Executive Summary

The *Sydney Water Catchment Management Act 1998* requires that an audit of the state of the land in the Sydney drinking water catchment (the Catchment) be undertaken every two years, and that a report on that audit be submitted to the Minister responsible for the Sydney Catchment Authority (SCA). The Department of Environment and Climate Change (DECC) was the nominated agency to undertake the 2007 Audit, covering the period from 1 July 2005 to 30 June 2007. The Audit's terms of reference were to:

- audit and report on the Catchment consistent with current methods used for the purpose of *New South Wales State of the Environment* (SoE) reporting, focusing on the priority sub-catchments
- as part of the audit, consult with stakeholders within and outside the Catchment to seek information and data that may assist with the audit and to seek comments relating to the state of the Catchment.

In this Audit, consistency with current methods for SoE reporting was achieved by using the 'Pressure-State-Response' (PSR) model of environmental reporting. The same 16 indicators used in previous audits were used again to quantify and simplify the complex natures of environmental states and pressures and their interactions, under four broad themes: raw water quality; managing water resources; land condition; and ecosystem health. Using the same indicators also allows an analysis of trends in the state of the Catchment. The Auditor assessed the progress made on recommendations in the 2005 audit report and the findings of this Audit, and developed a set of recommendations for the 2007 Audit report.

The Catchment is split into 28 sub-catchments of which nine have been assessed as priorities for SCA. For the first time, this Audit includes information compiled on a sub-catchment basis, to highlight the condition of individual sub-catchments and the pressures on them.

Agriculture and sewage treatment plants (STPs) are major sources of nutrient loads in the Catchment. The total nutrient contribution from STPs has decreased since the 2005 Audit period. The Kangaroo River, Mulwaree River, Wingecarribee River, Upper Coxs River, Wollondilly River, Upper Wollondilly River and Reedy Creek sub-catchments had the greatest nutrient load export potential for either phosphorus or nitrogen or both. The Auditor recommends continuing action to reduce nutrient loads and improved environmental performance at the STPs. There are also a number of villages in the Catchment that have no sewerage service and these may contribute nutrients to the Catchment if they are not appropriately managed.

Quality requirements for raw water from the SCA's storages supplied to water filtration plants were generally met to the satisfaction of Sydney Water Corporation and the NSW Department of Health. There was a decrease in the exceedence of the Bulk Water Supply Agreement for algae, turbidity, colour and pH parameters compared to the 2005 Audit period. Raw water supplied to the Kangaroo Valley (Kangaroo River sub-catchment) and Wingecarribee (Wingecarribee River sub-catchment) filtration plants had the most exceedences of quality requirements.

The incidence of toxic blue-green algae (cyanobacterial) in the water storages decreased slightly compared to the 2005 Audit period. The incidence of total cyanobacteria increased slightly compared to the 2005 Audit period, and there was continued presence of cyanobacterial indicating high levels of nutrients in some parts of the Catchment. There were incidences of toxic blue-green algae in Lake Yarrunga (Kangaroo River sub-catchment), Wingecarribee Reservoir (Wingecarribee River sub-catchment), and Lake Burragorang during the 2007 Audit period. In August 2007, outside the Audit period, an algal bloom developed and has since persisted in the Lake Burragorang storage, activating the SCA's short-term storage management procedures which are maintaining the quality of raw water supplied to the water filtration plants. Presence of pathogens in the storages remained low where sampling occurred. There was a continued presence of pathogens at a number of sites in the Catchment requiring further investigation, and the absence of pathogen monitoring in certain sub-catchments was noted, prompting a recommendation to undertake such monitoring in the Kangaroo River sub-catchment.

The licensed environmental flow releases from the water storages were reduced in the 2007 Audit period because of the drought and the consequent low levels of the water storages. The transfer of large volumes of

bulk water from the Wingecarribee Reservoir into the local Upper Nepean tributaries and the Wingecarribee River may have affected the health of those waterways.

The Upper Coxs River, Upper Wollondilly River, Wingecarribee River, Wollondilly River, and Kangaroo River sub-catchments were identified as areas affected by surface water extractions in the 2007 Audit period. The greatest number of groundwater bores are located in the Wingecarribee River sub-catchment. The Kangaroo River, Mulwaree River, Wollondilly River and Upper Wollondilly River sub-catchments also have a large number of groundwater bores.

