

# NSW Marine Estate Management Strategy

2018–2028

# NSW Marine Estate Management Strategy

More information can be found at  
[www.marine.nsw.gov.au](http://www.marine.nsw.gov.au).



# 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,

cultural, economic and environmental 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* (the Strategy) was developed by the Marine Estate Management Authority (Authority) on behalf of the NSW Government and the broader community. It 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 the most important threats to the environmental assets and social, cultural and economic benefits the community derives from the marine estate.

We have prioritised actions to address water quality – this is what you told us was of greatest importance. We will undertake a catchment-based approach to implement initiatives to address the cumulative threats identified to major coastal waterways, and ensure a coordinated approach to waterway health that benefits the NSW community. To complement this, we are also introducing innovative measures to improve the habitats that coastal and marine wildlife rely upon.

The Strategy is consistent with the *Marine Estate Management Act 2014* and 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.

The Strategy also acknowledges the links with other reform and management programs that are already helping to reduce the priority threats. Notable among

these is the coastal reforms, where complementary outcomes will be sought for Strategy implementation. Delivering coordinated governance in the marine estate will ensure decision-making is participatory, effective, efficient, equitable and consistent with relevant legislation.

The NSW Government is committed to working collaboratively with coastal Aboriginal communities who have a long history of coastal resource management as part of the improved management of the marine estate. The Authority acknowledges their contribution to the development of 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.

We have carefully considered your feedback in finalising the Strategy, and we look forward to continuing to work with the NSW community and the many stakeholders of the marine estate on the implementation of the Strategy.

We will look to new digital technologies to share information and data. Importantly, we will implement a comprehensive ten-year Marine Integrated Monitoring Program (Monitoring Program) to monitor conditions of assets and benefits, measure our success in reducing the priority threats and to fill key knowledge gaps.

Implementation of the Strategy will be outlined in an Implementation Plan spelling out activities, measures of success and nominating the responsible agencies. The Strategy will create employment opportunities into the future, for example delivering on-ground works and education programs, and supporting marine industries.

This is only a snapshot of what is planned. Our schedule of works is ambitious over the next ten years, but we are confident that our partnerships with community, industry and the range of agencies and organisations involved in marine estate management will enable us to deliver on our vision.

**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



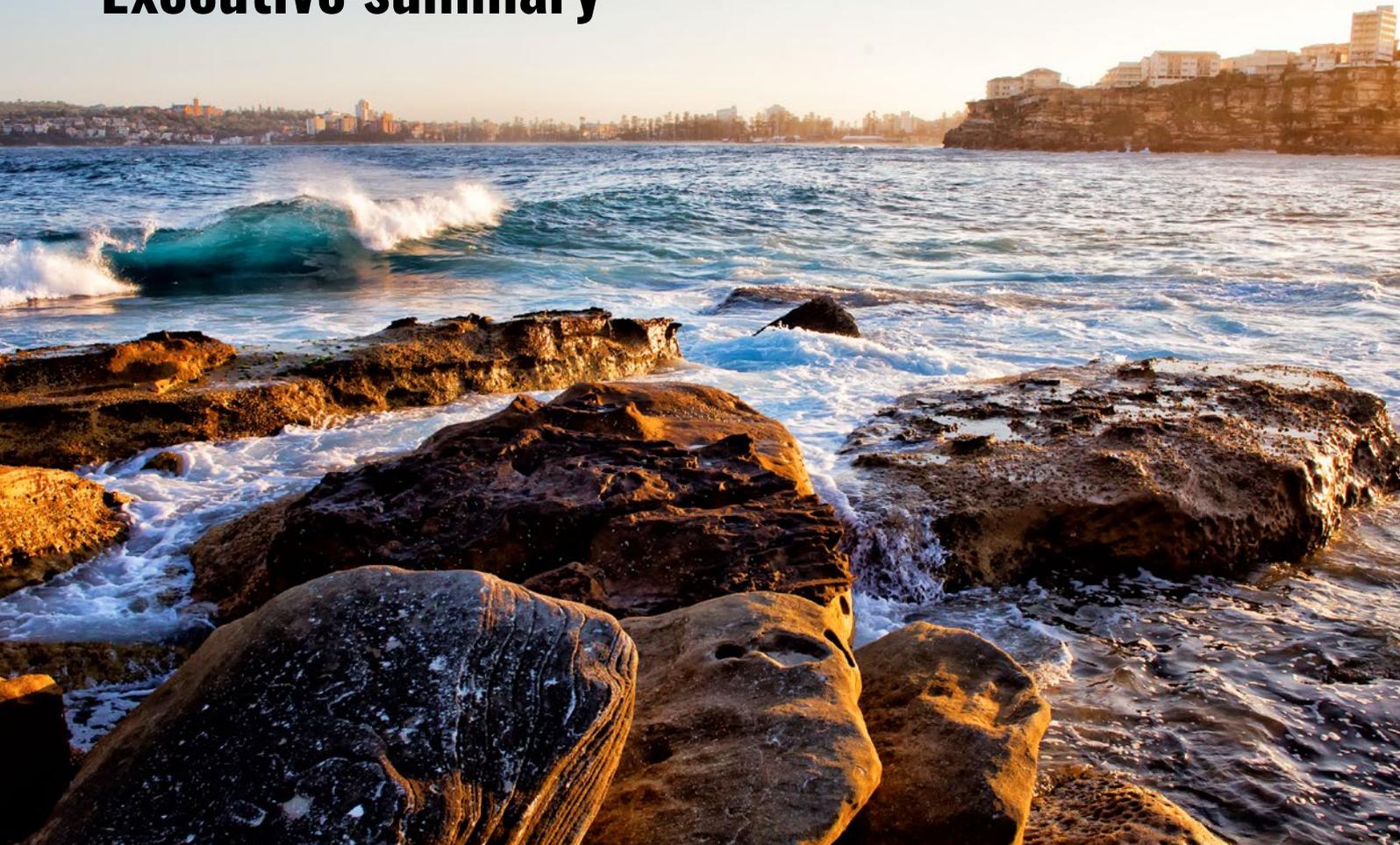
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# Executive summary



## A healthy coast and sea, managed for the greatest wellbeing of the community, now and into the future.<sup>1</sup>

The NSW marine estate is a valuable natural asset to the people of NSW. It comprises tidal rivers and estuaries, the shoreline, submerged lands, offshore islands, 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<sup>1</sup>.*

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



**Figure 1. The Authority's five-step decision-making process<sup>2</sup>**

<sup>1</sup> *Managing the NSW Marine Estate: Purpose, Underpinning Principles and Priority Setting* (MEMA 2013)

<sup>2</sup> *NSW Marine Estate Threat and Risk Assessment Report* (WBM BMT for MEMA 2017)

This process started in 2014 when the Authority began to work with the NSW community and experts, including the Marine Estate Expert Knowledge Panel (the Panel) to identify the benefits of the marine estate to the community – the environmental, social, cultural and economic values and benefits. In 2016–17, an evidence-based, statewide threat and risk assessment (statewide TARA) assessed benefits and identified the threats to these benefits that are a priority for action.<sup>3</sup>

This Strategy is the result of that process. It has also considered the Authority's ten management principles and proposes a suite of initiatives and actions that are effective for addressing priority threats. A five-year health check will measure progress of how the initiatives are performing against the key performance indicators and whether the risk of the threats identified in 2017 have changed.

The Strategy is a key commitment of the NSW Government in its response to the findings of the 2012 *Independent Scientific Audit of Marine Parks in NSW* (the Audit),<sup>4</sup>

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 outlines how we can manage threats to the environmental assets, as well as to the social, cultural and economic benefits the community derives from the marine estate. It identifies evidence-based management priorities and sets policy directions to manage 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 on governance arrangements, the development of the Strategy, including the statewide TARA, and the role of marine protected areas and other forms of spatial management.

**What are the priority threats?** – outlines the priority threats identified in the Marine Estate Community Survey Final Report (the Community Survey)<sup>5</sup> and statewide TARA, the cumulative threats and how they link to other, related reforms.

**How will priority threats be reduced?** and **Management initiatives** – outlines how the priority threats will be addressed by nine 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 nine 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 with other coastal and marine programs and reforms in NSW to achieve a more coordinated approach to management of the marine estate by all levels of government. An Implementation Plan provides more detail: how management actions will be implemented, agency and stakeholder responsibilities, timeframes, and key performance indicators.

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

The Authority will guide the implementation of the Strategy over 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 Authority is confident the Strategy will guide the management of 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.*

<sup>3</sup> *Managing the NSW Marine Estate: Purpose, Underpinning Principles and Priority Setting* (MEMA 2013)

<sup>4</sup> *Independent Scientific Audit of Marine Parks in NSW* (Beeton et al. for MEMA 2012)

<sup>5</sup> *Marine Estate Community Survey Final Report* (Sweeney Research for MEMA 2014)

# 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, with more than 1,750 kilometres of ocean coastline, 6,500 kilometres of estuarine and coastal lakes foreshores, 826 beaches, 44 offshore islands, and 185 estuaries and coastal lakes (Figure 2).

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

The NSW community derives social, cultural, and economic benefits from the marine estate, which are underpinned by good water quality, healthy habitats and diverse and abundant marine life. 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.<sup>6</sup>

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.

<sup>6</sup> *Independent Scientific Audit of Marine Parks in NSW* (Beeton et al. for MEMA 2012)

## BOX 1. WHAT IS THE MARINE ESTATE

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.<sup>7</sup>

## Community benefits and opportunities

In 2014, we asked 1,700 NSW residents about their values and attitudes in relation to the marine estate. The results of the survey were published in the Community Survey. The survey revealed that the NSW community considers:

- the health of the marine estate is 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.

## ENVIRONMENTAL ASSETS AND OPPORTUNITIES

The Community Survey revealed that the marine estate's most important asset to people is its natural beauty and clean waters supporting a variety of unique and abundant Australian marine life. 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.

<sup>7</sup> *Marine Estate Community Survey Final Report* (Sweeney Research for MEMA 2014)

## 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. Experiences in, and associations with, the marine estate through the generations has established a contemporary coastal and marine culture that crosses many sectors. For example, a surfing culture in NSW is well recognised and is an iconic activity important to a broad range of community and visitors. Similarly, commercial and recreational fishing have a long history in NSW, with associated cultural values (tangible and intangible) established through shared experiences, knowledge generation and a connection to nature.

The marine estate also holds spiritual and physical 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 Sea Country, making it central to cultural practices and activities. Cultural fishing provides immense social, economic and health

benefits to many coastal Aboriginal communities in NSW in addition to its cultural value.

Marine historic heritage, such as lighthouses, jetties, shipwrecks and other physical features or landscapes also provide valuable social, cultural and economic benefits to the community through continued education and appreciation of important artefacts and places.

Reducing user conflict, improving public access, maintaining a safe environment and improving the water quality, natural beauty and cultural heritage were identified in the Community Survey 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.<sup>8</sup>**



<sup>8</sup> Community representative's response to community surveys, South East Region (2014)



Figure 2. Map of the NSW marine estate

## 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. Sydney is the gateway to Australia and its iconic harbour supports many marine industries, contributing to the NSW economy. The Community Survey identified economic opportunities by 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.

## Governance of the marine estate

The Strategy is a first for NSW. It coordinates many aspects of marine estate management under one framework. This involves all relevant NSW Government agencies, 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, Crown Lands and Water, Destination NSW, and the NSW Department of Primary Industries (DPI). It is responsible for biosecurity, agriculture, fisheries, forestry policy, and related education and research programs. DPI is also the lead agency for implementing the marine estate reforms program and managing the State's marine protected areas.
- The **NSW Department of Planning and Environment** (DPE) is responsible for the State's land-use planning system.

- The **NSW Office of Environment and Heritage** (OEH) is responsible for coastal and estuary management, the NSW parks' estate, the Beachwatch Water Quality Program, wetland conservation, marine fauna (mammals, reptiles, shore and seabirds) and maritime heritage programs. OEH also administers the NSW Environmental Trust, which contributes to marine estate research and education, and it funds organisations to run projects that enhance the environment of NSW.
- The **NSW Environment Protection Authority** (EPA) is the primary environmental regulator in NSW, managing environmental issues such as air, water and noise pollution, waste, sewage and septic, litter, resource recovery and pesticides.
- **Transport for NSW** provides strategic advice for ports, shipping, boating, boating infrastructure, access and safety.
- **Roads and Maritime Services** (RMS) is a division of Transport for NSW. It is responsible for marine safety and regulation of commercial and recreational boating and for administering all land below the mean high water mark in Sydney Harbour, Botany Bay, Newcastle and Port Kembla Harbours. It manages moorings in NSW (other than in marine parks). Roads and Maritime Services have statutory responsibilities for improving safety and protecting the environment on the navigable waterways in NSW, including the removal of litter from Sydney Harbour.

NSW local government has a key role in implementing NSW coastal reforms, coastal management programs, coastal and estuarine Crown land management, land use planning and development controls as well as development and environmental compliance.

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:

- marine pollution (including marine debris, litter and microplastics)
- 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.

The various management authorities have diverse interests and responsibilities and, in some instances, overlap in jurisdictional boundaries. All levels of government – Commonwealth, State and local government – work closely together where needed so that legislation, policy and programs support management of the marine estate in its entirety.

Examples of close Commonwealth involvement include biosecurity, fisheries management, national security, shipping and trade, climate change, marine parks, and the management of threatened and protected species.

Industry, stakeholders, community and researchers also contribute to the management of the marine estate through, for example, on-ground works projects to rehabilitate coastal habitats and riparian vegetation; formal research, education and citizen science programs; volunteer work; advising government during community engagement processes; working on advisory committees with natural resource managers; or simple activities such as picking up litter on daily walks.

Details of the relevant governance structures and management actions to deliver on the Strategy are in **Initiative 9** and the Implementation Plan.

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<sup>9</sup> *Managing the Marine Estate: Purpose, Underpinning Principles and Priority Setting* (MEMA 2013)

## BOX 2. TEN UNDERPINNING PRINCIPLES FOR MARINE ESTATE MANAGEMENT<sup>9</sup>

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 decisions 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 Authority's role in marine estate management

The NSW Government established the Authority in 2013 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 Industry (represented by 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 tasked the Authority to develop an overarching Strategy and to undertake specific projects on the way to developing it. For each task, the Authority has sought the advice of the Panel, whose members have social, economic and environmental expertise.

