



NATURE CONSERVATION REVIEW: FRESHWATER ECOSYSTEMS

Six years in the making, the VNPA's fourth Nature Conservation Review, Natural Victoria – Conservation priorities for Victoria's natural heritage, 2014 was released.

Chapter 4 (approx. 40 pages, fully referenced) synthesises information from scientific, government and community sources. It focuses on freshwater habitats – rivers and streams, wetlands and aquifers – and on ecosystems dependent on freshwater, in particular riparian (streamside) and floodplain habitats.

The chapter describes the natural values of Victoria's freshwater ecosystems and the major habitat types; characterises important ecological processes, particularly natural flow regimes; describes the current state of biodiversity and habitats in freshwater ecosystems; outlines major threats, in particular disruptions to flow regimes and degradation of freshwater habitats. Finally, it identifies gaps and priority reforms for policies and programs in six major areas: environmental flows, riparian habitats, freshwater protected areas, wetlands, groundwater and catchment management. Thirty detailed recommendations are made.

FRESHWATER SNAPSHOT

- Freshwater ecosystems are the most threatened on earth.
- For the richness of life they sustain, the refugia they provide in dry times and their contributions to the health and productivity of other ecosystems, Victoria's freshwater ecosystems have immense ecological value.
- Many rivers, wetlands, riparian zones and floodplains are suffering the effects of flow regulation that reverses natural seasonal patterns, suppresses floods essential for floodplain health, leaves too little water for essential ecological functions and imposes barriers to natural migrations and dispersals.
- Close to half or more of Victoria's native fish, frog and crayfish species are threatened. A quarter of wetlands have been destroyed and many others have been degraded. Freshwater ecosystems are also damaged by catchment activities such as land clearing, grazing in riparian zones, introduction of invasive species and nutrient enrichment.

- Most Victorian wetlands have been lost or substantially degraded. The latest Victorian survey of the condition of rivers and streams found that less than one quarter (23%) of river length was in good or excellent condition and close to one-third (32%) was in poor or very poor condition, with the remainder (43%) in moderate condition.
- Freshwater habitats are present on a massive scale in Victoria, both above and below ground. Victoria has 3820 named watercourses extending 56,000 kilometres, as well as many un-named tributaries and streams. Victoria has an estimated 23,739 natural wetlands. Subterranean groundwater ecosystems are extensive across Victoria, yet despite comprising about 15% of Victoria's total water use and extraction, their full extent and condition is unknown.

KEY THREATS TO FRESHWATER ECOSYSTEMS: SUMMARY

Changes to natural flow regimes in surface water

In more than half of Victoria's 29 river basins, fewer than 20% of rivers have healthy flow regimes. In some years, over three-quarters of the total flow is harvested from a quarter of Victoria's river basins. In such heavily regulated systems, extensive overbank flooding essential for floodplain health occurs only in rare extreme flood events.

The impacts are profound and multi-faceted, resulting in loss or degradation of aquatic, riparian, floodplain, estuarine and groundwater habitats. Almost half of Victoria's high-value wetlands and a third of other wetlands are threatened by compromised flows, most due to changed flow regimes in their source rivers.

Exploitation of groundwater

Groundwater comprises about 15% of Victoria's total water use and extraction is increasing, often in the absence of a sound understanding of sustainability and needs of groundwater-dependent ecosystems. The

physical and functional connections between surface water and groundwater mean that flow changes affecting one are also likely to affect the other.

Loss of groundwater volume reduces habitat and diminishes contributions to river baseflows and wetlands. A recent wetland assessment found that a quarter of wetlands fed by groundwater had an altered flow regime. The converse – excessive recharge due to irrigation and replacement of deep-rooted native vegetation with shallow-rooted crops and pasture – is also a problem, leading to dryland salinity.

Loss and degradation of habitats

Grazing severely threatens riparian and floodplain habitats and wetlands, driving vegetation loss, land degradation and poor water quality. Cattle trampling and grazing destabilises the banks of wetlands and waterways and promote erosion. Cattle spread weeds, and damage and prevent regeneration of native vegetation. Cattle dung and urine are a source of nutrients and, in combination with increased turbidity; they degrade water quality and promote the growth of algae and pathogens, which are a problem for human health as well as biodiversity.

Damage caused by excavation (dredging, draining), infilling, vehicles and recreation (as well as grazing and land clearing) threatens wetland and riparian areas. More than a third of high-value wetlands assessed in 2009- 2011 had had vehicles driving on them, and more than a quarter of high-value wetlands and almost half of the 'representative' wetlands assessed had been excavated in some way.

Dysfunction of biological interactions

Many introduced animals, plants and pathogens threaten freshwater biodiversity, and the extensive modification of freshwater habitats by altered flow regimes, clearing and grazing aids their spread. These threats include introduced fish species. The impacts of invasive fish include domination of habitat and exclusion of native fish, predation of native fish and frogs, damage to aquatic habitats and spread of disease

Feral animals and weeds

More than 250 environmental weeds are invading riparian vegetation in Victoria. Feral deer, pigs and horses can severely damage wetlands and riparian areas, many of their impacts similar to those of cattle – vegetation damage, decline of particular plant species, erosion and addition of nutrients and pathogens to water.

