The Melbourne – Southern California experience

David L. Feldman
Professor and Chair,
Department of Planning, Policy and Design
School of Social Ecology

Director, *Water UCI*

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Introduction

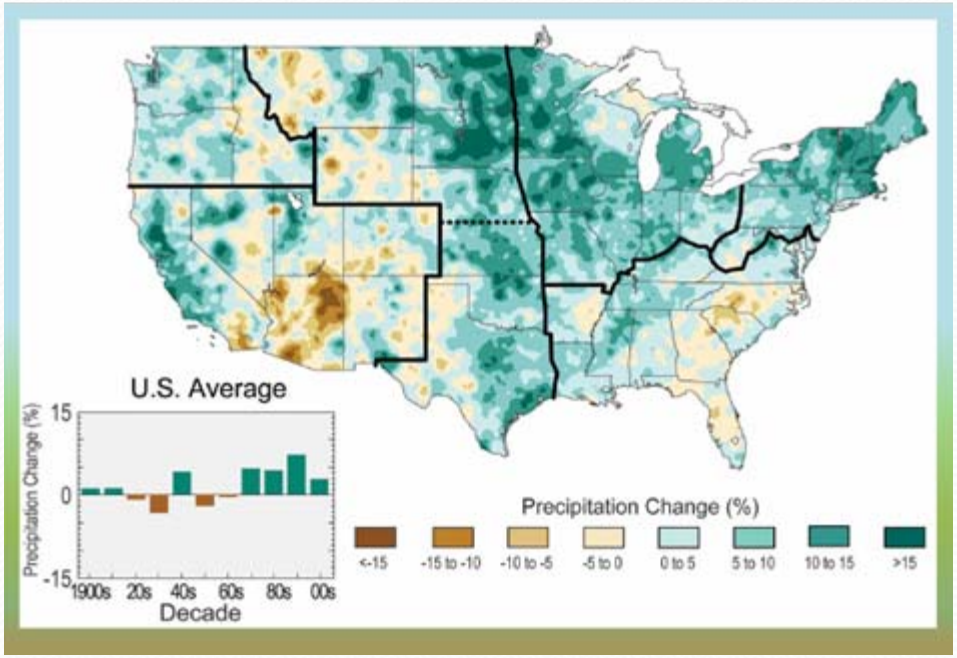
- **A collaborative effort among universities in Southern California and Melbourne is examining challenges in achieving water-sensitive cities.**
- **This talk will:**
  - **Describe the effort**
  - **Frame its context**
  - **Summarize <u>three</u> projects**

Overview – the effort

- **Called NSF-PIRE, it's a multidisciplinary team whose goal is transforming water use in western U.S. through lessons learned in Australia. *5 foci –***
  - **Pollutant removal in biofilters**
  - **Public health risks, energy savings and GHG emissions**
  - **Regulations, economic Instruments, equity, policy**
  - **Watershed scale processes**
  - **Crosscutting issues**

