



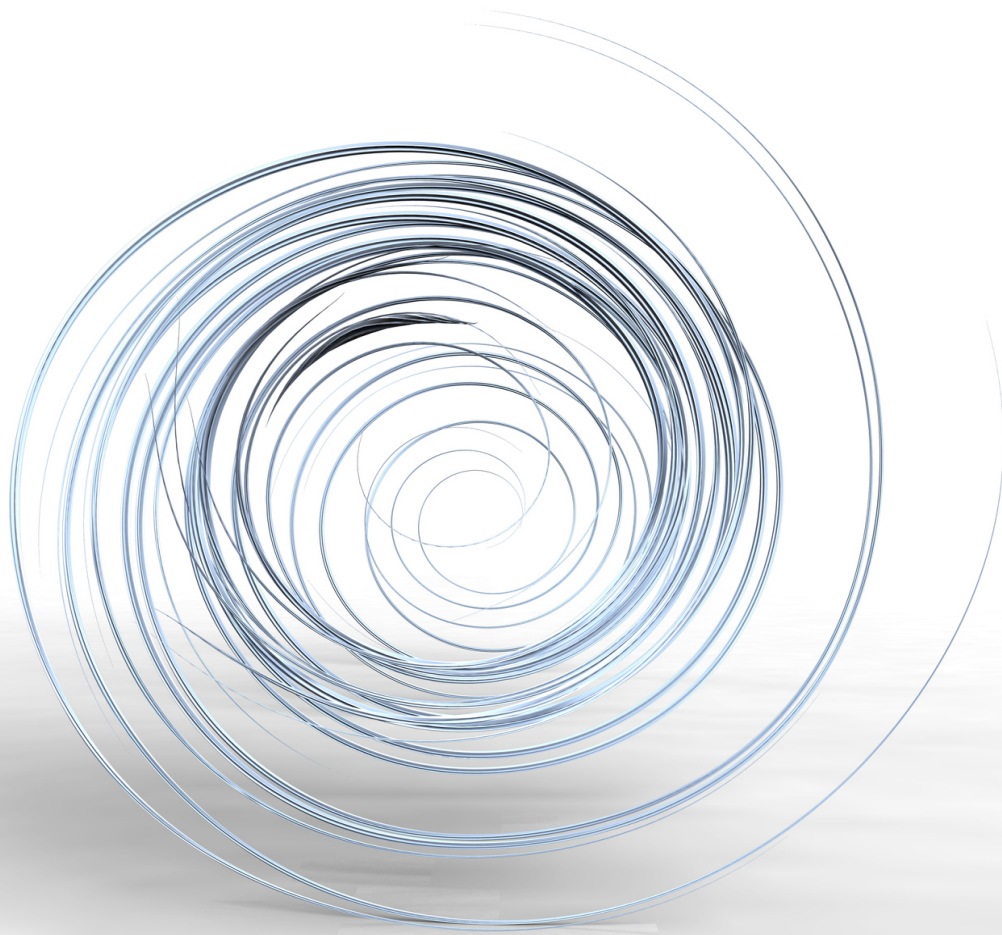
MARINE ESTATE MANAGEMENT STRATEGY

# Stage 1: Status update report for local government (Initiatives 1 – 3)

Reporting Period: Stage 1 (up to 30 April 2020)

MARINE ESTATE MANAGEMENT AUTHORITY

INT20/68324



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# List of abbreviations

Abbreviation	Definition
Authority	Marine Estate Management Authority
CMP	Coastal Management Program
DPI Agriculture	Department of Primary Industries – Agriculture
DPI Fisheries	Department of Primary Industries – Fisheries
DPIE Crown Lands	Department of Planning, Industry and Environment – Crown Lands
DPIE PA	Department of Planning, Industry and Environment – Planning and Assessment
DPIE Water	Department of Planning, Industry and Environment – Water
EES	Department of Planning, Industry and Environment – Environment, Energy and Science
EPA	New South Wales Environment Protection Authority
LGA	Local Government Area
NRAR	Natural Resources Access Regulator
Risk-based Framework	Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions
RTO	Registered Training Organisation
SEED	The NSW Government’s central resource for Sharing and Enabling Environmental Data
SEPP	State Environmental Planning Policy
Strategy	Marine Estate Management Strategy
TARA	threat and risk assessment
TfNSW	Transport for NSW
WRL	University of NSW Water Research Lab

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# Part 1: Introduction

## Reporting period

Information included in this report covers the entire period of Stage 1 up until 30 April 2020 (August 2018 – 30 April 2020).

## Purpose

The purpose of this report is to provide a once-off update that guides and informs local government on the progress of Stage 1 of the Strategy for initiatives 1 to 3. The report covers the period of Stage 1 up to 30 April 2020. These initiatives focus on water quality, marine litter, the health of estuarine and marine habitats, coastal management and climate change, all of which have strong alignment with CMPs.

Since its release in August 2018, staff implementing the Strategy, have been liaising with council staff to identify partnerships, plan projects and ensure they are relevant to, and complement council programs where possible. This report aims to support the current communication channels by providing a written update on the progress of key Strategy initiatives and actions. This information is intended to inform and assist councils when developing their CMPs but should not replace continued contact with regional agency staff who are working day to day on these issues.

This report is not intended to be a regular update but rather a once-off snapshot of progress as the Authority nears the completion of Stage 1 of the Strategy. This report will be supplemented by our new regular quarterly snapshot reports as well as the Strategy's Implementation Annual Report. The quarterly snapshot report will be a useful ongoing communication tool, for councils and other stakeholders to receive regular updates on actions which have progressed in each quarter. The quarterly snapshots can be found on the publications page on the [marine estate website](#), under the section, *Marine Estate Management Strategy progress reporting*.

The [Strategy's implementation webpage](#) is regularly updated with project updates which are also communicated through the Strategy newsletters. The implementation webpage includes updates on all nine initiatives delivered under the Strategy. The initiative pages are a key source of up-to-date information for a range of Strategy actions.

