



The Role of the Environmental Manager

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Outcomes of Environmental Water Management

NWI

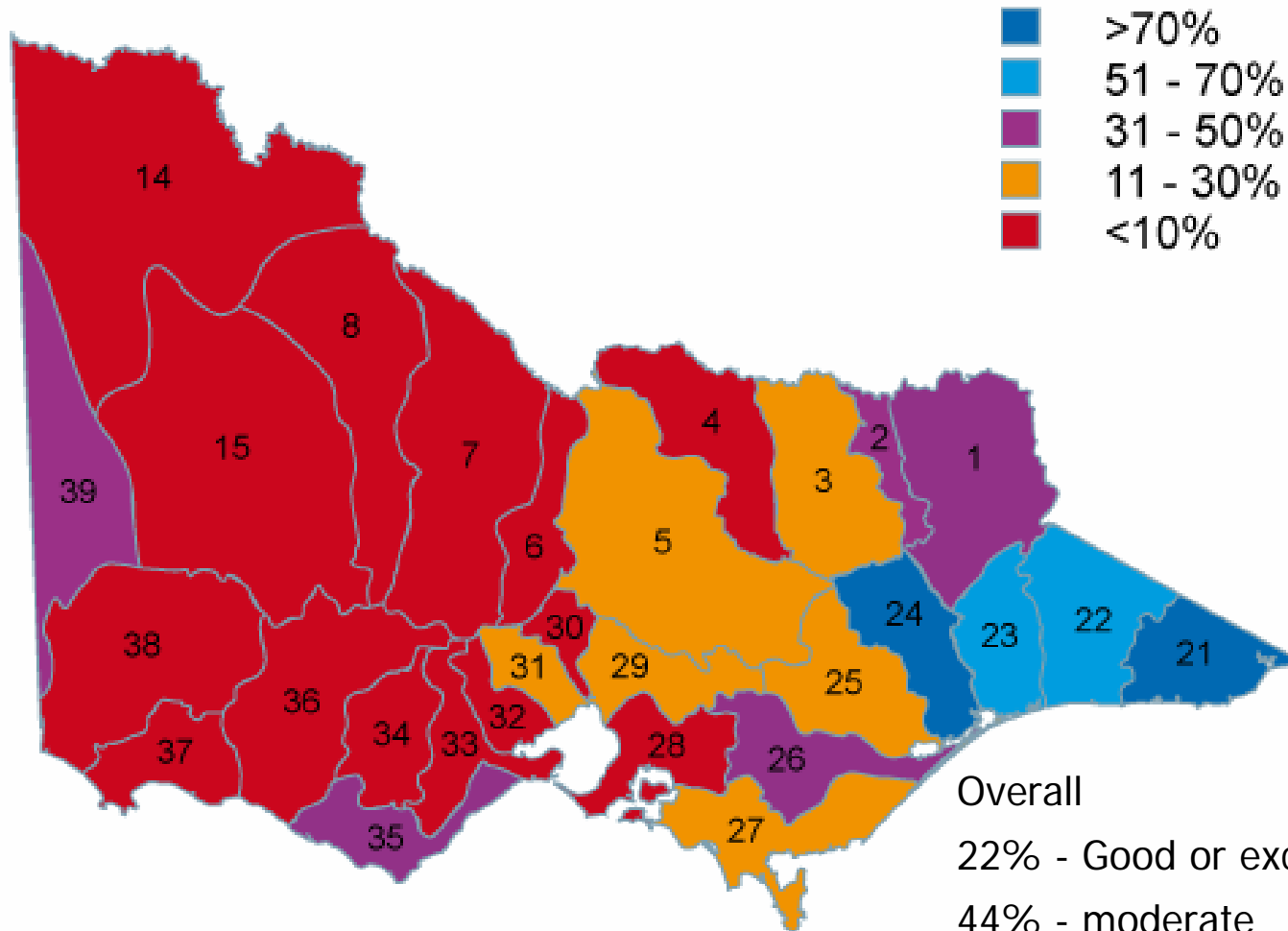
- Has a very strong focus on environmental water
 - achieving sustainable levels of water extraction
 - Making provision for environmental and other public benefit outcomes
 - Managing environmental water

Doing it

- To achieve improvements in the ecological condition of rivers, floodplains and wetlands in order to
 - Maintain/improve their environmental values, biodiversity and ecological functioning and thereby the other water services dependent of the environmental condition of the system

