

Returning the lifeblood to rivers

A quiet revolution has taken place in our understanding about the fundamental role that rivers play in healthy landscapes and productive local communities. The emerging science of environmental flows is providing overwhelming evidence of the damage inflicted on Australian rivers and estuaries, and is now developing solutions to restore river environments. These advances underpin new national policy and regional action plans aimed at restoring and protecting the country's rivers and estuaries.

For centuries we have taken the health of rivers and creeks for granted: damming, re-directing and draining their waters for our immediate needs. In recent years, alarm signals from deteriorating riverine habitats have awoken us to the importance of the natural flow cycles of rivers to their surrounding ecosystems.

As less (but often more degraded) water reaches them, fundamentally altered river habitats have had knock-on effects to water quality, wetlands and dependent plants and animals. In turn, this has affected the wider health of our catchments, with implications for local communities. We've been forced to acknowledge the need for naturally timed, clean, and ample flows in our waterways, and have begun to work out and negotiate how best to restore them.



Irrigation and river flows need to be balanced. CSIRO Land & Water

What are environmental flows anyway?

Riverine ecosystems rely on natural water flow cycles to maintain the diversity of habitats, plants and animals, and their interactions, which characterise the ecosystems themselves. Where natural flow cycles have been modified, environmental flows can be provided by releasing water from storages, by protecting in-channel



Sunset on the Murray River near Mildura, Victoria. Willem van Aken

flows from pumping or diversion, or through other mechanisms that provide the flows needed to sustain river ecosystems. It's not just the timing, volume, duration and variability of flows that are critical, but also the quality, temperature and chemical characteristics of the released water are important.

The planning and management of environmental flow volumes is scientifically complex, requiring a detailed knowledge of ecosystems. In tandem, careful and sensitive consultation of the water needs of associated communities is required.

Fortunately, where once releases of river water were seen by some as a waste of a precious resource, their vital role in the health of local ecosystems is slowly becoming more widely recognised. By extension, adequate river flows – particularly where the Murray-Darling is concerned – have an indirect but significant bearing on regional economies and livelihoods through sustaining healthy riverine habitats.

Driving this raising of awareness has been the mounting evidence of the environmental consequences of the way we have developed water resources. In

Fortunately, where once releases of river water were seen by some as a waste of a precious resource, their vital role in the health of local ecosystems is slowly becoming more widely recognised.

response, and to address growing calls for action from accumulated research, national programs have been established to understand and tackle our water priorities.

The National Water Initiative, the water management action agreement by the Council of Australian Governments (COAG), the National Action Plan for Salinity and Water Quality, targeting our major catchment areas, and the Natural Heritage Trust, established by the federal government to provide funding to environmental priorities including water management, are some major programs central to the current efforts to integrate environmental flows concepts and action across Australia's most stressed inland

P r o g r e s s

The benefits of environmental flows

- Provides soil moisture for healthy plant life, improving riverbank and floodplain vegetation, which in turn helps stabilise river banks and prevent bank erosion;
- Moves carbon (from decomposing material) between floodplains and wetlands – a key factor for healthy rivers and their food webs;
- Stimulates native fish to migrate and breed, or to move onto floodplains to feed;
- Stimulates invertebrate eggs to hatch and plant seeds to germinate;
- Provides downstream food, breeding and migration cues for estuarine and marine fish and shellfish at the end of catchments;
- Sufficient deep and enduring flows enables water birds to nest and raise fledglings;
- Replenishes aquifers and flushes salty and stale water left in wetlands and billabongs after evaporation;
- Where high flows are concerned, replenishes floodplain habitats by depositing soil and nutrients, and stimulating vegetation as food for native and domestic animals.



Dry and exposed banks of the Lachlan River, Hillston, NSW. Credit: Greg Heath

waterways. Associated with these programs, more concentrated initiatives – such as the Water for a Healthy Country Flagship initiated by CSIRO and the *Living Murray* program under the Murray-Darling Basin Commission – are helping to focus efforts regionally.

River states

According to a recent *National Land and Water Resources Audit*¹ report, one-third of Australian rivers are in extremely poor condition. While the health of rivers varies greatly across the continent, the most stressed systems generally correspond to the intensively settled and utilised regions. As such, our southern rivers have been the worst affected. Most major ones have been dammed, and many smaller ones are

diverted by weirs or pumped, their water heavily allocated to land-based activity. Remaining flows are often degraded with sediment or excessive chemical loads carried down in runoff from the land.

The rivers and associated ecosystems of the economically important Murray-Darling basin are a high profile case in point, but they are now the new frontier of encouraging, cooperative efforts to better manage river ecosystems, and assure the sustainability of rural communities.

Australia's northern river systems hold 70% of our water resources and are by contrast 80% free flowing, mostly due to their isolation. There are exceptions, however, such as the Ord River catchment in the Kimberley region of Western Australia, where a vast irrigation scheme serving intensive cropping and water infrastructure subverts the natural flow cycle,

and increasingly, the quality of the Ord and its tributaries.

With growing calls for immediate planning and legislation to safeguard the health of northern rivers against ensuing development, The National Rivers Consortium of Land & Water Australia is now assessing such measures, although trading-off the future economic needs of developing regions with environmental priorities will constantly be politically challenging.

Moving forward

We are only just acknowledging that imposing intensive European agricultural practices on a landscape highly adapted to water scarcity and variability has caused big problems for river systems. Modifying entrenched water use systems and agricultural practices is complicated and requires a multi-faceted approach. The national and regional programs are addressing this through communication of ecological understanding and priorities, community consultation, research partnerships and on-ground action plans.

The issue of negotiating changes to water allocations for increased environmental flows, however, has often been the last to be addressed given the direct relationship of water use to agricultural revenues and local livelihoods. With dire river and land conditions becoming more obvious, there is increasing comprehension that both more efficient irrigation and increased water allocation for flows are required to maintain the health of rivers.

The evolving science of environmental flows, therefore, which aims to underpin the ecological needs of Australia's major river systems, is working alongside the broader needs of the community and industry to achieve a healthy and liveable environment. We have just begun the steps to that goal, and as regional participation in restorative initiatives expand, the long-term productivity of our national river systems has a chance of being ensured for future generations to enjoy.

There will be further coverage of Australia's water initiatives in subsequent issues of *Ecós*.

More information:

Federal Environmental Flows initiatives:
www.deh.gov.au/water/rivers/nrhp/flows/
 A social perspective on flows:
www.alga.asn.au/newsRoom/speeches/JP20030710.php
 'The Darling', Murray-Darling Basin Commission: www.mdbc.gov.au/

¹ <http://www.nlwra.gov.au/>