SLIDES: Environmental Water in Australia

Chris Arnott

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Chris Arnott

BSc – Hons (Fluvial Geomorphology)
Managing Director, Alluvium Consulting
Victorian Catchment (Watershed) Management Council
Peter Cullen Trust Fellow
Chairman, Engineers without Borders
We are passionate about the protection, rehabilitation and restoration of our water resources, rivers and catchments. We strive to make a positive difference to the world we live in.

Read our blog
Environmental water in Australia

1. The Australian context
2. Our approach to environmental water management
3. Climate change & the way forward
Old, stable, flat, arid
<table>
<thead>
<tr>
<th></th>
<th>Mississippi</th>
<th>Murray</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>2,320 km</td>
<td>2,375 km</td>
</tr>
<tr>
<td>Watershed</td>
<td>2,981,076 km²</td>
<td>1,061,469 km²</td>
</tr>
<tr>
<td>Discharge per year</td>
<td>12,743 m³/s</td>
<td>767 m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6% of Mississippi</td>
</tr>
</tbody>
</table>
Floodplain systems

- Water shedding floodplain
- Main channel
- Water shedding floodplain
- Water retaining floodplain

- Anabranch
- Low flow channel
- High flow channel
- Anabranch
- Wetlands/backwaters

- Infiltration to groundwater
Environmental water in Australia

1. The Australian context

2. **Our approach to environmental water management**

3. Climate change & the way forward
The Australian approach

A) The Australian Environmental Water Management Report 2010

B) The FLOWS method
What is environmental water?

“Environmental water is the **water regime** provided to achieve **environmental objectives**”
A simplified representation of the environmental-consumptive spectrum within a water resource
The four elements of the environmental water management framework

NWI goal
- Sustainable water management

Determination

Review

Commitment

Compliance
The FLOWS method

FLOWS
- a method for determining environmental water requirements in Victoria.
FLOWS assessments in Victoria
Outline of the steps in the FLOWS method.
<table>
<thead>
<tr>
<th>Season</th>
<th>Magnitude</th>
<th>Frequency</th>
<th>Duration</th>
<th>Objectives</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec – Apr</td>
<td>Low Flow &gt;125ML/d (or natural)</td>
<td>Continuous</td>
<td>Continuous</td>
<td>1a, 1b, 2a, 2b</td>
<td>Optimum area of habitat with water depth &gt;0.4m over stream bed</td>
</tr>
<tr>
<td></td>
<td>Low Flow Freshes &gt;230ML/d</td>
<td>7 per year</td>
<td>3 day minimum</td>
<td>2c, 7a</td>
<td>Minimum depth (0.4m) over shallowest allowing fish passage and bed sediment scouring</td>
</tr>
<tr>
<td>May – Nov</td>
<td>High Flow &gt;230ML/d (or natural)</td>
<td>Continuous</td>
<td>Continuous</td>
<td>1a, 1b, 2a, 2b, 2c, 2e</td>
<td>Minimum depth (0.4m) over shallowest allowing permanent fish passage</td>
</tr>
<tr>
<td>May – Nov</td>
<td>High Flow Freshes &gt;800ML/d</td>
<td>On average 5 per year – with at least 2 in Sep/Oct (triggered by inflows)</td>
<td>4 day minimum</td>
<td>2d, 4a, 4b, 4c, 6a, 7a</td>
<td>Inundate benches and litter recruitment</td>
</tr>
<tr>
<td></td>
<td>Bankfull Flow &gt;2000ML/d</td>
<td>1 in2 years</td>
<td>3 days &gt;2000ML/d</td>
<td>2d, 4b, 4d, 6b, 7b, 9</td>
<td>Maintain disturbance processes and ensure riparian vegetation diversity/structure</td>
</tr>
</tbody>
</table>
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Environmental water in Australia

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Reduction in stream flows (in Victoria) over past 10 years compared to long term average

<table>
<thead>
<tr>
<th>River system</th>
<th>Reduction in stream flows experienced over the past 10 years</th>
<th>Forecast reduction in stream flows in 2055 as a result of medium climate change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barwon</td>
<td>34%</td>
<td>28%</td>
</tr>
<tr>
<td>Moonee Valley</td>
<td>60%</td>
<td>32%</td>
</tr>
<tr>
<td>Werribee</td>
<td>51%</td>
<td>33%</td>
</tr>
<tr>
<td>Maribyrnong</td>
<td>41%</td>
<td>32%</td>
</tr>
<tr>
<td>Bunyip/Tarago</td>
<td>41%</td>
<td>24%</td>
</tr>
<tr>
<td>Yarra</td>
<td>29%</td>
<td>23%</td>
</tr>
<tr>
<td>Latrobe</td>
<td>53%</td>
<td>19%</td>
</tr>
<tr>
<td>Thomson/Macalister</td>
<td>34%</td>
<td>23%</td>
</tr>
</tbody>
</table>
Figure 1. Australian temperature deciles for 30 January 2009, showing the large area in Tasmania which experienced its hottest day on record.
Reduction in stream flows (in Victoria) over past 10 years compared to long term average.
Reduction in stream flows (in Victoria) over past 10 years compared to long term average.
A common division of economic & environmental water
Websites

• Alluvium – www.alluvium.com.au
• NWC – www.nwc.gov.au
• Victorian Catchment Management Council – www.vcmc.vic.gov.au
• FLOWS method – ‘google’ it