

State of the catchments 2010

Riverine ecosystems

Hawkesbury–Nepean region

State Plan target

By 2015 there is an improvement in the condition of riverine ecosystems.

Background

The Hawkesbury–Nepean region covers 21,400 km² and includes the coastal reaches from Turimetta Headland to Barrenjoey near its mouth, and catchments for Warragamba, the Upper Nepean and the Mangrove Creek dams that are the main water supply reservoirs for the Sydney Metropolitan Area, including Gosford/Wyong. Although there are a number of dams and instream structures throughout the region, the Hawkesbury–Nepean river system is considered an unregulated river.

The longest river in the system is the Nepean River, which rises near Mount Butler at an elevation of 766 m above sea level in the southern section of the region. The Hawkesbury River, at a length of 126 km, commences near Pacific Park at an elevation of 39 m above sea level. The Nepean River merges with the Hawkesbury River at an elevation of 1.8 m above sea level. In the northern section of the region, the Colo River is the major tributary of the Hawkesbury River, providing up to 50 per cent of the freshwater flows into the system. Cocks River is another major tributary and flows into the major water storage of Warragamba Dam, before discharging into the Nepean River.

A detailed technical report describes the methods used to derive the information contained in this report. At the time of publication of the *State of the catchments (SOC) 2010* reports, the technical reports were being prepared for public release. When complete, they will be available on the NOW website: www.water.nsw.gov.au.

Note: All data on natural resource condition, pressures and management activity included in this SOC report, as well as the technical report, was collected up to January 2009.

Map of the catchment

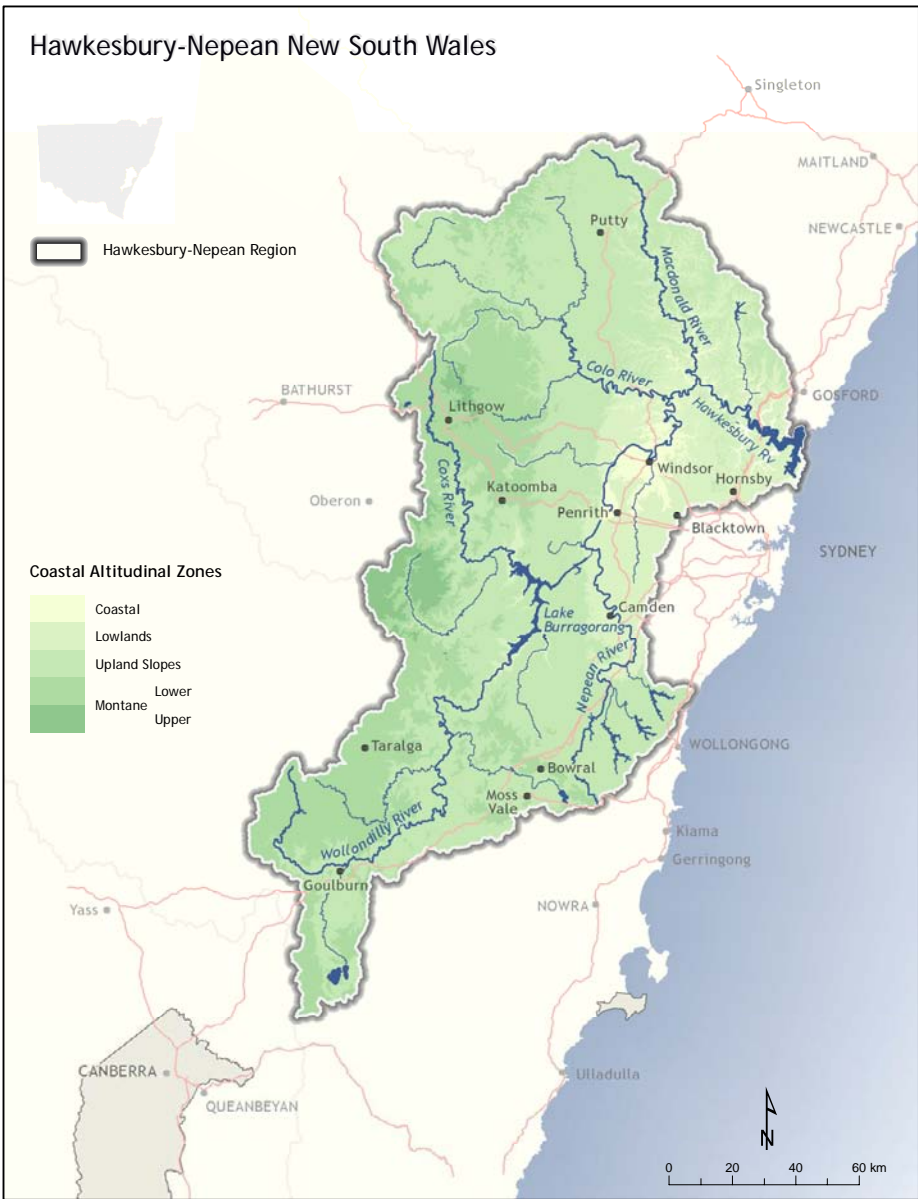
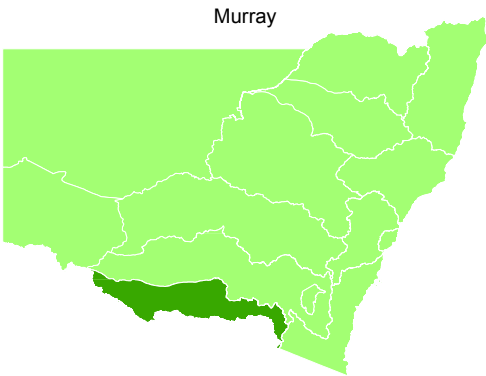


Figure 1 The Hawkesbury–Nepean region

Assessment

Riverine ecosystem condition has been assessed using water quality, macroinvertebrate, fish and hydrology indicators. Water quality condition is described as the degree to which the data exceeds the water quality guidelines for turbidity and total phosphorus (ANZECC & ARMCANZ 2000). Condition is described for macroinvertebrates, fish and hydrology by using a five point scale, a similar ranking process to the scale used in the Sustainable Rivers Audit (SRA) (Davies et al 2008). Trend information is provided for the water quality indicators: electrical conductivity, turbidity and temperature.