2004 River basin condition

Percentage of total stream length in excellent or good condition



Overall

22% - Good or excellent

44% - moderate

34% - poor or very poor

RRHS Risk Assessment

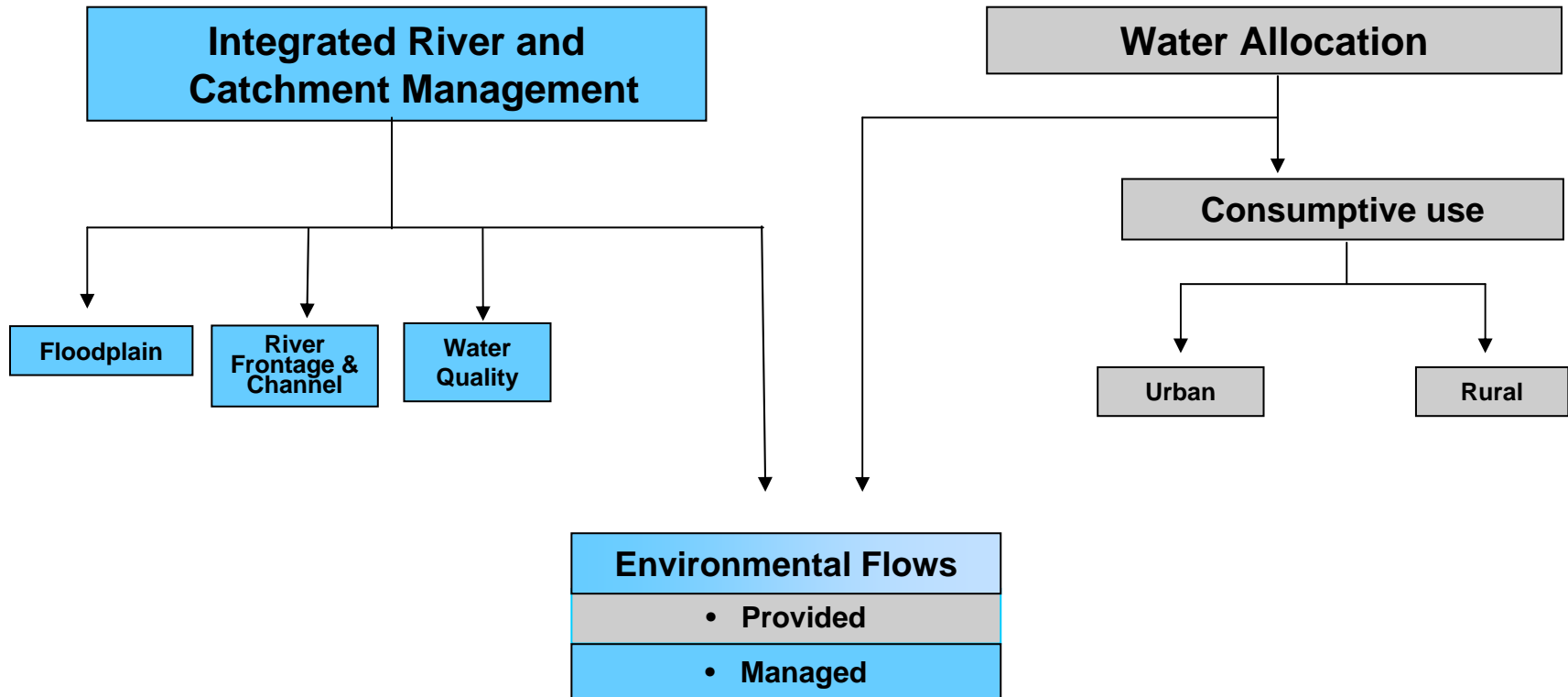
Table 6.2. Risk ratings for each threat in High Priority Reaches in the Goulburn Basin

	Reach Number	Goulburn River: Goulburn Weir to Murray River	Goulburn River: Eildon Res. to Goulburn Weir	Seven Creeks	Seven Creeks	Gobarup Creek	Hughes Creek	King Parrot Creek	Yea River	Acheron River	Taggerty River	Rubicon River	Goulburn River: u/s of Eildon Res.	Goulburn River: lower u/s of Eildon Res. upper	Big River lower	Big River upper	Howqua River lower	Howqua River upper	De latite River	De latite River	
		L1	U1	19	20	33	37	51	55	62	64	66	15	16	67	68	69	70	71	72	
Physical Threats	Bank erosion	H	VH					M2												M2	
	Bed instability		VH	M2																H	M1
	Channel modification	H	M2		M2																
	Loss instream habitat	H	VH	M2			M2				VH										
	Stock access	VH	VH	VH	VH	M1	VH	VH	VH	H											VH
Flow Threats	Flow deviation	VH	VH					M2				VH									
	Wetland connectivity	VH**																			
Water Quality Threats	Water quality	VH	VH	VH	VH																
	Water quality SIGNAL	VH	VH	VH				VH													M2
	Water quality trend	H	H		H								H			H					H
	Temperature		VH																		
Biological Threats	Algal blooms		VH																		
	Introduced flora	M2	VH	M2			M2	M2					M2	VH							H
	Introduced fauna	M2		M2	M2					M2											
	Fish barriers		VH	M2	M2		VH	H	H		H										VH
	Degraded riparian veg		VH	M2	M2									H							H

** - Reach 1 only

Key: VH – Very High; H – High; M1 – Medium 1; M2 – Medium 2 (see Table 6.1 for explanation).

