

Draft River Murray (Corowa to Ovens River) Erosion Management Plan

Management of boating wash and riverbank erosion

December 2017



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GLOSSARY

BEO: Boating Education Officer

BSO: Boating Safety Officer

MDBA: Murray Darling Basin Authority, Commonwealth Government

NSW DPI: NSW Department of Primary Industries, New South Wales Government

Precautionary Principle: The principle (also known as the precautionary approach) to risk management states that if an action, policy or situation has a suspected risk of causing harm to the public, or to the environment, the absence of direct scientific evidence or consensus shall not prevent action being taken to try to remedy the situation. The World Charter for Nature, which was adopted by the UN General Assembly in 1982, was the first international endorsement of the precautionary principle. This was reaffirmed under Principle 15 of the UNEP (1992) Rio Declaration

River Murray: Main channel of the river and its associated anabranches and effluents as defined in clause 86A of the Commonwealth Water Act 2007. “Murray River” refers to the main river channel only.

Roads and Maritime: Roads and Maritime Services, New South Wales Government, which incorporates the NSW Maritime Division

TfNSW: Transport for NSW, New South Wales Government

Wake/Wash Enhancing Activity: means the operation of a vessel that is ballasted, or that uses some other method, so as to generate an enhanced wave or wake for the purpose of using that wave or wake for a wake-sports activity

Wake-Sports Activity: means wake boarding, wake surfing or any similar activity (excluding water skiing and barefooting) conducted on an enhanced wave or wake generated by a vessel.

Wash or Wake: The movement of water created by a vessel

INTRODUCTION

This management Plan is a draft.

The draft Plan outlines several proposed actions to address a complex issue involving recreational, environmental, social and economic factors, and forms the basis for discussion during a comprehensive stakeholder and community consultation process which commenced on 1 December 2017. The Plan will be reviewed and amended as necessary following that process.

The final actions shall form the key component of the final Plan, and will be implemented on a trial basis. The final Plan will be socialised to key stakeholders and the community prior to implementation.

CONTEXT

The River Murray is one of Australia's greatest rivers and the country's longest at 2,508 kilometres forming most of the border between New South Wales and Victoria. The River Murray rises in the Australian Alps, draining the western side of Australia's highest mountains and then meanders across Australia's inland plains along the New South Wales and Victorian border in a north-west direction as it flows into South Australia. It turns south at Morgan for its final 315 kilometres, reaching the ocean at Lake Alexandrina. The Murray is well established as an Australian icon which supports an extensive and important range of commercial industries and local communities.

The Murray Darling Basin Authority (MDBA) is responsible for regulating flow along the River Murray system to provide water for downstream water users. It is recognised that flow regulation contributes to bank erosion in some areas. In response the Commonwealth, New South Wales, Victorian and South Australian Governments contribute funding to implement a River Works Program to mitigate the detrimental geomorphic and ecological impacts of flow regulation downstream of Hume Dam to just upstream of Lake Mulwala.

Since 2000, the Commonwealth Government, and New South Wales and Victorian state governments have contributed approximately \$25 million through the MDBA to river improvements along the river between the Hume Dam and Lake Mulwala.

Much of the regulated water released from the Hume Dam occurs during the summer and early autumn and consists of long-duration and relatively steady releases to deliver water for irrigation. This results in the river maintaining a consistent level and running at high flows over these months.

These stable releases, combined with the naturally low levels of wind on the river due to the dense riparian vegetation, provide ideal conditions for powered boating, particularly aquaplaning activities.

While boating activity has been identified as a contributing factor to river bank erosion, it is known that flooding, river regulation, loss of vegetation, stock access, wind waves, and natural environmental changes also contribute to erosion. Each of these causes interact in complex ways, often compounding and amplifying the level of erosion along river banks.

The fairly stable water level in the River Murray over summer provides ideal conditions for boating, but also results in vessel wash impacting on a concentrated section of the bank profile. This accelerates the formation of a notch at the water level, which undermines the upper bank profile and leads to subsequent block collapse. This increases the rate of retreat of the upper bank profile, leading to the development of a pronounced elongated ledge (**Appendix I**). This is a common bank profile seen in high boat use areas on the River Murray, and has also been identified in some of NSW's other river systems. In cases such as this, it is important to manage vessel wash in order to ensure the future sustainability and enjoyment of the river system.

RIVER MURRAY, EROSION AND WASH

Boating on the River Murray has long been an important part of the commerce and recreational lifestyle for many people who live in or visit the Riverina area. The River Murray is one of Australia's most attractive sites for recreational boating activities such as water skiing and wakeboarding, due to its width, which, in many places, allows vessels to pass safely in opposite directions. Its relatively high water level over the warmer month and its smooth water surface, a result of the dense riparian vegetation which provide shelter from the wind, increase its boating appeal.

Waterways often play an integral role in defining the character of adjacent cities and towns and are enjoyed by local residents, boaters and local businesses for recreation and commercial benefit including agriculture and tourism.

The River Murray affects the livelihood and well-being of millions of Australians. As well as its economic importance to agriculture and industry, the river is a resource of immense environmental and social value. Its waters maintain over 2,500 kilometres of aquatic and riparian environment which has evolved over millions of years. It is a major source of domestic water for around 1.25 million people. Hydro-electricity generated from the river and its tributaries makes a small but important contribution to supplies in the ACT, Victoria and New South Wales, meanwhile, each year the river becomes increasingly popular for recreation and tourism.

Riverbank erosion management is a significant issue for the health and stability of all our river systems including the River Murray. As stated earlier, there is a range of reasons for riverbank erosion including river regulation, loss of vegetation, stock access, wind waves, high wash boating activities and natural environmental changes such as flooding.

In 2014, Transport for NSW (TfNSW) consulted communities across 11 waterway regions in NSW to inform Regional Boating Plans (RBPs). One of the key actions arising from the RBP process was the need to develop a state-wide policy framework for mitigating and managing erosion issues where boating is thought to be a contributing factor.

