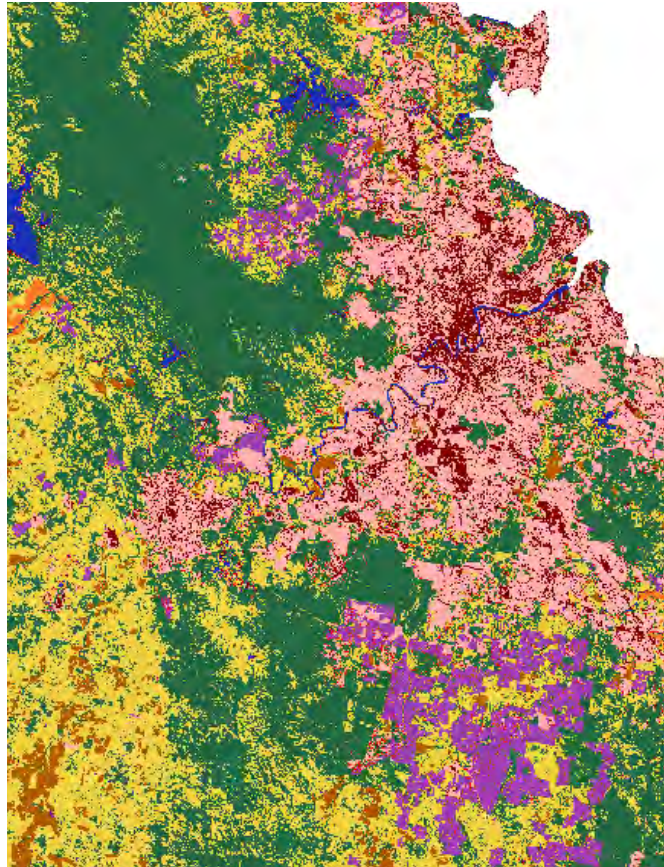
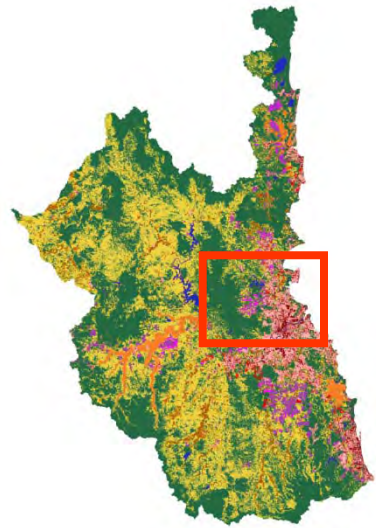
New Planned Supplies 18%

Existing Supply 32%

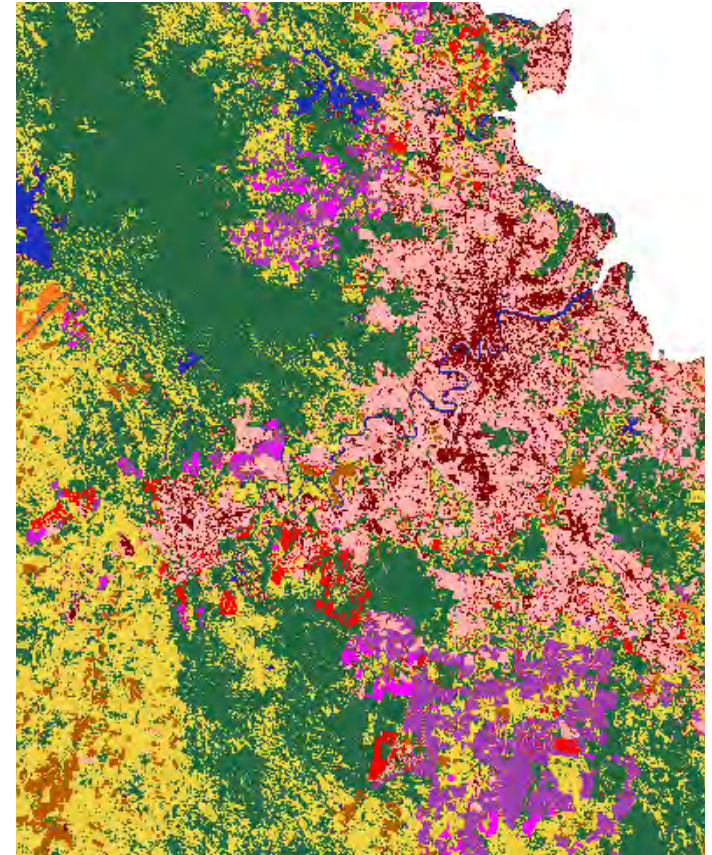
People wish to live, work and play in SEQ