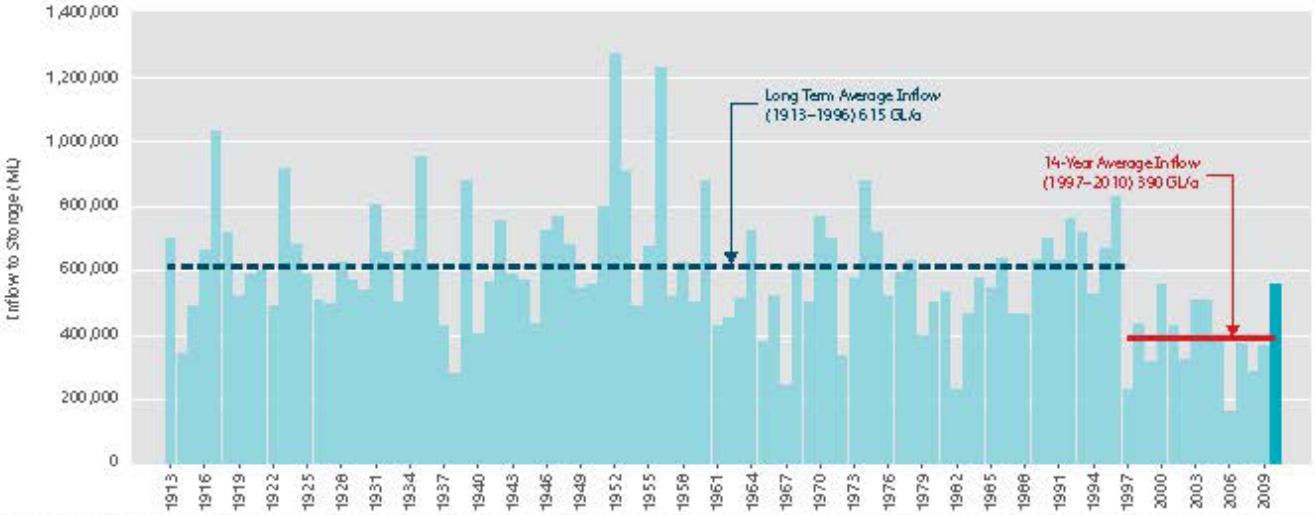
Challenge

Southeast Australia has experienced extreme weather in the past decade (record droughts and floods). Can their experience in climate change adaptation help inform similar efforts in the Southwest U.S. and beyond?

