MURRAY VALLEY ADAPTIVE ROAD MAP

MV Stakeholders Concept Plan

Basin People Connecting Our Rivers and Wetlands

Social-Ecological outcomes through efficient water use for people and nature.

VISION

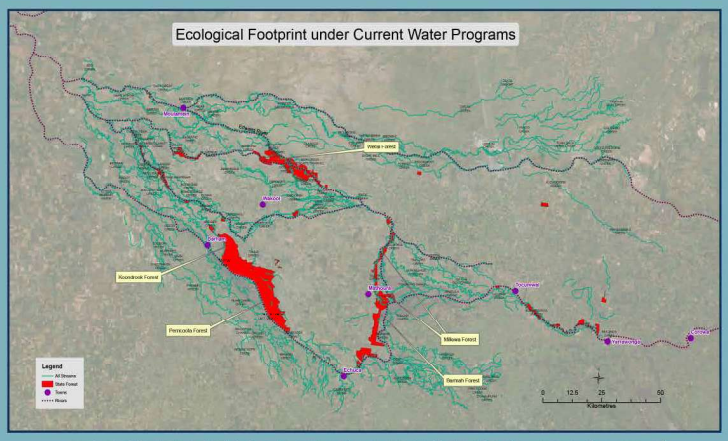
Socially and economically prosperous rural communities incorporating and enhancing major benefits for natural and modified environments through collaborative partnerships and investments in private infrastructure.

MISSION

Increase the ecological footprint of the Murray Valley, through community developed solutions to increase ecological connectivity and water efficiency while decreasing third party impacts.

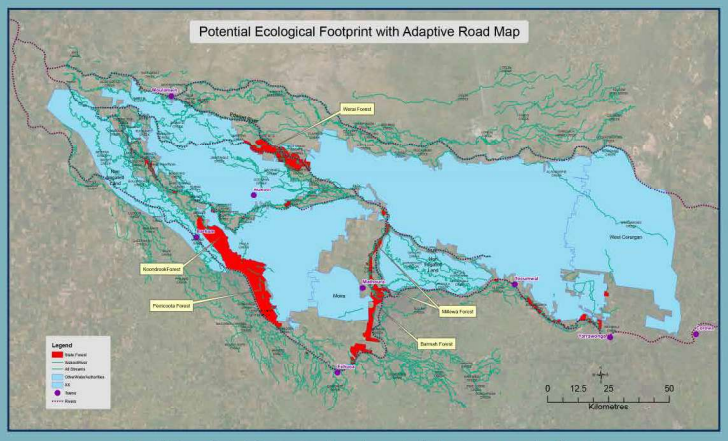
GUIDING PRINCIPLES

- The Murray Valley supported Aboriginal people for countless generations and continues to be their basis for cultural and economic well being. We acknowledge this cultural landscape now supports diverse communities across the region.
- A new focus on Community developed strategies, partnering with Governments to efficiently deliver operational and environmental water while maximising the Murray Valley's ecological footprint
- Broaden ecological outcomes and community engagement with environmental water via a new multiple methods approach for the 2750GL as part of the Sustainable Diversion Limit Adjustment Mechanism
- Recognising physical limitations of Murray, Goulburn and Edward (Kolety)/Wakool River systems and interconnected flood risks
- Understanding the ecological role of consumptive water and private land in the region, and how system changes can negatively impact the ecology of the whole system
- Improved opportunities with Murray Valley's major ecological assets through positive interactive relationships with public/private landholders and local communities
- Work with local stakeholders and affected parties to achieve cooperative solutions for environmental and operational water in the Murray and Edward/Wakool Rivers system limitations within known ecological and flood risks profiles
- Identifying regional solutions for circumstances when the Darling River is not providing connectivity flows
- Recognition of Murray Valley system limitations and risks of new irrigation demands downstream of the Barmah choke



Ecological footprint (highlighted in red) in the Murray Valley under the current objectives of the Murray Darling Basin Plan and Environmental Watering Programs.