The Strategy has been developed following ten principles developed by the Authority (Box 2) and the five-step decision-making process (Figure 1), 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.**

The Authority's five-step decision-making process (see Figure 1) is summarised as follows:

- STEP 1 Find out what benefits the community derives from the marine estate.

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- STEP 2 Identify the threats and risks to those benefits based on expert advice and community views.

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- STEP 3 Assess current management to see where action is needed to reduce priority threats and to enhance community benefits.

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- STEP 4 Develop management options that will reduce the priority threats and risks and that are cost-effective.

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- STEP 5 Be accountable. Monitor, evaluate and report on the effectiveness of the management options to ensure they are working.

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:

**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 draft Strategy identified community and stakeholder views on proposed management actions or initiatives, and ways to improve the Strategy.

**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 are robust, evidence-based and transparent and ensure delivery on the vision for the marine estate.

## Why is a Strategy needed?

The Strategy is designed to reduce the major 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 now and into the future.

This ten-year, overarching Strategy ensures 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 challenges from an 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 programs 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 approach 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 in Appendix 1.

### 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.



## 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 social, cultural, economic or environmental 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, cultural or economic benefit (e.g. stormwater). Threats often affect multiple assets and benefits. 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 areas where information is lacking and research is needed.

The **three management regions** are:

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

A **trade-off** is the relinquishment of one benefit or value for another that is regarded as more desirable or of greater importance.



## Marine protected areas and other forms of spatial management

The Authority released a marine protected areas policy (MPA policy) statement in October 2017.<sup>10</sup> It states that, depending on their design, marine protected areas can:

- conserve and enhance ecological function and values of marine ecosystems
- maintain biodiversity in the marine estate
- protect unique habitats and species of high conservation value, including rare, threatened or depleted species
- conserve indirect economic benefits (intrinsic and bequest benefits) in particular areas of the marine estate
- conserve and protect Aboriginal cultural, geological and heritage sites
- provide economic opportunities for nature-based tourism and recreational activity
- help increase ecosystem resilience by limiting extraction and use

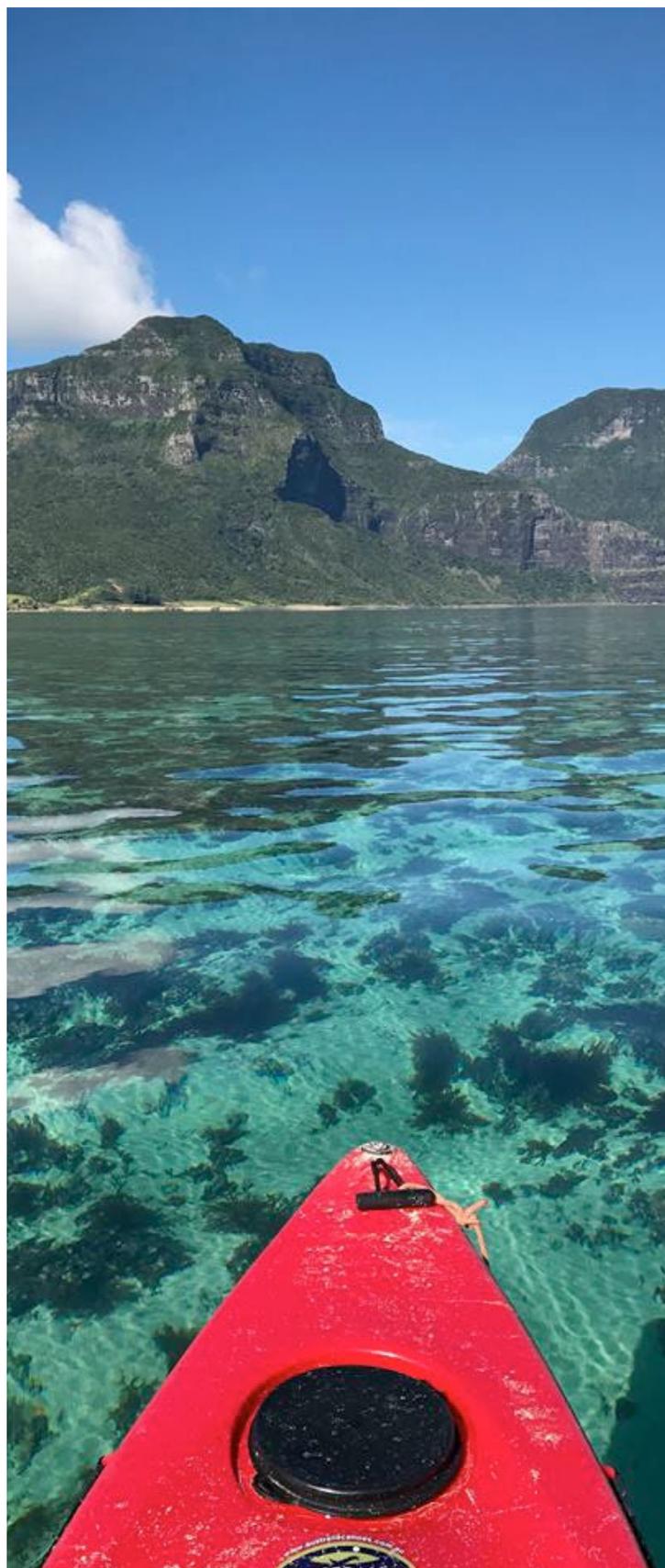
<sup>10</sup> *Marine protected areas within the NSW marine estate – their role and purpose* (MEMA 2017)

- develop community and education opportunities to discover and interact with the marine environment
- address resource use conflicts by providing designated areas for specific uses such as areas available for recreational fishing and no-take areas for passive users such as snorkellers, divers and swimmers
- provide reference areas for research or monitoring based on the absence of all or selected extractive activities
- assist in increasing resilience of biodiversity and habitats to climate change depending on the spatial extent, location and accompanying management regulations within the marine protected area being appropriate to the task
- show increased size and abundance of commonly fished species inside no-take zones, which is evidence for a direct benefit to non-extractive recreation in those areas and possible benefit to fisheries outside these zones.

The MPA policy states that marine protected areas are an important management tool for addressing social, cultural, economic and environmental threats, typically those that can be regulated within the boundary of the marine protected area itself (such as harvesting, wildlife interactions and disturbance, and resource-use conflict). Marine protected areas are less effective in dealing with off-site impacts such as land-based runoff, water pollution, litter and marine debris, erosion, marine pests, overcrowding, and legacy issues (including contamination, habitat loss, and reclamation).

NSW has an established network of marine protected areas, declared under the *Marine Estate Management Act 2014* and managed by the 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.



Around 20,000 hectares of estuarine and oceanic habitats, areas below the astronomical high tide level, are within national parks or nature reserves declared under the *National Parks and Wildlife Act 1974* and these areas are managed by the National Parks and Wildlife Service.

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). Marine parks are located in each marine bioregion in NSW, with the exception of the Hawkesbury Shelf marine bioregion and Twofold Shelf marine bioregion. Ten aquatic reserves are in the Hawkesbury Shelf marine bioregion.

## SPATIAL MANAGEMENT

Site-based management tools that promote, regulate or control activities at different places in the marine estate are called 'spatial management'. These tools include marine protected areas (aquatic reserves, marine parks), recreational fishing havens, fishing closures or fishing rules, boating controls to limit speeds or anchoring, or restricted access for vehicles, dogs or other activities to particular beaches. These tools can also be used to

conserve Aboriginal cultural heritage and to support access and use of the marine estate for cultural purposes.

Spatial management tools may be used separately, or in combination, to reduce threats to biodiversity or to the community's use and enjoyment at individual sites and, if coordinated across a group of sites, across the marine estate.

The NSW Government is committed to maintaining the existing system of marine parks in NSW and improving the holistic management of the protected area network, guided by the objects and requirements of the *Marine Estate Management Act 2014*. The Government is assessing options for enhancing the protection of biodiversity in the Hawkesbury and Twofold Shelf marine bioregions of NSW, which have been identified in the Audit as current gaps. Spatial management has been recommended to address identified social, cultural, economic and environmental threats in the Hawkesbury Shelf marine bioregion.<sup>11</sup> An assessment of mechanisms to enhance conservation of marine biodiversity in the Twofold Shelf marine bioregion is pending.



<sup>11</sup> *The Hawkesbury Shelf Marine Bioregion Threat and Risk Assessment Report* (WBM BMT for MEMA 2015)

The Authority will oversee the development of statutory management plans for the effective management of each marine park and aquatic reserve (or reserve network). Management plans for each park and for one or more aquatic reserves, informed by the Authority's five-step decision-making process, will replace the current zoning and operational plans. Each management plan will clearly document management objectives and actions to address priority threats. A stronger emphasis on monitoring performance and assessment of management actions will be a key feature of this approach.

As with other regulatory tools, any proposals for spatial management will be evaluated against other possible options to determine the most effective option for maximising community benefits and reducing the risk level of the threat, including the level of cumulative threat. Community engagement is a critical component of this process.

The NSW Government's commitments in relation to marine protected areas and bioregional assessments over the ten-year life of the Strategy are outlined in Box 5.

## BOX 5. MARINE PROTECTED AREA AND BIOREGIONAL ASSESSMENT COMMITMENTS

1. Develop and pilot a new approach to management planning at Batemans Marine Park and Solitary Islands Marine Park.
2. Prepare management plans for remaining marine parks in accordance with statutory requirements and make recommendations to update rules and improve management, where needed.
3. Explore and implement mechanisms to enhance conservation of marine biodiversity while balancing community outcomes in the Hawkesbury Shelf marine bioregion (Newcastle – Sydney – Wollongong).
4. Explore mechanisms to enhance conservation of marine biodiversity while balancing community outcomes in the Twofold Shelf marine bioregion (far south coast of NSW).
5. Investigate and apply the use of spatial management tools, in consultation with the community, that are most effective at reducing priority threats at a bioregion and site-based scale.



# What are the priority threats?



## Priority threats to be reduced

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:

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

### 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 costs of accessing the marine estate.

## HAWKESBURY SHELF MARINE BIOREGION TARA RESULTS

The Hawkesbury Shelf TARA was completed in 2015. The assessment found that the highest 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.

The highest priority threats 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 region were influenced by this assessment. This process also resulted in the reframing of the statewide social, cultural 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 Figure 2). Feedback from consultation on the draft statewide TARA<sup>12</sup> 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).

Threats to species, populations and communities that are listed as protected or threatened under the *Fisheries Management Act 1994* (FMA) and the *Biodiversity Conservation Act 2016* (BCA) were also identified.

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 statewide TARA outcomes in 2017 draw broadly similar conclusions to the results of the Community Survey in 2014: 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, cultural and economic benefits derived from the marine estate.

<sup>12</sup> NSW Marine Estate Threat and Risk Assessment Report – Draft Report (WBM BMT for MEMA 2016)

**LEGEND**

Identified as:

 Moderate Risk

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

 High Risk

**e** estuaries

**cm** coast & marine

**TABLE 1. Statewide priority threats to ENVIRONMENTAL assets**

ENVIRONMENTAL	Estuarine & marine habitats, assemblages & associated biota													Threatened & protected species		
	Clean waters	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 & communities protected under FMA	Species protected under BCA
	Estuarine & ocean waters															
ACTIVITY/THREAT	ASSET															
1. Urban stormwater discharge	e	e	e	e	e	e	cm	e					e		e	e
2. Estuary entrance modifications	e	e	e	e	e	cm	e						e		e	e
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
6. Modified freshwater flows	e	e		e			e						e		e	e
7. Foreshore development		e	e			e	cm								e	e
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	
14. Passive recreational use – swimming, surfing & dog walking						e										e
15. Recreational fishing – shore-based line & trap fishing														e		
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
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**

LEGEND	
Identified as:	
<span style="color: orange;">■</span> Moderate Risk	<span style="color: red;">■</span> High Risk

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

## 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 species on beaches can be very localised, as some activities are permitted on certain beaches only, but if they occur on beaches in all three regions and are deemed a moderate or high risk they meet 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 and that have not triggered a statewide response have not been directly addressed in this Strategy. They are identified for further consideration in a regional context; such as, in the development of new management plans for marine parks, coastal management programs or other regionally focused strategies or plans. These include threats to the central region from large and small commercial vessels and related port activities; sewage effluent and septic runoff; service infrastructure (such as pipes and cables); industrial and thermal discharges and sediment contamination. In the northern and central regions estuary prawn trawl, recreational hand gathering and four-wheel driving on beaches are identified as regional threats and sea urchin, turban shell and abalone harvest in the southern region.

## CUMULATIVE THREATS

A cumulative threat is the threat from the combined (or cumulative) effect of numerous threats and stressors. Management initiatives to address cumulative threats are particularly important due to the additive 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 have an increasing impact on community benefits over the next 50 years. For example, sea level rise and increased storm activity can affect coastal environmental and physical assets. The imperative is to take practical adaptation and resilience-building actions 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 threatened and protected species – the cumulative impacts associated with disturbance or interactions with threatened and protected species 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**).

The breadth of these categories suggests that most environmental assets and processes are influenced by cumulative threats. A specific management initiative addresses each of the cumulative threat categories (Figure 4), with links to other initiatives.

The cumulative threat category ‘multiple threats to estuarine water quality’ has been included in a broader water quality (**Initiative 1**) that includes estuarine and marine water quality management actions. It is also linked closely to other initiatives including *Delivering healthy coastal habitats with sustainable use and development* (**Initiative 2**) and *Reducing impacts on threatened and protected species* (**Initiative 5**).