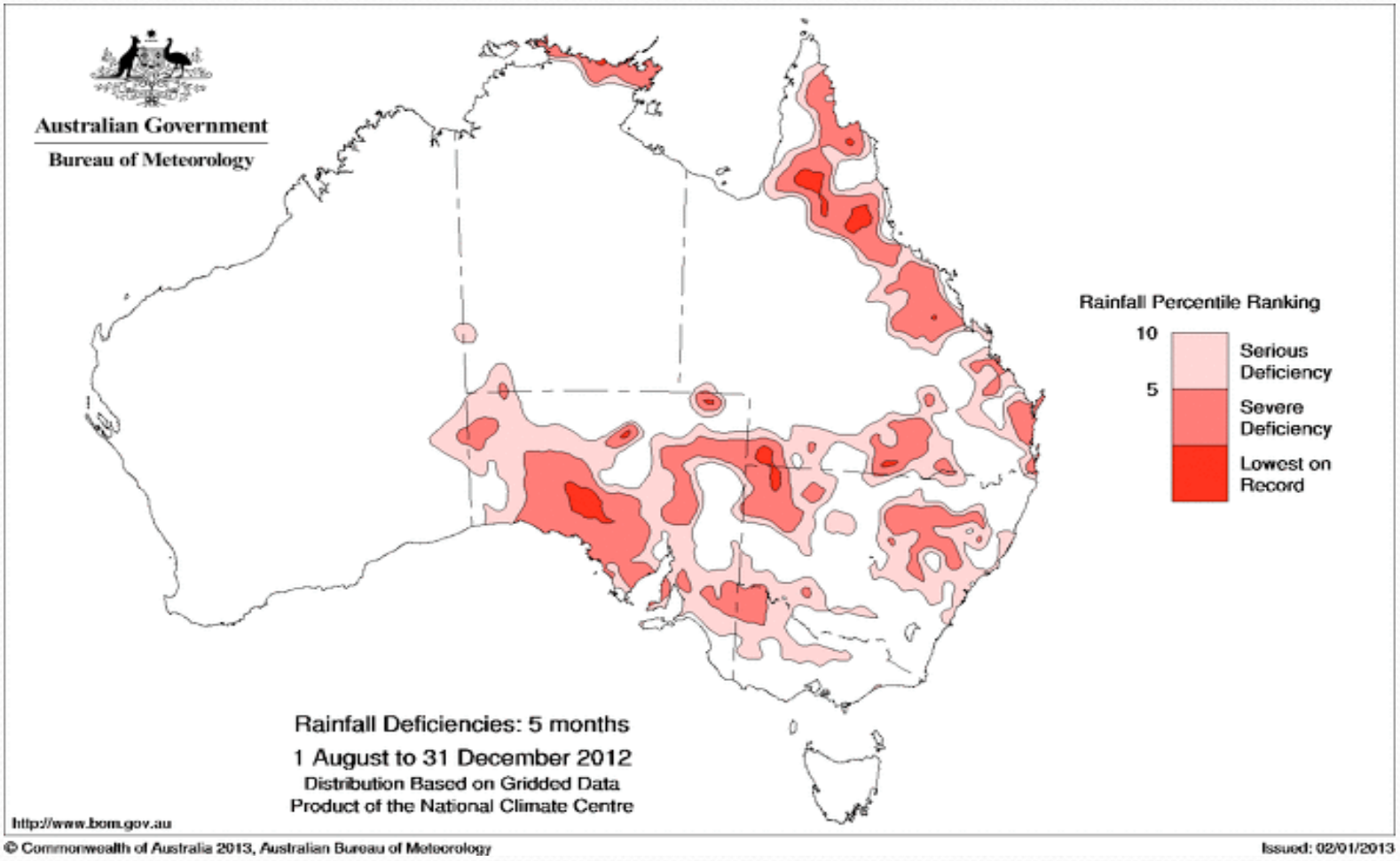


Context – Australia's millennium drought

Figure 2: Total Annual Water Flowing Into Melbourne's Main Water Supply Storage Reservoirs[10]
(Thomson, Upper Yarra, O'Shannassy and Maroondah Reservoirs)



Millennium Drought severity



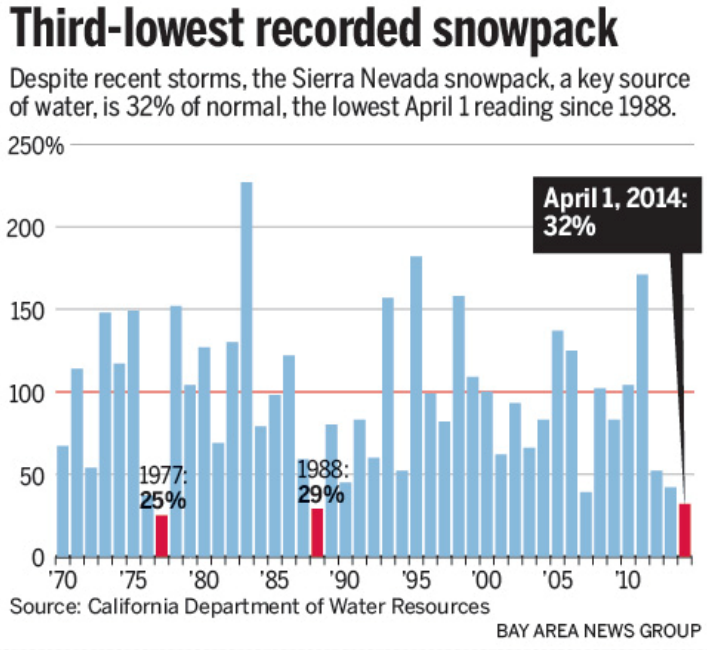
- **Federal Government provided $4.5 billion in aid**