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# Background

## Marine Estate Management Strategy

The [Strategy](#) is a framework for the NSW Government to coordinate the management of the marine estate over a ten year period (2018 – 2028). The Strategy identifies actions to address [statewide priority threats](#) to the marine estate. The NSW Government has allocated \$45.7 million to implement Stage 1 of the Strategy in the first two years (July 2018 – June 2020).

The Strategy was developed by the Authority drawing on input from stakeholders, including local government, peak interest groups and the broader community.

The Strategy's nine initiatives are as follows:

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.

## Marine Estate Management Authority

The Marine Estate Management Authority advises the NSW Government on the management of the NSW marine estate. The Authority brings together the heads of the NSW Government agencies with key marine estate responsibilities. The Authority is established under the *Marine Estate Management Act 2014* and reports to the Ministers responsible for the marine estate – the Minister for Agriculture and Western NSW and the Minister for Energy and the Environment. The Authority brings together the heads of the following NSW Government agencies with key marine estate management responsibilities:

- NSW Department of Primary Industries
- NSW Department of Planning and Environment – Environment, Energy and Science
- NSW Department of Planning and Environment – Planning and Assessment
- Transport for NSW.

## Delivering long term outcomes

The Strategy's nine initiatives will contribute to: delivering healthy waterways, coastal habitats and sustainable land use; planning for climate change; protecting Aboriginal cultural values of the marine estate; reducing impacts on marine life; delivering sustainable boating and fishing; enhancing social, cultural and economic benefits; and delivering effective governance.

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Stage 1 (ending June 2020) has focused on addressing the most severe threats to the health of the marine estate, particularly water pollution, which was identified as the greatest threat to the marine estate by the NSW community and through an evidence-based [threat and risk assessment](#) in 2017.

Some Strategy actions have been piloted in Stage 1 in specific locations along the coast, such as natural oyster reef restoration in Port Stephens. Other actions have statewide benefits, such as the application of a Risk-based Framework for water quality in estuaries and their main tributaries. Information about where Strategy actions are being implemented can be found in the following two maps:

- [Local Government Areas – NSW Statewide](#)
- [Local Government Areas – Greater Sydney](#).

## Additional resources for local government

The following resources have been developed for local government to help identify links to CMPs and ways to integrate the Strategy with CMPs:

- [FAQ for local government](#)
- [Marine Estate Management Strategy Implementation Plan](#)
- [Annual Implementation Report](#).

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## Part 2: Initiative updates

### Initiative 1: Improving water quality and reducing litter

Taking action to stop water pollution and litter before it gets into our waterways. Read more here:

<https://www.marine.nsw.gov.au/strategy-implementation/putting-strategy-into-action/water-quality-and-litter>

*Initiative Leads:*

Neil Gemmell (actions led by EES) – [neil.gemmell@environment.nsw.gov.au](mailto:neil.gemmell@environment.nsw.gov.au)

Kylie Russell (actions led by DPI) – [kylie.russell@dpi.nsw.gov.au](mailto:kylie.russell@dpi.nsw.gov.au)

<b>Action 1.1</b>	<b>Improve water quality in agricultural and urban catchments using a pilot-based implementation of the Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land use Planning Decisions.</b>
Spatial extent & key LGAs	1.1.1 has had a focus in urban areas, including, Hornsby Shire, South Creek (the Hawksbury), Northern Beaches and Illawarra. 1.1.2 is focused on the Richmond River catchment area.
<b>Sub-action</b>	<b>Progress on deliverables</b> <i>Deliverables listed below in bold are taken directly from the Strategy's implementation plan.</i>
1.1.1 <i>In progress</i>	<b>At the end of Stage 1, local councils in the pilot areas will have applied the Risk-based Framework, by:</b> <ul style="list-style-type: none"><li><b>Consulting with their local communities and determining how they value and use their waterways.</b></li><li><b>Identifying local water quality objectives needed to achieve the community's environmental values and uses.</b></li></ul>

These deliverables are being applied in the South Creek catchment. This pilot provides an exemplar on how to use the [Risk-based Framework](#) to update water quality and waterway health objectives.

Work has progressed in the South Creek catchment pilot with a focus on strategic planning. Two key outputs have been delivered to date:

- Review of existing community values in the context of land use developments under way in the South Creek catchment. The review has resulted in a map of high value waterways and water dependent ecosystems, which identifies important waterways and wetlands needed to maintain or improve the biodiversity within the catchment.
- The Risk-based Framework and water quality policy have been integrated into the [Greater Sydney Region Plan](#) and [District Plans](#) within the South Creek catchment. These provisions are now being considered into more detailed planning instruments, such as the draft principles of the [Aerotropolis SEPP](#) and [Development Control Plan \(DCP\)](#).

Work is continuing in the South Creek pilot but due to Covid-19 the project is subject to delays and will likely progress in mid-late 2020. This work will include:

- Spatial data collected (and technical reports produced) to support implementation of Risk-based Framework.
- Updated water quality and waterway health objectives.
- Case study to inform guidance on implementing the Risk-based Framework, with a focus on establishing context for integrated land use and water cycle management.

Contact: [Jocelyn Dela-Cruz](#) - EES

1.1.1  
In progress

**At the end of Stage 1, local councils in the pilot areas will have applied the *Risk-based Framework*, by:**

- **Embedding the community's environmental values and uses into their Local Strategic Planning Statements and checking their local planning instruments to strengthen provisions on achieving the values and uses.**

This deliverable has been applied in two pilot areas, Northern Beaches LGA and Hornsby Shire LGA.



**Northern Beaches:** This pilot provides an exemplar on how to integrate the Risk-based Framework and water quality policy into the NSW Planning System including Regional Plans, District Plans, Local Strategic Plans, Local Environmental Plans and Development Control Plans.

The Risk-based Framework has now been integrated into the [Local Strategic Planning Statement](#). In addition, work is progressing to deliver the following by mid-2020:

- Assessment Tool and Technical Report to evaluate and compare clauses in Local Environmental Planning instruments.
- Stormwater Strategy for Northern Beaches LGA to inform the Development Control Plan.
- Case study to inform guidance on implementing the Risk-based Framework, with a focus on integrating the state government policy on water quality in the NSW Planning system.