CUMULATIVE THREATS	Multiple threats to fish assemblages	Climate change	Multiple threats to estuarine water quality	Multiple threats to threatened and protected species	Multiple threats to Aboriginal cultural heritage
					
	<b>Delivering effective governance &amp; enhancing social, cultural &amp; economic benefits (Initiatives 8 and 9)</b>				
MANAGEMENT INITIATIVE	Ensuring sustainable fishing & aquaculture (Initiative 6)	Preparing for climate change (Initiative 3)	Improving water quality & reducing marine litter & delivering healthy coastal habitats with sustainable use & development (Initiatives 1 and 2)	Reducing impacts on threatened & protected species & Enabling safe & sustainable boating (in-part) (Initiatives 5 and 7)	Protecting the Aboriginal cultural values of the marine estate (Initiative 4)

Figure 4. Mapping management initiatives with cumulative risk categories

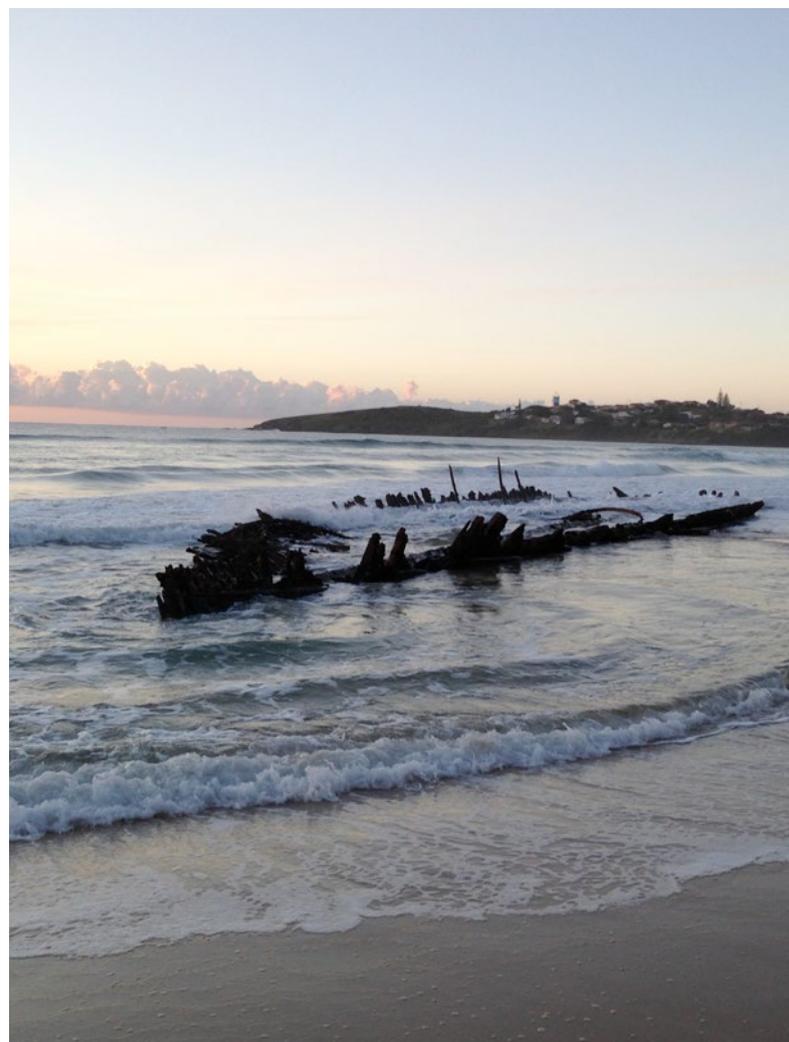
### EMERGING THREATS AND KNOWLEDGE GAPS

The NSW community has raised concerns about perceived emerging threats or unassessed threats that had not yet been identified as a statewide threat during the statewide TARA process. These include potential threats to marine historic heritage such as shipwrecks and significant coastal landscapes; new aquaculture ventures; light pollution on coastal marine animals; sea urchin barrens in the southern region and the expansion of the bather protection program and installation of additional shark nets in the northern region (see below).

Identified emerging and unassessed threats have been included in the Monitoring Program to be monitored, and knowledge gaps addressed as required, to inform the five-year health check. This process will identify if risks from these threats require future management intervention.

### HERITAGE

The conservation, enjoyment and use of marine historic heritage provide social, cultural and economic benefits to the NSW community, but the threats to these benefits were not assessed as part of the statewide TARA; community feedback highlighted this gap. While some current government reforms are likely to benefit the protection and management of marine historic heritage, it is important to acknowledge the benefits of marine



historic heritage and the threats to which it is exposed. Examples of potential threats include the effects of anchoring of recreational and commercial vessels on shipwrecks, four-wheel driving on coastal landscapes, and sand mining in offshore areas.

## MARINE AQUACULTURE

Oyster aquaculture has a long history and is the largest aquaculture industry in NSW. It operates under strict guidelines and is well regulated. Opportunities exist for new and emerging aquaculture ventures, particularly offshore, to address a growing demand for seafood. The NSW community has expressed its concern that new marine aquaculture ventures should be rigorously assessed and, if approved to proceed, closely monitored while in operation to detect and manage unintended consequences.

## LIGHT POLLUTION

Submissions identified a need for the effect of artificial light ('light pollution') on species at night to be assessed because its effects in NSW are not yet known. In warmer waters, it is well documented that artificial lighting can misdirect sea turtle hatchlings to onshore lights instead of to the ocean as well as increasing the risk of predation when the hatchlings enter the water. Seabird fledglings, such as the wedge-tail shearwater, are also attracted to artificial lights when first leaving the burrow – they can mistakenly fly to populated coastal areas rather than out to sea. This is considered as part of the research proposals for the wildlife research in **Initiative 5**.

## SEA URCHIN BARRENS

The presence of urchin barrens in NSW is a legacy issue attributed to a reduction of key urchin predators and now reflected in the stability of the barrens area over many decades. Monitoring is under way to understand how the structure of reefs may change in the presence and absence of urchin predators, however, results may take decades to be evident and measurable. Resources are identified in the proposed Monitoring Program to expand this monitoring.



## BATHER PROTECTION AND SHARK NETS

The bather protection program in NSW has seen the expansion of shark net deployment, from the traditional locations along the Sydney coastline, to trials of their use on the north coast of NSW. The threats to marine life will continue to be monitored during these trials and this activity will be reviewed periodically in line with current trial approvals and management plans.

## Links to other government reforms and programs

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.

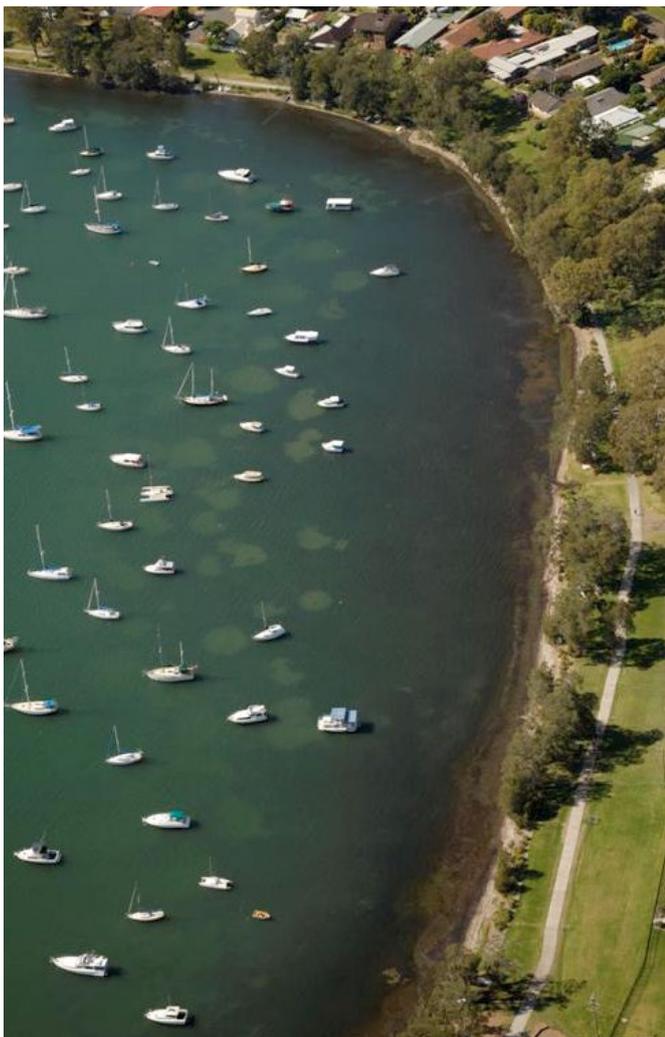
**The marine estate is to be managed as a single continuous system for the greatest wellbeing of the community.<sup>13</sup>**

<sup>13</sup> *Independent Scientific Audit of Marine Parks in NSW* (Beeton et al. for MEMA 2012)

## COASTAL REFORMS

The legislative and policy framework under the coastal reforms recognises natural coastal processes and the local and regional dynamic character of the coast, and promotes land use planning decisions that accommodate them. The reforms ensure coordinated planning and management of the coast and support public participation in these activities.

The *Coastal Management Act 2016* replaces the *Coastal Protection Act 1979*. This 2016 Act supports the objects of the *Marine Estate Management Act 2014* as the coastal zone is an important part of the marine estate. Coastal management programs will provide for regional delivery of some of the actions in various management initiatives of this Strategy, specifically **Initiative 1, 2, 3** and **9**.



## ABORIGINAL CULTURAL HERITAGE REFORMS

The NSW Government remains committed to creating 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.

Extensive feedback demonstrates there are wide-ranging and contrasting views of what the final model for reform should be. Key stakeholders are engaged in this process.

**Initiative 4** considers Aboriginal cultural heritage reforms in its actions, however does not duplicate the reforms.

## COMMERCIAL FISHERIES BUSINESS ADJUSTMENT PROGRAM (BAP)

The Commercial Fisheries Business Adjustment Program (BAP) was 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:

- tailoring share linkage arrangements 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 actions relevant to commercial fishing reforms.

## ABORIGINAL 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 DPI, in consultation with the Aboriginal Fisheries Advisory Council, will develop and implement management options 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 in marine parks and aquatic reserves.

## CLIMATE CHANGE POLICY FRAMEWORK AND STRATEGIC PLAN

In November 2016, the NSW Government released the NSW Climate Change Policy Framework. It outlines the Government's role in reducing emissions, and helping NSW adapt and become more resilient to the impacts of climate change. The policy framework provides the strategic framework for NSW Government action on climate change and sets two objectives:

- achieve net-zero emissions by 2050
- make NSW more resilient to a changing climate.

The policy framework also includes commitments to value emissions savings in economic appraisal and consider climate change in government decision making. This policy framework builds on a strong track record of expanding clean energy, helping households and businesses reduce their bills by saving energy and preparing for the impacts of climate change. **Initiative 3** links to the Climate Change Policy Framework.

## BIOSECURITY REFORMS

The *Biosecurity Act 2015* came into effect on 1 July 2017. It aims to manage biosecurity risks from animal and plant pests and diseases, weeds and contaminants by:

- preventing their entry into NSW
- quickly finding, containing and eradicating any new entries
- effectively minimising the impacts of pests, diseases, weeds and contaminants that cannot be eradicated through robust management arrangements.

The *Biosecurity Act 2015* and its supporting instruments were developed in consultation with industry, community and government partners. It provides a flexible and responsive statutory framework to help achieve its objectives for the benefit of the NSW economy, environment and community. These reforms are linked to **Initiatives 6** and **7**.

## LAND MANAGEMENT AND BIODIVERSITY CONSERVATION REFORMS

The NSW Government has delivered on a 2015 election commitment to reform the legislative framework for land management and biodiversity conservation in NSW. The reforms introduced the *Biodiversity Conservation Act 2016* and amendments to the *Local Land Services Act 2013*. The reforms provide a modern approach to biodiversity conservation that ensures strong protection for plants and animals (including marine fauna except for fish), supports ecologically sustainable development (including delivering a legislated biodiversity offset scheme), delivers prioritised and targeted investment, regulates vegetation clearing and provides for a sustainable and productive agricultural sector.

The Biodiversity Conservation Regulation 2017 sets out additional provisions to help protect marine mammals, including the approach distances for any aircraft, vessels, unmanned aerial vehicles (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 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 legislation is the culmination of more than four years of engagement with the community about the future of Crown land. The Crown lands reform program aims to specifically examine use and management of coastal Crown land to promote the sustainable use of, and access to this land and improve public benefits for current and future users. This reform is linked to **Initiative 2**.

## REGIONAL PORTS STRATEGY

Crown Lands and Water 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 and long term.

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, 6, 7 and 8**.



## NSW FREIGHT AND PORTS PLAN

The freight industry plays a vital role in the movement of \$200 billion a year in goods across the State. The NSW Freight and Ports Plan provides direction to business and industry for managing and investing in freight into the future.

In developing the Plan, an integrated approach has been adopted, with close alignment with the State Infrastructure Strategy, Future Transport 2056 Strategy, Regional and Greater Sydney Services and Infrastructure Plans, and the issue-specific and place-based plans. This initiative is linked with **Initiatives 7** and **8**.

## 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 government 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 linked with **Initiatives 7** and **8**.

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 DPI are investigating transition arrangements for mandating the use of environmentally friendly moorings in environmentally sensitive areas. 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 will be pursued to ensure effective delivery and wider adoption of environmentally friendly moorings across NSW. Accurate seagrass mapping and accessible data will support this activity. This project links to **Initiatives 3, 6, 7** and **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 environmental, social, cultural and economic information available – the lack of this information is, in itself, a priority threat
- evaluate new or emerging threats that were not initially identified. There may be new management actions in response to this midterm health check.

The management of priority threats in this Strategy is grouped into nine 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 (see Case Study 1). 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 threatened and protected species (Initiative 5)*.

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

The nine management initiatives in this Strategy start with *Improving water quality and reducing litter*, as this has been identified as of most concern to the community in the Community Survey. It is also 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, and referenced in each initiative, but specific actions are included in **Initiative 4**.

# CASE STUDY 1 - RESTORING THE RICHMOND RIVER

## Integrated initiatives to restore the sixth-largest catchment in NSW

The Richmond River is a vital environmental and community asset. Despite more than a century of modification and misuse, it provides habitat for fish and birds. It supports agriculture, fishing, recreation and tourism activities. It is a spiritual place for Aboriginal people, who have relied on its resources for thousands of years.

### The problem

The past century has not been kind to the river and its floodplain. It is now in worse ecological health than most estuaries in NSW. Water quality is 'very poor', with high nutrient concentrations and excessive turbidity.

The floodplain habitat has been degraded by an extensive artificial drainage system that was installed in the 1900s and extended 50 years later. Drainage of the area has resulted in the floodplain vegetation now dominated by dryland species.

A direct result of these changes has been extensive fish kills and diseased fish and oysters due to low dissolved oxygen levels after even a moderate flood and exposed acid sulphate soils discharging acidic water into the river. The Richmond River experienced widespread fish kills affecting 30km of river in 2001 and 2008 as dissolved oxygen levels crashed to levels lethal to aquatic life.

Some of the drained former wetlands on the coastal floodplain are at, or below, sea level. Farmers that maintain these areas in a drained state for agricultural purposes will see high environmental and financial costs that will increase into the future. Other options are needed.