Outcomes: 550km^2 and limited public/private partnerships



By utilising private infrastructure broader ecological outcomes are significantly increased through partnership models for public/private land.

Outcomes: 11,913km^2 ecological footprint with reduced third party impacts and increased community participation and support.

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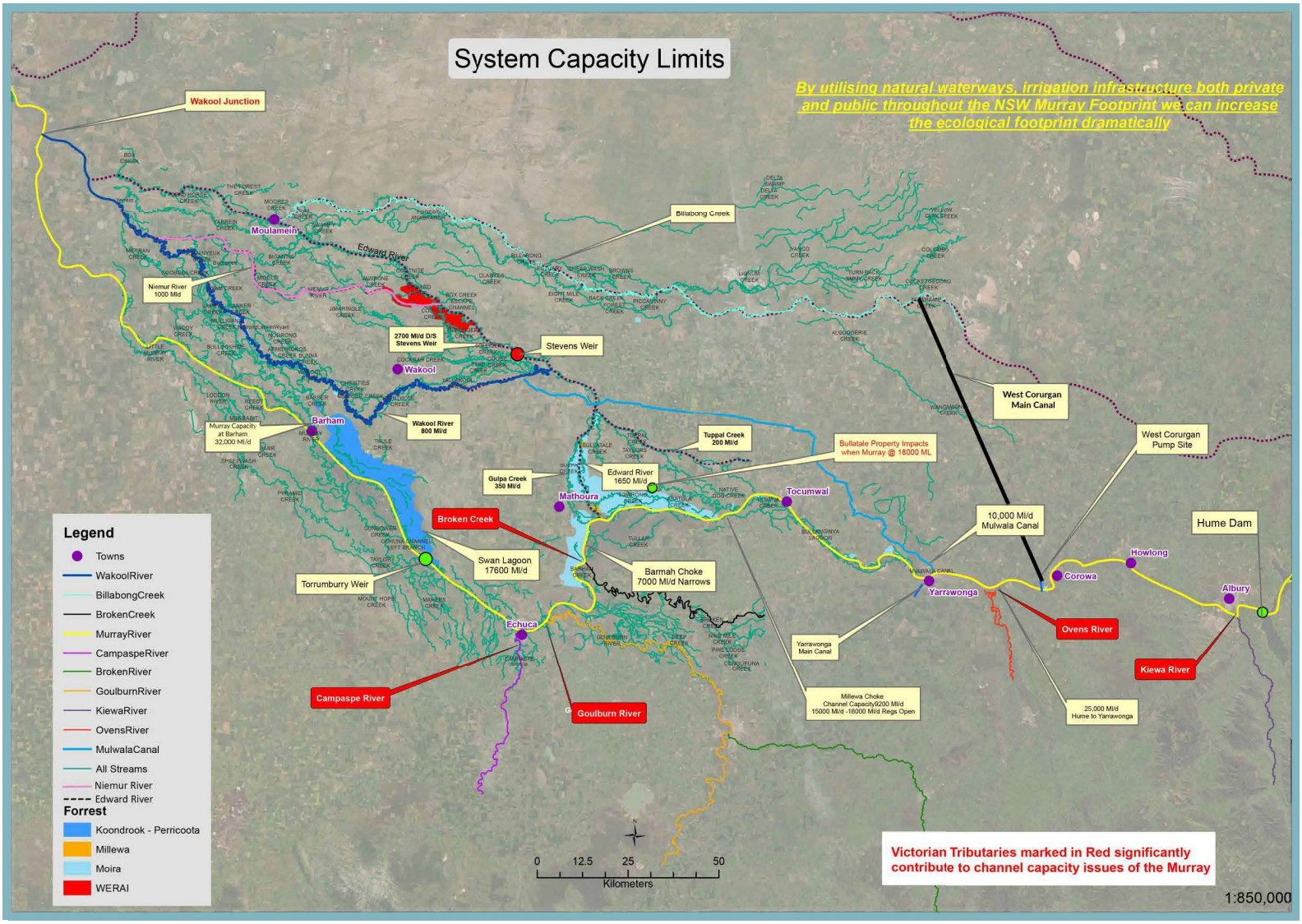
Social-Ecological outcomes through efficient water use for people and nature.