Rivers – ICM Intersects with Water Allocation



Integrated River Management

- Environmental Water Management has to be undertaken as a key/crucial component of integrated river management
- Integrated river management undertaken to achieve clear river objectives
 - Set around environmental values and consequent community services provided by river
- Undertaken by an Integrated River Manager
 - Planning
 - Determination of adequate environmental flows
 - Management of environmental flows
 - Implementation of integrated works programs



Inventory of Assets

Environmental

Rarity

- Significant Flora / Fauna
- Significant EVC
- Wetland/Estuary Significance
- Sites of Significance

Representativeness

- Representative River

Naturalness

- Natural macroinvertebrate communities
- Natural riparian vegetation
- Natural fish populations
- Fish Migration
- Ecologically Healthy River

Large Scale Significance

- Heritage River
- Ramsar wetland

Social

Recreation

- Fishing
- Non motor boats
- Motor boats
- Camping
- Swimming
- Passive recreation

Cultural

- Sites of Cultural Significance
- Land Claim
- European Heritage
- Listed landscape

Flagship Species

Economic

- Irrigation water supply
- Proclaimed water supply catchments
- Public infrastructure
- Agricultural land
- Tourism
- Power generation
- Ecosystem services

Threats

- Bank erosion
- Bed stability
- Barriers
- Channel Modification
- Flow deviation
- WQ Trend
- WQ Level
- WQ Signal
- Temperature
- Algal Blooms
- Exotic Flora
- Degraded Riparian Vegetation
- Introduced Fauna

RRHS Risk Assessment

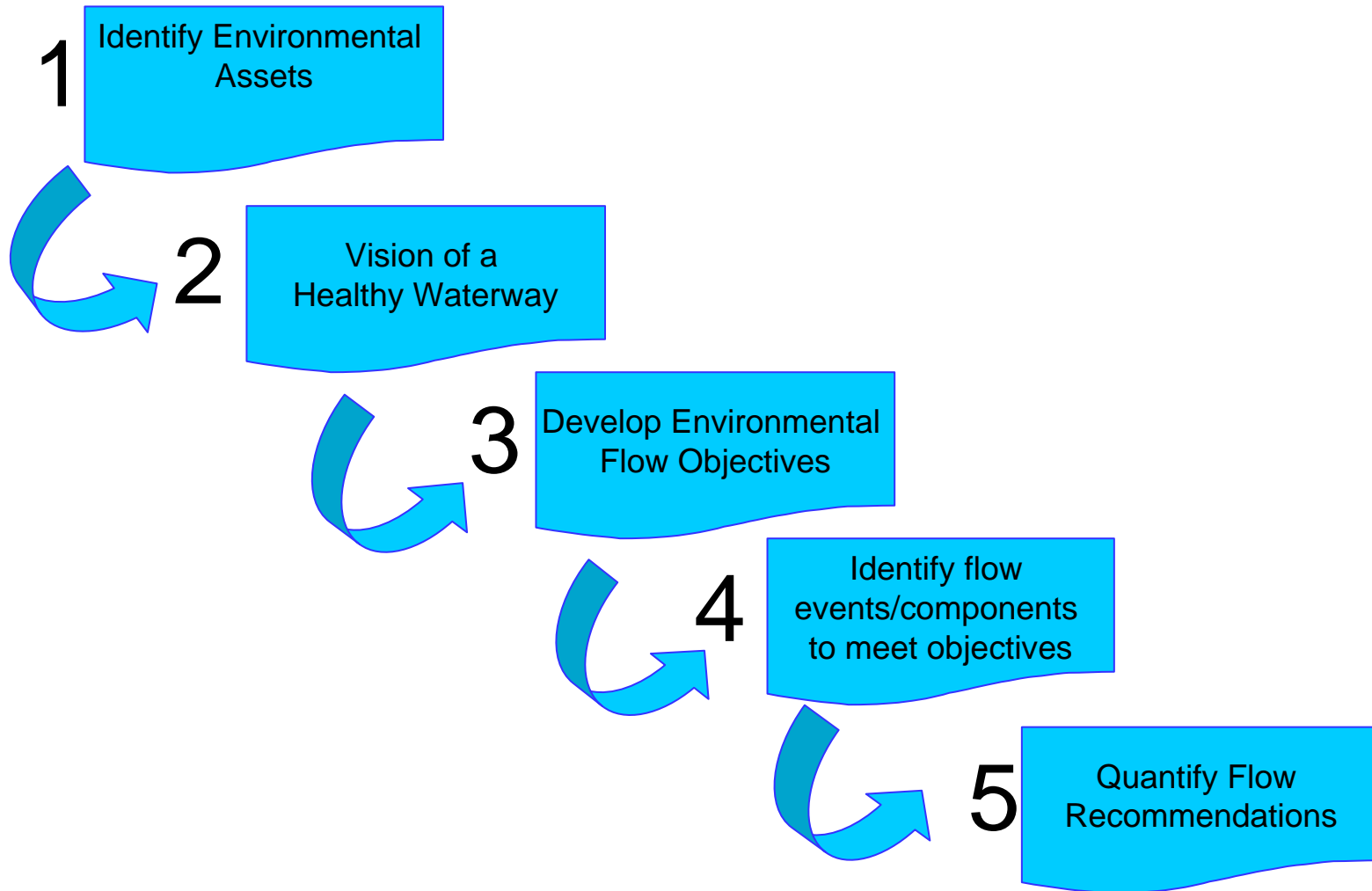
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Identifying environmental water needs for assets