### The opportunity

Land use is already changing throughout the Richmond River catchment. The urban area is expanding, and agricultural land practices and crops are changing. The new land uses present an opportunity to improve floodplain management and planning.

Better planning, coordination and on-ground action will help restore the health of the Richmond River. These measures can help restore water quality in the system, which benefit communities, the environment and local economies.

### The solution

On its own, no single initiative in the Strategy will be enough to restore the health of the Richmond River. It will take actions from all the initiatives to work together to improve the health of the Richmond River estuary.

Under **Initiative 1**, a pilot program—*Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions*—will help councils and environmental regulators consider water quality outcomes in their broader catchment development and land use planning.

Other Government policy and regulation changes in **Initiative 1** target the management of private drainage systems and opportunities for private land conservation. This will contribute to improvements in estuarine water quality over the long term.

Capacity-building activities and on-ground works including wetland restoration, riparian fencing and replanting, and bank protection that will provide natural water quality improvements are planned under **Initiative 1**.

**Initiative 1** also introduces education and compliance activities to improve landholders' understanding of the opportunities to change their land use and their responsibility to contribute to better water quality outcomes in the Richmond River estuary. Improved governance, education, compliance and research actions will be implemented via actions in **Initiatives 8** and **9**, and opportunities for increased Aboriginal participation in Sea Country management in the Richmond River will be facilitated in **Initiative 4**.

**Initiative 2** includes an action to provide fish passage at priority barriers in coastal NSW. Two of the priority barriers, Cookes Weir and Jabour Weir, are in the Richmond River catchment near Casino. These fish passage works will build on earlier successful barrier remediation projects and return the Richmond River to a fish superhighway increasing fish breeding and productivity.

Access to the Richmond River also needs to be ensured as foreshore areas around coastal towns such as Ballina are highly prized places to walk, fish and swim. Decisions about the use of this Crown land on the foreshore should be strategic. Foreshore Structure Strategies are proposed in **Initiative 2** to identify the important areas of foreshore for public use, commercial fishing and important habitats. Other areas may be suitable for installation of private foreshore structures. This strategic approach enables reductions in red tape for low impact works in mapped locations.

Planning for the future changes to the estuary will also be important to manage the impacts of climate change.

**Initiative 3** identifies the key locations where estuarine vegetation communities will be able to retreat upslope in response to sea level rise. In many areas, hard infrastructure such as rock walls, roads and housing will limit this migration, and estuarine vegetation systems will degrade due to this and other pressures. Actions in **Initiatives 1** and **2** will consider this information in planning and securing opportunities for future climate change adaptation. Improved foreshore planning will also assist in addressing habitat loss risks to threatened and protected species, such as shorebirds, via **Initiative 5**.

**Initiatives 6** and **7** provide fresh seafood to the community and enhance the range of fishing and boating experiences on the Richmond River which are reliant on improved water quality. Habitat rehabilitation works under **Initiative 1** will improve fish productivity, enhancing the benefits provided by **Initiatives 6** and **7**.

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

MANAGEMENT INITIATIVE	Regulation/ compliance/ incentives	Policy/ program/ planning	Education/ awareness	Research/ monitoring/ mapping	On-ground works	Data / reporting	Collaboration
1. Improving water quality and reducing litter	✓	✓	✓	✓	✓	✓	✓
2. Delivering healthy coastal habitats with sustainable use and development	✓	✓	✓	✓	✓		✓
3. Planning for climate change		✓	✓	✓	✓		✓
4. Protecting the Aboriginal cultural values of the marine estate		✓	✓	✓	✓		✓
5. Reducing impacts on threatened and protected species	✓	✓	✓	✓	✓	✓	✓
6. Ensuring sustainable fishing and aquaculture	✓	✓	✓	✓		✓	✓
7. Enabling safe and sustainable boating	✓	✓	✓	✓	✓	✓	✓
8. Enhancing social, cultural and economic benefits	✓	✓	✓	✓		✓	✓
9. Delivering effective governance	✓	✓	✓	✓		✓	✓

## Strategy Implementation Plan

An **Implementation Plan**, developed by the Authority’s member agencies in consultation with key stakeholders articulates in more detail the management actions that will address priority threats, as well as the key performance indicators, timeframes and agency and stakeholder responsibilities. A key focus of the plan is to coordinate functions and responsibilities within and across government, including local government as well as partnerships with industry and community.

## Marine Integrated Monitoring Program

The **Monitoring Program** links to the Strategy’s key performance indicators (included in the Implementation Plan) and will inform evaluation and reporting on the performance of the Strategy in preparation for the five-year health check. It also enables additional evidence to be collected in response to key knowledge gaps identified in the statewide TARA. For more information, see the section ‘How will we know if we are delivering on our vision?’



# Management initiatives



A series of icons are included for each management initiative to depict which environmental assets and/or community benefits (social, cultural and economic) will improve as a result of the management intervention.

### ICONS DEPICTING ENVIRONMENTAL ASSETS AND SOCIAL, CULTURAL AND ECONOMIC BENEFITS\*

ENVIRONMENTAL ASSETS			
	Estuarine and ocean waters		Rocky shores
	Saltmarsh		Shallow sub-tidal reefs
	Mangrove		Deep sub-tidal reefs
	Seagrass		Fish assemblages
	Beaches and mudflats		Planktonic assemblages
	Shallow soft sediments		Species and communities protected under the <i>Fisheries Management Act 1994</i>
	Deep soft sediments		Species and communities protected under the <i>Biodiversity Conservation Act 2016</i>

SOCIAL, CULTURAL AND ECONOMIC BENEFITS			
	Participation (safety, health and wellbeing)		Aboriginal cultural heritage and use
	Participation (socialising and sense of community)		Economic - indirect values (intrinsic and bequest)
	Enjoyment - biodiversity and beauty (social intrinsic benefit)		Economic - direct values (individual enjoyment)
	Enjoyment - consumptive use (e.g. catching a fish)		Viability of business (employment and value of production)

\* NSW Marine Estate Threat and Risk Assessment Report – Report (BMT WBM 2017)

# 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. The commercial fishing and aquaculture industries rely on clean water to provide fresh seafood to the community. 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 overstated.

## 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 social, cultural and economic 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 sufficiently significant concern for the Premier to set a goal of reducing the volume of litter in NSW by 40 per cent by 2020.<sup>14</sup> This requires sustained government intervention and management action over the medium-to-long term. The NSW Environment Protection Authority (EPA) is responsible for leading programs to deliver litter reduction, with powers and responsibilities to reduce litter and enforce the laws shared across NSW state and local governments, businesses and individuals.

Urban growth in the central region is increasing pressure on water quality. In the northern and southern regions, water quality is primarily under threat from diffuse sources of water pollution, particularly in catchments where the health of the receiving waters are already rated as being poor. The risk is increased if discharges are not managed cohesively and strategically.

This management initiative represents an opportunity to improve the coordination and management of urban and rural diffuse-source water pollution at a catchment-scale at a time of significant land-use change, which will bring forward improvements to water quality and waterway health.

Point-source pollution, such as sewage, industrial and thermal discharges is generally regulated by the EPA. The EPA's regulatory processes aim to continually improve the performance of licensed premises that discharge to waters, including load-based licensing, risk-based licensing, five-yearly licence reviews, pollution reduction programs, environmental auditing programs, and enforcement action where appropriate.

The EPA regulates sewage system operators, including Hunter Water, Sydney Water and councils to improve sewage management and minimise pollution. To ensure that the community is able to access information on discharges, licence holders are required to publish the results of monitoring on their web sites.

Regulation of sewage system operators by the EPA has led to measurable improvements<sup>15</sup> to water quality in the marine estate, including significant improvements to water quality in the Hawkesbury River estuary and Sydney's beaches.



The EPA also leads programs to understand and address emerging water quality issues. For example, investigating the legacy of per- and poly- fluoroalkyl substances (PFAS) use in NSW. PFAS are emerging contaminants, which means that their ecological and/or human health effects are unclear. The EPA is working to better understand the extent of PFAS use and contamination in NSW, to be better prepared to respond if any health and environmental impacts become known.

<sup>14</sup> 'Keeping our environment clean', *Premier's Priorities* (NSW Premier 2012)

<sup>15</sup> For example see NSW EPA (2015), *New South Wales State of the Environment 2015*, NSW Environment Protection Authority, Sydney; Sydney Water (2014) *2014 Sewage Treatment System Impact Monitoring, Interpretive Report*, Sydney Water, Parramatta; and NSW DECC (2009) *Hawkesbury-Nepean River Environmental Monitoring Program: Final Technical Report*, NSW Department of Environment & Climate Change, Sydney.

## HOW WILL THIS MANAGEMENT INITIATIVE HELP?

The management actions will reduce the impacts of urban and agricultural diffuse-source water pollution including stormwater. 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.

These activities will together provide a range of benefits to the community, including flow-on benefits such as the provision of locally caught fresh seafood to the community. 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. Restoration of natural water filters such as shellfish reefs, mangroves, saltmarsh and seagrass will reinstate water quality improvement processes and other environmental benefits that are naturally provided by these habitats.

A targeted marine litter campaign will address the direct impact of litter on the marine environment—wildlife entanglement in plastic waste is an example. In addition, signage, better infrastructure and other measures will be trialled in a small number of hotspot sites as part of an integrated approach to drive behaviour change with regard to littering.

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 Improve water quality in agricultural and urban catchments using a pilot-based implementation of the <i>Risk-based Framework</i> .
	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 flows, altered watertable levels and connectivity. Loss of wetlands for migratory shorebirds leads to threatened species decline and local extinction.	1.2 Improve the management of diffuse-source water pollution by: <ul style="list-style-type: none"> <li>clarifying NSW Government and local government roles and responsibilities</li> <li>building capacity to implement the <i>Risk-based framework</i></li> <li>using mechanisms within existing policy, planning and legislative frameworks to improve outcomes</li> <li>improving minimum requirements for industry standards and ensuring compliance with regulations and best-practice through social research, education campaigns and compliance programs.</li> </ul>
	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.	1.3 Facilitate and deliver on-ground activities that reduce diffuse-source water pollution through investigation and provision of funding programs and financial incentives.
	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 estuarine habitats.	1.4 Implement a targeted marine litter campaign and establish a Marine Litter Working Group.
	Sewage effluent and septic runoff – affects water, seagrass, shallow soft sediment, planktonic assemblages and species and communities protected under the FMA	Sewage and septic runoff introduces pathogens and microplastics that impact on water quality, habitat and wildlife.	1.5 Develop monitoring, reporting and performance indicators for water quality actions and fill key knowledge gaps. This action is integrated into the Monitoring Program.
	Climate change (over the next 20 years) – affects saltmarsh, shallow reefs, planktonic assemblages and species and communities protected under the FMA and BCA	Physical disturbance will occur to saltmarsh and mangroves due to rising sea levels, wildlife will be disturbed through habitat loss for migratory shorebirds leads to threatened species decline and local extinction.	Note: diffuse-source water pollution includes stormwater.
	Modified freshwater flows – affects water, saltmarsh, seagrass, shallow soft sediments, planktonic assemblages and species and communities protected under the FMA and BCA	Changes to tidal flow patterns have occurred through wetland drainage, leading to water pollution from acid sulfate soils and blackwater events.	

	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 <b>Initiative 4</b> ).
	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, inefficient 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.	

	Statewide priority threats	Stressors	Management actions
Social, cultural and economic TARA	Habitat disturbance	Habitat disturbance leading to poor water quality impacts on biodiversity and beauty. Poor water quality reduces natural productivity affecting consumptive uses such as fishing. This affects community enjoyment and cultural use.	
	Modified hydrology, hydraulics and flow regimes	Modified hydrology can reduce water quality which impacts fish health and number. This leads to reduced enjoyment by impacting on consumptive use and on cultural benefits.	
	Lack of community awareness of the marine estate and associated threats and benefits	Community awareness of the causes and solutions of some water quality problems is limited, for example understanding acid sulfate soil impacts and remediation. This affects biodiversity and beauty, impacting on community enjoyment and cultural heritage and use.	
	Inadequate social and economic information	Inadequate social information has hampered design of effective programs for voluntary practices that result in improved water quality, such as increased implementation of best land use practices techniques. This then impacts on all social and economic benefits.	

## 2. Delivering healthy coastal habitats with sustainable use and development



### WHAT ARE THE COMMUNITY BENEFITS?

Healthy and resilient coastal and marine habitats are fundamental for a biologically diverse marine estate that enables a range of opportunities for enjoyment, participation, employment, education, research and general appreciation of nature in the marine estate.

NSW has a wide range of coastal and marine habitats. Subtidal rocky reefs, soft sediment and rocky foreshores in the central and southern regions support temperate fish species, sponges, crustaceans and bryozoans. Warmer waters in the northern region support coral growth with over 100 species of corals, tropical anemones and an array of sub-tropical and temperate fish, shark and ray species. All seven mangrove species found in NSW occur in northern region estuaries, and seagrass beds that occur in most estuaries are known for their importance as nursery areas for many marine species.

Most marine species rely on different types of habitat at different life stages, so they need a sufficient range and quality of coastal and marine habitats, connectivity within habitat types, and proximity to other habitats. These are fundamental to building resilient communities and maintaining viable populations of fish and other species using the habitats.

Coastal habitats and the benefits they provide, draw many people to visit or move to the coast. The Australian lifestyle is strongly associated with the coast in both urban and rural settings and the overwhelming majority of the NSW community lives within 50 kilometres of the coastline. Coastal residents and visitors enjoy a variety of activities throughout the marine estate – the upstream mangrove-lined coastal river systems, to the bustling downstream harbours and port facilities, and beyond to the extensive offshore reefs systems.



Community wellbeing, both physically and mentally, is improved by outdoor pursuits and experiences in healthy coastal habitats. It is, therefore, at the core of marine estate management – to promote a biologically diverse, healthy and productive marine estate that facilitates economic opportunities, the broad range of social and cultural uses, as well as opportunities for research and education.

With the majority of the NSW community living in coastal catchments, the daily decisions people make can impact on important coastal habitats such as water quality or flow, seagrass beds and estuary foreshores. Population growth and development along the NSW coast can increase the threats and risks to coastal catchments, their estuaries and nearby offshore areas.