Challenges for South East Queensland



2002



2026

Predicted increase in loads:
STP loads: **50%**
Diffuse loads: **20%**

HEALTHY WATERWAYS

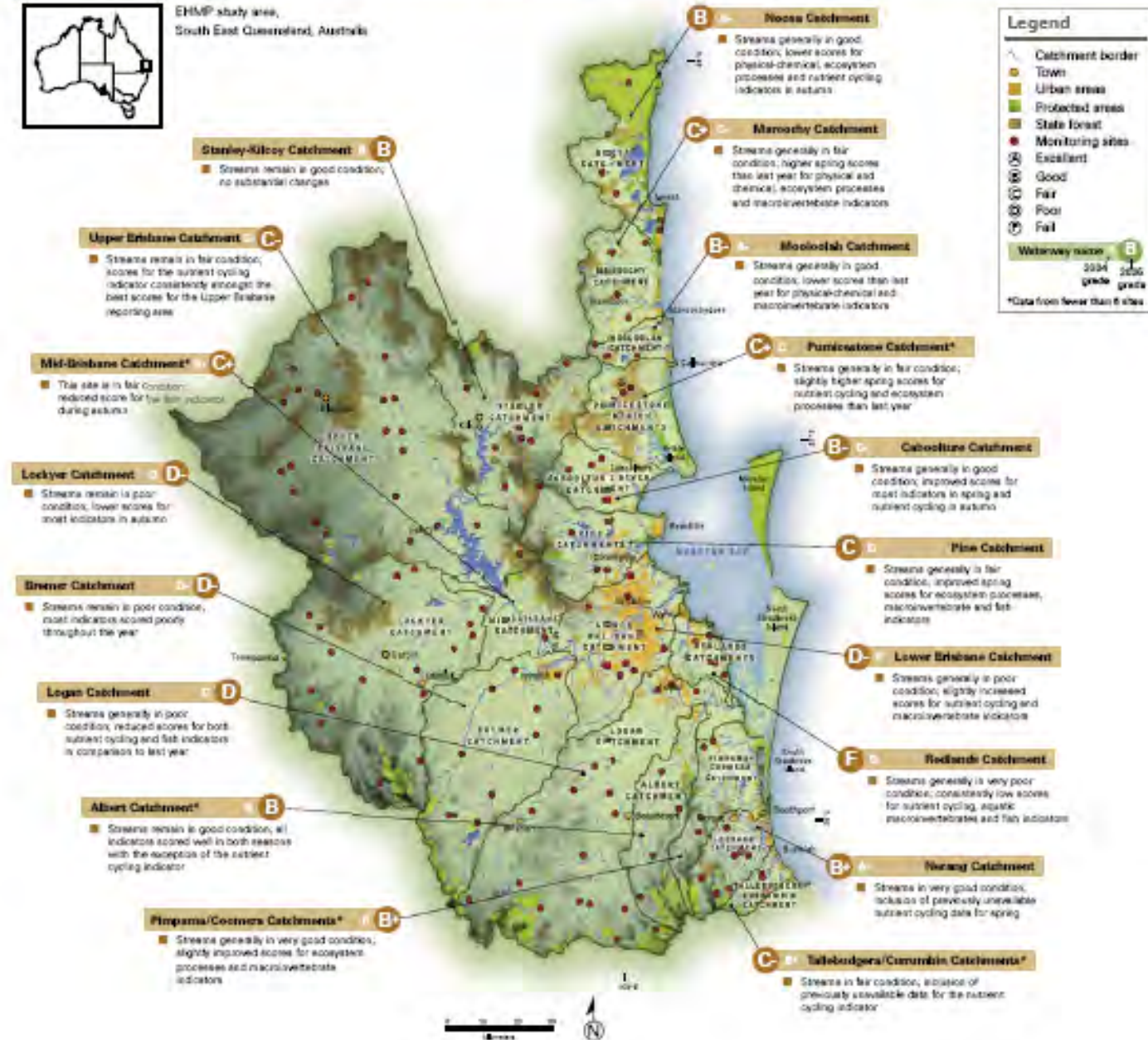


Because we're all in the same boat

