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Acknowledgement of the Traditional Owners of the Murray–Darling Basin

The Murray−Darling Basin Authority pays respect to the Traditional Owners and their Nations of the Murray−Darling Basin. We acknowledge their deep cultural, social, environmental, spiritual and economic connection to their lands and waters.

The guidance and support received from the Murray Lower Darling Rivers Indigenous Nations, the Northern Basin Aboriginal Nations and our many Traditional Owner friends and colleagues is very much valued and appreciated.

Aboriginal people should be aware that this publication may contain images, names or quotations of deceased persons.

Contents

Abbreviations

ACID	Aboriginal Cultural Information Database
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
BMEC	Barkindji–Maraura Elders Council
DoI Water	NSW Department of Industries - Water
DSM	Digital Surface Model
GIS	Geographical Information Systems
HUS	Historically Undisturbed Sediment
LVAC	Lake Victoria Advisory Committee
LVCLPoM	Lake Victoria Cultural Landscape Plan of Management
LVOS	Lake Victoria Operating Strategy
LVWG	Lake Victoria Working Group
MDBA	Murray–Darling Basin Authority
OEH	NSW Office of Environment and Heritage
PAD	Potential Archaeological Deposit
SA Water	South Australian Water Corporation
SRP	Scientific Review Panel

Quick index

AHIP Condition	Topic
Condition 1-2	• Commencement and duration
Condition 3	• Proposed works
Condition 4	• The MDBA to be responsible for the compliance with the AHIP
Condition 5	• Suitably skilled staff • Project Manager to oversee the actions relating to this AHIP
Condition 6	• Project Manager to oversee the actions relating to this AHIP
Condition 7	• Project Manager to oversee the actions relating to this AHIP
Condition 8	• Salvage of Aboriginal objects under this AHIP
Condition 9	• Lake Victoria Cultural Landscape Plan of Management
Condition 11	• Salvage of Aboriginal objects under this AHIP
Condition 12	• Salvage of Aboriginal objects under this AHIP
Condition 13-20	• Lake Victoria Cultural Landscape Plan of Management
Condition 20-23	• BMEC meetings and BMEC involvement at Lake Victoria
Condition 24-26	• Scientific Review Panel (SRP)
Condition 27-40	• Lake Victoria Cultural Landscape Plan of Management
Condition 30	• Communication with the broader community
Condition 31	• Communication with the broader community
Condition 32	• Access
Condition 33	• Aboriginal Employment
Condition 34	• Cultural heritage conservation • Aboriginal Cultural Information Database (ACID)
Condition 35	• Lakeshore stability conservation and monitoring
Condition 36	• Native vegetation regeneration conservation and monitoring
Condition 37	• Managing non-native fauna
Condition 38	• Water quality monitoring
Condition 39	• Cultural heritage conservation

AHIP Condition	Topic
	• Monitoring and burial protection works
Condition 40	• Research at the Lake
Condition 41-44	• Lake Victoria Operating Strategy (LVOS)
Condition 45-47	• Annual Reporting
Condition 48	• Aboriginal Cultural Information Database
Condition 49-54	• Impact on areas outside the Lake
Condition 55	• Cultural and natural heritage inventory
Condition 56	• Cultural heritage conservation • Salvage of Aboriginal objects under this AHIP
Condition 57	• Damage or discovery of Aboriginal objects not covered by the AHIP
Condition 58-59	• Indemnity and release
Condition 60	• Written notice and notification of fieldwork
Condition 61-75	• Salvage of Aboriginal objects under this AHIP
Condition 62	• Suitably skilled staff
Condition 63	• Variation to conditions
Condition 64	• Communication with the broader community • Commencement, duration and revocation of the AHIP • Notice to cease or restrict salvage activities
Condition 65-66	• Access for officers of OEH
Condition 67	• Access
Condition 68-69	• Communication with the broader community
Condition 71	• Obligations under other legislation
Condition 72	• Lakeshore stability conservation and monitoring • Cultural and natural heritage inventory • Impact of salinisation on fauna and faunal habitat
Condition 73-75	• Recovery and care of Aboriginal objects
Condition 76	• Cultural heritage conservation • Monitoring and burial protection works
Condition 77-80	• Recovery and care of Aboriginal objects

About this report

Lake Victoria (the Lake) is a naturally occurring, shallow, freshwater lake in south-western New South Wales, near the South Australian and Victorian borders. It is approximately 60 river kilometres downstream of the Murray–Darling junction at Wentworth. Lake Victoria is a culturally and spiritually significant place to the Aboriginal community, particularly the Barkindji and Maraura people. There is extensive evidence of Aboriginal occupation at the Lake spanning at least the past 18,000 years. Since 1928, Lake Victoria has been operated by the Murray–Darling Basin Authority (MDBA) and its predecessors as a regulated, off-river storage. Lake Victoria plays an extremely important role in the regulated supply of water along the River Murray System.

Lake Victoria is owned by the South Australian Government and operated by the South Australia Water Corporation (SA Water) on behalf of a joint venture comprising the Australian, New South Wales, Victorian, and South Australian Governments. SA Water's and NSW Department of Industry Water's program of works is funded and directed by the MDBA on behalf of these four asset-controlling governments.

Regulation of the Lake has contributed to the exposure and erosion of Aboriginal cultural material on the lakeshore and surrounding cliffs, in particular Aboriginal burial grounds. Since 1994, substantial works have been built to protect known burials from wave and wind erosion where possible. In 1998, an Environmental Impact Statement was prepared to support a Section 90 Consent Permit, now an Aboriginal Heritage Impact Permit (AHIP), under the *National Parks and Wildlife Act 1974* (NSW). This Consent allows for the continued disturbance of non-burial Aboriginal objects by regulation of the Lake, as long as a series of Conditions are complied with as outlined in the AHIP.

The Annual Report is provided to demonstrate compliance with each of the Conditions contained in the Variation of AHIP issued in August 2015. This report provides a summary of activities that were undertaken for the 12-month reporting period from 1 January 2017 to 31 December 2017. The variation to the AHIP was approved by the NSW Office of Environment and Heritage (OEH) in August 2015. Unless revoked, this AHIP is in force until 4 August 2020.

Some parts of this report contain excerpts of data and information from other sources. Full reference details of these other sources are provided at the end of this report.

Statement of the cultural heritage condition for 2017 reporting period

It has been a time of consolidation of cultural heritage work at Lake Victoria - both in data and site recording and in on-ground works. Digby Jacobs, formerly of then NSW Department of Primary Industries Water (now NSW Department of Industry Water), replaced Damian Green as Director of the MDBA Riparian Program.

Inspection of burials along Rufus River and Frenchman's Creek and in the southern lakebed area found that only a few burials required maintenance work and most other burial protection works were in good condition. Some replenishment works were undertaken with BMEC Elders on the Nulla lunette and Western beach where sandbags were showing evidence of degradation over time, and at Snake Island and Duncan's Corner. Exclosure fences around the Murray Black cemeteries were repaired and Tar-ru men have been involved in this project. There are trials to see if planting spiny sedge around burial sites will help protect them from wind and flooding, and several small-scale grazing exclusion sites on Snake Island are being trialled. At the cultural heritage annual inspection with the BMEC Elders, Neale Draper and Colin Pardoe, two new grinding stones and shell midden within the historically undisturbed sediment (HUS) layer were recorded.

Pest animal and weed control continues - pig control concentrated on Snake Island and rabbit control continued with 45 kilometres of baiting trail. Kangaroo control continued on Noola and Nulla along with goat mustering. Fox baiting to protect nesting turtles and ground nesting birds and cat trapping were also conducted.

The Barkindji Maraura Elders Council continued to meet regularly under the chairmanship of Kingsley Abdulla. Sadly, long time member May Johnson passed away in November 2017.

NSW OEH indicated its approval of the Protocol for the recording and conservation of cultural heritage in the vicinity of Lake Victoria which makes it easier for SA Water and NSW DoI staff to complete cultural heritage protection works outside the AHIP area, and outlines responsibilities of both agencies in this work. Preparations of joint-venture owned properties, Noola and Nulla Nulla Stations, for sale have been delayed by efforts to resolve historical surveying errors and water access arrangements and are not expected to be finalised until late 2018.

Following the variation to the AHIP in 2015, the Lake Victoria Cultural Landscape Plan of Management (CLPoM) must be reviewed. This has involved an internal revision during 2017 which will then be circulated to BMEC, landholders and agencies for their input.

On-site training has been conducted during the year for recording human skeletal remains with BMEC cultural heritage monitors and NSW DoI staff. SA Water staff undertook site monitoring sampling and site card recording training with AHIMS site registration as part of this process. The increased activity and training has been very positive for Lake Victoria's cultural heritage protection and monitoring this year.

Dr Jane Lennon AM
Chair Lake Victoria Advisory Committee (LVAC)
2017

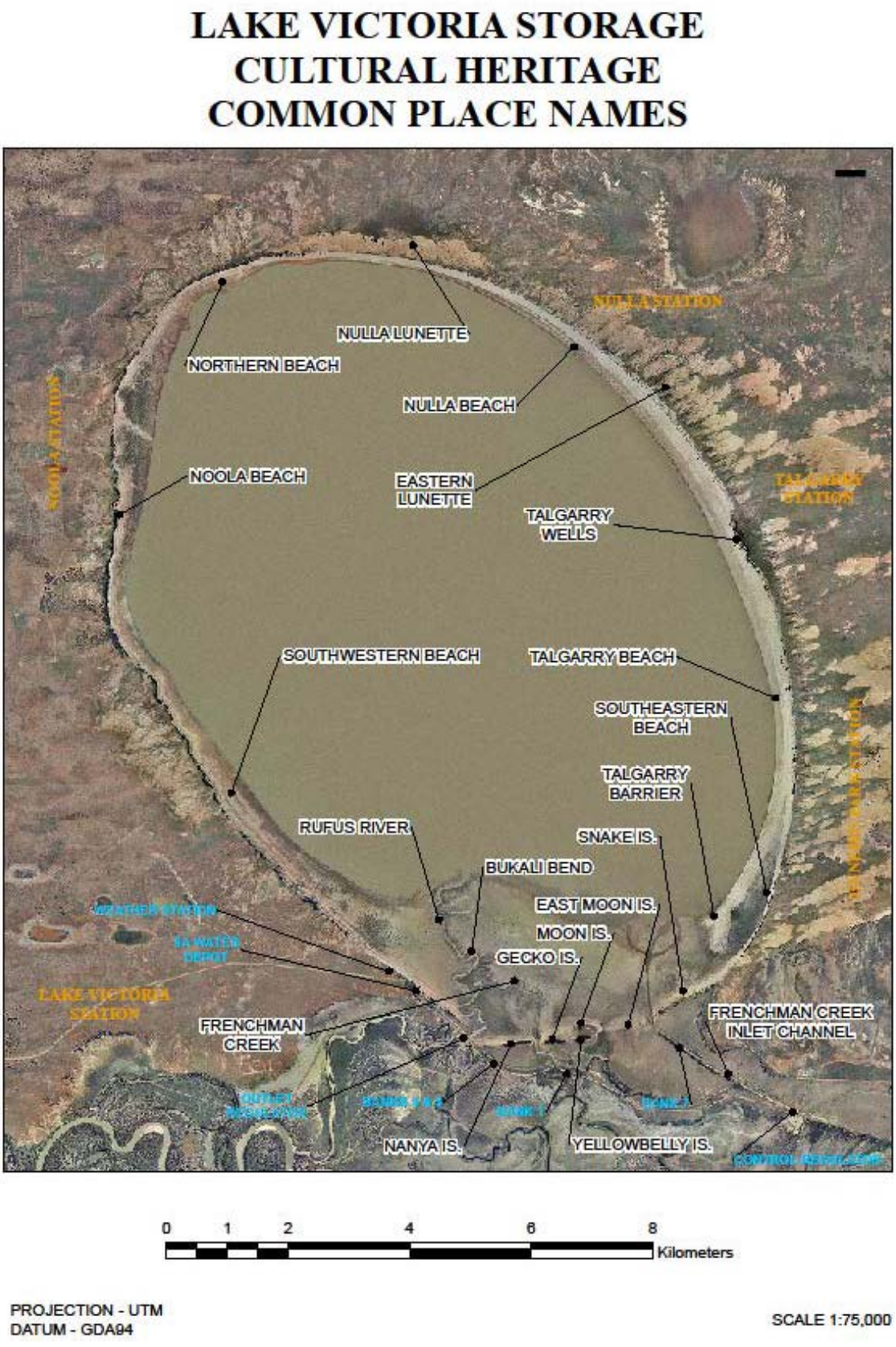

Figure 1 Common management area names around Lake Victoria

Snapshot of Lake Victoria in 2017

Cultural heritage protection, monitoring, and the Aboriginal Cultural Information Database (ACID)

- The Aboriginal Cultural Information Database (ACID) contains information on 341 burial sites, of which 304 or 89% of the sites were monitored during the reporting period.
- A total of 26 burials were identified as high or very high priority for maintenance works across the reporting period. Of these, 24 sites were maintained and the remaining 2 will be carried out as soon as possible.