### **WHY IS THIS MANAGEMENT INITIATIVE NEEDED?**

This management initiative addresses threats to habitats (and related species) associated with use of the marine estate and adjacent catchments. The threats identified in the statewide TARA include foreshore development, modification of waterways for boat navigation, altered hydrology from dredging or estuary entrance works, drainage works, and manipulation of freshwater inputs to estuaries, beach nourishment and four-wheel driving impacts.

The modification or loss of coastal habitat (including beaches, mudflats, rocky shores, wetlands, mangroves, saltmarsh, and seagrasses) from development or other human activities significantly affects coastal and marine biodiversity. Poorly considered development can reduce or remove breeding and nursery areas for fish, shorebirds and waders, affect other wildlife habitats and change natural tidal and freshwater flow patterns. This can cause problematic sediment transport and ultimately reduce water quality.



Declining biodiversity has negative social, cultural 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 affected. 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. Legacy issues can be addressed to mitigate past damage, prevent future losses, and promote rehabilitation where appropriate. While coastal infrastructure, such as breakwalls, serve an important role, including providing safe boating access to the marine estate, older structures can be strategically modified to enhance fish habitat and promote experiences such as fishing or wildlife observations.

## HOW WILL THIS MANAGEMENT INITIATIVE HELP?

This management initiative will implement mechanisms to increase habitat health and resilience by:

- limiting future detrimental impacts of foreshore development and uses on coastal and estuarine habitats
- using infrastructure renewal projects (urban and rural) and agricultural land-use changes as an opportunity to address legacy land-use issues in coastal catchments
- ensuring that estuary entrance management and dredging is done in a way that maintains or improves estuarine and marine habitat health
- reducing the cumulative impacts of existing agricultural infrastructure on freshwater flows and estuarine hydrology
- promoting the use of best practice to design and assess foreshore development and waterways infrastructure proposals.

This management initiative is closely aligned with the coastal reforms and the Crown lands reform programs. It will improve the way State and local government manage and develop the coast so that legacy issues are considered with new coastal use and development proposals, 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 management initiative supports the development of a policy for coastal and submerged Crown lands which includes offshore habitats such as soft sediment, shallow and deep reefs. These habitats and associated species were identified as at risk from climate change and ocean trawl, which are addressed in **Initiatives 3** and **6** respectively. Fish assemblages at risk from fishing are addressed in **Initiative 6**. Threatened and protected species are addressed in **Initiative 5**.



## 2 MANAGEMENT OBJECTIVE:

To protect coastal and marine habitats and associated species and enhance the health of the marine estate by improving the design, quality and ongoing management of foreshore development, use and waterway infrastructure

	Statewide priority threats	Stressors	Management actions
Environment TARA	Dredging (navigation, entrance and harbour management) – affects water, seagrass, beaches and mudflats, shallow soft sediment, planktonic assemblages, species and communities protected under the 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).	<p>2.1 Assess and manage cumulative and legacy impacts for estuary entrance modification and dredging by:</p> <ul style="list-style-type: none"> <li>strategically dredging trained entrances to minimise the impact of interruptions to sand movement caused by entrance infrastructure and redeploying sand at erosion and sediment deprived locations</li> <li>developing and incorporating practical design features that maximise marine habitat and recreational values into existing training walls during maintenance and upgrade works</li> <li>auditing commercial dredging in estuaries.</li> </ul> <p>2.2 Assess and manage cumulative and legacy impacts on foreshore development and land-use change in the coastal zone by:</p> <ul style="list-style-type: none"> <li>reviewing and updating existing coastal design guidelines to promote best-practice designs in coastal urban environments.</li> <li>implementing policy changes to enable adequate assessment of and response to the impact of existing infrastructure that modifies freshwater flows or drains wetlands when rezoning or when land-use change is considered to remediate the legacy impacts of older infrastructure.</li> </ul> <p>2.3 Develop and implement a statewide policy for the management of coastal Crown lands (including submerged lands) in collaboration with local government Coastal Management Programs in priority areas to:</p> <ul style="list-style-type: none"> <li>develop estuary-wide strategies that reduce red tape and inform the assessment of foreshore structures strategies for private works spanning the intertidal foreshore (such as pontoons and boat ramps)</li> </ul>
	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 freshwater inputs, impacts on 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		

	Statewide priority threats	Stressors	Management actions
Environment TARA	Four-wheel driving – affects saltmarsh, beaches and mudflats and species and communities protected under the FMA and BCA		<ul style="list-style-type: none"> <li>• develop marine vegetation management plans that maximise resilience, accommodate sea level rise (see <b>Initiative 3</b>), address key threats (clearing and drainage, cattle grazing, four-wheel driving on saltmarsh), facilitate rehabilitation opportunities (see <b>Initiative 1</b>), and reduce red tape for low impact works (e.g. mangrove trimming for safety traffic sight-lines)</li> <li>• investigate estuary-wide bank protection options to inform the assessment of bank protection work proposals (including beach nourishment and grooming) and facilitate rehabilitation opportunities (see <b>Initiative 1</b>)</li> <li>• facilitate greater coordination between State and local government in the assessment of foreshore and intertidal zone development proposals</li> <li>• maximise State and local government responses for non-compliant development and activities.</li> </ul> <p>2.4 Re-establish resilient coastal floodplains and connectivity within coastal catchments by:</p> <ul style="list-style-type: none"> <li>• better aligning existing government policy and resourcing for floodplain and drainage management</li> <li>• providing fish passage at priority weir and road crossing barrier sites in coastal catchments.</li> </ul> <p>2.5 Undertake research and monitoring to address key knowledge gaps, such as techniques to minimise the impact of trained estuary entrances, and methods for determining marine vegetation resilience, and assess the effectiveness of the management actions within this initiative. This action is integrated into the Monitoring Program.</p>
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: <ul style="list-style-type: none"> <li>• habitat disturbance</li> <li>• lack of compliance (e.g. illegal development)</li> <li>• loss of public access (private development)</li> <li>• limited or lack of access infrastructure</li> <li>• inadequate and inefficient regulation.</li> </ul>	(See actions above that address social and economic threats associated with coastal use and development. Cultural actions are included in <b>Initiative 4</b> ).

### 3. Planning for climate change



#### WHAT ARE THE COMMUNITY BENEFITS?

Preparing for climate change will help to ensure that the benefits the marine estate provides to the NSW community will continue under climate change projections. It enables communities and industries to develop adaptation responses and identify opportunities to respond to climate change. It also helps the community better understand the likely effects so we can build resilience and identify opportunities 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. Extreme events can also exacerbate water pollution and degrade important coastal and marine habitats. The impacts of climate change are expected to increase as we move towards a 50-year timeframe.

Through knowledge and research, communities will better understand the impacts of climate change on our marine estate. This will allow communities to better prepare and adapt to future changes. This initiative will help fill this gap by building on and supporting actions under the coastal reforms and the NSW Climate Change Policy Framework.

### **HOW WILL THIS MANAGEMENT INITIATIVE HELP?**

This management initiative will increase our understanding and knowledge of how climate change will affect the marine estate. The benefits include:

- supporting the conservation and management of threatened and protected marine and estuarine ecosystems (such as mangrove and saltmarsh)
- building regional resilience to climate change, by facilitating strategic adaptation planning and management
- assisting managers as they plan and prioritise current and future resources for the management of environmental, social, cultural and economic values.

This initiative supports the long-term objective to make NSW more resilient to climate change, as part of the NSW Government's Climate Change Policy Framework. This framework outlines policy directions to guide government action, including managing the impacts of climate change on natural resources, ecosystems and communities.

This initiative supports the NSW coastal reforms, by increasing our knowledge about the impacts of climate change on the marine estate to help guide management actions. Through these reforms, the NSW Government is working to deliver a new legislative framework to better equip local government and coastal communities to respond to existing and emerging challenges like storm surges, coastal erosion and east coast lows.



### 3 MANAGEMENT OBJECTIVES:

Understand, adapt and increase resilience, to help mitigate 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	<p>Physical disturbance of habitats from sea level rise, increased storms, flooding, inundation resulting in:</p> <ul style="list-style-type: none"> <li>• loss of habitat and nesting sites for shorebirds and turtles</li> <li>• loss of shorebirds foraging habitat</li> <li>• loss of intertidal foraging habitat including seagrass</li> <li>• loss of intertidal habitats such as saltmarsh.</li> </ul>	<p>3.1 Enhance mapping of estuarine communities (such as saltmarsh and mangroves) to identify those communities most at threat from sea level rise under expected climate change scenarios and use this information to model areas of land suitable for retreat and those that should be prioritised for protection. Apply this information in decision making.</p> <p>3.2 Provide support to coastal and marine managers to facilitate consistent application of the NSW and Australian Capital Territory (ACT) Regional Climate Modelling (NARClIM) projections in marine management.</p> <p>3.3 Build the knowledge and capacity of coastal and marine managers and the community to increase resilience to climate change in the marine estate through strategic adaptation planning and management.</p> <p>3.4 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. This action is linked to <b>Initiative 4</b>.</p> <p>3.5 Research and monitor the effects of climate change on the marine estate to fill knowledge gaps and inform future management actions, focusing on marine biodiversity and coastal communities. This action will be integrated into the Monitoring Program.</p> <p>Note: on-ground activities and habitat protection and rehabilitation that will help mitigate the impacts of climate change will be undertaken in actions under <b>Initiatives 1 and 2</b>. Activities will include rehabilitating coastal wetlands, revegetating riparian areas, and protecting river banks.</p> <p>Marine protected areas contribute to building resilient ecosystems that are better able to cope with stresses such as climate change. Marine protected area commitments are captured under 'Marine protected areas and other forms of spatial management' section.</p>
	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 are 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 Australian Current and sea temperatures, which are likely to affect turtle, whale and dolphin migration patterns. Changes in temperature are 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
<p>Environmental – climate change stressors 20 years</p>	<p>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.</p> <p>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; this affects business viability.</p> <p>Increased sea temperatures and sea level rise could affect the spiritual connections of Aboriginal communities (e.g. culturally significant species, links to Land and Sea Country and food sources).</p>	<p>(See actions above that address social and economic threats associated with climate change. Cultural actions are included in <b>Initiative 4</b>).</p>

# 4. Protecting the Aboriginal cultural values of the marine estate



### WHAT ARE THE COMMUNITY BENEFITS?

Sea Country is important to the overall health and wellbeing of Aboriginal people, their cultural 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 that are important for use in ceremonies, food, traditional medicine and healing. This knowledge is passed on to the next generations to continue 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.

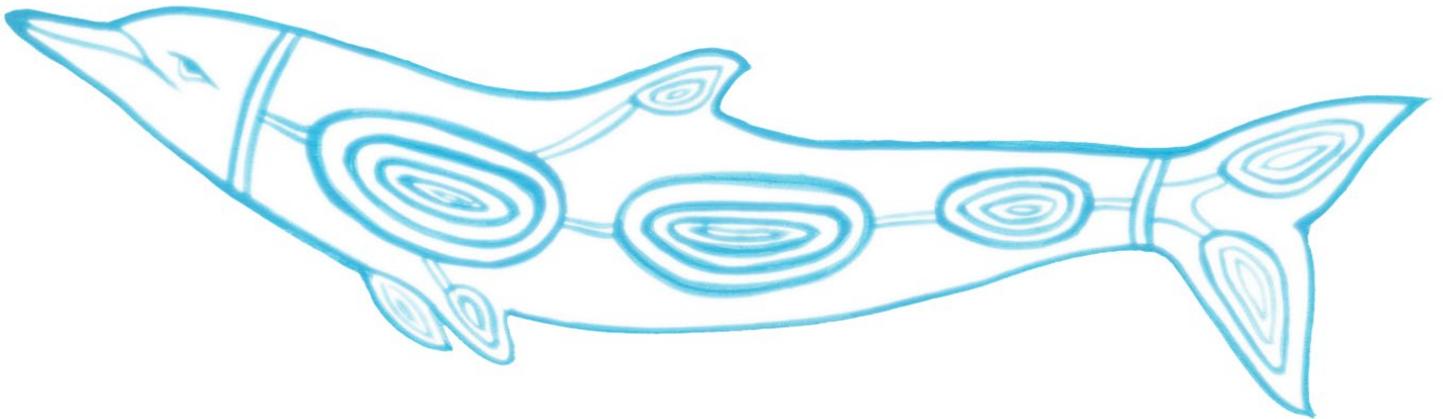
The lack of Aboriginal involvement in decision-making has also been identified as a major threat to culture. The need for Aboriginal knowledge and expertise to be incorporated into the ongoing management of Sea Country is recognised by government. There is currently limited opportunity for structured and ongoing participation of Aboriginal people in marine estate management. Increasing participation will benefit in the culturally appropriate 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 Land and Sea Country.

These actions will be developed further by working collaboratively with Aboriginal communities 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 but not duplicate other government reform processes, in particular, proposals to improve the governance arrangements for managing Aboriginal cultural heritage and cultural fishing.

The Strategy does not affect the operation of the *Native Title Act 1993* of the Commonwealth or the *Native Title (New South Wales) Act 1994* in respect of the recognition of native title rights and interests.