**Hornsby Shire:** This pilot provides an exemplar on how to retrofit existing council planning and monitoring to the Risk-based Framework, and then using the outputs to inform the CMP for the Hawkesbury. In Stage 1 work has focused on updating the community environmental values and uses and waterway health objectives. In addition, work is progressing to deliver the following by mid-2020:

- Case study to inform guidance on implementing the Risk-based Framework, with a focus on retrofit of existing council planning and monitoring.
- Prioritised actions for improving water quality and waterway health in Hawkesbury CMP.

Contact: [Jocelyn Dela-Cruz](#) - EES

1.1.1  
In progress

At the end of Stage 1, local councils in the pilot areas will have applied the *Risk-based Framework*, by:

- Assessing the impacts of stormwater discharges on their waterways and investigating cost-effective water sensitive urban design options to mitigate the impacts.
- Assessing optimal stormwater infrastructure solutions to help deliver healthy waterways, including protecting aquatic biodiversity.

	<p>This deliverable relates to applying the Risk-based Framework in the Lake Illawarra catchment.</p> <p>This pilot assesses barriers to implementation of an outcomes-based approach (i.e. Risk-based Framework) to stormwater management – specifically, cost constraints, compliance and effectiveness of water sensitive urban design measures/infrastructure.</p> <p>Guidance that includes the types, costs and effectiveness of water sensitive urban design (WSUD) measures is being developed and will be made available as part of sub-action 1.2.4.</p> <p>In addition, work is progressing to deliver the following by mid-2020:</p> <ul style="list-style-type: none"> <li>• Stormwater Strategy for Lake Illawarra catchment.</li> <li>• Delivery of water quality actions in <a href="#">Lake Illawarra Coastal Management Program</a> (see page 44)</li> <li>• Case study to inform guidance on implementing Risk-based Framework, with a focus on cost constraints.</li> </ul> <p>Contact: <a href="#">Jocelyn Dela-Cruz</a> - EES</p>
<p>1.1.2 In progress</p>	<p><b>At the end of Stage 1, local councils in the pilot areas will have applied the <i>Risk-based Framework</i>, by:</b></p> <ul style="list-style-type: none"> <li>• <b>Investigating the options for and feasibility of applying the Risk-based Framework in a rural setting.</b></li> </ul> <p>The Richmond River catchment has been chosen as a pilot study for the application of the Risk-based Framework in a rural catchment. Local councils within the Richmond River catchment, including Ballina Shire Council, Richmond Valley Council, Lismore City Council, Kyogle Shire Council, Byron Shire Council and Rous County Council, have been kept informed of the project’s progress. The finalised Richmond River Risk-based Framework is likely to be a key component of the CMP that will be developed for the Richmond River.</p> <p>As part of this project, EES have developed a draft Richmond River Water Quality Monitoring Strategy (monitoring strategy). The monitoring strategy is designed to provide data at appropriate scales. It will also establish sentinel monitoring sites for ecosystem health to measure the effectiveness of the</p>

Strategy actions over time. Commencement of the monitoring strategy is essential to progressing the development of the Richmond River Risk-based Framework.

A fundamental component for the implementation of Phase 1 of the monitoring strategy is the need for the development of new monitoring equipment/infrastructure to allow reliable and consistent water sample analysis. Phase 1 monitoring is explicitly aimed at filling key knowledge gaps that are currently impeding further development of the Richmond River Risk-based Framework. In addition, it is anticipated that new monitoring infrastructure funded under this arrangement will provide significant ongoing monitoring support for Stage 2 of the Strategy projects (pending funding). As of April 2020, specialised auto-sampler technology has been successfully trialled by EES and Southern Cross University.

Relevant local councils within the Richmond River catchment continue to receive progress updates on the development of the Richmond River Risk-based Framework via the existing Richmond River Coastal Zone Management Plan Implementation/CMP Development Committee.

*Contact: [Jonathan Yantsch](#) – DPI Fisheries, [Angus Ferguson](#) – EES*

## **Action 1.2**

**Improve the management of diffuse source water pollution by:**

- **clarifying NSW Government and local government roles and responsibilities**
- **building capacity to implement the Risk-based Framework**
- **using mechanisms within existing policy, planning and legislative frameworks to improve outcomes**
- **improve minimum requirements for industry standards and ensure compliance with regulations and best practice through social research, education campaigns and compliance programs.**

<b>Spatial extent &amp; key LGAs</b>	Statewide
<b>Sub-action</b>	<b>Progress on deliverables</b> <i>Deliverables listed below in bold are taken directly from the Strategy's implementation plan.</i>
1.2.1 <i>In progress</i>	<p><b>Clarified governance arrangements for managing diffuse source water pollution, including arrangements at the state, regional and local government scale.</b></p> <p>A roles and responsibilities statement was endorsed by the Authority in 2018. This is currently being revised in light of the mid-2019 Machinery of Government changes. This revision will provide a clearer understanding of the roles and responsibilities.</p> <p>Contact: <a href="#">Neil Gemmell</a> - EES</p>
1.2.2 <i>In progress</i>	<p><b>Reviewed the NSW Diffuse Source Water Pollution Strategy, and recommended to government the changes needed to effectively manage diffuse source water pollution.</b></p> <p>A list of thematic focus areas is being developed based on a review of the NSW Diffuse Source Water Pollution Strategy. This will provide information and guidance for effectively managing diffuse source water pollution in NSW.</p> <p>Contact: <a href="#">Neil Gemmell</a> - EES</p>
1.2.3 <i>Completed</i>	<p><b>Strengthened provisions in the NSW planning system for achieving the NSW Water Quality and River Flow Objectives, through the Risk-based Framework.</b></p> <p>This is a statewide project aimed at strengthening provisions for water quality policy and the Risk-based Framework in various state and local planning instruments, and CMPs.</p> <p>The NSW Water Objectives and Risk-based Framework has now been incorporated in the following:</p> <p><b>Regional Plans</b></p> <ul style="list-style-type: none"> <li>• <a href="#">A metropolis of three cities</a></li> </ul>

- [Illawarra-Shoalhaven regional plan.](#)

### **District Plans**

- Five [Greater Sydney District Plans.](#)

### **Land Use Infrastructure and Implementation Plans**

- [Greater Macarthur Growth Area](#)
- [Wilton 2040.](#)

### **Local Strategic Planning Statements**

- [Northern Beaches Local Strategic Planning Statement](#)
- [Hornsby Local Strategic Planning Statement.](#)

### **Coastal Management Programs**

- The Risk-based Framework is identified as one tool under the [Coastal Management Manual Toolkit](#) for assessing the Coastal Environment Areas under the Coastal Management SEPP.
- Applied in the [draft Lake Illawarra CMP](#)
- Considered in the Port Stephens Council [CMP scoping study](#)

Key spatial datasets have been developed to support implementation of the Risk-based Framework.