For the aquatic biota indicators, different colour schemes are presented on the maps. A number of methods were applied in the coastal regions, based either on a coastal adaptation of the SRA approach to condition assessment, or an interim approach where data or model availability did not allow an SRA style approach. Outcomes were not available for some areas. In all coastal regions, altitude zones could not be applied to macroinvertebrate modelling, as was done for the inland regions (ie SRA approach). For hydrologic condition mapping, data was not available at the time this report was produced to provide a whole-of-region outcome for condition. This data is being collated and will be available in the near future.

Condition

Water quality

Condition was determined for the following indicators of water quality in the Hawkesbury–Nepean region:

- **turbidity**, which is a measure of the effect of suspended sediment on water clarity and a potential indicator of sedimentation and erosion
- **total phosphorus (TP)**, which is a measure of all forms of phosphorus, some of which can occur naturally or via inputs from other factors including erosion, sedimentation and grey water (all non-toilet household wastewater). High levels may cause eutrophication, resulting in excessive growth of aquatic plants.

For lowland river areas, data was analysed for 2003–2007. For upland river areas, data was analysed for 2005–2008. For turbidity, the upper limit of the ANZECC guideline was adopted (ie 25 and 50 nephelometric turbidity units [NTU] for upland and lowland rivers respectively). The ANZECC guideline for total phosphorus was adopted (<0.02 mg/L for upland rivers and <0.05 mg/L for lowland rivers).

The map (Figure 2) shows the percentage of water quality samples at each site that exceeded the above guidelines. In general terms, the higher the percentage of exceedance, the higher the priority the site (and its catchment) would be for further investigation.

Trends (Figure 3) were determined for the following indicators of water quality in the Hawkesbury–Nepean region:

- **water temperature**, which is affected by altitude, shading, channel width and depth, flow, water impoundment, groundwater discharge and climate
- **electrical conductivity (EC)**, which measures the ability of water to carry an electrical current. This ability depends on a number of factors including the presence and concentration of salts
- **turbidity**, which is a measure of the effect of suspended sediment on water clarity and a potential indicator of sedimentation and erosion.

Those sites marked with * in the map (Figure 3) indicate that the trend is only slight or difficult to ascertain and is unlikely to be significant. Trend data for upland river sites was not available; information may be sourced from the annual water quality reports prepared by the Sydney Catchment Authority (see www.sca.nsw.gov.au/water-quality/water-quality-monitoring-reports).

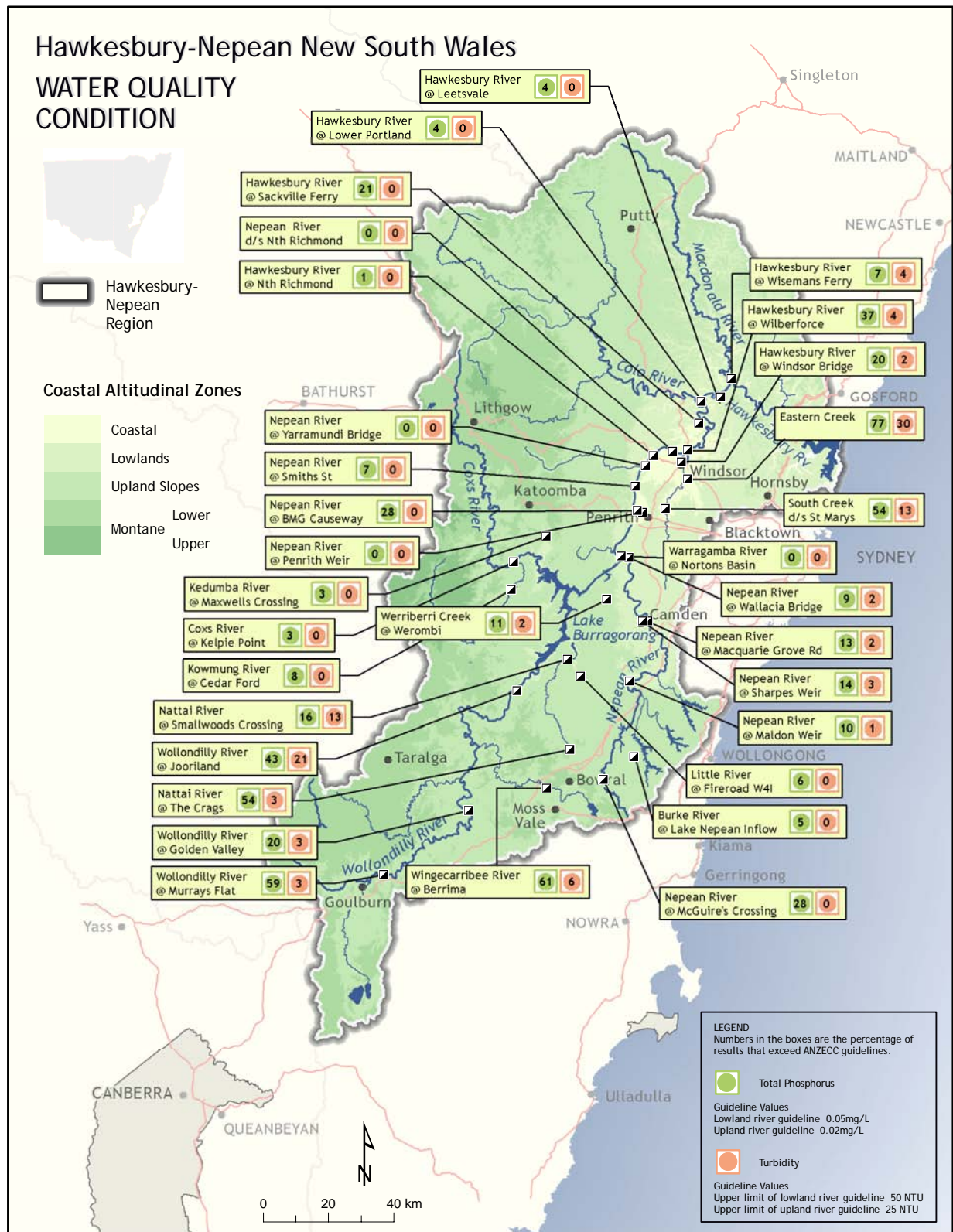
There were many water quality monitoring sites in the Hawkesbury–Nepean catchment relative to other regions. Data was sourced from Krogh et al (2008) for sites below the major water supply storages, and from the Sydney Catchment Authority for upstream sites. Analysis periods differed between the two data sources. The percentage of samples that exceeded the total phosphorus guidelines was generally low to very low across the region with the exception of six sites that had higher exceedances (Figure 2). These sites were located either in the urban areas of western Sydney or at a relatively high altitude in the upper catchments. Percentage exceedances of the turbidity guidelines was generally low across the region with a few sites having slightly higher results, located again in the urban areas of western Sydney and the upper slopes (Figure 2).

