Operational scenarios for the delivery of

WATER FOR THE ENVIRONMENT

River Murray 2021-22

Australian Government

NSW GOVERNMENT

Government of South Australia

VICTORIA State Government

We acknowledge and pay respect to the traditional owners of the River Murray and their Nations for their cultural, social, environmental, spiritual and economic connection to the lands and waters. We recognise traditional owner knowledge and cultural values in natural resource management and will work closely with them to help heal the land, country and peoples.

Healthy Rivers - Caring Communities

Water for the Environment

– Planning for outcomes in year 2021-22

This map reflects the amount of water for the environment potentially available to support environmental outcomes at key sites along the River Murray in 2021-22.

The volume identified at each site is represented as a range, as the scale of the watering is determined by climate conditions, the contribution of natural flows and environmental water availability at that time.

Each year, environmental water holders work with river operators and communities to plan for all weather and climate scenarios. Water for the environment can be reused many times to target multiple sites as it flows along the River Murray.

NOTE: This is not a complete list of watering actions or sites where water for the environment will be delivered in 2021-22. There are many smaller scale or complementary waterings that will also occur.

K	**River Murray – Lower reaches:** 620 – 700 gigalitres
	Increase availability of faster flowing habitats
	Support spawning and development of golden and silver perch
	Improve condition of riverbank and wetland vegetation
	Better regulate temperature ranges in weirs to help alleviate harmful algae blooms

J	**Pike and Katarapko Floodplains:** 4 – 30 gigalitres
	Maintain and establish wetland vegetation
	Restore native fish populations
	Support waterbird breeding
	Improve ecosystem productivity and processes

H	**Lindsay, Mulcra and Wallpolla Islands:** 15 gigalitres
	Improve wetland vegetation condition
	Improve wetland productivity
	Improve habitat conditions for waterbirds
	Support native fish breeding and populations

L	**Lower Lakes, Coorong and Murray Mouth:** 780 – 960 gigalitres
	Support native fish breeding, distribution and migration
	Support aquatic and riverine vegetation including *ruppia tuberosa* in the Coorong
	Maintain waterbird habitat and support waterbird populations
	Export salt from the Murray River to the sea

I	**Chowilla Floodplain:** 11 – 94 gigalitres
	Improve wetland vegetation condition
	Improve condition of river red gum and black box forests
	Support waterbird breeding
	Improve habitat conditions for native animals

M	**Lower Darling / Baaka and the Great Darling Anabranch:** 55 – 240 gigalitres
	Increase connectivity between the northern and southern Basins
	Support native fish health, habitat, breeding and movement into the River Murray
	Improve riverbank vegetation

G	**Hattah Lakes:** 47 – 150 gigalitres
	Maintain vegetation and support new growth
	Improve wetland health
	Support native fish breeding
	Support waterbird breeding

C	**Murrumbidgee River flows into the River Murray:** 280 – 295 gigalitres
	Support native fish breeding and movement
	Improve wetland and fringing vegetation