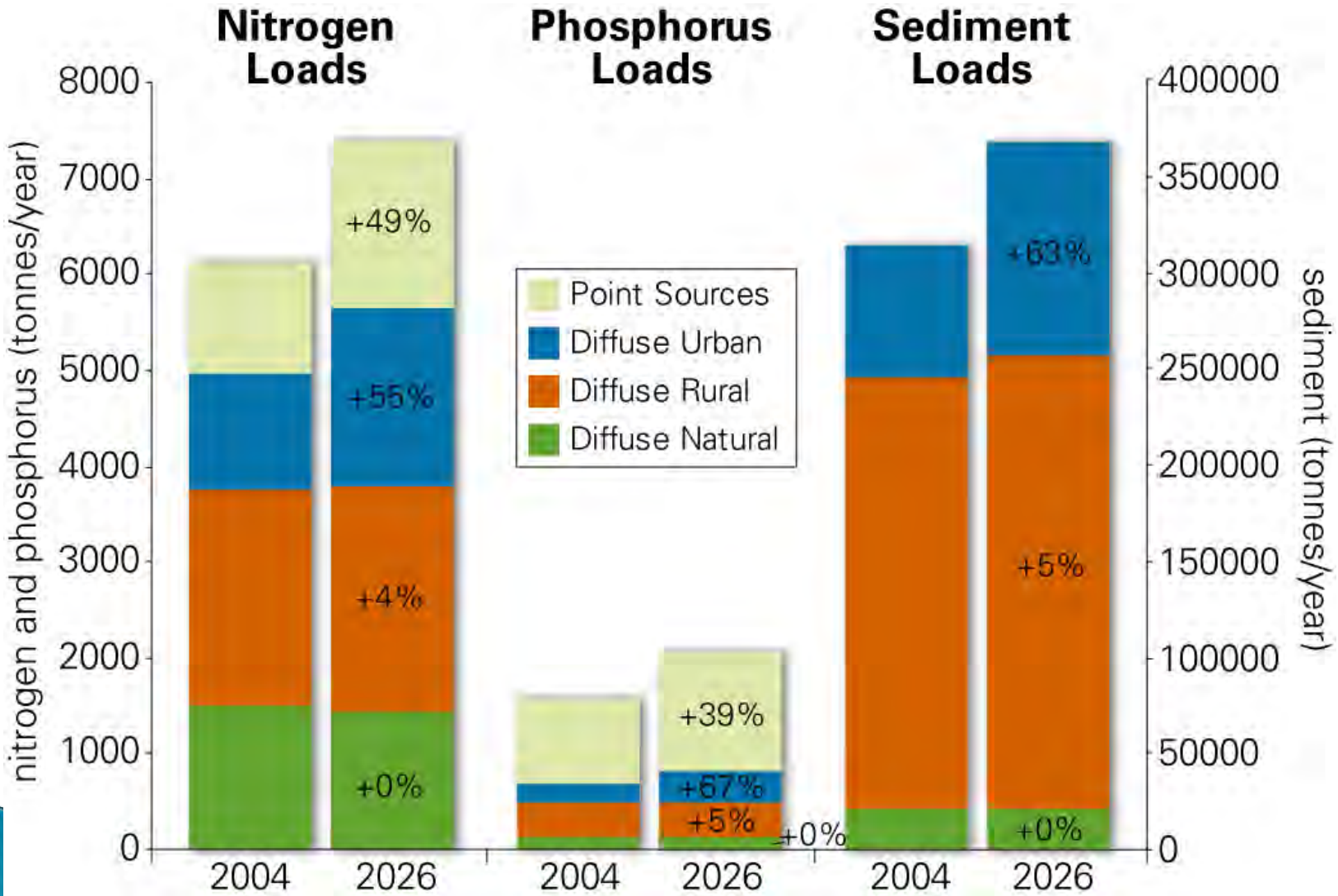
Freshwater Report Card 2005



EHMP study area,
South East Queensland, Australia



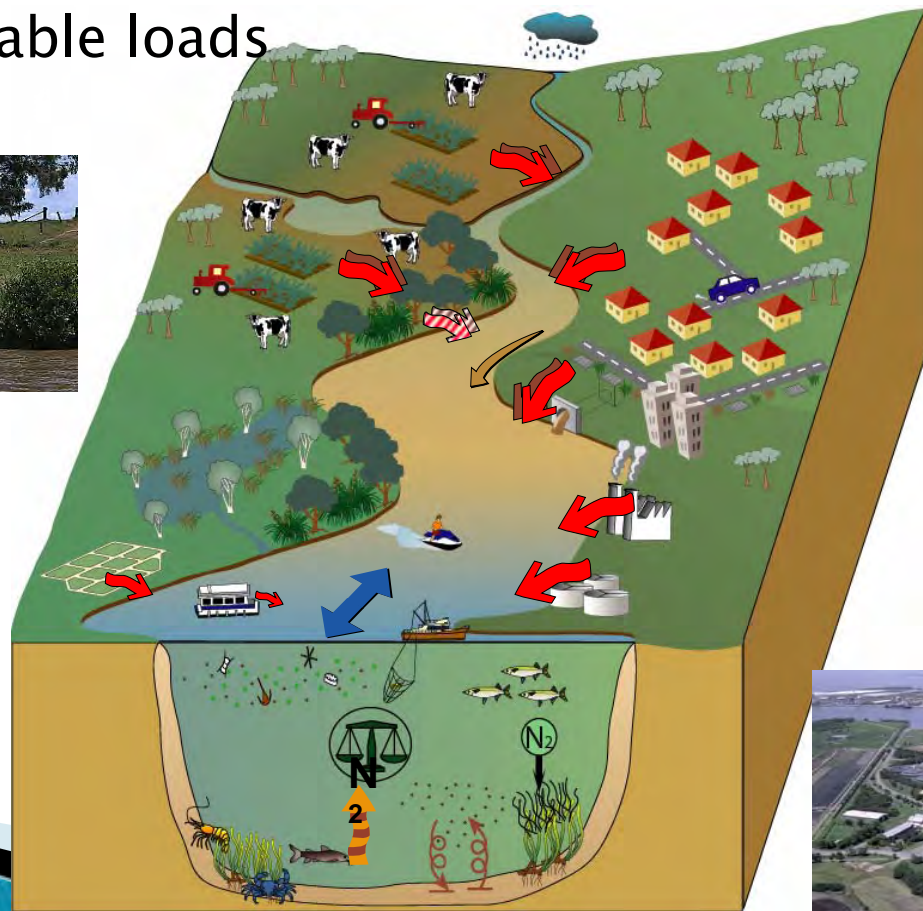
Challenges for South East Queensland