Lake Victoria Advisory Committee (LVAC) and community relations

- There were three LVAC and four BMEC meetings conducted during the reporting period.
- The LVAC and BMEC continued to be informed of cultural heritage monitoring and protection measures undertaken at these meetings and through the monthly communication newsletter 'Lake Yarning' produced by the SA Water Cultural Heritage team.
- BMEC members participated in burial protection and monitoring programs at the Lake, including a four day field inspection between 2 and 5 May 2017.
- Five additional burials were protected and many artefacts were recorded as part of this program.
- Neighbouring landholders continued to provide valuable advice on land management and cultural heritage issues at Lake Victoria through LVAC and one-on-one conservations.

Employment of Aboriginal people at Lake Victoria

- The employment of Aboriginal workers throughout the Lake Victoria program continued in the reporting period.
- Pamela Dunrobin continued as the Lake Victoria Project Support Officer and facilitated BMEC engagement.
- Baden Moore continued in the role of Cultural Heritage Field Officer with SA Water.
- Wade Stidiford continued in his role as SA Water Cultural Heritage Team Leader (CHTL) position at Lake Victoria until June 2017.
- Keah McLeod and Natasha Walder were successful in gaining a position with SA Water commencing work on the 22 May 2017 as part of a two year traineeship.
- SA Water undertook a recruitment process for the replacement of the Cultural Heritage Team Leader in December 2017.

Research activities, the Scientific Review Panel (SRP) and monitoring program

- The SRP panel met twice in March and November during the reporting period and continued to oversee the development of the monitoring program, which entered its third year.
- The north-east lakeshore and Talgarry Beach continue to be the areas where cultural heritage is most at risk from wave and wind erosion as there is little vegetation existing in this area.

- The SRP and LVAC have endorsed two PhD projects to be undertaken relevant to better understand the ecohydrology of spiny sedge (*Cyperus gymnocaulos*) and longshore drift of lakeshore sediments at Lake Victoria.

Land management

- Land management activities continued to be implemented with a focus on pest plant and animal control both inside and outside the AHIP area.
- Kangaroo management across joint-venture owned properties continues under an occupier's licence to harm protected animals and commercial harvest conditions set by National Parks & Wildlife Service (NPWS). A total of 1257 animals have been removed across NSW managed properties over the reporting period.
- Feral goats continued to be removed from joint-venture owned properties by the NSW DoI authorised contractor. A total of 2078 animals have been removed across the two properties.
- A wider community of landholders that surround Lake Victoria have met at the request of the NSW DoI Project Officer, Peter Teasdale, to work on coordinating timing of pest plant and animal management across the broader region.
- Dunedin Park and Talgarry landholders requested NSW DoI staff and contractors to not access the Talgarry lake paddock to undertake work on their property due to biosecurity risk.
- Joint-ventured owned properties continue to be prepared for disposal with many historical survey and alignments issues that are required to be undertaken prior to disposal.
- A review of the Lake Victoria CLPoM has commenced but requires a further review and consultation with LVAC members before final presentation to the NSW OEH Chief Executive for approval. The review will be completed in the second half of 2018.

Lake operations

- Lake operations during the reporting period were consistent with the guidelines set out in the Lake Victoria Operating Strategy (LVOS). It is recognised that various features of River Murray operations have changed since the inception of LVOS in 2002.
- Changes to how the River Murray system is operated are likely to occur into the future as the Sustainable Diversion Limit adjustment projects are implemented and environmental water is used. A review of the LVOS is currently underway by the MDBA River Operations Improvement team to understand how these changes might impact operations at Lake Victoria and provide advice. The LVAC and the SRP will be part of the review consultation process which then will require approval from OEH.
- A black water event followed on from moderate flooding across the Murray-Darling Basin in October 2016 into the 2017 reporting period. Blackwater was circulated through Lake Victoria and back out through Rufus River outlet regulator.

Shaun Richardson
Lake Victoria Program Coordinator
2017

Compliance response

Advisory and review group conditions

Lake Victoria Advisory Committee and community relations (Conditions 13-20)

- The MDBA continued to maintain the role and status of the LVAC as an advisory committee to the MDBA and partner governments.
- LVAC continues to provide a major voice to the Aboriginal people with an interest in, and historic ties to, the Lake.
    - Three LVAC meetings were convened in the reporting period: March 2017 (Meeting 81), July 2017 (Meeting 82) and November 2017 (Meeting 83).
    - The LVAC Terms of Reference were reviewed in and accepted by LVAC in July 2017 to align with the 2015 AHIP and proposed variations to the AHIP in 2020.
- The LVAC attendee list for 2017 is provided on page 42 and there were no changes to the stakeholders represented on LVAC.
- The Dareton Local Land Council (DLALC), Tar-ru Lands Board and the Barkindji Native Title Eight (BNT8) Group continue to be invited to attend LVAC meetings.
- The minutes of all LVAC meetings were distributed to stakeholders in a timely manner.
- LVAC was provided with a summary of the partner agencies' (MDBA, NSW DoI Water and SA Water) actions undertaken to comply with the AHIP conditions at each meeting, including Aboriginal cultural heritage protection and land management.
- The 2015–16 Lake Victoria Annual Compliance Report was developed and provided to OEH for approval on 28 April 2017 as per AHIP Condition 45.
- LVAC received updates on past, current, and future River Murray System and Lake Victoria operations as per advice from River Operations at MDBA. Ongoing discussions occurred regarding lake levels and how lake operation interacts with broader river operations, vegetation management, Aboriginal cultural heritage protection and monitoring.
- LVAC were informed of the cultural heritage protection measures undertaken at the Lake by the SA Water Cultural Heritage team through several presentations.
- No proposals to undertake scientific research at Lake Victoria were received during the reporting period.
- LVAC were informed on the progress on PhD student recruitment for two research projects to inform cultural heritage protection including:
    - Better understanding the ecohydrology of spiny sedge (*Cyperus gymnocaulos*)
    - Better understanding longshore drift of sediment around the lakeshore
- LVAC were informed of the restoration and dating of the wooden artefact now housed in the Keeping Place. The artefact was restored by ArtLab in Adelaide and evidence from radiocarbon dating found the artefact to be at least 300 years old.
- LVAC continued to be updated on the review process of the Lake Victoria Cultural Landscape Plan of Management.
- David Dreverman, MDBA Executive Director of River Management, gave an overview of the Lake Victoria Program across the 17 years of his involvement at the Meeting 82 and wished to pay his respects and thanks to members of LVAC for their contributions over time as he embarked on retirement.

BMEC involvement at Lake Victoria and BMEC meetings (Conditions 20-23)

- The MDBA continues to consult with the Aboriginal community through the BMEC about appropriate management of Aboriginal cultural heritage and the cultural landscape at the Lake.
- Sadly, several past members of the BMEC passed away during the reporting period. These Elders were very valued contributors to the management and protection of Aboriginal cultural heritage at Lake Victoria for many years and will be greatly missed.
- The MDBA continues to resource the BMEC and be guided by the NSW Government Department of Premier and Cabinet Department guidelines on advisory committee remuneration.
- Four BMEC meetings were held during the reporting period including one Annual General Meeting (AGM) in August 2017 and three BMEC meetings. The BMEC AGM meeting was held in Wentworth, NSW and BMEC members visited the Old Wentworth Gaol Museum after the meeting to view Aboriginal artefact items on display relating to Lake Victoria.
- Kingsley Abdulla was re-elected as the BMEC Chair, and Roland Smith Snr elected as deputy Chair at the 2017 AGM.
- Four BMEC members attended the Melbourne Museum with the Lake Victoria Project Officer, Peter Teasdale, to view Aboriginal cultural heritage items relating to Lake Victoria on 19 July 2017. BMEC members also had the opportunity to visit the First Peoples exhibition in the Bunjilaka Aboriginal Cultural Centre on the same day which memorialises the Rufus River massacre which occurred near Lake Victoria.
- The BMEC were advised of application for an AHIP as part of proposed road maintenance on Noola Station which included the movement of two grinding stones to the Lake Victoria Keeping Place.
- BMEC members were involved in the MDBA Strengthening Connection video production with nominated members, Claude Mitchell and Kingsley Abdulla, filming stories about their connection to Lake Victoria at the Lake Victoria campground on the 29 May 2017.
- BMEC members participated in multiple cultural heritage monitoring and protection programs across the reporting period including a four day field inspection during early May on where several burials and important artefacts were found (see page 17).
- BMEC members have also been involved in protection works outside of the AHIP and for plant nursery works when assistance is required.
- BMEC members joined the graduate cohort at Lake Victoria for the annual MDBA Graduate field trip in November 2017.
- BMEC members were involved in several recruitment processes for SA Water staff across the reporting period including new trainees, Coordinator Lake Victoria and Team leader Cultural Heritage. BMEC members visited Lake Victoria regularly to mentor and provide local cultural context to recently recruited SA Water trainees which built on knowledge and relationships with one another.

Figure 2 Barkindji-Maraura Elders Council at a BMEC Meeting during 2017 (Source: Shaun Richardson, NSW DoI).

Lake Victoria Working Group (LVWG)

- The Lake Victoria Working Group (LVWG), a sub-committee of the LVAC, met three times during the reporting period: March 2017 (Meeting 34), July 2017 (Meeting 35) and November 2017 (Meeting 36).
- The LVWG exists to improve communication between agency staff and to address out-of-session business relevant to the state and Commonwealth Lake Victoria managing agencies, both inside and outside the AHIP area as documented in the Lake Victoria and Surrounding Lands Management Arrangements.
- After development and review, LVWG approved and brought into effect the 'Protocol for recording and conservation of Aboriginal cultural heritage within the vicinity of Lake Victoria, NSW' which outlines management arrangements between SA Water and NSW DoI Water regarding cultural heritage protection outside the AHIP area.
- Monthly operational meetings to coordinate works between NSW DoI Water and SA Water have continued to assist in achieving improved on-ground outcomes.
- Some of the other key issues discussed by the LVWG included:
    - Agency staff recruitment and organisational restructures;
    - Pest plant and animal control across government-managed lands;
    - Consultation with BMEC and local Aboriginal groups regarding access to the Aboriginal Heritage Information Management System database for Lake Victoria and the 'Big Lake' area;
    - Progress on the upcoming legislation reforms following community consultation on the draft NSW Aboriginal Cultural Heritage Bill and how this may change management of Lake Victoria;

- Recent cultural heritage conservation and monitoring by SA Water Cultural Heritage Team and BMEC members;
- Disposal of surplus lands on Nulla and Noola;
- Progress on lakeshore monitoring program using drone imagery;
- Involvement in workshops with the Tar-ru Lands Board of Management on the 'Healthy Country Plan' development;
- The review of the Lake Victoria Cultural Landscape Plan of Management (CLPoM);
- Research by PhD at Lake Victoria regarding spiny sedge ecohydrology and longshore drift; and
- Feedback on the Lake Victoria Annual Report 2015-16

Scientific Review Panel (SRP) (Conditions 24–26)

- The MDBA continues to maintain a Scientific Review Panel (SRP) that provides technical scientific advice to LVAC.
- The SRP is chaired by the Director of the Riparian Program at the MDBA and it currently has five members with expertise in a range of fields including Aboriginal cultural heritage significance, management and protection, broader cultural heritage management, archaeology, hydrogeology, geomorphology, wetland vegetation and ecology. Hydrology and river management advice is provided by MDBA staff, while natural resource management advice, on-ground observations and recommendations are provided by staff from both SA Water and NSW DoI Water.
- The SRP met as a group twice over the reporting timeframe in March 2017 and November 2017. Colin Pardoe and Neale Draper also participated in a two day cultural heritage survey at the lake and this is discussed further on page 17.
- MDBA staff also liaised with individual SRP members to gain their advice on a range of issues as they arose including development and recommendations from the lakeshore monitoring program using drone imagery, the development of proposals for PhD research and archaeological advice for recently restored artefacts.
- The SRP continues to support the annual inspection of cultural heritage sites at the Lake by a subset of SRP, BMEC and LVAC members.
- During the year, the SRP also discussed and provided advice on:
    - The development of the new vegetation and shoreline monitoring program using remotely sensed imagery and supporting documents such as methodology manual and guide to vegetation mapping;
    - The cultural heritage monitoring results and new initiatives to protect burials;
    - Further development of the cultural heritage monitoring program including a new sampling monitoring approach;
    - A initial work into reviewing the Lake Victoria Operating Strategy;
    - A review of vegetation photo monitoring program;
    - The upcoming review of the Cultural Landscape Plan of Management;
    - The development of two PhD research projects on spiny sedge and longshore drift;
    - The potential for a Lake Victoria symposium and bibliography to gather information relating to Lake Victoria over the past 30 years of the program;

- A draft MDBA journal paper outlining the history of cultural heritage management at Lake Victoria; and
- Erosion in gullies and on the lunette outside the AHIP area.

