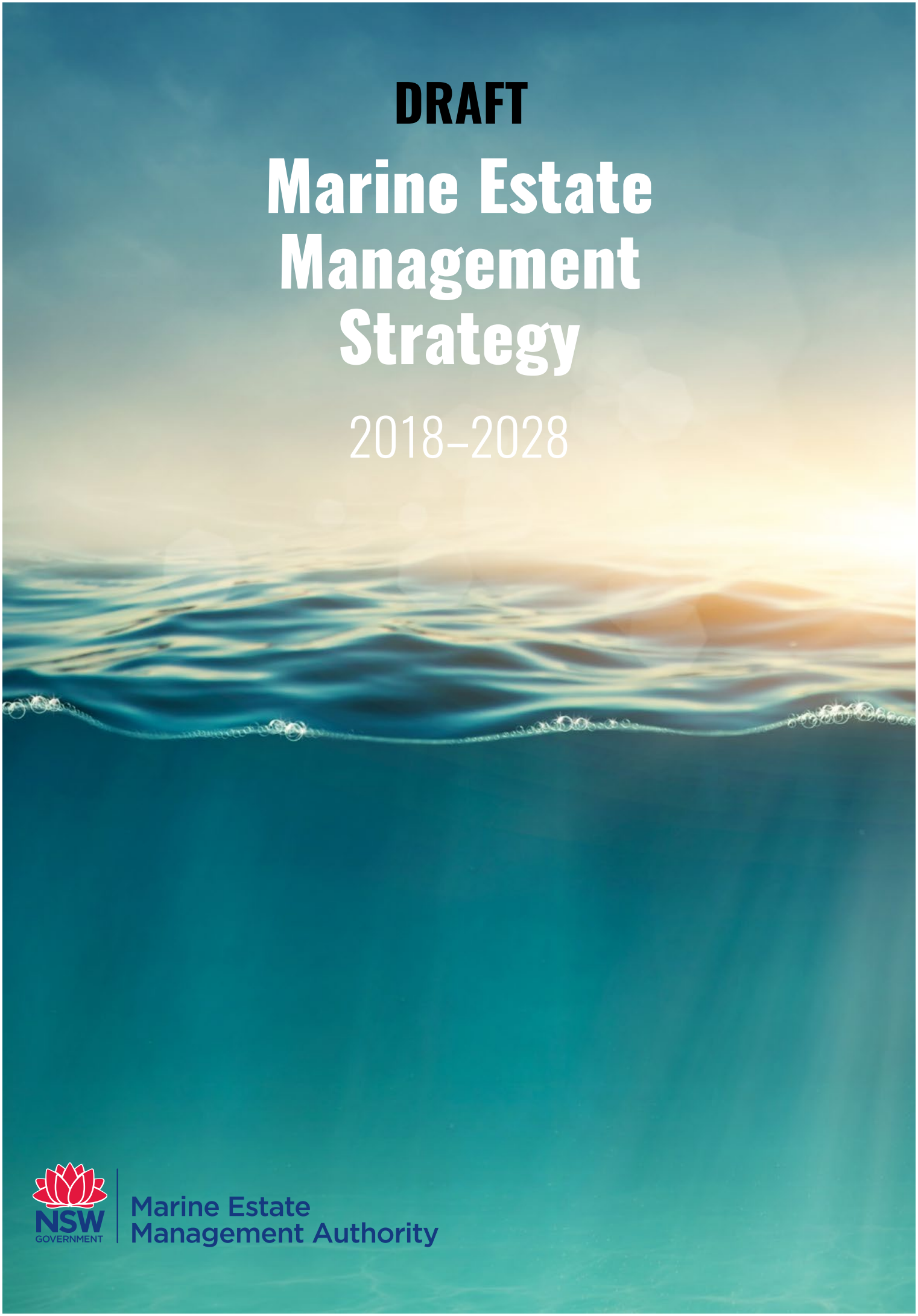


DRAFT

Marine Estate Management Strategy

2018–2028

NSW GOVERNMENT

Marine Estate Management Authority

How to provide feedback **on the** Marine Estate Management Strategy

The Marine Estate Management Authority (Authority) is interested in your feedback on the Strategy. You can submit your feedback via an electronic submission form on the marine estate reforms website: **www.marine.nsw.gov.au.**

Workshops are being held at six places on the NSW coast.

More information can be found at **www.marine.nsw.gov.au.**

If you have any queries or would like to register for marine estate reform updates you can email us at **contact.us@marine.nsw.gov.au**.

Your feedback from public consultation will be used to finalise the Strategy and guide the management of the NSW marine estate over the next ten years.

The Authority may publish your submission unless you advise otherwise. Publication of submissions will usually include your name and the name of your organisation, if relevant. The Authority will remove contact details such as your email address, postal address and telephone number. At the Authority's discretion, certain submissions (or parts of submissions) might not be published due to their length, content, appropriateness or confidentiality. All submissions could be disclosed, if requested, in accordance with the *Government Information (Public Access) Act 2009*.

Foreword

The State's estuaries, coastline and waters (the NSW marine estate) are collectively one of our greatest natural assets and are highly valued by locals and tourists alike. They provide recreation and enjoyment, contribute to our quality of life and are of social, economic, cultural and ecological importance to the people of NSW.

Our vision for the NSW marine estate is for *a healthy coast and sea, managed for the greatest wellbeing of the community, now and into the future.*

The *Marine Estate Management Strategy 2018-2028* (Strategy) reaffirms the NSW Government's commitment to maintaining and improving holistic management of the marine estate as one continuous system, and outlines how we will manage priority threats to the environmental assets and social, cultural and economic benefits the community derives from the marine estate.

The Strategy is informed by the objects and requirements of the *Marine Estate Management Act 2014* and application of the five-step decision-making process of the Authority. Based on a comprehensive threat and risk assessment, it acknowledges the pressures on the NSW coastal environment and sets out the actions necessary to deliver improved, evidence-based management of our marine estate.

Traditional Owners have used NSW coastal resources for thousands of years and the NSW Government is committed to working collaboratively with coastal Aboriginal communities as part of the improved management of the marine estate. The Authority acknowledges their contribution to the Strategy as well as that of other members of the NSW community – including interested individuals, community groups, peak industry bodies, environmental groups, scientists, government agencies, the Chair and members of the independent Marine Estate Expert Knowledge Panel (the Panel), all of whom committed time and effort.

The Authority looks forward to continuing to work with the NSW community and the many stakeholders of the marine estate on the finalisation and implementation of the Strategy.

Dr Wendy Craik, AM
Chair
Marine Estate Management Authority

Aboriginal people are the Traditional Owners of the NSW marine estate and have a continuing connection to their Land and Sea Country

Contents

Executive summary

A healthy coast and sea, managed for the greatest wellbeing of the community, now and into the future.[1]

The NSW marine estate is a valuable natural asset to the people of NSW. It comprises tidal rivers and estuaries, the shoreline, the submerged lands, and the waters of the NSW coast from the Queensland border to the Victorian border and out to three nautical miles offshore. The NSW Government's broad vision for the NSW marine estate is:

A healthy coast and sea, managed for the greatest wellbeing of the community, now and into the future.

To achieve this vision, the Marine Estate Management Authority (the Authority) established a five-step decision-making process (Figure 1).

Starting in 2014, it involved working with the NSW community and experts to identify the benefits of the marine estate to the community – the environmental, social, cultural and economic values and benefits. An evidence-based statewide threat and risk assessment (statewide TARA)[2] during 2016–17 assessed benefits and identified the threats that are a priority for action. This Strategy proposes a suite of initiatives that are the most effective options for addressing priority threats. A five-year health check will measure progress.

These steps and their associated outputs, along with the Authority's ten management principles, underpin this Strategy for the NSW marine estate.

[1] *Managing the NSW Marine Estate: Purpose, Underpinning Principles and Priority Setting* (MEMA 2013)

[2] *NSW Marine Estate Threat and Risk Assessment Report* (MEMA 2017)

Figure 1. The Authority's five-step decision-making process[3]

The Strategy is a key commitment of the NSW Government resulting from the NSW Government's response to the findings of the 2012 *Independent Scientific Audit of Marine Parks* in NSW (the Audit).[4]

It sets the overarching framework for the NSW Government to coordinate the management of the marine estate over the next decade in accordance with the objects of the *Marine Estate Management Act 2014* and the NSW Government's vision for the marine estate. The Strategy balances economic growth, use and conservation of the marine estate by identifying evidence-based management priorities and setting policy directions for managing the marine estate as a single continuous system.

The Strategy uses the best available evidence, as well as input from scientists, the community, Aboriginal people, industry, government and non-government organisations. It is presented in the following sections:

Introduction – provides background to current governance arrangements, the development of the Strategy, including outcomes of the statewide TARA, and the role of marine protected areas in the marine estate.

What are the priority threats? – outlines the priority threats identified in the Community Survey and statewide TARA, the cumulative threats and how they link to other, related reforms.

How will priority threats be managed? and ***Management initiatives*** – outlines how the priority threats will be addressed by eight management initiatives and a suite of proposed management actions.

How will we know if we are delivering on our vision? – summarises how management actions will be monitored, reported and adapted over the ten-year life of the Strategy and track how they are meeting their intended objectives to inform the five-year health check.

The eight management initiatives correspond to the cumulative threat categories identified through the statewide TARA process. This allows a holistic approach to dealing with the cumulative threats.

The Strategy integrates other coastal and marine reforms in NSW to achieve a more coordinated approach to management of the marine estate by all levels of government. An implementation plan will provide more detail: how management actions will be implemented, agency responsibilities, timeframes and key performance indicators.

A five-year health check will review progress to respond to research and monitoring outputs, new evidence, and emerging threats that need a management response. It includes a midterm review of the statewide TARA. A Marine Integrated Monitoring Program (the Monitoring Program) will report on how we are meeting key performance indicators and filling knowledge gaps.

The Authority will guide the implementation of the Strategy over the next ten years, with advice from the Panel, and will work closely with relevant management bodies, industry and community to ensure the vision for the marine estate is achieved.

The NSW Government is confident the Strategy will guide the new approach to managing the marine estate and achieve the vision of *a healthy coast and sea, managed for the greatest wellbeing of the community, now and into the future.*

[3] *Managing the NSW Marine Estate: Purpose, Underpinning Principles and Priority Setting (MEMA) November 2013*

[4] *Independent Scientific Audit of Marine Parks* in NSW (Beeton et al. for MEMA 2012)

Introduction

It's your marine estate

The marine estate is one of the most significant natural resources in NSW. It includes around one million hectares of estuary and ocean, including more than 1,750 kilometres of ocean coastline, 6,500 kilometres of estuarine and coastal lakes foreshores, 826 beaches, and 185 estuaries and coastal lakes (Figure 2).

Almost six million people live within 50 kilometres of the NSW coastline, including the people of eleven coastal Aboriginal nations that are intimately connected to their Land and Sea Country.

The marine estate brings a range of environmental, cultural, social and economic benefits to the NSW community. It offers the opportunity for activities such as diving, swimming and fishing, and it provides a livelihood for many, such as commercial fishing and tourism businesses. Millions of domestic and international visitors enjoy the marine estate, generating billions of dollars each year for NSW and the Australian economy.

The NSW marine estate is owned by all people and has to be managed for all people[5].

The many different uses of the marine estate can sometimes come into direct conflict with each other, for example boating and swimming. Some activities can also present threats to the social, cultural and economic benefits or environmental assets of the marine estate with potential implications for the broader community. For example, much of the water runoff from cities, industries and agriculture along the coast ends up in estuaries and can lead to reduced water quality. Other threats, including rising sea temperatures, ocean acidification and invasive species present longer-term concerns.

[5] *Independent Scientific Audit of Marine Parks* in NSW (Beeton et al. for MEMA 2012)

BOX 1. MARINE ESTATE DEFINITION

The *Marine Estate Management Act 2014* defines the marine estate as:

- the coastal waters of NSW within the meaning of Part 10 of the *Interpretation Act 1987*
- estuaries (being any part of a river whose level is periodically or intermittently affected by coastal tides) up to the highest astronomical tide
- lakes, lagoons and other partially enclosed bodies of water that are permanently, periodically or intermittently open to the sea
- coastal wetlands (including saltmarsh, mangroves and seagrass), lands immediately adjacent to, or in the immediate proximity of, the coastal waters of NSW that are subject to oceanic processes (including beaches, dunes, headlands and rock platforms)
- any other place or thing declared by the regulations to be the marine estate but does not include any place or thing declared by the regulations not to be the marine estate.

Australians are coastal people. The coast is our heritage and way of life and I wouldn't be me without it[7].

Community benefits and opportunities

In 2014, we asked 1,700 NSW residents about their values and attitudes in relation to the marine estate. Through this survey, we learned that the NSW community considers:

- the health of the marine estate to be a core value
- pollution of the marine estate is a major threat, whether from littering, spills or land-based runoff
- the marine estate is integral to the social and cultural wellbeing of the community
- diversity and abundance of marine life and natural beauty of the marine estate are key economic values for nature-based and regional tourism.

The results of the survey were published in the *Marine Estate Community Survey Final Report* (the Community Survey).[6]

ENVIRONMENTAL ASSETS AND OPPORTUNITIES

The Community Survey revealed that people value the marine estate's natural assets more than any other 'benefit' - the estate's natural beauty and the clean waters supporting a variety of unique and abundant Australian marine life was identified as the most important asset. The natural beauty of the marine estate was a key reason people gave for wanting to live on or near the coast of NSW. In addition, commercial and recreational fishers recognised the need to conserve and support marine life so that future generations will also be able to appreciate the marine estate.

The Community Survey also noted a range of opportunities to reduce water pollution through better land management practices, rehabilitation of coastal habitats and wetlands, reducing marine litter, and targeted education programs.

[6] *Marine Estate Community Survey Final Report* (Sweeney Research, for MEMA 2014)

[7] Community representative's response to community surveys, Lismore (2014)

Figure 2. Map of the NSW marine estate (refer to Box 4 for terminology)

SOCIAL AND CULTURAL BENEFITS AND OPPORTUNITIES

The marine estate is a central part of Australia's heritage and culture. It is no different in NSW, where the estate's natural beauty was identified as a major benefit, even by those who don't visit it often. It offers countless opportunities for the community to socialise with friends and family as well as a chance to engage with the natural world. It holds spiritual significance for Aboriginal people who live along the coast and for those who live further afield. For thousands of years, Aboriginal people have relied on the natural resources provided by the Sea Country, making it central to cultural practices and activities.

Reducing user conflict, improving public access, maintaining a safe environment and improving the water quality, natural beauty and cultural heritage were identified as opportunities to maintain the social and cultural benefits of the marine estate.

> Access to water gives us our quality of life – for the Aboriginal man, the community and the culture.[8]

ECONOMIC BENEFITS AND OPPORTUNITIES

The marine estate is an important economic resource for the NSW community. It provides income for locals, particularly as a hub for international and domestic trade and tourism through its ports, nature-based tourism, and seafood related industries. The Community Survey identified economic opportunities from addressing all forms of water pollution, promoting the beauty and biodiversity of the marine estate, improving public access, and protecting the coastline from impacts of climate change.

[8] Community representative's response to community surveys, South East Region (2014)

Governance of the marine estate

The Strategy is a first for NSW. It coordinates all aspects of marine estate management under one framework. This involves all relevant NSW Government agencies, integration with local government, industry, stakeholders and communities.