Partnerships for Pathways to Positive Water Outcomes:

- Review and improve existing water delivery options to maximise environmental and operational outcomes
- Community led partnerships to identify relevant risks and opportunities within the maximum flow limits, identified in the Yarrawonga to Wakool Junction Constraints Management Strategy Business Case (up to 25,000 ML/d)
- Increase opportunities for enhancing and expanding the ecological footprint; delivery of environmental and operational water using private and public infrastructure
- Enabling *Positive Pathways* for Murray Valley people working towards broader ecological goals
- Recognition of the social, cultural, economic and ecological importance of maintenance of base flows and connectivity (native refugia, stock and domestic/irrigation surety)
- Increased partnerships for Government/private monitoring of environmental outcomes.

Outcomes:

- Increased ecological footprint through waterway and wetland connectivity throughout the Murray Valley and beyond
- Increased efficiencies for delivery of environmental water on private and public lands using irrigation and private infrastructure, including Murray Valley natural creeks
- Delivering existing operational and consumptive water to address system limitations with reduced losses. Enables increased delivery flexibility and multiple timing potential within diverse delivery systems
- Investments will enable increased flexibility and multiple timing options for delivery of existing operational and environmental water with significantly reduced losses
- Building on established models for success; Governments, communities and landholders working together to achieve ecological outcomes
- Murray River Objective and Outcomes Operational Rules must address increased flood risks from Basin Plan flow objectives and limits of the Central Murray Floodplain Plan. This includes timing, frequency and duration of environmental flows.
- Significant cost benefits to Australian Taxpayers through explicit co-designed and agreed measures with affected parties
- Enhancing cultural outcomes through partnerships and holistic water management
- Strengthened regional economic outcomes for the Murray Valley, riparian landholders, General Security irrigators and Tourism operators
- Plan is consistent with Living Murray objectives that identified infrastructure investments as an effective mechanism to deliver environmental with reduce flooding risks.


System Capacity Limits
By utilising natural waterways, irrigation infrastructure both private and public throughout the NSW Murray Footprint we can increase the ecological footprint dramatically
Wakool Junction
Moulamein
Billabong Creek
Edward River
Niemur River 1000 Ml/d
2700 Ml/d D/S Stevens Weir
Stevens Weir
Wakool
Barham
Murray Capacity at Barham 32,000 Ml/d
Wakool River 800 Ml/d
Tuppal Creek 200 Ml/d
Bullatale Property Impacts when Murray @ 18000 ML
Gulpa Creek 350 Ml/d
Edward River 1650 Ml/d
Mathoura
Tocumwal
Broken Creek
Swan Lagoon 17600 Ml/d
Barmah Choke 7000 Ml/d Narrows
Torrumburry Weir
Echuca
Campaspe River
Goulburn River
West Corurgan Main Canal
West Corurgan Pump Site
10,000 Ml/d Mulwala Canal
Hume Dam
Howlong
Corowa
Albury
Yarrawonga
Ovens River
Kiewa River
Yarrawonga Main Canal
Millewa Choke Channel Capacity9200 Ml/d 15000 Ml/d -18000 Ml/d Regs Open
25,000 Ml/d Hume to Yarrawonga
Legend
Towns
WakoolRiver
BillabongCreek
BrokenCreek
MurrayRiver
CampaspeRiver
BrokenRiver
GoulburnRiver
KiewaRiver
OvensRiver
MulwalaCanal
All Streams
Niemur River
Edward River
Forrest
Koondrook - Perricoota
Millewa
Moira
WERAI
0 12.5 25 50
Kilometers
Victorian Tributaries marked in Red significantly contribute to channel capacity issues of the Murray
1:850,000

Environmental and Operational Flows – Murray Valley

Multiple natural capacity limits exist in the Murray, Goulburn, Edward/ Wakool River systems. Building Community/Government partnerships, valuing local knowledge, recognising risk thresholds and need for adaptive management, is essential to achieving environmental and operational benefits through and within the Murray Valley.