These include:

- high ecological value waterways and water dependent ecosystems in [Greater Sydney](#) and all [NSW coastal catchments](#)
- [estuary health risk maps](#) to inform scoping studies of CMPs.

Technical reports as evidence base for inclusion in plans, including Wilton and Greater Macarthur and CMPs, are currently being finalised and expected to be delivered by mid-2020.

Contact: [Jocelyn Dela-Cruz](#) - EES

#### 1.2.4

Phase 1  
Completed

Phase 2  
In progress

**Consulted with key stakeholders, including the stormwater industry, water utilities, peak urban development groups and local councils on their information needs to apply the Risk-based Framework and improve stormwater management in NSW (phase 1).**

**Delivered key guidance material, tools and foundational datasets to support stakeholders and the community to implement the Risk-based Framework (phase 2).**

This is a statewide project to determine what data, information and other materials are needed by government and industry to implement the Risk-based Framework (phase 1), and deliver foundational materials using outcomes of pilots (phase 2).

In the first phase of this action the NSW Government engaged stakeholders, including councils, to identify the tools required to support the implementation. Outcomes of this engagement will be shared with the public in mid-late 2020. Tools and materials will be developed in the second phase, which is under way. Draft Risk-based Framework guidance material should be completed in the second half of 2020.

The following actions have now occurred. Key resources will be shared as part of the new toolkit/website for the Risk-based Framework. This is expected to be ready in mid-late 2020.

- stakeholder workshops
- overarching communication strategy for roll out of the Risk-based Framework, based on the outcomes of the stakeholder engagement
- industry report on effects-based assessments (Step 2) for freshwater ecosystems
- industry report on effects-based assessments (Step 2) for estuaries

In addition, work is progressing to deliver the following. This work has been delayed due to Covid-19 and delivery is expected in late 2020.

- guidance/practice notes for each step of the Risk-based Framework
- range of tools to support implementation of Risk-based Framework including:
  - flow chart/decision tree to align Risk-based Framework to NSW Planning system, CMP and other catchment planning processes

	<ul style="list-style-type: none"> <li>○ guidance on using the Risk-based Framework under varying urban land use development scenarios, including state significant developments</li> <li>○ tender and/or business case templates on applying the Risk-based Framework</li> <li>○ outline of training programs</li> <li>○ webinar and fact sheets</li> <li>● toolkit/website on Risk-based Framework to disseminate the guidance and tools</li> </ul> <p>Contact: <a href="#">Jocelyn Dela-Cruz</a> - EES</p>
<p>1.2.5 <i>In progress</i></p>	<p><b>Reviewed the NSW Water Quality and River Flow Objectives for each catchment in coastal NSW to reflect contemporary values and expectations and, where appropriate, updated these objectives in consultation with the community.</b></p> <p>The update of the NSW Water Quality and River Flow Objectives has been rescoped due to the compounding impacts of the 2019/2020 bushfires and Covid-19. Community consultation has been postponed, however, there will be aspects delivered by the end of June 2020, with other action expected mid-2021. The outcomes of this consultation will be provided to councils once they are collated.</p> <p>This is a statewide project aimed at updating the NSW Water Quality Objectives which were developed almost 20 years ago.</p> <p>The NSW Water Quality Objectives inform the first step of the Risk-based Framework and are an operational form of the state water quality policy. They consist of community environmental values and uses of the state’s waterways, and indicators and numerical criteria.</p> <p>Outputs to be delivered include:</p> <ul style="list-style-type: none"> <li>● guidance/method on deriving community environmental values and uses, based on online and face to face community engagement</li> <li>● guidance/method on deriving Aboriginal cultural heritage values of the waterways</li> <li>● guidance/method on deriving regional and site-specific objectives for freshwater ecosystems</li> <li>● updated NSW Water Quality Objectives website.</li> </ul>

	<p>Contact: <a href="#">Jocelyn Dela-Cruz</a> - EES, <a href="#">Neil Gemmell</a> - EES</p>
<p>1.2.7 (&amp; 2.4.1) In progress</p>	<p><b>Investigated options to address the complex approvals process for coastal floodplain drainage works and prepared proposed changes to legislative framework.</b></p> <p>The interagency working group is meeting regularly and considering a variety of options to reduce the complexity of coastal floodplain infrastructure management, balanced with improved water quality outcomes, through regulatory change. This is a statewide internal government process considering a range of works approval path scenarios, with variables such as land tenure, infrastructure ownership, project proponent, zoning (such as Coastal SEPP) and landscape/water quality risk. Agencies involved in the project include DPIE Water, DPIE Crown Lands, DPIE PA, DPI Fisheries, NRAR and EES (EPA, Biodiversity Conservation). There have been numerous delays to project progress so development of options will continue into Stage 2. A consultation process is expected to occur in the 2020/21 financial year regarding any proposed changes.</p> <p>Contact: <a href="#">Kylie Russell</a> – DPI Fisheries</p>
<p>1.2.8 In progress</p>	<p><b>Filled knowledge gaps and identified constraints and opportunities of coastal floodplain land use, infrastructure and resilience to future risks in priority catchments.</b></p> <p>Improved knowledge of floodplain infrastructure, landscape risks (such as acid sulfate soils), tenure, landscape values and vulnerability to climate change impacts are vital to inform decision making across coastal floodplains. The UNSW WRL coastal floodplain study is filling many of these knowledge gaps and providing uniform landscape prioritisation information for seven large coastal floodplains across NSW. Fieldwork for the project is complete, and the data analysis and prioritisation process is under way. Due to delays from drought, bushfires, floods, landholder access and Covid-19, the draft report is expected to be circulated to local councils in late 2020. Consultation with relevant industry and councils will offer the opportunity for review of final draft reports. This research will inform regulatory change decision making in 1.2.7.</p> <p>Contact: <a href="#">Kylie Russell</a> – DPI Fisheries</p>