The NSW Government agencies that manage the marine estate include:

- **NSW Department of Industry**, which includes Local Land Services, Lands and Forestry (Crown lands), Destination NSW, and the NSW Department of Primary Industries. It is responsible for biosecurity, agriculture, fisheries, regional water management, and related education and research programs. The NSW Department of Primary Industries is also the lead agency for implementation of the marine estate reforms program and marine protected area management.
- The **NSW Office of Environment and Heritage** is responsible for coastal and estuary management, the NSW parks estate, the Beachwatch Water Quality Program, wetland conservation, marine fauna and maritime heritage programs. The NSW Office of Environment and Heritage also administers the Environmental Trust, which contributes to marine estate research and education, and it funds organisations to undertake projects that enhance the environment of NSW.
- The **NSW Department of Planning and Environment** is responsible for the State's land-use planning system and for delivering critical infrastructure.
- **Transport for NSW** provides strategic advice for ports, shipping, boating, boating infrastructure, access and safety.
- **Roads and Maritime Services** is responsible for marine safety and regulation of commercial and recreational boating. It is responsible for administering all land below mean high water mark in Sydney Harbour, Botany Bay, Newcastle Harbour and Port Kembla Harbour. It manages moorings in NSW (other than in marine parks and Lord Howe

Island). Roads and Maritime Services has statutory responsibilities for improving safety and protecting the environment on the navigable waterways in NSW, including the removal of rubbish from Sydney Harbour.

- The **NSW Environment Protection Authority** is the primary environmental regulator in NSW, managing environmental issues such as air, water and noise pollution, waste, litter, resource recovery and pesticides.
- **NSW local government** has a key role in planning, and delivering a range of services to coastal communities.

In 2014, the Authority asked local government to identify the top ten key challenges facing the marine estate over the next ten years. The results were consistent with concerns raised by community in the Community Survey, and included:

- management of access to foreshores and waterways
- catchment management and diffuse water pollution
- coastal development
- climate change and coastal hazard management
- lack of resources to support local government management of the marine estate
- habitat and species protection and management
- loss of aquatic habitat
- managing access to natural resources
- community engagement and education capacity
- marine pollution (including marine debris, litter and microplastics).

The various management authorities have diverse interests and responsibilities and, in some instances, overlap in jurisdictional boundaries. Management relies upon the suite of State and local government legislation, policy and programs, with some influence from the Commonwealth Government through key legislation. Industry, stakeholders, community and researchers also contribute to the management of the marine estate.

The Authority's role in marine estate management

The NSW Government established the Authority in 2012 to provide advice on policies, priorities and direction for the NSW marine estate. The Authority comprises an independent chair, the chair of the Panel, and the heads of the four agencies involved in managing the NSW marine estate: NSW Department of Primary Industries, NSW Department of Planning and Environment, NSW Office of Environment and Heritage, and Transport for NSW. The Authority provides advice to two Ministers: the Minister for Primary Industries and Minister for the Environment.

The NSW Government asked the Authority to develop an overarching Strategy and to undertake specific projects on the way to developing it. For each project, the Authority has sought the advice of the Panel, whose members have economic, social and environmental expertise.

The Strategy has been developed following ten principles developed by the Authority (Box 2) and a five-step decision-making process (Figure 3), to achieve the Authority's vision for the NSW marine estate.

THE VISION FOR THE MARINE ESTATE

A healthy coast and sea, managed for the greatest wellbeing of the community, now and into the future.

BOX 2. **TEN UNDERPINNING PRINCIPLES**[9]

1. Effective community engagement to identify and prioritise benefits and threats
2. Identification of priority actions will be based on threat and risk assessment
3. Values will be assigned to enable trade-off decision between alternative uses of the marine estate
4. Best available information will be used in trade-off decisions, but judgement will still be required
5. The wellbeing of future generations will be considered
6. Existing access arrangements will be respected
7. The precautionary principle will be applied
8. Efficient and cost-effective management to achieve community outcomes
9. Management decisions will be transparent and adjust in response to new information
10. Management performance will be measured, monitored and reported and information pursued to fill critical knowledge gaps.

The management options in Step 4 were developed in accordance with the four stages of the *Guidelines for Assessing Management Options for the NSW Marine Estate* (MEMA 2017). In summary, these stages are to:

Stage A: Develop guiding management objectives for priority threats and management opportunities. This involved working with all stakeholder agencies to consider the scope and priority of the threats.

Stage B: Assess current management settings (against guiding management objectives) and review the risk against any existing or proposed initiatives or reforms. This assessment identified where new management may be needed or resources better allocated.

Stage C: Identify other ways of addressing the proposed guiding management objectives, for example by modifying existing tools, to reduce priority threats and cost-effectively achieve the objectives. Community consultation on the Strategy will further identify management actions that are acceptable to the community and key stakeholders.

Figure 3. The Authority's five-step decision-making process[10]

STEP **1**	Find out what benefits the community derives from the marine estate.
STEP **2**	Identify the threats and risks to those benefits based on expert advice and community views.
STEP **3**	Assess current management to see where action is needed to reduce priority threats and to enhance community benefits.
STEP **4**	Develop management options that will reduce the priority threats and risks and that are cost-effective.
STEP **5**	Be accountable. Monitor, evaluate and report on the effectiveness of the management options to ensure they are working.

[9, 10] *Managing the Marine Estate: Purpose, Underpinning Principles and Priority Setting* (MEMA 2013)

Stage D: Assess management options. This involved:

- identifying the expected effective change in the level of risk posed by the threat
- considering the expected positive and negative changes to the community across the environmental assets and social, cultural and economic benefits (net community benefits)
- considering effectiveness in addressing risk and net benefits against cost.

The aim of this process has been to ensure that management actions deliver on the vision for the marine estate.

BOX 3. **OBJECTS OF THE *MARINE ESTATE MANAGEMENT ACT 2014***

(a) To provide for the management of the marine estate of NSW consistent with the principles of ecologically sustainable development in a manner that:

(i) promotes a biologically diverse, healthy and productive marine estate, and

(ii) facilitates:
- economic opportunities for the people of NSW, including opportunities for regional communities, and
- the cultural, social and recreational use of the marine estate, and
- the maintenance of ecosystem integrity, and
- the use of the marine estate for scientific research and education,

(b) to promote the coordination of the exercise, by public authorities, of functions in relation to the marine estate,

(c) to provide for the declaration and management of a comprehensive system of marine parks and aquatic reserves.

Why is a strategy needed?

The Strategy responds to threats to the NSW marine estate and provides for the range of multiple uses and associated benefits that contribute to the wellbeing of the NSW community.

A ten-year, overarching Strategy ensures, for the first time, that management decisions for the marine estate are coordinated, strategic, transparent and evidence-based. It sets the stage for the fundamental shift in management needed to address the increasing population and the range of associated threats to the marine estate.

Specifically, this Strategy:

- outlines the environmental assets and social, cultural and economic benefits identified by the NSW community
- identifies the priority threats to those benefits
- outlines initiatives and actions to manage priority threats
- identifies how the Strategy links with other related reforms.

It is part of the NSW Government's response to the Audit: to establish a coordinated, holistic, triple bottom-line approach to the management of the NSW marine estate that aims to balance the environmental, social, cultural and economic benefits derived from the marine estate. It includes new legislation (the *Marine Estate Management Act 2014*) and a threat and risk assessment framework (the framework), with the guidance of independent social, economic and environmental experts on the Panel.

The Strategy articulates how the Authority's vision and management priorities will be delivered over the next ten years under the objects of the *Marine Estate Management Act 2014* (Box 3).

The Strategy uses some new terms that will be commonplace in marine estate communications. Key terms are included in Box 4, with a full glossary available on the **marine estate web site**.

BOX 4. **KEY TERMINOLOGY USED IN THE STRATEGY**

An **asset** is a physical feature of the marine estate (e.g. environmental assets include beaches or rocky shores; cultural assets such as structures or places that contribute to cultural identity; or infrastructure such as jetties installed for people to use and interact with the marine estate).

A **benefit** is anything that contributes to the wellbeing of the community (social, cultural economic or environmental) such as swimming at the beach or operating a marine related business.

A **risk** is the chance of something happening that will have an impact on the achievement of environmental, social or economic objectives.

A **stressor** is the consequence of an activity (e.g. water pollution) that causes an effect on an environmental asset (e.g. clean water) or the associated social, cultural or economic benefit (e.g. ability to swim at the beach).

A **threat** is a broad activity, event or process that poses a potential level of risk to an environmental asset or social or economic benefit (e.g. stormwater). Threats often affect multiple assets and benefits and similarly, an asset or benefit can be affected by multiple threats.

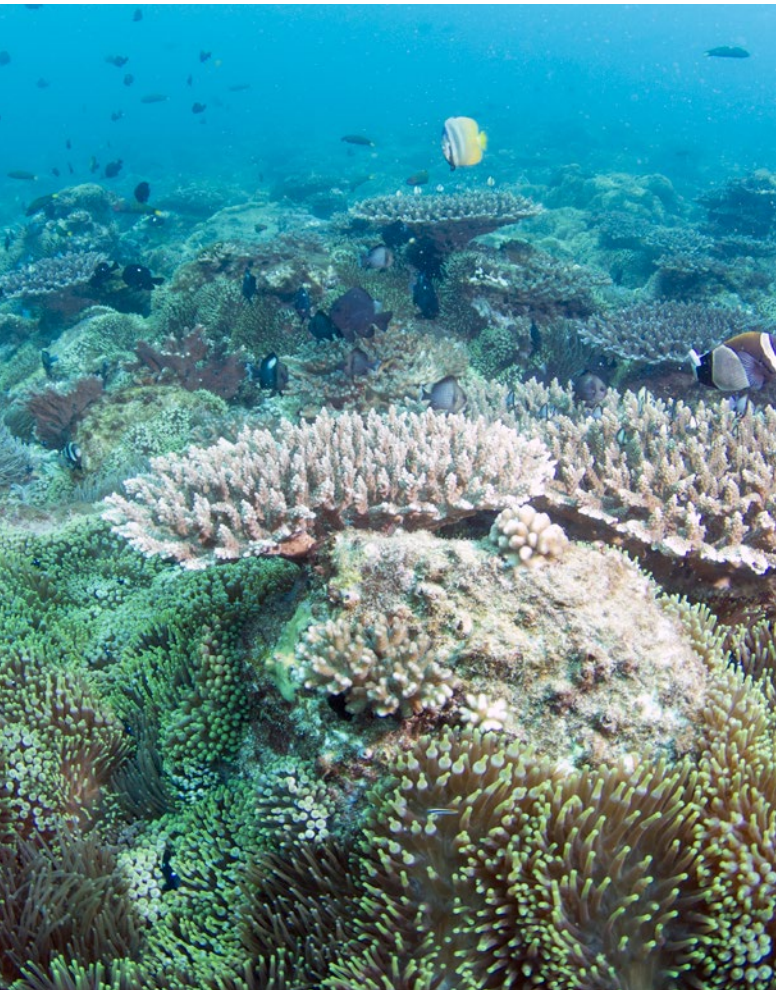
A **threat and risk assessment** (TARA) is a process that identifies, assesses and prioritises threats and their associated risk to the marine estate. It also highlights where areas where information is lacking and research is needed.

The **three regions** are:

- **northern region** extends from the Queensland border down to Stockton Beach
- **central region** extends from Stockton Beach to Shellharbour
- **southern region** extends from Shellharbour to the Victorian border.

Role of marine protected areas in the marine estate

The role and purpose of marine protected areas in the NSW marine estate is described in the Authority's marine protected areas policy statement[11]. It outlines how marine protected areas are an important management tool for addressing environmental, economic, cultural and social threats, typically those that can be regulated within the boundary of the marine protected area itself (e.g. harvesting, wildlife interactions and disturbance, fishing-related marine debris and resource-use conflict).



While marine protected areas are less effective in dealing with off-site impacts – such as land-based runoff, water pollution, litter and marine debris, erosion, legacy issues (e.g. contamination, habitat loss, reclamation), marine pests, or overcrowding – they can contribute to a healthy ecosystem with reduced pressures (e.g. in sanctuary zones) and so increase the marine environment's resilience to off-site impacts. They can also be used to separate conflicting uses.

NSW has an established network of marine protected areas, declared under the *Marine Estate Management Act 2014* and managed by the NSW Department of Primary Industries. These marine protected areas include:

- 12 aquatic reserves – which cover around 2,000 hectares of the NSW marine estate
- six multiple use marine parks - which cover around one-third (approximately 345,000 hectares) of the NSW marine estate.

National parks and nature reserve areas occurring below the astronomical high tide level, which include around 20,000 hectares of estuarine and oceanic habitats, are managed by the National Parks and Wildlife Service. These can include the foreshore or inshore regions of the marine estate and are declared under the *National Parks and Wildlife Act 1974*.

The six multiple-use marine parks established in NSW commenced with the Solitary Islands Marine Park in northern NSW in 1991 (initially as a marine reserve). They are located in each marine bioregion, with the exception of the Hawkesbury Shelf marine bioregion and Twofold Shelf marine bioregion, although the Hawkesbury Shelf bioregion has ten aquatic reserves. The NSW Government is committed to enhancing the protection of biodiversity in these bioregions as identified in the Audit and is assessing mechanisms to achieve this. An output of a threat and risk assessment in the Hawkesbury

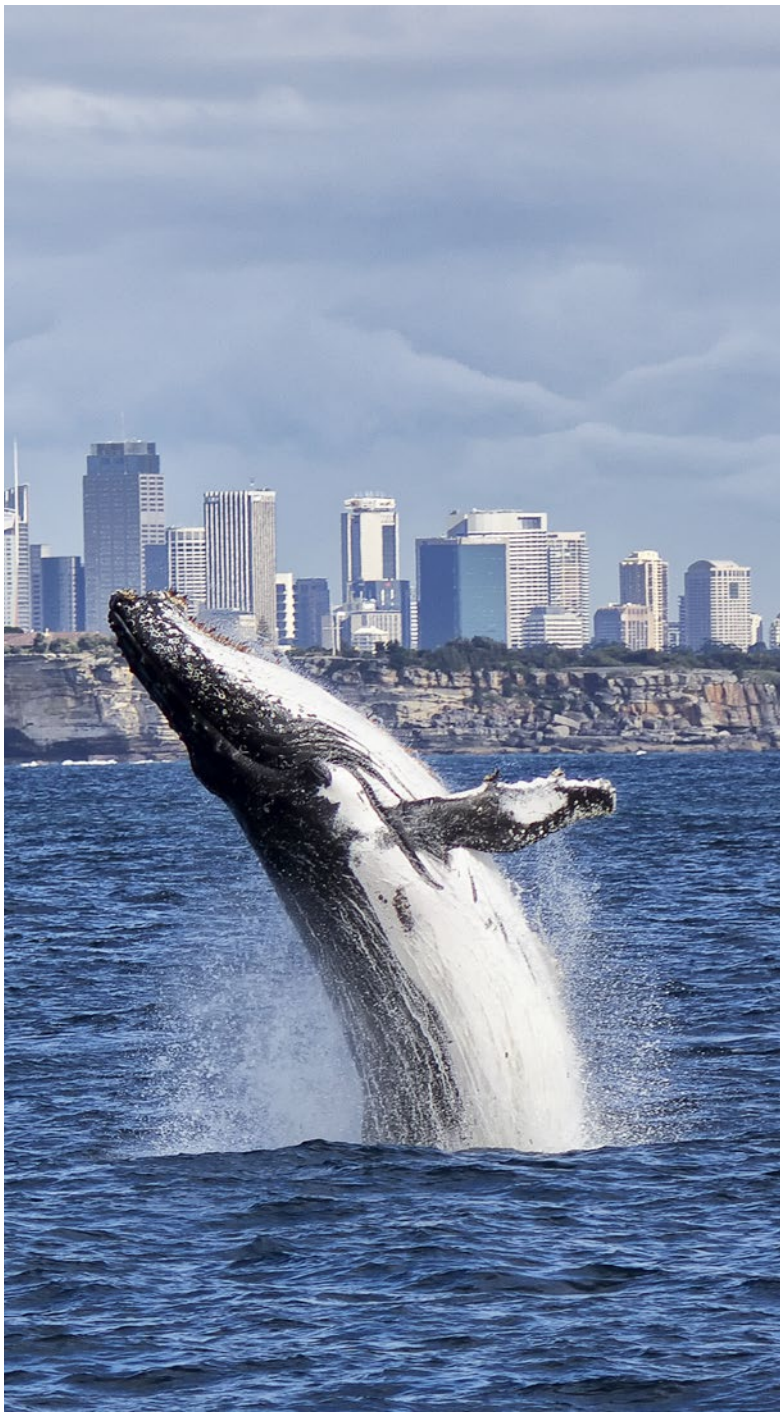
[11] Marine protected areas within the NSW marine estate - their role and purpose (MEMA 2017)

Shelf marine bioregion was the consideration of spatial management to address identified environmental, social, cultural and economic threats. A similar approach is proposed in the Twofold Shelf marine bioregion.