Data confidence	Commentary
Not assessed	<p>Data for lowland sites was analysed for the period 2003–2007. Data has been sourced from Krogh et al (2008). Consult this reference for further information on water quality condition analysis.</p> <p>Data for upland sites was analysed for the period 2005–2008. Data was sourced from the Sydney Catchment Authority (SCA). The reader is referred to the SCA annual water quality monitoring reports as a reference for further information on water quality condition analysis.</p> <p>www.sca.nsw.gov.au/water-quality/water-quality-monitoring-reports.</p>

Water quality trend

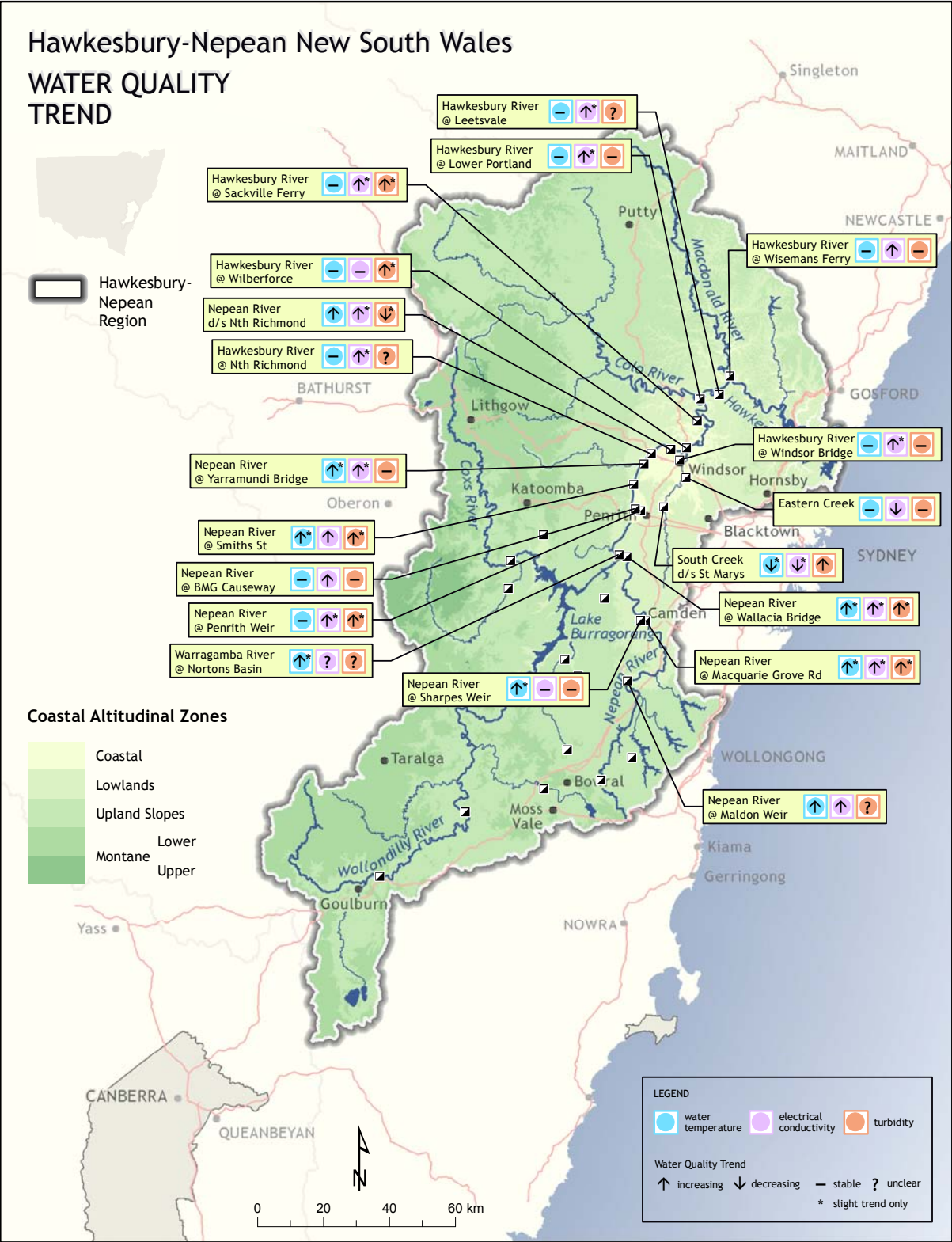
A dense network of sampling sites was available for analysis in the lower Hawkesbury–Nepean region, relative to other regions. Results were sourced from a report prepared as part of the Hawkesbury–Nepean River Environmental Monitoring Program (Krogh et al 2008). The period of analysis was four years from 2003 to 2007. All sites had a stable, slightly rising or rising trend for water temperature, apart from one site that had a slight decreasing trend. The majority of stable water temperature trends were at sites in the lower portion of the catchment. The majority of sites had a slightly rising or rising EC trend, while a couple of sites each had a stable, decreasing or unclear trend. A third of the sites had a slightly rising or rising trend for turbidity. Just over another third of the sites had stable turbidity trends, while one site had a decreasing trend and five sites had an unclear result.