Research at the Lake (Conditions 40)

- Following River Murray Operations Committee funding approval, LVAC and SRP considered and approved a proposal to fund two PhD research projects on a spiny sedge ecological response model and understanding longshore drift.
- No external proposals for research at the Lake were considered by LVAC or SRP during the reporting period.

Lake Victoria Cultural Landscape Plan of Management (LV CLPoM) (Conditions 9, 27–40)

- The MDBA continued to maintain and implement the Lake Victoria CLPoM to guide cultural heritage, land and water management in the area.
- The current CLPoM was published in 2007 and its ongoing development is based in continuing the cycle of adaptive management at the Lake.
- The review of the CLPoM was undertaken in 2017 by Dr. Jane Lennon, Neale Draper and MDBA. Consultation on the revised CLPoM will commence in 2018 and a final document is expected in mid-2018.

Communication with the broader community (Conditions 30, 31, 64(b), 68 & 69)

- The Lake Victoria CLPoM Communication Strategy continued to be implemented to communicate with the broader community on the significance of Lake Victoria.
- The Communication Strategy was reviewed in 2017 and consultation with LVAC members will commence in 2018.
- New SA Water trainees developed an informative newsletter 'Lake Yarning' outlining monthly cultural heritage protection and land management work out at Lake Victoria. SA Water sends the newsletter to BMEC, MDBA, OEH, NSW DoI and landholders each month.
- The 2015-16 Annual Report was provided to the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS), Canberra.
- The MDBA and partner governments offered support for the Rufus River Memorial Day in 2017 however no event was organised.
- BMEC were actively involved in communicating the significance of Lake Victoria through their involvement in the MDBA Strengthening Connections videos and Melbourne Museum.
- Reports or publications containing culturally sensitive information were referred to the BMEC prior to release.
- NSW OEH, Australian Museum and LVAC continue to have the right to use and authorise the use of information collected under the AHIP with the approval of BMEC.

Figure 3 Kingsley Abdulla (BMEC chair) and Claude Mitchell (BMEC member) preparing for interviews for the Strengthening Connection videos (Source: Sophie Taylor, MDBA).

Access (Conditions 32 & 67)

- The CLPoM Access Protocol continued to be implemented to manage unnecessary disturbance and to minimise intrusion on neighbouring landholder properties.
- SA Water developed a Lake Victoria AHIP induction which outlines the main requirements of any visitor to the lake with regards to the AHIP and is presented at time of induction. This will allow any visitor to understand the sensitivities in visiting Lake Victoria and the requirements under the AHIP with respect to cultural landscape.

Aboriginal employment (Condition 33)

- The Lake Victoria Program has one dedicated Aboriginal position as the Lake Victoria Program Support Officer within the NSW DoI Water.
- SA Water continued its employment of cultural heritage team positions throughout the reporting period.
- The position of SA Water Cultural Heritage Team Leader was vacant in June 2017 and SA Water conducted a recruitment process in December 2017 for this position.
- The Aboriginal Trainee Program has been structured to be run across a two year period by SA Water.
- Trainees are provided with an opportunity to gain a Certificate IV in Conservation and Land Management with TAFE. Trainees also receive experience and competency certification in the use and operation of heavy plant and in works related to the water management industry.
- Pamela Dunrobin continued as the Lake Victoria Project Support Officer and facilitated BMEC engagement.

- BMEC Elders, BMEC proxies, representatives from Tar-ru Lands and the wider community were employed throughout the reporting period at the Lake to:
    - participate in burial monitoring and protection;
    - undertake cultural heritage monitoring;
    - assist with revegetation works when required;
    - participate in interview panels as part of recruitment for positions in SA Water and NSW DoI;
    - share cultural knowledge with visitors, such as LVAC members and SRP members, and facilitate the annual MDBA graduate field trip; and
    - share cultural knowledge and provide insight to newly employed SA Water trainees.

Cultural heritage conservation (Conditions 34, 39, 56, 70, 76)

Strategies to monitor and conserve cultural heritage

- The Lake Victoria CLPoM includes strategies to conserve and monitor cultural heritage both inside the AHIP and on adjacent land. In 2017, these strategies were reviewed by MDBA and the LVAC Chair and Deputy Chair and will be consulted on with LVAC in 2018.
- Known burial sites are protected using approved techniques and inspections of the lakeshore are undertaken to monitor the condition of burial sites and to locate and protect burial sites that are exposed and replenish existing protection.
- The monitoring program allows for condition and location of new and existing burials to be recorded by the SA Water Cultural Heritage team using an ArcGIS enabled portable geographical positioning system (GPS) unit. These monitoring results are then uploaded into the Aboriginal Cultural Information Database (ACID).
- Improvements to the Structured Cultural Heritage Monitoring Program in 2017 now allow for the monitoring information to be automatically uploaded into the ACID and for information to be captured more easily.
- The ACID can be used to generate reports and maps of burials and cultural heritage records upon BMEC request and annual reporting. It is also used to inform scheduling of conservation works, priority management actions and further monitoring during the year.
- During the 2017 reporting period, OEH endorsed MDBA's proposal which outlines a process to register existing management areas on the lakeshore as 'Potential Archaeological Deposits' (PADs) with artefacts and cultural heritage sites related to the PADs via site component forms to the Aboriginal Heritage Information Management System (AHIMS) database.
- Additionally, OEH endorsed a sampling based methodology proposed by MDBA to monitor and understand key threatening processes to artefacts and cultural heritage sites at Lake Victoria with any damage to the objects or sites recorded through Site Impact Recording forms on the AHIMS database.
- Further work to operationalise this proposal still continues with initial consultation and AHIMS form training conducted with the SA Water Cultural Heritage Team during the field trip in April 2017.

- BMEC members were involved with the cultural heritage monitoring program during the reporting period, where practical and a summary of the monitoring results were provided at both BMEC and LVAC meetings.
- Both the NSW OEH archaeologist and the BMEC chair were notified prior to and at the completion of major cultural heritage fieldwork being undertaken including the 2017 cultural heritage survey, inspections and protection of new burials during the 2017 period. Communications were primarily via email or discussions with BMEC and LVAC meetings.

Protocol for areas outside of the lake

- The protocol for the Recording and Conservation of Cultural Heritage in the vicinity of Lake Victoria had been developed by partner agencies and approved by OEH in May 2017.
- Since the implementation of this Protocol, works have been undertaken to monitor burial works and protect burials on Duncan's Corner and Nulla lunette. Protection of 5 new burials on the Nulla lunette and replenishment of 19 burials across Nulla lunette and Duncan's Corner have been effectively implemented through this new management agreement.

Monitoring and burial protection works (Conditions 8, 39, 76)

Results from monitoring burial protection works

- Monitoring of burial protection works by the SA Water Cultural Heritage Team, assisted by BMEC and other community members, continued during the 2017 reporting period.
- A total of 304 of 341 recorded burials were monitored during autumn of the reporting period. Of the 37 burials not monitored, 24 burials near the junction of Rufus and Frenchman's and at lower elevations were submerged during Autumn 2017, 7 burials on Talgarry Barrier were stranded due to rising lake levels and the remainder were unable to be located, buried with sediment or covered by establishing vegetation.
- Seven burials were classified as high or very high priority for replenishment works within the AHIP and 19 burials outside the AHIP. All except FC-21 and SN-13 were replenished by the end of the monitoring period including burial NB-42 identified in the 2015-16 monitoring period. The remaining burials are scheduled to be replenished in early 2018.
- Of the 19 burials outside of the AHIP, a total of 10 existing burials on Duncan's Hill as a part of a larger conservation project were replenished during the reporting period. The management of this area was facilitated by the new arrangements under the 'Big Lake' Protocol.
- In addition, SA Water staff inspected 'at-risk' areas of the foreshore and lunette under high wind events.
- The NSW OEH archaeologist and the BMEC Chair were notified at the completion of cultural heritage monitoring work during 2017 reporting period at LVAC.

Annual field inspection – 12-13 April 2017

- The annual field inspection was held again in April 2017 to:
    - Inspect recent cultural heritage protection work by SA Water staff;
    - Explore high risk areas for cultural heritage; and
    - Share ideas and knowledge between BMEC Elders, archaeologists and agency staff.

- BMEC Chair, SA Water Cultural Heritage Team, Neale Draper, Colin Pardoe and MDBA staff attended the annual field inspection at Lake Victoria on 12 and 13 April 2017. The first day focussed on the western and northern lakeshore and the second, eastern lakeshore.
- Following the findings of the 2015-16 reporting period, the focus of this year's inspection was to survey newly exposed Aboriginal cultural heritage and also to explain the proposal for AHIMS database and the Structured Cultural Heritage Monitoring Program and demonstrate the use of AHIMS site recording forms as a refresher.
- Some artefacts recorded included two silicified limestone anvil and grindstones, a flat silcrete seed-grinder and grindstone and four shell midden sites embedded in shelves of historically undisturbed sediment (HUS).
- Consistent with last year's field inspection, the field team frequently encountered fragments of mineralised, waterworn bone in the lower beach zone on the north-eastern beaches such as Nulla Northern and Nulla Southern Beach.
- The field team also noted some areas of the foreshore midway up the eastern beach where spiny sedge had been effective at trapping and building up sand on the lakeshore and around burial protection measures.

Figure 4 Gary Abdulla Snr, Colin Pardoe, Tim Kruger, Wade Stidiford and Hugo Bowman recording a cultural heritage site on the Southern Lakebed during the annual field inspection (Source: MDBA).

- MDBA staff also reviewed the current status of existing cultural heritage records for Frenchman's Creek and Rufus River. This was followed by a field inspection to better understand the threatening processes along these two channels (MDBA 2017b).

Aboriginal Cultural Information Database (ACID) (Conditions 34 & 48)

- The Aboriginal Cultural Information Database (ACID) which holds the spatial archive of data associated with all discovered Aboriginal burials, cultural heritage and sites continues to be housed, updated and maintained by SA Water on behalf of the Lake Victoria Program.

- With a view to improving data entry onto AHIMS for cultural heritage sites, MDBA organised site recording training with the SA Water Cultural Heritage Team to ensure that all ACID data is compatible with AHIMS requirements. The training was led by NSW OEH archaeologist and consisted of:
    - The process to record cultural heritage for the AHIMS database using Potential Archaeological Deposits (PADs) and site component recording forms as negotiated by MDBA and OEH; and
    - Step-by-step course in completing site component recording forms including what to identify for each site type, quantifying site condition and impacts and making interm management recommendations for protection.
- The training was well received and informative to the SA Water Cultural Heritage Team. Ongoing efforts continue to be made by all parties to input information into the ACID and upload these site details into the AHIMS as per the requirement outlined in the Lake Victoria AHIP.

Burial sites

- The ACID now contains 341 burials of which 241 are recorded inside of the AHIP boundary. Since 2012, a total of 194 new burials have been recorded and protected at the Lake.
- A total of 17 new burial records were added to the ACID during the reporting period (Table 1). Of these, ten burials were newly discovered and seven were existing protected burials that were not previously recorded in the database.
- Of the 10 newly discovered sites in 2017, five were within the AHIP area and five were outside of the AHIP on the Nulla lunette.

Table 1 Summary of burials records in the ACID for 2017 reporting period both inside and outside the AHIP area (Source: SA Water)

Aboriginal Cultural Information Database from 1 January to 31 December 2017			
Type of burial site	**Location of site**	**Number of burials**	**Total**
Known burial sites recorded	*Inside AHIP*	241	341
	Outside AHIP	100	
Burial sites added to the ACID in 2017	*Inside AHIP*	2	7
	Outside AHIP	5	
Burial sites newly discovered in 2017	*Inside AHIP*	5	10
	Outside AHIP	5	

- There are currently 25 burials within that AHIP that are recorded in the ACID but yet to be registered on the AHIMS database.
- Three of the 25 burials not recorded in AHIMS were recorded in the ACID and protected historically, however due to the inaccuracy of the GPS data at the time, these burials have yet to be correlated with an existing AHIMS site. These three sites remain on the ACID and further attempts to locate them will continue to be undertaken.