The number of development applications submitted to the SCA for review and concurrence decreased during the 2007 Audit period. Large areas of agriculture and increased urbanisation and rural residential development can put pressure on the water quality in the Catchment, unless best management practices are adopted. The SCA's re-assessment of over 1000 identified sites of pollution and potential contamination, showed a decrease in the number of sites that are in the very high, high and medium risk categories. The majority of the sites in the higher categories of assessed pollution and contamination risk are located in the Kangaroo River, Werriberri Creek and Wingecarribee River sub-catchments.

Active gully erosion has been observed in only a small percentage of the Catchment, but local impacts can be severe and local remediation action is required. Eleven percent of the Catchment has very high or high estimated rill or sheet soil erosion, but only a small area of the Catchment is susceptible to or experiencing salinity issues.

The percentage of locations where water quality parameters exceeded ANZECC guideline values for aquatic ecosystem protection was higher in the 2007 Audit period than in the 2005 Audit period for seven out of the 12 parameters tested. This represents a deterioration in water quality across the Catchment. The number of locations where ANZECC water quality guideline values were exceeded increased for physical and toxicant parameters, and remained high for nutrient parameters compared to the 2005 Audit period. Degraded water quality was found in approximately half of the 28 sub-catchments, including the Kangaroo River, Werriberri Creek, Wingecarribee River, Grose-Blue Mountains, Lake Burragorang, Nattai River and Upper Nepean River sub-catchments. The Auditor considers it likely that a number of other sub-catchments have degraded water quality, because of identified pressures in these sub-catchments. However, there are no current water quality monitoring points in these sub-catchments, prompting an Audit recommendation to establish monitoring programs in all sub-catchments.

There were fewer water bodies where analysis of macroinvertebrate assemblages produced 'similar to reference' ratings compared to the 2005 Audit period. Macroinvertebrate assemblages at 39 per cent of the sampled locations in the Catchment were found to be 'significantly impaired' and two per cent of all sampled locations had a 'severely impaired' rating. The invasion of introduced fish species is problematic throughout the Catchment, indicating a level of disturbance to native species, flows or riparian vegetation structure. Fish populations with low or no endemic species, suggesting a potentially disturbed water body, were found in the Mulwaree River, Werriberri Creek, Mid Coxs River and Wollondilly River sub-catchments.

Riparian zones outside the Special Areas around the water storages were under variable pressure, due to little to no standing vegetation cover, stock access, and the presence of exotic species. The state of riparian and native vegetation varied across the Catchment. Native vegetation covered approximately 50 per cent of the Catchment. In broad terms, the majority of the sub-catchments adjacent to water storages had a good cover of vegetation. Only the Mulwaree River, Upper Wollondilly River, Braidwood Creek and Reedy Creek sub-catchments in the upper reaches of the Catchment had a poor cover of vegetation. Approved land clearing resulting in loss of vegetation remained low during the 2007 Audit period.

The Catchment was officially declared as drought-affected for approximately three quarters of the 2007 Audit period. Where relevant, the Auditor interpreted the influence of the drought when reporting findings and implications against relevant indicators by referring in the report to drought or low-flow conditions. Climate change may cause changes in average temperature, rainfall and evaporation in the Catchment. These changes will have long-term consequences for the Catchment, but the impacts are more likely to be felt through extreme weather events. Projections suggest that there will be more hot days, bushfires, droughts and intense storms. Adaptation to climate change and the management responses required are continuing challenges for land and water managers/agencies in the Catchment.

From the 16 indicators and available data that was assessed in this Audit report the sub-catchments under the most pressure are the Kangaroo River, Wingecarribee River, Mulwaree River and Wollondilly River. The

Auditor found that there were policies, plans and strategies in place, with both short- and long-term actions in progress. Gaps in monitoring or improvements necessary in responses to these issues are addressed in the Audit recommendations. Some recommendations are carried over or a revision of a recommendation from the 2005 Audit. A list of Auditor's 2007 recommendations, including those carried over or revised from the 2005 Audit is provided below.