Other NSW waterway regions identified to be impacted by erosion issues include the Clarence River, Tweed River, and the Upper Williams River (also known as the Seaham Weir Pool). In late 2014, TfNSW held public consultation sessions in each of these other regions and met with key stakeholders about the issues.

A key objective of these sessions was to identify areas of the river bank that are sensitive to erosion through river bank monitoring and identifying where high-wash boating activity is likely to be a contributing factor.

Generally, once a location is identified the management approach revolves around analysis of available evidence and an extensive consultation process to develop area specific management plans which aim to balance the environmental, social and economic needs of the community.

Monitoring undertaken by MDBA over several years has identified a 49 km section of the River Murray between Corowa and its confluence with the Ovens River as experiencing accelerated rates of bank erosion. Information gathered points to a correlation between an increase in the use of motorised recreational vessels, a change in vessel activity (specifically wake enhancing activities) and an increase in riverbank erosion occurring along certain parts of the river in this section.

The accelerated rates of riverbank erosion in recent years have been noted as part of the MDBA's long running River Works Program which extends back to 1959. This program has focussed on bank stabilisation works, revegetation, fencing, the acquisition of easements to pass regulated flow and re-snagging activities. A monitoring regime was established within the program to regularly assess riverbank condition, the extent of erosion and to understand whether the mitigating actions were performing as designed.

In recent years, the monitoring regime has identified a significant increase in erosion along the lower parts of this section of the river. For example, riverbanks along the Ovens Reach have significantly deteriorated in the past seven years. The Ovens Reach is 19 km long (38 km of riverbank) and is located in the downstream section of the river between Corowa and its confluence with the Ovens River. In 2009, there was approximately 4.2 km of eroded riverbank in the Reach, with 280 metres of this classified as high priority. In 2016, there was more than 10 km of eroded riverbank with 4.5 km of this classified as high priority. 27% of the 38 kms of riverbank along the reach is now classified as actively eroding (**Appendix I**).

A river is formed through an active process of natural erosion, over many years, with floods being a significant driver. However, compared to other rivers around the world, the River Murray has evolved as a low energy river system, with slow currents, low natural wave energy and comparatively low rates of erosion. Although bank erosion has been and will always be a natural process, the rate of erosion can be accelerated by other forces such as river regulation, vegetation clearance, stock access and high boat wash activities.

Due to the sheltering effect of the dense riparian vegetation, wind waves only have a small contribution to the erosion of the river banks in this section of the Murray. In contrast, the wave energy generated by a vessel is much higher than that generated by a single wind wave and when a large number of boat passes occur, the river banks can suffer significant erosion particularly if these boats generate enhanced wakes.

Because the flow of the River Murray is regulated, the river level is often held relatively high against the upper bank over the warmer months. Repeated exposure of the upper banks to high wash accelerates the formation of a notch, which undermines the bank profile and eventually leads to block collapse. This increases the rate of retreat of the upper bank profile and results in development of a pronounced elongated ledge.

The MDBA's River Works are generally an effective means of reducing the accelerated erosion associated with river regulation, stock access and vegetation clearance. However, in areas where boating activity is particularly high, vessel wash can undermine the bank protection works, inhibiting their ability to perform as designed. In many instances, this has resulted in the bank protection works requiring repair or replacement. Where vessel wash is not as high, the bank protection works continue to perform as designed.

There is no direct evidence showing a straightforward causal link between bank erosion and wake-enhancing activities, however there is a confluence of both the known higher rates of erosion and increased wake-enhancing activity on this section of the river.

Vessel usage monitoring was undertaken through the MDBA on two weekends during the boating season in 2017. Weather conditions on one weekend in January were not conducive to boating and the results were not indicative of normal use. However, conditions were favourable during the other weekend day in March. 160 vessel passes were observed along a point in the reach immediately upstream from the confluence with the Ovens River, 40 of these vessels were carrying out wakeboarding activity.

Roads and Maritime's Boating Safety Officers have reported a significant increase in the number of wakeboard boats on the River Murray over the past decade, as well as growth of the size of these vessels and their ability to create large wakes. These officers assess that the boat pass numbers on a normal busy summer weekend day would be at least twice those recorded during the observation in March this year. The recent growth in wake surfing is a more recent phenomenon that has also been reported by the officers. It is significant due to its impact on other waterway users and potential to result in accelerated rates of bank erosion.

MDBA has received both formal and numerous informal representations from a range of stakeholders regarding the impacts of powered boating within the Lake Hume to Lake Mulwala reach of the River Murray. The concerns have mostly focused on vessel wash causing bank erosion and environmental degradation. In 2010, these representations led the Advisory Group for Hume to Yarrawonga Waterway Management to encourage MDBA to convene a 'Boating Issues Forum'.

MDBA hosted this Forum as a first step towards achieving a balanced and pragmatic management approach to minimising the effect that powered boating has on the river banks. Attendees included river frontage landholders, recreational river users, government representatives (Commonwealth, New South Wales, Victorian and Local) and staff from

agencies and organisations involved in river management in various capacities. Recommended solutions and options arising from the Forum included; zoning of boating use, increasing the enforcement of regulations and education of river users, and investigating the viability of off-river ski parks (**Appendix III**).

Federation, Moira and Indigo Shire Councils have likewise received multiple representations from members of the public about boating activities causing damage to riverbanks in the section of the River Murray between Corowa and its confluence with the Ovens River.

Roads and Maritime also considers there to be safety and amenity implications related to the increase in numbers of wake-enhancing vessels. These specifically relate to the impacts on other waterway users such as smaller powered and passive craft. Community input (both formal and informal) received over a prolonged period by MDBA and local councils suggests these safety and amenity implications could be resolved through the introduction of user specific areas, i.e. waterway areas set aside for activities that are otherwise adversely affected by wake-enhancing activities.