- Of the 22 remaining sites, a total of 7 burial sites not yet recorded on AHIMS database were recorded in the ACID and protected in the 2017 reporting period. These records will continue to be added to the AHIMS.
- There are still 21 burials outside the AHIP on the Nulla lunette which have yet to be recorded on AHIMS. Of these, 10 burials were recorded in ACID and protected during the latter half of the 2017 reporting period. These records will continue to be added to the AHIMS. The remaining 12 burials have been protected during the 2014-15 and 2015-16 reporting periods as part of collaborative projects with NSW DoI Water.

Non-burial sites and objects

- SA Water and MDBA are still in the process of adding previously recorded non-burial sites and objects to the ACID such that information can be cross-checked and updated with the AHIMS database.
- A trial of the non-burial monitoring program was commenced in 2017 with a total of 28 non-burial sites monitored within the AHIP. This monitoring program is still in development with MDBA, SA Water and OEH and improvements will continue to be made into 2018.
- As a part of the structured cultural heritage monitoring program proposal, all of the remaining site card areas were registered with AHIMS in 2017. During this process, three lakebed channels including Rufus River, Frenchman's and Beach Lakebed Channels which experience similar threatening processes were combined but are still able to be individually interrogated with the ACID.
- As of December 2017, a total of 687 non-burial sites and objects resided in the ACID.
- A total of 26 new non-burial sites and objects were discovered in the reporting period with 14 of these outside of the AHIP area and 12 of these inside the AHIP area.
- There were no requests from other parties to access the information from the ACID in 2017.

Lakeshore stability conservation and monitoring (Conditions 35, 72, 76)

- Erosion is a major process affecting the stability of the foreshore of Lake Victoria. The 2007 LV CLPoM outlines strategy for the management and monitoring of lakeshore erosion.
- The monitoring program continues to explore new methods with the aim of achieving best practice in identifying and prioritising areas for conservation and intervention.
- As part of the 2017 CLPoM review, the lakeshore stability conservation and monitoring strategy has been reviewed by MDBA and the LVAC Chair and Deputy Chair. The review of this strategy will form part of the consultation in 2018.
- A summary of shoreline stability observations for the 2017 reporting period is outlined below.

Shoreline profiles

- A total of 37 shoreline profiles are currently monitored annually around the lakeshore of Lake Victoria, some since 1995. Each shoreline profile is generally surveyed annually to monitor the extent of sediment erosion and deposition and are reviewed by the SRP.
- Analysis of the shoreline profiles show that the lakeshore is relatively stable with the exception of some change on the eastern foreshore. The eastern foreshore has exhibited a reduction in sediment on the lower part of the lakeshore (below 25.5m AHD) and an increase in sediment closer to the lunette and dune systems (above 26.5m AHD) between 1999 and 2017 (Figure 5).
- In some areas, the movement of loose unconsolidated sand over the eastern lakeshore has occurred in the 2017 reporting period. Historical photo monitoring indicates that the eastern beach is largely devoid of vegetation and sand in this area has moved to and from this area

over time. This has exposed the more consolidated and solid Historically Undisturbed Sediment (HUS) which presently forms a 'pavement' across most the eastern foreshore.

- The field inspection team observation that in some areas on the eastern lakeshore where spiny sedge is establishing on the lower lakeshore and sandhill canegrass in the upper elevations towards 27m AHD, this vegetation effectively slows and traps sand on the lakeshore.
- The shoreline profiles on northern, western and southern sections of the lakeshore continue to show very little change.
- Some minor changes in shoreline profiles near southern lakebed islands including Moon and Snake Island were detected. Upon inspection of the aerial imagery in these areas, these changes were constrained to localised areas where loose sand had formed berms. As these changes were relatively modest and localised, SRP did not considered them be a concern.

Figure 5 Shoreline survey results for PS-28 (on the Eastern Beach) for 1999, 2006, 2013, 2015, 2016 and 2017 showing moderate change between years (Source: Daniel Haines, SA Water)

Observations from the Digital Surface Model trial

- Ongoing refinements to the digital surface model continue to be made to better represent on-ground conditions.
- Data expressing change between years from DSMs is expected to assist in identifying priority areas for minimising erosion and for identifying areas where cultural heritage may better be protected.
- Promising results are returned by preliminary results from sediment change detection maps when compared with on-ground observations (Figure 6). However, vegetation coverage and vertical accuracy remain an obstacle to the broad-scale use of the digital surface model to understand change. Improvements and refinements on the methodology will continue into 2018.

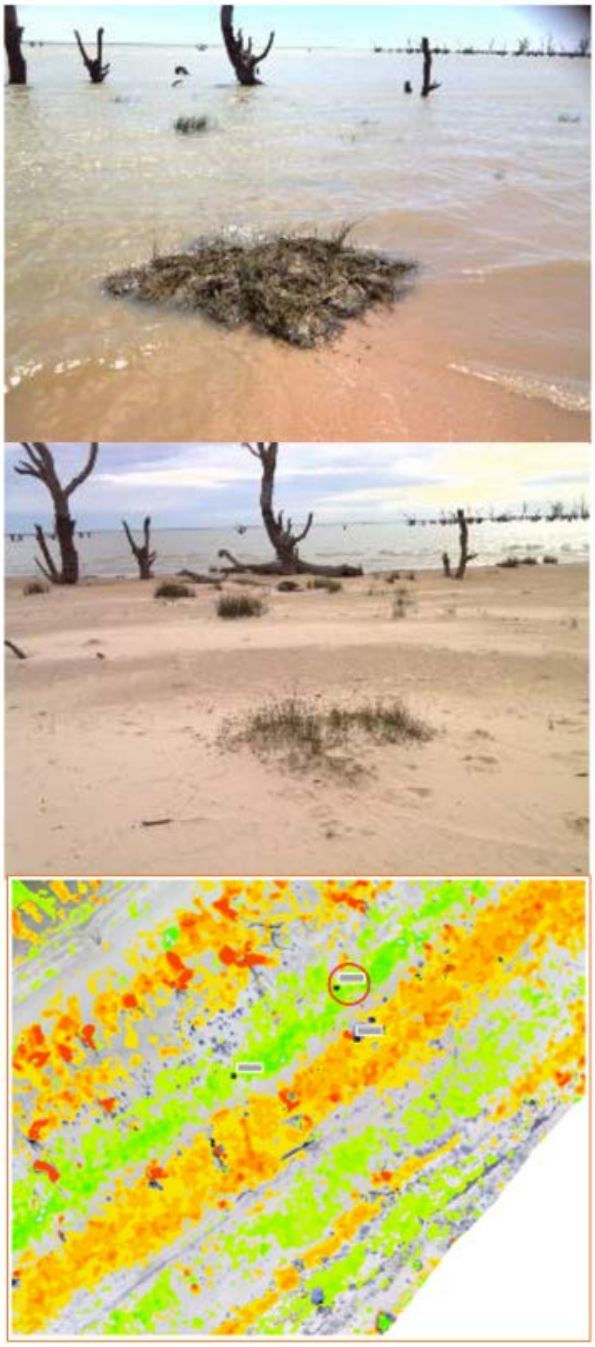

Figure 6 An example of a trial sediment change detection map above showing broad-scale changes in sediment cover on the foreshore. The red circle shows the location of a cultural heritage site with an increase in sediment (shown in green) and relevant photos of this site showing improved sediment cover between 2016 (top) and 2017 (bottom) (Source: MDBA).

Native vegetation regeneration, conservation and monitoring (Condition 36)

- The 2007 Lake Victoria CLPoM contains strategies for lakeshore vegetation conservation and monitoring. These strategies include the ongoing implementation of the LVOS which aims to keep the Lake low at certain times of the year to encourage the growth and recruitment of spiny sedge and other native riparian vegetation (see page 31). These strategies have been reviewed in 2017 and LVAC will be consulted with in 2018.
- Promoting reestablishment of vegetation on the foreshore is also achieved through keeping surrounding government-owned properties destocked, maintaining watering systems at government-owned properties away from the lakeshore, spreading spiny sedge culms and small-scale plantings in targeted areas requiring intervention such as Snake Island.
- In addition, pest animal control programs are undertaken to reduce grazing by goats, rabbits and other animal species.

Vegetation photo monitoring

- Assessment of the annual vegetation monitoring photos against the historical archive show that generally vegetation condition has continued to improve and spiny sedge stand continue to persist in most areas.
- Existing stands of spiny sedge in the Southern Lakebed, Frenchman's Islands, Talgarry Barrier and some areas of the western foreshore continue to persist across the foreshore above 24.5m and some vegetation exhibited some modest growth or improved condition (Figure 8).
- Some areas of the lakeshore in the Southern Lakebed area have shown persisting stands of spiny sedge but less cover of weeds and emerging seedlings in lower elevations (below 24m), possibly due to the later drawdown of the lake (Figure 7).
- On the western lakeshore around Noola Southern Beach and Western Beach, there has been a reduction in spiny sedge culms generally between 25 to 26m AHD likely through grazing or plant death during dry conditions.
- Over the longer term, there was an increase in spiny sedge at low elevations during the Millennium Drought when the Lake was kept low for an extended period of time. Since the breaking of the drought in 2011, the Lake has been filled more often and this has appear to limit the annual regrowth but not cover of spiny sedge in these areas. The LVOS review and PhD research aim to understand this relationship between spiny sedge persistence and lake operations.

Figure 7 Persisting stands of spiny sedge on the Southern Lakebed around Snake Island (KSN09) at 25.0m AHD (top: April 2016, bottom: April 2017) (Source: Daniel Haines, SA Water)

Figure 8 Improvement of condition in couch grass and persisting spiny sedge behind Talgarry Barrier at photo point KT206 at 26.2m AHD (top: April 2016, bottom: April 2017) (Source: Daniel Haines, SA Water)

Observations from the Aerial Imagery Trial

- The vegetation monitoring using high resolution aerial imagery captured by a drone commenced in 2014 and was again undertaken in 2017.
- A map showing the total estimated vegetation cover for 2017 for the entire lakeshore shows similar vegetation cover to the 2016 monitoring period for the areas which were not underwater during the time of imagery capture in 2017 (Figure 9).
- The vegetation cover data allows for a range of analysis techniques to be undertaken, including determining change in vegetation cover around the Lake in space and time.
- Vegetation mapped in 2017 follows a general trend of cover increasing with elevation around the Lake as per observations in 2016 (Table 2). Nulla Northern, Nulla Southern, Talgarry Wells and Talgarry Beach continue to all have considerably less vegetation cover between 24 and 26.5m AHD as per 2016 observations.
- The aerial imagery trial continues to be refined and altered to more accurately and precisely represent on-ground conditions through undertaking quality assessments for mapped vegetation, field surveys and considering supplementary data collection.
- In April 2017, MDBA Riparian and GIS Team developed a visual guide to better map lakeshore vegetation from drone imagery. This including documenting and photographing vegetation composition and cover for a series of standardised quadrats assist GIS operators to more accurately classify vegetation.
- This information has provided useful in ground-truthing vegetation classification in 2017 and will continue to be built upon in the future.