Maintaining the existing system of marine parks in NSW and improving the holistic management of the protected area network is a priority of the NSW Government. The future role and functions of marine protected areas in marine estate management will be informed by the objects and requirements of the *Marine Estate Management Act 2014*.

The Authority will oversee the development of a single statutory management plan for the effective management of each marine park and aquatic reserve (or reserve networks). A single management plan will replace the current separate zoning and operational plans and be informed by the Authority's five-step decision-making process. Each management plan will clearly document management objectives and strategies, including zoning, compliance, education and communications. A stronger emphasis on monitoring performance and assessment of management actions will be a key feature of this approach.

As with any other regulatory tool, any proposal for marine protected areas will be evaluated against other possible options to determine the most cost-effective option for maximising community benefits and reducing the risk level of the threat, including the level of cumulative threat. Community consultation is a critical component of marine protected area planning and management into the future.



What are the priority threats?

Priority threats for management

Priority threats to the NSW marine estate have been identified through several community engagement processes and an evidence-based review of more than 1,000 scientific papers and reports. Most notably, the following reports provide a comprehensive assessment of threats and risks to the marine estate through the lens of community, stakeholders, scientists, industry and natural resource managers:

- the Community Survey – *Marine Estate Community Survey Final Report* (2014)
- the Hawkesbury Shelf TARA – *Hawkesbury Shelf Marine Bioregion Threat and Risk Assessment Report* (2016)
- the statewide TARA – *NSW Marine Estate Threat and Risk Assessment Report* (2017).

MARINE ESTATE COMMUNITY SURVEY RESULTS

The Community Survey identified a range of views about the marine estate. These included perceived threats to the environment, as well as threats to the social, cultural and economic benefits derived from the marine estate. The three highest priority threats were seen to be:

- littering and marine debris
- oil and chemical spills
- water pollution from sediment or runoff.

Threats to social benefits included antisocial behaviour as well as the potential loss of appeal due to pollution or littering. Overcrowding, conflicting use, and lack of public access were also recognised as potential social threats. Perceived threats to economic viability were associated with water pollution, loss of natural areas, and increasing cost to access the marine estate.

HAWKESBURY SHELF MARINE BIOREGION TARA RESULTS

The Hawkesbury Shelf TARA was completed in 2015. The assessment found that the priority threats to the estuaries, coast and ocean in the State's central region were:

- climate change
- urban stormwater discharge
- clearing foreshore vegetation
- dredging and excavation activities
- shipping.

Identified impacts to social, cultural and economic benefits included:

- governance issues associated with government regulations
- access to the marine estate
- climate change
- a range of activities (some conflicting).

The results of the Hawkesbury Shelf TARA informed the statewide TARA. Some risk levels in the statewide TARA central section were influenced by this assessment. This process also resulted in the reframing of the statewide social and economic TARA through a community wellbeing lens rather than a sector-based approach: the benefits and costs to the community as a whole were considered rather than the benefits to a particular user group, sector or industry.

STATEWIDE TARA RESULTS

An evidence-based process to identify and prioritise statewide threats started in 2016. Threats were recognised as a statewide priority if they were assigned a risk level of moderate or high in all three regions (northern, central and southern, see Box 4). Feedback from consultation on the draft statewide TARA[12] was considered when finalising the statewide TARA in 2017.

The statewide TARA found that the greatest threats to the environment were related to:

- urban and rural discharges or runoff
- climate change
- disturbance to habitat and species from estuarine entrance modification, harbour maintenance, foreshore development, drainage, and other works (Table 1).

Estuaries were at a higher risk than the coast and ocean, primarily due to the high levels of use in estuaries coupled with the reduced resilience to threats in a confined area relative to the much larger offshore areas.

The greatest threats to the social, cultural and economic benefits were primarily associated with water pollution and a general lack of social, cultural and economic information, lack of compliance with regulations and lack of access to the marine estate (Table 2).

The results of the Community Survey in 2014 and the statewide TARA outcomes in 2017 draw broadly similar conclusions: that pollution, habitat disturbance and climate change are key threats to the NSW marine estate. Similarly, pollution, antisocial behaviour, climate change and information gaps have been identified as key threats to the social, economic and cultural benefits derived from the marine estate.

[12] *NSW Marine Estate Threat and Risk Assessment Report* – Draft Report (2016)

TABLE 1. Statewide priority threats to ENVIRONMENTAL assets.

Identified as:

LEGEND

- Moderate Risk
- Moderate-High Risk *(A mix of moderate and high risk levels in the three regions statewide).*
- High Risk

e estuaries

cm coast and marine

ENVIRONMENTAL	Clean waters	Estuarine & marine habitats, assemblages and associated biota												Threatened & protected species	
	Estuarine & ocean waters	Saltmarsh	Mangrove	Seagrass	Beaches & mudflats	Beaches	Shallow soft sediments	Deep soft sediments	Rocky shores	Shallow reefs	Deep reefs	Planktonic assemblages	Fish assemblages (harvest & bycatch)	Species and communities protected under FMA	Species protected under BCA
ACTIVITY/THREAT	**ASSET**														
1. Urban stormwater discharge	e	e	e	e	e	cm	e					e		e	e
2. Estuary entrance modifications	e	e	e	e	e	cm	e					e		e	e cm
3. Agricultural diffuse-source runoff	e	e	e	e	e		e					e		e	e
4. Clearing riparian & adjacent habitat including wetland drainage	e	e					e					e		e	e
5. Climate change (over the next 20 yrs)		e								cm		e cm		e	e cm
6. Modified freshwater flows	e	e		e			e					e		e	e
7. Foreshore development		e	e		e	cm								e	e cm
8. Recreation & tourism boating & boating infrastructure	e			e	e		e							e	e
9. Navigation & entrance management & modification, including harbour maintenance	e			e	e		e					e		e	
10. Sewage effluent & septic runoff	e			e			e					e		e	
11. Stock grazing of riparian & marine vegetation in estuaries		e	e	e										e	
12. Four-wheel driving		e			e									e	e
13. Recreational fishing – boat-based line & trap fishing													e cm	cm	
14. Passive recreational use – swimming, surfing & dog walking					e										e cm
15. Recreational fishing – shore-based line & trap fishing													e cm		
16. Beach nourishment & grooming					e	cm									
17. Commercial fishing – ocean trawl								cm							
18. Commercial fishing – ocean trap & line														cm	
19. Commercial fishing – estuary general													e		
20. Deliberate introduction of pests & weeds															e cm
21. Shipping – small commercial vessels															cm
22. Oyster aquaculture				e										e	
23. Commercial fishing – ocean haul													cm		
24. Recreational fishing – hand gathering													cm		
25. Whale & dolphin watching															cm

TABLE 2. Statewide priority threats to SOCIAL, CULTURAL and ECONOMIC benefits

SOCIAL , CULTURAL & ECONOMIC	Social benefits				Cultural benefits	Economic benefits		
	Participation – safety, health & wellbeing	Participation – socialising & sense of community	Enjoyment - biodiversity & beauty	Enjoyment – consumptive use	Cultural heritage & use	Indirect values	Viability of businesses	Direct values (individual enjoyment)
THREAT/STRESSOR	**BENEFITS**							
1. Water pollution on environmental values – urban stormwater discharge								
2. Water pollution on environmental values – agricultural diffuse-source runoff								
3. Water pollution on environmental values – litter, waste, debris and microplastics								
4. Inadequate social and economic information								
5. Lack of compliance with regulations (users) or lack of compliance effort (agencies)								
6. Limited or lack of access infrastructure in the marine estate								
7. Reductions in abundance of species and trophic levels								
8. Antisocial behaviour and unsafe practices								
9. Climate change over the next 20 years								
10. Loss of public access								
11. Inadequate, inefficient regulation or overregulation								
12. Pests and disease								
13. Sediment contamination								
14. Overcrowding and congestion								
15. Conflict over resource-use access								
16. Habitat disturbance								
17. Loss or decline in marine industries								
18. Seafood contamination								
19. Modified hydrology, hydraulics and flow regimes								
20. Water pollution of environmental values – septic runoff, point-source pollution and sewage overflows								
21. Wildlife disturbance (shorebirds, turtles, whales) – e.g. by dog walkers, four-wheel drives, and vessels								
22. Lack of community awareness of the marine estate and associated threats and benefits								
23. Lack of, or ineffective community engagement or participation in, governance								
24. Other water pollution and contamination affecting human health and safety								
25. Excessive or illegal extraction								

REGIONAL AND LOCAL THREATS

Some threats were identified specifically at a regional or local scale in the statewide TARA. Although management actions are focused on statewide threats, localised threats are included in the Strategy if they were reported from all three regions. For example, disturbance of threatened or protected wildlife on beaches by dogs is very localised as dogs are permitted on certain beaches only, but it occurs on beaches in all three regions and is deemed a moderate risk and therefore meets the criteria for a management response in a statewide context.

Other regional or localised threats that were deemed moderate or high in only one or two regions have not been directly addressed in this Strategy. They are identified for further consideration in a regional context (e.g. in the development of new management plans for marine parks or coastal management programs).

CUMULATIVE THREATS

A cumulative threat is the threat from the combined (or cumulative) effect of other threats and stressors. Management initiatives to address cumulative threats are particularly important due to the multiplier effect of their impacts.

In the statewide TARA, environmental assets or social benefits were identified as being subject to cumulative threats if they were at risk from a large number of stressors that result in additive or interactive effects. The process identified five cumulative threat categories:

- multiple threats to estuarine water quality – the cumulative impact of agricultural runoff, urban stormwater, sediment contamination and other threats should be managed together to address the water quality of NSW estuaries (see **Initiative 1**)
- climate change – multiple stressors are grouped under the threat of climate change and these will impact community benefits increasingly over the next 50 years. For example, sea level rise and increased storm activity can affect coastal infrastructure. The imperative is to move towards practical adaptation and resilience-building actions that can be taken now rather than waiting for the impact (see **Initiative 3**)
- multiple threats to Aboriginal cultural heritage – the cumulative impacts of pollution, loss of habitat, depletion of stocks, conflict over resources, lack of Aboriginal representation in decision-making and other threats collectively impact upon Aboriginal values derived from Land and Sea Country (see **Initiative 4**)
- multiple threats to wildlife – the cumulative impacts associated with disturbance or interactions with threatened and protected marine wildlife from fishing, vessels, recreational and land-based activities as well as climate change (see **Initiative 5**)
- multiple threats to fish assemblages – the cumulative impact of fishing (commercial, recreational, cultural fishing) on fish assemblages and trophic structures (see **Initiative 6**).

	Multiple threats to fish assemblages	Climate change	Multiple threats to estuarine water quality	Multiple threats to wildlife	Multiple threats to Aboriginal cultural heritage
CUMULATIVE THREATS					
	< improving governance and enhancing social and economic benefits >				
MANAGEMENT INITIATIVE	Sustainable fishing & aquaculture	Preparing for a changing climate	Improving water quality & reducing marine litter & Sustainable coastal use & development for healthy habitats	Reducing impacts on wildlife & Enabling safe and sustainable boating (in-part)	Protecting the cultural values of the marine estate

Figure 4. Mapping management initiatives with cumulative risk categories

A specific management initiative addresses each of the cumulative threat categories (Figure 4).

The cumulative threat category 'multiple threats to estuarine water quality' has been included in a broader water quality initiative that includes estuarine and marine water quality management actions. It is also linked closely to other initiatives including 'sustainable coastal use and development for healthy habitats' and 'reducing impacts on wildlife'.

Links to other government reforms and initiatives

This Strategy supports related NSW Government reform processes. It integrates processes and outputs to meet the NSW Government's directive to set the overarching framework that will coordinate the management of the marine estate over the next ten years.

The marine estate is to be managed as a single continuous system for the greatest wellbeing of the community.

COASTAL REFORMS

The *Coastal Management Act 2016* provides the architecture for strategic management of our coastal areas into the future. It communicates the NSW Government's vision for coastal management and reflects the vital natural, social, cultural and economic values of our coastal areas and promotes the principles of ecologically sustainable development in managing these values.

The *Coastal Management Act 2016* replaces the *Coastal Protection Act 1979*. The new Act supports the objects of the *Marine Estate Management Act 2014* since the coastal zone forms part of the marine estate. Coastal management programs will provide for regional delivery of some of the actions in the management initiatives.

ABORIGINAL CULTURAL HERITAGE REFORMS

The NSW Government remains committed to creating new, stand-alone Aboriginal cultural heritage legislation that respects and protects Aboriginal cultural heritage while providing clear and consistent processes for economic and social development.

The reform process is well advanced. It has included: three phases of public consultation; the release of six major documents, including the recommendations of an independent working party and the NSW Government's proposed reform model; and work across NSW Government agencies; and consultation with key stakeholders.

Extensive feedback demonstrates there are wide ranging and contrasting views on what the final model for reform should be. The NSW Government is revising its model to reconcile and balance these views to prepare an Aboriginal Cultural Heritage Bill. Key stakeholders are engaged in this process. Initiative 4 considers Aboriginal cultural heritage reforms in its actions.

COMMERCIAL FISHERIES BUSINESS ADJUSTMENT PROGRAM (BAP)

The Commercial Fisheries Business Adjustment Program (BAP) has been developed in response to the 2012 *Independent Report into NSW Commercial Fisheries Policy, Management and Administration*. The three components of the BAP include structural adjustment, changes to governance processes, and consultation mechanisms.

The structural adjustment component of the BAP includes:

- share-linkage arrangements tailored to each share class that links shares to either catch or fishing effort
- providing $16 million in assistance measures to help commercial fishers adjust their fishing businesses to be consistent with the new share linkage arrangements through the Adjustment Subsidy Program
- streamlining current fishing controls that impact fishing efficiency.

Initiative 6 will deliver several key actions relevant to commercial fishing reforms.

