Climate change and urban water: Managing the risks

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Context

- Higher average and maximum temperatures with more hot days and heat waves
- Reduced annual average rainfall and increased frequency and severity of droughts
- More intense rainfall events
- Rising sea levels

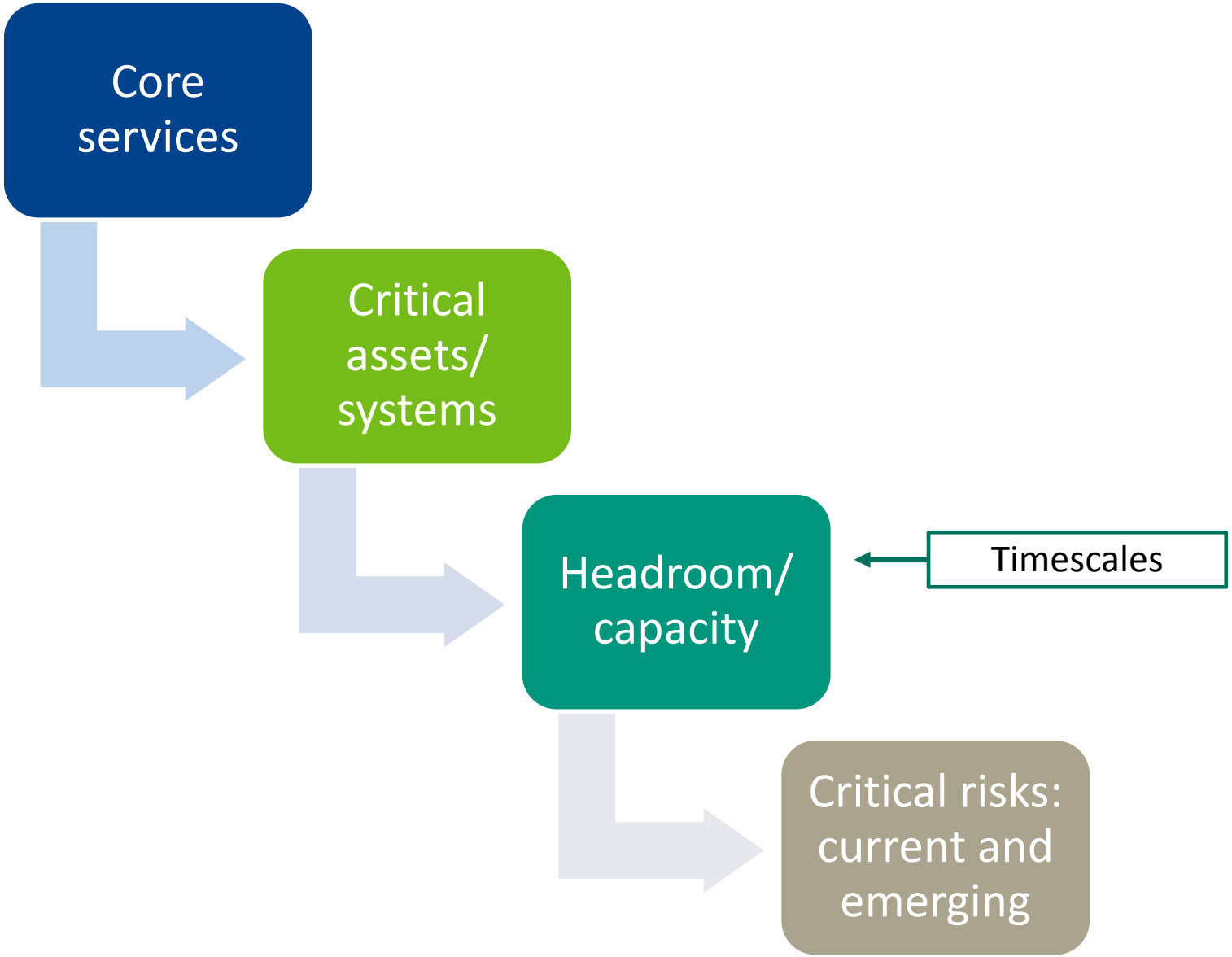
The water industry in Australia is facing an unprecedented challenge, with implications for all facets of the urban water cycle from water supply, sewerage transfer and treatment and infrastructure, to river health, drainage and flood management (WSAA, 2012).

Evolving climate risk approach

2008: Hazard based assessment

2014: *Service delivery focus
*International standards of asset and risk management

The risk assessment processes



Observations

- Differentiating between current (existing and will be exacerbated) and emerging risks
  - Integration of ‘climate change risks’ with other business risks

- Importance of clear risk definition (risk framework)

