Monitoring and adaptive management framework

Southern Bell frog © Regina Durbridge

The Monitoring and Adaptive Management Framework Project involves ecological, water and soil monitoring to gain useful information for managing the Coorong, Lower Lakes and Murray Mouth (CLLMM) region.

Why are we monitoring?

Monitoring of the plants, animals and non-living aspects of the ecosystem is being undertaken to assess the CLLMM response to flow conditions, continue to improve knowledge on the ecological character of the Coorong and Lakes Alexandrina and Albert Wetland of International Importance, and help inform current and future management decisions for the site.

Monitoring is undertaken in line with the CLLMM Monitoring Framework objectives that includes gathering information to:

- Detect changes, or likely changes, in the ecological character of the site, including monitoring significant biological components and the extent and condition of wetland types
- Provide or improve descriptions of key components of the ecosystem, key processes within the ecosystem such as habitat connectivity, and drivers of the site such as climate, hydrology and geomorphology.

Monitoring is conducted by the South Australian Department of Environment, Water and Natural Resources (DEWNR), in partnership with scientific organisations, Ngarrindjeri and the community.

The Coorong, Lower Lakes and Murray Mouth (CLLMM) Recovery Project is a key component of South Australia's $610 million Murray Futures program, funded by the Australian Government's Water for the Future initiative.

The CLLMM Recovery Project, is comprised of a suite of management actions that collectively aim to improve the ecological features of the CLLMM site to deliver a healthy, productive and resilient wetland of international importance, as well as to increase capacity, knowledge and understanding across communities. It is being delivered in collaboration with the community and Ngarrindjeri, the areas traditional owners.

Government of South Australia

Australian Government

What are we monitoring?

Abiotic monitoring

Abiotic monitoring looks at the non-living aspects of the ecosystem, including:

- water quality, including nutrients and microalgae
- groundwater
- soil

Abiotic monitoring aims to:

- assess water quality impacts associated with the previous drying and rewetting of acid sulfate soils
- give an early warning if there are any negative changes to water quality
- provide information for long-term planning for the CLLMM Site
- assess how the site's acid sulfate soils are recovering following the drought.

Ecological monitoring

Ecological monitoring focuses on plants and animals in the CLLMM region, including:

- zooplankton (microscopic organisms)
- macroinvertebrates (small animals such as chironomids)
- birds
- fish
- *ruppia tuberosa*

Ecological monitoring looks at the response of living species to continued water availability following the recent drought, in particular:

- changes in abundance and distribution of species
- changes in habitat condition
- any signs of population increase and re-colonisation

When do we monitor?

The quality of lake water is monitored every month, while groundwater is monitored quarterly. Event-based water quality monitoring is also carried out on a as need basis at previous acid sulfate soils hotspot sites. Soil monitoring is done every year.

Ecological monitoring is undertaken throughout the year and is timed to capture important ecological responses. For instance, bird surveys take place between October and February to align with breeding seasons and fish monitoring is undertaken from spring to autumn when fish are most active.

Who undertakes the monitoring?

Monitoring is carried out by a range of service provides from universities and the State and Commonwealth governments.

Local communities have also been involved in the bird and frog monitoring programs.

Fairy Tern with chick © Kerri Bartley

What is the monitoring telling us about the system?

Since the return of barrage flows in 2010 the monitoring results suggest there has been improvement in water quality, acid sulfate condition and ecological communities.

Abiotic Monitoring Results

- Overall the Lower Lakes water quality is within ANZECC guidelines, above limestone dosing triggers and now similar to pre-drought conditions.
- Salinity in Lake Albert is also improving, although levels are still above the pre-drought level and historic average of 1800 EC.
- Microalgae abundance is slower to recover, being similar to drought conditions in the lakes and to immediate post-drought conditions in the Coorong.
- Groundwater still remains acidic around some of the lake margins, but is slowly recovering.
- The acidification hazard in the Lower Lakes remains high after re-inundation. If water levels were to decline and expose acid sulfate soils it is likely these will rapidly re-acidify and impact surface water and ecosystem health.

Ecological Monitoring Results

- Macroinvertebrate communities show improvements in diversity and abundance throughout the Murray Mouth and the Coorong (North Lagoon), including the reappearances of several species rarely seen in recent years.
- The current macroinvertebrate community (2012/13) is distinct from those communities occurring during the drought, with the differences based on flow scenarios.
- There have been signs of recruitment of most polychaete species, as well as several bivalve species.
- Zooplankton communities have shown a varied response over recent years to flow scenarios and salinity levels, currently reflecting freshwater conditions in the lakes and estuarine conditions downstream of the barrages.
- There has been an increase in bird numbers, including waterfowl that breed in the area, with over 4000 active nests detected
- Wader numbers have increased, including species such as the red-necked stint and sharp-tailed sandpiper.
- 13 important cryptic bird species have been recorded including the Australasian Bittern, Little Bittern and the Latham's Snipe.

Acid sulfate soil monitoring © 2009

Retrieving seine net © SARDI

Water quality monitiring © SARDI

Pelicans at the River Murray Mouth © SARDI

Ecological Monitoring Results (continued)

- Most fish species (e.g. small-mouthed hardyhead, yellow-eye mullet, mulloway, tamar goby and sandy sprat) have had recruitment success and increased their distribution ranges, with some expanding into the Coorong South Lagoon.
- Diadromous fish species (congolli and common galaxias) have recruited well in the past 18 months and have increased their abundance and distribution range.
- A key aquatic plant in the Coorong, *Ruppia tuberosa* has not responded on a large scale since the drought due to a severely depleted seed bank.

How are we using the information we collect?

The information collected through monitoring is being used to proactively manage the CLLMM region through the adaptive management process, with feedback from monitoring, research and management actions being incorporated into subsequent management decisions. The process recognises the continuous need for information feedback, reflection and revision.

Monitoring activities are guided by a monitoring framework which details the monitoring activities that will be undertaken over the life of the project, from 2011-2016.

Monitoring activities are further guided by annual workshops and reviews where activities are revised for the next year.

The information collected is being used to update the Ecological Character Description (ECD) of the Coorong and Lakes Alexandrina and Albert Ramsar Wetland of International Importance. The ECD provides a baseline description of the Ramsar Site, and will be useful for assessing any changes in ecological character.

Futher information

Department of Environment, Water and Natural Resources
T: (08) 8204 1910

www.naturalresources.sa.gov.au

JANUARY 2014 | FIS 92228