EROSION AND VESSEL WASH

It is difficult to quantify and determine the precise contribution of vessel wash to bank erosion. However, it is known that different types of vessels and different modes of operation create different magnitudes of wash with different wave energy levels. The magnitude and form of the waves produced by a boat travelling along a river are a function of the depth of the channel and the vessels' hulls design, its displacement relative to the channel cross-section, its speed and direction of travel relative to currents in the channel, and its distance from the bank (Camfield *et al.*, 1980). The rate of erosion of the channel banks depends on the frequency of wave impacts as well as the balance between the energy in the waves and the resistance of the bank sediment (Nanson *et al.*, 1994).

During slow towing activities, such as wake sports, a vessel is generally operated in a *transitional* mode, where the vessel's hull is between its displacement mode and being on the plane. This mode of operation creates the largest wash. Waves generated during this transitional phase have been recorded to reach 40-50 cm (Asplund, 2000). In recent years, advancements in wake enhancing technology have improved the operational outcomes of these vessels, and it is expected this figure may now be significantly higher. These waves are typically associated with high amplitude and velocity resulting in high energy waves with the greatest potential to impact on the shoreline compared to other forms of recreational boating activity, such as water skiing (Dickenson, 1999). Furthermore, there has been an increase in large

heavy wake enhancing vessels over recent years as a proportion of all vessels. With increasing vessel size there is often an associated increase in the size and energy of vessel wash.

A study conducted by Nanson et.al (1994) found that the maximum wave height is the simplest measure and is associated with a major threshold in erosive energy on unconsolidated sand alluvium at wave heights of 30-35 cm. The study also found that at maximum wave heights above 35 cm all but the most resistant bank sediments erode and that reducing maximum wave heights to below 30 cm (e.g. by limiting slow towing activities) caused a dramatic decline in bank erosion along the river.

The erosive action of vessel wash is also dependent on a range of other factors, for example the type and consistency of the soil on the bank, bank profile (shape), presence or absence of vegetation and extent of previous erosion. In some situations, a bank may be inherently stable even in the face of a variety of natural and human-related processes but then be pushed over an erosion threshold by vessel wash and then be affected by erosion for the first time. In other cases, vessel wash can act on an already unstable bank face, accelerating rates of erosion. In other instances, vessel wash can help to prevent the re-establishment of a bank already eroded as a result of another factor, by preventing revegetation.

It is likely that the full spectrum of scenarios exists along the identified reach of the River Murray, making simple characterisation of the issue problematic.

While boat numbers have steadily increased over the last thirty years, it is likely that the millennium drought has altered the geography of water-skiers and wake boarders, resulting in more boating traffic on the River Murray. During the very low inflow years, the water level in many Victorian lakes was very low while the level in the river remained relatively high as water continued to be delivered in channel for downstream users. Observations indicate these low water levels in other areas have led people to move their boating activities from these lakes to the River Murray.

Like many other inland waterways, the Hume Dam to Lake Mulwala reach of the River Murray has seen a significant increase in the popularity of recreational boating. The increase in boating traffic has also coincided with a rise in the popularity of activities associated with enhanced vessel wash, such as wake boarding and wake surfing. The wash from these activities has resulted in an increase in the level of energy dissipated on the river banks.

The River Murray between Corowa and its confluence with the Ovens River has been identified as having pronounced riverbank erosion issues. River bank monitoring funded through the MDBA has revealed accelerated rates of erosion with a doubling in the extent of erosion along some areas of this reach over the last four years (Figures 1 and 2).

