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Management of Melbourne's water supply catchments

Program for Asian Development Bank Water Professionals on Water Utility Operation and Management

Gary Howell: Manager waterways and land asset management



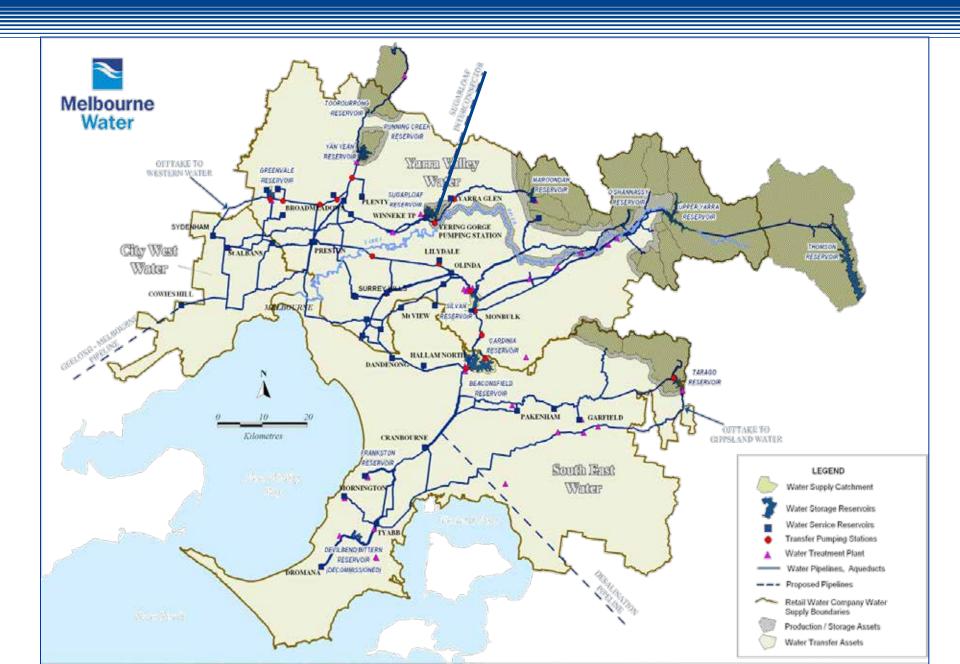


What is a catchment?

- A water supply catchment is an area of land where rainfall collects in rivers and streams that flow into reservoirs
- Melbourne is one of only about five cities in the world that has protected wilderness catchments that are uninhabited
- 80% of Melbourne's drinking water comes from closed water catchments
- These forested areas have been closed to the public for over 100 years



Melbourne's drinking water supply system



Catchment management objectives

Primary Objective:

To safeguard the quality and quantity of the water supply for the greater Melbourne area.

- Restrict human access into the catchment areas;
- Minimise the risk of contamination of the water supply by pests;
- Protect catchment values from fire; and
- Control soil erosion (incl. road maintenance).

Secondary Objectives:

Preservation and protection of the natural environment.

- Allow natural environmental processes to continue with minimal disturbance;
- Protect landscape values;
- Protect archaeological and historic sites and features; and
- Assist with and undertake scientific research and monitoring;

Enhancing life and liveability through the provision of high-quality, safe and reliable drinking water that meets or exceeds expectations of our stakeholders now and into the future

Our customers are assured highquality, safe and reliable drinking water that is affordable

Source waters are protected now and into the future

With our customers, we are trusted leaders in drinking water quality management and knowledge

Our approach to drinking water quality is integrated across the business

Together with our customers we efficiently and cost effectively manage a reliable, robust and resilient drinking water system from catchment to tap

Together with our customers and stakeholders we protect catchments and leave a positive legacy for future generations

We will drive improvements through research, collaborative relationships, innovation and best practice

Our programs are aligned across the business to deliver high-quality, safe and reliable drinking water

- Improve management in accordance with the preventive risk management framework & QMS
- Water is preferentially sourced from protected catchments
- Risks are known and managed System is reliable, robust and resilient to disasters, climate change and security threats
- · Protection for catchments is formally · Investment is based on evidence recognised in legislation and statutory
- · All catchments have an effective catchment management plan
- · Land uses in open catchments are sustainable & co-exist harmoniously with source water protection
- and best practice
- · Water quality information is accessible
- · Monitoring and research inform water quality safety, & influence
- Assets and processes pose no harm to personnel or the public
- · Rural land & river health programs protect drinking water sources
- · Land use planning & development protect drinking water and assets
- · Integrated water management programs are holistic and sustainable
- · Environmental outcomes are improved