<p>1.2.9 In progress</p>	<p><b>Investigated opportunities for improved coastal vegetation community outcomes using private land and other conservation measures.</b></p> <p>Changes in the NSW planning system have increased the opportunity to use offset mechanisms to achieve triple bottom line outcomes. Provisions for critical state significant infrastructure and the offsetting scheme for terrestrial systems provided by the <a href="#">Biodiversity Conservation Act 2016</a> have been designed to meet this need. Refinement of the existing policy framework for offsetting impacts to aquatic habitats is necessary to maintain or improve key fish habitats. The Offset Policy project scope has been refined, linkages with other Strategy projects determined and collaborations established with internal (DPI Fisheries) and discussions commenced with partners including EES, Biodiversity Conservation Trust, DPIE Crown Lands and DPIE Water. A draft document outlining DPI Fisheries offsetting policy has been circulated internally and will circulate amongst the Strategy agencies mid-2020.</p> <p>A procurement process to investigate offset amounts for key fish habitats using a value stacked approach using several case studies is currently being finalised and outcomes are expected toward the end of 2020.</p> <p>Contact: <a href="#">Patrick Dwyer</a> – DPI Fisheries</p>
<p>1.2.10 1.2.13 In progress</p>	<p><b>Increased the capacity, knowledge and minimum standards of the construction industry, including local councils, to achieve improved water quality outcomes.</b></p> <p><b>1.2.10:</b> Local councils play a key role in keeping waterways healthy. They oversee the construction, operation and maintenance of waterway structures like culverts and bridges and undertake works in and around waterways. Councils can make sure these structures and works are conducted in a ‘fish friendly’ way.</p> <p>DPI Fisheries is working with local councils to hold fish friendly workshops. The workshops look at ways councils can manage and build structures and undertake works in and around waterways that are friendly for fish and protect water quality. A pilot of this program is under way on the NSW North Coast during 2019-2020. The program aims to expand across NSW in Stage 2 of the Strategy implementation (pending funding).</p>

DPI Fisheries have successfully delivered a [Fish Friendly Workshop](#) for Richmond Valley Council with over 35 participants.

Fisheries Management Act audits completed in eight LGAs, with over 68 audits completed across North region. Audits are an essential part of this project as, in addition to determining whether councils are complying with DPI Fisheries permit conditions, they assist with the identification of components of councils' works that require improvement, and these are then incorporated into targeted workshop delivery. Councils that expressed interest for workshops include Ballina, Kempsey, Nambucca, Tweed, Byron and Port Macquarie. Workshops are currently postponed due to Covid-10 restrictions. Key contacts made with other North Coast councils for Stage 2 delivery. These include Ballina, Kempsey, Lismore, Nambucca, Tweed, Byron, Port Macquarie, Richmond.

By the end of the financial year it is intended to develop a Fish Friendly Workshop resource kit and a series of storyboard's and key messages to be developed for video production on compliance under the *Fisheries Management Act* to be used within the Fish Friendly Council workshops. Audit locations for the remaining northern region LGA areas are also being determined for Stage 2.

*Contact: [Jonathan Yantsch](#) – DPI Fisheries*

**1.2.13:** This sub-action focuses on developing model conditions for erosion and sediment control on construction sites approved under the local development pathway. The aim of the sub-action is to develop a set of conditions that councils can implement to guide improving water quality in their local area.

Procurement is being processed to engage the services of the Soil Conservation Service who will be reviewing a sample of council conditions and developing a draft set of model conditions. Currently developing a discussion paper which will be used to circulate the draft conditions and will give councils the opportunity to provide comment. The focus in the first quarter has been on consultation to define the extent of the problem and to define action scope.

Initial ad hoc consultation has occurred with council representatives from the Sydney area. Subsequent consultation will focus on expanding consultation to regional areas of NSW. This is planned to occur mid to late 2020 subject to funding for Stage 2.

Contact: [Phoebe Laing](#) – DPIE - PA

**Worked to better understand industry barriers to implementing improved landuse management practices and developed strategies and tools to address these barriers.**

This action forms part of the [‘Clean Coastal Catchments’](#) program.

Stage 1 of this sub-action focuses on the northern region of NSW, and is blueberry, greenhouse vegetable and macadamia nut industry specific.

**1.2.11:** Review of the blueberry industry has shown the complexity of farming systems and the factors that influence fertiliser behaviours. On-ground irrigation assessments and the trial of Hort360 benchmarking surveys on blueberry farms, confirmed the inter-connectedness of on-farm behaviours and fertiliser management. To address behaviour change and reduce fertiliser exports from farming systems, a comprehensive framework needs to be in place that includes infrastructure (e.g. diffuse policy and industry accepted best management practice), people and culture.

An upstream social marketing strategy has been successfully implemented with the formation of the Fertiliser Stewardship Group. The Group provides an outlet for the fertiliser supply chain to access evidence-based information to underpin advice given to farmers. The forum has highlighted knowledge gaps in nutrient management in both blueberry and macadamia industries informing future research projects.

Contact: [Sarah Dadd](#) – DPI Agriculture

**1.2.12:** The development of industry-focused education tools to address the impacts of land-use practices on the NSW marine estate is ongoing. Fertcare Accredited training for agronomists has been planned. An experienced RTO consultant is currently adapting course material successfully utilised in the grains sector to suit agronomists and advisors in the target industries.