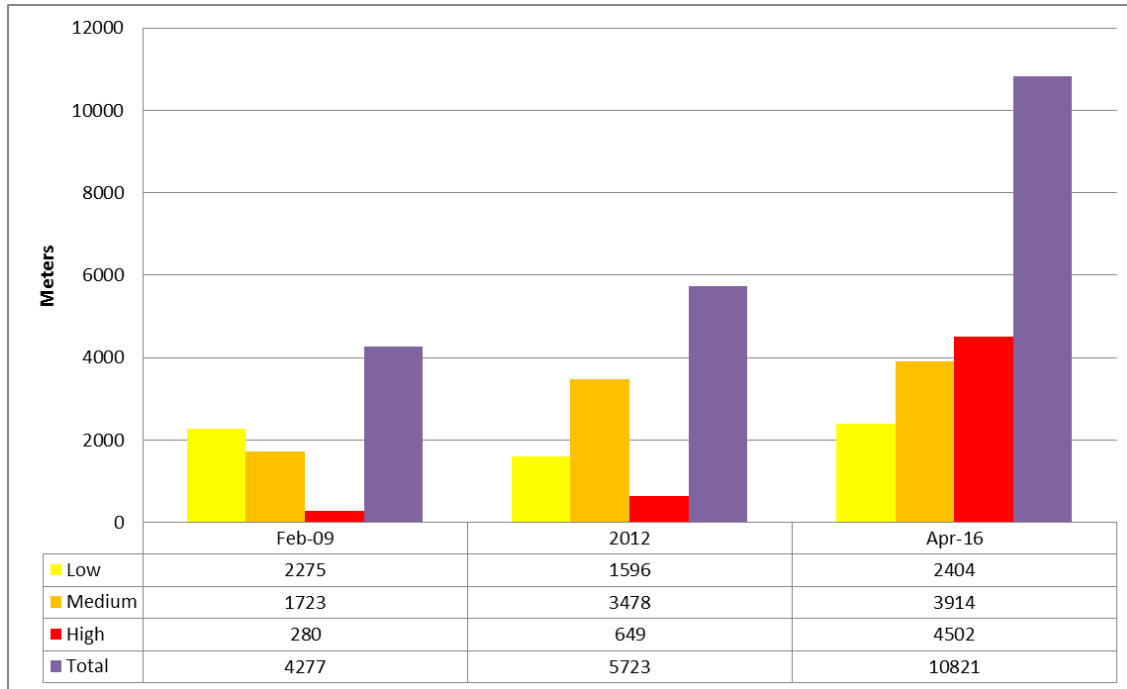


Figure 1: Erosion along Ovens Reach since 2009

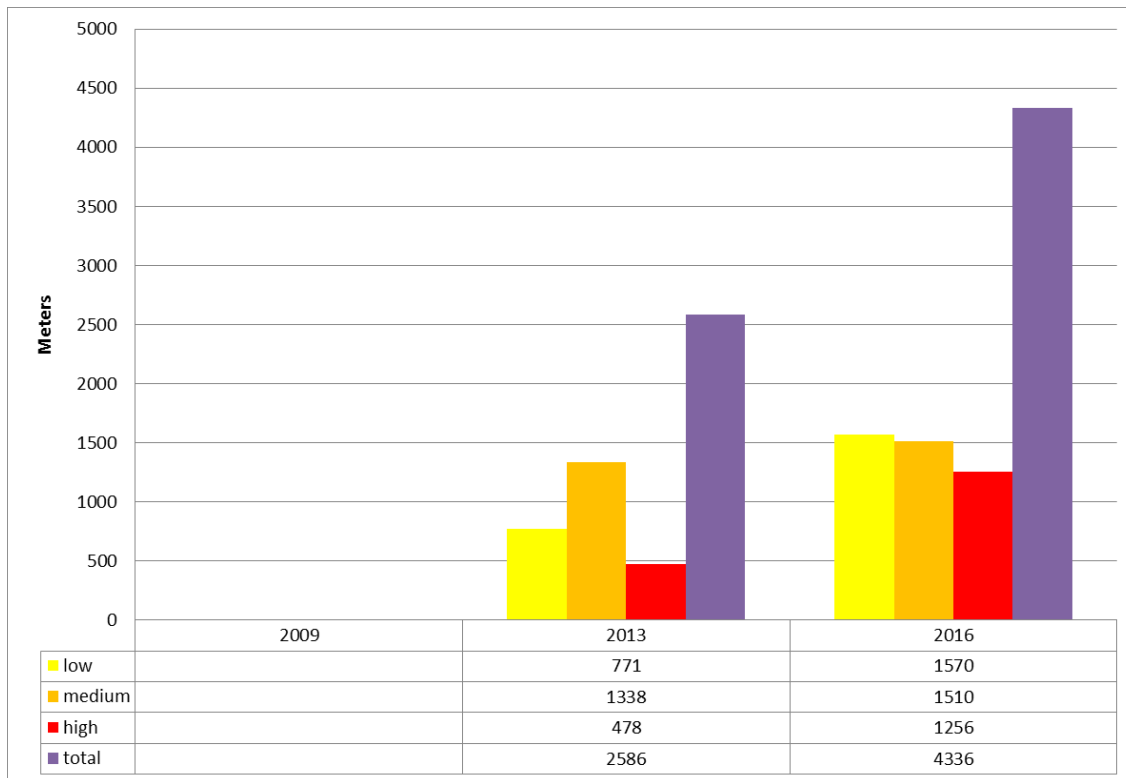


Figure 2: Erosion along Corowa Reach since 2013

This correlates with a known increase in boat-use in the area. Extensive riverbank improvement works constructed in recent years, to mitigate the detrimental geomorphic impacts associated with river regulation, have also been undermined and no longer behave as designed. In many instances these have had to be repaired at significant cost. The same bank protection works implemented in other areas where vessel wash is thought to not be as prevalent, continue to behave as designed.

Data from various sources, including Roads and Maritime’s licence and registration databases, boat usage monitoring and industry surveys indicate a distinct increase in boating activity in all NSW waters over the past 30 years and particularly the use of larger recreational vessels and activities associated with wake-enhancing devices such as wake-surfing and wakeboarding in the River Murray .

More recently the increased popularity of wake-sports has led to significant technological developments in purpose-built wake-sport vessels with higher displacement (>7.5 metres length overall and 2900kg dry weight) and load carrying capacity (up to 19 people) than the previous generation of ski boats. Many of these vessels have a range of additional wake enhancing

accessories including, specialised hull design technology, wake gates, hydrofoils and automatic ballast (which can fill tanks on either side of a vessel with >1200 litres of water while the vessel is operating at speed).

This increase in vessel traffic (including wake-sports vessels) when coupled with the numerous scientific studies into the impacts of enhanced vessel wash activities on riverbank erosion on similar waterways within NSW, nationally and internationally, provide further support of this correlation between high boat-use areas and increased erosion.

Throughout the majority of the section of the Murray flowing between NSW and Victoria, the NSW-Victoria border lies at the original southern high bank of the natural watercourse (in accordance with the 1850 determination of the New South Wales and Victoria border and the 1991 Joint Surveyors-General determination). Additionally, all of the land submerged beneath the Murray (i.e. the riverbed) is owned and regulated by the NSW Government.

Roads and Maritime is responsible for marine safety, specifically the regulation of commercial and recreational vessels and their operations and the protection of the environment in connection with the use of vessels in NSW waters. Part of this role includes developing equitable management arrangements for interacting waterways users such as the impacts of wake-enhancing vessels on other waterway users.

MANAGEMENT COMMITTEE

As part of the TfNSW Regional Boating Plans (RBPs) state-wide policy for managing and mitigating boating-related erosion issues and in order to find a balance and pragmatic management approach to this problem, Roads and Maritime and MDBA established a new joint agency management committee. The purpose of the committee is to advise on the development, implementation and review of the River Murray (Corowa to Ovens River) Erosion Management Plan (the Plan) for this section of the river. The committee is known as the River Murray (Corowa to Ovens River) Project Management Committee (the Committee).

The Committee's initial task has been to propose management actions, based on both the evidence obtained over a prolonged period and application of the Precautionary Principle, to reduce ongoing accelerated rates of erosion along the vulnerable sections of river bank; address the safety and amenity implications related to the increase in wake-enhancing vessels and devices and minimising any economic impact on the various industries directly or indirectly reliant on the river.