- All 12 elements of ADWG adopted. quantitative risk assessments, multiple and effective barriers
- Supply from protected catchments is optimised and operating costs are reduced
- Groundwater & surface risk assessments for all catchments
- Vulnerability and capability assessments and plans, reduction in security threats, disaster risk reduction, protected head works
- Catchments are formally recognised
- · All catchments have a catchment management plan, best practice measures are implemented, no point pollution discharges from wastewater treatment plants, diffuse pollution declines, water quality index ratings improve
- · Treatment costs do not increase due to new hazards and no new incompatible developments
- Regulators and customers endorse plans for expenditure, interventions are best practice, stakeholder survey . Planning controls for drinking water indicates 'above average' satisfaction
- Water quality information is current and inquiries decrease
- · Investigative monitoring informs decision making & research is current catchments, integrated water
- Critical assets have planning buffer, safety hazards are managed and critical assets have effective security . No increase in solid waste and energy and fire plan
- · River health programs align with catchment management plans
- protection are integrated into corporate systems and protect supplies and critical assets
- · Reduction in recreational use in management programs reduce point & diffuse pollution sources
 - from renewable sources

Guiding principles: multiple barriers; do not degrade; prevention; precaution and due diligence; evidence; proportionality; collaboration through understanding, transparency & involvement; sustainability and safety

Safe Drinking Water Act 2003

- Places obligations on Melbourne Water to provide safe, good quality drinking water.
- The Safe Drinking Water Act provides a regulatory framework for drinking water quality that includes:
 - a risk management framework from "catchment to tap"
 - a set of standards for key water quality criteria
 - auditing and information disclosure requirements
 - systemic community consultation processes.

Australian Drinking Water Guidelines

Pathogens are the top priority.







Multiple barriers are required.

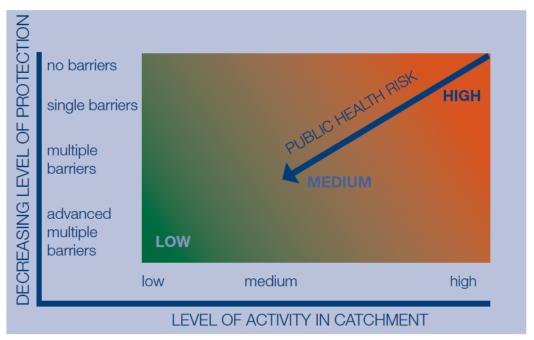


Figure 2: Effect of increasing the number of barriers for protection of drinking water.

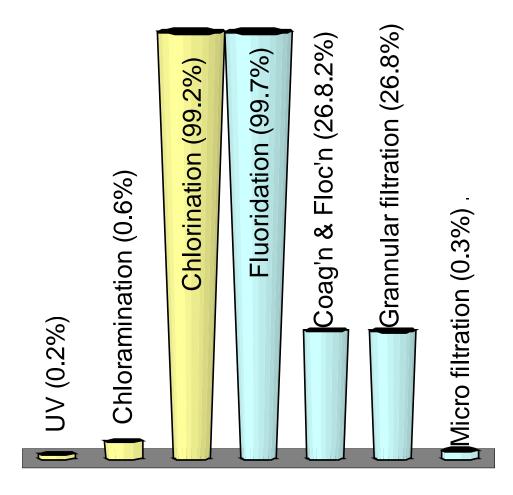
Source protection is the most effective barrier.