- Importance of engagement across the whole business

Western Regional Water Balance

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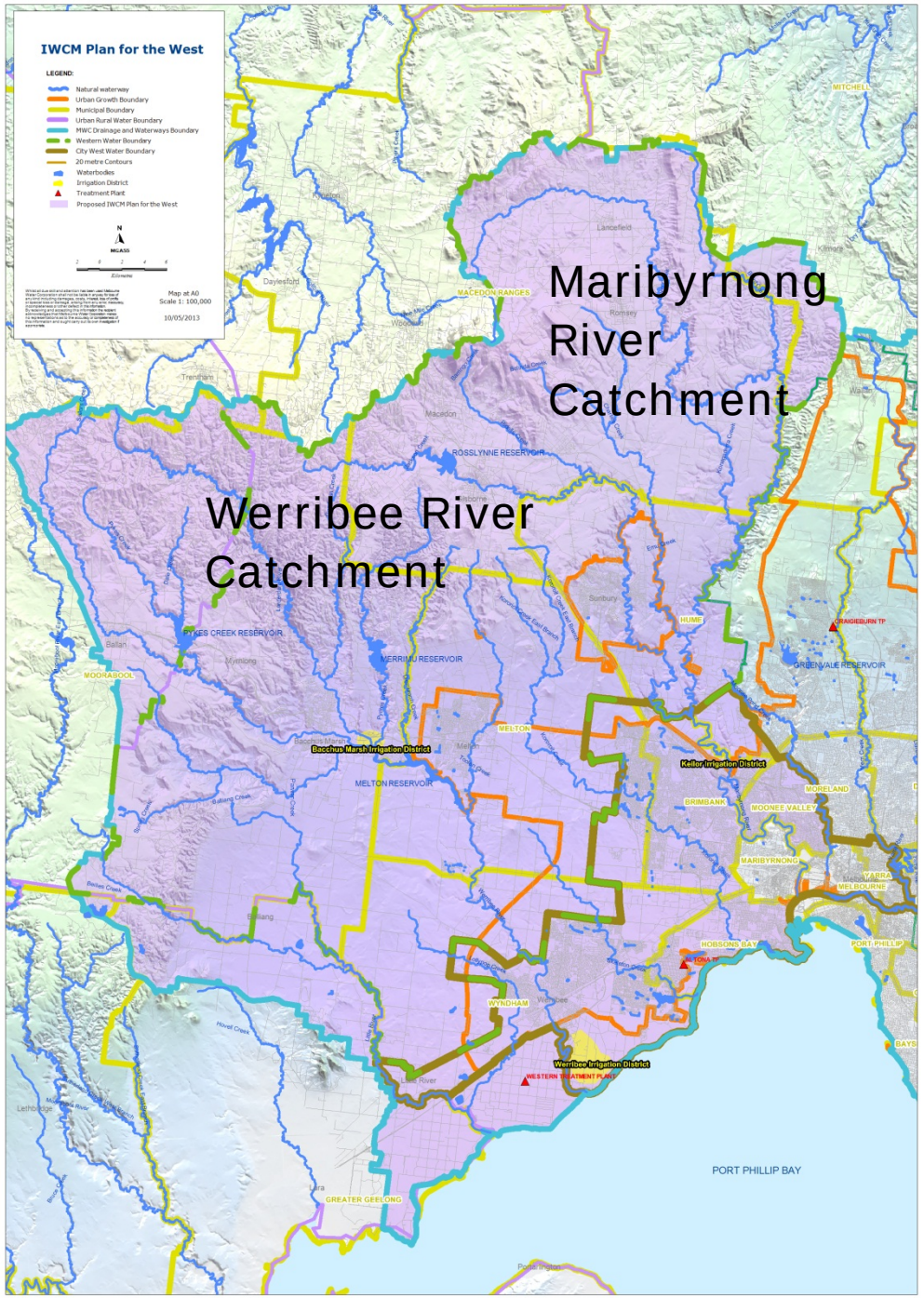
State Government Victoria

Melbourne Water

Western Regional Water Balance

- Mapping supply and demand from a range of sources plus likely future changes

- Optimise the regional system to:
  - avoid capital intensive infrastructure
  - achieve healthier waterways (e-flows and stormwater runoff)
  - and ensure reliability for the region's agriculture.



Understanding the impact of Climate Change

Investigated three climate scenarios:

- **(1) Historical** - daily rainfall, evaporation and evapotranspiration data from 01/01/1900 to 31/12/2013 was used
- **(2) Median CC at 2030 and (3) Median CC at 2050 -** climate change impacts are expressed as a proportional change relative to the historical climate record. Scaling factors are applied to historical data to generate synthetic climate data.

Climate dependent information:

- streamflows;
- stormwater runoff;
- rainwater harvesting and stormwater harvesting yields;
- urban and rural irrigation demands; and
- net evaporative losses in water reservoirs and recycled water plant storages.

Different models with different timesteps used to derive this information

Application of Climate Change Analysis

Monthly, catchment scale REALM models were used to derive urban, rural, rural irrigation, farm dam demands.

- catchment-specific climate change parameters were adopted from Guidelines for the Development of Water Supply Demand Strategies (DEPI)

Daily models were used to derive stormwater runoff, rainwater & stormwater harvesting, urban irrigation demands.

- Seasonal scaling parameters were adopted from Climate Change in Port Phillip and Westernport (DSE, 2008).

GAP:

- the use of seasonal and annual scaling factors doesn't take into account changes in the intensity of rainfall events and the number of rain days per year.

Key observations for BAU Option: **DRAFT**

Modelled climate change has a more significant impact on the rural water balance:

- total urban demand increasing by about 1.5% and heavier reliance on desalinated water supply
- total rural demand increasing by about 4.5%
- Catchment runoff and inflows to bulk water supply reservoirs are reduced: 7% and 16% lower for urban and rural respectively
- Urban stormwater runoff reduces by 6% and rainwater harvesting yields reduce by 2%

3 take home messages

1. Climate risk management is an ongoing process of engagement, review and improvement .
    - A solid risk framework should form the basis of any climate risk assessment.

2. Using a service delivery approach to assessing the risks can help to prioritise action

3. Whilst there is currently no clear cut or perfect way to incorporate climate change projections into the *full range* of planning and design decisions we need to make, we do nonetheless have enough information to do so anyway.
    - We need to accept the inherent uncertainty in climate change projections whilst also accepting the need to make decisions now

Thankyou

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