Councils are provided updates on these actions through the Blueberry Interagency Committee.

Contact: [Luke Jewell](#) – DPI Agriculture

1.2.11

1.2.12

*In progress*

<b>Action 1.3</b>	<b>Facilitate and deliver on-ground activities that reduce diffuse source water pollution through investigation and provision of cost-effective funding programs and financial incentives.</b>
Spatial extent & key LGAs	Location varies, refer to each sub-action for details.
<b>Sub-action</b>	<b>Progress on deliverables</b> <i>Deliverables listed below in bold are taken directly from the Strategy's implementation plan.</i>
1.3.1 <i>In progress</i>	<p><b>Research and monitoring programs for innovative new techniques in oyster reef restoration.</b></p> <p>DPI Fisheries has developed strategic research collaborations to help identify restoration methods specific to NSW. Collaborations include:</p> <ul style="list-style-type: none"> <li>• Working with Southern Cross University regarding research on Leaf Oysters in northern NSW as a possible future subtidal native reef forming species.</li> <li>• Working with University of Newcastle using e-DNA to determine species using oyster reefs in Port Stephens.</li> <li>• Contributing to University of NSW's work on aspects of oyster reef restoration constraints, benefits and methodology.</li> <li>• Assisting with research on novel substrates for creating oyster reefs with Macquarie University in numerous estuaries along the NSW coast.</li> </ul> <p>Pre and post monitoring of the Port Stephens reef restoration sites also continues.</p> <p>Contact: <a href="#">Kylie Russell</a> – DPI Fisheries, <a href="#">Victoria Cole</a> (research lead) – DPI Fisheries</p>
1.3.1 <i>In progress</i>	<p><b>Oyster reef restoration</b></p> <p>The first large scale oyster reef restoration project in NSW has been completed in Port Stephens, with one hectare of hard substrate deployed at two locations (Myall and Karuah River mouths), using 3,300T of rock and 180m<sup>3</sup> of recycled oyster shell. Monitoring is continuing but oyster settlement had begun within weeks of the rock being deployed. The International Conference on Shellfish Restoration in</p>

	<p>Nelson Bay was postponed from March to December 2020 due to Covid-19. Mapping remnant reefs in priority estuaries, historical study, community engagement and education (particularly oyster industry and recreational fishers), planning for further works (regional and metro) and assisting with a range of collaborative research projects is progressing in many locations along the coast. Advice for councils to consider oyster reef restoration in CMPs was developed and is available on the marine estate <a href="#">website</a>. The project is generally on track. More information about this project and regular updates on progress can be found <a href="#">here</a>.</p> <p><i>Contact: <a href="#">Kylie Russell</a> – DPI Fisheries</i></p>
<p>1.3.2 1.3.4 1.3.6 <i>In progress</i></p>	<p><b>On-ground works in priority locations that will result in water quality improvements over time.</b></p> <p>Local Land Services (LLS) in the North Coast (NC), Hunter (H) and South East (SE) regions are leading this two-year project to reduce diffuse pollutants entering the marine estate by:</p> <ul style="list-style-type: none"> <li>• undertaking riparian revegetation, bush regeneration and stock control fencing to buffer against nutrient and sediment run-off.</li> <li>• upgrading unsealed roads to reduce sediment loss into adjacent waterways.</li> <li>• constructing instream erosion control works to stabilise vulnerable riverbanks.</li> </ul> <p>For more information:</p> <ul style="list-style-type: none"> <li>• <a href="#">Reducing water pollution fact sheet</a></li> <li>• <a href="#">Reducing water pollution – putting strategy into action</a></li> </ul> <p><b>1.3.2 Riparian vegetation improvements &amp; stock fencing</b></p> <p>The combined area of riparian native vegetation enhanced/rehabilitated in year two so far is 70.78 hectares spread over 39 kilometres of riverbank. All projects are progressing well.</p> <p><b>NC LLS:</b> The on-ground works in the north coast region have had some delays due to the bushfires earlier in the year but are now back on track. Riparian enhancement works have been undertaken, predominantly with macadamia farmers and Ballina Shire Council managed land along 25 kilometres of</p>

streamline / 50 hectares of riparian area within Emigrant Creek catchment. This has resulted in 6.8 hectares of riparian zone protected from stock by fencing and 20 hectares/10 kilometres of riparian zone planted with native species. Works continue to compliment the work of sub-action 1.3.3 (Clean Coastal Catchments) of erosion control mapping and on ground works where possible. Ballina Council sites are negotiated directly with council and includes ongoing maintenance of sites.

**H LLS:** H LLS, in partnership with MidCoast Council and Landcare Australia funding, have assessed and approved eight projects in The Branch section of the Karuah river to further enhance the outputs and outcomes of the Strategy program. Agreements have been negotiated with the landholders and works are currently being implemented to secure protection of 270 hectares of estuarine wetlands. H LLS has also negotiated a further 23 Land Management Agreements with landholders to fence off and protect riparian vegetation on the Karuah River, Wallis Lake, Myall River, Wallamba River, Lansdowne River and the Manning estuary.

**SE LLS:** In the South East 35 agreements have been contracted to date with another nine under negotiation in the last quarter. For works completed South East have achieved 20 hectares of vegetation being protected and enhanced by fencing along 14 kilometres of stream length, plus another 14 hectares has been planted to date. Works have been undertaken in partnership with private landholders, local government, national parks and local aboriginal land councils.

Locations: MidCoast, Ballina, Bega Valley, Eurobodalla, Shoalhaven, Shellharbour, Kiama and Wollongong council areas.

#### **1.3.4 Bank protection**

The bank management strategy is being trialled in the North East region (see 2.3.3).

**NC LLS:** Soil Conservation Service have constructed 800 metres of works in May. Works include an innovative mangrove embayment approach to erosion control. Works are being undertaken on a priority reach within Emigrant Creek (in the Richmond River).