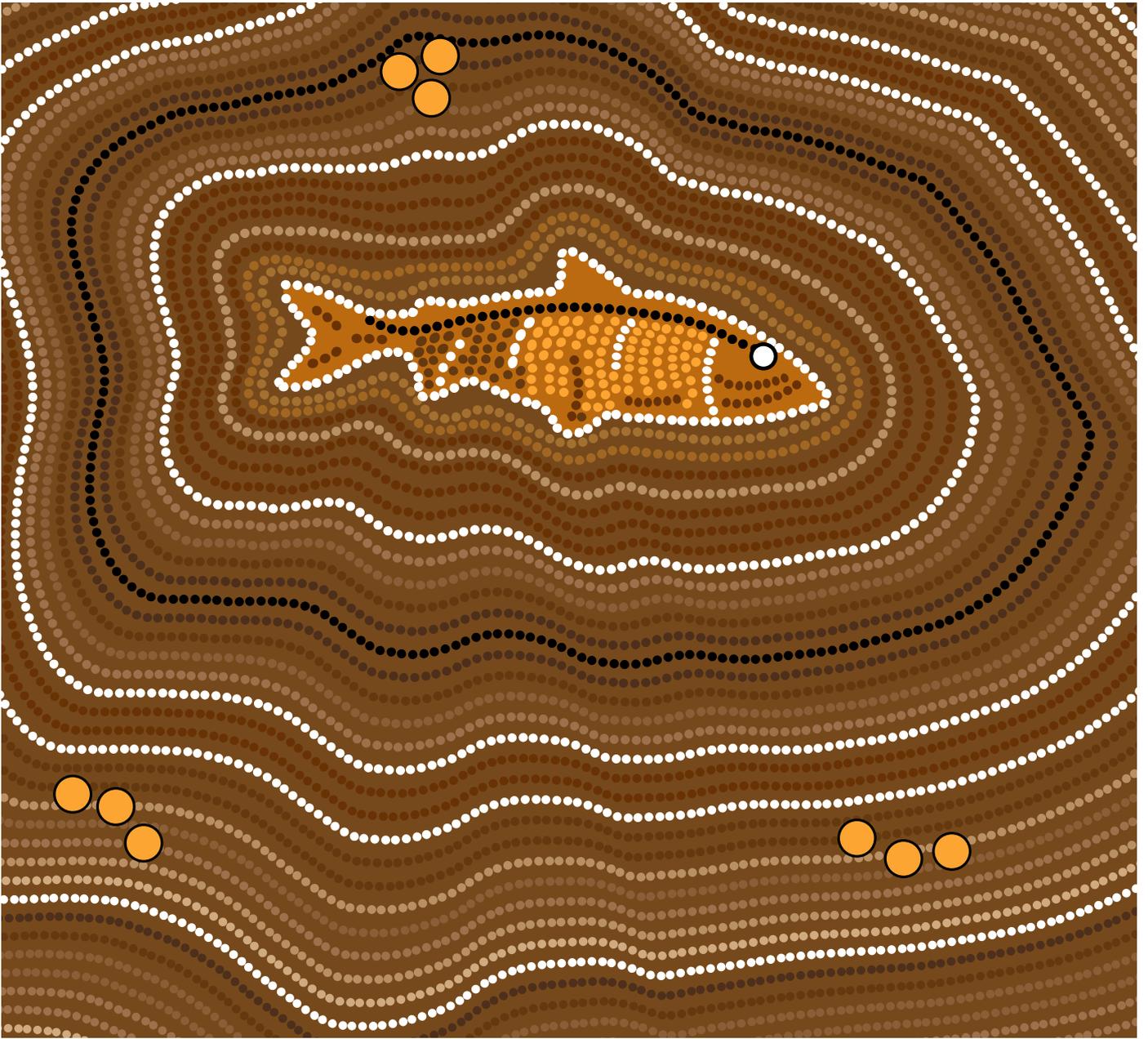


# 4

## MANAGEMENT OBJECTIVE:

Work with Aboriginal communities in the management of Sea Country to reduce threats and risks to Aboriginal cultural heritage

	Statewide priority threats	Stressors	Management actions
Social, cultural and economic TARA	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.	<p>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.</p> <p>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.</p> <p>4.3 Implement an integrated Aboriginal engagement model to increase Aboriginal participation in Sea Country management, planning and monitoring through employment and training of Aboriginal people at a regional and local level.</p> <p>4.4 Explore and assist Aboriginal communities to implement opportunities for economic development in the NSW marine estate and improved representation of Aboriginal cultural values in NSW marine parks.</p> <p>4.5 Integrate research and monitoring into the Monitoring Program to address key knowledge gaps and to assess management effectiveness in reducing threats and risks to Aboriginal cultural heritage.</p>
	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	Inadequate or no engagement with Aboriginal people on marine estate management issues prevents input to 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 Land and Sea Country.	



## MANAGEMENT INITIATIVES

# 5. Reducing impacts on threatened and protected species



### WHAT ARE THE COMMUNITY BENEFITS?

NSW boasts unique marine life that plays an important role in maintaining a balanced ecosystem. 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.

NSW is home to many threatened and protected species. Some are managed under the *Biodiversity Conservation Act 2016* (BCA): such as species of whales, dugongs, seals, turtles, Little Penguin, seabirds, shorebirds and wader birds and saltmarsh communities. Marine vegetation, aquatic invertebrates and fish are managed under the *Fisheries Management Act 1994* (FMA): such as Greynurse Shark, White Sharks, Black Rockcod and endangered populations of the seagrass *Posidonia australis* and marine brown algae *Nereia lophocladia*, which is found in only one location on the north coast of NSW.

The management of marine animals and plants that are not threatened or protected are included in a number of other management Initiatives. For example, **Initiative 2** seeks to address threats to coastal and marine habitats and associated species, including mangrove, saltmarsh and seagrass communities that are key to the survival of associated species such as crustaceans, juvenile fish and shorebirds. **Initiative 3** seeks to address threats from climate change (such as coral bleaching, ocean acidification), which poses significant threat to subtidal reefs and the suite of reef fish, marine algae and shelled animals.

**Initiative 6** focuses on fish and shellfish species targeted by commercial, recreational and cultural fishers, and seeks to ensure sustainable fishing and aquaculture practices.

Reducing impacts on threatened and protected species will benefit the community through improved nature appreciation and tourism, including the scuba diving and whale and dolphin watching industries,



having measurable benefits for the economy, the environment and the community. 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.<sup>16</sup> 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.

### **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 species. These impacts also threaten Aboriginal cultural heritage due to the spiritual connection Aboriginal people have with culturally significant species such as whales, dolphins, fish and turtles.

The cumulative threats of commercial and recreational fishing can impact threatened and protected species through bycatch, ghost fishing, marine debris, physical disturbance and population health. Entanglement in, and ingestion of fishing gear and marine debris has a significant impact on marine mammals, turtles and birds. Entanglement in active or discarded fishing gear can cause injury or drowning of animals.

<sup>16</sup> *Who Cares About the Environment?* (Office of the Environment and Heritage 2015)

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 land-based activities also increases wildlife disease and entanglements.

Vessel-based activities, such as boating, shipping, and commercial vessels, are also 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 and hunt. Noise also impacts wildlife breeding, foraging, resting and animal health and can displace animals from 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, along the south coast where Southern Right Whales go to calve.

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.<sup>17</sup>

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.<sup>18</sup>

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<sup>17</sup> *Who Cares About the Environment?* (Office of the Environment and Heritage 2015)

<sup>18</sup> 'Executive Summary – Marine environment 2016', in *Australia State of the Environment Report* (Australian Government Department of the Environment and Energy 2016)



## HOW WILL THIS MANAGEMENT INITIATIVE HELP?

This management initiative seeks to reduce the cumulative threats to threatened and protected species 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 threatened and protected species conservation programs
- expanding community and industry education on the impacts of noise, vessel collisions, marine debris and fishing activities and gear.

The expansion of the commercial fishing observer program in this initiative will assess bycatch and interactions with threatened and protected species, including sharks such as the Grey Nurse Shark and Black Rockcod, listed as critically endangered and vulnerable respectively under the *Fisheries Management Act 1994*. This initiative also links with **Initiative 6** which commits to an environmental assessment in the recreational fishing sector. This provides an opportunity to understand and mitigate threats posed by recreational fishers to threatened and protected species.



## 5 MANAGEMENT OBJECTIVE:

To understand and mitigate threats to threatened and protected species in NSW.

	Statewide priority threats	Stressors	Management actions
Environment TARA	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.	<p>5.1 Improve strategic planning and coordination for marine threatened and protected species programs across NSW to address priority threats.</p> <p>5.2 Strengthen partnerships for marine threatened and protected species conservation responses to ensure effective management, including:</p> <ul style="list-style-type: none"> <li>• establishing governance arrangements</li> <li>• strengthening interagency capabilities</li> <li>• formalising partnerships for rescue, rehabilitation and notifications</li> <li>• establishing a process for Aboriginal knowledge holders to participate in marine wildlife events with culturally significant species, e.g. marine mammal strandings and carcass management (see <b>Initiative 4</b>).</li> </ul> <p>5.3 Improve the awareness of threats to threatened and protected species and compliance with regulations to reduce impacts through education campaigns, social research (see <b>Initiative 8</b>) and increased compliance.</p> <p>5.4 Improve reporting and data sharing on threatened and protected species 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.</p> <p>5.5 Expand existing observer programs, including the use of new technologies to high and moderate risk commercial fisheries to better understand threats associated with bycatch and interactions with threatened and protected species.</p> <p>5.6 Understand and reduce the impacts of threatened and protected species habitat modification 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.</p>
	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, is 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, is linked to disease outbreaks and mortalities in wildlife populations.	
	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.	

	Statewide priority threats	Stressors	Management actions
Environment TARA	Urban stormwater discharge	Runoff and associated contaminants and debris can impact wildlife health, including increases in disease and mortalities.	5.7 Develop and implement research programs to address key knowledge gaps associated with cumulative threats to threatened and protected species and the effectiveness of management interventions. This action will be integrated into the Monitoring Program.
	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	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.	
	Four-wheel driving		
	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 and physical 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)	Enjoyment of biodiversity is threatened by biodiversity loss, poor wildlife health and welfare, and wildlife disturbance.	(See actions above that address social and economic threats associated with threatened and protected species. Aboriginal cultural actions are included <b>Initiative 4</b> ).
	Wildlife disturbance (shorebirds, turtles, whales) and impacts on species by dog walkers, four-wheel drives and vessels)		

## MANAGEMENT INITIATIVES

# 6. Ensuring sustainable fishing and aquaculture



### WHAT ARE THE COMMUNITY BENEFITS?

Recreational and commercial fishing make a significant contribution to the NSW economy. Recreational fishing 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 and offers considerable health, social and educational benefits across all parts of the community. It has a long history in NSW: it is a fully inclusive, non-discriminatory pastime and is one of the few forms of nature-based recreation that can be enjoyed throughout childhood, adolescence, adulthood and into the senior years. Recreational fishing also provides significant benefits to children and youth with behavioural and mental health issues and can assist in addressing antisocial behaviour. Recreational Fishing Licence fees support education, compliance, research as well as habitat protection and restoration works by anglers to protect the aquatic environment and help ensure a positive future.

Aboriginal cultural fishing is a key value and of social importance to Aboriginal people on the coast and ongoing access is imperative to the provision of fresh seafood to the community, which enhances health and wellbeing. Access to Sea Country and involvement in the management of Sea Country enables knowledge and traditions to be passed on to younger generations (see **Initiative 4**).

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 \$70 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. Boat harbours, breakwalls and safe boat launching facilities underpin benefits derived from many fishing activities. The health benefits of seafood are well documented. 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 Aboriginal cultural use, although one-in-five participants viewed fishing as a threat. The statewide TARA also identified some commercial and recreational fishing activities as a threat to particular environmental assets. Threats were identified to threatened and protected species (see **Initiative 5**), deep soft sediment (from trawling) and aquaculture was identified as a threat to seagrass. Threats to fish assemblages were identified (both harvest and bycatch), noting a reduction in species abundance and trophic levels. While some reductions in species

abundance are associated with extractive industries, the level of extraction seeks to balance ongoing sustainability to ensure the future of the resource.

Sustainable fishing is defined as:

- leaving enough fish in the ocean – fishing must be at a level that ensures it can continue indefinitely and the fish population can remain productive and healthy
- respecting habitats – fishing activity must be managed carefully so that other species and habitats within the ecosystem remain healthy
- ensuring people who depend on fishing can maintain their livelihoods – fishing must comply with relevant laws and be able to adapt to changing environmental circumstances.<sup>19</sup>

A healthy marine ecosystem relies on good water quality (**Initiative 1**) and healthy habitats (**Initiative 2**) in harmony with sustainable harvest and minimising interactions with threatened and protected species (**Initiative 5**).

<sup>19</sup> What is sustainable fishing? (Marine Stewardship Council). Available from <https://20.msc.org/what-we-are-doing/our-approach/what-is-sustainable-fishing>



## HOW WILL THIS MANAGEMENT INITIATIVE HELP?

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

The initiative links to the commercial fishing reforms Business Adjustment Program (BAP). The BAP 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 and communication of the effects of harvest, bycatch, and better reporting of interactions with threatened and protected species from high and moderate risk fishing sectors.

Harvest strategies<sup>20</sup> and ecological risk assessments (reporting on the broader effects of fishing on the ecosystem) will be developed to understand and address changes to fish assemblages and trophic levels. Decision support tools will be applied. Partnering with industry to build capacity and improve social licence is also an action.

Other management actions will expand or improve current programs. An environmental assessment of recreational fishing and review of recreational fishing rules will help address identified environmental and social threats, as well as maximise education, advisory and compliance regimes.

This management initiative also links to the NSW oyster industry and several 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. The threat of marine pests and disease is addressed in this initiative (and linked to **Initiative 7**) as any outbreak will have significant impacts on seafood consumption. Liaison and cooperation with the Commonwealth to mitigate biosecurity threats, will continue.

<sup>20</sup> A harvest strategy is a framework that specifies pre-determined management actions in a fishery for a defined species (at the stock or management unit level) necessary to achieve the agreed ecological, economic and/or social management objectives (from *National Guidelines to Develop Fishery Harvest Strategies*, FRDC 2014).

## 6 MANAGEMENT OBJECTIVE:

To ensure fishing and aquaculture is managed in a way that is consistent with ecologically sustainable use while providing for the health, heritage and social benefits of fishing and seafood consumption

	Statewide priority threats	Stressors	Management actions
Environment TARA	Estuary general fishery impacts on fish assemblages	Reduction in abundance of species and trophic levels due to current and historical levels of harvest.	<p>6.1 Introduce harvest strategies and evaluate ecological risk in partnership with stakeholders and shareholders to address the priority threats associated with the reduction in abundance of fish species and trophic levels.</p> <p>6.2 Conduct an environmental assessment of recreational fishing, periodically review current rules, and take action to improve fish stocks and to address threats associated with harvest, bycatch and illegal sale of fish.</p> <p>6.3 Explore opportunities for new marine aquaculture ventures.</p> <p>6.4 Apply best-practice guidelines for seagrass protection in the NSW Oyster Industry Sustainable Aquaculture Strategy.</p> <p>6.5 Integrate various commercial, recreational and cultural fishing data and new research into the Monitoring Program to address key knowledge gaps associated with harvest and bycatch.</p> <p>Note: Aboriginal cultural fishing and aquaculture actions are included in this initiative and <b>Initiative 4</b>).</p>
	Ocean trap and line fishery impacts on threatened and protected species and communities protected under the FMA	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.	
	Ocean trawl impacts on deep soft sediment	Physical disturbance from trawling in deep soft sediment habitats resulting in impacts on biota.	
	Ocean haul impacts on fish assemblages	Wildlife disturbance or entanglement from fishing gears and activities.	
	Shore and boat-based recreational 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.	
	Boat-based recreational line and trap fishing (offshore) impacts on species and communities protected under FMA	Reduction in abundance of species and trophic levels due to levels of harvest.	
	Hand gathering (coast) impacts on fish assemblages	Ingestion of and entanglement in fishing gear, and impacts on several protected species from specific types of traps.	
	Oyster aquaculture	Fishing-related litter and marine debris that results in impacts on a range of species.	
	Harvest of a range of on-reef and rocky shore species at a level that results in measurable impacts.		
	Physical disturbance to seagrass ( <i>Posidonia</i> ) from vessel propellers, resuspension of sediment and shading from structures.		