CULTURAL FISHING REFORMS

The *NSW Fisheries Management Act 1994* was amended in 2009 to recognise Aboriginal cultural fishing and commit to its protection and promotion. Aboriginal cultural fishing is defined in the Act as:

> *fishing activities and practices carried out by Aboriginal persons for the purpose of satisfying their personal, domestic or communal needs, or for educational or ceremonial purposes or other traditional purposes, and which do not have a commercial purpose.*

NSW Department of Primary Industries is currently considering management options, in consultation with the Aboriginal Fisheries Advisory Council, for protecting and promoting Aboriginal cultural fishing. This links to **Initiative 4** and **Initiative 6**. The *Marine Estate Management Act 2014* also supports cultural uses of the NSW marine estate, including marine parks and aquatic reserves.

CLIMATE CHANGE POLICY FRAMEWORK AND STRATEGIC PLAN

The NSW Climate Change Policy Framework outlines the NSW Government's long term objectives to achieve net-zero emissions by 2050. Between 2017 and 2022, the NSW Government will invest $1.4 billion through the Climate Change Fund Strategic Plan to help meet long-term climate objectives.

This policy framework builds on the NSW Government's strong track record of addressing climate change in NSW. The expansion of clean energy is helping households and businesses reduce their bills by saving energy and preparing for the impacts of climate change. The framework also guides NSW Government programs, including the three action plans on clean energy, energy efficiency and climate change adaptation. **Initiative 3** links to climate change reforms.

LAND MANAGEMENT AND BIODIVERSITY CONSERVATION REFORMS

The NSW Government made an election commitment in March 2015 to reform regulation of land clearing and biodiversity conservation in NSW. The reforms introduce a new *Biodiversity Conservation Act 2016* and amendments to the *Local Land Services Act 2013* that commenced on 25 August 2017. The reforms provide a modern approach that ensures strong protection for plants and animals, supports ecologically sustainable development (including delivering a legislated biodiversity offset scheme), delivers prioritised and targeted investment, and provides for a sustainable and productive agricultural sector.

Under the *Biodiversity Conservation Act 2016*, marine fauna will continue to be protected. The Biodiversity Conservation Regulation sets out provisions to help protect marine mammals, including the approach distances for any aircraft, vessels, unmanned aerial vehicles (e.g. drones) and other human interactions with marine mammals. The Regulation also prescribes the penalty notice amounts for offences related to marine mammals. These reforms are closely linked to **Initiative 5**.

CROWN LAND REFORMS

The *Crown Land Management Act 2016* and the *Crown Land Legislation Amendment Act 2017* underpin the management of the State's vast and important Crown estate. This new legislation is the culmination of more than four years of engagement with the community about the future of Crown land. The process included a NSW parliamentary inquiry into Crown land, public consultation, and targeted discussions with stakeholders. The Crown lands reform program will also specifically examine use and management of coastal Crown land to improve public benefits for current and future users. This reform is linked to Initiative 2.

REGIONAL PORTS STRATEGY

Lands and Forestry (Crown lands) in the NSW Department of Industry is developing a comprehensive strategy to guide investment and operations of regional ports and associated infrastructure under its management, in the short term and the long term.

The department is responsible for the management and maintenance of major maritime assets worth $1.6 billion, including 25 coastal ports (outside the commercial Ports of Newcastle, Sydney, Port Botany and Port Kembla), 21 river entrances (including breakwaters and river training walls), the Tweed River sand bypass system, and Lake Illawarra.

The Regional Ports Strategy is focused on the physical assets owned by the department, but it also seeks to understand the relationship with surrounding areas and assets owned by others to ensure that the Regional Ports Strategy can help to achieve broader objectives, including improved regional social and economic outcomes. This major project is linked to **Initiatives 2** and **7**.

NSW BOATING NOW

NSW Boating Now is a five-year boating infrastructure funding program that aims to support the delivery of new and improved boating facilities through effective partnerships with local councils and other organisations. The NSW Government's $70 million funding program will support initiatives that enhance the boating experience by improving the overall capacity and amenity of boating infrastructure on NSW waterways. This is interlinked with Initiative 7.

In 2014, Transport for NSW and Roads and Maritime Services consulted extensively with the boating community, local government and other boating stakeholders on boating safety, access and infrastructure priorities across the State. This consultation informed the development of 11 Regional Boating Plans, which were released in early 2015.

MOORINGS REVIEW

There are more than 26,600 mooring sites managed by Roads and Maritime Services in NSW. The Moorings Review program is designed to focus on improved regulation, administration and exploring new technologies and delivery mechanisms.

Transport for NSW and the NSW Department of Primary Industries are investigating transition arrangements for mandating the use of environmentally friendly moorings in environmentally sensitive areas in the next three to five years. The review seeks solutions for mooring demand and reducing the threat of physical disturbance to sensitive *Posidonia* seagrass.

Better coordination among all agencies involved in mooring management, particularly supported by accurate seagrass mapping and accessible data, will be pursued to ensure effective delivery and possibly the wider adoption of environmentally friendly moorings across NSW. This project links to **Initiatives 6-8**.

How will the priority threats be managed?

Marine estate management strategy

The **Strategy** establishes the overarching framework for the coordinated management of the marine estate through to 2028, with a planned five-year health check. This will:

- establish whether risk levels have changed in the first five years of the Strategy
- fill knowledge gaps in the social, cultural and economic information available – the lack of this information is, in itself, a priority threat
- address new or emerging threats that were not initially identified. There could be new management actions in response to this midterm health check.

A summary of initiatives and proposed management mechanisms is included in Table 3.

The management of priority threats in this Strategy is grouped into eight management initiatives that summarise management objectives, benefits, threats, stressors and proposed management actions. The management initiatives do not operate in isolation; rather, it is the collective set of actions that address priority threats. Many actions are interlinked between each initiative; for example, actions in *Enabling safe and sustainable boating* (**Initiative 7**) are linked to actions in *Reducing impacts on wildlife* (**Initiative 5**).

The eight management initiatives follow, with *Improving water quality and reducing litter* the first management initiative, as this has been identified as of most concern to the community in the Community Survey and the highest priority threat in the statewide TARA. The other management initiatives are in no particular priority order. Threats to Aboriginal cultural heritage and use benefits are relevant to all initiatives; however, they are specifically referred to and addressed in **Initiative 4**.

TABLE 3. Mechanisms to address priority threats in each management initiative

MANAGEMENT INITIATIVE	Regulation/ compliance/ incentives	Policy/ program/ planning	Education/ awareness	Research/ monitoring/ mapping	Onground works	Data / reporting	Collaboration
1. Improving water quality and reducing litter	✔	✔	✔	✔	✔	✔	✔
2. Sustainable coastal use and development for healthy habitats	✔	✔	✔	✔	✔		✔
3. Planning for a changing climate		✔	✔	✔	✔		✔
4. Protecting the cultural values of the marine estate		✔	✔	✔	✔		✔
5. Reducing impacts on wildlife	✔	✔	✔	✔	✔	✔	✔
6. Sustainable fishing and aquaculture	✔	✔	✔	✔		✔	✔
7. Enabling safe and sustainable boating	✔	✔	✔	✔	✔	✔	✔
8. Improving governance and enhancing social and economic benefits	✔	✔	✔	✔		✔	✔

Strategy implementation plan

Implementation Plan will be developed by the Authority's member agencies. The plan will articulate the management actions that will address priority threats, as well as the key performance indicators, timeframes and agency responsibilities. One key function of the plan is to coordinate functions and responsibilities within and across government, including local government, as this underpins the successful implementation of the Strategy.

Any changes required as a result of the five-year health check will be included in a revised Implementation Plan rather than in the overarching Strategy.

Marine integrated monitoring program

The **Monitoring Program** links to the Strategy's key performance indicators (included in the Implementation Plan) and will report on the performance of the Strategy to inform the five-year health check. It will also provide additional evidence that has been collected in response to key knowledge gaps identified in the statewide TARA. For more information, see *How will we know if we are delivering on our vision?*

1. Improving water quality and reducing litter

WHAT ARE THE COMMUNITY BENEFITS?

Healthy marine and estuarine environments with clean water and biologically diverse marine life in their natural habitat are highly valued by the NSW community.

Clean marine and estuarine waters support a variety of unique and abundant marine life. Clean waters are also essential to the uses and activities that generate social, cultural and economic benefits from the marine estate. People want to swim, surf, dive and fish in unpolluted water, which in turn, provides for vibrant marine industries. Aboriginal people rely on healthy waterways for marine resources, medicines, traditions and spiritual connections. The benefits of good water quality for all coastal communities cannot be understated.

WHY IS THIS MANAGEMENT INITIATIVE NEEDED?

Water pollution has been identified as the number one threat to both the environmental assets and the social, cultural and economic benefits derived from the marine estate in the statewide TARA. The Community Survey reported similar views: litter, oil spills and land-based runoff contributing to water pollution were seen as the greatest environmental threats to the marine environment. Water pollution and littering were also identified as high-priority economic and social threats.

There is an opportunity to improve the health of the marine estate by improving water quality through habitat improvements, addressing litter and reducing land-based runoff. Litter has become a significant enough concern for the Premier to set a goal of reducing the volume of litter in NSW by 40 per cent by 2020.[13] This requires sustained government intervention and management action over the medium-to-long term.

[13] 'Keeping our environment clean', Premier's Priorities (NSW Premier 2012)

Urban growth in the central region is an ongoing pressure on water quality. In the northern and southern regions, water quality is under threat from diffuse sources of water pollution, particularly in catchments where the health of the receiving waters are already rated as being poor. There will be an increased risk of diffuse-source water pollution if the discharges are not managed cohesively and strategically. This management initiative represents an opportunity to improve the management of urban and rural diffuse-source water pollution at a time of significant land-use change, which will bring forward improvements to water quality and waterway health.

The need for greater coordination by the NSW Government regarding the management of estuarine and marine waters was identified at a Water Quality Forum (the Forum) in July 2017. Led by the Authority, the Forum provided an opportunity for relevant agencies and other regulators to discuss priority threats, and opportunities to address them in the Strategy. A recommendation from the Forum was the establishment of h-level working group to oversee implementation of water quality actions in this management initiative.

This management initiative is not ed at addressing point-source pollution regulated by the NSW Environment Protection Authority, such as sewage, industrial and thermal discharges: the NSW Environment Protection Authority already has processes in place that continually review and improve the performance of premises and activities that discharge to waterways. Regulation of licensed point sources has led to measurable improvements in water quality and ecological health in the marine estate.

HOW WILL THIS MANAGEMENT INITIATIVE HELP?

The management actions will reduce the impacts of urban and agricultural diffuse-source water pollution. Parts of the initiative will provide improved guidance and coordination of land-use activities affecting water pollution, including across government. Other actions propose on-ground works that will directly reduce the diffuse sources of water pollution. Research and monitoring programs are proposed to fill knowledge gaps.

A key action is to adopt a risk-based framework for considering waterway health outcomes in strategic land-use planning decisions. The framework is a best-practice protocol for managing the impacts of land-use activities on the health of waterways in NSW. It brings together existing principles and guidelines recommended in the National Water Quality Management Strategy. The guiding principle of the framework is to ensure that management actions will meet specific water quality and aquatic ecosystem health standards.

Targeted land-use and habitat rehabilitation actions will improve past and present sources of water pollution. Better education, changed land management practices or improved infrastructure will empower the community to reduce current impacts. Programs to restore lost or degraded habitat will reverse the impacts of past activities that are still contributing to current water quality problems. In many cases, these actions will reinstate water quality improvement processes and other environmental benefits that are naturally provided by these habitats.

Consideration and application of opportunities to better utilise, coordinate or adjust existing government legislation and policies will provide a cost-effective and sensible means for improving water quality within existing management. This is expected to deliver better awareness, improved practices, streamlining of some processes, and more effective compliance of diffuse source water pollution.

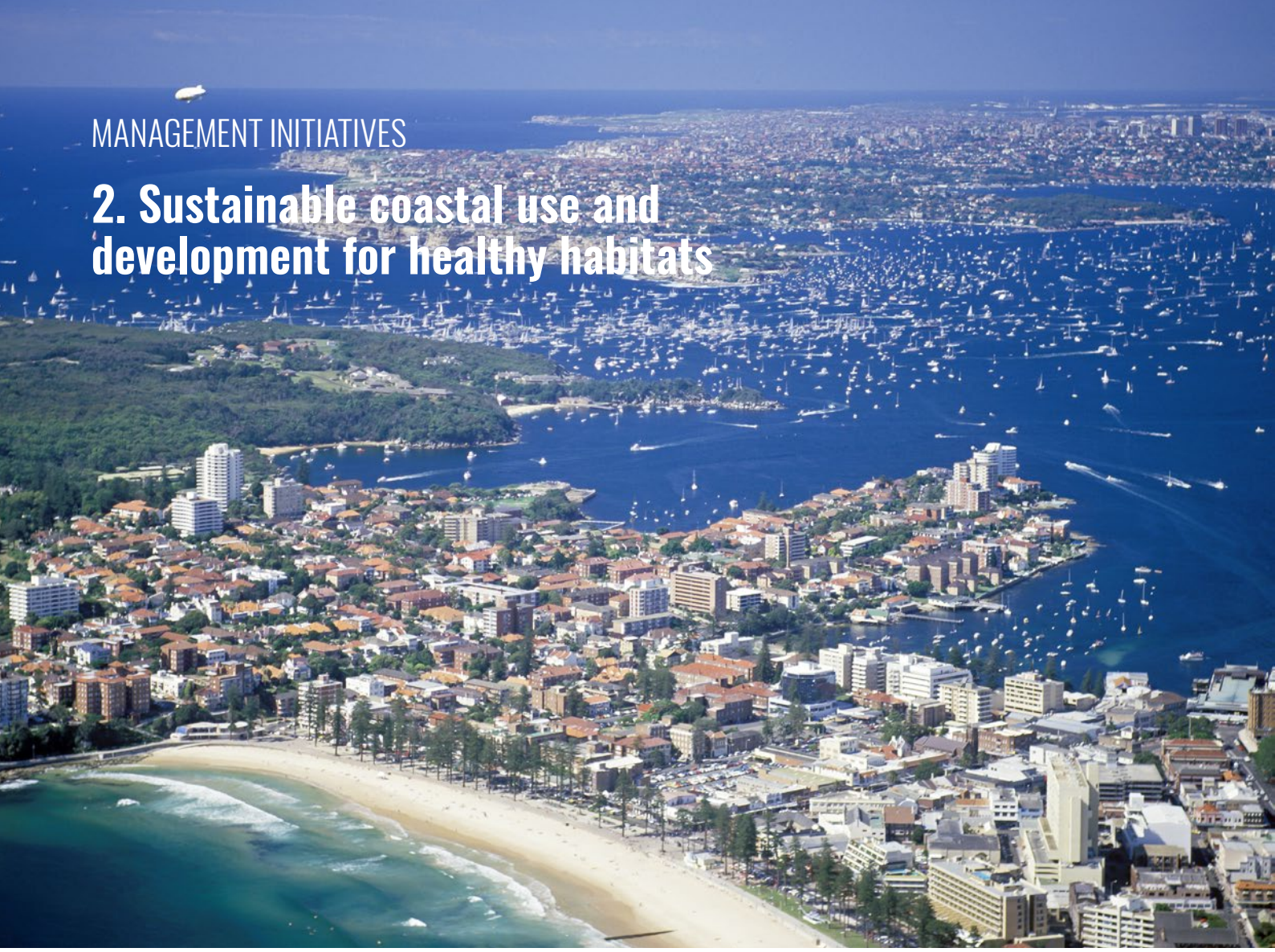
1 MANAGEMENT OBJECTIVE:

To improve water quality and reduce marine litter for the benefit of marine habitats, wildlife and the community.