Melbourne's water supply



Melbourne's water supply

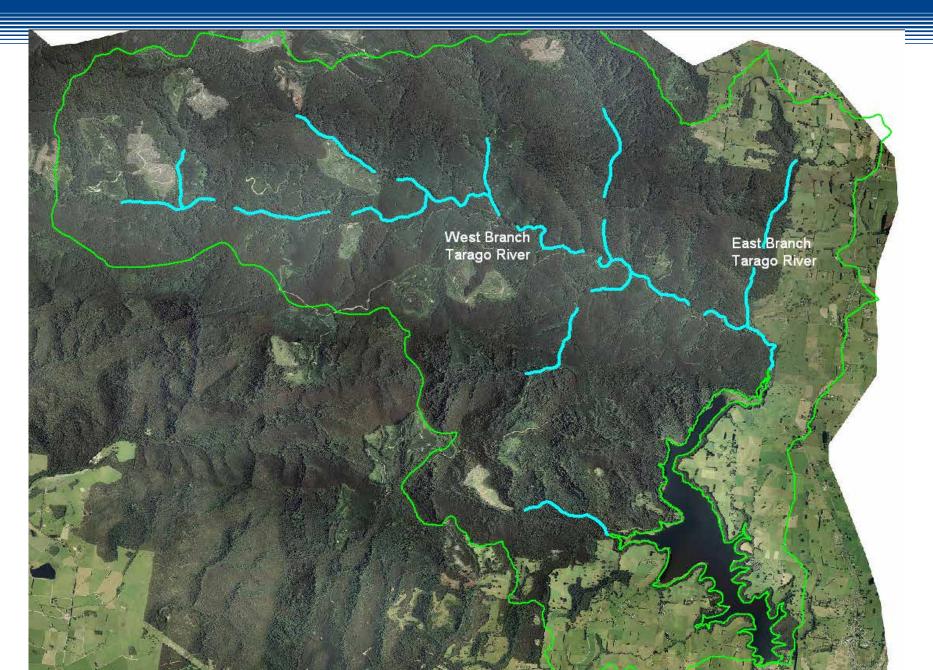
Melbourne's drinking water disinfection & treatment



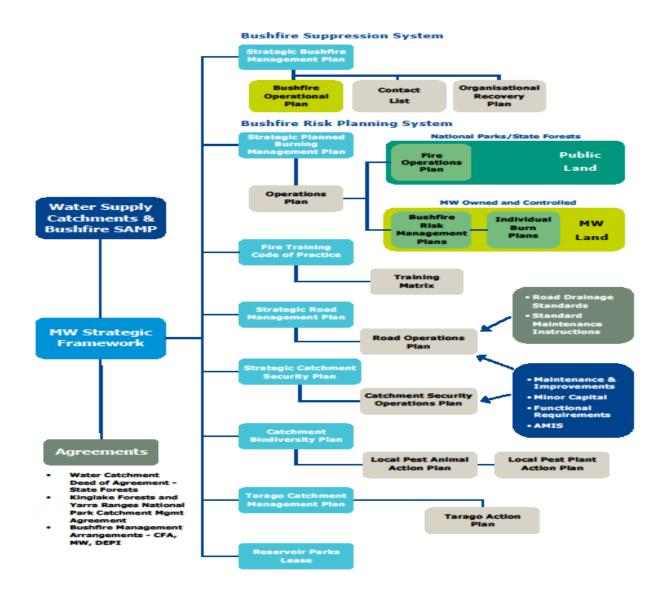
% is the relative proportion of the drinking water supplied annualy

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Managing open catchments



Managing catchments as an asset



Catchment Management - Levels of Service

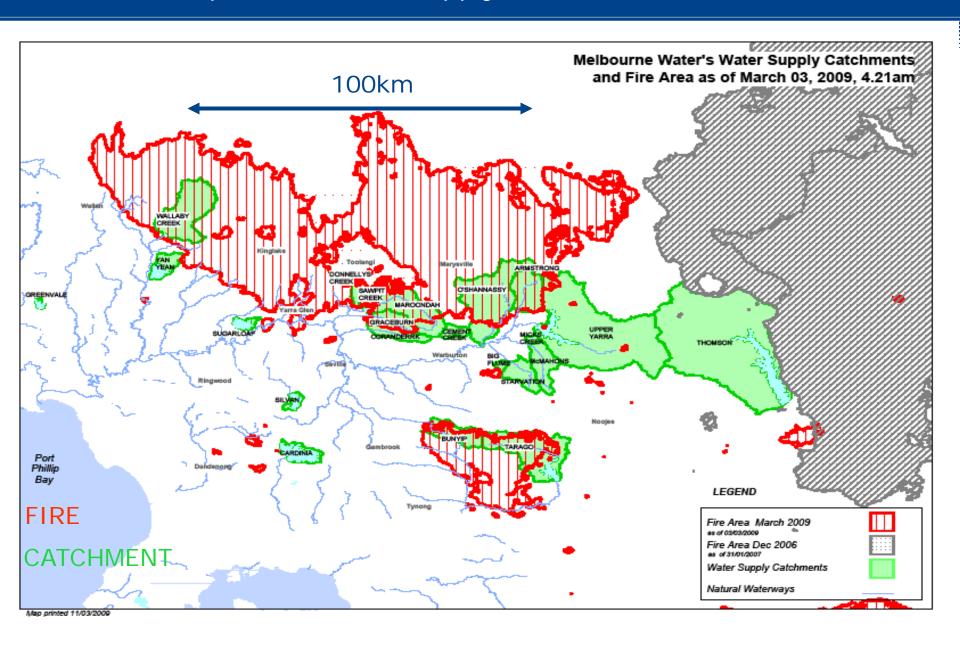
Priorities	Asset (not in priority order)	Activity (not in priority order)
1. Fire Management	Road Access	Road Slashing
		Slope Mowing
		Road Opening
	Fuelbreak	Slashing
	Infrastructure	Water Point Maintenance
		Vantage points
		Helipads
2. Security	Fence	Fence Maintenance
	Signage	Sign Maintenance
	Gates	Gate Maintenance
		Road Opening and Closing
	Catchment	Patrols
3. Pest Animals		Pest Animal Management
4. Road Drainage	Road Surface	Road Grading
		Road Dozer Maintenance
	Culverts	Culvert and Crossing Maintenance
5. Land Management	Biodiversity	Weed Management