Table 2 Heat table showing percentage of area with vegetation cover within different elevation bands within management areas for 2017 at the Lake. Note: no data was available for Lakebed Channel in 2016 or 2017 due to processing issues. Cells with strike through were affected by inundation at the time of imagery capture (Source: MDBA)/

Elevation band (m AHD)	Noola Beach North	Nulla Northern Beach	Nulla Southern Beach	Talgarry Wells	Talgarry Beach	Talgarry Barrier	Snake Island	Lake Bed Channel	Western Beach South	Western Beach North	Noola Beach South	Area-weighted elevation band average
27.5 - 28.0	75	37	7	41	48	55	37	N/A	88	91	90	59
27.0 - 27.5	72	23	2	43	57	81	57	N/A	90	90	95	62
26.5 - 27.0	50	1	0	33	48	63	52	N/A	91	81	80	53
26.0 - 26.5	41	0	0	11	20	40	45	N/A	74	61	60	41
25.5 - 26.0	23	0	0	5	17	53	46	N/A	80	52	42	36
25.0 - 25.5	10	0	0	1	13	48	70	N/A	45	24	12	48
24.5 - 25.0	3	0	0	1	5	15	48	N/A	16	2	2	14
24.0 - 24.5	1	0	0	0	2	15	45	N/A	1	0	0	16
23.5 - 24.0	0	0	0	0	0	2	6	N/A	0	0	0	2
23.0 - 23.5	0	0	0	0	0	1	2	N/A	0	0	0	2
22.5 - 23.0	0	0	0	0	0	0	0	N/A	0	0	0	0
22.0 - 22.5	0	0	0	0	0	0	0	N/A	0	0	0	0
Mapsheet weighted average	11	2	0	6	12	13.2	41.9	N/A	22.2	21.5	19.2	14.2

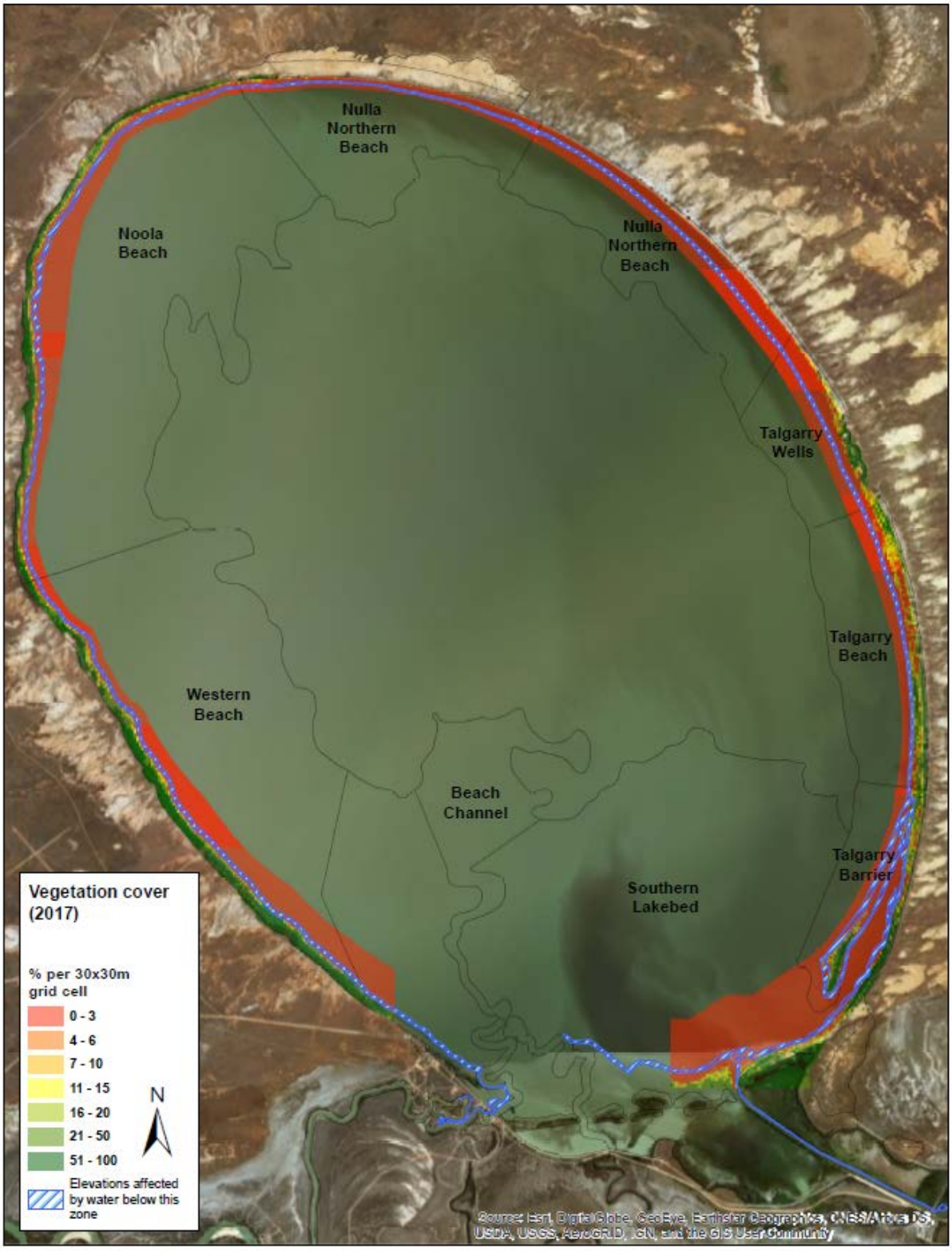

Figure 9 Vegetation cover percentage for lakeshore impacted by lake operations from 22 to 28m AHD in 2017 derived from vegetation classification results. The blue hashed area shows the zone at which elevations are affected by water below (i.e. between 23.8 and 24m was inundated during imagery capture). Note: vegetation data was not available for Southern Lakebed area at the time of writing (Source: MDBA).

Weeds

- Contractors were engaged in throughout the reporting period to assist with implementing multiple weed control programs in lakeshore areas indicated in Figure 10 as lake levels allowed.
- The most significant weed of the floodplain environment is the noogoora burr (*Xanthium occidentale*).
- Other weed species treated in the reporting period include horehound (*Marrubium vulgare*), black nightshade (*Solanum nigrum*), scotch thistle (*Onopordum acanthium*), spiny emex (*Emex australis*), golden dodder (*Cuscuta* species), common thornapple (*Datura stramonium*), onion weed (*Asphodelus fistulosus*) and castor oil plant (*Ricinus communis*).
- A total of 27,500 litres of mixed chemical was applied to weed species as part of SA Water weed treatment programs for the 2017 reporting period.

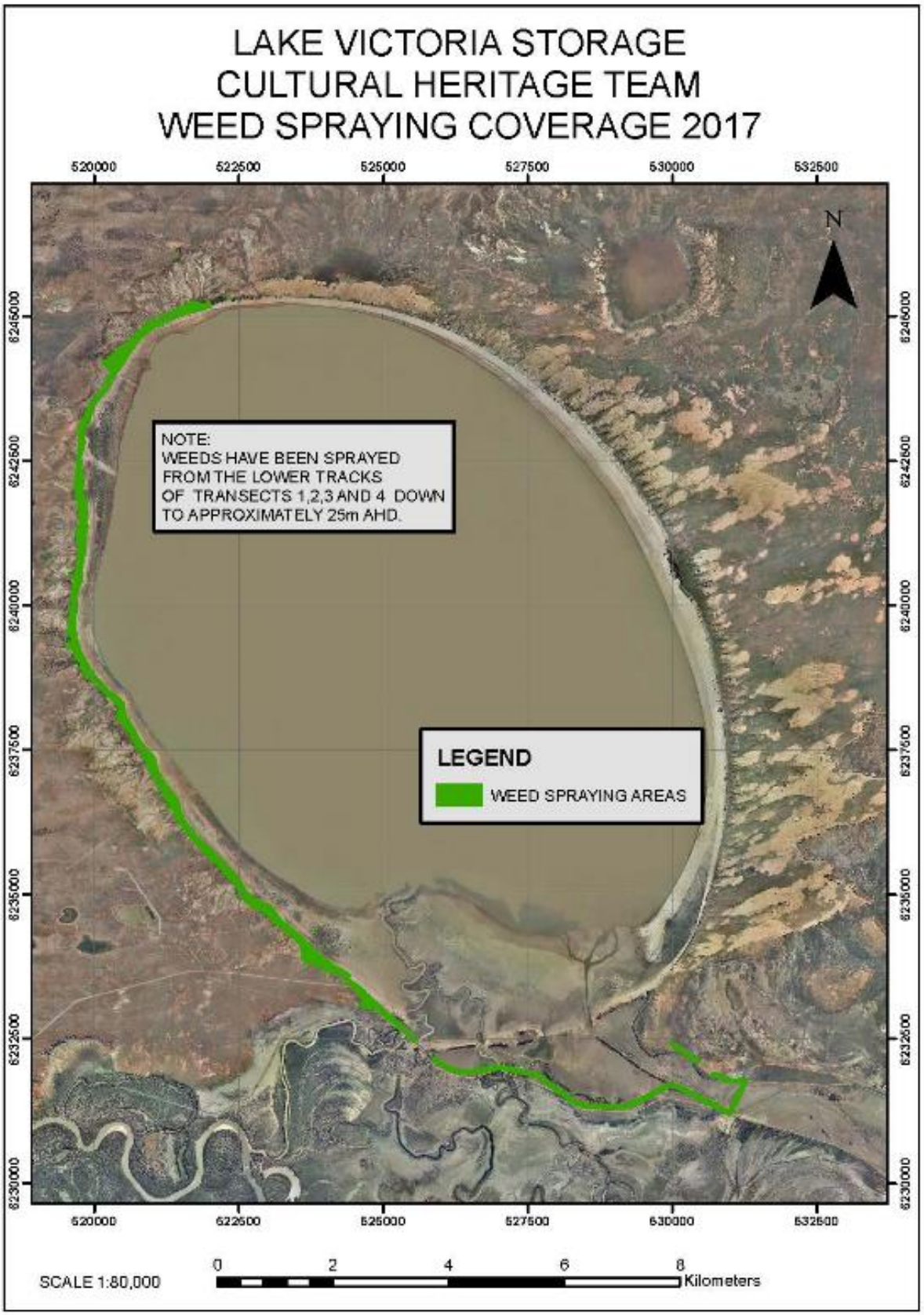

Figure 10 Coverage of weed spraying activities undertaken by SA Water for 2017 reporting period (Source: Daniel Haines, SA Water)

Managing non-native fauna (Condition 37)

Rabbit control

- A pest animal contractor delivered a 1080 poison oat rabbit control program in Riparian Zones 1 to 4 in January 2017.
- Day time rabbit transect monitoring undertaken by SA Water revealed rabbit numbers were climbing in June 2017 across sites.
- A 1080 poison program across Riparian Zones 3 and 4 started in August and September 2017 by the SA Water contractor. Approximately 200 kilograms of free feed oats and 50 kilograms of 1080 poison used in on ground works.
- A 1080 poison program was carried out across Snake Island in October 2017. 130 kilograms of free feed oats, and 75 kilograms of 1080 poison oats covering 16.5 kilometres of trail as part of program works.
- Day light rabbit monitoring transects continued to be monitored throughout the period by the SA Water contractor and Cultural heritage trainees.

Pig control

- A pest animal contractor was engaged to deliver a feral pig program at Lake Victoria. A total of 56 feral pigs were removed from various locations during reporting period. The majority of those animals were trapped and disposed in July and August 2017.

Fox control

- A SA Water pest animal contractor implemented a fox control program in January 2017 through Riparian Zones 1 to 4 with 42 baits laid and 51% of the baits were recorded as taken.
- A SA Water pest animal contractor implemented a fox control program in September 2017 to support nesting turtle activity on banks 4 and 5 with a 50% take of baits recorded post program.
- A fox control program continued in October 2017 with 50 baits laid through however results not provided on percentages taken by SA Water.
- A meeting of the adjacent landholders and staff from MDBA, NSW DoI Water, SA Water and pest control contractors was convened in mid-October 2017. The meeting allowed for a flow of ideas relating to coordinating pest plant and animal management across the Lake Victoria district and surrounding properties.

Water quality monitoring (Condition 38)

- Salinity, measured as electrical conductivity (EC), is measured daily (or continuously) at the Lake Victoria hydrographic stations (4260553 and 426502). It is important to consider long term trends in salinity data as groundwater generally moves slowly through the landscape and is influenced by a number of different factors.
- The long-term data set indicates that salinity in the Lake and in the River Murray is generally lower now than in the late 1990s when the initial AHIP was granted and the new operating strategy developed.

- The reduction over time is due to the operations of the salt interceptions schemes, improved irrigation and pastoralism practices, improved river operations and drier conditions. However even in recent wet years, salinity levels have not increased back to where they were in the late 1990s.
- The Lake salinity is still slightly higher than the nearest upstream River Murray location (Lock 9) indicating the higher saline groundwater, characteristic of the area, as it continues to enter the Lake.
- Salinity levels in Lake Victoria continue to follow the trend of lower EC from 2003 onwards into the reporting period (Figure 11).