Defining operational and environmental flows is required to avoid third party impacts such as riparian landholders, elevated flooding risks, reliability of Murray General Security entitlement holders, and to appropriately apportion system losses downstream of the Barmah Choke associated with exceeding natural capacities.

- Zone 1 – Hume to Yarrawonga
- Zone 2
  - Murray, Goulburn - Yarrawonga to Torrumbarry
  - Edward River (kolety) offtake - to Stevens Weir
- Zone 3 – Stevens Weir to Wakool Junction

Regional Flood Risks

Major floods occur from multiple scenarios, including singular or combined sources. Managing zonal flood risks is a critical component for managing environmental flows and achieving community participation. The Murray Valley is subject to unique flood risks through -

- Dartmouth and/or Hume Dam releases
- Victorian catchments conditions, e.g. Ovens River (Vic) unregulated flows merging with the Murray River
- Victorian catchment conditions - Goulburn River (Vic) merging with the Murray downstream of Yarrawonga Weir (if Goulburn and Murray Rivers are in major flood, Murray River flows are naturally directed into Edward/Wakool system), with overflows impacting the Wakool and Neimur systems
- Barmah/Millewa and Perricoota/Koondrook forest systems antecedent conditions have the potential to elevate major flood events following environmental watering events, if subsequent significant rainfall occurs, in mountain catchments
- Murray River (Barham capacity limits) – higher or flood flows naturally move north across the floodplain into Edward/ Wakool system once channel capacity is exceeded, including flooding of the Koondrook/Perricoota Forest

Environmental Flow Scenarios

Managing environmental flows in zones 1, 2 and 3 – potential options for community acceptance

- Maintenance of all commercial and base operational flows within existing capacity limits/Barmah Choke rules and natural river bank limitations except where agreement is reached that utilises existing infrastructure.
- Environmental flows and MDBA Pre-requisite Policy Measures (piggy-backing), must be subject to capacity limitations, infrastructure limitations and avoidance of additional flood risks, all conditions required to achieve broad community acceptance
- Zone 1: Hume to Yarrawonga regulated conditions (25,000 ML/d)
- Zone 2:
  1) Yarrawonga to Barmah Millewa retain current regulated conditions (15,000 ML/d)

  2) Investigate additional flow options for Yarrawonga to Barmah Milewa – for environmental purposes only, up to 25,000 ML/d (up to 30,000ML/d for specific events). Not exceeding a combined total Mid Murray/Edward/Wakool flow operational footprint of 25,000 ML/d (operational & environmental).

  3) Additionalflows above 15,000 ML/d are restricted for environmental flow purposes only and protected to the Murray Mouth (SA)

  - ➢ Murray Irrigation offtake – investigate options to deliver environmental flows within channels subject to capacity availability and downstream flow impacts (Edward/Wakool)
  - ➢ Yarrawonga -Stevens Weir (Zone 2) – utilise private and in forest infrastructure opportunities to maximise environmental outcomes, subject to all third-party impacts being fully investigated, addressed and flood risk prevention strategies included in all operational requirements including Murray River operating rules and enacted prior to the event being initiated.
- Zone 3:
  Stevens Weir – Wakool Junction (Zone 3) recognition of restricted flow capacity within zone 3 for Wakool River (800 ML/d), and downstream of Stevens Weir (2,700 ML/d) and Colligen/Niemur River (1,000 ML/d). Investigation of additional infrastructure to maximise environmental flows.