Why Fire Protection is Important

- Water quality
- Water yield
- Property owner responsibilities
- Protection of environmental values



2009 - Impact on Water Supply Catchments



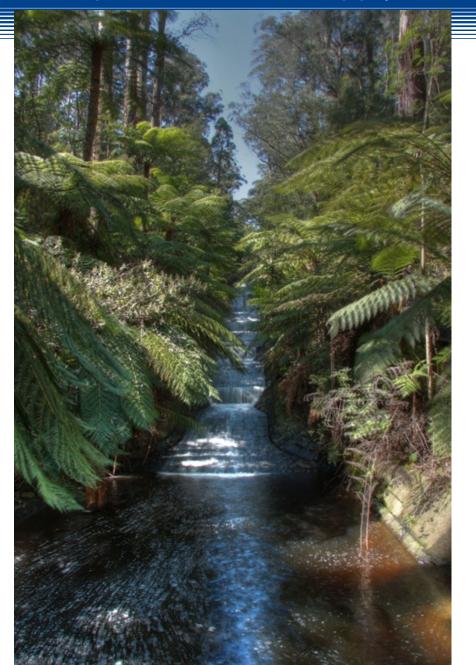
Impact on Water Supply Catchments – O'Shannassy



Impact on Water Supply Catchments – Wallaby Creek



Impact on Water Supply Catchments – Wallaby Creek





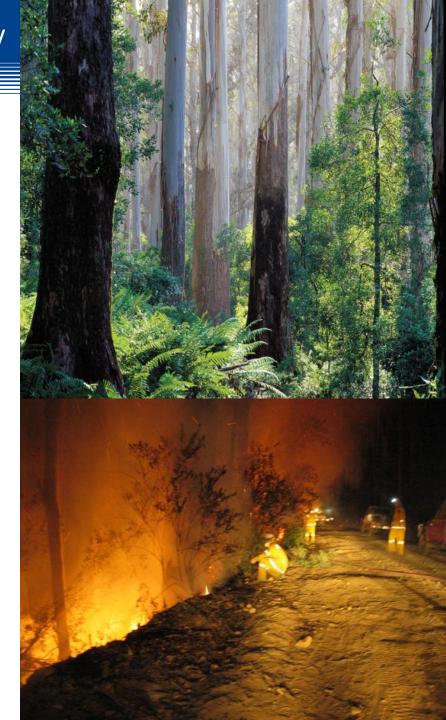
Bushfire Impacts – Water Quality

Short term issue: 0-5 years

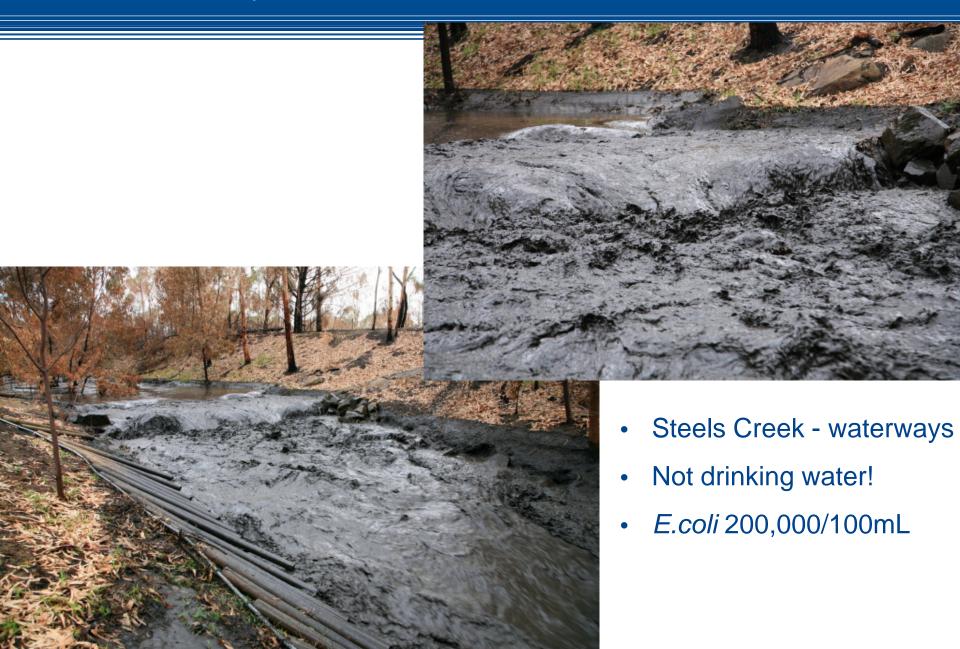
Potentially:

- massive increases in Turbidity, colour, Fe, Mn
- Reductions in DO
- Unable to disinfect
- Landslips/Debris flows
- Storage outages of 3 12+ months
- Remediation efforts often ineffective

Highly variable response to fire