Need to maintain a balance

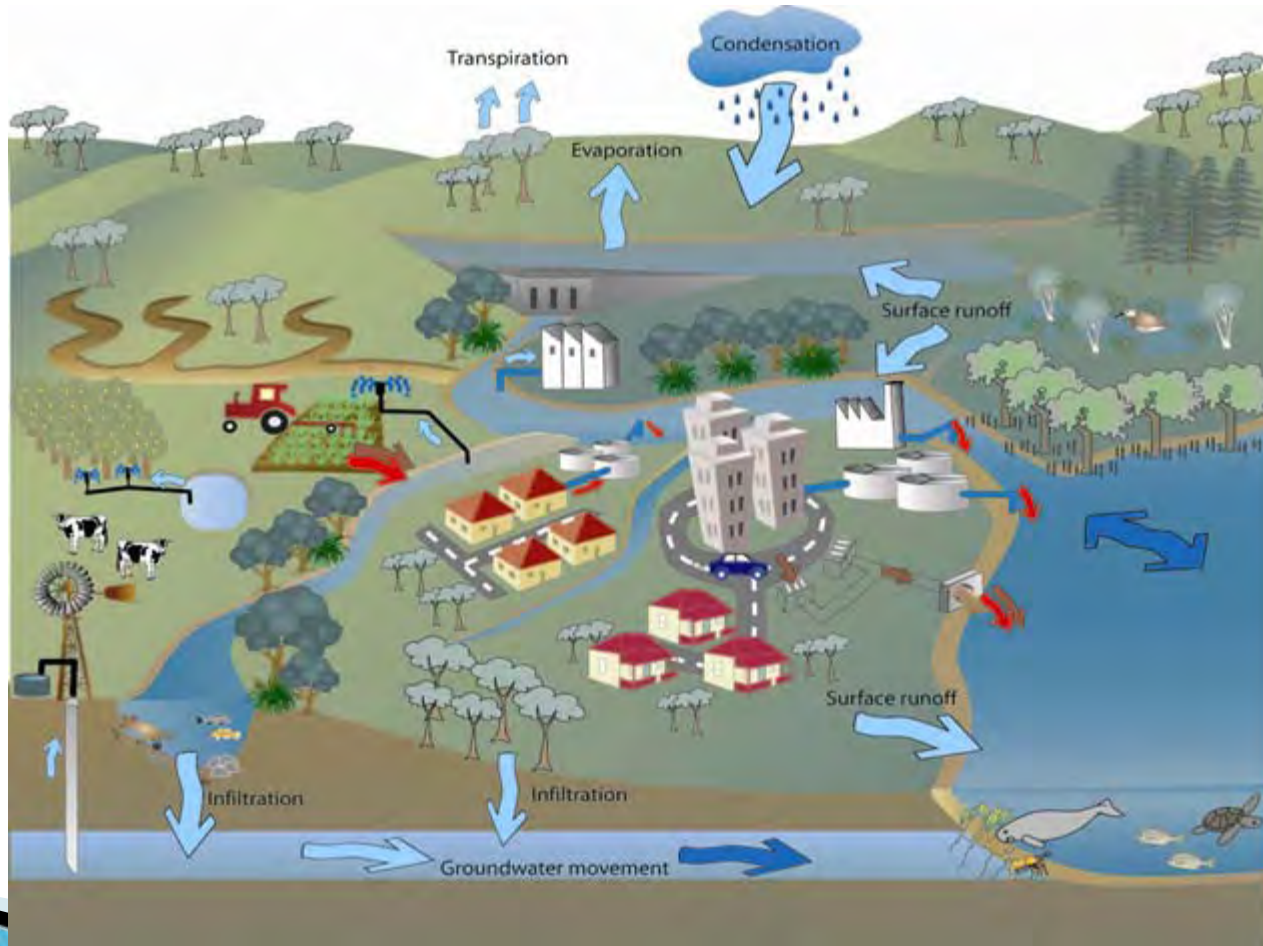
Sustainability of our rural sector and industrial growth, as well as achieving good ecosystem health in our waterways, are all essential for urban growth