Data confidence	Commentary
Not assessed	Data has been sourced from Krogh et al (2008). Consult this reference for further information on trends, R^2 values, and interpretation of the trend analysis.



Prepared by the Spatial Services Unit, April 2009, DWE Queanbeyan.

Figure 2 Water quality condition outcomes for the Hawkesbury–Nepean region



Prepared by the Spatial Services Unit, April 2009, DWE Queanbeyan.

Figure 3 Water quality trend outcomes for the Hawkesbury–Nepean region

Aquatic biota

The condition of aquatic biota was assessed using the following measures of riverine ecosystem health:

- **macroinvertebrate assemblages**, which consist of larval and adult insects, molluscs, worms and crustaceans and are an important component of river ecosystems
- **fish assemblages**, which consist of native and introduced species.

Macroinvertebrate assemblages

The condition of macroinvertebrate assemblages in the rivers of eastern New South Wales was modelled giving predictions of AUSRIVAS observed/expected (O/E) composition of macroinvertebrate fauna scores (see ausrivas.canberra.edu.au/Bioassessment/Macroinvertebrates/Man/Sampling/NSW/NSW_Ausrivas_protocol_Version2_2004.pdf). The model combined areas of two regions (Hawkesbury–Nepean and Sydney Metropolitan). The AUSRIVAS O/E scores were scaled so the maximum possible value was 1, representing the condition when there was no observed disturbance. The scaling was achieved by subtracting the minimum possible value for that region (based on the maximum possible value of the disturbance index) from the prediction for each subcatchment and then dividing this by the full range of possible values. The scaled O/E scores were then mapped under five condition categories that represent different magnitudes of predicted loss of macroinvertebrate families compared with a relatively undisturbed reference condition (Figure 4).

1. **Very good:** loss of macroinvertebrate families was predicted to be less than five per cent and thus may be considered insignificant ($O/E > 0.95$)
2. **Good:** loss of macroinvertebrate families was predicted to be less than 25 per cent ($0.75 < O/E < 0.95$)
3. **Moderate:** more than half of the macroinvertebrate families were predicted to be retained but over a quarter were lost ($0.5 < O/E < 0.75$)
4. **Poor:** most macroinvertebrate families were predicted to have been lost but over a quarter remain ($O/E 0.25\text{--}0.5$)
5. **Very poor:** three quarters or more of the macroinvertebrate families were predicted to have been lost.

The overall catchment condition score was calculated using the median of recent (2006–2008) AUSRIVAS O/E50 scores that were scaled using the formula $[(O/E50 - \text{minimum } O/E50) / \text{range of scores}]$.

Further details on the scoring system for macroinvertebrates is listed in the technical report for riverine ecosystem condition (NOW in prep.).

