



Australian Government



Estimating the Environmental Water Requirements of the Murray-Darling Basin

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Thoughts influencing the approach

- Consistency and linkages to Water Act
 - International agreements
- A ‘whole of system’, ‘whole of flow regime’ approach
- Focus on features with greatest impact
- Focus on regions where change needed
- Provide appropriate SDLs – EWP and local managers to determine ‘operational’ detail

Components

1. An asset based assessment
 - Detailed, localised, site specific assessment
 - High flows focus - largest impact on ESLT
2. An ecosystem function based assessment
 - Conceptual and basin wide
 - Provides low flow requirements, and a checking mechanism for high flows
 - Lesser impact on ESLT

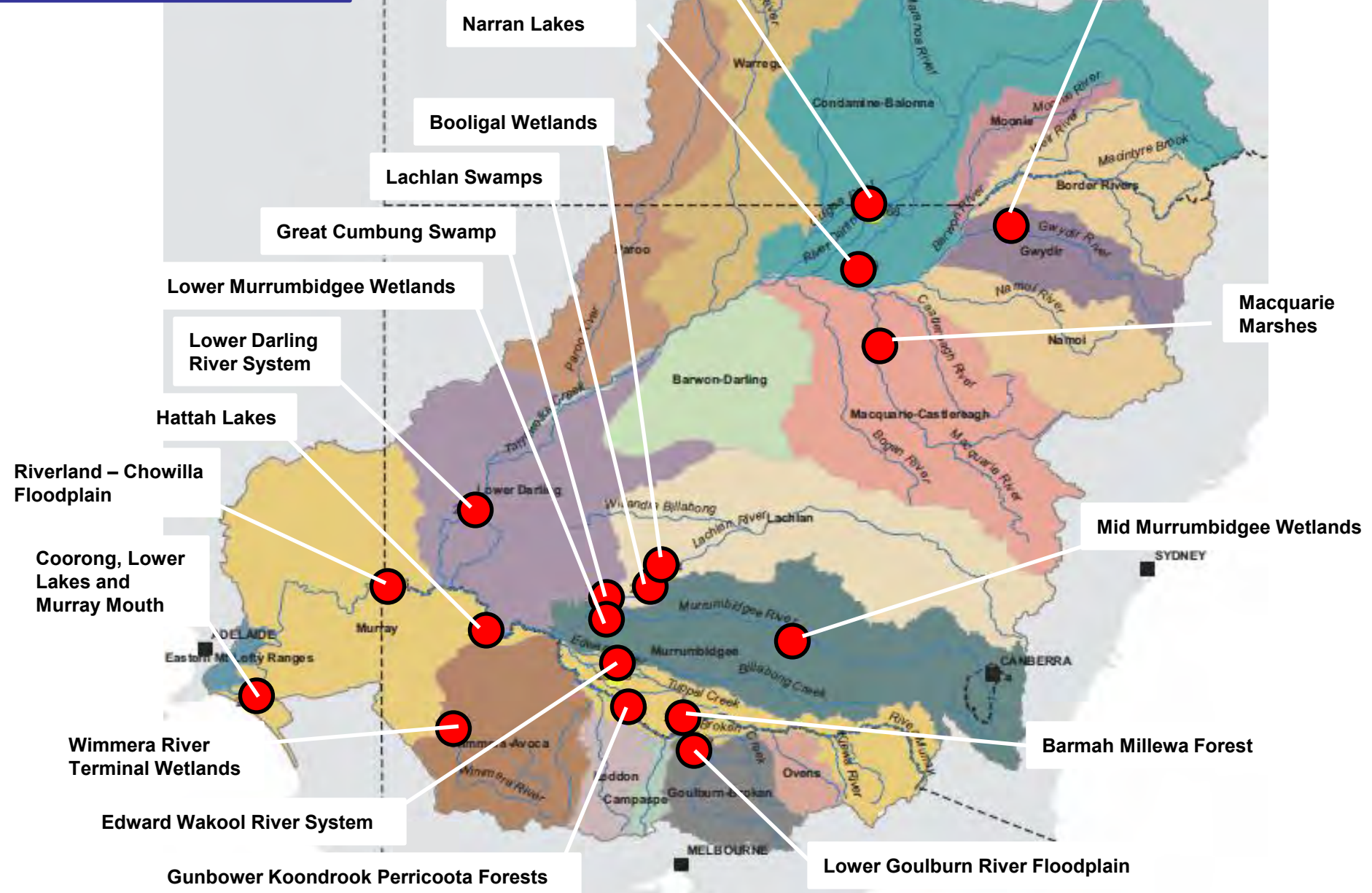
Asset Based Assessment

- Assessment of the environmental water requirements of discrete assets
- Assets are selected as indicators – hydrologically representative of environmental water requirements at a catchment or reach scale
- Assumption: watering the indicator assets will water many others
- Most indicator assets are wetlands and floodplains - typically require high flows (bankfull/overbank)
- High flows make the biggest contribution to volume - biggest influence on the ESLT

Criteria for Indicator Assets

1. Asset is a 'key environmental asset'
2. Asset is high flow dependant
 - high flows greatest impact on SDL,
functional approach will assess low flows
3. Asset has the 'largest' environmental water requirement in the region
4. The group of assets provide a geographic spread and avoid repetition
5. In regions where change required

Indicator Key Environmental Assets



Objectives and Targets

- Objectives link to key asset criteria
 - Criteria in turn linked to Water Act
- Focus on obligations of international agreements
 - Ramsar
 - Bird agreements (JAMBA, CAMBA...)
 - Threatened species (incl fish)
- Targets aim to protect/restore habitat types needed by these species
 - Many species – therefore all habitat types