- ▶ e.g. sustainable loads concept

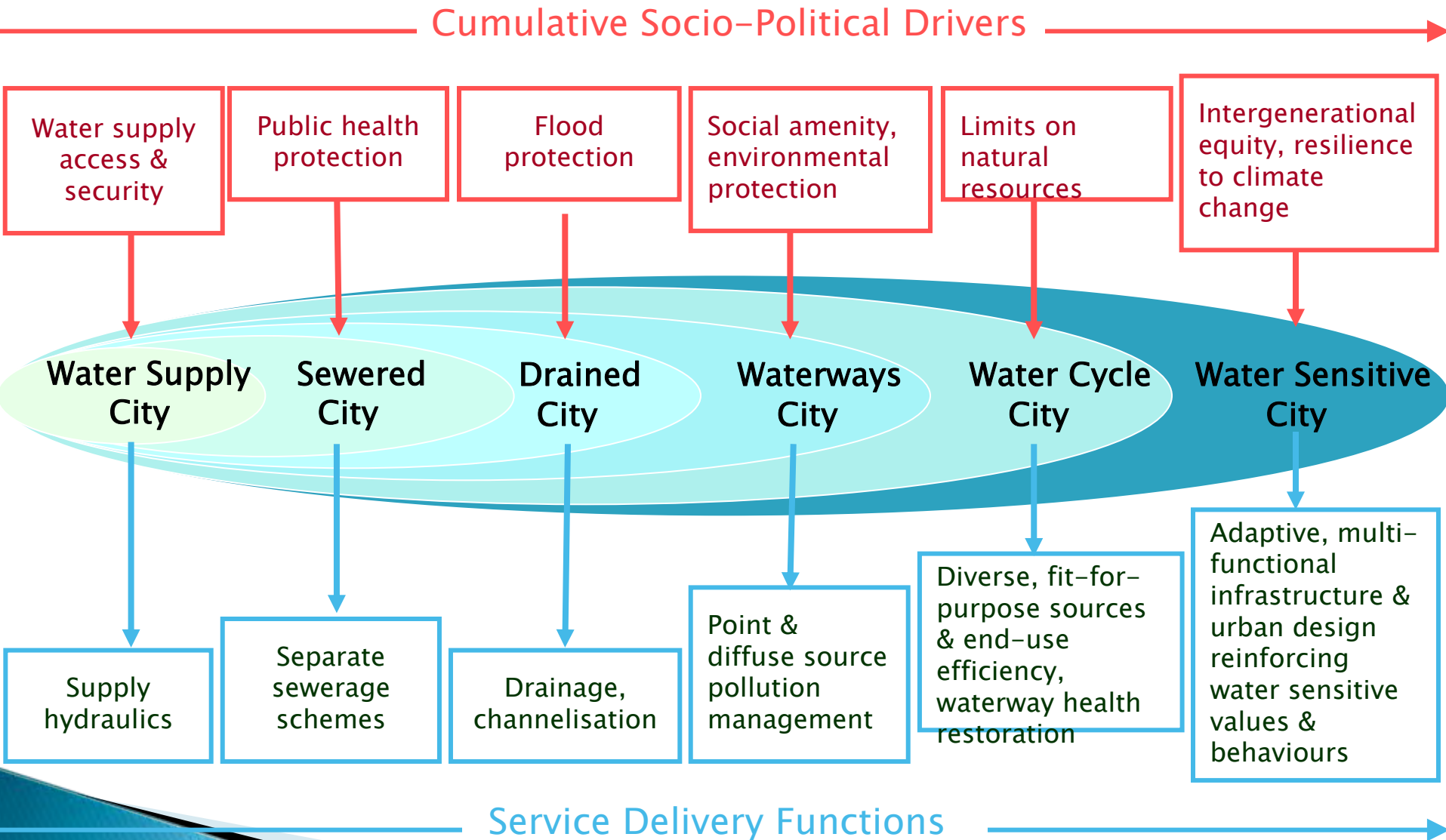


The need for integrated resource management

- ▶ Need to integrate understanding of a complex system (e.g. whole-of-water cycle)



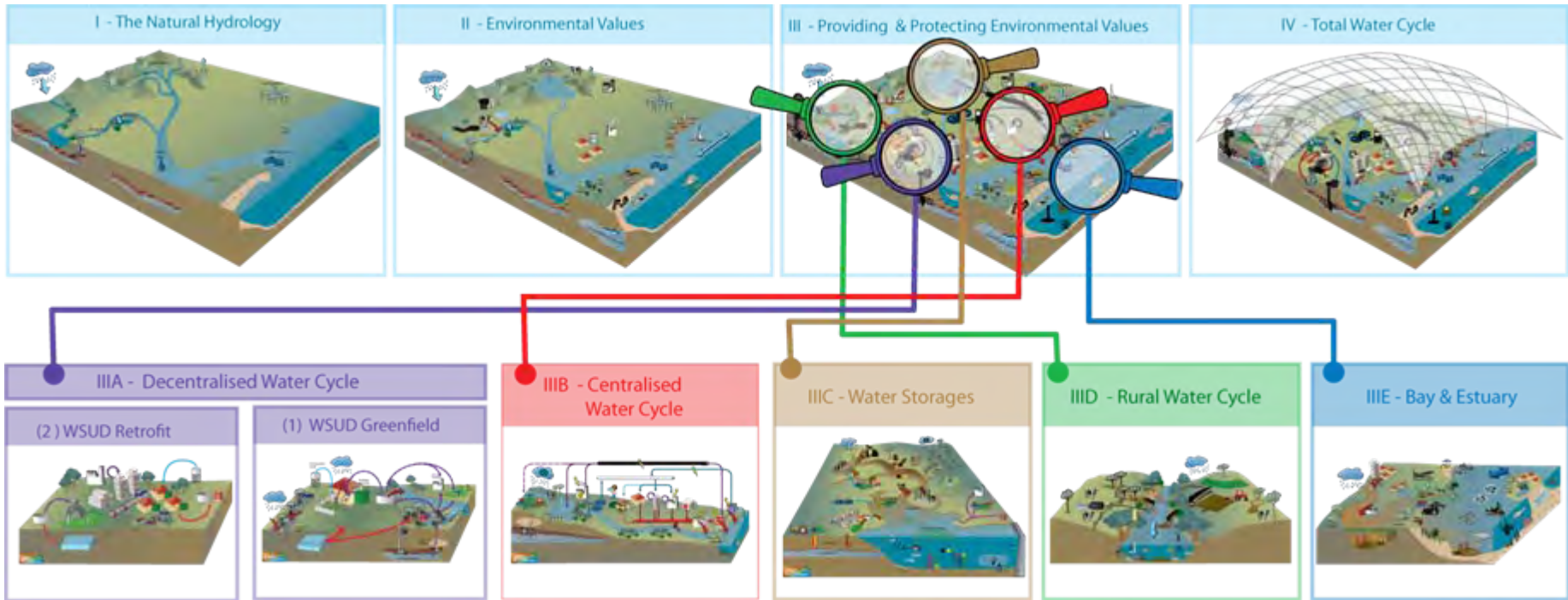
Evolving Urban Water Hydro-Social Contract



Brown *et al* (2008), and Wong and Brown (2008)

Total Water Cycle Conceptual Diagram Series

July 2008



IIB - Centralised Water Cycle

System Optimisation (Energy GHGs)
Veolia

Desalination Plant Siting
Qld Water Commission

Purified Recycled Water
UWSRA (CSIRO, UQ, GU)