Application in Yarra river

Environmental flow recommendations -Warrandyte

Season	Flow	Volume	Frequency	Duration	Rise/Fall	Objective (refer to objectives tables for id reference)
Summer / autumn	Low flow	200 ML/d	All season			Maintain access to habitat for bugs & fish, drying on banks for vegetation M5-1, F5-1, V5-1
	Fresh	750 ML/d	3 events between December & April	2 days	1.4/0.85	Maintain habitat M5-2, V5-2
	High flow	1500 ML/d	1 per year April/May & April	7 days	1.4/0.85	Trigger spawning by Grayling & transport eggs downstream F5-3
Winter / spring	Low flow	350 ML/d	All season			Maintain access to habitat for bugs & fish, wet bank vegetation M5-1, F5-1, V5-1
	Fresh	2000 ML/d	2 events between June and September	7 days	1.4/0.85	Maintain suitable habitat Scour gravel riffles to improve conditions for Macquarie perch spawning M5-2, F5-1, F5-2, V5-2
	High	2000 ML/d	1 in October -November	14 days	1.4/0.85	Sediment scouring to increase habitat availability, vegetation disturbance, fish passage & spawning habitat, entrain organic material M5-3, F5-2, V5-3
	Bankfull	10000 ML/d	1 event every two years in winter/spring	2 days	1.4/0.85	Maintain existing channel geometry & prevent vegetation encroachment in channel, entrain organic material, engage high flow channels & floodplain Engage billabongs & low level floodplains. G5-1, M5-3, V5-3, G5-3, V5-5



Environmental Flows

- Provided as
 - ‘Above cap’
 - Passing flows from storages
 - Environmental entitlements held in storage
 - Operating strategy aimed at sustaining river/wetland assets
 - Sets priorities for watering based on asset value and water needs
- **Maximum gain for water/\$\$ invested**
 - type and value of ecological assets that would benefit
 - Comparative size of ecological benefit (eg reinstate fish breeding in an endangered sp)
 - length of river where benefit is realised
 - does it avert a serious ecological loss.
 - type and value of assets for which loss is avoided
- towards achieving clear river health objectives – articulated as river assets
- Managed as part of integrated program
 - Yarra - water quality, riparian restoration, longitudinal connectivity



LM Icon Sites

- 500GL for six icon sites for \$700M
- Each icon site plan has complementary land management activities and works programs aimed at achieving clear site objectives



Dryer Future

- Less environmental water
- Will need to do more with less
- Important to have clear objectives
- Important to undertake environmental water management as part of integrated river management
 - Simulating natural flows with works to make more efficient use of environmental water
 - Regulators
 - Pumping eg Hattah Lakes
 - Connecting channels/pipes to irrigation/river systems
 - complementary restoration activities
 - Ensure survival during drought
 - Provide pathways for recolonisation
 - Promote recovery during wetter years
- Concept/Role of Environmental Manager needs to broaden



Basin Plan Issues

- Aim for sustainable levels of extraction and coordinated environmental management
 - Not acknowledged that this depends on river objectives
 - Not clear how you would set
- Must be part of an integrated program to achieve real river health outcomes