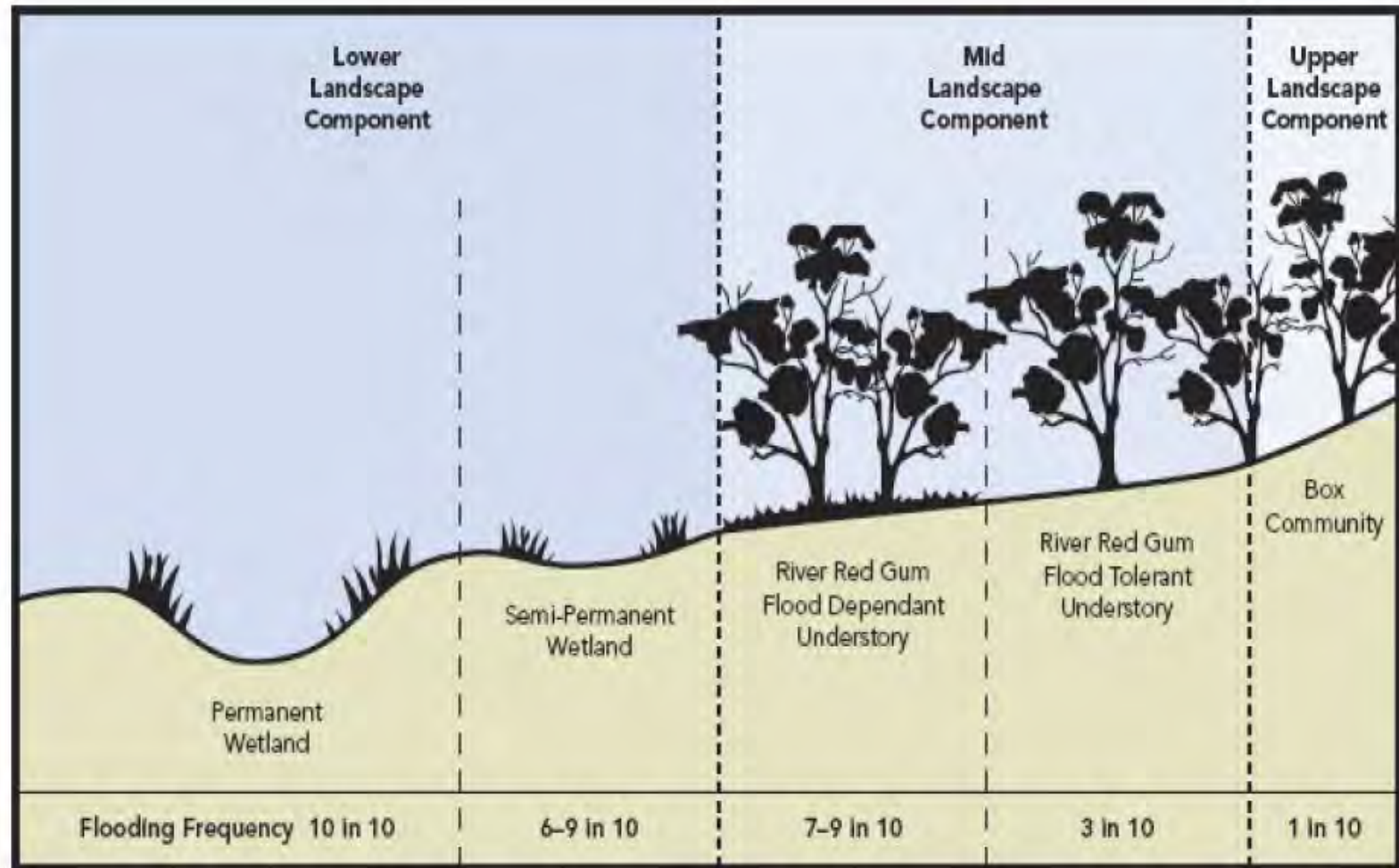
Objectives and Targets

- Maintain current extent
 - Limitation of Basin Plan powers to change land use (Section 22(10))
- Restore/rehabilitate condition

Ramsar listed	Restore to the condition at the time of listing (Section 21(1) of the Water Act and Section 334 of the EPBC Act)
not Ramsar listed	Maintain the current extent of the asset, and rehabilitate/restore long term condition.