Water Quality - rain



Bushfire Impacts on Catchments

Rainfall and Soil Erosion

 Variables: soil type, soil damage, extent of vegetation removal, time elapsed before rainfall, rainfall intensity, topography, mitigation measures



Erosion in Wallaby Creek Catchment (January, 2010)

Water Quality - interventions

- Physical barriers
- Silt curtains
- Rehabilitation of fire breaks

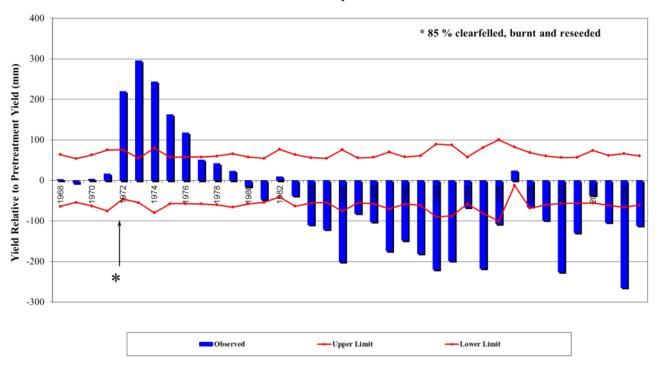




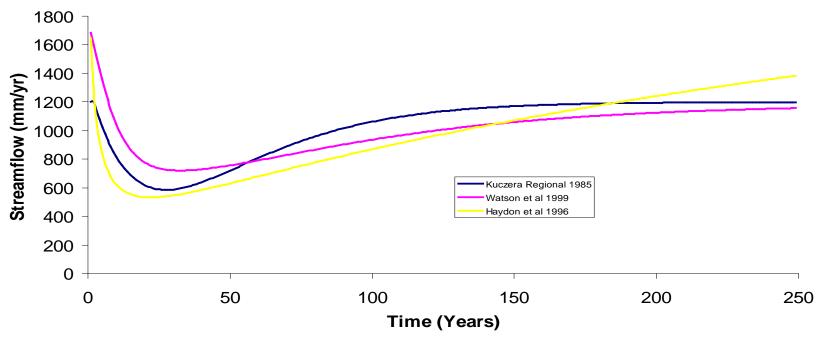
Bushfire Impacts - Quantity

- Maximum 50% yield reduction
- Based on observation, experimental results & modelling

PICANINNY CREEK ANNUAL RUNOFF MODEL Climatic-Index: Slip Creek Runoff



Bushfire Impact - Quantity





Mitigation – Prevention, preparedness, response and recovery