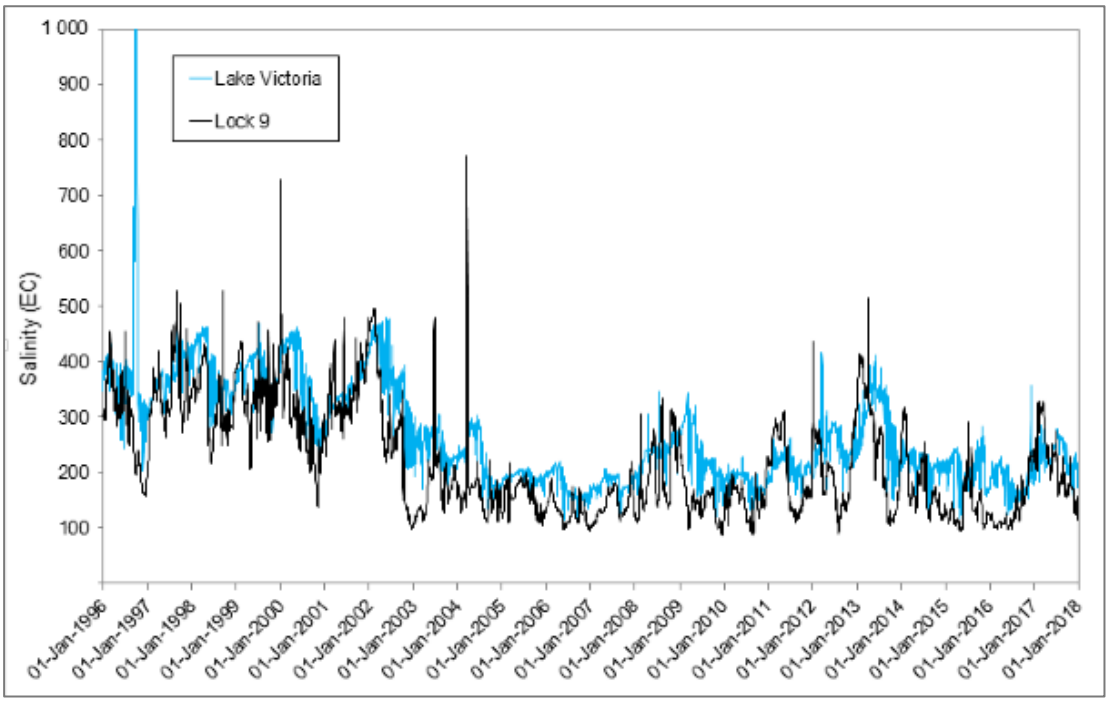

Figure 11 Salinity levels in the River Murray at Lock 9 and in Lake Victoria since 1996 until present (Source: MDBA)

Lake Victoria Operating Strategy (LVOS) (Conditions 41-44)

- The LVOS continues to remain compatible with the Lake Victoria Cultural Landscape Plan of Management and the MDBA remained compliant with the LVOS during the 12 month reporting period.
- Lake Victoria was operated with respect to guidelines outlined in the Lake Victoria Operating Strategy during the reporting period and did not deviate from guidelines.
- During the second half of the 2017-18 water year, lake levels remained well below the limits outlined in the LVOS for the end of March, April and May due to the dry conditions across the southern Basin (Figure 13). The lake started filling in April 2017 remaining below 25m until June 2017 due to relatively dry conditions during autumn (Figure 12).
- The lake was held around 25.8m from June until September 2017 mainly due to well-below average inflows in the Murray system (Figure 12).
- The lake levels reached their peak of 26.95m AHD on 28 September 2017. This relatively late filling of Lake Victoria reflects the dry conditions in the Murray system up until some moderate rainfall in late August and early September.

- Due to the changing weather conditions and confidence in the ability to fill the Lake by the end of the season, lake levels were varied between 26.5m and 27m from October through to December 2017.

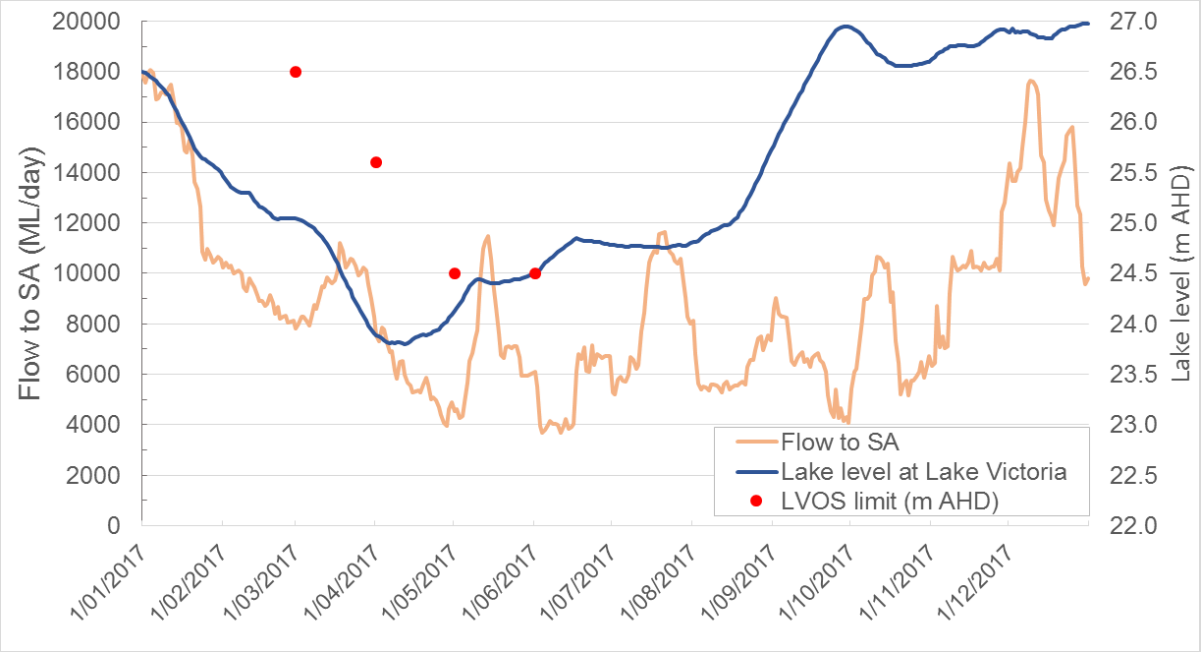

Figure 12 Daily lake level at Lake Victoria storage in m AHD and flow to South Australia in megalitres per day for the reporting period (Source: MDBA)

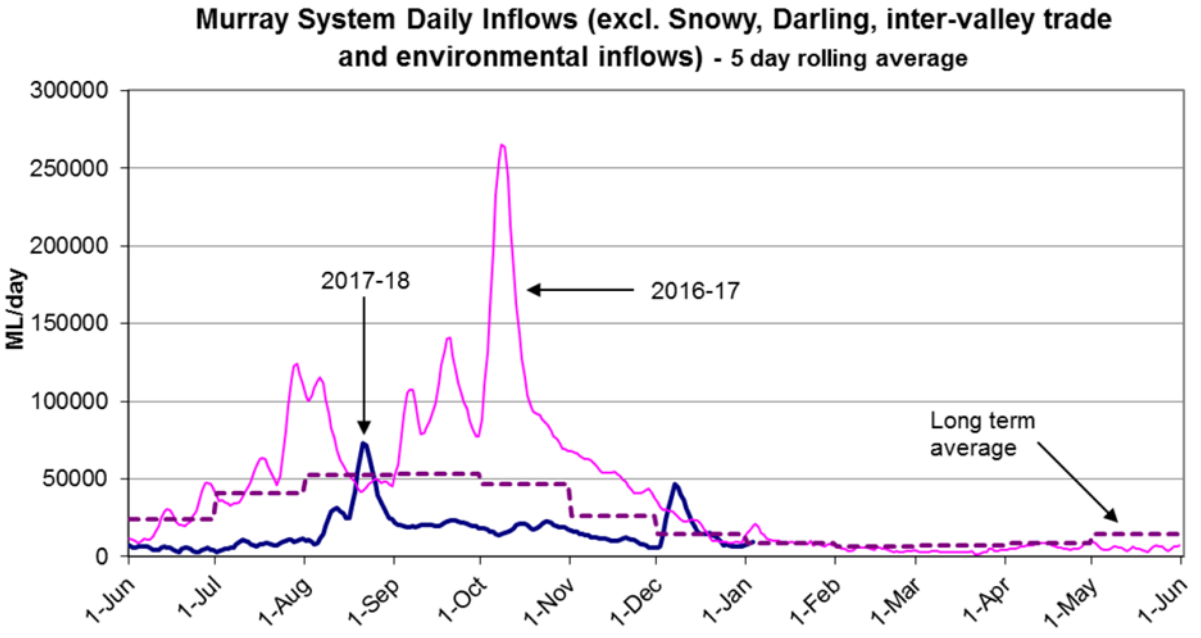

Figure 13 Well-below average inflows in the Murray system between June and December 2017 (dark blue line) when compared to long-term average (dark purple line) (Source: MDBA)

Impact on areas outside the Lake (Conditions 49-54)

Adjacent landholders

- Operational staff continue to liaise with neighbouring landholders to manage impacts including to adjacent properties including Talgarry, Dunedin Park, Lake Victoria Station and Moorna.
- Dunedin Park and Talgarry landholders requested NSW DoI staff and contractors to not access the Talgarry lake paddock to undertake work on their property due to biosecurity risk.
- A meeting of the adjacent landholders and staff from MDBA, NSW DoI Water, SA Water and pest control contractors was convened in mid-October 2017. The meeting allowed for a flow of ideas relating to coordinating pest plant and animal management across the Lake Victoria district.
- The NSW DoI Water Hydrogeology team visited Lake Victoria, Dunedin Park and Talgarry. This included discussion about the hydrogeology of the region and also a range of salinity issues, onsite with these landholders.
- Condition 49 (formerly Condition 42), states that the MDBA "will conduct a process to quantify the impacts of the operation of Lake Victoria and Frenchmans Creek on neighbouring properties in the interests of achieving an enduring agreement with affected landholders".
- MDBA has continued to work on reaching an agreement and the relevant landholders have been advised the four partner governments have yet to reach a consensus on this matter relating to Condition 49.
- The team also reviewed the groundwater monitoring program at Lake Victoria which will be considered by MDBA in 2018.

Figure 14 Landholders, contractors and MDBA staff discussing how to better coordinate pest animal and weed control in the greater Lake Victoria region (Source: MDBA).

Maintain awareness of regional planning processes (Condition 50)

- The MDBA continued to liaise with Local, State, and Commonwealth agencies to maintain its awareness of regional planning and land management processes which may be relevant to the mitigation of any impacts of the operation of Lake Victoria. Through LVAC, the MDBA continues to formally share and gain information on regional planning and management processes from governmental agencies and landholders.

Groundwater monitoring (Condition 51)

- At the end of the reporting period, NSW DoI Water hydrogeology team conducted a review of the groundwater monitoring program and will be considered in 2018. It should be noted that some of the preliminary data presented in this section falls within the 2018 reporting timeframe.
- Water NSW monitors groundwater levels and salinity with a monitoring bore network located in the lakebed and across the floodplain (Figure 15). There are 70 active groundwater monitoring sites with a total of 90 pipes. The majority of the monitoring sites are nested; screening across aquifers at different depths. Most of the monitoring sites have their water levels logged continuously (82 actively logged sites) giving a detailed insight into aquifer responses to lake operations and climate.

- Groundwater levels in the vicinity of Lake Victoria and on adjacent land to the east and south continued to be monitored in 2017.
- Routine groundwater monitoring continued bores in the lakebed on the shoreline and in the wider Lake Victoria area (Figure 15).