The proposed range of management actions have been developed on the basis of the river bank monitoring provided by the MDBA, expert Roads and Maritime boating knowledge, strategic management advice and historical public and stakeholder consultation and feedback.

A map of the proposed Plan area is shown at **Appendix II**.

An extensive public consultation process will be undertaken to ensure the opinions of all key stakeholders and the general community are considered before the Plan is finalised and implemented.

STAKEHOLDER AND COMMUNITY CONSULTATION

Before any management actions are taken there is a need to fully consider the social and economic impacts of these actions on the communities, local residents, boaters and local businesses, including the impact on recreation and commercial benefit realised through agriculture and tourism. A key stakeholder and community consultation plan has been developed to assist with this consideration.

Accordingly, this draft River Murray (Corowa to Ovens River) Erosion Management Plan, (the Plan) has been developed to form a basis for the engagement plan. It is a draft which will be revised to take into account comments received from stakeholders and the community. This draft seeks to find a balance between environmental imperatives and the community's continued sustainable and responsible enjoyment of the river while minimising any economic impact on the various industries directly or indirectly reliant on the river. The multi-agency committee has been established to develop this Plan, lead the engagement process and, in due course, implement the final Plan.

OBJECTIVES

The objectives of the proposed management actions in the Plan complement each other. They are to:

- balance the protection of the environmental values of the river and adjacent riparian environments
- promote responsible and equitable enjoyment of the river by local communities and tourists
- enable growth of local businesses and economies
- reduce spending on river bank repair and protection.

To achieve these objectives the Plan recommends the implementation and monitoring of several interim management activities as a trial. In summary these are:

1. Implement a new vessel wash restriction zone between South Corowa and the junction of the Ovens River on a trial basis.
2. Continue the MDBA River Works Program.
3. Review the existing boating rules within the Plan area and surrounding areas to ensure these are still appropriate.
4. Undertake ongoing research and monitoring.
5. Identify potential locations more suited to wake enhancing boating activities.
6. Undertake ongoing boating education and increased compliance during the trial period.
7. Review the status of the Plan and progress of actions.

During the stakeholder and community consultation process the Committee will seek input on the following:

1. The proposed seven actions.
2. Impacts of these actions on the region (recreational, social, economic and environmental impacts).
3. Any outcomes from these actions that have not yet been identified.
4. Impacts likely to occur outside the restriction zone, for example at Lake Mulwala, Lake Hume, Lake Eildon, and upstream of Corowa.
5. How much notice the community would need prior to commencement of a final plan.
6. In what format the community would prefer to be kept informed, and how often.
7. Any other comments.

This draft Plan will be reviewed following receipt of this input, and the final Plan will be developed and socialised.

The proposed management actions, or variations of these actions following public consultation, will be implemented by the Committee on a trial basis for an initial period of three years. Throughout this trial period the Committee will meet regularly to assess, review and evaluate the Plan's effectiveness, consult further with key stakeholders and the general community and incorporate any changes that may be required.

A number of agencies will be responsible for various aspects of the Plan and an overarching group with representatives from Roads and Maritime and MDBA will be required to implement its actions.

PROPOSED MANAGEMENT ACTIONS

Action 1: Roads and Maritime Services will trial a new vessel wash restriction zones in the key areas identified between South Corowa (chainage 2073) and the junction of the Ovens River (chainage 2025)

The section of the River Murray between Corowa and the confluence with the Ovens River has been identified as having pronounced riverbank erosion issues. Extensive riverbank improvement works undertaken in recent years as part of the River Works Program, designed to protect the river banks from the detrimental geomorphic impacts associated with regulation, have failed in many instances. This correlates with an observed increase in activities associated with enhanced vessel wash. These structures require repair at significant expense to prevent further deterioration in the condition of the river banks.

On the basis of the observations and the Precautionary Principle, the Committee recommends the implementation of a trial ‘no wake enhancing activities’ zone in the River Murray between South Corowa (chainage 2073) and a location on the river (known locally as ‘the Cut’) which is approximately 1.5 kilometres upstream of the confluence with the Ovens River (chainage 2025), including all anabranches and tributaries under NSW jurisdiction, in addition to the current boating restrictions in place within this reach of the river. As the regulatory authority Roads and Maritime would administer this new zone. The proposed no wake enhancing activities zone is shown in **Appendix II**.

This proposed zone would restrict the operation of certain vessel activities that generate an enhanced (larger) wash or wake that is considered to result in an unacceptable risk to bank stability. Regulation within the zone could (however is not limited to) prohibit:

- Wakeboarding
- Wake surfing (whether a person is being towed behind a vessel by a rope or is ‘free surfing’ without a rope).
- Other wake-sports and wake enhancing activities
- Use of ballast in vessels or other devices to enhance wash.
- Operation of a vessel in a manner that creates enhanced wash.

The initial review does not indicate there is a need for a general prohibition on all power boating activities or all towing activities including water-skiing and barefooting, or the introduction of additional speed restrictions throughout the zone. The Committee may consider other vessel

use management arrangements in the zone based on community feedback during the consultation phase leading up to finalisation of this draft Plan.

It is expected that the combination of the introduction of the proposed 'no wake enhancing activities' zone and the continuation of riverbank rehabilitation work will significantly reduce the amount of wave energy being generated, improve the resilience of river banks to erosion, and provide an area for other waterway users to enjoy the river without experiencing the safety and amenity impacts of wake-enhancing sports.

While it is thought that this will lead to a reduction in the rate of erosion of river banks in these areas, ongoing monitoring and review will allow the restrictions to be revised if required. The restrictions will apply to the vast majority of circumstances where heavy wash is generated; such as wakeboarding, wake surfing, aquaplaning and use of ballast or wake-enhancing devices.

A prohibition on water skiing activities is not considered necessary due to the comparatively lesser level of wash generated and thus the lesser impact on river bank erosion.

It is proposed that this zone will be initially implemented on a trial basis pending the outcomes of the proposed ongoing monitoring. The Committee has determined an initial trial duration of three years.