Statewide priority threats	Stressors	Management actions
<p>Threats include resource use conflict, environmental, governance, critical knowledge gaps and lack of access</p>	<p>Stressors affecting community enjoyment, participation and economic viability, both in estuaries and offshore, include:</p> <ul style="list-style-type: none"> <li>• pests and disease</li> <li>• reduction in abundance of species and trophic levels</li> <li>• habitat disturbance (commercial and recreational fishing methods)</li> <li>• conflict over resource access and use</li> <li>• lack of compliance with regulations</li> <li>• loss or decline in marine industries</li> <li>• loss of access (government area closures).</li> </ul>	<ul style="list-style-type: none"> <li>6.6 Enhance fisheries via targeted fish stocking and other activities to improve fishing opportunities where appropriate.</li> <li>6.7 Partner with fishing and aquaculture sectors to deliver information and training to fishers in NSW to improve self-compliance and sustainable fishing practices, and develop economic opportunities.</li> <li>6.8 Work with fishing sectors and tourism authorities to investigate and implement opportunities to promote fishing and NSW wild caught seafood and build social licence.</li> <li>6.9 Deliver advisory programs to the community to reduce the risk of spread of marine pest and diseases and enhance the understanding of everyone's general biosecurity duty so they act to minimise aquatic pest and disease risk.</li> </ul>

# 7. Enabling safe and sustainable boating



## WHAT ARE THE COMMUNITY BENEFITS?

Recreational boating brings significant social, cultural, and economic benefits to the NSW community. An estimated two million people go boating in the NSW marine estate each year.<sup>21</sup>

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, wharves, 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; 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.

Commercial vessels provide valuable services to the community and include ferries, tourism charter vessels such as whale watching vessels, tugboats, houseboats, various government vessels used for research and compliance, and commercial fishing vessels.

There are approximately 1,500 commercial vessel operators throughout NSW, operating approximately 2,000 vessels: most operate on the coast. About one-third of these are based in the Sydney metropolitan area. Another 80 vessels are in the greater Sydney area, including Hawkesbury River and Brisbane Waters; the rest operate mostly, but not exclusively, on the coast. Two million passengers are carried on Sydney Harbour each year, and more than double that number are carried on vessels throughout the State. The total turnover of the industry is estimated to be around \$600 million each year.<sup>22</sup>

<sup>21</sup> *Social and economic background information report on the NSW marine estate* (Vanderkooi Consulting for MEMA 2015).

<sup>22</sup> *Industry Facts* (Commercial Vehicle Association 2017), available from <http://cvansw.org.au/industry-facts/>

NSW's ports provide a critical link between the landside and seaside elements of the supply chain and play a key role in supporting the growth in all import and export trade. The major ports are Port Botany, Port Jackson, Port Kembla and the Port of Newcastle, together contributing some \$4 billion to NSW's Gross State Product.<sup>23</sup>

Marinas also play an important role. They provide social benefits through their direct services to the public (such as fuel, pump out facilities, chandlery, boat repair and maintenance) and community events (such as 'try sailing' days), and 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 to enhance the quality, diversity and accessibility of maritime facilities and services that directly contribute to the economy and provide additional boat storage capacity (such as berths and pens, moorings, dry stack or hard stand).

NSW's rich maritime heritage is a reflection of the reliance on boating for trade, transport and defence historically. Approximately 1,800 shipwrecks exist in the NSW marine estate, including a World War One battlecruiser, *HMAS Australia* (1910–1924); a Japanese type A midget submarine, *M24* (1942); Scottish clipper ships and colonial trading vessels; steamships; and harbour craft. Jetties, wharves, shipyards, pilot stations, lighthouses and port facilities are also an integral part of Australia's maritime history.

### **WHY IS THIS MANAGEMENT INITIATIVE NEEDED?**

The Community Survey revealed the lack of access to the marine estate is a threat to social cultural 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 waterway 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, cultural and economic benefits. This initiative seeks to balance a growing interest in boating with continued protection of the marine estate's environmental assets. This initiative also links to **Initiative 5**, which addresses collisions and vessel disturbance to threatened and protected species.

### **HOW WILL THIS MANAGEMENT INITIATIVE HELP?**

This initiative addresses the priority threats identified in the statewide TARA. It tackles sources of vessel pollution and seeks to ameliorate impacts on threatened and protected species. Several actions build on existing programs, such as the Boating Now Program, to improve access and boat storage, and the Moorings Review, to reduce impacts on sensitive seafloor habitats such as seagrass. Improved reporting and data sharing opportunities are proposed to fill knowledge gaps, linking with **Initiatives 5** and **9**.

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 is 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. This initiative also complements the Maritime Safety Plan 2017-2021.

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<sup>23</sup> NSW Port Network (Transport NSW 2017), available from <https://www.transport.nsw.gov.au/operations/logistics-network/nsw-port-network>

## 7 MANAGEMENT OBJECTIVE:

To balance protection of coastal and marine habitats and species with ongoing 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	<p>Physical disturbance of <i>Posidonia</i> seagrass and other seagrasses due to physical scouring of habitat resulting in impacts.</p> <p>Wildlife disturbance from activity and vessel collisions.</p> <p>Marine debris and a range of water pollution stressors, particularly copper pollution and antifouling paints.</p>	<p>7.1 Reduce the threats to seagrass from vessels through improved regulation, administration, education, new mooring technologies and delivery mechanisms.</p> <p>7.2 Establish a framework to manage increased mooring demand through the Moorings Review program.</p> <p>7.3 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, anti-fouling and sewage pump out into waterways.</p>
	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.	<p>7.4 Partner with industry to investigate a pilot program at marinas in NSW to design and install sump drain runoff handling systems with sediment traps.</p> <p>7.5 Improve awareness of threats to threatened and protected species, and compliance with regulations, through data sharing, education, social research and compliance planning to reduce impacts of boating. This links to actions in <b>Initiatives 5, 8 and 9</b>.</p> <p>7.6 Integrate research and monitoring into the Monitoring Program to address key knowledge gaps associated with shipping movements and interactions with threatened and protected species.</p>
Social, cultural and economic TARA	Lack of access	Limited or lack of access infrastructure to the marine estate reduces the ability to participate in a range of activities in the marine estate and affects participation, enjoyment and viability of businesses.	<p>7.7 Continue improving environmentally sustainable boating and resolve conflicting uses and waterway access to the marine estate through the NSW Boating Now Program.</p> <p>7.8 Deliver waterways infrastructure in accordance with the Maritime Safety Plan to enhance social, cultural and economic benefits through an interagency approach (also see <b>Initiative 8</b>).</p>
	Governance	Inadequate, inefficient regulation and overregulation (agencies) affects participation, enjoyment and viability of businesses.	

## 8. Enhancing social, cultural and economic benefits



### WHAT ARE THE COMMUNITY BENEFITS?

The community derives many social, cultural and economic benefits from the NSW marine estate. 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. Cultural benefits include Aboriginal cultural heritage and use benefits such as food sources, traditions and spiritual values. Economic benefits include those from running a business (such as whale watching, scuba diving or commercial fishing). Indirect values include intrinsic (valuing regardless of direct use) and bequest values (knowing it's protected for future generations). The conservation and enjoyment of marine historic heritage and non-Aboriginal cultural heritage also provides social, cultural and economic benefits to the NSW community.

### WHY IS THIS MANAGEMENT INITIATIVE NEEDED?

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

The Community Survey conducted in 2014 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 (such as 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.

### HOW WILL THIS MANAGEMENT INITIATIVE HELP?

This initiative will improve understanding of current and future use of the marine estate and identify specific management responses to address priority threats associated with anti-social behaviour, unsafe practices, loss of public access and resource-use conflict. This action also links to **Initiative 6** and **7** in gathering fishing and boating activity data, trends, opportunities and management issues.

Other management actions include improved awareness of the marine estate by building on community education and awareness programs and developing best practice guidance and codes of practice to support environmental stewardship and self-compliance. Education and awareness is highlighted across several management Initiatives: **Initiative 5** aims to increase awareness of threats to threatened and protected species; **Initiative 7** is associated with educating the boating community about environmentally sustainable boating practices.

The Marine Integrated Monitoring Program supports evidence-based decision-making and adaptive management by addressing knowledge gaps, developing a shared understanding of community benefits derived from the marine estate, tracking the impacts of threats to those benefits and effectiveness of management. This action links directly to all other initiatives in the Strategy and also provides the key mechanism for evaluating the effectiveness of the Strategy in delivering its objectives.

This initiative will work collaboratively with marine industries (such as fishing, aquaculture, offshore renewables and marine tourism – see **Initiatives 6** and **7**) to develop a blue growth strategy (see Case Study 2).<sup>24</sup> The strategy will scope opportunities for marine sectors to enable ecologically sustainable growth. Blue growth will not only contribute to the NSW economy but also support wider community wellbeing objectives. The long term potential for innovation, jobs and economic growth are considerable, but responsible and appropriate sustainable approaches to economic

## CASE STUDY 2 - THE GLOBAL BLUE GROWTH ECONOMY

### STRATEGIC AND SUSTAINABLE GROWTH IN THE MARINE AND MARITIME SECTORS

The global maritime economy is growing. It is also changing from a reliance on fishing and shipping towards emerging industries such as aquaculture, offshore renewables and cruise tourism. The European Commission estimated that by 2030, this 'blue economy' is expected to be worth more than EUR 1.3 trillion in terms of value adding and employment, more than double its current value.

### THE EUROPEAN UNION'S SOLUTION: A BLUE GROWTH STRATEGY

The 2012 Blue Growth Strategy was developed by the European Union (EU) to build on this growth and create the conditions for a thriving maritime economy. The focus is on five economically and environmentally sustainable growth sectors with innovation and jobs creation potential: aquaculture, coastal tourism, marine biotechnology, ocean energy and marine mineral resource sectors.

Other initiatives focus on key 'enablers' of growth such as data and information, research, spatial planning, skills, environmental protection and maritime surveillance; policies to tackle market failures; funding instruments; promoting partnerships between governments and between the public and private sector; and developing market opportunities worldwide.

### BLUE GROWTH OPPORTUNITIES IN NSW

Growth in the blue economy presents a significant opportunity for the NSW Government, both economically and in terms of community wellbeing. The long-term potential for innovation, jobs and economic growth are considerable, but there are risks associated with any development. Responsible and appropriate sustainable approaches to economic development are therefore needed.

All sectors of the NSW economy support the marine economy in some way. Initiative 8 proposes to develop a blue growth strategy. This provides opportunities to holistically consider marine industries rather than individual sectors evolving in isolation. Development of the blue growth strategy will involve working collaboratively with industry to scope opportunities for marine sectors offering greatest potential for sustainable growth.

development will be critical to realising blue growth's full potential. This action links in particular to **Initiatives 1** and **2** due to the interdependence between good water quality, healthy marine and coastal habitats and thriving maritime sectors. It also links to **Initiative 6** with regard to aquaculture development and **Initiative 7** for sustainable boating growth.

<sup>24</sup> Blue Growth Strategy establishes the long term strategic and sustainable growth in the marine and maritime sectors

# 8

## MANAGEMENT OBJECTIVE:

To improve the social, cultural and economic benefits that the NSW community derives from the marine estate by responding to priority threats

	Statewide priority threats	Stressors	Management actions
Social, cultural and economic TARA	Governance of the marine estate	Lack of community awareness of the marine estate, associated threats and benefits; regulation and opportunity for participation.	<p>8.1 Increase stakeholder and community awareness of marine estate values, management arrangements and promote safe and ecologically sustainable use of the marine estate by:</p> <ul style="list-style-type: none"> <li>building on existing school and community education programs to encourage environmental stewardship, enhance self-compliance and promote physical and mental health benefits associated with nature</li> <li>developing and promoting best practice guidance / codes of practice to reduce resource use conflicts (also see action 8.4)</li> <li>developing online information resources and expansion of digital technologies.</li> </ul> <p>8.2 Improve awareness of, promote and identify threats to marine historic and non-Aboriginal cultural heritage to inform future management in the marine estate. This action is linked to <b>Initiative 4</b>.</p> <p>8.3 Establish and deliver the Marine Integrated Monitoring Programs social, cultural and economic components, to:</p> <ul style="list-style-type: none"> <li>develop a shared understanding of the NSW community’s attitudes, values, perceptions, experiences, knowledge, aspirations, patterns of use to support evidence-based decision-making and adaptive management</li> <li>communicate data / results publicly through appropriate information portals.</li> </ul> <p>8.4 Develop a baseline of current and future use of the marine estate, initially at a pilot scale, to support effective management, address resource use conflicts and access to the marine estate by:</p> <ul style="list-style-type: none"> <li>carrying out a comprehensive analysis of human use activities, supporting infrastructure and facilities, activity trends, management issues</li> <li>spatially mapping on a public facing digital platform</li> <li>identifying hotspots and developing specific management responses to address issues in partnership with agencies and stakeholders</li> <li>linking outcomes to education and awareness programs to promote best practice (also see action 8.1).</li> </ul> <p>8.5 Explore opportunities for innovative ecologically sustainable activities in the marine estate, based on the results of activity mapping in action 8.4, by developing a blue growth strategy.</p>
	Critical knowledge gaps	Inadequate social, cultural and economic information limits the ability to address identified threats.	
	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 reduces the ability to participate in a range of activities in 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.	

# 9. Delivering effective governance



### WHAT ARE THE COMMUNITY BENEFITS?

Good governance ensures that effective and efficient processes are in place for developing and implementing decisions that lead to positive benefits for community wellbeing. Participation in decision-making can lead to stakeholder and community empowerment and joint ownership so projects meet real needs and priorities.

Ultimately, effective governance ensures the long-term ecological sustainability of initiatives. Delivering coordinated governance in the marine estate will ensure decision-making is participatory, effective, efficient, equitable and consistent with relevant legislation.