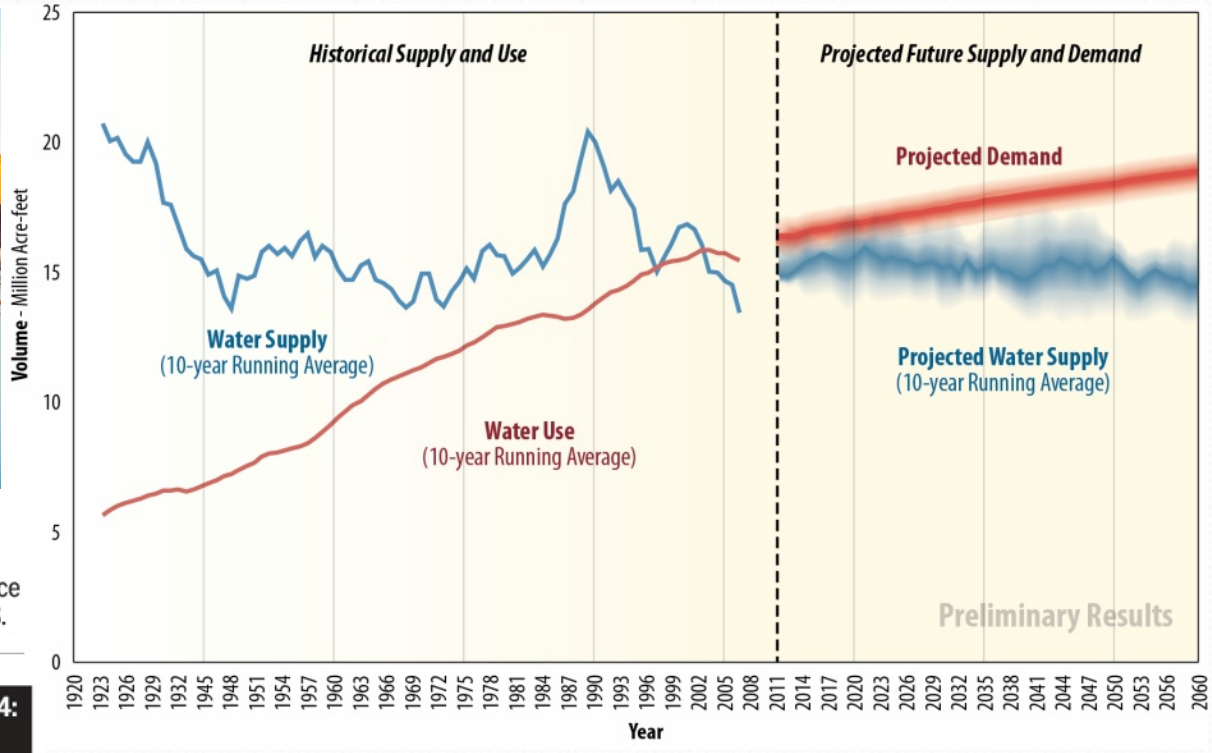
Impacts on Melbourne

- Local reservoirs fell to 26% capacity
- Public became open to conservation
- Policymakers engaged citizens in responses

Figure 3: Map of Greater Melbourne by Local Government Area[11]