Section 11 of the Marine Safety Act 1998, provides the NSW Minister for Roads, Maritime and Freight the legislative powers to prohibit or regulate the operation of vessels in navigable waters by a notice displayed in or in the vicinity of those waters. Accordingly this zone would be enacted through the installation of authorised Roads and Maritime signage (fixed shore based and in-water as required) that clearly communicate the restricted activities within the new wash restriction zone. **Appendix IV** provides an example of signage that has been used in other vessel wash management areas.

Educational & advisory materials such as brochures, website and advisory signage detailing any new rules and restrictions will be developed and distributed to the community as part of an ongoing education and compliance strategy (Action 6).

The Committee (or relevant identified members) will be tasked with supporting the development and distribution of such materials.

Action 2: The Murray Darling Basin Authority (MDBA) will continue the current river-works program in the trial area and, where appropriate, enhance river bank protection in adjacent areas where vessel wash is increased due to the proposed wash trial restriction zone.

The Commonwealth, New South Wales, Victorian and South Australian Governments contribute funding to implement a River Works Program to mitigate the detrimental geomorphic and ecological impacts of flow regulation (**Appendix I**).

Since 2000, more than \$25 million has been spent to implement physical bank protection works and to enhance the environmental values of the Hume to Yarrawonga reach. In most areas, the use of log revetment and revegetation is favoured, over rock beaching, due to the ecological benefits for habitat and because it allows the river to continue to gradually migrate across the floodplain, which is consistent with floodplain river behaviour.

The River Works program has included extensive riverbank improvement works in recent years along the 49.5 km reach from South Corowa to the junction with the Ovens River.

The MDBA will continue the River Works program, and where appropriate, enhance the river bank protection works in areas that are likely to see an increase in vessels undertaking wake enhancing activities as a result of the restriction zone.

Action 3: Roads and Maritime Services will review the existing boating rules within the management plan area and surrounding areas to ensure these remain consistent with the trial objectives.

In accordance with the 1850 determination of the New South Wales and Victoria border (confirmed in the 1991 Joint Surveyors-General determination) any part of the River Murray north of the original southern high bank of the natural watercourse (as at 1850), which forms the NSW/Victorian border, is considered NSW navigable waters. Concurrently any section of water which exists naturally or otherwise south of the NSW Victorian border is exclusively under Victorian jurisdiction, this includes any anabranch, tributaries or lagoon, such as Lake Moodemere.

There are a number of exemptions to this general determination, however the only exemption of relevance to this Plan relates to the waters of Lake Mulwala and the Ovens River in that the *Marine Safety Legislation (Lakes Hume and Mulwala) Act 2001* defines the area transferred to New South Wales jurisdiction as all the waters of Lake Mulwala including the waters of the Ovens River north of the Murray Valley Highway Bridge. Roads and Maritime has interpreted this legislation to imply that only the natural watercourse of the Ovens River down to the Murray Valley Highway Bridge is under NSW jurisdiction in terms of boating laws. As such these waters are subject to NSW marine safety legislation which includes the *Marine Safety Act 1998* (the *Act*) and subordinate regulations.

It is important to note the objects of this Act are as follows:

- a) to ensure the safe operation of vessels in ports and other waterways,
- b) to promote the responsible operation of vessels in those waters so as to protect the safety and amenity of other users of those waters and the amenity of occupiers of adjoining land,
- c) to provide an effective framework for the enforcement of marine legislation,
- d) to provide for the investigation of marine accidents and for appropriate action following any such investigation,
- e) to consolidate marine safety legislation.

Section 11 of the *Act*, provides the NSW Minister for Roads, Maritime and Freight the legislative powers to prohibit or regulate the operation of vessels in navigable waters by a notice displayed in or in the vicinity of those waters. In accordance with Section 11 of the *Act*, the following vessel restrictions are currently enforced within the vessel wash management plan area:

River Murray (Corowa upstream) four knot area - The navigable waters of that part of the River Murray at Corowa enclosed between lines directly across the waterway firstly two hundred (200) metres upstream of the John Foord Bridge at the eastern entrance to the lagoon and secondly approximately six hundred (600) metres downstream of the John Foord Bridge.

River Murray (Corowa downstream) eight knot area - The navigable waters of that part of the River Murray at Corowa enclosed between lines directly across the waterway firstly approximately six hundred (600) metres downstream of the John Foord Bridge and secondly at the extension of Augusta Street approximately three thousand (3000) metres further downstream.

River Murray No Wash area - The navigable waters of that part of the River Murray (limited to the main channel) between the 2043 river kilometre sign and a point on the river approximately 500m downstream of the 2060 river kilometre sign.

River Murray No Water-skiing and Aquaplaning area - The navigable waters of that part of the River Murray (limited to the main channel) between the 2043 river kilometre sign and a point on the river approximately 500m downstream of the 2060 river kilometre sign.

Lake Mulwala (Murray and Ovens Rivers Junction – The Cut) four knots Area - The navigable waters of that part of the junction of the Murray and Ovens Rivers at Bundalong Victoria being an interconnecting channel known locally as The Cut at a point approximately twenty (20) kilometres upstream by the course marked by navigation aids from Yarrawonga Weir.

Ovens River (Bundalong) four knot area - The navigable waters of that part of an anabranch of the Ovens River at Bundalong Victoria enclosed by lines across the waterway firstly in the north three hundred (300) metres north from the prolongation of Austins Road and in the south six hundred (600) metres south from the prolongation of Austins Road.

Ovens River (Murray Valley Highway) eight knot area - The navigable waters of that part of the Ovens River Victoria and its anabranches enclosed by lines across the waterway firstly in the south by the northern side of the Murray Valley Highway Bridge crossing and in the north approximately twelve hundred (1200) metres downstream from that Murray Valley Highway Bridge.