### WHY IS THIS MANAGEMENT INITIATIVE NEEDED?

The statewide TARA highlighted the complexity of current management arrangements, including regulatory processes, lack of user compliance with regulations, and a lack of compliance effort by agencies. Together with limited community awareness of the marine estate and participation in management, all these factors affect the community benefits derived from the marine estate.

Responsibility for management of the NSW marine estate is complex. It is spread across a number of government departments and agencies, potentially posing a significant threat to effective governance.

In response to the Independent Scientific Audit of Marine Parks in 2012, the NSW Government established a new integrated governance structure to support improved co-ordination, efficiencies and evidence-based decision-making. The marine estate reforms commenced with the enacting of the *Marine Estate Management Act 2014* and the creation of the Authority and the Panel to support delivery of the reforms.

Although the new multi-agency structure has gone some way towards achieving improved co-ordination across the marine estate, more is needed, in particular to coordinate responses with other programs and reform processes, and with native title considerations and interests.

## HOW WILL THIS MANAGEMENT INITIATIVE HELP?

This initiative addresses the threats identified in the statewide TARA. It enhances existing management arrangements to further improve governance structures and support integrated management of the marine estate.

Commonwealth, State and local government will work collaboratively to co-ordinate management of the marine estate, clarifying roles and responsibilities and reducing inconsistencies and duplication.

Stakeholders and communities will be provided with capacity building tools to enable greater involvement in marine estate management and decision-making.

Greater understanding and reduced complexity of the regulatory processes will be delivered through a regulatory review. Improved co-ordination and awareness of compliance will reduce resource-use conflict.



## 9 MANAGEMENT OBJECTIVE:

To improve governance arrangements across the marine estate to support coordinated, transparent, inclusive and effective decision-making

Social, cultural and economic TARA	Statewide priority threats	Stressors	Management actions
	<p>Governance of the marine estate</p>	<p>Inadequate, inefficient regulation and overregulation (agencies) diminish how the marine estate is managed or is perceived to be managed. Lack of compliance with regulations (by users) or lack of compliance effort (by agencies). Lack of, or ineffective community engagement or participation in governance.</p>	<p>9.1 Improved co-ordination and integration across all levels of government (including cross-border and the land-sea interface) by developing a governance framework piloted at a catchment scale (see <b>Initiative 1</b>) to:</p> <ul style="list-style-type: none"> <li>• identify overlapping jurisdictional boundaries</li> <li>• clarify roles and responsibilities</li> <li>• align policies and programs</li> <li>• Identify opportunities for:               <ul style="list-style-type: none"> <li>- data management and sharing</li> <li>- research, monitoring and mapping</li> <li>- compliance and reporting</li> <li>- communication and engagement.</li> </ul> </li> </ul> <p>9.2 Increased stakeholder and community participation by building capacity and awareness of coastal and marine management, piloted at a catchment scale (see <b>Initiative 1</b>) and locally via marine park management planning pilots.</p> <p>9.3 Identify opportunities through the marine park management planning pilots projects to streamline regulatory instruments to:</p> <ul style="list-style-type: none"> <li>• address inconsistencies, reduce duplication of effort, and reduce regulatory burden where appropriate</li> <li>• ensure these instruments are efficient, effective, transparent and proportionate</li> <li>• increase awareness of the authorisation process and requirements for the end user through education and online tools.</li> </ul> <p>9.4 Improve co-ordination and effectiveness of compliance across government by:</p> <ul style="list-style-type: none"> <li>• investigating tools to support proactive compliance by users through use of new technologies and education programs (see <b>Initiative 8</b>)</li> <li>• collaborate across multiple government agencies to co-ordinate enforcement, education and data sharing.</li> </ul>

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



The Monitoring Program will measure and report on progress towards achieving key performance indicators for the nine management initiatives to guide adaptive management as well as fill knowledge gaps identified in the Statewide TARA.

There are three key purposes of the Monitoring Program:

1. to monitor the condition and trend of environmental assets and community benefits against components of the vision to inform the five-year health check
2. to evaluate the effectiveness of the management initiatives and actions that aim to reduce priority threats and risks
3. fill knowledge gaps that were identified as part of the statewide TARA process.

Monitoring 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 will inform evaluation of the Strategy.

The Monitoring Program will include:

- **short, medium and long-term monitoring** – to examine the condition of assets and benefits, and extent of impact on, and reduction of risks to community benefits over time
- **citizen science monitoring** – volunteer monitoring and observations of condition of environmental assets and presence of species.

Key performance indicators in the Strategy's Implementation Plan are linked to the Monitoring Program. They relate to ecological assets (such as seagrass beds and coastal habitats), social, cultural and economic benefits (such as wellbeing) as well as threats and associated stressors.

A network of organisations that use or generate monitoring data or reporting products are engaged in the development of the Monitoring Program. This includes Authority agencies, research providers, universities and local government. The community will also support marine monitoring through existing and new citizen science programs. Reporting timeframes for Monitoring Program activities will depend on NSW Government requirements. Performance information and milestones will be reported to stakeholders and agencies, and access to data streams will adhere to the NSW Government's Open Data Policy. The program will provide annual progress reporting and a comprehensive review every five years as part of the five-year health check.

The five-year health check will include an evaluation of the Monitoring Program outputs to assess if priority threat risk level have changed, as well as consider new evidence. Management will be adapted accordingly.



# APPENDIX Glossary of terms

These terms are used consistently by the Authority in the delivery of their priority actions and initiatives with the Schedule of Works.

TERM	DESCRIPTION
activity	something occurring in the marine estate. This may be a community benefit and/or a threat to an environmental asset or social, cultural or economic values, for example, boating, fishing, dredging or shipping
asset	the physical features of the marine estate, but does not include people. There are three main types of assets: <ul style="list-style-type: none"> <li>• environmental assets – the natural attributes, components and living resources of the marine estate for example habitat (e.g. beaches or rocky shores) or threatened species</li> <li>• cultural assets – structures, places or associations that form or contribute to cultural identity</li> <li>• infrastructure assets – functional structures installed for people to use and interact with the marine estate</li> </ul>
benefit	see 'community benefit'
community benefit	anything that contributes to the wellbeing of the community. There are three separate categories of community benefits: economic, social and environmental benefits. Many community benefits are based on what people think is important (what they value). A community benefit of the marine estate could be: <ul style="list-style-type: none"> <li>• swimming at the beach</li> <li>• boating in an estuary</li> <li>• doing something as a hobby (e.g. fishing, kayaking, surfing, bird watching, etc.)</li> <li>• running a business (e.g. whale watching business, charter fishing, commercial fishing, etc.)</li> <li>• clean waters and marine biodiversity</li> <li>• intrinsic values i.e. valuing the environment regardless of direct benefits. The <i>Marine Estate Management Act 2014</i> uses the term 'community value' for this</li> </ul>
community wellbeing	the overall aggregate of economic, social and environmental benefits
community wellbeing lens	this is considering the benefits and costs to the community as a whole rather than a particular user group, sector or industry
consequence	the result of something happening, including a change in circumstances affecting objectives. It can be certain or uncertain and have positive or negative effects on objectives. A consequence can be expressed qualitatively or quantitatively
cumulative impact, threats or risks	the impact (positive or negative) resulting from the effects of one or more impacts, and the interactions between those impacts, added to other past, present and reasonably foreseeable future pressures
cultural use	the use of the marine estate to demonstrate or perform skills, arts, beliefs and customs and to pass these on from one generation to the next
ecological	the relationship between organisms and their environment
economic	the production, distribution, and use of income, wealth, and commodities
economic benefits	benefits derived by the community from the marine estate that are of an economic or financial nature
effect	a deviation from the measured status. Effects can be positive or negative
environmental benefit	benefits derived by the community from an environmental asset
evaluation	The process of determining the worth or significance of a management activity, policy or program. It will report on the relevance of objectives, the efficacy of design and implementation, the efficiency of resource use, and the sustainability of outcomes. An evaluation should enable the incorporation of lessons learned into the decision-making process of all stakeholders
evidence	relevant and credible information sources relating to threats and risks (environmental, social or economic) such as scientific research or reports, unpublished data/research or supporting background reports

TERM	DESCRIPTION
impact	the outcome of the direct or indirect effect of activities and natural events on the assets or values of the environmental, social or economic components (i.e. pressure + response)
key stressors	these are stressors that are responsible for impacts on environmental assets and related risks to community benefits e.g. an activity such as storm water discharge can adversely impact environmental assets through several key stressors, such as water pollution, marine debris and sediment contamination
likelihood	the chance of something happening
marine estate	as defined in the <i>Marine Estate Management Act 2014</i> means: <ul style="list-style-type: none"> <li>• the coastal waters of NSW within the meaning of Part 10 of the <i>Interpretation Act 1987</i></li> <li>• estuaries (being any part of a river whose level is periodically or intermittently affected by coastal tides) up to the highest astronomical tide</li> <li>• lakes, lagoons and other partially enclosed bodies of water that are permanently, periodically or intermittently open to the sea</li> <li>• coastal wetlands (including saltmarsh, mangroves and seagrass), lands immediately adjacent to, or in the immediate proximity of, the coastal waters of New South Wales that are subject to oceanic processes (including beaches, dunes, headlands and rock platforms)</li> <li>• any other place or thing declared by the regulations to be the marine estate</li> <li>• but does not include any place or thing declared by the regulations not to be the marine estate</li> </ul>
monitoring	A systematic collection of data on specified indicators to provide the main stakeholders of an ongoing management action with indications of the extent and trend of progress towards achievement of objectives. Monitoring can be at numerous scales and can include measures of inputs, activities, outputs, outcomes and impacts of management activities at the project and program levels. The Authority's Monitoring Program also includes systematic collection of data (including through research) to address knowledge gaps
open access resource	resources that can be accessed by anyone at any time
opportunity	a time, set of circumstances or activity that makes it possible to improve community wellbeing
over-exploitation	harvesting species or resources at rates faster than natural populations or resources can recover
priority threat	those threats that have the greatest risk of producing adverse effects on the flow of benefits from the marine estate. A threat was considered to be a statewide priority if it had a high or moderate risk level for each of the three regions across the state (i.e. north, central and south). Risk levels of high or moderate in only one or two regions lead to those threats being identified as regional priorities
priority risk	is a term used in the NSW Marine Estate Threat and Risk Assessment Draft Report and refers to a risk level of high or moderate
quality of evidence	a rating of the quality of available evidence e.g. adequate, limited or inferred to convey the level of confidence in the knowledge and deal with uncertainty and/or absence of evidence
region	the section of NSW that the TARA has been applied to. North region is from Tweed Heads to Stockton, Central region from Stockton to Shellharbour and South region from Shellharbour to NSW/Victorian border
residual risk	the risk remaining after taking current management efforts into account (these efforts are called risk treatment or risk management)
resilience	the maximum change (or disturbance) that can occur before a population or system can no longer resist it or recover from it. The change (or disturbance) can be: <ul style="list-style-type: none"> <li>• 'pulse' – an acute, short-term change that results in a temporary response</li> <li>• 'press' – a sustained or chronic change that could cause a long-term response</li> <li>• 'catastrophic' – a major, long-term change from which a population or system is unlikely to recover</li> </ul>

TERM	DESCRIPTION
resource use	resource uses and activities resulting in stressors to environmental assets arising from these activities e.g. recreational fishing
resource use conflict	disagreements and disputes over access to and control of natural resources
risk	the chance of something happening that will have an impact on achieving environmental, social or economic objectives
risk analysis	a process to comprehend the nature or level of risk
risk assessment	overall process of risk identification, risk analysis and risk evaluation
risk context	the internal and external environment in which the government and broader community seek to achieve their objectives
risk criteria	terms of reference against which the significance of a risk is evaluated. They are based on objectives and risk context and can be derived from standards, laws, policies and other requirements
risk evaluation	the process for deciding whether the risk and its magnitude are acceptable or tolerable. The evaluation does this by comparing the results of risk analysis to agreed criteria
risk identification	process of finding, recognising and describing risks. It involves the identification of risk sources, events, their causes and potential consequences. It can draw on historical data, analysis, informed and expert opinions, and surveys of stakeholder needs
risk level	magnitude of a risk or combination of risks, generally expressed in terms of the combination of consequences and their likelihood e.g. high, moderate, low or minimal
risk management	coordinated activities to direct and control threats with regard to risk
risk management framework	a set of components that provides the foundations and management arrangements for designing, implementing, monitoring, reviewing and continually improving risk management.
risk owner	the agency or stakeholder with the accountability and authority to manage a risk
risk perception	a stakeholder's view on a risk
risk treatment	a process to modify the risk (e.g. avoiding it, removing the source, changing the likelihood or consequences, sharing the risk or retaining and managing the risk by informed decisions). Management controls introduced by government are examples of risk treatments
social	of or relating to the life and relations of people in a community
social benefits	the social and relational benefits the community derives from the marine estate
social and economic benefit	also called community benefit, this is anything that contributes to the wellbeing of the community
spatial extent	the scale of the risk of the threat to a benefit being realised e.g. local, regional or statewide
stakeholder	a person, organisation (including agencies) that can affect, be affected by, or perceive themselves to be affected by a decision or activity

TERM	DESCRIPTION
stressor	a consequence of an activity (e.g. water pollution, overcrowding) that causes an effect on an environmental asset (e.g. clean waters) or social and economic benefit (e.g. recreation and tourism activities at a local beach or waterway). Different activities may lead to the same stressors (e.g. foreshore development and dredging activities can produce different forms of water pollution if not managed effectively)
temporal scale	the timeframe in which the risk of the threat being realised will occur e.g. 1- 2 years, 10 years or 20 years
threat	a broad activity, event or process that poses a potential level of risk to an environmental asset or social or economic benefit. Threats often affect multiple assets/benefits and similarly, an asset/ benefit may be affected by multiple threats
threat and risk assessment	a process that identifies, assesses and prioritises threats and their associated risks to the marine estate. It also highlights areas where information is lacking and research is needed
trade-off	the relinquishment of one benefit or value for another that is regarded as more desirable or of greater importance
trend	how a threat varies over time e.g. increasing, decreasing or stable
value	the term used by the <i>Marine Estate Management Act 2014</i> for 'community benefit'







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- 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](http://www.marine.nsw.gov.au).

This Strategy and background reports are also available at [www.marine.nsw.gov.au](http://www.marine.nsw.gov.au).

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