UWSRA (CSIRO, UQ, GU)

- Source Control
- Reservoir
- Advance Monitoring Techniques

Transfer of Treated Effluent
Qld Water Commission

Qld Water Commission

Enhanced Treatment
UWSRA (UQ)

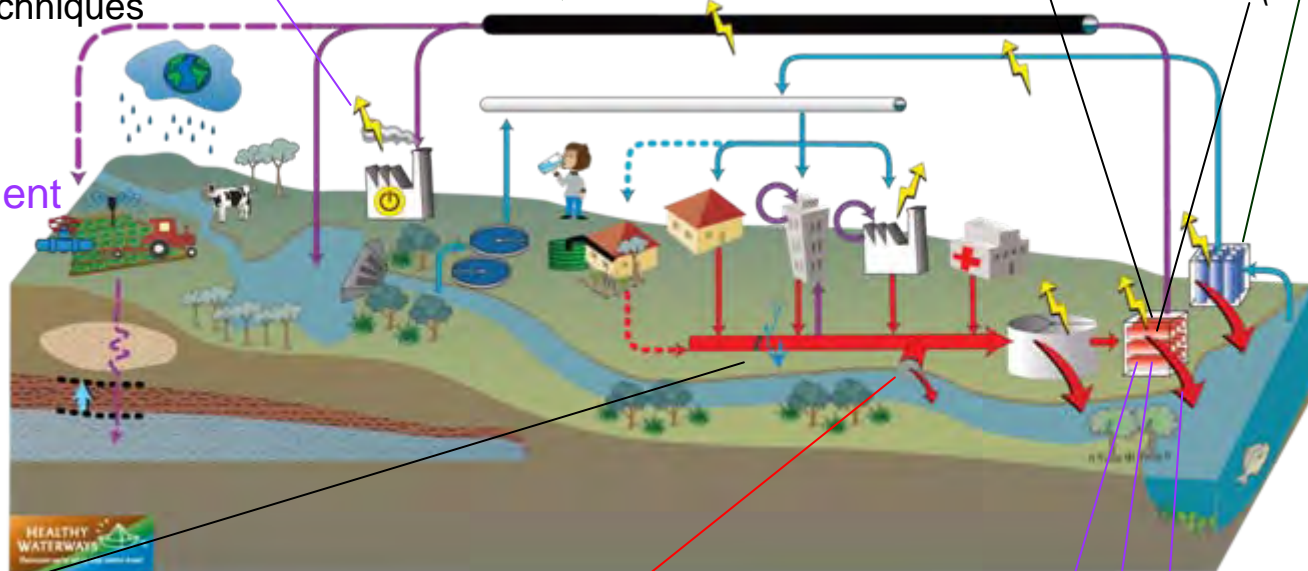
UWSRA (UQ)

NDMA Formation
UWSRA (UQ)

UWSRA (UQ)

Microbe Pollutant
Monitoring & Management
Veolia

Veolia



Water Loss
(Systems Losses)
UWSRA (CSIRO, GU)

UWSRA (CSIRO, GU)