**H LLS:** HLLS worked with MidCoast Council to deliver protection to North Moto Road and the Lansdowne Riverbank through provision of funding for 70 meter rock revetment, 160 meter rock fillets and construct rock flume to manage eroding mitre drain between the road and river. Work has now been completed for 500 meter of rock fillets on the east side of the Wallamba River with a further 800 metres of rock fillets currently progressing on the west side. This project was delivered in partnership with MidCoast Council and the Soil Conservation Service.

**SE LLS:** In the South East nine agreements have been signed. On-ground works achieved to date have resulted in 475 metres of bank protection using large woody debris, rock work, coir logs and sandbag protection structures. Another 500 metres of bank work is to be completed over the remaining quarter. Works have occurred in the Bega, Wagonga, Pambula, Wapengo, Tomaga and Shoalhaven Catchments.

### 1.3.6 Road improvements

**NC LLS:** NC LLS, via Ballina Shire Council, have completed a total of 11 sites to date resulting in approximately 5650 metres of road surface sealed to reduce sediment input. The estimated road base material conserved and prevented from entering aquatic environments is approximately 1000 tonnes. This work is being done with Ballina Shire Council's road management team under a grant agreement with NC LLS.

**H LLS:** In partnership with MidCoast Council, Hunter LLS has provided for sealing 1400 metres along Burraneer Drive (Wallis Lake). A further 1000 m of sealing has been completed on The Branch Lane with another range of roadworks currently being implemented and hopefully finished by June.

**SE LLS:** In the South East, of the 23 contracted projects 13 sites have been completed to date which includes 1015 metres of sealing, plus an additional 10,000 metres of dirt road upgrades such as drainage repairs. The remaining works are being implemented by local councils and national parks over the final quarter. Projects have occurred in partnership with NPWS, Bega Valley Shire Council, Eurobodalla Council and Shoalhaven Council.

	<p>Contact: <a href="#">Shaun Morris</a> – North Coast LLS, <a href="#">Shannon Brennon</a> - South East LLS, <a href="#">Geoff Le Messurier</a> – Hunter LLS</p>
<p>1.3.3 In progress</p>	<p><b>On-farm improvements</b></p> <p>This action forms part of <a href="#">‘Clean Coastal Catchments’</a></p> <p>Incentive grants have been provided to 50 macadamia farms in the Richmond region for the completion of integrated orchard management works to reduce soil and nutrient loss through erosion. Twelve expressions of interest for incentive grants for blueberry farms around Coffs Harbour were received. Five of these were successful and these farms will undertake a range of on-farm works that will help to improve water, nutrient and erosion management. Councils may be provided updates on these actions through the Blueberry Interagency Committee.</p> <p>Contact: <a href="#">David Cordina</a> – DPI Fisheries, <a href="#">Luke Jewell</a> – DPI Agriculture</p>
<p>1.3.3 In progress</p>	<p><b>Capacity building programs and education campaigns that help land managers reduce their impacts on water quality.</b></p> <p>This action forms part of the <a href="#">‘Clean Coastal Catchments’</a> program.</p> <p>Farming technology trials on two blueberry demonstration farms has progressed and another is expected to be commissioned in Stage 2. The above sub-actions 1.2.11 and 1.2.12 feed into this. Councils may be provided with updates on these actions through the Blueberry Interagency Committee or other fora.</p> <p>Contact: <a href="#">David Cordina</a> – DPI Fisheries, <a href="#">Luke Jewell</a> – DPI Agriculture</p>
<p>1.3.3 In progress</p>	<p><b>Establish a research program that addresses knowledge gaps in nutrient use within intensive agriculture.</b></p> <p>This action forms part of <a href="#">‘Clean Coastal Catchments’</a></p> <p>The Wollongbar Blueberry Nutrition Research Facility is progressing and is due to be commissioned in the final quarter of Stage 1 to enable research trials to commence. Research evidence from these trials will inform fertiliser guidelines for Blueberry production. Soil amendment and erosion research to assess</p>



	<p>the efficacy of a range of erosion treatments to manage soil erosion is well under way and is expected to conclude next quarter.</p> <p>Contact: <a href="#">David Cordina</a> – DPI Fisheries, <a href="#">Luke Jewell</a> – DPI Agriculture</p>
<p>1.3.3 In progress</p>	<p><b>Better understand movement of nutrient and sediment within and from intensive agriculture by establishing a monitoring program.</b></p> <p>This action forms part of the <a href="#">‘Clean Coastal Catchments’</a> program.</p> <p>Water and nutrient monitoring networks are fully operational on five demonstration farms (three blueberry farms and two macadamia farms) and baseline data on the water and nutrient loss pathways in these systems is being collected. Vegetable greenhouse monitoring trial has been completed and a Southern Cross University report has been prepared and soon to be approved for publication.</p> <p>Contact: <a href="#">David Mitchell</a> – DPI Fisheries</p>
<p>1.3.5 In progress</p>	<p><b>Coastal Floodplain Wetland Rehabilitation works</b></p> <p>The focus for the Coastal Floodplain Wetland Rehabilitation project is to develop collaborative projects to reinstate more natural floodplain and wetland hydrology to improve water quality (such as acidic water and water with very low dissolved oxygen) entering estuaries and minimise other key threats and risks to the marine estate. A decision matrix and criteria were developed to ensure project sites and actions that address the most significant threats and risks to the marine estate, and are achievable, are prioritised.</p> <p>A collaboration with NPWS funded the purchase, from a willing seller, of a property adjacent to an existing national park. Private holdings within the same wetland as areas of reserved estate can limit the potential to reinstate a more natural hydrology in the wetland and maximise the environmental values, consequently such purchases and funding of on-ground hydrologic restoration works can lead to permanent improvements in water quality. Hydrologic restoration works were funded at: Tomago Wetlands within the Hunter Wetlands National Park (modelling and retrofitting an existing floodgate to enable tidal flushing) and Tuckean Nature Reserve (modelling).</p> <p>Collaborations have also been developed to progress projects with several local councils: Shoalhaven City Council (modelling completed and planned on-ground works on the Crookhaven River) and Tweed</p>

