

Environmental Flows: An essential piece in the IWRM puzzle

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*Webinar on Environmental Flows:
Harmony between Humans & Nature
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Multiple Pressures on Aquatic Ecosystems

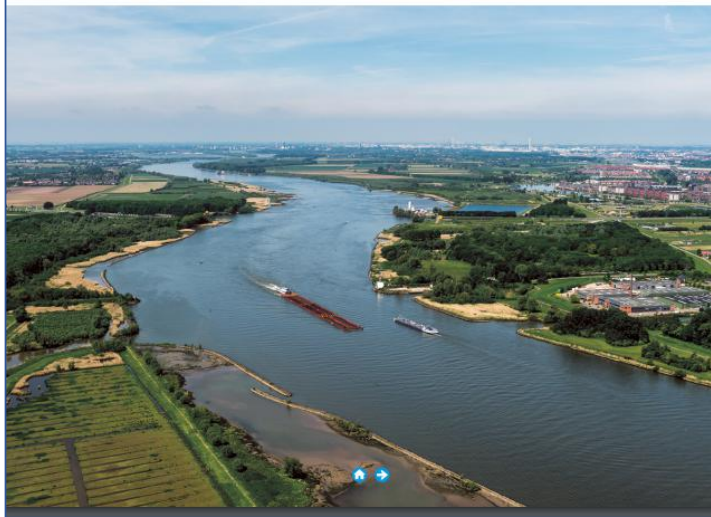
- *Pollution*
 - Agricultural
 - Urban
 - Industrial
- *Habitat Destruction & Fragmentation*
 - River training
 - Wetland drainage
- *Over exploitation*
- *Invasive Species*
- *Flow and Level Alteration*

Environmental Flows



Rijkswaterstaat
Ministerie van Infrastructuur en Milieu

River Basin Management Plans
Stroomgebiedbeheerplan Maas
2016-2021



Assessment

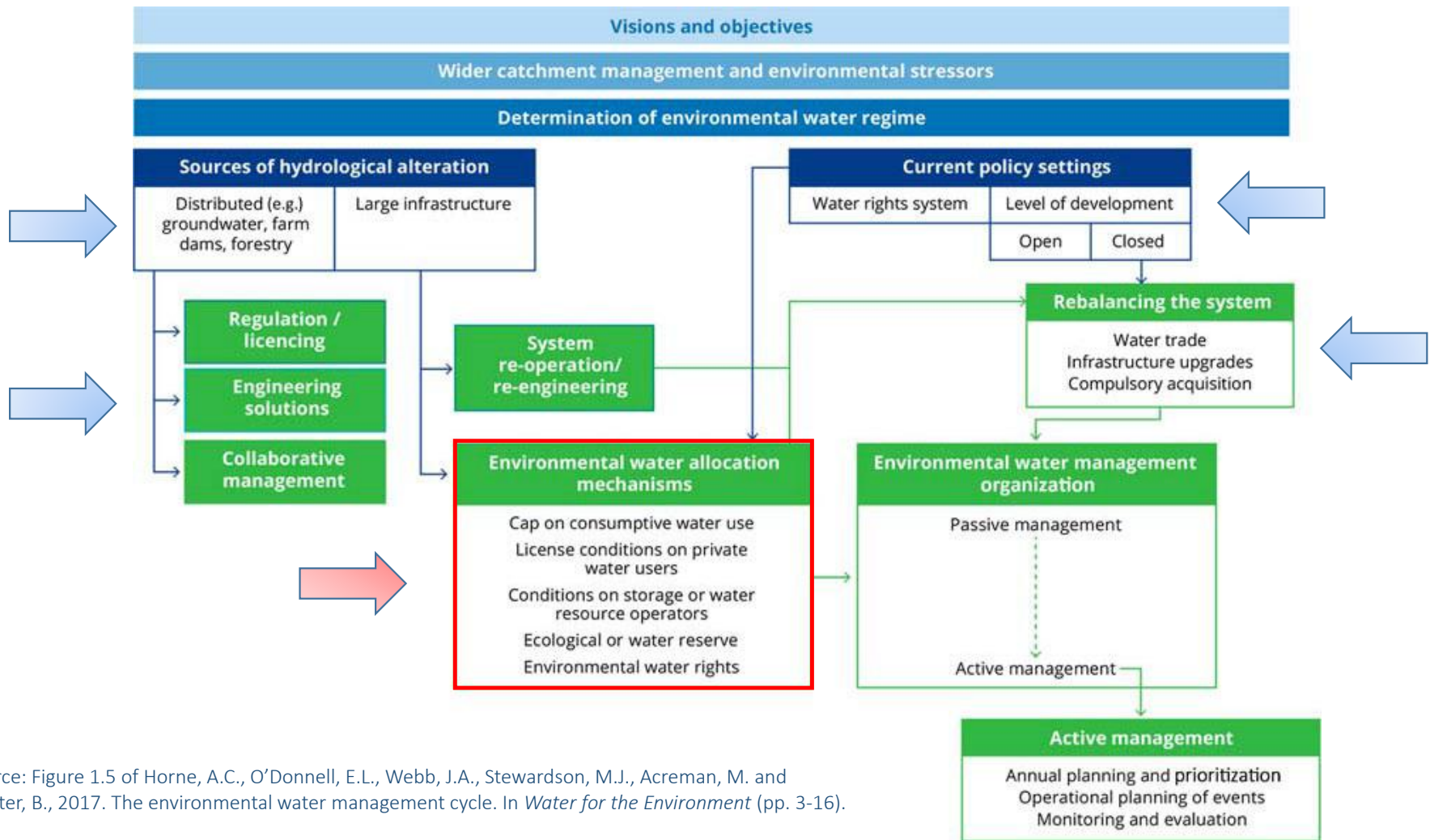
- Physical description of the basin;
- Land use inventories;
- Current water use inventory;
- Pollution source inventories;

