# Water Policy in a drying climate – is it keeping pace?

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# Water Policy in a drying climate

- Climate Responses in South West
- Current Water Policy
- Overview of Water Supply
- Overview of Drainage
- Overview of Floodplain Management
- Is Water Policy keeping pace?

# Water Policy in a drying climate

## Climate Change & Variability

- Over the past 35 years, the number of storms have decreased, bringing less rain
- Over the same period, winter rainfalls have decreased by 15%
- Reduced rainfalls in the past 35 years have reduced runoff by over 50% into public water supply dams
- The expected drying 'trend' may unfold with steps, smooth trends, or even with temporary regressions

# Water Policy in a drying climate

## Carpenter Govt Water Policy

- Outlines 7 policy objectives

  1 - Use & Recycle Water Wisely

  2 – Plan & Manage Water Resources Sustainability

  3 – Invest in Science, Innovation and Education

  4 – Protect Ecosystems, Water Quality and Resources

  5 – Enhance Security of Water for the Environment & Use

  6 – Develop Water for a Vibrant Economy

  7- Deliver Services for a Strong & Healthy Community

# Water Policy in a drying climate

## Carpenter Govt Water Policy

- Embodies policy into State Water Plan (2007)

  1 - Provides a strategic framework to plan & manage water resources in Western Australia

  2 - Outlines priority actions for implementation that align to the 7 policy objectives

  3 - These actions to be delivered over a 5 year timeframe

  4 - Acknowledges that water policy must take into account Climate Change

# Water Policy in a drying climate

## Carpenter Govt Water Policy

- Water Plans

  1 – Statutory Water Management Plans

  2 – Drinking Water Source Protection Plans

  3 – Drainage Plans

  4 – Floodplain Management Plans

# Water Policy in a drying climate

## Carpenter Govt Water Policy

- Adapting to Climate Change

  1 – Adaptive Management (Learning Method/DoW)

  2 - Security through Diversity / Integrated Water Supply System (Redundancy Method/Water Corp)

  3 - Precautionary Principle & Risk Management (Worst Case Method/Water Corp/Engineers Australia)

  4 – Total Water Cycle Management (System Method/DoW/Water Corp)

  5 – Water Sensitive Urban Design (System Method/DoW/DPI)

# Water Policy in a drying climate

Overview of Water Supply in the South West

- Dams
- Groundwater
- Desalination
- The Kimberley
- Water Conservation

# Water Policy in a drying climate

Dams

- The main river systems draining the Darling Range have been dammed
- There is little remaining potential to expand this reservoir system
- From these dams Water Corporation currently takes some 100 GL a year, which meets about 20% of Perth's domestic needs

# Water Policy in a drying climate

Groundwater

- Currently provides about 80% of the total water needs for Perth and adjoining areas
- The Yarragadee, overlying aquifers in the Leederville and near-surface sands now supply about 60%, mainly from Gnangara & Jandakot
- Other large resources are known to exist
- Superficial/Surficial unconfined quartz sand aquifers other 20%

# Water Policy in a drying climate

## Reuse & Recycling

- Kwinana Water Recycling Plant supplying non-potable water to industry
- Goal 20% reuse of treated stormwater/wastewater by 2012
- 'Fit for Purpose' water consumption through the substitution of potable supplies with reclaimed water for non-potable use

# Water Policy in a drying climate

Desalination

- Perth Seawater Desalination Plant in Kwinana, commissioned in 2006 producing 45 GL of water
- Proposed Southern Desalination Plant in Binningup, estimated to produce up to 100 GL of water

# Water Policy in a drying climate

The Kimberley

- From time to time it has been proposed that a pipeline or channel be constructed to bring water from the Kimberley District to Perth
- Many experts have maintained that there are numerous economic and practical flaws in the proposal
- Political will / Goldfields Water Scheme 1900

# Water Policy in a drying climate

Water Conservation

- Waterwise Rebate Program
- Third Pipe Schemes (Brighton)
- Home Bores & Rainwater Tanks
- Sprinkler Restrictions
- Greywater Recycling
- Xeriscaping

# Water Policy in a drying climate

## Water Supply

- In summary the Perth scheme water system is robust, but climatically stressed
- Of particular significance has been the development of water resource systems in which the whole is greater than the sum of the parts
- Since around 1973 principles of conjunctive use have been introduced and exploited in the Integrated Water Supply Scheme (IWSS)
- The IWSS follows the precautionary principle and is particularly sophisticated in its drought mgt capabilities