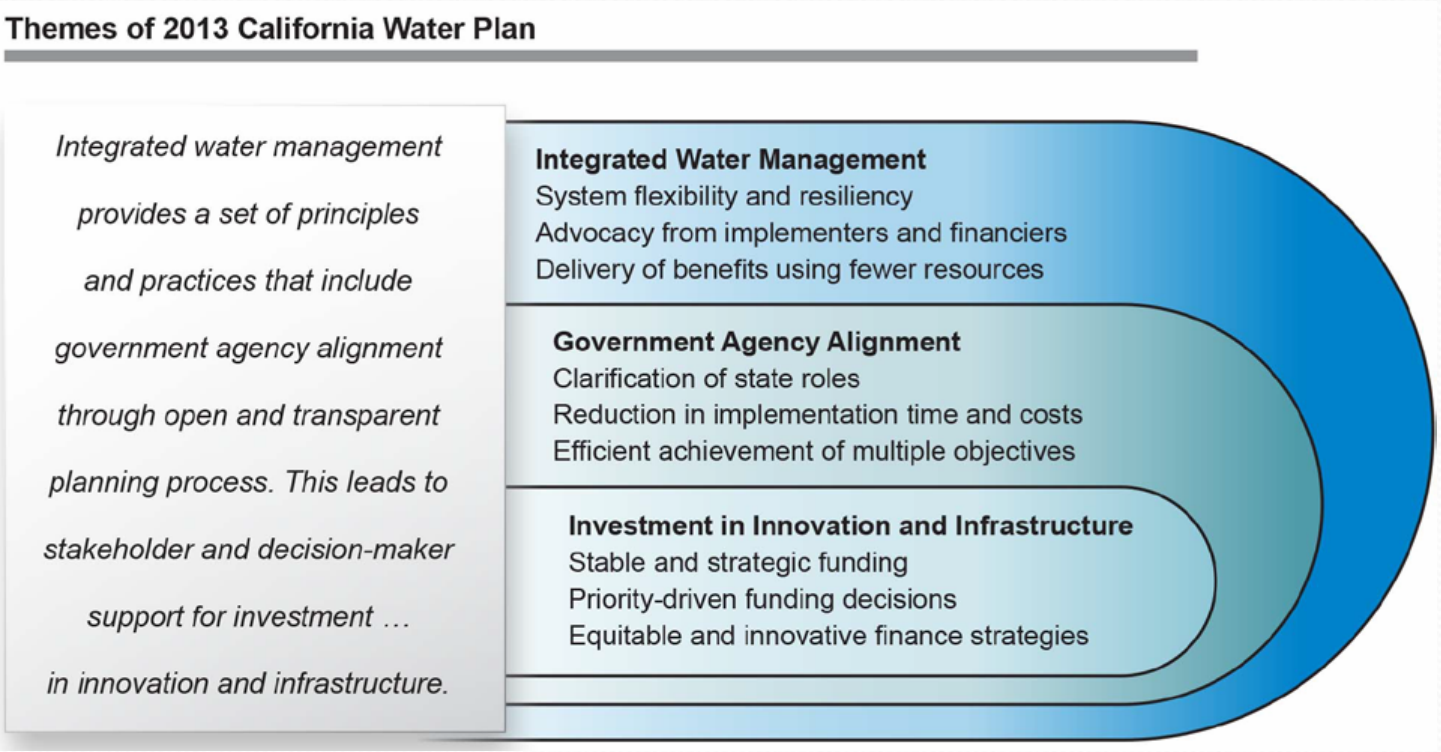
California's current drought





Colorado River – U.S. Bureau of Reclamation (2012)

Impacts on policy



- ***State water plan*** **coincided with drought; urged state/local agencies to diversify local water portfolios through:**
  - **Stormwater capture, floodplain reconnection to "improve the environment, flood management, water supplies," and making communities more resilient.**