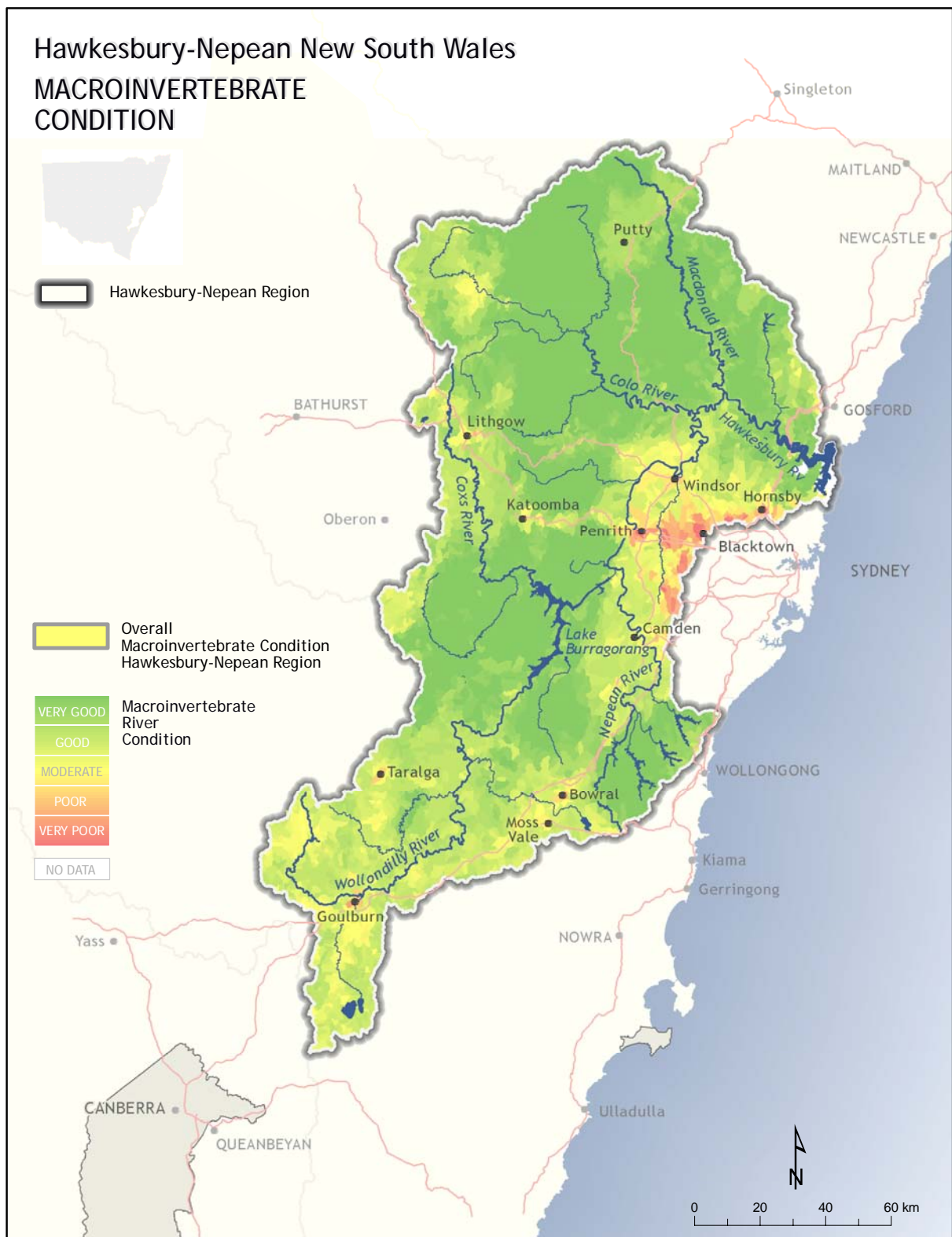
Fish assemblages

The Fish Condition Index (Figure 5) integrates indicators of ‘expectedness’ (the actual presence of native species relative to the species expected under reference condition) and ‘nativeness’ (proportion of fish population that is native rather than alien). The Pre-European Reference Condition for Fish (PERCH) scores derived for the calculation of the expectedness indicator for coastal catchments are based on existing data and a literature review, but have not yet undergone expert panel evaluation.

The site selection, sampling and analytical procedure used in coastal catchments were largely as described in the SRA report (Davies et al 2008) for inland valleys. The few minor exceptions were the addition of a fifth catchment zone in coastal valleys, called the coastal plain, which extended from 3 m to 35 m above sea level, a minimum distance of 2.5 km between sampled sites, the inclusion of randomly selected sites that fell within impoundments, and the measurement and inspection of an additional 20 random individuals per species per operation after the SRA sub-sampling requirement had been met.

Most importantly, sampling was not available for the minimum of seven sites per altitude zone, or a minimum of 18 sites per valley in coastal catchments, as required by the SRA method. However, the minimum site number requirements for coastal valleys have not yet been analysed and may differ from inland ones. Therefore, results from zones within valleys and valleys themselves should be interpreted with caution. However, at least seven sites were sampled per altitude zone per region so more confidence can be given to that data.

Data confidence	Commentary
Overall catchment score – low	Data was analysed for the period 2006 to 2008. Confidence in the single catchment rating is low due to the high variance of O/E50 scores from samples across the catchments.
Catchment model outcomes – medium	<p>Assessments at many of the sites were based on AUSRIVAS O/E scores from a single sampling event. This may be inadequate for representing the integrity of macroinvertebrate assemblages, because of the large amount of uncertainty associated with each sample (Hose et al 2004, Gillies et al 2008). The five models developed for the coastal regions used all available macroinvertebrate assessments made between 1994 and 2008; hence, these maps represent the average condition of rivers since 1994.</p> <p>Disturbance indices used here (Stein et al 2002) were developed at a continental scale and do not incorporate some disturbances that are known to affect river biodiversity such as instream barriers and degradation of the riparian zone and instream environment. The hydrological component of the disturbance index was based on data that was too patchy to be incorporated into the models, so the current models do not account for the ecological degradation caused by flow regulation.</p> <p>The significance of the correlations underlying the regression models, and the results of validation tests performed for each model, suggest that the maps produced are likely to represent broad-scale patterns in the integrity of macroinvertebrate assemblages in the rivers of the five coastal regions.</p>



Prepared by the Spatial Services Unit, March 2009, DWE Queanbeyan.

Figure 4 Macroinvertebrate condition across the Hawkesbury–Nepean region

Fish condition

The overall fish condition was poor (Figure 5), with nativeness (the proportion of the fish assemblage that is native versus introduced fish) being moderate and expectedness (the proportion of species collected during sampling that were expected to have occurred in each basin zone before European colonisation) being very poor.

Of the individual catchment zones, the coastal plains were in good condition, slopes and uplands zones were in poor condition, lowlands were in very poor condition and the highlands were in extremely poor condition. Nativeness was good in the slopes zone; moderate in the coastal plains, lowlands and uplands; and extremely poor in the highlands. Expectedness was good in the coastal plain zone, poor in the uplands, very poor in the slopes zone and extremely poor in the lowland and highland zones.