	Statewide priority threats	Stressors	Management actions
Environment TARA	Agricultural diffuse-source runoff – affects water, saltmarsh, mangrove, seagrass, beaches and mudflats, shallow soft sediment, planktonic assemblages and species and communities protected under the FMA and BCA	Surface water carries nutrients and toxic contaminants to waterways. This affects aquatic organisms and habitats.	1.1 Establish a high-level government working group, including representatives from agencies with responsibility for estuarine and marine water quality management, to oversee implementation of this initiative and clarify roles and responsibilities for managing diffuse source water pollution. 1.2 Implement a pilot approach for improved diffuse-source water pollution management in agricultural and urban catchments such as South Creek and Richmond River. 1.3 Facilitate and deliver on-ground activities that improve diffuse-source runoff or reduce their impacts through investigation and provision of cost-effective funding programs and financial incentives. 1.4 Improve diffuse-source water pollution outcomes using mechanisms within existing policy, planning and legislative frameworks. 1.5 Adopt the *Risk-based framework for considering waterway health outcomes in strategic land-use planning decisions* to improve management of diffuse source-water pollution management in the NSW marine estate and build capacity to implement the framework and address knowledge gaps on water quality and ecosystem health. 1.6 Improve minimum requirements for industry standards and ensure compliance with regulations and best-practice management for diffuse sources of pollution through social research, education campaigns and compliance programs. 1.7 Reduce marine litter by extending the 'Hey Tosser!' antilitter campaign to focus on marine litter scenarios and establishing a Marine Litter Working Group. 1.8 Develop monitoring, reporting and performance indicators for water quality actions, and incorporate them, and key knowledge gaps, into the monitoring program.
	Clearing riparian vegetation and adjacent habitat including wetland drainage – affects water, saltmarsh, shallow soft sediment, planktonic assemblages and species and communities protected under the FMA and BCA	Clearing and wetland drainage leads to acidic runoff and black water events. Other stressors include physical disturbance to habitat, changed tidal flow velocity, altered watertable levels and connectivity. Loss of wetlands for migratory shorebirds leads to threatened species decline and local extinction.	
	Stock grazing of riparian and marine vegetation – affects saltmarsh, mangrove, seagrass and species and communities protected under the FMA	Physical disturbance occurs on saltmarsh, mangroves and seagrass from trampling and grazing. Nutrients from livestock and turbidity impact seagrass.	
	Urban stormwater discharge - affects water, saltmarsh, mangrove, seagrass, beaches and mudflats, shallow soft sediment, planktonic assemblages and species and communities protected under the FMA and BCA	Urban stormwater can greatly increase the amount of pollutants such as sediment, nutrients, chemicals and litter entering the marine estate. This impacts water quality and a range of estuarine habitats.	
	Sewage effluent and septic runoff – affects water, seagrass, shallow soft sediment, planktonic assemblages and species and communities protected under the FMA	Sewerage and septic runoff introduces pathogens and microplastics that impact on water quality, habitat and wildlife.	

	Statewide priority threats	Stressors	Management actions
Social, cultural and economic TARA	Water pollution environmental values – septic runoff, point source pollution and sewage overflows (outfalls and sewage treatment plants)	Sewerage and septic runoff introduces pathogens and microplastics affect community enjoyment of the marine estate.	(See actions above that address social and economic threats associated with water quality. Cultural actions are included in **Initiative 4**).
	Water pollution environmental values – urban stormwater discharge	Stormwater discharges affect all aspects of community enjoyment, participation, direct and indirect values and economic viability, both in estuaries and coastal foreshores.	
	Water pollution environmental values – litter, solid waste, marine debris and microplastics	Litter, solid waste, marine debris and microplastics (often associated with stormwater) also affect all aspects of community enjoyment, participation, direct and indirect values and economic viability, both in estuaries and coastal foreshores.	
	Water pollution environmental values - agricultural diffuse-source runoff	Poor water quality from agricultural sources impacts all aspects of community enjoyment, participation, direct and indirect values and economic viability.	
	Seafood contamination	Pathogens and water pollution can result in seafood contamination affecting community enjoyment (consumptive use).	
	Inadequate, inefficent regulation, over regulation (agencies)	Inefficient regulation of activities that lead to water pollution can increase the threat to community safety and affect participation, enjoyment, and viability of businesses.	
	Reductions in abundance of species and trophic levels	Poor water quality can reduce the abundance of many marine species and affect trophic levels. This affects community enjoyment, viability of businesses and indirect values.	

2. Sustainable coastal use and development for healthy habitats



WHAT ARE THE COMMUNITY BENEFITS?

The overwhelming majority of the NSW community lives within 50 km of the coastline, so the Australian lifestyle is strongly associated with the coast in both urbanised and rural settings. Coastal residents and visitors enjoy a variety of activities throughout the marine estate – from the upstream mangrove-lined coastal river systems, to the bustling downstream harbours and port facilities, and beyond to the extensive offshore reefs systems.

WHY IS THIS MANAGEMENT INITIATIVE NEEDED?

This management initiative addresses threats associated with coastal use and development on foreshores and waterways. The threats include foreshore development and other uses, modification of waterways for boat navigation, altered hydrology from dredging, drainage works, and manipulation of freshwater inputs to estuaries.

Modifications to, and loss of coastal habitat (including beaches, mudflats, rocky shores, wetlands, mangroves, saltmarsh, and seagrasses) from development, or other human activities affects coastal and marine biodiversity. Poorly considered development can reduce breeding and nursery areas for fish and waterfowl, affect wildlife habitats, change natural tidal and fresh water flow patterns, which can then cause problematic sediment transport and ultimately reduce water quality.

Declining biodiversity has negative social and economic impacts on local communities that, passively and actively, enjoy the numerous benefits of the marine estate. Watching wildlife, commercial and recreational fishing, boating and the enjoyment of scenic beauty are all impacted. Habitat disturbance also has a cultural impact on Aboriginal communities through damage to sites, disruption of cultural practices, or decline in spiritually important species.

Decades of altered freshwater flows, habitat modification and estuary entrance works present historical and ongoing threats to estuarine habitat, water quality and species abundance. These legacy issues need attention to avoid further decline.

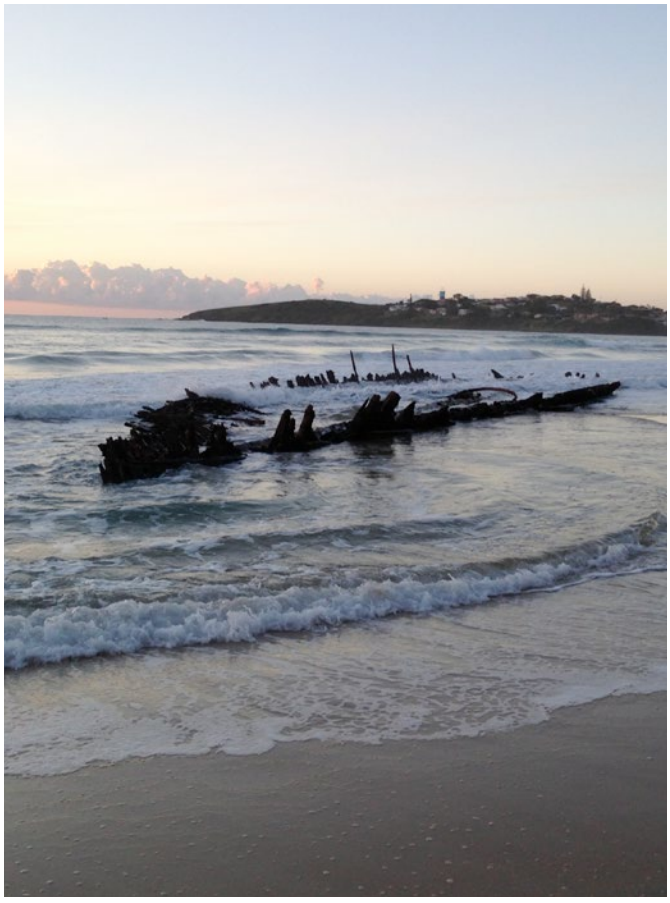
HOW WILL THIS MANAGEMENT INITIATIVE HELP?

This management initiative will implement mechanisms to:

- limit further detrimental impacts of foreshore development and use (e.g. by improved management of beach nourishment and grooming) and using urban and infrastructure renewal projects and agricultural land-use changes as an opportunity to address legacy issues
- apply an improved understanding of catchment and floodplain hydrology to inform better decisions and improve the design of future and upgraded infrastructure
- ensure that entrance management and dredging in estuaries is done in a way that maintains or improves estuary health
- reduce the cumulative impacts of existing infrastructure to modify freshwater flows and estuarine hydrology
- promote the use of best practice to design and assess foreshore development and waterways infrastructure proposals.

This management initiative links with two reform programs: the coastal reforms program and the Crown lands reform program. Both aim to improve the way State and local government develop urban areas on the coast so that future legacy issues associated with poor coastal development patterns are limited and existing impacts are remediated where possible. This includes being more sensitive to managing threats to key physical and ecological processes that support marine biodiversity, clean beaches and healthy estuaries for ongoing public benefit.

The coastal reform program includes new legislation and land-use planning development controls. The Crown land reform program will focus on eliminating duplication of resources and improved effectiveness for dealing with non-compliant development. It will regulate foreshore development activities to ensure there is more coordinated and streamlined assessment of development proposals.



2 MANAGEMENT OBJECTIVE:

To protect coastal habitats and enhance the health of estuarine and coastal waterways by improving the design, quality and ongoing management of foreshore development, use and waterways infrastructure.

Environment TARA

Statewide priority threats	Stressors	Management actions
Dredging (navigation, entrance and harbour management) – affects water, seagrass, beaches and mudflats, shallow soft sediment, planktonic assemblages, species and communities protected under FMA	Altered flow patterns, physical disturbance of sediment (e.g. dredging for navigation), altered tidal salinity patterns and magnitude, reduced water quality (increased water turbidity), and altered substrate transport (natural beach nourishment).	2.1 Assess the cumulative impacts of dredging campaigns, including an audit of commercial dredging in estuaries, and training walls at river entrances, to reduce legacy impacts. Minimise the impacts of existing trained entrance infrastructure to minimise environmental impacts including interruptions to longshore sand movements. 2.2 Align existing policy and seek funding to support and promote re-establishment of more natural hydrology and connectivity on coastal floodplains and within coastal catchments. Improve coordination of agencies to reduce ongoing impact of existing drainage and flood mitigation infrastructure on floodplain habitats. Reduce ongoing impacts of existing barriers to fish movements through remediation of infrastructure. 2.3 Require an appropriate level of environmental assessment to inform whether old and disused infrastructure should be modified to reduce their impact, if they are being repurposed when land is being redeveloped for housing. 2.4 Develop and implement estuary specific intertidal vegetation and foreshore management plans with local government to manage cumulative impacts and reduce the complexity of approvals associated with works spanning the intertidal zone. The plans will cover estuary-specific strategies for: • foreshore structures • estuary bank protection options • rehabilitation opportunities • marine vegetation management • beach grooming • collection of beach wrack • recreational users (e.g. four-wheel driving on saltmarsh, beaches and mudflats). 2.5 Investigate spatial management options to address threats to environmental assets and threats to social, cultural and economic benefits.
Hydrological modifications (estuary entrance modifications) – affect water, saltmarsh, seagrass, mangrove, beaches and mudflats, shallow soft sediment, planktonic assemblages and species and communities protected under the FMA and BCA		
Modified freshwater flows – (extraction and artificial barriers) losses and changes to water, saltmarsh, seagrass, planktonic assemblages, shallow soft sediment and species and communities protected under FMA and BCA	Water pollution in the form of low dissolved oxygen acid sulfate soil leaching into waterways, lowering pH and increasing turbidity. Changes to tidal flows, watertable levels, inundation regimes and floodplain and catchment hydrology also contribute. Impacts on aquatic habitat connectivity, including between fresh, estuarine and marine waters.	
Foreshore development – impacts on saltmarsh, mangrove, beaches and mudflats and species and communities protected under the FMA and BCA	Physical disturbance from habitat removal and destruction, legacy issues associated with clearing and development, changes to tidal flows and wave patterns, changes to sediment (grain size) and fresh water inputs, impacts to nesting shorebirds and turtles due to habitat loss, possible impacts on inshore dolphins.	
Clearing riparian vegetation – affects water, saltmarsh, shallow soft sediment, planktonic assemblages and species and communities protected under the FMA and BCA		
Beach nourishment and grooming – affects beaches and mudflats		
Four wheel driving – affects saltmarsh, beaches and mudflats and species and communities protected under the FMA and BCA		

	Statewide priority threats	Stressors	Management actions
Social, cultural and economic TARA	Threats specifically addressed in this management initiative are governance and lack of access.	Stressors affecting all aspects of community enjoyment, participation and economic viability, both in estuaries and coastal foreshores, include: • habitat disturbance • lack of compliance (e.g. illegal development) • loss of public access (private development) • limited or lack of access infrastructure • inadequate and inefficient regulation.	2.6 Coordinate multiagency efforts to identify locally and regionally significant marine estate issues when developing coastal management programs, including developing a policy for coastal Crown lands, including submerged land (links to action 8.10). 2.7 Review and update existing coastal design guidelines to promote best-practice design in coastal urban environments for the benefit of current and future generations of coastal communities and environmental assets. Work to embed coastal processes and habitat considerations into urban renewal projects. 2.8 Improve regulation of foreshore development and other activities requiring consent or a permit or licence, to ensure State agencies and local councils have more coordinated ways of considering development proposals without duplicating resources. 2.9 Improve the effectiveness and efficiency of regulatory processes for non-compliant development and activities. 2.10 Integrate various research and monitoring into the Monitoring Program to address key knowledge gaps and assess management effectiveness.

3. Planning for a changing climate

WHAT ARE THE COMMUNITY BENEFITS?

Preparing for climate change will ensure that the benefits the marine estate provides to the NSW community will continue under climate change projections. Preparedness enables communities and industries to modify practices, develop adaptation strategies, and strategically plan for foreseeable changes. It also helps the community better understand the likely effects so we can build resilience into ecosystem management and give species every opportunity to thrive in a changing climate. In most cases, the cost of being prepared is much lower than the cost of recovery.

WHY IS THIS MANAGEMENT INITIATIVE NEEDED?

Climate change was identified as a priority threat in the statewide TARA because of the impact on the environmental assets and community benefits derived from the NSW marine estate. In the next 20 years, climate change is likely to affect key components of the marine estate: ocean temperatures, the supply of nutrients, ocean chemistry, food chains, wind systems, ocean currents and extreme events such as east coast lows. These variables have the potential to affect the distribution, abundance, breeding cycles and migrations of marine plants and animals that people rely on for food, income and enjoyment. The impacts are expected to increase as we move towards a 50-year timeframe.

By better understanding the impacts of climate change on the marine environment, coastal communities and lifestyles, communities can prepare and adapt for the future. More information and research is needed to understand the severity and extent of future impacts on our marine estate.

The NSW Government is committed to preparing for climate change, however, to date there has been a gap in addressing climate change impacts strategically across the marine estate. This initiative will help fill this gap by building on, and supporting actions under the coastal reforms and *Climate Change Fund Draft Strategic Plan 2017 to 2022*, which are further described below.

HOW WILL THIS MANAGEMENT INITIATIVE HELP?