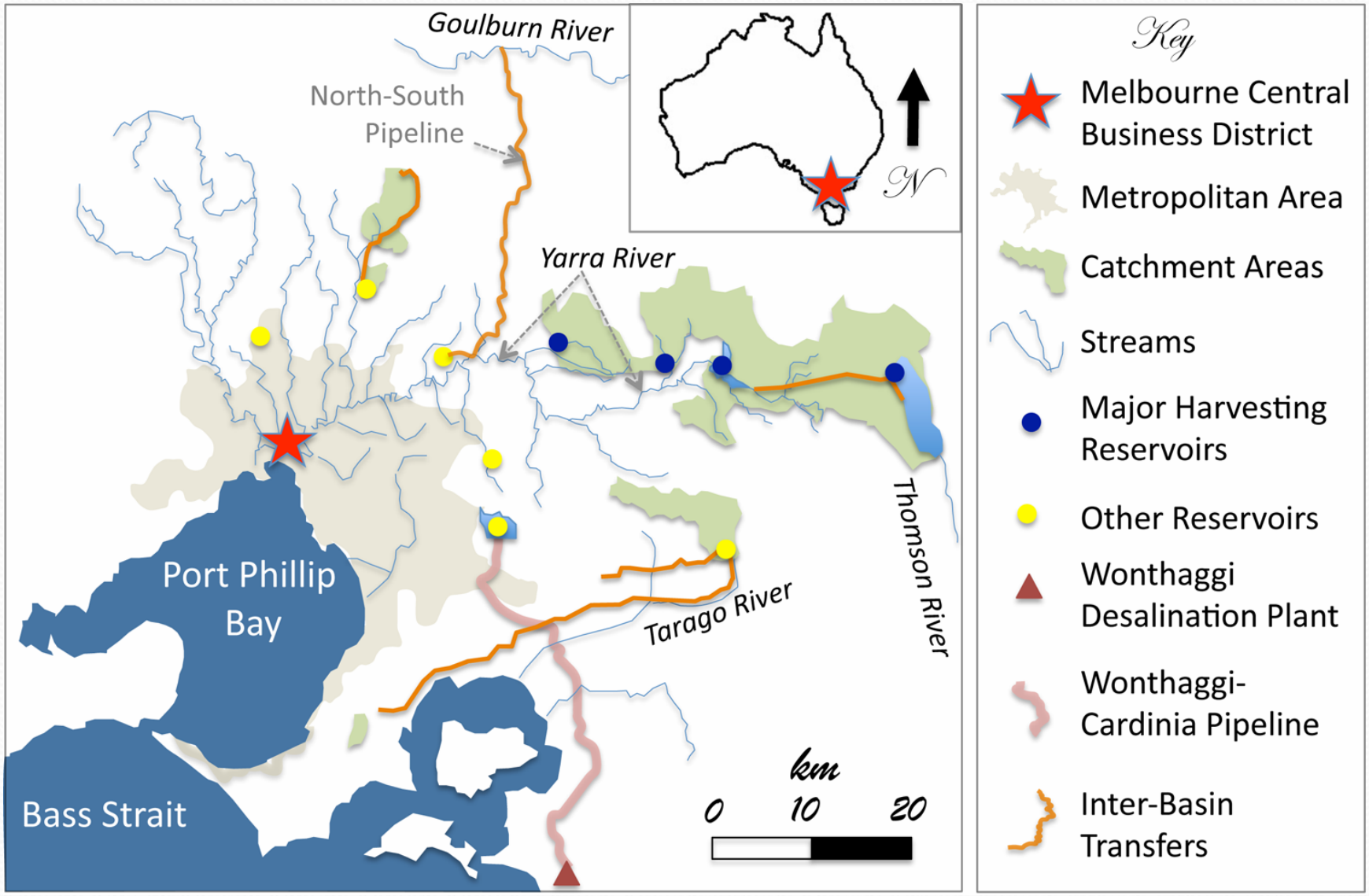
Comparing policy responses

- ***Melbourne and SoCal*** **responses have been conditioned by** ***path-dependent*** **political choices.**
- **Melbourne has operated within a political culture that encourages local funding & decision-making and innovation.**
- **Southern California policies have relied more on supply-side options reliant on national funds – innovation is more recent.**

Melbourne – drought response

- *Two large infrastructure projects*
  - **Desalination plant (Wonthaggi)**
    - **150 billion litres water/year.**
    - **In stand-by mode since 12/2012.**
    - **84 kilometre transfer pipeline from Wonthaggi to Berwick.**
  - **North- South (Sugarloaf) pipeline: completed 2/2010**
    - **Would carry water 70 km from Goulburn River to Melbourne.**
    - **Intended as insurance for future droughts.**
    - **Projects cost AU$700 million and $6 billion, respectively – can meet 40% of the city's current municipal demands.**