Impact of Sewer
Overflow on Waterways
Griffith University

Griffith University

Other AWTP Projects
Veolia

Veolia

Organic & Inorganic
Membrane Fouling
Veolia

Veolia

Treatment of RO Concentrate
Veolia

Veolia

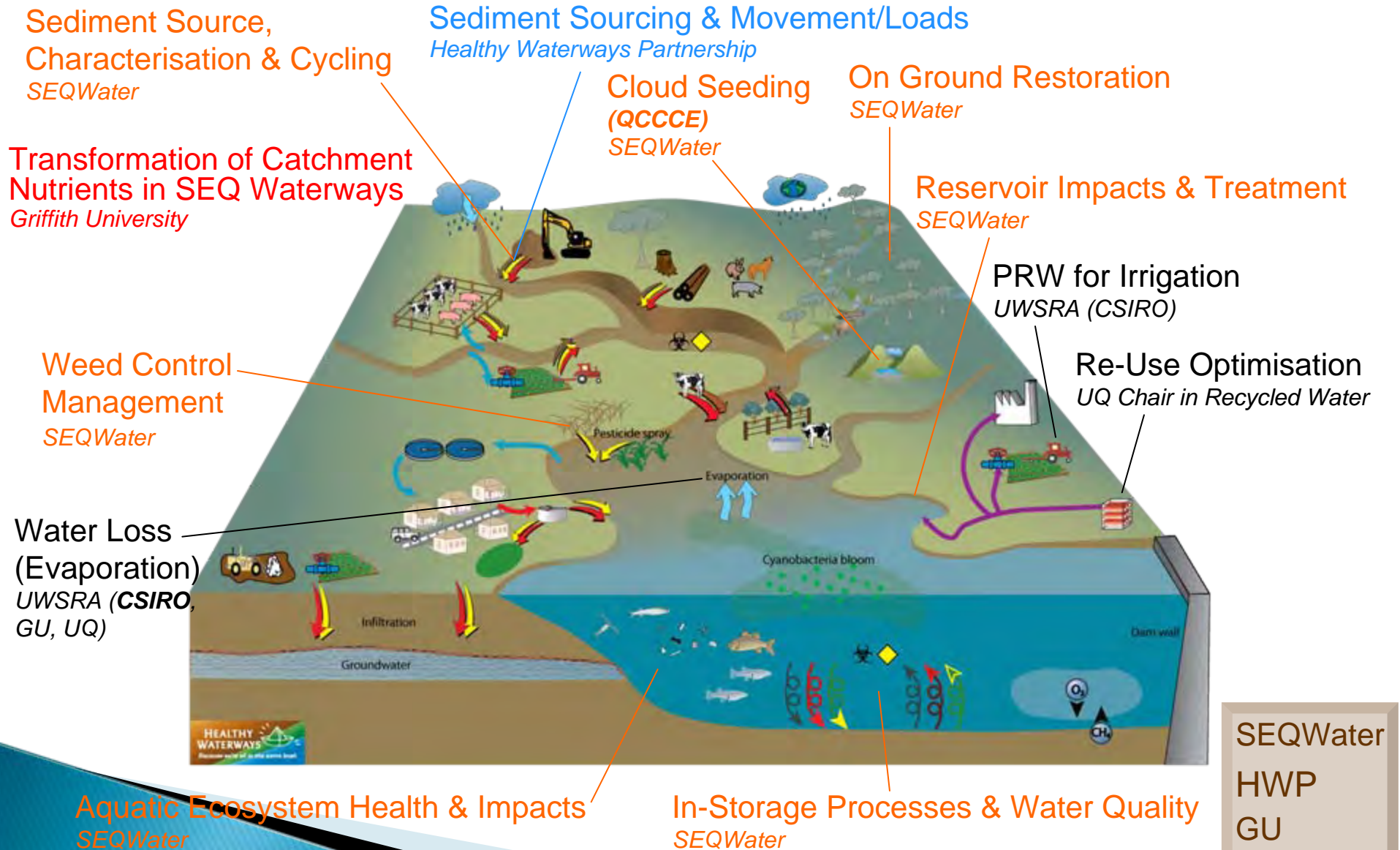
UWSRA

QWC

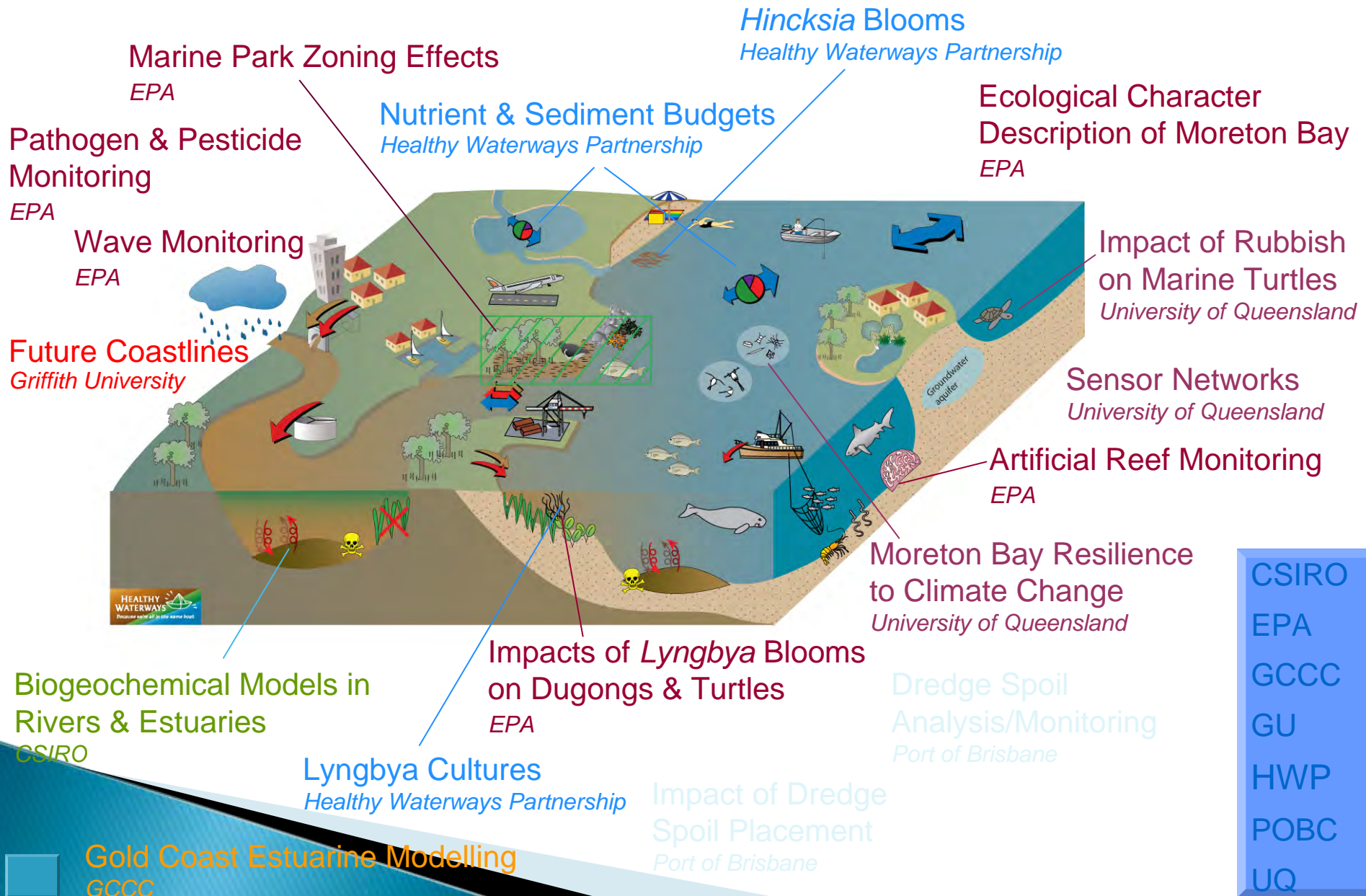
GU

Veolia

IIIC – Water Storages



IIIE - Bay & Estuary



IV – Total Water Cycle

Audit of Water Quality Related Databases

Healthy Waterways Partnership

Catchment Modelling Toolkit

eWater (

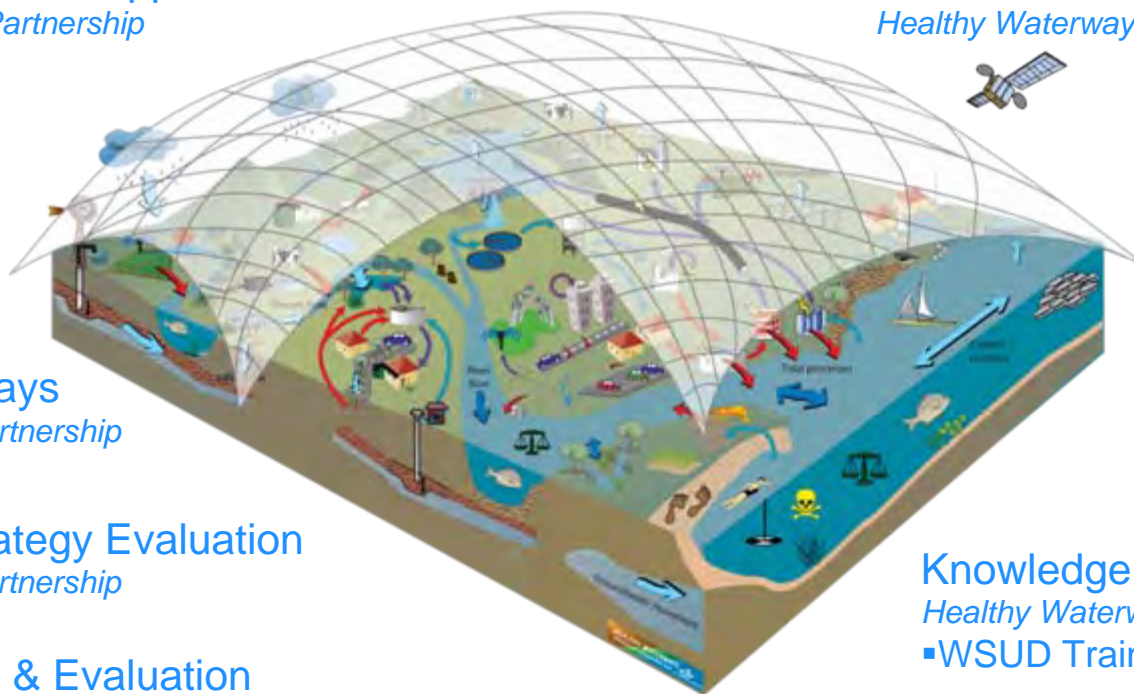
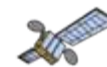
Integrated Decision Support Tools

Healthy Waterways Partnership

- Catchments
- Freshwater
- Moreton Bay
- Lyngbya

Remote Sensing Technologies

Healthy Waterways Partnership



Health-e-Waterways

Healthy Waterways Partnership

Management Strategy Evaluation

Healthy Waterways Partnership

Monitoring & Evaluation

Healthy Waterways Partnership

- EHMP Freshwater
- EHMP Estuarine/Marine
- Event Monitoring Program
- Contingency Monitoring Program
- EHMP Report Card Trend Analysis