Environmental Water Requirements

- Flow regimes not volumes



Functions Based Assessment

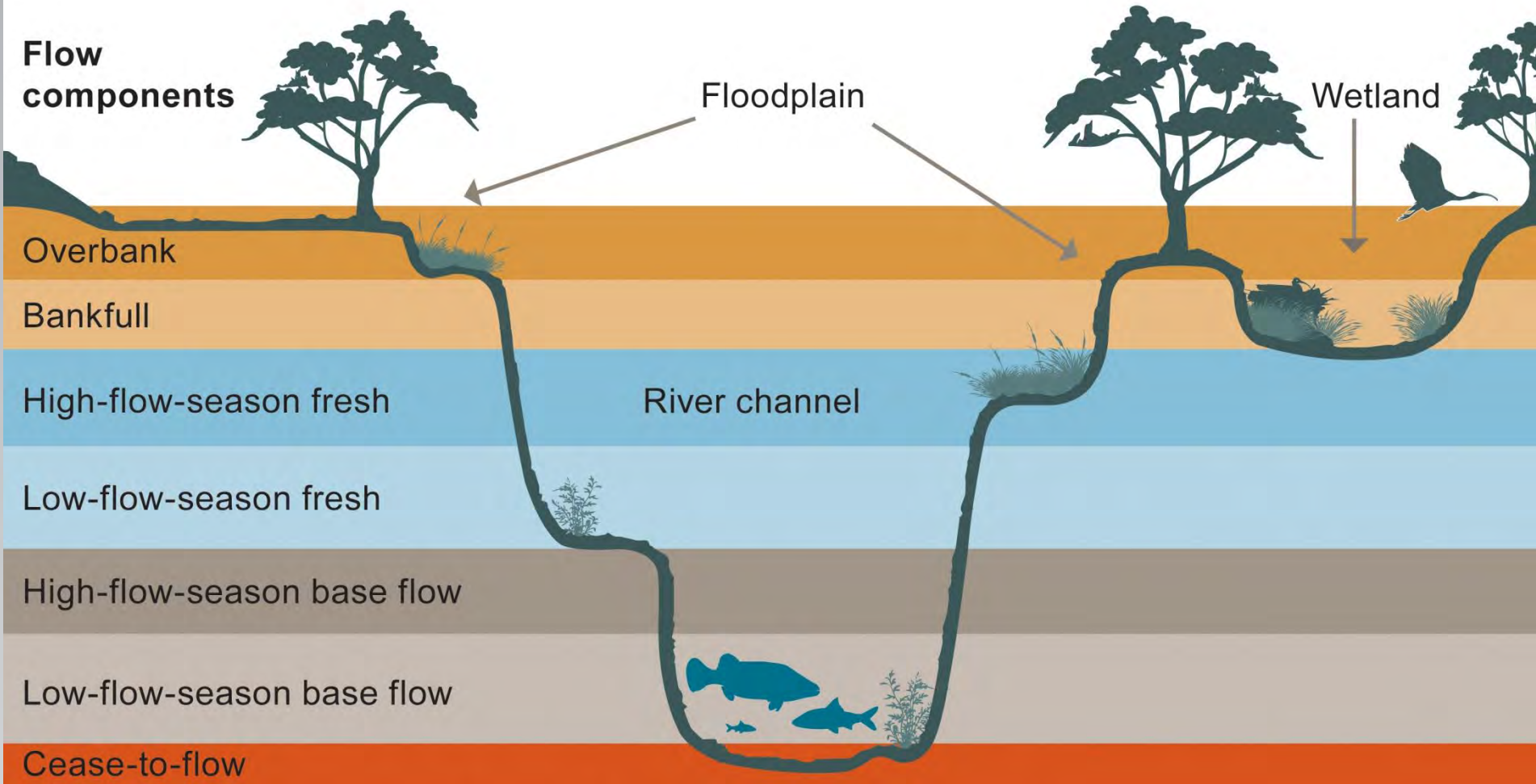
- A broader mechanism to assess flow regimes across the Basin
- Similar to Flow Events Method, ELOHA
- Generally applicable to all water dependant ecosystems, but less detailed than asset based assessment
- High flow requirements overlap with assets based assessment – but provides a mechanism to check impacts across the Basin
- Key output is low flow environmental water requirements – less impact on ESLT

What are functions?

- Fundamental physical, chemical and biological processes that support the Basin's environmental assets
 - Creation and maintenance of habitats for use by plants and animals (including fish)
 - Transportation and dilution of nutrients, organic matter and sediment
 - Connectivity along rivers for migration and recolonisation
 - Connectivity across floodplains, adjacent wetlands and billabongs for foraging, migration and recolonisation

What flows do functions require?

- All types



Functional Based Assessment

- Conceptual model used to link functions to flow types
- Flow metrics used to measure flow types
 - Measured as proportion of reference ('natural')
 - Inputs from Victoria FLOW studies, hydrologic analysis
- Adopt target values for metrics
- Assess metrics across the Basin (~88 sites)

Integrating assets and functions

- Indicator assets provide robust estimates of high flow requirements
- Ecosystem functions metrics provide
 - A mechanism to check impacts of assets EWR on flows elsewhere in the Basin (ie validate assumption)
 - Low flow environmental water requirements

EWRs to SDLs

- SDLs are long term average volumes
- In simple terms:
$$\text{SDL} = \text{Total Water Available} - \text{EWR}$$
- Need to convert EWRs to long term average volume of environmental water
- Combination of modelling and other analysis used