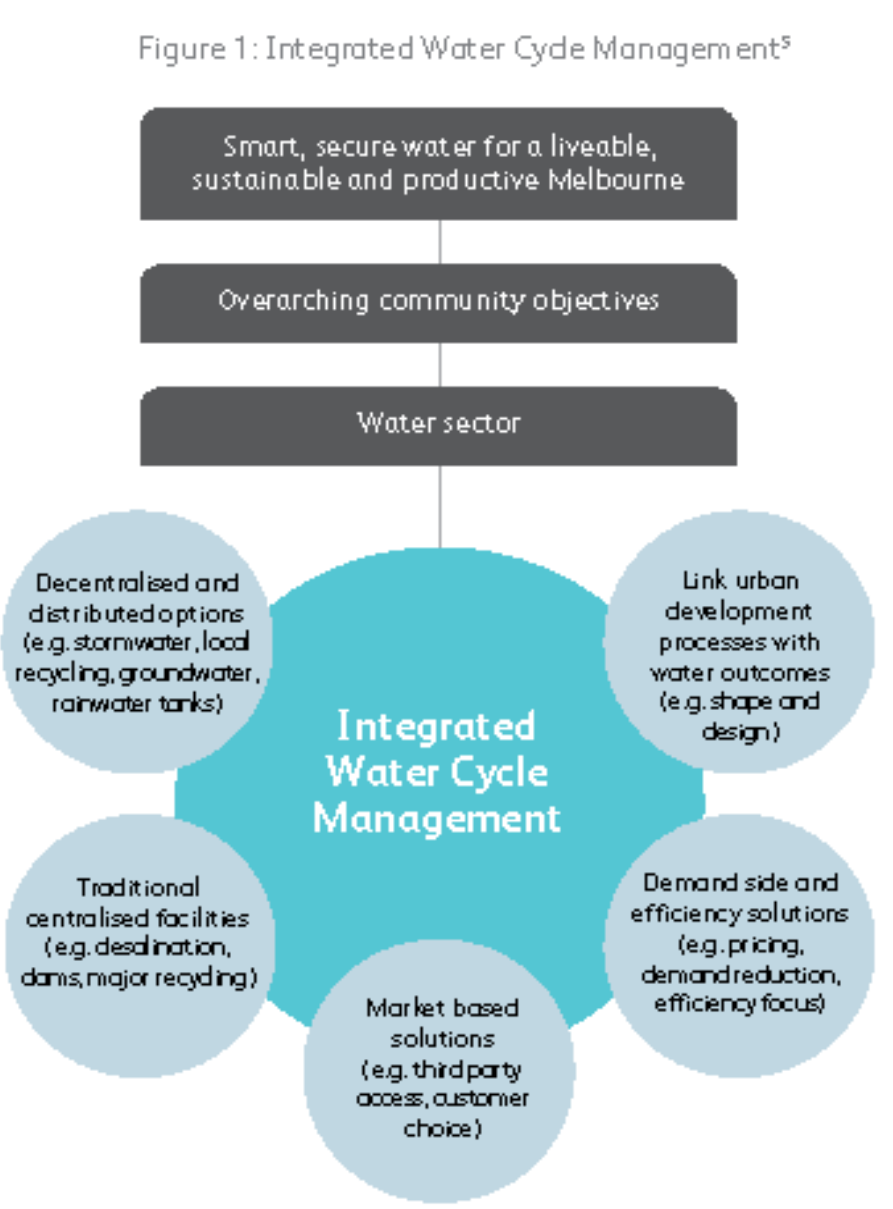
Sources of Melbourne's supply



Policy evolution, attitudinal change

- After drought ended concerns arose over cost, environmental impact, other stresses projects would impose – *led to a policy shift*.
- Demand Management:
  - Water restrictions.
  - Voluntary conservation campaigns.
  - Rebates for efficient appliances, rain water tanks.
  - 40% reduction in per capita daily demand resulted.
- Water substitution:
  - Recycled water: target of 20% reuse by 2010.
  - 23% reuse achieved by 2009; following drought, reuse declined.
- Water Marketing:
  - Individual entitlement holders (farmers) can use their allocation, sell it, or carry it over in storage for next season.

Melbourne's public engagement process



- **Encouraged adopting wide-ranging approaches to water productivity:**
  - **Education & outreach – using water bills to show savings.**
  - **Substituting low-quality treated water for non-potable needs.**
  - **Capturing rain-water runoff.**
  - **Reclaiming wastewater.**
  - **Conservation/tiered pricing mechanisms.**

California – infrastructural reliance

- Historical approach has been nationally-funded supply infrastructure:
  - Dams in Colorado, Sacramento, San Joaquin basins provided supplies, flood control, hydropower, irrigated agriculture.
- Policies favoring senior appropriators, and water markets permitting transfers to higher-valued uses, established .
- Following severe droughts (1970s - 1990s) block rate pricing introduced, drought-tolerant landscaping encouraged.
- *Fragmentation* prevails – policy responses tend to be locally-driven with minimal regional cooperation and information-sharing.