Ecological Response Models


eWater

Knowledge Interface & Access


Healthy Waterways Partnership

- WSUD Training & Capacity Building

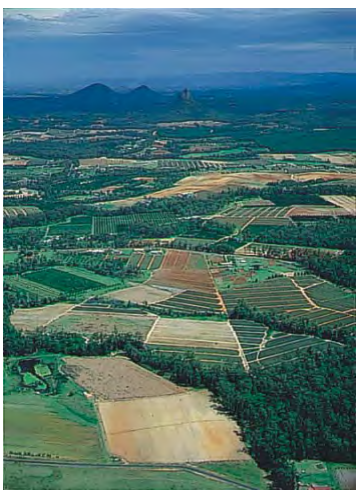
Water Security – Beliefs / Myths?

- ▶ 1: Water is a scarce commodity
 - ▶ 2: There is a natural water cycle which provides water in sufficient quantity and of higher quality than any other source
 - ▶ 3: Economies of scale are in the eye of the beholder
 - ▶ 4: Environmental flows are a luxury
 - ▶ 5: Ecosystem damage is reversible i.e there are no tipping points
- 

Water Security – Beliefs / Myths?

- ▶ 6: Privatising parts of the water cycle eliminates the politics of water
 - ▶ 7: The pulpit works well in a crisis but not in the long term
 - ▶ 8: We are very good at accurately recording the decline in our ecosystems
 - ▶ 9: Issues with GHG emissions will ultimately become an economic issue
- 

Need to balance activities in the catchment with uses/values



farming



urbanisation



aquaculture



grazing



industry



fishing



boating



ecosystem



drinking water

QWC