• **Aquatic and terrestrial ecosystem needs;**

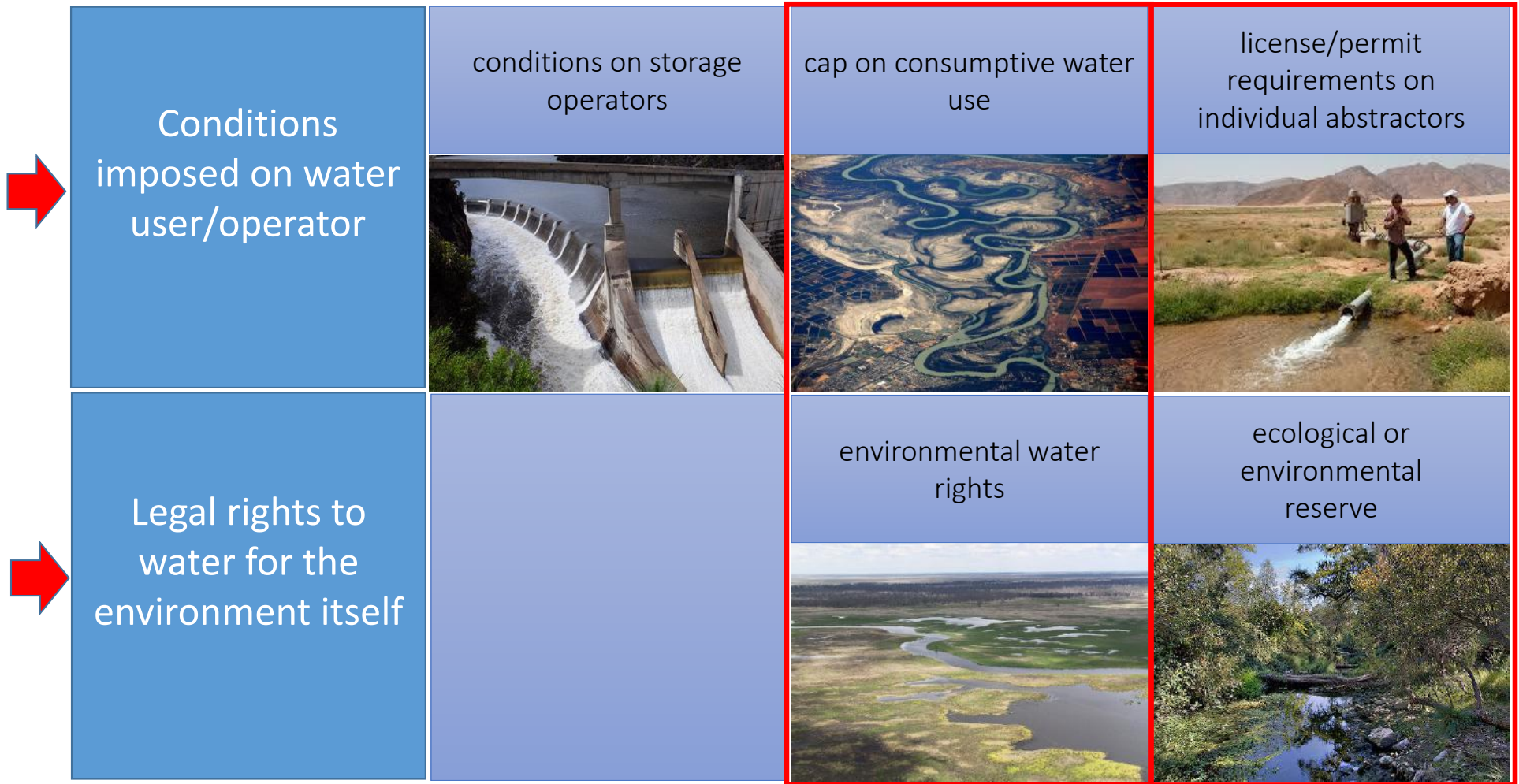
- Vulnerability to floods or extreme events;
- Identification of stakeholders;
- Implications of changing land use;
- Identification of priority issues;
- Short- and long-term goals for the river basin;
- Water related development scenarios;
- Water allocation and water quality objectives;