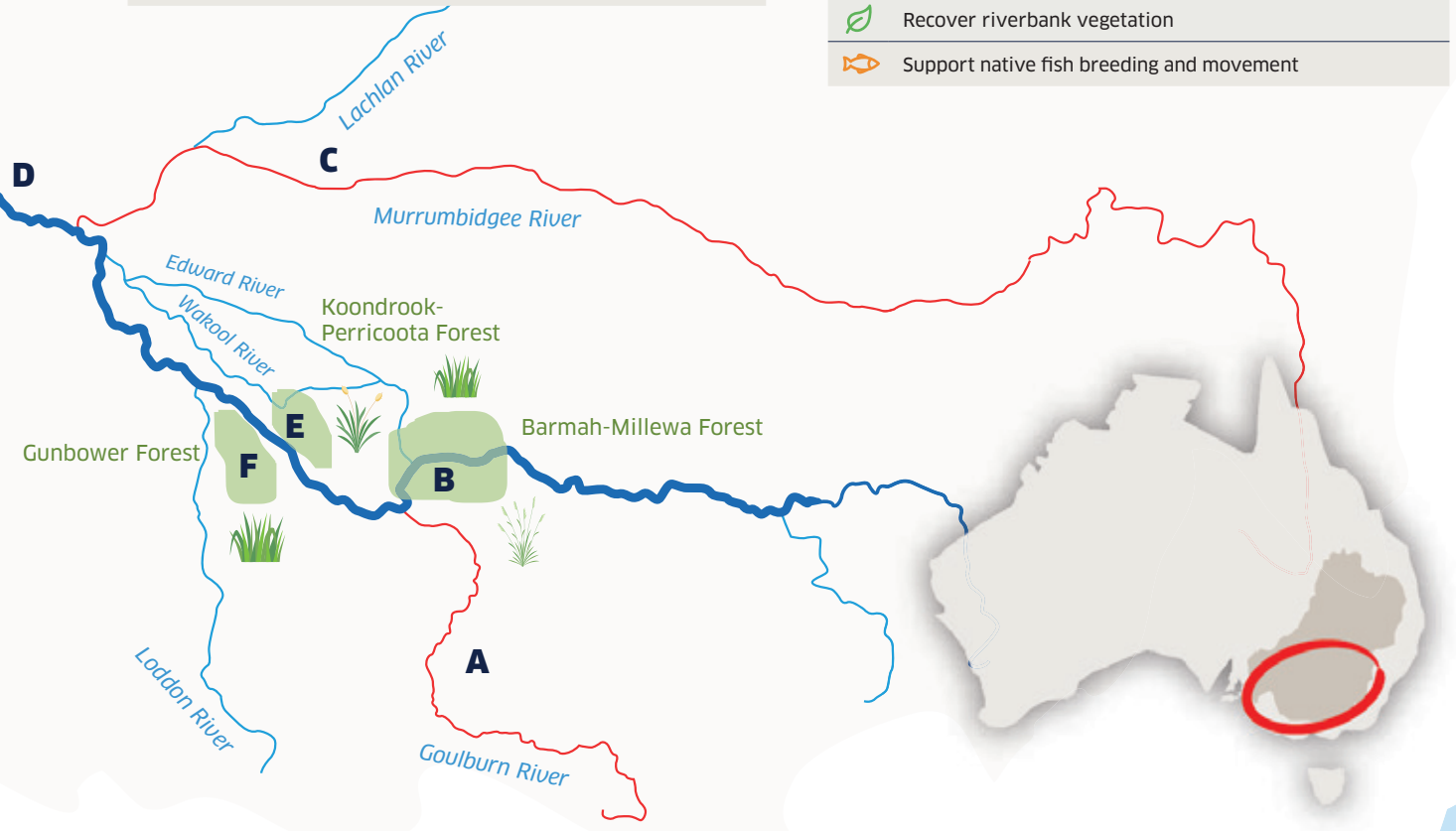
D	**River Murray – Upper to mid reaches:** 300 – 500 gigalitres
	Connect the River Murray from headwater storages to the river mouth
	Support native fish habitat, breeding and movement
	Improve riverbank vegetation
	Improve system productivity and ecosystem health

E	**Koondrook-Perricoota Forest:** 10 – 30 gigalitres
	Improve wetland vegetation condition
	Improve condition of fringing river red gums
	Support waterbird habitat

F	**Gunbower Forest:** 40 – 60 gigalitres
	Improve condition of river red gums and other flood-dependent vegetation species
	Improve wetland vegetation condition and productivity
	Maintain native fish habitat
	Support waterbird breeding

B	**Barmah-Millewa Forest:** 170 – 500 gigalitres
	Improve wetland vegetation condition
	Improve condition of floodplain marsh and low-level river red gum in wetter conditions
	Support Murray cod and golden and silver perch breeding
	Support waterbird breeding

A	**Goulburn River flows into the River Murray:** 112 – 400 gigalitres
	Recover riverbank vegetation
	Support native fish breeding and movement



Tributary environmental flows from the Goulburn, Murrumbidgee and Lower Darling rivers are coordinated with flows in the River Murray to improve system-wide outcomes for native fish, vegetation, and waterbirds by delivering seasonal flows and connecting the rivers with floodplains and wetlands.

2021-22 Outlook for Held Environmental Water	Extreme dry 99%	Very dry 90%	Moderate 75%	Near average 50%	Wet 25%
Water for the environment availability	1,370 GL	1,570 GL	2,180 GL	2,370 GL	2,540 GL

Note: Percentages reflect estimates (annual exceedance probability) for inflows into the River Murray System

Volumes for sites can not be added up to determine the total volume of water for the environment available as water is often used and reused across sites. An increase in volume is often associated with wetter conditions but could also result in a scenario where conditions can meet the environmental objectives and therefore less is needed from a water for the environment allocation.