Data confidence	Commentary
Medium to high	<p>All data was collected within the three-year period between 1 January 2006 and 31 December 2008.</p> <p>Data confidence within individual altitude zones varied from medium in the coastal plain, slopes, uplands, and highlands zones, where there was moderate inter-site variability across the zones to high in the lowlands zone, where inter-site variability was low.</p> <p>Data confidence at the overall regional scale fish community condition score was medium, because of the moderate spatial variability that existed across sites across the various zones.</p>

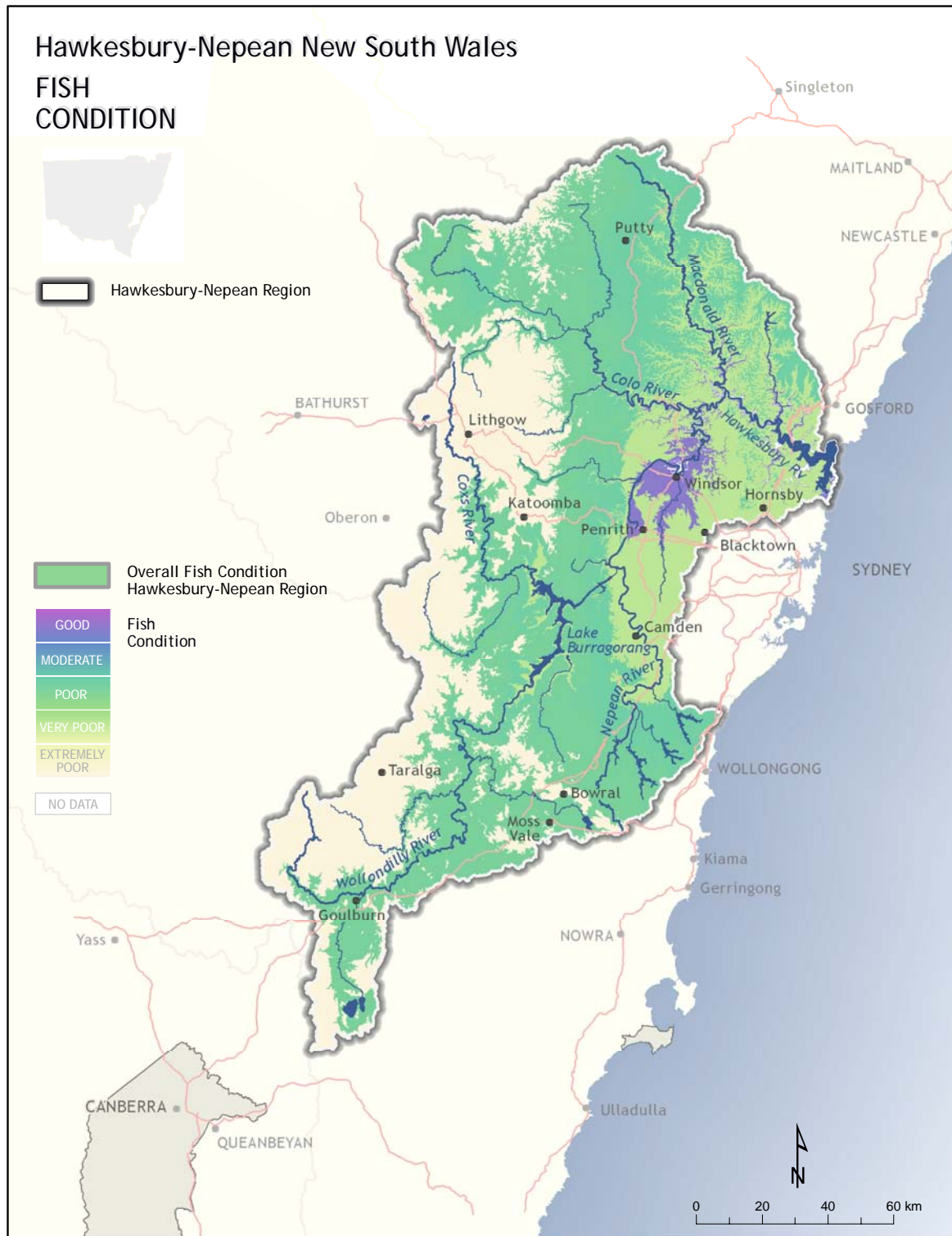


Figure 5 Fish condition across the Hawkesbury–Nepean region

Hydrology

No hydrology models were available. This data is being collated and may be available in the near future.

Pressures

Introduction of pest species

Alien fish species

Alien fish apply pressure to native fish species, populations and communities as they compete for available resources (habitat and food). Some alien fish also prey on native fish.

Alien fish species assessment is derived using the nativeness indicator output from SRA models (see Davies et al 2008). Nativeness comprises three metrics:

- proportion of total biomass of native species
- proportion of individuals that are native
- proportion of species that are native.

Rankings range from 0 to 100; the lower the number, the greater the pressure from alien fish. The nativeness ranking is the average score of sites within each zone.

Valley name	Altitude zone	Nativeness ranking
Hawkesbury	Coastal Plain	69
	Lowlands	67
	Slopes	99
	Uplands	60
	Highlands	0

Water management

Alteration of natural temperature patterns

The temperature of water within aquatic environments, such as rivers, affects natural ecological processes. Water storages (dams) have the potential to release water that can be unseasonably cold during the warmer months. The change in water temperature in the river system downstream of a dam is referred to as cold water pollution (CWP) (Preece 2004). The table below shows storages that are likely to be associated with CWP, their priority and to what extent downstream effects (>5°C peak depression) will be detected (where available) (Preece 2004). It should be noted that the known extent downstream is still uncertain and further monitoring will improve those temperature profiles.