This management initiative will increase our understanding and knowledge of how climate change will affect the marine estate, assist land and sea managers to plan for climatic changes using an adaptation pathways framework. It also implements actions to better adapt to future climate change impacts.

The actions in this management initiative will complement actions in the NSW Government's *Climate Change Fund Draft Strategic Plan 2017 - 2022*. This draft plan includes up to $100 million in new funding to help support the NSW Government's long-term objective to make NSW more resilient to a changing climate as part of the NSW Climate Change Policy Framework.

The actions also support elements of the NSW coastal reforms by increasing our knowledge about the impacts of climate change on the marine estate to help guide management actions. The NSW Government has allocated $83.6 million to support the coastal reforms. These reforms will provide a new legislative and regulatory framework to better equip coastal communities to respond to existing and emerging coastal challenges and opportunities, including climate change.

3 MANAGEMENT OBJECTIVES:

To use best available information, methods and technology to strengthen the NSW Government's understanding of how the marine estate will respond to a changing climate.

To use successful frameworks and processes to mitigate, adapt and monitor the impacts of climate change on the NSW marine estate.

	Statewide priority threats	Stressors	Management actions
Environment TARA	Sea level rise on saltmarsh, mangrove, beaches and mudflats, rocky shores and species and communities protected under the FMA and BCA	Physical disturbance of habitats from sea level rise, increased storms, flooding, inundation resulting in: • loss of habitat and nesting sites for shorebirds and turtles • loss of shorebirds foraging habitat • loss of intertidal foraging habitat including seagrass • loss of intertidal habitats such as saltmarsh.	3.1 Increase understanding and knowledge of how climate change will impact the marine estate through applied research of climate change impacts on the coastal zone, marine biodiversity and to the community. Integrate into the Monitoring Program. 3.2 Develop tools such as map layers to identify areas of importance for the management, conservation and migration of estuarine ecosystems and biodiversity under expected climate change scenarios. 3.3 Seek strategic opportunities to use climate change projections in marine estate and coastal management programs. 3.4 Assist and engage land and sea managers and coastal communities to plan for climatic changes and manage retreat of coastal, estuarine and marine habitats. This includes on-ground works to increase the resilience of existing marine vegetation communities. 3.5 Fund on-ground activities and investigate regulatory and non-regulatory incentives to facilitate rehabilitation and retreat of coastal wetlands that mitigate climate change and its impacts on the marine estate. 3.6 Consider climate change in spatial management planning, to contribute to building resilient ecosystems.
	Ocean acidification on all environmental assets (except fish assemblages)	pH changes (acidification) may affect calcifying organisms and sensitive organisms (such as urchins and molluscs, and including planktonic assemblages).	
	Altered ocean currents and nutrient inputs on shallow reef, species and communities protected under FMA and BCA	Changes to nutrients and fish abundance likely to impact higher order predators (seabirds, marine mammals, turtles).	
	Altered storm and cyclone activity on water, saltmarsh, seagrass, reefs and species and communities protected under FMA and BCA	Increased mortality of marine fauna after extreme events.	
	Climate and sea temperature rise on all environmental assets except shallow soft sediment, rocky shores and planktonic assemblages	Changes to the East Australia Current and sea temperatures, which are likely to affect turtle, whale and dolphin migration patterns. Changes in temperature likely to impact turtles nesting success and sex composition, range shifts in many species (including fish), loss of habitat such as kelp.	

	Statewide priority threats	Stressors	Management actions
Social, cultural and economic TARA	Environmental - climate change stressors 20 years	Impacts participation (e.g. safety, health and wellbeing) associated with loss of beach amenity through increased frequency of dangerous storms, potential increase in the abundance of jellyfish and changes in abundance of marine species. Climate change is affecting ocean temperatures, the supply of nutrients, ocean chemistry, food chains, wind systems, ocean currents and extreme events such as cyclones. These variables have the potential to affect the distribution, abundance, breeding cycles and migrations of marine plants and animals that people rely on for food, income and enjoyment therefore affecting business viability. Increased sea temperatures and sea level rise could affect the spiritual connections of Aboriginal communities (e.g. culturally significant species, links to Country and food sources).	(See actions above that address social and economic threats associated with climate change. Cultural actions are included in **Initiative 4**).

MANAGEMENT INITIATIVES

4. Protecting the cultural values of the marine estate

WHAT ARE THE COMMUNITY BENEFITS?

Conservation of Sea Country is central to the overall health and wellbeing of Aboriginal people, their culture practices and traditions. The Sea Country of NSW is culturally significant to Aboriginal people who live along the NSW coast and further afield. For thousands of years, Aboriginal people have relied on the natural resources provided by the sea. Sea Country includes islands, beaches, headlands, rocky shores, the ocean and estuaries, all of which hold spiritual significance.

The importance of Sea Country to Aboriginal people is reflected in their dreaming, languages, art, music, dances and stories. Coastal Aboriginal communities collect sea plants, animals, shells and stones which are important for use in ceremonies, food, traditional medicine and healing. This knowledge is passed on to the next generations to ensure continuation of these practices.

WHY IS THIS MANAGEMENT INITIATIVE NEEDED?

Aboriginal cultural heritage values within the marine estate are at risk from many threats identified in the statewide TARA. Physical threats to the environment, such as pollution, loss of habitat or depletion of stocks threaten Aboriginal culture because the lives and spirituality of Aboriginal people are directly related to Country. For Aboriginal people culture, nature, land and water are linked. Where these links to Country are threatened, due to environmental degradation, restricted access or competition between user groups, it can result in a loss of culture.

This occurs:

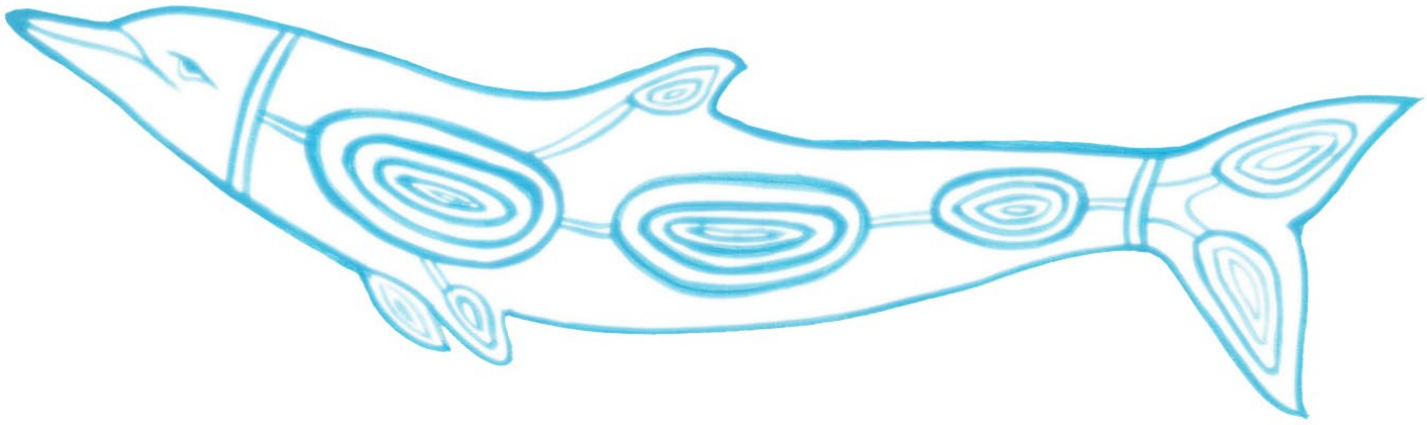
- through the degradation of culturally significant sites
- by reducing the ability of Aboriginal people to maintain connections to Country
- by limiting the transfer of cultural knowledge across generations
- through the loss of spiritual connections such as culturally significant species.

The lack of Aboriginal engagement in decision-making has also been identified as a major threat to culture. The need for Aboriginal knowledge and expertise to be incorporated into the ongoing management of Sea Country is clearly recognised by government. There is currently limited opportunity for structured and ongoing participation of Aboriginal people in marine estate management. Increasing participation could assist in the management of priority stressors identified by the statewide TARA.

HOW WILL THIS MANAGEMENT INITIATIVE HELP?

The actions proposed under this management initiative aim to increase Aboriginal participation in management decisions within the marine estate and establish a framework that will allow local communities to identify cultural values and undertake coastal management works to protect these values on Country.

These actions will be developed further by working collaboratively with Aboriginal people to ensure the actions will be effective and appropriate in addressing threats to culture. This will include targeted engagement with peak Aboriginal bodies, government agencies and statutory advisory bodies to design actions that can link with other government reform processes, in particular, proposals to improve the governance arrangements for managing Aboriginal cultural heritage and cultural fishing. This initiative extends existing actions in the Hawkesbury Shelf marine bioregion to the rest of the marine estate.



4 MANAGEMENT OBJECTIVE:

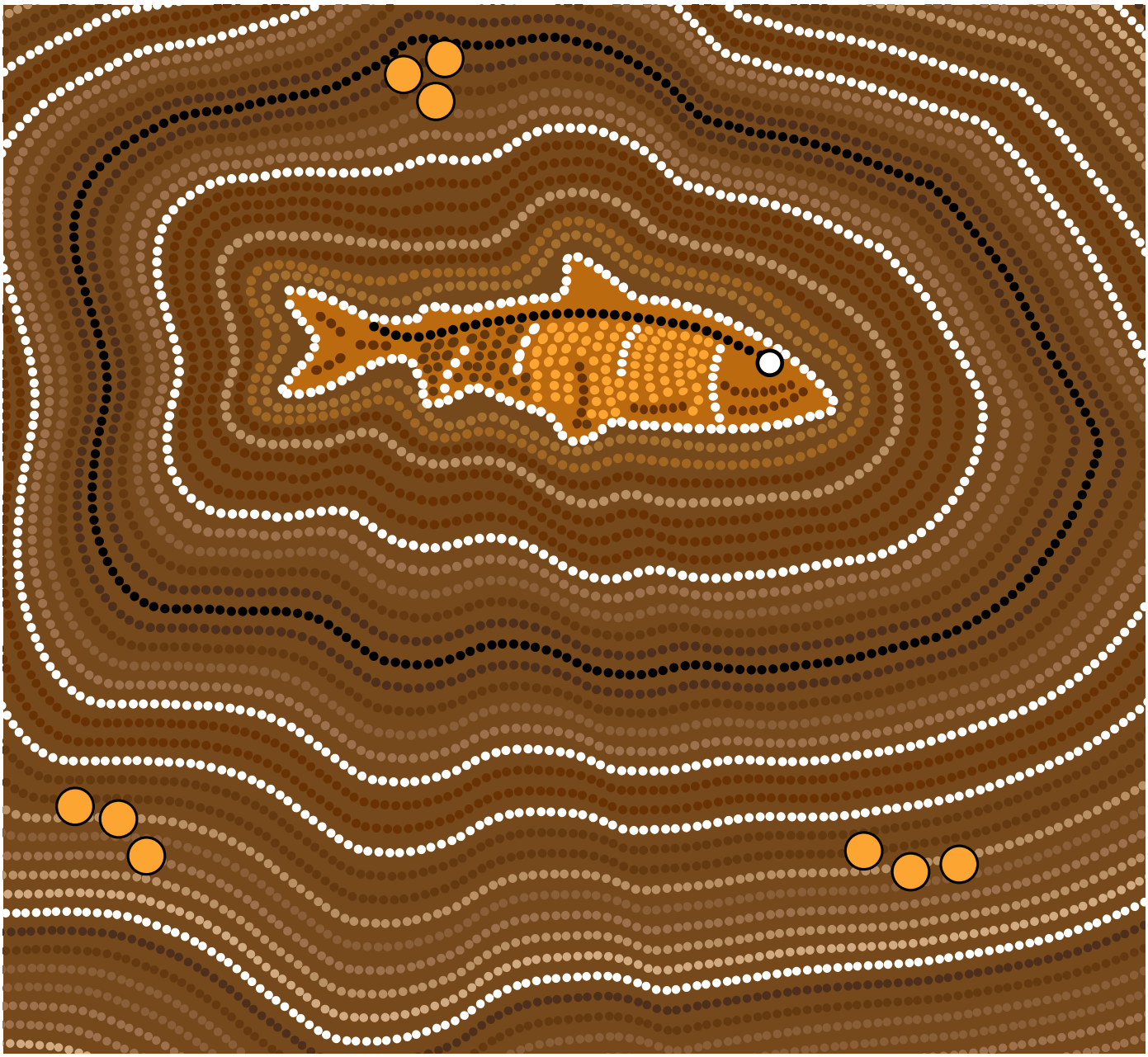
Involve Aboriginal people in the use, conservation and management of NSW's marine estate.

Social, cultural and economic TARA

Statewide priority threats	Stressors
Resource-use conflict	Cultural fishing rights often meet resistance from other sectors and conflict will increase as these rights are pursued. This conflict can result in antisocial behaviour, such as vandalism of significant cultural heritage places or artefacts, or the ability to practice cultural or traditional use of sites.
Environmental	For Aboriginal people, culture, nature, land and water are all linked. Where these links to Country are no longer possible due to environmental degradation from water pollution, habitat disturbance, pests and disease or climate change, Aboriginal people are prevented from using the land and practicing and passing on cultural traditions.
Governance of the marine estate and critical knowledge gaps	The lack or inadequate engagement with Aboriginal people on marine estate management issues prevents input in aspects of decision-making that impact on culture.
Public safety	Aboriginal people frequently eat and have cultural ceremonies using wild pipis, oysters and other shellfish that are known to be vulnerable to contamination issues.
Lack of access availability	The historic and ongoing loss of access to the coast associated with urbanisation, private development and protected area closures, such as sanctuary zones, prevents the practice and sharing of culture on Country.

Management actions

- 4.1 Work with Aboriginal communities to evaluate current arrangements for Aboriginal involvement in Sea Country management and decision-making and establish and implement a framework to ensure the involvement of Aboriginal people is effective and appropriate.
- 4.2 Work with Aboriginal communities to identify the cultural values of Sea Country to improve the incorporation of values into decision-making on the marine estate.
- 4.3 Undertake a pilot program, that as part of an integrated Aboriginal engagement model, would fund local Aboriginal communities to undertake coastal management works on Country.
- 4.4 Investigate the impacts of climate change on Aboriginal cultural heritage values in the marine estate and implement strategies to reduce or adapt to this risk.
- 4.5 Establish a process for Aboriginal knowledge holders to participate in marine wildlife events with culturally significant species.
- 4.6 Explore and implement opportunities for economic development in the NSW marine estate and improved representation of Aboriginal cultural values in NSW marine parks.
- 4.7 Investigate opportunities to address threats to cultural benefits through spatial management.
- 4.8 Integrate research and monitoring into the Monitoring Program to address key knowledge gaps and assess management effectiveness.



MANAGEMENT INITIATIVES

5. Reducing impacts on wildlife

WHAT ARE THE COMMUNITY BENEFITS?

NSW boasts unique marine wildlife that plays an important role in maintaining a balanced ecosystem. NSW is home to an abundance of threatened and protected species: humpbacks and southern right whales migrate through NSW waters each year; turtles use the north coast for important nesting sites; the little penguin colony in Manly is the only breeding colony of penguins on mainland NSW; small populations of resident dolphins inhabit our coastal estuaries; and seal populations are recovering and being sighted more commonly along the south coast.