Measures & Instruments

- Strategy, measures and action plan for achievement of goals with fixed time lines;
- Financing and economic instruments;
- Responsibility and schedule for implementation;
- Mechanisms for monitoring and updating.



Source: Figure 1.5 of Horne, A.C., O'Donnell, E.L., Webb, J.A., Stewardson, M.J., Acreman, M. and Richter, B., 2017. The environmental water management cycle. In *Water for the Environment* (pp. 3-16).



Horne, A.C., O'Donnell, E.L. and Tharme, R.E., 2017. Mechanisms to allocate environmental water. In *Water for the Environment* (pp. 361-398).

Conditions on storage operators

STORAGE (RECORDED DATE)	STORAGE CAPACITY (ML)	CURRENT VOLUME (ML)	PERCENT FULL %	NET CHANGE IN PAST WEEK %
Nepean Dam <i>Saturday 02 December</i>	67,730	48,673	71.9	-0.7

LATEST ENVIRONMENTAL FLOW RELEASES

Nepean Dam ▼

Today's requirements
16 ML

Past week
143 ML

Past year
9,578 ML

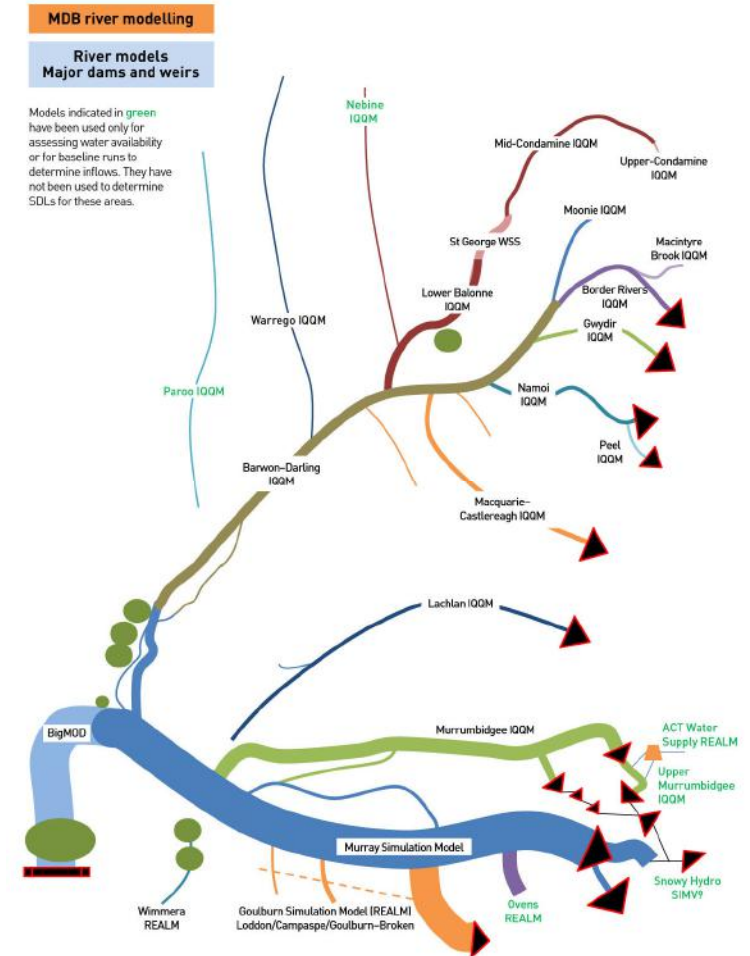
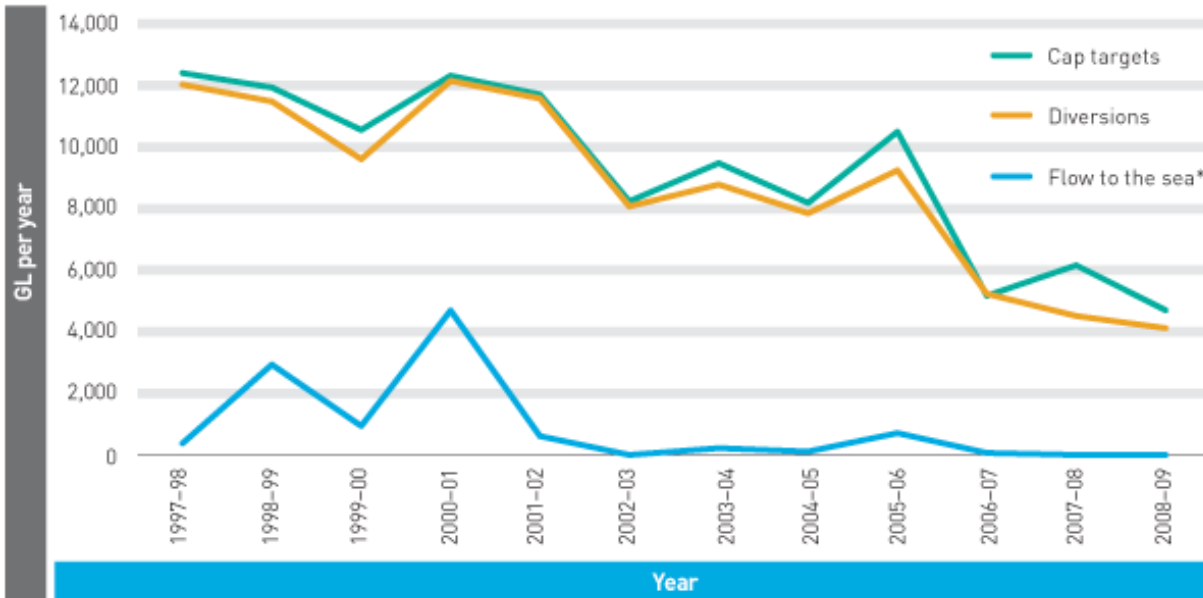


Source: Water New South Wales, Australia

<http://www.watarnsw.com.au/supply/dam-levels/greater-sydneys-dam-levels>

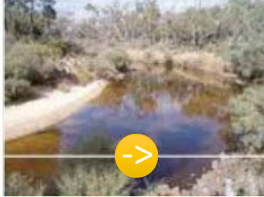
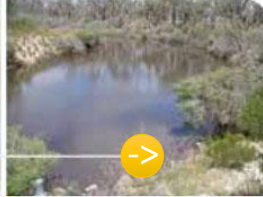
Caps on consumptive water use

“The volume of water that would have been diverted under 1993/94 levels of development”.