Dam	Priority	Extent downstream	Impacted river
Warragamba	Medium	50 km	Warragamba
Cataract	Medium	Not available	Cataract

Cordeaux	Medium	Not available	Cordeaux
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Warragamba Dam, on the Warragamba River, is the major water storage of the Sydney Water Supply Scheme. There is a large local CWP effect from water released from the storage; however, this is restricted to small riparian flows (Preece 2004).

Cataract Dam is located on the Cataract River and is used to transfer water for diversion at Broughtons Pass Weir. Discharge of cool water from Cataract Dam creates thermal stratification downstream of the storage until water is diverted into filtration plants at Broughtons Pass Weir, about 10 km below Cataract Dam (Preece 2004). Works are proposed before the end of 2009 and environmental flows are planned as part of the Sydney Metropolitan Water Strategy.

Cordeaux Dam has large water releases; however, the water is diverted 20 km downstream of the dam at Pheasants Nest Weir, minimising the distance effect of CWP (Preece 2004). Works are proposed before the end of 2009 and environmental flows are planned as part of the Sydney Metropolitan Water Strategy.

The NSW Government is working with dam owners, community groups and environmental scientists to identify the areas most seriously affected, and to find methods to mitigate or prevent cold water pollution. NSW Office of Water (NOW), in partnership with other key agencies, is implementing a strategy to control cold water pollution from dams identified for priority action in NSW.

Artificial barriers to fish passage

Many fish species migrate up and down rivers to breed or find alternative habitat during extreme events such as drought. Construction of weirs, dams, and road crossings can limit or prevent migration, resulting in loss or depletion of certain fish species upstream of such barriers.

In 2006, Industry & Investment NSW (I&I) undertook a detailed review of weir barriers to fish passage for each CMA. Primary objectives included identification of high priority barriers that have major impact on fish passage and aquatic habitat condition, priority ranking for remediation, as well as recommendations for appropriate remediation action. Below is a summary of the findings, which have been updated by I&I in December 2008. It lists the priority ranking, and the increase in habitat area available to migratory fish, should the barrier be remediated.

Rank	Barrier name	Watercourse	Potential increase in habitat area (km)
1	Lower Mangrove Creek Weir	Mangrove Creek	30
2	Wallacia Weir	Nepean River	64
3	Brownlow Hill Weir	Nepean River	2
4	Menangle Weir	Nepean River	34
5	Douglas Park Causeway	Nepean River	24
6	Penrith Weir	Nepean River	19

All weirs above remain priority sites, with the Wallacia, Brownlow Hill, Menangle and Douglas Park Causeway barriers identified for remediation within the next year (Sydney Catchment Authority and NOW project, regarding provision of environmental flows and fish passage at all mainstem

weirs on the Nepean River). Penrith Weir is also part of this process (ineffective fishway). Maldon Weir has been removed from the priority list, as this weir forms the division of distribution between Australian western and eastern Macquarie perch populations.

Other pressures with the potential to impact on riverine ecosystem condition are listed below.

Agricultural and urban development

- Polluted runoff from agricultural, industrial and domestic sources
- Livestock grazing.

Loss of native vegetation

- Clearing of riparian vegetation
- Clearing of catchment vegetation
- De-snagging of instream channels
- Decline in natural replenishment of instream wood.

Introduction of pest species

- Aquatic and riparian weeds.

Water management

- Alteration of natural flow patterns.

Climate change

- Ability for biota to adjust to environmental changes
- Possible alterations to life cycle cues
- Unknown environmental tolerances of biota.

Management activity

State level

The State Plan natural resource management targets are being addressed through state, regional and local partnerships. The catchment action plans (CAPs) and the investment programs that support them are the key documents that coordinate and drive the effort to improve natural resources across NSW. The CAPs describe the whole-of-Government approach to address each of the state-wide targets at the regional level. The Hawkesbury–Nepean CAP can be found at www.hn.cma.nsw.gov.au/topics/2181.html.

The riverine condition attributes have been grouped against management activities that are being applied to address associated pressures. Associating the management activities in this way identifies the actions being undertaken to address the specific pressures impacting on riverine condition.

At times, it is difficult to isolate the influence of individual and multiple pressures on some riverine condition attributes. Improvement of many condition attributes can also be derived from a single management activity. For example, riparian vegetation rehabilitation can influence the condition of water quality and the habitat for macroinvertebrates and fish. Managing altered river flow through water sharing plans (WSPs) can also improve water quality and then improve habitat for aquatic

biota. Hence, the benefits from some of the listed management activities should not be considered in isolation. Where management activities clearly address a broad range of condition/pressure outcomes, these are listed against 'multiple condition/pressure actions'.

Hydrology

The riverine ecosystems target is being addressed at the State level largely through improved water sharing between users and the environment through WSPs and water purchase for the environment.

WSPs have been the key mechanisms in NSW for balancing competing interests in water management. The WSPs:

- share water between users, and between users and the environment
- increase allocations for the environment and other public purposes
- provide longer term, more secure, and tradeable property rights to facilitate investment and increase business returns from the water used.

WSPs aim to make improvements in the management of NSW's water resources by providing flow patterns that are more beneficial to the river environment, particularly during low flow periods. However, many riverine ecosystems are still under stress from altered flow regimes, and from land-use practices that adversely affect water quality and aquatic habitat. The key initiatives being undertaken to meet this challenge are to adjust future WSPs to account for climate change impacts.

Water quality

The following actions are being undertaken to address water quality issues:

- progress strategies to maintain valued ecological processes such as the Cold Water Pollution Mitigation Strategy, protecting riparian zones in urban areas and the NSW Wetlands Policy
- maintain water quality that is 'fit-for-purpose' through the NSW Diffuse Source Water Pollution Strategy, stormwater management and regulation of point source pollution
- effectively implement the monitoring, evaluation and reporting strategy
- provide a framework for councils to develop stormwater management objectives
- provide decision support tools and information to land managers.