Three-quarters of respondents to the Community Survey felt that the natural beauty and marine wildlife of the marine estate were key reasons to live in and visit NSW. The community also called for the abundance and diversity of marine life to be maintained. Wildlife tourism, such as the whale and dolphin watching industry, has measurable benefits for the economy, the environment and the community, enabling the public to safely engage with animals in the wild. The NSW whale watching industry is the largest in Australia. It is worth more than $65 million to the NSW economy, attracting visitors to coastal national parks in the winter months. The 'Wild About Whales' mobile app has now more than 40,000 active users, showing a growing community interest in marine wildlife.

The NSW community also engages in wildlife counts and wildlife rescue. The 2015 survey *Who Cares About the Environment?* reported that 28 per cent of respondents had volunteered in these activities.[14] Non-government and volunteer organisations, such as the Organisation for the Rescue and Research of Cetaceans in Australia (ORRCA), support the NSW National Parks and Wildlife Service with marine mammal rescue. This results in significant cost savings for the NSW Government. These organisations also make a valuable contribution to community education, which improves environmental attitudes and behaviour.

[14] *Who cares about the environment?* (Office of the Environment and Heritage 2015)

WHY IS THIS MANAGEMENT INITIATIVE NEEDED?

The cumulative impacts of climate change, fishing, litter, vessel-based activities, recreational activities such as boating, as well as land-based and industrial activities, pose a cumulative threat to threatened and protected marine wildlife populations. These impacts also threaten Aboriginal cultural heritage due to the spiritual connection Aboriginal people have with culturally significant species such as whales, dolphins and turtles.

The cumulative threats of commercial and recreational fishing can impact wildlife through bycatch, ghost fishing, marine debris, physical disturbance and wildlife disturbance. Entanglement in, or ingestion of, fishing gear and debris can kill or injure wildlife. Fishing also impacts population health and can cause animals to be displaced from their habitat.

Land-based threats such as urban development, introduced pests, and recreational activities such as shore-based fishing, dog walking, four-wheel driving and bait collecting are a threat to vulnerable and endangered shorebirds and turtles in NSW. These activities can harm eggs and chicks or hatchlings. Human presence can disturb shorebirds by causing them to move away from important foraging areas or leaving their eggs and chicks exposed. Runoff from landbased activities also increases wildlife disease and entanglements.

Vessel-based activities, such as boating, shipping, and commercial vessels are also identified cumulative threats to wildlife. Vessel-based activities in NSW are important to the community, but the noise and disturbance of vessels can impact the ability of animals to communicate, navigate, hunt. Noise also impacts wildlife breeding, foraging, resting and animal health and can displace animals form their habitat. Vessel strike can kill or injure wildlife. There is an elevated risk in estuarine waters where populations are more vulnerable to injury, for example, in the south coast where southern right whales go to calve. Entanglement in fishing gear and marine debris has a significant impact on marine mammals, turtles and birds. These species can become entangled in active or discarded fishing gear, which can cause injury or drowning of animals.

In the 2015 survey *Who Cares About the Environment?*, community members stated their concern for the wellbeing, decline and survival of wildlife due to environmental degradation across NSW. They specifically raised the issue of tidal changes caused by climate change, and how this will erode beaches and endanger wildlife[15].

The 2016 State of the Environment Australia report also recognised the impacts of stressors such as climate change, water pollution and vessel disturbance as key impacts on the marine environment, calling for further understanding and mitigation measures[16].

HOW WILL THIS MANAGEMENT INITIATIVE HELP?

This management initiative seeks to reduce the cumulative threats to wildlife and to enable the continued social, cultural and economic benefits from the biodiversity of the marine estate. Proposed management actions include:

- improving partnerships between government agencies and non-government organisations
- improving existing wildlife conservation programs
- expanding community and industry education on the impacts of noise, vessel collisions, marine debris and fishing activities and gear.

The actions in this management initiative are supported by the introduction of the *Biodiversity Conservation Act 2016*, which brings threatened and protected wildlife under one piece of legislation in NSW. The Act increases penalties for breaching approach distances to marine wildlife and makes provisions for increased funding for compliance and education activities.

[15] *Who cares about the environment?* (Office of the Environment and Heritage 2015)

[16] 'Executive Summary - Marine environment 2016', in *Australia State of the Environment Report* (2016)

5 MANAGEMENT OBJECTIVE:

To understand and mitigate threats to marine wildlife in NSW.

Environmental TARA

Statewide priority threats	Stressors
Climate change – altered storm and cyclone activity, climate and sea temperature rise, ocean acidification, sea level rise and ocean currents and nutrient input	Climate change is predicted to cause reductions in food availability and changes in food distribution, increases in disease and mortalities, changes in distribution and migration patterns, reductions in breeding success and nest viability, and inundation and permanent loss of habitat.
Estuary entrance modifications	Modifications cause wildlife disturbance, physical disturbance, water pollution, sedimentation and changes to the tidal prism, leading to degradation, inundation and permanent loss of habitats.
Point discharges (industrial discharge, sewage effluent and septic runoff)	Water pollution, including increased chemicals, microplastics, and pathogens, are linked to disease outbreaks and mortalities in wildlife populations.
Deliberate introduction of animals and plants	Predation of shorebirds and seabirds has been linked to regional declines and localised extinctions of some species.
Agricultural diffuse-source runoff	Water pollution including increased nutrients and contaminants are linked to disease outbreaks and mortalities in wildlife populations.

Management actions

5.1 Improve strategic planning for wildlife programs across NSW to address priority threats.

5.2 Strengthen partnerships for marine wildlife conservation response to ensure effective wildlife management, including:

- establish governance arrangements
- strengthen interagency capabilities
- formalise partnerships for wildlife rescue, rehabilitation and notifications
- establish a process for Aboriginal knowledge holders to participate in marine wildlife events with culturally significant species (see **Initiative 4**).

5.3 Improve awareness of threats to wildlife and compliance with regulations to reduce impacts through education campaigns, social research and increased compliance.

5.4 Improve reporting and data sharing on marine wildlife threats to support evidence-based decision-making, including linking and enhancing existing databases, raising awareness of reporting pathways, actively analysing and communicating data more regularly, and integrating research and data into the Monitoring Program.

5.5 Work with stakeholders to research, develop and apply innovative technologies and tools (including expanding the fisheries observer program, trialling gear modifications and technologies) and assessing options to modify or restrict recreational crab traps to mitigate impacts on turtles.

5.6 Understand and reduce impacts of habitat modification on marine wildlife through mapping of key habitat areas, embedding rehabilitation and conservations actions in planning processes, and collaborating with land owners and the community to protect species and habitats.

5.7 Establish a research program to address key knowledge gaps in the statewide TARA, cumulative threats to wildlife and the effectiveness of management interventions.

5.8 Investigate opportunities to address threats to wildlife through spatial management.

	Statewide priority threats	Stressors	Management actions
Environmental TARA	Clearing riparian and adjacent habitat including wetland drainage	Clearing riparian and adjacent habitat causes degradation and permanent loss of habitat, impacting on population health and breeding success.	
	Foreshore development	Development leads to the permanent loss or degradation of habitats, impacting on wildlife health, breeding success and population viability.	
	Urban stormwater discharge	Runoff and associated contaminants and debris can impact wildlife health, including increases in disease and mortalities.	
	Modified freshwater flows	The alteration of natural flow regimes causes degradation and permanent loss of habitat, reductions in prey availability and loss of connectivity between habitat areas used by shorebirds and prey.	
	Passive recreational use – swimming, surfing, walking and dog walking Four-wheel driving	Dog walking and four-wheel driving cause physical and wildlife disturbance and marine debris, damage nesting habitat of turtles and shorebirds, and disturbs the behaviour, health and breeding success of threatened shorebirds.	

	Statewide priority threats	Stressors	Management actions
Environmental TARA	Charter activities – whale and dolphin watching	Whale and dolphin watching impacts on the ability of whales and dolphins to rest, feed and breed leading to poor health and sometimes displacing them from habitat areas.	
	Boating and boating infrastructure	Vessel-based activities are a cumulative threat and can cause collisions, noise disturbance, physical disturbance, wildlife disturbance and marine debris. Vessel collisions cause injury or mortality of wildlife. Noise from vessels impacts the ability of animals to communicate, navigate and hunt and also reduces animal health and can displace animals from their habitat.	
	Small commercial vessels (e.g. ferries, charter boats)		
Social, cultural and economic TARA	Habitat disturbance (e.g. from foreshore development, commercial and recreational fishing methods, four-wheel driving and extractive industries such as mining) Wildlife disturbance (shorebirds, turtles, whales) and impacts on species by dog walkers, four wheel drives, vessels)	Enjoyment of biodiversity is threatened by biodiversity loss, poor wildlife health and welfare, and wildlife disturbance.	

6. Sustainable fishing and aquaculture

WHAT ARE THE COMMUNITY BENEFITS?

Recreational and commercial fishing generates billions of dollars and creates thousands of jobs across coastal NSW. Recreational fishing alone generates about $3.4 billion of economic activity annually and creates the equivalent of around 14,000 full-time jobs. It is enjoyed by 850,000 anglers every year.

The NSW seafood industry includes wild harvest commercial fishers, aquaculturists, wholesalers, processors and retailers who supply fresh seafood to local, national and global markets. Wild harvest commercial fishing and aquaculture provide more than $90 million and $65 million respectively of Gross Value of Production to the NSW economy as well as indirect employment and economic opportunities to the wider community. In total, commercial fishing, aquaculture and oyster farms generate more than half a billion dollars of economic activity each year and directly employ more than 4,000 people. Most commercial fishers are based in regional coastal towns, and in some instances, the seafood industry provides the main source of employment for the community.

The health benefits of seafood are well known. The industry is rising to the challenge of ensuring that locally sourced fresh seafood is available throughout NSW.

WHY IS THIS MANAGEMENT INITIATIVE NEEDED?

The Community Survey highlighted the importance of locally sourced seafood for industry, personal and cultural use, although, one-in-five participants viewed fishing as a threat. The statewide TARA also identified certain commercial and recreational fishing activities as a threat to particular environmental assets. Threats to fish assemblages were identified (both harvest and bycatch), noting a reduction in species abundance and trophic levels. Threats were also identified to threatened and protected species and deep soft sediment (trawling specific). Aquaculture was identified as a threat to seagrass.

HOW WILL THIS MANAGEMENT INITIATIVE HELP?

This management initiative will enhance the management of NSW fisheries through an improved understanding of the ecosystem structure and will respond to identified threats. It will foster economically viable, environmentally sustainable commercial and recreational fishing sectors. This will have flow-on effects to community through enhanced fishing experiences, improved business viability, fresh-caught seafood for consumers and positive health and wellbeing outcomes.

The initiative links to one of the largest commercial fishing reforms in NSW: the Commercial Fisheries Business Adjustment Program (BAP). The BAP has introduced linkages between commercial fishers' shares and resource access, catch or fishing effort; capped the total commercial catch or fishing effort by way of catch or effort quotas across a number of fishery share classes; and is streamlining processes such as real-time catch and effort reporting. It also supports the post-harvest sector, including co-operatives, supporting jobs in regional areas.

Filling knowledge gaps is an important part of this initiative which aims to provide a better understanding of the effects of harvest, bycatch, and better reporting of interactions with threatened and protected species.

Fishery management strategies will be revised and include harvest strategies (for key commercial species) and ecological risk management strategies (reporting on broader effects on the ecosystem) to address changes to fish assemblages and trophic levels. It is acknowledged that this is a complex task and one that has not been fully resolved in other Australian jurisdictions. The harvest strategies will deliver outcomes specific to key commercial species (target and bycatch); and ecological risk management strategies will deliver outcomes that report on bycatch, threatened and protected species, habitats and assemblages. Decision support tools will help progress aspects of these objectives including those used by fisheries management agencies in Australia and overseas. Partnering with industry to build capacity and improve social licence is also proposed.

Other management actions will expand upon or improve current programs, or apply spatial management (e.g. fishing closures and marine protected areas) to address environmental threats, as well as threats to social, cultural and economic benefits (e.g. lack of access to the marine estate). Review of recreational fishing rules will help address identified environmental and social threats, as well as maximise education, advisory and compliance regimes. Research and monitoring programs will fill key knowledge gaps.

This management initiative also links to the existing NSW oyster industry, land-based sustainable aquaculture strategies. These strategies detail site and operational requirements, best industry practice and water quality protection guidelines. They provide a valuable community resource and include the history and operation of aquaculture in NSW and the legislation in place to monitor and regulate the industry.

6

MANAGEMENT OBJECTIVE:

To ensure fishing and aquaculture provides for sustainable use while providing for the health, heritage and social benefits of seafood consumption to the community.

Environmental TARA

Statewide priority threats	Stressors	Management actions
Estuary general fishery impacts on fish assemblages	Reduction in abundance of species and trophic levels due to current and historical levels of harvest. Bycatch of a wide range of secondary species as well as threatened and protected species (e.g. Greynurse Shark, Black Rockcod) that results in impacts on population status. Physical disturbance from trawling in deep soft sediment habitats resulting in impacts on biota. Wildlife disturbance or entanglement from a range of fishing gears and activities.	6.1 Support implementation of the Commercial Fisheries Business Adjustment Program and integrate commercial fishing catch and effort information to the Monitoring Program to enable periodic review of threat and risk levels. 6.2 Introduce harvest strategies and ecological risk management strategies for fisheries that have moderate and high risk levels in NSW. Guide sustainable harvest by developing performance indicators and management responses to identified reference points. 6.3 Expand the commercial fishing observer program across moderate and high risk commercial fisheries to fill knowledge gaps and develop management responses that will further reduce threats associated with bycatch and interactions with threatened and protected species. 6.4 Investigate spatial management options to address threats to environmental assets (e.g. fish assemblages and deep soft sediment) and threats to social, cultural and economic benefits (e.g. lack of access to the marine estate and resource-use conflict). 6.5 Undertake an environmental assessment of recreational fishing, periodically review current rules, and implement management actions to address threats associated with harvest, bycatch, illegal sale of fish and improve fish stocks. 6.6 Apply best-practice guidelines for seagrass protection in the NSW Oyster Industry Sustainable Aquaculture Strategy. 6.7 Integrate various research and monitoring into the Monitoring Program to address key knowledge gaps associated with the cumulative threats of fishing, in particular interactions with wildlife and habitat, fisher attitudinal research and impacts of aquaculture on seagrass.
Ocean trap and line fishery impacts on threatened and protected species and communities protected under FMA		
Ocean trawl impacts on deep soft sediment		
Ocean haul impacts on fish assemblages		
Shore and boat-based line and trap fishing (estuaries and offshore) impacts on fish assemblages	Bycatch of a wide range of secondary species as well as threatened and protected species (e.g. Greynurse Shark, Black Rockcod) that results in impacts on population status. Reduction in abundance of species and trophic levels due to levels of harvest. Ingestion of and entanglement in fishing gear, and impacts on several protected species from specific types of traps. Fishing-related litter and marine debris that results in impacts on a range of species.	
Boat-based line and trap fishing (offshore) impacts on species and communities protected under FMA		
Hand gathering (coast) impacts on fish assemblages	Harvest of a range of on-reef and rocky shore species at a level that results in measurable impacts.	
Oyster aquaculture	Physical disturbance to seagrass (*Posidonia*) from vessel propellers, resuspension of sediment and shading from structures.	