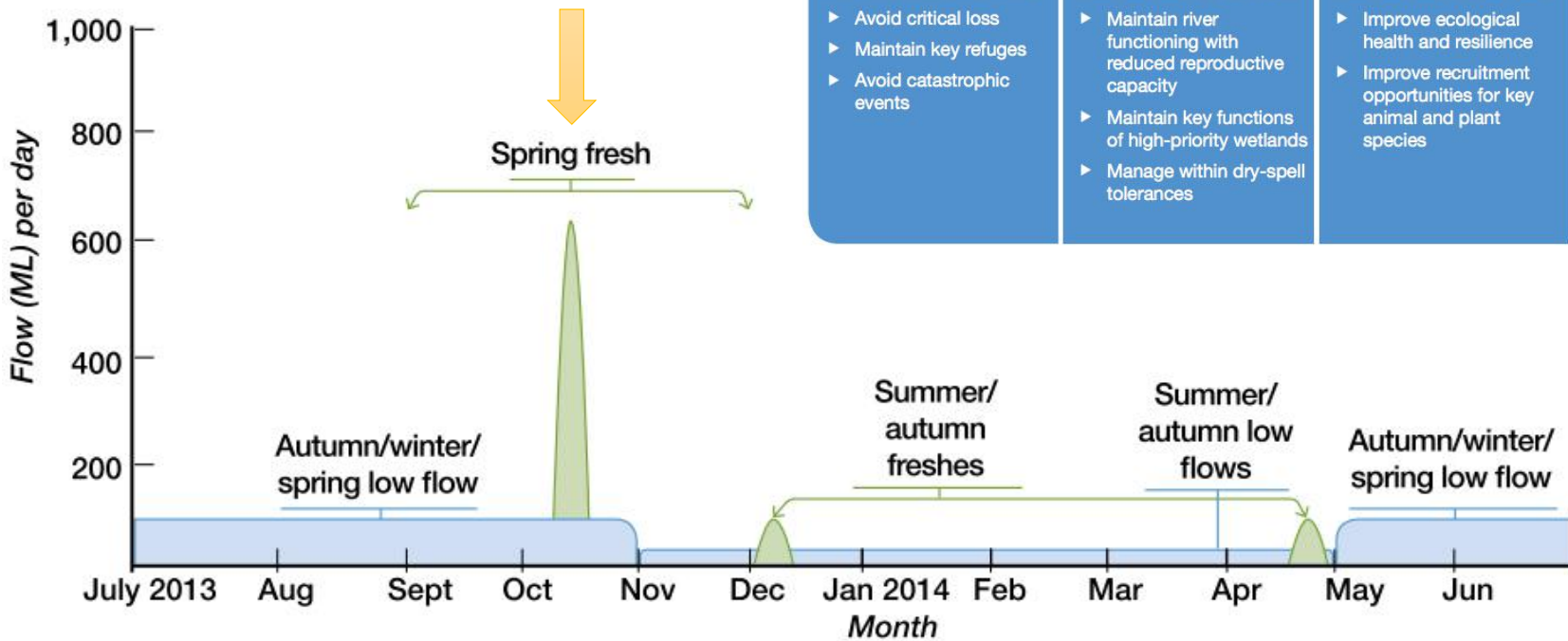


<https://www.mdba.gov.au/news/modelling-future-flows-managing-basin%E2%80%99s-water>

Environmental water rights

			
Drought Main objective: PROTECT <ul style="list-style-type: none"> ▶ Avoid critical loss ▶ Maintain key refuges ▶ Avoid catastrophic events 	Dry Main objective: MAINTAIN <ul style="list-style-type: none"> ▶ Maintain river functioning with reduced reproductive capacity ▶ Maintain key functions of high-priority wetlands ▶ Manage within dry-spell tolerances 	Average Main objective: RECOVER <ul style="list-style-type: none"> ▶ Improve ecological health and resilience ▶ Improve recruitment opportunities for key animal and plant species 	Wet to very wet Main objective: ENHANCE <ul style="list-style-type: none"> ▶ Restore key floodplain and wetland linkages ▶ Enhance recruitment opportunities for key animal and plant species

Loddon River in Victoria, Australia



Doolan, J.M., Ashworth, B. and Swirepik, J., 2017. Planning for the active management of environmental water. In *Water for the Environment* (pp. 539-561).