# Water Policy in a drying climate

## Overview of Drainage

- Primary focus to provide protection from flooding caused by stormwater or inundation from groundwater
- This focus led to the construction of drainage infrastructure to facilitate urban development
- Consideration is also given to protecting valued natural resources and receiving water bodies
- In addition, drainage water is now considered a valuable resource that should be managed as part of an integrated water cycle
- Facilitate opportunities for water conservation, reuse & recycling

# Water Policy in a drying climate

## Overview of Flood Management

- Primarily plans for floods due to heavy rainfall, storm surges and cyclonic activity
- Ensure land use minimises flood risk and damage costs
- Ensure appropriate floodplain mitigation measures minimise damage & are acceptable to the local community
- Ensure measures have sound triple bottom line outcomes
- Ensure statutory bodies understand their responsibilities
- Support flood forecasting, warning systems and emergency management

# Water Policy in a drying climate

## Is Drainage Policy keeping pace with a drying climate?

- The debate on climate change has been very much focused on water supply in Western Australia so little attention has been placed on the practical effect on Drainage Policy.

- Consequently with respect to urban development my response would be probably YES & NO for the following reasons:

# Water Policy in a drying climate

Is Drainage Policy keeping pace with a drying climate?

1. Current design of drainage infrastructure based on overall historical rainfall record so could argue that it is conservative relative to last 30 years.
2. Penalised with higher than necessary fill heights and detention storages impacting on affordability and unnecessarily sterilising developable land
3. Increased risk of pipe failure and collapse and acidification due to lower groundwater levels
4. Neither ARR (Engineers Aust) nor the Stormwater Management Manual (DoW) give any guidance
5. Precautionary principle would argue return of wetter period, but at what cost

# Water Policy in a drying climate

Is Floodplain Management Policy keeping pace with a drying climate?

- The debate on climate change has been very much focused on water supply in Western Australia so little attention has been placed on the practical effect on Floodplain Management Policy.

- Consequently with respect to urban development my response would be probably YES & NO for the following reasons:

# Water Policy in a drying climate

## Is Floodplain Management keeping pace with a drying climate?

1. Current floodplain mapping and 100 year flood levels based on overall historical rainfall record so could argue that it is conservative relative to last 30 years.
2. Penalised with higher than necessary fill heights impacting on affordability and unnecessarily sterilise developable land
3. Neither ARR (Engineers Aust) nor the Draft Western Australia Floodplain Management Strategy (DoW) give guidance on climate change
4. Precautionary principle would argue return of wetter period, but at what cost

# Water Policy in a drying climate

Is Water Supply keeping pace with a drying climate?

On balance YES, except with respect to urban development in the following:

- Risk to water supply for POS
- Scheme Water Pricing

# Water Policy in a drying climate

Is Water Supply keeping pace with a drying climate?

Risk to water supply for POS

1 – Stormwater as a resource is not adequately considered in any practical way for reuse

2 - Shallow groundwater as a resource is not recognised

3 – Does not address Water Allocation for POS

4 – In many urban developments there is no allocation available for POS

# Water Policy in a drying climate

Is Water Supply keeping pace with a drying climate?

Water Pricing as Demand Management

1 – Economists have argued that the best way to moderate demand for water is raise its price

2 – There is ample empirical evidence to support the use of pricing as a demand management tool

3 – The elasticity of demand has shown that a 10% increase in price could reduce demand by up to 5%

# Water Policy in a drying climate

Is Water Supply keeping pace with a drying climate?

Water Pricing as Demand Management

4 – A progressively larger number of consumers already value water at higher than existing prices

5 – Innovation in water conservation technology is best served by raising the price of scheme water

6 – The annual cost of 250kl of scheme water in Perth is $280 or $0.001/l compared to approx $2/l for bottled water

# Water Policy in a drying climate

## Is Water Supply keeping pace with a drying climate?

## Water Pricing as Demand Management

7 – Innovation metrics are stymied by the low price of potable scheme water.

8 – For example the metrics for proposed third pipe schemes like Brighton are proving uneconomic purely because of the unrealistically low prices of potable scheme water

# Water Policy in a drying climate

- Venice a case study in poor Adaptive Management
- Commenced flood protection works in 1744
- Climate Change challenges on going
- Learning – mismanagement has been primary driver of crisis not climate change
- Resilience – Venice is still there!