Specific NSW Government actions to address the target in the Hawkesbury–Nepean region include:

Multiple condition/pressure actions

- Hawkesbury–Nepean CMA's Hawkesbury Nepean River Health Strategy
- Hawkesbury–Nepean CMA's Local Government Partnership Program
- Hawkesbury–Nepean CMA's River Restoration Project.

Water quality

- the NSW Government is developing a Lower Hawkesbury–Nepean Nutrient Management Strategy to respond to pressures on the river. It will contribute to meeting the NSW Government's objective to manage nutrient inputs so agreed environmental values can be achieved over time
- the NSW Government is finalising an Integrated Monitoring Program for the Hawkesbury–Nepean River
- development of regional water quality guidelines

- ongoing water quality monitoring at strategic locations to assess the long-term trends and changes in condition.

Hydrology

- the NSW Government is undertaking technical investigations to recommend an environmental flow regime for Warragamba Dam.

Fish

- the Sydney Catchment Authority Hawkesbury–Nepean Weirs and Environmental Flows program is delivering works to improve environmental flows and allow fish passage below Nepean River storages.

Multiple condition/pressure actions

The Department of Planning (DOP) advocates that the planning system, in conjunction with relevant agencies and local government, has an important role in natural resource management (NRM) and protection of environmental values.

The planning process creates a strategic framework to identify, assess and prioritise land-uses and to assist in the strategic investment for the revitalisation/management of natural resource values. The framework and investment reflect two streams in the integration of NRM and environmental protection – a ‘strategic planning stream’ and an ‘investment stream’. These connections occur at a regional and local level and are important in the delivery of regional strategies (prepared by DOP) and local growth management strategies, local environmental plans (LEPs) and state of the environment reports (prepared by local councils).

DOP state level measures that may enhance riverine condition include state environmental planning policies (SEPPs) (eg Rural Lands SEPP).

DOP also provides a regional context for planning via the development of regional growth strategies to guide sustainable growth and protect valuable natural and cultural assets. The development of regional strategies is undertaken with the involvement of the CMAs.

Regional level

At the regional level the Hawkesbury–Nepean CMA is undertaking the following activities in relation to the riverine ecosystems theme:

Multiple condition/pressure actions

- investing in riverine restoration works through the Hawkesbury–Nepean CMA River Restoration Project according to the NSW Government endorsed Hawkesbury–Nepean River Health Strategy. In 2007–08 the project worked with 170 landholders:
 - conserving 35km (220 ha), of riverbank
 - rehabilitating 113km (448 ha) of riverbank
 - revegetating with 112,000 riparian plants
- investing in riparian protection and restoration to priority subcatchments in moderate to good condition such as Wollemi Creek, Wheeny Creek, Tuglow-Hollanders River, River Lett and Upper Coxs subcatchments
- providing support to consolidate work in areas of current and previous river restoration projects with the aim of maximising landholder involvement along river reaches in subcatchments such as the Coxs, Capertee, Macdonald, Colo and Upper Wollondilly subcatchments.

Organisations working with the CMA on these projects or on other significant activities in the catchment contributing to improved riverine ecosystems outcomes include: Landcare and Bushcare, local government, I&I, DECCW, Greening Australia, Conservation Volunteers Australia.

The DOP regional planning measures in the Hawkesbury–Nepean region include:

Multiple condition/pressure actions

- *The Metropolitan Strategy, City of Cities – A Plan for Sydney's Future* (2005) provides a 25-year broad framework to facilitate and manage growth and development while protecting Sydney's natural environment and resources. The strategy includes actions to protect against the loss of biodiversity, protect air quality, manage with less water, move towards cleaner energy, protect viable agricultural and resource lands and respond to the risk of climate change
- a series of draft sub-regional strategies provide local content and include objectives of the Metropolitan Strategy. The draft North, draft North East, draft North West and draft South West Sub-Regional Strategies apply to the Hawkesbury–Nepean Catchment region. These strategies identify actions on how environmental, heritage and natural resource targets of the State Plan will be met
- *The Central Coast Regional Strategy* (2008) also applies to part of the Hawkesbury–Nepean Region (refer to the Hunter–Central Rivers Region above)
- the *2001 Hawkesbury Nepean Statement of Joint Intent* establishes environmental values for the Hawkesbury–Nepean Catchment – these values are reinforced in the sub-regional strategies
- the *Sydney Regional Environmental Plan (SREP) No 20 – Hawkesbury–Nepean River* (No 2–1997) applies to part of the catchment area. The SREP aims to protect the environment of the Hawkesbury–Nepean River system by ensuring that the impacts of future land-uses are considered in a regional context.

Water quality

- the *Drinking Water Catchments Regional Environmental Plan No 1* (2006) aims to achieve water quality management goals whilst encouraging improved land-use practices for sustainable development, land managers and decision makers
- DOP is working with relevant government agencies and organisations to progress natural resource model clauses, including stormwater, for inclusion in the standard LEP instrument and to provide guidance on how local councils may incorporate these provisions into their new LEPs.

Local level

DOP also provides for local planning measures and activities to address a number of pressures including:

- working with DECCW, NOW and I&I in developing NRM clauses for councils to incorporate into their new LEPs as part of the NSW Government's planning reform initiative
- preparing a practice note to provide guidance to councils on the environmental protection zones in the standard LEP instrument and how they should be applied in the preparation of LEPs. DOP is working on similar guidance for waterways and riparian corridors
- working with local councils as they develop their local strategic plans
- integrating NRM with local strategic planning, which has been hampered by the lack of spatial data on NRM values – or the provision of data late in the planning process.

Further reading

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