	Statewide priority threats	Stressors	Management actions
Social, cultural and economic TARA	Threats addressed include resource use conflict, environmental, governance, critical knowledge gaps and lack of access	Stressors affecting community enjoyment, participation and economic viability, both in estuaries and offshore, include: • pests and disease • reduction in abundance of species and trophic levels • habitat disturbance (commercial and recreational fishing methods) • conflict over resource access and use • lack of compliance with regulations • loss or decline in marine industries • loss of access (Government area closures).	6.8 Undertake targeted fish stocking and sustainable fishery enhancement in estuaries to improve fishing opportunities where appropriate. 6.9 Partner with OceanWatch to deliver information and training to all fishers to reduce user conflict within and between sectors, improve self-compliance, and develop economic opportunities. 6.10 Investigate and implement with industry the opportunities available to promote fishing and wild caught seafood, to build social licence. 6.11 Integrate outcomes of social research into NSW marine pest and disease advisory programs to reduce the spread of marine pest and disease by enhancing community responsibility for passive surveillance and aquatic hygiene activities.

MANAGEMENT INITIATIVES

7. Enabling safe and sustainable boating

WHAT ARE THE COMMUNITY BENEFITS?

Recreational boating brings significant economic and social benefits to the NSW community. An estimated 1.8 million people go boating in the NSW marine estate each year.[17]

The benefits from recreational boating are reliant on adequate land-water interface amenities, either through land-based infrastructure (such as boat launching ramps, pontoons, jetties, wharfs, boat storage facilities, pump out facilities), or water-based infrastructure (such as navigation aids, moorings and marinas).

The social benefits of boating include health and wellbeing benefits of physical exercise, enjoyment, socialising with family and friends, competitive sports such as boat and yacht racing, and the opportunity to enjoy the beauty of the NSW marine estate.

The economic benefits are also significant: approximately 13,000 people are employed in the boating industry in NSW and up to $2 billion of direct revenue is generated and a further $1.38 billion in indirect spending has been estimated as a result of recreational boating activities.

Marinas also play an important role. They provide social benefits through their direct services to the public (e.g. fuel, pump out facilities, chandlery, boat repair and maintenance) and community events (e.g. 'try sailing' days, waterway accessibility). They contribute to the economy through purchasing products and services, employing staff, renting spaces to business tenants, engaging contractors and paying lease payments and taxes. NSW marina operators invest in capital expenditure that enhance the quality, diversity and accessibility of maritime facilities and services that directly contribute to the economy and provide additional boat storage capacity (e.g. berths and pens, moorings, dry stack or hard stand).

[17] *Social and economic background information report on the NSW marine estate* (Vanderkooi Consulting, for MEMA 2015).

WHY IS THIS MANAGEMENT INITIATIVE NEEDED?

The Community Survey highlighted the lack of access to the marine estate as a threat to social and economic benefits. The benefits from recreational boating depend on adequate accessible land–water interface infrastructure for all user groups.

It is forecast that vessel ownership in NSW will continue to grow, placing increased pressure on the need for boat storage and waterways access infrastructure. Negative impacts on current employment or production are due to the lack of access infrastructure, as businesses can operate only where there is access (and therefore customers).

The statewide TARA identified threats associated with boating and boating infrastructure in the marine estate. These include the lack of access to the marine estate as well as the impacts of small commercial vessels, recreational boating and boating infrastructure on environmental assets and social, and economic benefits. This initiative also links to **Initiative 5** which address the impacts on wildlife of disturbance and collisions from vessels.

HOW WILL THIS MANAGEMENT INITIATIVE HELP?

This initiative addresses the priority threats identified in the statewide TARA. Several actions build on existing programs such as the Boating Now Program and the Moorings Review. Improved reporting initiatives are proposed to fill knowledge gaps.

The initiative also continues to support Commonwealth agencies. The Australian Maritime Safety Authority (AMSA) is leading a national effort to educate the maritime community about the impacts on marine wildlife from collisions. In NSW, AMSA are partnering with Organisation for the Rescue and Research of Cetaceans in Australia (ORRCA) Whale and Seal Rescue for incident reporting. AMSA is supported in raising public awareness and communicating existing measures that regulate vessel and wildlife interactions.

7 MANAGEMENT OBJECTIVE:

To balance protection of coastal and marine habitat and species with access and safe and sustainable boating.

	Statewide priority threats	Stressors	Management actions
Environment TARA	Boating and boating infrastructure – affects water, seagrass, beaches and mudflats, shallow soft sediment and species and communities protected under the FMA and BCA	Physical disturbance of *Posidonia* seagrass and other seagrasses due to physical scouring of habitat resulting in impacts. Wildlife disturbance from activity and vessel collisions. Marine debris and a range of water pollution stressors, particularly copper pollution and antifouling paints.	7.1 Continue the Moorings Review - focus on improved regulation, administration and exploring new technologies and delivery mechanisms. The review seeks solutions for mooring demand and reducing the threat of physical disturbance to sensitive *Posidonia* seagrass and other seagrasses. 7.2 Manage boat-based contamination through the AMSA national framework and implement an education program in NSW to address the environmental impacts of water pollution from recreational vessel cleaning, to address information failure. 7.3 Partner with industry to investigate a pilot program at marinas in NSW to design and install sump drain runoff handling systems with sediment traps. 7.4 Improve awareness of threats to wildlife, and compliance with regulations, to reduce impacts of boating on wildlife through education, social research and compliance planning. This links to actions in **Initiative 5**. 7.5 Explore opportunities for improved data sharing of vessel activity and collisions with marine fauna, between existing government databases (e.g. Australian Marine Mammal Centre national ship strike database and the Elements database). Improve reporting of vessel and wildlife incidents. This links to the actions in **Initiative 5**. 7.6 Integrate various research and monitoring into the Monitoring program to address key knowledge gaps.
	Small commercial vessels (e.g. ferries, charter boats, commercial fishing, whale watching) on species protected under the BCA	Physical disturbance and wildlife disturbance of threatened and protected species, principally from vessel collisions and noise.	
Social, cultural and economic TARA	Lack of access	Limited or lack of access infrastructure to the marine estate impacts upon the ability to participate in a range of activities in the marine estate and affects participation, enjoyment and viability of businesses.	7.7 Continue improving waterway access to the marine estate through the NSW Boating Now Program to address the lack of access. Funding is allocated according to Regional Boating Plans developed in consultation with local government, boating stakeholders and waterway users in each region. 7.8 Strengthen partner agency coordination across State and local government to identify and deliver waterways infrastructure, and improve the overall social and economic benefits of the marine estate.
	Governance	Inadequate, inefficient regulation and overregulation (agencies) affects participation, enjoyment and viability of businesses.	

8. Improving governance and enhancing social and economic benefits

WHAT ARE THE COMMUNITY BENEFITS?

The community derives many social and economic benefits from the NSW marine estate, as well as the intrinsic value of the marine estate itself (valuing it regardless of direct interaction). The social benefits include socialising, health and wellbeing, a sense of community, and enjoying the biodiversity and beauty of the marine estate while swimming at the beach, recreational boating, fishing, kayaking or diving. Economic benefits include those from running a business (e.g. whale watching, SCUBA diving or commercial fishing).

WHY IS THIS MANAGEMENT INITIATIVE NEEDED?

This initiative addresses threats to community benefits through the triple bottom-line threat and risk assessment as part of the marine estate reform process; this is the first time this approach has been used in NSW. It will improve strategic planning for the marine estate, now and into the future, by considering environmental threats with social, cultural and economic threats.

The Community Survey highlighted the intrinsic value of a healthy marine estate as well its value as providing an income, particularly through tourism and seafood industries. It also identified antisocial behaviour as the number one threat to social benefits, followed closely by

overcrowding, conflict of use (e.g. danger to swimmers from recreational activities such as boating and jet skiers) and a lack of public access. Perceived threats to economic viability were associated with water pollution, loss of natural areas, and increasing cost to access the marine estate. In addition, the general lack of awareness or community engagement on current management of the marine estate was noted as a key concern in the Community Survey. These were also findings of the statewide TARA.

The statewide TARA identified a need for governance models that support improved integrated management of the marine estate over the life of the Strategy. This is an opportunity to enhance the Authority's existing multiagency approach to governance through improved interagency coordination and streamlining of agency effort. It is also an opportunity to test contemporary approaches to regulation and compliance and actively involve communities in managing the marine estate.

HOW WILL THIS MANAGEMENT INITIATIVE HELP?

This initiative will improve the governance of the marine estate, reduce user conflicts, and improve public access to ensure the community benefits are maintained now and into the future.

A commitment from government agencies – Commonwealth, State and local government – to coordinate their management of the marine estate will streamline all aspects of marine planning and operations. It also offers more opportunities for holistic management and allows more effective engagement with all stakeholders, including government, community groups and industry.

This initiative also addresses the social and economic threats associated with antisocial behaviour, unsafe practices, loss of public access and resource-use conflict. New marine park management plans and the coastal reform program will place greater emphasis on maintaining and improving public access in coastal use areas, including when new developments are being assessed. Other management actions include new policies and programs and regulatory review, with a focus on incentives and risk-based approaches to compliance.

An integrated monitoring program will help address knowledge gaps and develop a shared understanding of community benefits derived from the marine estate and the threats to those benefits.

8 MANAGEMENT OBJECTIVE:

To improve governance arrangements in the marine estate and to respond to knowledge gaps, resource-use conflict and loss of public access.

	Statewide priority threats	Stressors	Management actions
Social, cultural and economic TARA	Governance of the marine estate	Inadequate, inefficient regulation and overregulation (agencies) diminish how the marine estate is managed, or is perceived to be managed. Other stressors include lack of community awareness of the marine estate, associated threats and benefits; regulation and opportunity for participation; and lack of compliance with regulations (by users) or lack of compliance effort (by agencies).	8.1 Review the range of current legislation, regulation and policy that has linkages to the *Marine Estate Management Act 2014*, or is otherwise applicable to the marine estate, to identify opportunities to streamline these instruments to address inconsistencies and duplication of effort. 8.2 Strengthen interagency capacity between Authority agencies, local government and other State agencies by clarifying roles and responsibilities, to provide increased coordination and implementation of program areas such as: • communications and engagement • compliance • research, monitoring and mapping • data management. 8.3 Build stakeholder capacity in marine estate management by mapping and reviewing existing advisory groups and their functions, to improve their coordination and enhance partnerships. 8.4 Facilitate proactive compliance by users through incentive-based initiatives and adequate resourcing, to be delivered through the other initiatives outlined in this Strategy. 8.5 Investigate, develop and implement contemporary risk based and outcome-based approaches to prioritise compliance effort and assess existing regulations. 8.6 Develop an innovative culture and expansion of digital technologies, in particular for compliance and education programs. 8.7 Develop school and community education and awareness programs to improve awareness of the marine estate. 8.8 Improve coordination and implementation of policies and programs, including incentive-based initiatives, with tourism stakeholders to enhance sustainable tourism and recreational use of the marine estate.
	Critical knowledge gaps	Inadequate social, cultural and economic information limits the ability to address identified threats.	

	Statewide priority threats	Stressors	Management actions
Social, cultural and economic TARA	Lack of access availability	Loss of public access (either by private development or Government area closures) and limited or lack of access infrastructure to the marine estate impacts upon the ability to participate in a range of activities in the marine estate.	8.9 Establish a Marine Integrated Monitoring Program (Monitoring Program) that includes social, cultural and economic components, to develop a shared understanding of the NSW community's attitudes, values, perceptions, experiences, knowledge, aspirations, patterns of use and support for management responses to inform future management and policy. 8.10 Explore opportunities for improved access to reduce resource-use conflict in the marine estate such as through: • land-use planning frameworks and policies • coastal reforms processes • Crown land reforms program • spatial management mechanisms. 8.11 Investigate equitable cost-recovery mechanisms that provide infrastructure solutions to ease congestion without burdening ratepayers or businesses for site-specific developments. 8.12 Develop incentives to promote safe use of the marine estate and compatible behaviour to complement the existing regulatory compliance approach. 8.13 Apply spatial management tools to reduce resource-use conflict, providing opportunities for a diverse range of activities within the spectrum of compliant uses on the marine estate.
	Resource-use conflict	Non-compatible uses of the marine estate cause stressors such as increased conflict over resource use, and loss or decline in marine industries. Other stressors include antisocial behaviour and unsafe practices, overcrowding and congestion, which decrease beach amenity and ability to utilise and enjoy the marine estate.	

How will we know if we are delivering on our vision?

The Marine Integrated Monitoring Program (Monitoring Program) will monitor environmental assets and social, cultural and economic benefits that were identified by the statewide TARA as being under moderate, high or cumulative risk from human activities.

The primary purpose of the Monitoring Program is to evaluate management initiatives in this overarching Strategy and actions that aim to address these threats and risks. This will be achieved by linking to key performance indicators in the Strategy's implementation plan. In addition, the Monitoring Program will aim to fill knowledge gaps that were identified as part of the statewide TARA process.

The Monitoring Program will measure and report on progress towards achieving the key performance indicator targets and will guide adaptive management. The Monitoring Program will include:

- **short-term to medium-term monitoring** – to examine the condition of assets and benefits, and extent of impact on, and reduction of risks to community benefits
- **long-term monitoring** – to assess the condition and trend of the marine estate's assets and broadscale impacts
- **citizen science monitoring** – volunteer monitoring and observations of condition of habitats and presence of species.

The Monitoring Program will help track the progress of the Strategy under five themes:

1. ecosystem health
2. biodiversity
3. water quality
4. community benefits
5. economic benefits.

The Strategy's implementation plan will include targets for key performance indicators and actions to maintain and improve habitats, species, ecosystem health and community wellbeing. These targets relate to the ecological assets (for example seagrass meadows and coastal habitats) that support or best represent the ecological and biological processes of the marine estate to:

- provide habitat for biodiversity, including threatened species
- increase resilience to climate change
- support economic and community benefits (for example natural beauty, fisheries and protection from wave action).

The Strategy includes a management initiative to improve water quality. Monitoring and evaluation of the effectiveness of management actions in reducing nutrient, litter and sediment loads in priority areas is therefore required.

The wellbeing of the NSW community is linked to the health of the marine estate, and many people have strong connections with the estate through recreational activities, occupation, cultural or community ties. A key focus of the Monitoring Program will be to assess the effectiveness of actions to address the identified threats to community wellbeing and to fill key knowledge gaps.

A network of organisations that use or generate monitoring data or reporting products will be engaged in the development of the Monitoring Program. This includes Authority agencies, universities and local government. The community will also be encouraged to participate to ensure effective monitoring. Several citizen science programs are already well established to support marine monitoring, and others will be encouraged.

Reporting timeframes for Monitoring Program activities will depend on NSW Government requirements. Performance information and milestones will be reported to stakeholders, committees and agencies. The program will be reviewed every five years as part of the five-year health check.

Marine Estate Management Strategy

Published 2017 by the NSW Marine Estate Management Authority:

- Dr Wendy Craik AM, Chair
- Secretary, NSW Department of Industry
- Chief Executive, NSW Office of Environment and Heritage
- Secretary, NSW Department of Planning and Environment
- Secretary, Transport for NSW
- Professor R. Quentin Grafton, Chair, Marine Estate Expert Knowledge Panel.

The NSW Marine Estate Management Authority is advised by the Marine Estate Expert Knowledge Panel. The Authority was established by the NSW Government in 2013 to advise on policies, priorities and directions for the NSW marine estate.

The NSW marine estate includes marine waters, estuaries and the coast from the Queensland border in the north to the Victorian border in the south. It extends seaward out to three nautical miles. The full definition and map can be found at **www.marine.nsw.gov.au**.

This Strategy, background reports and a glossary of key terms are also available at **www.marine.nsw.gov.au**.

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RM8 reference: INT17/66942