GAPS IDENTIFIED IN THE NATURE CONSERVATION REVIEW

Riparian protection and restoration: With more than half its riparian area along named waterways in public ownership, Victoria has a great opportunity to address many significant water quality, health and conservation problems by reforming management of the 30,000 kilometres of crown water frontages. Current State government funding and targets for riparian restoration are woefully inadequate.

Environmental flows: The environmental water reserve for Victorian rivers is inadequate and needs clear ecologically driven goals. Victoria's 2013 waterway management strategy fails to specify objectives and actions to drive reforms essential to protect and restore river and wetland health. Because it lacks clear objectives and targets, the waterway management strategy is likely to perpetuate current patterns of over-extraction at the expense of the health of freshwater ecosystems.

Victoria has no strategy to ensure ecologically important floodplains actually flood. Victoria needs 'a comprehensive, systematic, spatially explicit and publicly transparent inventory of flood dependent natural values' as a basis for allocating water and determining priorities for infrastructure investment to protect floodplains.

Wetlands: Victoria lacks an overarching strategy to set out goals, targets and measures for wetland protection. (Victoria is the only Australian state without a dedicated wetlands policy or strategy.) The Victorian waterway management strategy has a chapter on wetlands but will not drive comprehensive reform. Wetland conservation is also dependent on restoring more-natural flow regimes, addressed above, and addressing major threats such as damage by cattle and vehicles, pollution and invasion by weeds, fish and feral animals.

Groundwater: There is need for research to ascertain the extent or reserves and sustainable extraction limits for groundwater and ensure that these limits are applied. These limits need to take into account the dependence of many riverine, wetland and floodplain ecosystems on groundwater input. 'The Department of Sustainability and Environment and water corporations do not know whether groundwater use is sustainable.' (Victorian auditor general, 2010)

Improving catchment management: The latest five-yearly report on catchment condition by the Victorian Catchment Management Council criticises the lack of evaluation and monitoring of the condition and management of land and water resources. There is a

lack of clarity about the objectives of management, about what is required to achieve healthy catchments and about the priorities for investment. Although the Catchment and Land Protection Act has an objective to maintain and enhance long-term land productivity, explicit biophysical targets are lacking.

FUTURE DIRECTIONS

Victoria should seize the opportunity provided by its 30,000 km publicly-owned network of crown water frontages to improve water quality and restore riparian habitats. The poor and declining status of many wetlands points to an urgent need to bolster laws and planning processes, particularly for the 80% of Victoria's wetlands on private land.

Sympathetic ecosystem-based management at the catchment scale is an essential complement to protection and restoration of freshwater ecosystems. Reducing pressures in riparian and floodplain areas – by managing invasive species, reducing grazing impacts, preventing clearing and supporting low impact agriculture – will facilitate natural recovery.

Ignoring groundwater ecosystems, as is the case with current Victorian waterway policies, exacerbates declines in freshwater ecosystem health and resilience.

In 2010 the Victorian Coalition government promised an independent State-wide investigation into Freshwater-dependent ecosystems (including groundwater) by the Victorian Environmental Assessment Council. That promise was later broken.

SUMMARY OF KEY RECOMMENDATIONS

There are 30 detailed recommendations contained in the Freshwater Ecosystems Chapter 3. They include:

Riparian protection

- Implement recommendations contained in the VNPA's Riverside Rescue report, such as additions to the conservation estate for applicable riparian land, replacing grazing licences with a conservation licence and enforcing Victorian laws preventing unauthorised activities on riparian public land.
- Provide funding of \$20 million per year for four years to accelerate the implementation of good management and assist landholders to take positive steps to repair,

restore and protect riparian lands.

Wetlands

- Develop a Victorian wetlands strategy that sets policy goals, targets and reporting regimes.
- Require land use planning schemes to contain wetland overlays to prohibit destruction or modification of high-value wetlands, as identified by catchment management authorities and including all Ramsar sites.
- Use the Flora and Fauna Guarantee Act to protect high-value wetlands that provide habitat for threatened species by declaring them as critical habitat and, where they are under imminent threat, by issuing 'interim conservation orders'.
- Protect all Ramsar wetland sites on public land within the national park estate.

Environmental flows

- Establish sustainable environmental flow targets based on ecological criteria for surface water and groundwater systems.
- Purchase water entitlements in a staged program aiming to reliably achieve sustainable environmental flow targets.
- Undertake a systematic assessment of the condition of Victorian aquifers, including identification of linkages between groundwater and surface water, and establish base-level data for ongoing monitoring and to inform management.

Catchment management

Chapter 3 provides considerably more detail on land use recommendations.

- Strengthen catchment management strategies, including by adopting an ecosystem-based approach, identifying clear targets and indicators, developing a long-term monitoring program and clearly linking catchment management to the health of marine and coastal environments and the Murray River.
- Strengthen links between catchment management strategies and land-use planning.
- Revise and strengthen the Victorian waterway management strategy to define clear indicators and targets for regional river health and restoration.

>> For more detail see Public Summary, or Chapter 4 (Freshwater Dependent Ecosystems) in the full report