Scientific monitoring informs decision-making

The scientific monitoring of ecological responses provides information about how the health of environmental sites are tracking, and this information is used to improve the planning and delivery of water for the environment.

Below is a snapshot of the monitoring that is undertaken across the southern Murray-Darling Basin, focusing on selected sites, known as The Living Murray Icon Sites. Icon site grades, ranging from A-D, will vary over-time and between years, to reflect changing environmental conditions and the targeted delivery of water for the environment. Looking at trends across water years is important to our operational scenario planning.

We have gathered more than 12 years of ecological monitoring which shows that where we have been able to deliver water for the environment and operate environmental works, the health of rivers, wetlands and floodplains are improving. For more information visit the Murray-Darling Basin Authority website.

Arrows represent where site grades have improved or declined between 2018-19 and 2019-20.

	Barmah-Millewa Forest	Gunbower Forest	Koondrook-Perricoota Forest	Hattah Lakes	Lindsay-Mulcra-Wallpolla Islands	Chowilla Floodplains	Lower Lakes, Coorong, Murray Mouth
2019/20	B	B	D	A	B	C	C
2018/19	B	A	D	B	B	B	C
2017/18	A	B	D	A	B	B	C
2016/17	A	B	C	A	B	B	B
2015/16	B	B	D	A	B	C	C
2014/15	B	B	D	A	N/A	C	B
2013/14	C	B	D	B	C	C	B
2012/13	C	B	D	C	C	C	B
2011/12	C	C	D	B	B	C	B
2010/11	B	B	D	C	C	B	D
2009/10	C	C	D	D	D	C	D
2008/09	D	C	D	D	D	C	D

Environmental works/works used

Flooding year

GRADES				
A	B	C	D	E
Excellent	**Good**	**Fair**	**Needs attention**	**N/A**
Most (75-100%) of ecological objectives have been met.	More than half (50-74%) of ecological objectives have been met.	Fewer than half (25-49%) of ecological objectives have been met.	Few (0-24%) of ecological objectives have been met.	

Water for the Environment

Water for the environment is water allocated and managed to improve the health of the rivers, wetlands and floodplains across the Murray-Darling Basin.

Priorities for coordination in 2021-22:

- increase engagement with First Nations to improve two-way knowledge sharing and increase understanding
- coordinate delivery of water for the environment between the River Murray and its tributaries in spring to maximise system-scale environmental outcomes
- use and reuse water for the environment across the southern Murray-Darling Basin to:
  - support Ramsar-listed wetlands of international significance
  - improve ecological health and resilience of dozens of rivers, wetlands and floodplains after several dry years
  - increase flows in the Lower Darling (Baaka) for native fish recovery and to support the movement of native fish from Menindee Lakes into the Murray River
  - support flows for the continued recovery of the Coorong at the mouth of the Murray-Darling Basin in South Australia

Best practice, best science, maximises results

Environmental water holders and river operators work together year-round to adjust to changing conditions and capitalise on opportunities as they arise.

Tough decisions are made to ensure the most effective use of water for the environment and where possible, water is reused at multiple sites along the River Murray.

Watering events can also be delivered alongside operational flows to maximise the benefits for both the environment and Basin communities.

Using adaptive management, plans are continually updated to reflect the best science and knowledge.

Strengthening relationships

Improved transparency and a growing understanding of the importance and value of water for the environment is helping environmental water holders build strong relationships with First Nations, river communities and landholders.

Environmental water holders are working with First Nations to support two-way learning and build capability. Working together with First Nations in the planning and delivery of water for the environment will help to protect and heal river Country and strengthen environmental outcomes.

Consultation and feedback between water for the environment agencies, river operators, First Nations, river communities, landholders, scientists, technicians, and engineers inform each year's annual planning and inform delivery decisions.

We're in this together

Australian Government
Department of Agriculture, Water and the Environment

Australian Government
Commonwealth Environmental Water Office

Australian Government
MURRAY–DARLING BASIN AUTHORITY

NSW Government
Planning, Industry & Environment

Government of South Australia
Department for Environment and Water

VICTORIA State Government
Environment, Land, Water and Planning

VICTORIAN ENVIRONMENTAL WATER HOLDER

For more information, go to the Southern Connected Basin Environmental Watering Committee's page at www.mdba.gov.au or visit the website of the environmental water holder agencies.