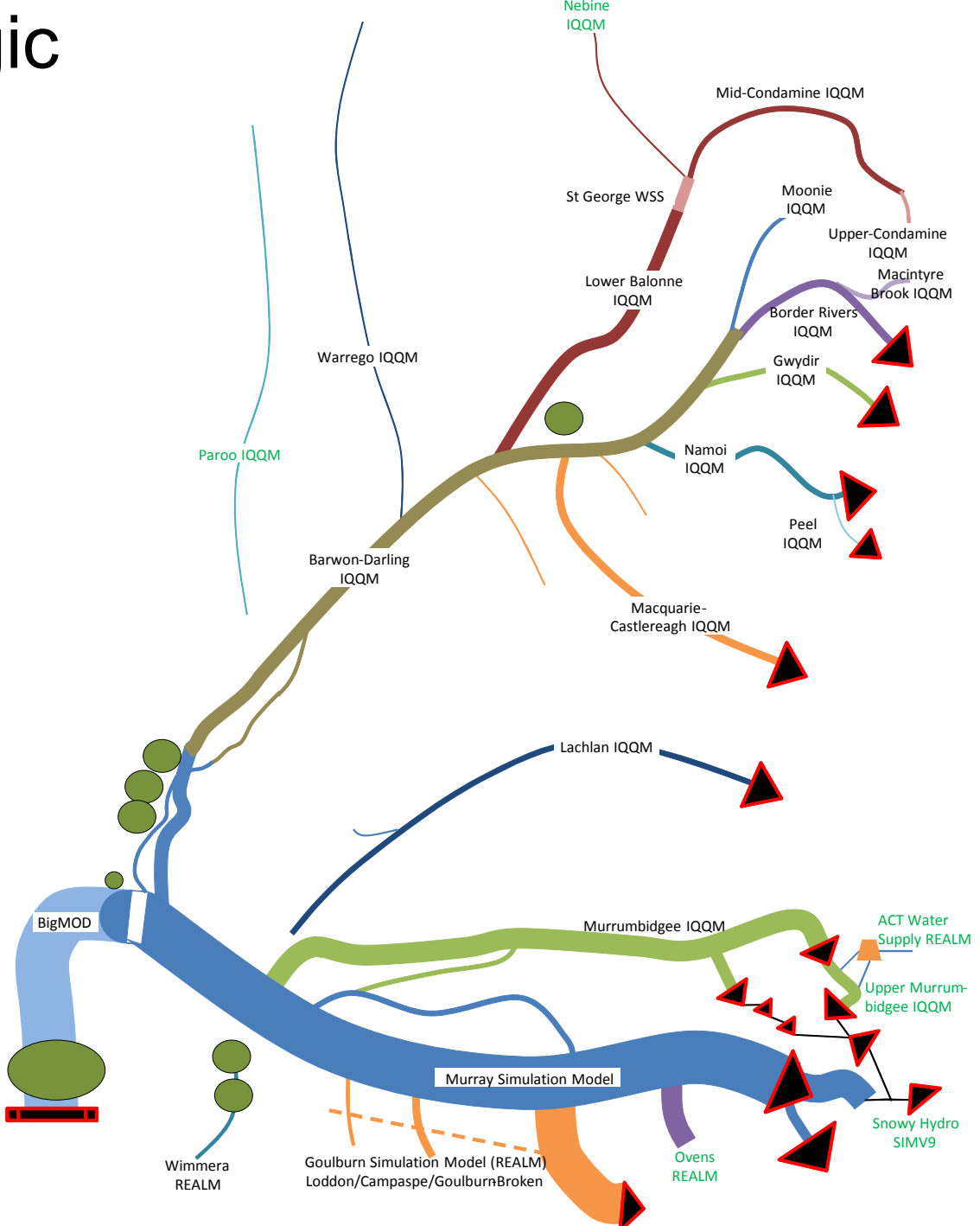
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Modelling Approach

- Environmental water requirements expressed as 114 years of environmental flow demand time series (eFlow predictor tool)
- Environmental flow demands entered into models, as per irrigation demands
- Environmental flow demands delivered, and the reduction in diversions determined

Hydrologic Models



Acknowledgements

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