Ecological or environmental reserve

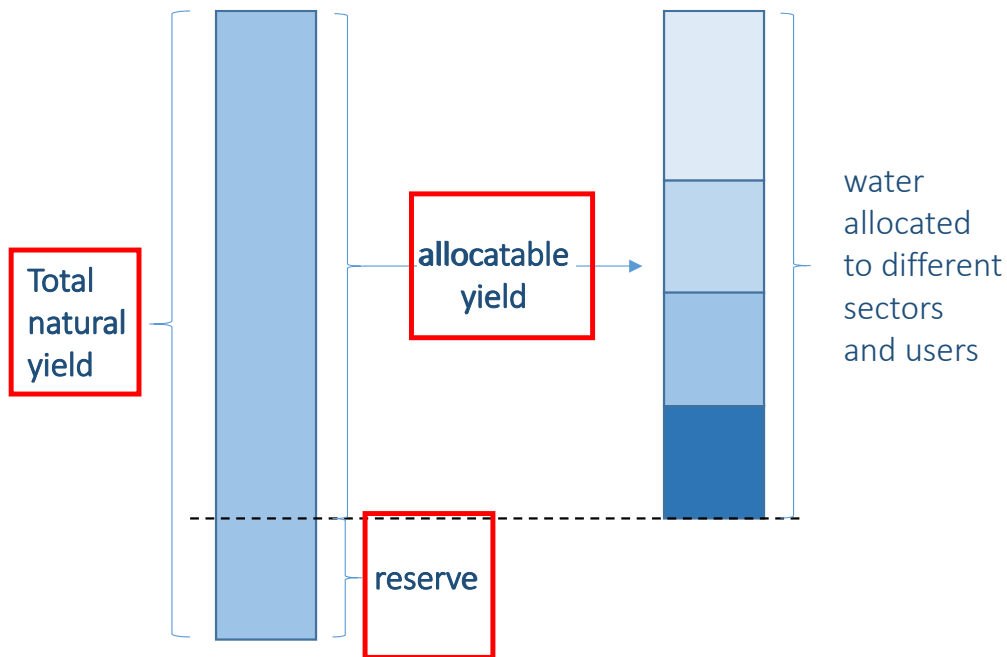


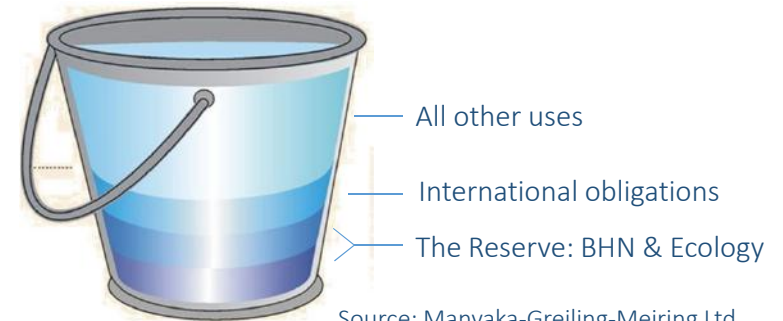
Illustration modeled after one in Speed et al. (2013) Basin Water Allocation Planning. Principles, procedures and approaches for basin allocation planning, UNESCO, Paris.

Republic of South Africa Water Act 1998

"Reserve" means the quantity and quality of water required –

(a) to satisfy basic human needs by securing a basic water supply, as prescribed under the Water Services Act, 1997 (Act No. 108 of 1997), for people who are now or who will, in the reasonably near future, be - (i) relying upon; (ii) taking water from; or (iii) being supplied from, the relevant water resource; and

(b) to protect aquatic ecosystems in order to secure ecologically sustainable development and use of the relevant water resource



Source: Manyaka-Greiling-Meiring Ltd

Main Messages

- Environmental flows are a standard, but essential, tool in Integrated Water Resources Management.
- They address the pressure of water flow and level alteration, which no other tool addresses.
- Eflows are determined in the planning process and delivered through measures and instruments appropriate for the given policy setting and source of alteration.
- Imposing conditions on water users or operators and establishing a legal right to water for the environment are possible environmental water allocation mechanisms.

License and permit requirements for individual users