Sources of Southern California's supply

Hastening innovation via adaptive governance

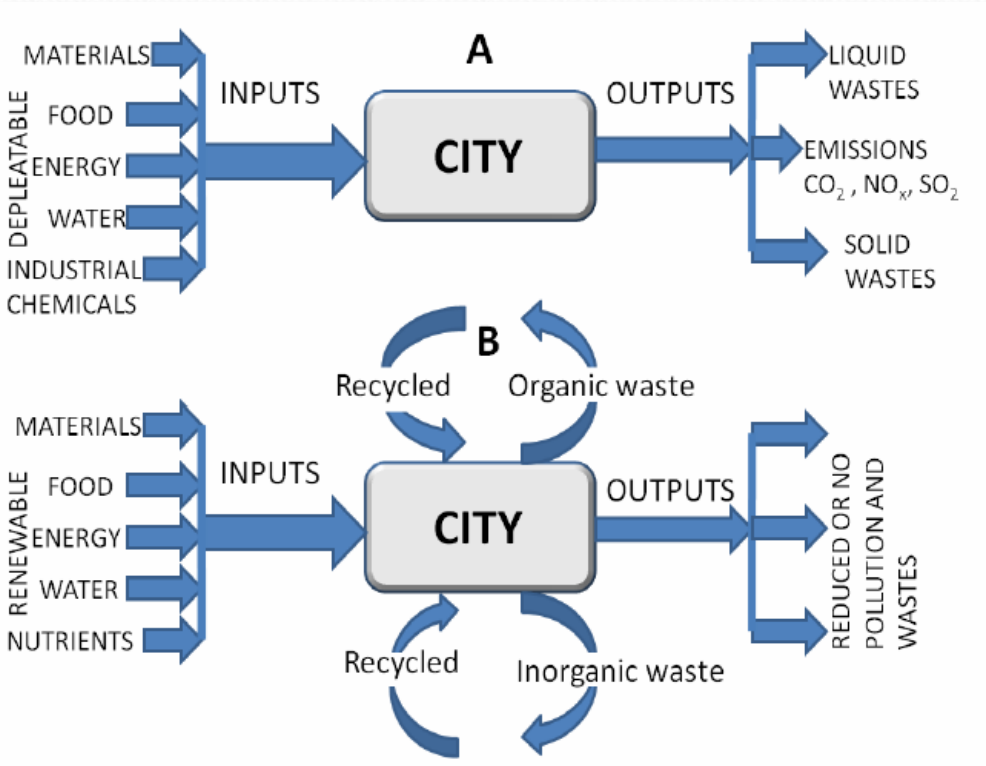
- **The PIRE project has learned that policy change tends to be driven by adaptive governance – occurring in varying degrees in Melbourne/SoCal:**
  - **Collaboration with civil society groups; social learning through broad participation; flexible policy environment encouraging innovation. Requires:**
    - ***Transparency***
    - ***Democracy and inclusiveness***
    - ***Means for accountability***
    - ***Fairness and equitability***

Goal **= co-production of information, adoption of measures that can be modified in light of lessons learned.**

Three innovations illustrate governance challenges

- ***Stormwater harvesting***
- ***Wastewater re-use***
- ***Water quality offsets***

Toward "closing the loop"



From: V. Novotny, et. al (2010) *Water and Energy framework & footprints for sustainable communities*, World Water Congress.

Stormwater harvesting – Melbourne vs. SoCal

- Can reduce runoff, improve water quality, augment local supplies.
- In ***Australia***, state & territorial governments have *overall authority* for land and water use:
  - Catchment management trusts, management boards prepare plans, undertake works, *encourage community participation*.
  - Overall management objectives & guidelines set by federal/state policies.
  - In ***California*** federal regulations (Clean Water Act) regulate discharges from municipal storm sewer systems, construction activities:
  - Management approaches traditionally reliant on top-down regulation.
  - State responsibility for Clean Water Act enforcement, coupled with local water needs, has led to recent emphasis on "best management practices."