Ovens River no wakeboarding and wake enhancing activities area - The navigable waters of that part of the Ovens River Victoria and its anabranches enclosed by lines across the waterway

firstly in the south by the northern side of the Murray Valley Highway Bridge crossing and in the north to its confluence with the Murray River (near Bundalong).

Ovens River No Water-skiing and Aquaplaning area - The navigable waters of that part of the Ovens River Victoria enclosed by lines across the waterway firstly in the south approximately twelve hundred (1200) metres downstream from that Murray Valley Highway Bridge and in the north approximately three thousand two hundred (3200) metres downstream from that Murray Valley Highway Bridge.

These zones are all shown in **Appendix II**.

Roads and Maritime records indicate that the majority of these zones have been in place for many years with little or no change.

A key action of the *Transport for NSW, Regional Boating Plan Murray - Riverina Region* is to “review the placement and planning of navigations aids and signage to improve navigation where appropriate” and “review strategies to improve on-water behaviour and safe boating practices across the region”. The proposed review under Action 3 of this Plan will directly contribute towards addressing the action in this Regional Boating Plan.

Action 4: The River Murray (Corowa to Ovens River) Project Management Committee will undertake the following research and monitoring:

i. Vessel usage and river bank erosion monitoring.

The Committee will undertake vessel monitoring to obtain vessel usage data, both in and adjacent to the proposed trial area. Vessel monitoring is scheduled to commence in early December 2017 and will run over four months on selected days.

In addition, the MDBA will extend the existing river bank monitoring program to include additional partial cross sections along and adjacent to the reach from Corowa to the Ovens River confluence. This will help the Committee understand the correlation between vessel wash and bank stability in different areas. While the current monitoring and observations provide a strong indication of the contribution that vessel wash has on bank erosion, it can be difficult to demonstrate and quantify the precise impact of different activities due to other factors, such as flooding. Long-term monitoring over many years will be required to observe and record changes to the health of the river banks.

ii. Social and economic analysis and monitoring of the local community.

It is vital that the Plan adequately addresses the environmental needs of the river and provides certainty for the local and wider community whom use the river for recreation and commercial benefit.

Analysis of community demographics is key to understanding any potential social and economic impacts the Plan might have on the local and wider community. Consequently, a detailed community and stakeholder engagement plan has been developed. A key role of the management committee members (specifically the Local Government Authorities and Murray River Action Group) is to provide expert advice into the development of a demographic profile and identify the potential social or economic impacts of the Plan on the community.

The public consultation phase of the Plan will also provide an opportunity to gather further information and assist in measuring the level of such impacts on the community.

Action 5: The River Murray (Corowa to Ovens River) Project Management Committee will work with local stakeholders to investigate potential locations more suited to wake enhancing activities.

Research analysis undertaken in similar waterways as part of the Roads and Maritime state-wide framework for managing boating activity in erosion-sensitive areas (including the Clarence River and Upper Williams River) has identified certain stretches of river can be considered more suitable for wake generating activity under assumed tolerances. These tolerances included restricting such activities to the centre of the river (to reduce the intensity of wave impact on the river bank) and ensuring that a certain level of riverbank remediation occurs at key sites.

Similar stretches of river may be suitable in other sections of the River Murray, Lake Mulwala or Hume Dam. Certain off river waterways may also provide suitable environments for wake sports activities.

In addition to these locations the Committee is open to ideas and suggestions from the wake-sports community about alternative locations that are well suited to wake generating activities and any proposals for suitable locations to establish dedicated wake sports areas and facilities such as off river wake sports parks.

In any locations identified as being more suited to wake generating activities, the Committee will develop educational and advisory materials (i.e. signage) that encourage the wake-sports community to undertake higher impact wash generating activities in a safe manner, while reducing their impact on the environment. Such materials will be developed in conjunction with the relevant representatives of the wake-sports community, such as local boating clubs and relevant business operators.

Action 6: Roads and Maritime (with the assistance of the other committee agencies) will undertake ongoing education and increased compliance during the trial period.

During implementation there will be a need for increased education and compliance operations as well as immediate and ongoing education, particularly during the boating season (October to March), for boaters and local residents to ensure that everyone understands the new restrictions and boating regulations more generally.

Roads and Maritime will develop a specific safety education and compliance campaign for implementation by boating safety and education officers. It will include a focus on finding opportunities to educate Victorian boaters on the relevant NSW rules and regulations.

The campaign will deliver the objectives of the Boating Safety Communications and Education Strategy 2015-18, a three-year strategy for promoting a culture of safe and responsible boating state-wide.

Developed by TfNSW in partnership with Roads and Maritime, this strategy underpins education, communication, regulatory and compliance activities that promote a culture of safe and responsible boating state-wide to achieve NSW Government boating safety priorities.

'Watch your wash' is one of the key sub-messages of the Boating Safety Communications and Education Strategy, underpinning the overarching safety message 'You're the Skipper – You're Responsible' which encourages personal responsibility by ensuring those who use NSW waters are aware of appropriate rules, requirements and codes of conduct.

A central strategy of the wash messaging is the presence and visibility of BSOs and BEOs. These officers will be engaged in skill sharing and delivering face to face education with the boating public, particularly at boat ramps at peak use times and at major events such as Melbourne Boat Show.

Supporting the frontline work of the BSOs and BEOs will be educational and advisory materials such as brochures, web pages and advisory signage detailing any new rules and restrictions, to be developed by Roads and Maritime in consultation with TfNSW.

Action 7: The Committee will meet regularly to discuss the status of the Plan, progress on actions and consider any emerging or current issues.

The Committee will oversee the implementation of the Plan, review and consider ongoing river bank and boat use monitoring data, consult with stakeholders and community and recommend any changes. A number of agencies will be responsible for various aspects of the Plan and an overarching group with representatives from Roads and Maritime, MDBA and NSW DPI will be required to implement its actions.

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APPENDICES

Appendix I: MDBA, *Bank erosion along the River Murray between Hume Dam and the Ovens Junction*, April 2017.