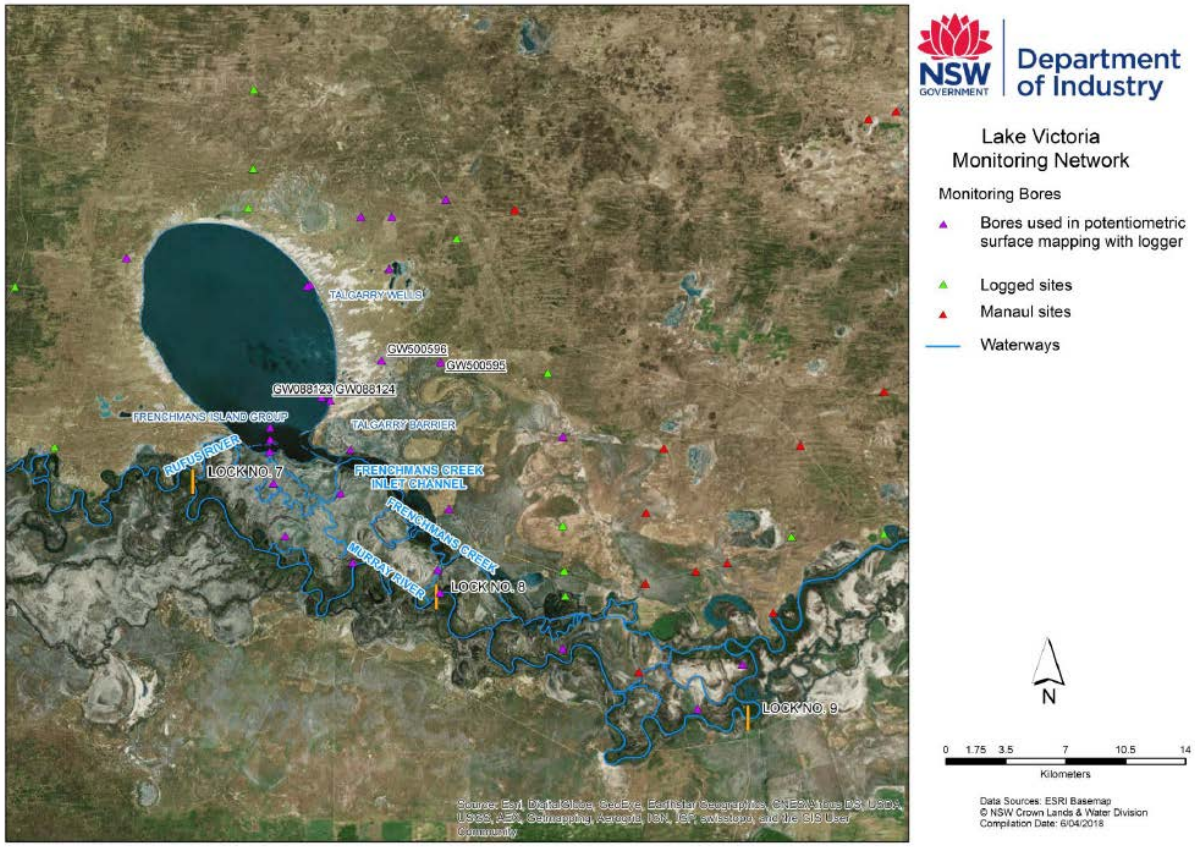

Figure 15 Lake Victoria groundwater monitoring network (Source: Water NSW)

Groundwater Level

- Groundwater levels adjacent to the Lake or under the Lake itself continue to fluctuate in unison with the volume of water held in the Lake. Bores GW088123 and GW088124 are shown as examples in the hydrograph in Figure 16.

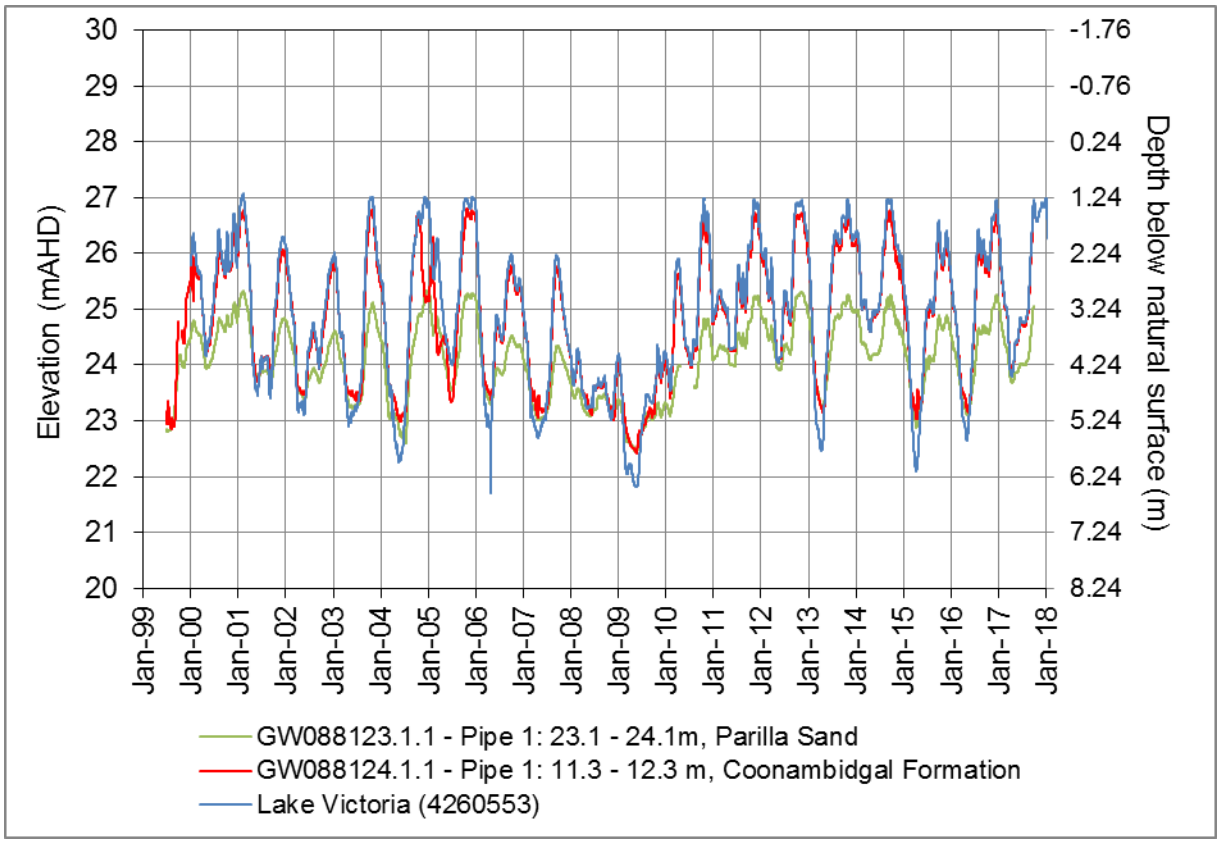

Figure 16 Hydrographs for monitoring sites GW088123 and GW088124 and Lake Victoria lake levels (Source: Water NSW)

Groundwater Quality

- The salinity measurements (electrical conductivity) for monitoring bores within the shallow aquifer are shown in Figure 18. The freshest lenses of groundwater can be found near the river inlet and outlet along the southern margin of the Lake where the Frenchman's Island group are found. Another lens of freshwater can also be found along the River Murray adjacent to Lock 8, located to the south east of the lake inlet regulator (Figure 19).
- Outside of these fresh zones, the quality of the groundwater is brackish to saline then becoming hypersaline. Salinity increases with depth down the aquifer profile (Figure 18). The extent to which the Lake freshens the surrounding shallow aquifer (as indicated in Figure 17) does not appear to be as far reaching as the effect of the hydraulic pressure from the Lake as seen by the brackish nature of the Coonambigal Formation in monitoring site GW088124, the same bore which seasonal mirrors Lake levels as shown in Figure 16.
- Whilst the outward pressure from the groundwater mound can be measured in monitoring bores in the middle of the Talgarry Barrier floodplain, the aquifer here is hypersaline (Figure 19). The fresher quality groundwater is limited to the immediate lakebed and littoral zone.

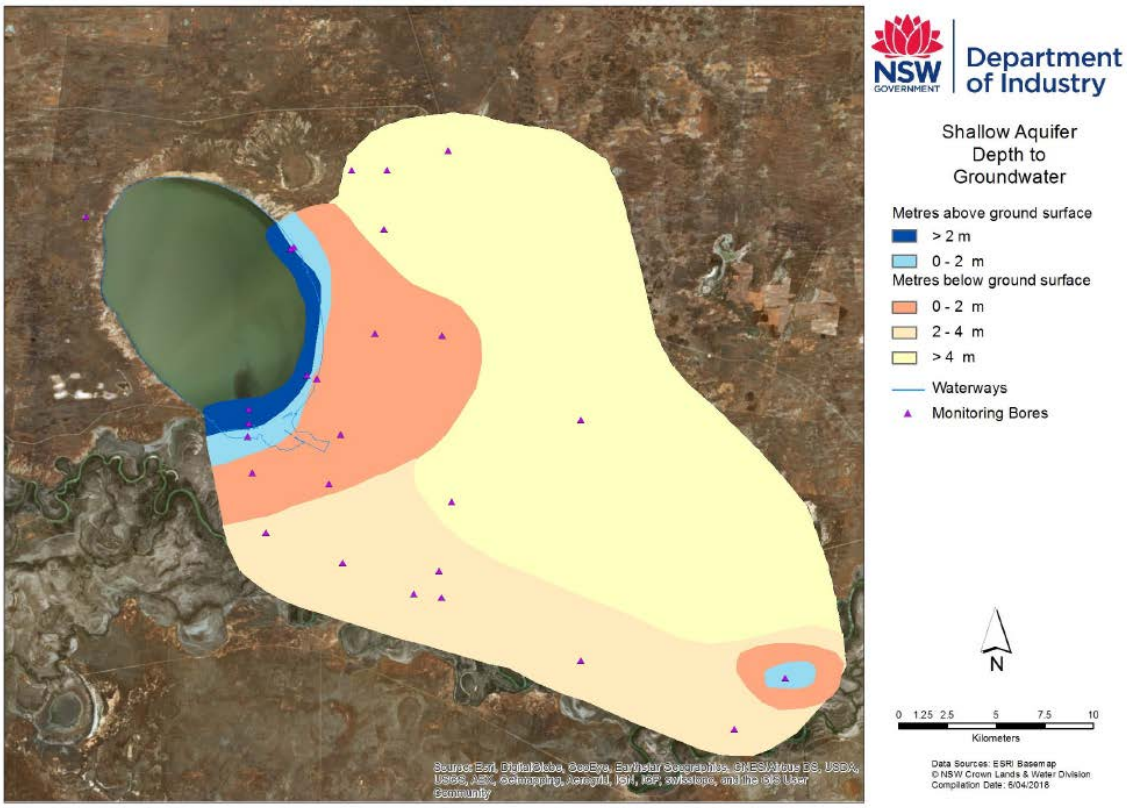

Figure 17 Depth to groundwater in the shallow aquifer that surrounds Lake Victoria in December 2017 (Source: Water NSW)

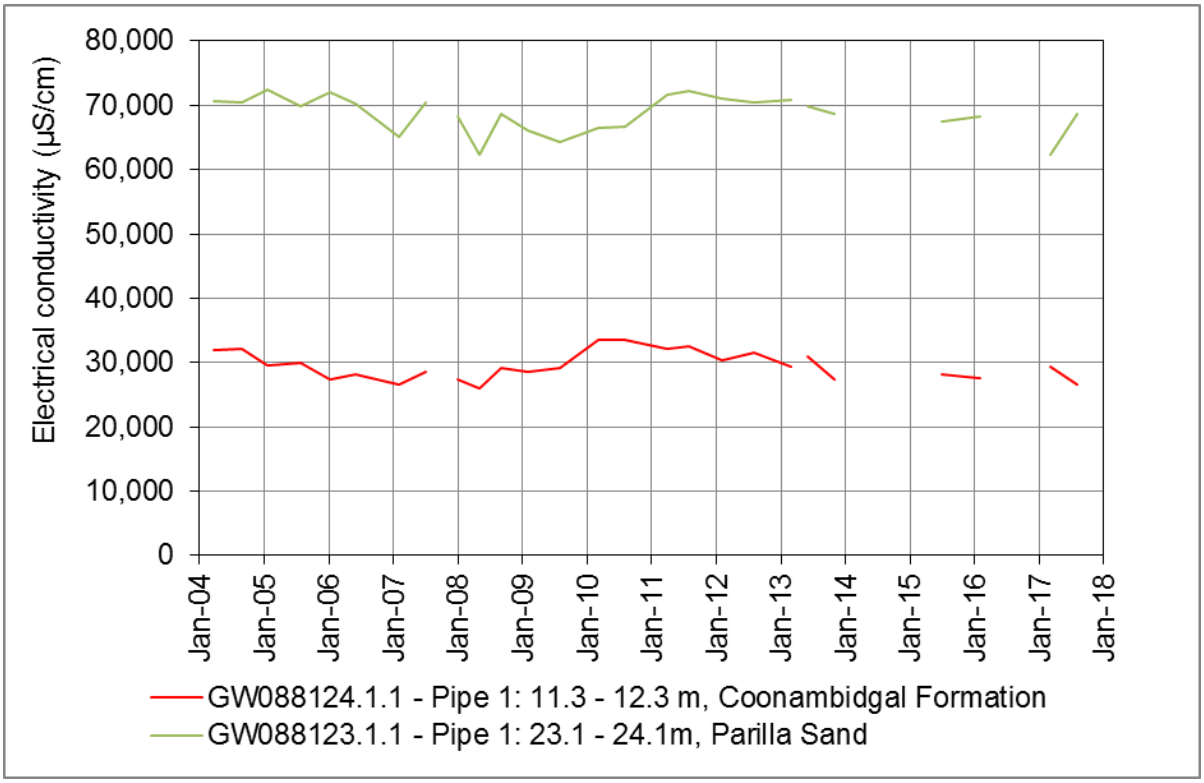

Figure 18 Gruondwater salinity increases with depth to shallow aquifer for selected bores GW088124 and GW088123 in the wider Lake Victoria monitoring network (Source: Water NSW)