Adaptive Road Map - Concept Plan is an initiative of the Murray Regional Strategy Group - A coalition of water users including: Murray Valley Private Diverters, West Corurgan Private Irrigation, Eagle Creek Pumping Syndicate, Southern Riverina Irrigators, Ricegrowers Association Australia, Murray Irrigation Limited, Yarkuwa, Speak Up Campaign.
The Murray Valley Adaptive Road Map Concept Plan is supported by Murray River Action Group.

Community Supported Environmental Flow Options: Mid-Murray

CURRENT: Murray River Regulated flow conditions: Yarrawonga to Barmah Choke 15, 000 ML/d release from Yarrawonga is managed within Millewa and Barmah choke limitations by operating NSW & Vic in-forest regulators

This flow threshold also achieves connectivity within the system for river channels, creeks and low lying wetlands and providing breeding opportunities for biota, and limits risks of third party impacts.

- Further infrastructure investments can Increase connectivity between main river channel and low-lying wetlands and off-channel habitats (e.g. Millewa/Gulpa Koondrook/Perricoota, Werai), provide breeding opportunities for instream and wetland biota and encourage dispersal, and establishment of permanent wetlands.
- Utilise public & private infrastructure to enhance options for priority and disconnected wetlands, fish passage and to utilise connectivity between main channels and smaller creeks (e.g regulated creeks and ephemeral systems).

Late Winter/Spring releases frequency as required – system maintenance.

OPTION 15,000 – 18,000 ML/d additional environmental release from Yarrawonga managed within Millewa and Barmah Forests by operating NSW & Vic in-forest regulators and through additional infrastructure on public and private land

Flow threshold aimed at a spring pulse to stimulate breeding and dispersal in river and wetland biota, (e.g. flow specialist fish). Pulse event to stimulate breeding of flow dependent fish species and increase connectivity to forest wetlands and reconnection events for low lying wetlands.

- Infrastructure investment required such as, maintaining property access, functions of farm fixtures (e.g. pumps, roads etc).
- Use private infrastructure to maximise river channel connectivity to Edward River and/ or creeks and wetlands and encourage biota breeding and dispersal.

Late Winter/Spring releases; Non annual and to be negotiated.

OPTION: 18,000 - 25,000ML/d an environmental release from Yarrawonga to achieve significant ecological benefits in Barmah/Millewa, Perricoota/Koondrook, Werai forests and associated wetlands within the system, initially done in 2000ML/day increments from 18000ML/ day to assess flooding and associated third party impacts. Investigation for any additional short pulsed environmental flows to a maximum of 25,000 ML/d (up to 30,000ML/d for specific events), is conditional on Governments recognition of antecedent flooding risk conditions to private property, Murray, Edward/Wakool System. Governments must ensure flood risk avoidance to prevent private property impacts in the Murray, Edward/Wakool system**

Flows are aimed at watering of off-channel habitats including key large forest wetland sites (Millewa, Koondrook/Perricoota, Werai,). Regional Flooding risks are significantly increased and must be recognised and prevented, including direct engagement with effected parties.

- Increase connectivity between river channels and forest wetlands, enhance breeding opportunities for river and wetland biota (e.g. wetland fish colonial nesting birds).
- Investigation of additional in-forest infrastructure to maximise environmental outcomes.
- Infrastructure investment required such as, maintaining property access, functions of farm fixtures (e.g. pumps, roads etc).
- Zone 2 & 3 impacts need to be carefully considered and negotiated with relevant parties.

Late Winter/Spring; Non annual event and to be negotiated. **30,000ML/d for specific events

Non-irrigation Winter Base Flows in main river channels

These flows are aimed at maintaining connectivity in the larger river channels (e.g. Murray, Edward) within the drying phase period for river banks and wetlands. Encourage breeding of winter active biota (e.g. Murray Crayfish). Consultation with community on timing, duration and frequency to open system infrastructure to allow flowing environments and translucent flows to occur.