Appendix II: Map of proposed vessel wash management area.

Appendix III: Boating Issues Forum, Murray Darling Basin Authority, *Forum Outcomes Report, 2010* – Summary of outcomes

Appendix IV: Example of vessel wash management area signage.

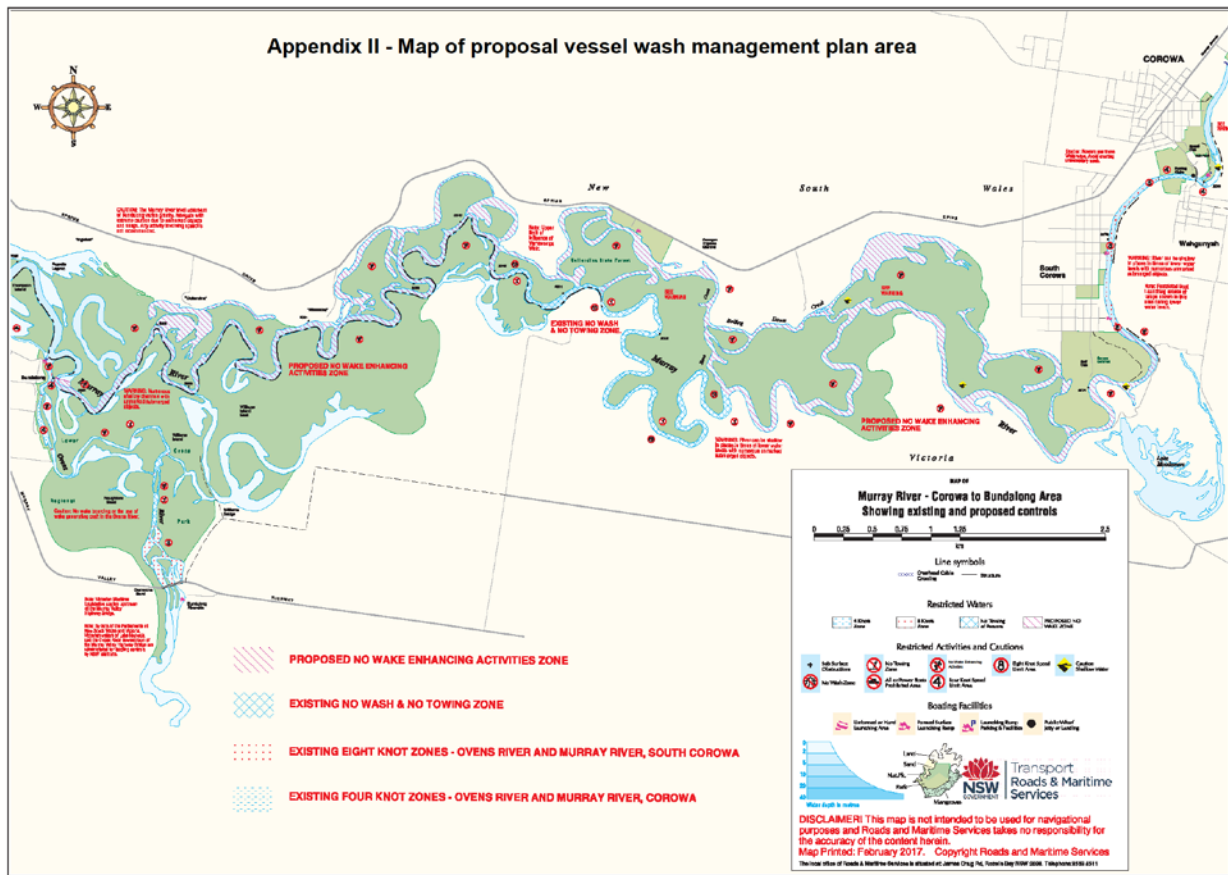
Appendix I

MDBA, *Bank erosion along the River Murray between Hume Dam and the Ovens Junction*, April 2017.

<https://www.mdba.gov.au/publications/mdba-reports/bank-erosion-along-river-murray-between-hume-dam-ovens-junction>

Appendix II

Map of proposed vessel wash management area.



Appendix III

Boating Issues Forum, Murray Darling Basin Authority, *Forum Outcomes Report, 2010*.

Summary of Forum outcomes - What is the most important thing you need to discuss?

Governance

Issues

- Consistent approach to Management
- Identification of responsible authorities in relation to various aspects of river management
- Regulation and cross border issues with boating. Visitor behaviour

Solutions

- Need for overall plan – too many agencies, need for one responsible body
- Appropriate regulation, appropriate resourcing for management and compliance

Erosion

Issues

- Bank erosion -threatens natural infrastructure and other assets
- Protection and restoration of riparian areas. Need proactive programs not reactive
- Boat type to do with erosion (large displacement)
- Riverbank erosion asset protection (wake boats enhance erosion)
 - Recognition that the river is a dynamic system
 - Allowance must be made for geomorphic processes – erosion and deposition
- Erosion and asset protection along with passive and power boat usage clashing. Particularly wake board boats that lead to increased erosion
- Removal of snags for water activities (wake board, boats) is not good practice

River Use

Issues

- Ecological effect of waves- i.e. aquatic plant dislodgement, disturbs fauna
- Addressing full range of impacts on the rules
- Loving Murray to death
- Finding a balance for the future
 - Infrastructure
 - Boat ramps etc
- Interaction of power boating and passive river use, Erosion (particularly wake boats)
- How can you make off river parks work? There is over 165 river kms
- Maintain protection of access for fishing
- Protection of tourism industry (boating)

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Solutions

- Understanding the changing ‘face’ of boating i.e.:
 - Technology
 - Attitudes
- Identification of suitable areas for different types of boating activity
- Retention of alternative boating sites

Safety

Issues

- Safety for river users
- Safety of boat users and other river users

Solutions

- Vehicle and boat licenses interact and demerit points transferable
- Policing existing laws

Appendix IV

Example of vessel wash management area signage.