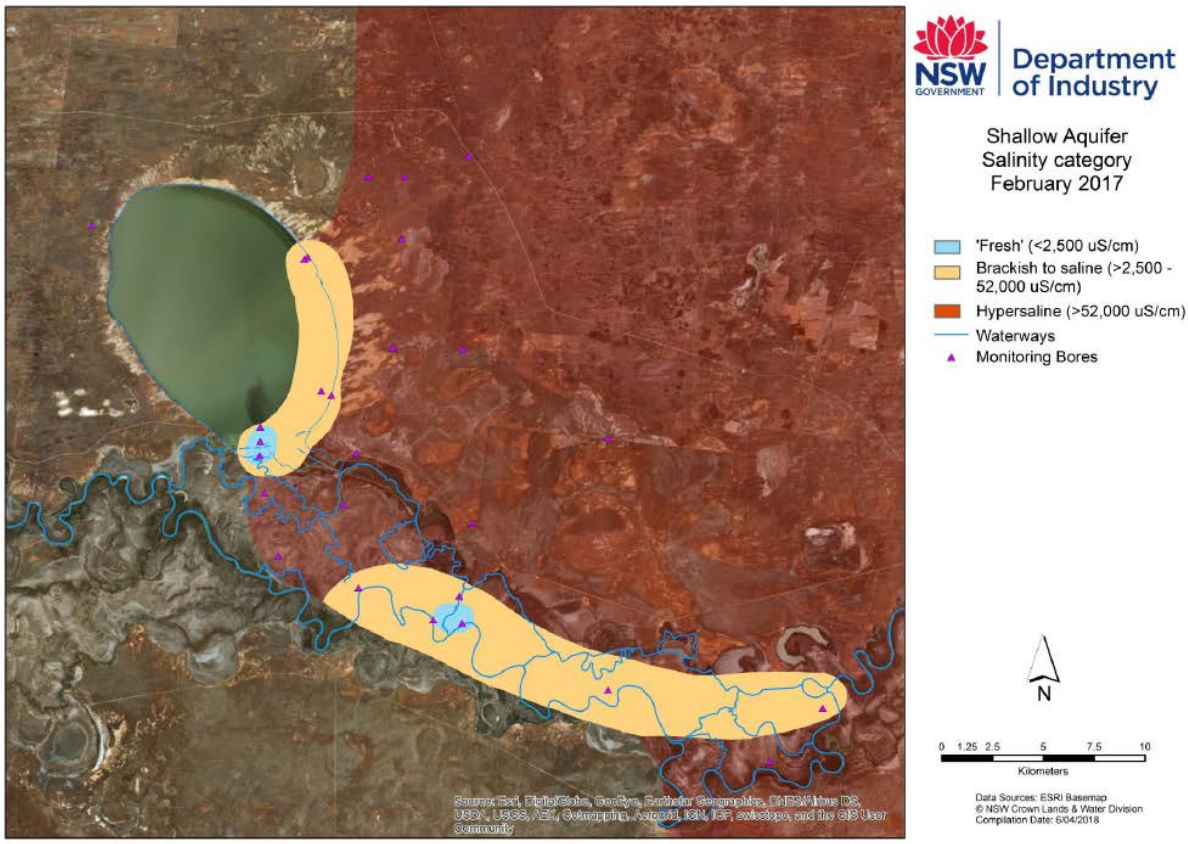

Figure 19 Electrical conductivity categories in the shallow aquifer surrounding Lake Victoria in February 2017 (Source: Water NSW)

- MDBA continued to work with the relevant state and commonwealth government agencies to quantify the impacts of the operation of Lake Victoria and Frenchman's Creek on neighbouring properties.

Cultural and natural heritage inventory (Conditions 52, 54 & 72)

- In 2002, a cultural heritage inventory of the Lake Victoria Rangelands was conducted by Hope et al. Aboriginal heritage material, predominantly shell, hearths, and stone artefacts, were found on all landform types on the southern floodplain. Burial sites were found in one location, a red sandy raised area.
- Hope et al. (2002) states that these burial sites are not subject to any known salinity problem, and advises that salinity is not a predominant threat to other cultural heritage items surveyed except where salinity contributes to erosion of clay sediments.

Impact of salinisation on fauna and faunal habitat (Conditions 52, 54, 55 & 72)

- The LVOS continues to be implemented to contribute to mitigating the potential impacts on fauna and faunal habitat through land salinisation. Vegetation monitoring has indicated that the vast majority of the vegetation decline occurred prior to the AHIP being issued. In

addition, groundwater levels continue to generally decline in areas further from the Lake, reducing the risk of further damage to critical habitat and threatened species.

- MDBA undertook a review of the threatened flora and fauna species inventory for the AHIP and salt-affected areas in 2016 which was reviewed and accepted by OEH in 2017. The review included updating the current inventory of threatened species in NSW, updating the assessment of likely presence of each listed species and the potential for each species' habitat to be adversely affected by current lake management.
- A full list of the threatened species assessment for species in the AHIP, salt-affected lands and 'Big Lake' areas continue to remain available in the 'Threatened Species at Lake Victoria Report' (MDBA 2017a).

Damage or discovery of Aboriginal objects not covered by the AHIP (Conditions 53 & 57)

- Two large grinding stones were discovered on Nulla Nulla Station by the NSW DoI Lake Victoria Project Officer, Peter Teasdale, in February 2017.
- The BMEC expressed that these objects be relocated to the Keeping Place at Lake Victoria for safe keeping. An AHIP application process has been undertaken after site inspection by OEH archaeologist John Gilding.

Administrative, general and notification conditions

Commencement, duration, and revocation of the AHIP (Conditions 1-2 & 64)

- The current AHIP commenced on 4 August 2015 and it will expire on 4 August 2020.
- There is an ongoing assessment of the operation of the Lake in line with the Conditions of the AHIP through measures including the Annual Compliance Report, the Lake Victoria CLPoM, LVAC meetings, the SRP and research projects. This assessment will inform the review of the AHIP in the lead up to its expiry in 2020.

Proposed works (Condition 3)

- During the reporting period, the Lake was operated in accordance with the proposed works agreed to in the AHIP (see page 31).

The MDBA to be responsible for the compliance with the AHIP (Condition 4)

- As the holder of the AHIP, the MDBA takes full responsibility for all works covered by the AHIP.

- Before commencing work within the AHIP, all persons are made aware of the AHIP via a site induction which includes being briefed by SA Water on the significance and sensitivities of undertaking fieldwork at Lake Victoria.
- The SA Water Coordinator Lake Victoria oversees and manages all persons involved in actions or works within the AHIP area.
- For the 2017 reporting period, the MDBA is not aware, to the best of its knowledge, of any persons involved in works that have not complied with the AHIP.

Project manager to oversee the actions relating to this AHIP (Conditions 5-7)

- In 2017, Mr. David Dreverman, Executive Director of River Management Division at the time oversaw the actions relating to the AHIP as the Project Manager until his retirement in August 2017. For the remainder of the reporting period, Mr. Andrew Reynolds as current Executive Director of River Management oversaw the actions relating the AHIP.

Annual reporting (Conditions 45-47)

- The final draft of the '2015-16 Lake Victoria Annual Report' was distributed to LVAC in June 2017 and subsequently submitted to the Chief Executive of NSW OEH.
- A copy of the report was published on the MDBA website (see: www.mdba.gov.au/publications/mdba-reports/lake-victoria-annual-report-2015-16). Hard copies of the Annual Report were sent to the Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra and the Australia Museum, Sydney.

Indemnity and release (Conditions 58-59)

- In 2017, the MDBA continued to indemnify and release parties named in Conditions 58 and 59 of the AHIP in the absence of any wilful misconduct of negligence.

Conditions applying to the Section 87 Permit to Salvage

Salvage of Aboriginal objects under this AHIP (Conditions 10, 11, 12, 56, 57 & 61, 62, 73-75)

- All salvage works are permissible under Section E under the direct supervision of the Cultural Heritage Team Leader as a representative of the MDBA, and in accordance with Section 87 Permit and the Lake Victoria CLPoM.
- No Aboriginal objects were salvaged during this reporting period.

Access for officers of OEH (Conditions 65 & 66)

- Following site inductions by managing agencies, OEH officers have full access to all of the areas covered by this AHIP.
- Officers from OEH, including the Senior Archaeologist, took part in several field trips with other agency staff and members of the SRP to various locations at Lake Victoria 2017 including Nulla lunette, eastern lakeshore and western beach.

Notice to cease or restrict salvage activities (Condition 64)

- A notice to cease or revoke this permit was not received from the NSW OEH Chief Executive in 2017.

Written notice and notification of fieldwork (Condition 60)

- The OEH was advised of all routine works, field surveys and research activities through consultation at the LVWG and LVAC meetings as well as site visits, email and teleconferences.
- Requirements to provide written notice to the OEH Office were complied with using the communication methods listed in Condition 60.

Obligations under other legislation (Condition 67 & 71)

- Authorisation and approvals under all relevant legislation were sought prior to undertaking the works of this AHIP.
- MDBA remains aware that the AHIP itself does not give authority to enter or work on freehold land or leased Crown Land.

Suitably skilled staff (Conditions 5, 62)

- All agents, employees, contracts and staff of the MDBA who are engaged to perform work under this AHIP are suitably skilled and possess appropriate expertise for the work they conduct. All activities have adequate skilled supervision to allow the work to be conducted in an appropriate professional manner.

Variation to conditions (Condition 63)

- The Conditions of the AHIP were last reviewed in 2015. The new AHIP containing the revised Conditions was issued in August 2015 following approval from the OEH Chief Executive.

Recovery and care of Aboriginal objects (Conditions 73–75, 77–80)

- No new Aboriginal objects were recovered during the 2017 reporting period.
- Two individual ‘Care and Control’ permits issued by NSW OEH are in force. One permit pertains to ‘SA Water Depot, Rufus River Road’ (which includes the early Kefous and Hope collections) and the other to ‘The Keeping Place, Rufus River Road’. All objects in the existing inventory have been collected in compliance with the ‘Community Collection’ rule.

Lake Victoria Advisory Committee attendees 2017

Name	Organisation
Claude Mitchell	BMEC
Cora Lawson	BMEC
Dale Abdulla	BMEC
Dawn Smith	BMEC
Emma Handy	BMEC
Eunice Abdulla	BMEC
Gary Abdulla Snr	BMEC
Gracie Smith	BMEC
Leonie Johnson	BMEC
Lilian Charles	BMEC
Nicholas Smith	BMEC
Phyllis Harris	BMEC
Ricky Handy	BMEC
Robyn Lawson	BMEC
Samuel Koolmatrie	BMEC
Shakira Abdulla	BMEC
Tamika Smith	BMEC
Thomas Wilson	BMEC
Timmy Abdulla Jnr	BMEC
Kingsley Abdulla	BMEC Chair
Roland Smith Snr	BMEC Deputy Chair
Paul Cohrs	Landholder
Warren Duncan	Landholder
Jane Lennon	LVAC Chair

Name	Organisation
Neale Draper	LVAC Deputy Chair
Damian Green	MDBA
David Dreverman	MDBA
Digby Jacobs	MDBA
Kyra Evanochko	MDBA
Monika Muschal	NSW DoI
Pamela Dunrobin	NSW DoI
Peter Teasdale	NSW DoI
Shaun Richardson	NSW DoI
Alf Kelly	Observer
Christine Kelly	Observer
Jason Johnson	Observer
Stuart Duncan	Observer
Graeme Enders	OEH
John Gilding	OEH
Peter Ewin	OEH
Randell Blair	OEH
Rob Evitt	OEH
Steve Meredith	OEH
Baden Moore	SAW
David Chudleigh	SAW
Gary Fyfe	SAW
Keah McLeod	SAW
Natasha Walder	SAW
Rachel Siddle	SAW
Sarah Smith	SAW
Tim Kruger	SAW

Name	Organisation
Wade Stidiford	SAW
Ben Slingsby	WLLS
Kaye Gottschutzke	WLLS
Steve McGlashan	WLLS

References

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