	<p>Shire Council (modelling and assessment works for a site that causes very poor water quality); and a promising project with Coffs Harbour City Council was not able to progress because the landholder withdrew interest.</p> <p>A collaboration with TfNSW to remediate a wetland in Bellingen Shire Council has been completed the preliminary investigations. The Action also substantially contributions to an ongoing multi-agency and local council project to improve the hydrology of the Clybucca coastal wetlands located in Kempsey.</p> <p>Contact: <a href="#">Patrick Dwyer</a> - DPI Fisheries, <a href="#">Max Osborne</a> – DPI Fisheries</p>
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<b>Action 1.4</b>	<b>Implement a targeted marine litter campaign and establish a Marine Litter Working Group.</b>
Spatial extent & key LGAs	Statewide
Sub-action	<b>Progress on deliverables</b> <i>Deliverables listed below in bold are taken directly from the Strategy's implementation plan.</i>
1.4.1 <i>In progress</i>	<p><b>A targeted marine litter campaign across NSW, supported by targeted campaigns in local litter hotspots. Campaign materials are publicly available to support community and local government action research and information on the effects of marine debris, to inform the development of priority actions for reducing marine litter.</b></p> <p>Leveraging off the existing Don't be a Tosser campaign, the campaign will educate the community on the effects of marine debris, and NSW Litter Program grants will align with the marine campaign to provide resources for practical on-ground litter prevention projects.</p> <p>The marine litter campaign will be delivered across three main components, which will work together to create a strong campaign message.</p> <ul style="list-style-type: none"> <li>• Visual social media campaign that explains how litter impacts marine life.</li> </ul>

	<ul style="list-style-type: none"> <li>• Immersive community engagement experiences that show how litter affects the marine environment.</li> <li>• A public relations campaign that educates the community about the impacts of litter on the health of our marine environment. This will include working with experts and key social influencers.</li> </ul> <p>This campaign was set to start in May 2020. Because of Covid-19, the timeline has been revised, with a new plan to launch in November 2020.</p> <p>The NSW Litter Program will work with relevant local councils to identify media and other opportunities to promote campaign messages into their communities. The campaign materials are publicly available in the online <a href="#">Litter Library</a>.</p> <p><a href="#">Community litter grants</a> and <a href="#">cigarette butt litter grants</a> are now open, closing 28 July 2020. Successful litter grantees are encouraged to align local programs with the upcoming marine litter campaign where appropriate.</p> <p><i>Contact: <a href="#">Rupert Saville</a> – EES</i></p>
<p>1.4.2 <i>In progress</i></p>	<p><b>Research that has identified marine litter priorities and informed the development of marine litter campaigns that raise awareness of the impact of litter on the marine estate, and change behaviours.</b></p> <p>The Marine Debris (Marine Litter) Working Group has been established. The group is composed of agency representatives from DPI, DPIE, NPWS and Taronga Conservation Society, as well as academic and industry experts from various marine debris related fields. Currently, the main objective of the working group is to oversee the application of a marine debris specific threat and risk assessment (assessment), statewide for NSW.</p> <p>The assessment will be the primary output of the working group. The results will be reported to stakeholders and will include a priority ranking of marine debris items. The assessment will be available for use by all stakeholders and levels of government to maximise the benefits of management actions that address the threats imposed by marine debris. The prioritisation will use the results of the assessment to rank types of marine debris by their potential harm to wildlife populations, ecosystems or biodiversity, environmental assets, social, cultural or economic values.</p>

	<p>The results will also include proposed priorities for management intervention to reduce the priority threats identified. This will enable government, at all levels, to identify and prioritise policy and management responses to target the most urgent problems.</p> <p>The threat and risk assessment will be completed in late 2020, after some earlier delays in the formation of the working group. It will direct the Stage 2 of the Marine Litter Working Group’s work, which will aim to address the threats identified, under a proposed grants program. Councils will play an important role in the next stage when addressing the threats, which occur at statewide, regional and local scales (i.e. in council areas). The NSW Government will invite additional collaboration with a variety of additional stakeholders in Stage 2 to enable the greatest remediation of the priority threats identified.</p> <p>Contact: <a href="#">Edwina Foulsham</a> – EES</p>
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<b>Action 1.5</b>	<b>Develop monitoring, reporting and performance indicators for water quality actions, and incorporate them and key knowledge gaps. This action is integrated into the Monitoring Program</b>
Spatial extent & key LGAs	Statewide
<b>Sub-action</b>	<b>Progress on deliverables</b> <i>Deliverables listed below in bold are taken directly from the Strategy’s implementation plan.</i>
1.5.1 <i>In progress</i>	<p><b>Developed indicators for monitoring water quality and ecosystem health.</b></p> <p><b>Commenced reporting on water quality and estuary health results is occurring using a report card system.</b></p> <p>Statistical data is being collected on the physical features of 184 estuaries in NSW, including their size, location, estuary type and entrance condition. The information collected helps to manage estuaries effectively. This data can also provide local councils with advice to help them make land-use planning decisions to better protect estuaries.</p>

	<p>Two indicators have been developed and applied. Both newly captured and the previously captured data, from the last decade, which has been sampled from estuaries monitored by the NSW Government, will contribute to ongoing waterway health monitoring. The indicators support the implementation of the <a href="#">Risk-based Framework</a> (see action 1.1) by assessing whether community values are being met, and enabling monitoring to show whether management actions are protecting community values. They also allow calculation of report card grades to assist communities to understand the condition of their estuaries.</p> <p>The indicators are:</p> <ul style="list-style-type: none"> <li>• algal index – this is relevant to the impacts of nutrients on estuaries</li> <li>• water clarity index – this is relevant to the impacts of sediments on estuaries.</li> </ul> <p>Knowledge gaps relating to additional indicators have been identified and will be addressed in Stage 2 (pending funding). Some of these knowledge gaps are: long term effects of low pH, pesticide monitoring, microbial source tracking, safe seafood metric, estuary fish assemblages, impacts of debris, and the impacts of estuary outflows on coastal waters.</p> <p>All the information, including report card grades, will soon be available as an update to the <a href="#">Estuaries pages</a> on the EES website. The Estuaries pages are being developed as an interactive platform that links the website with the data. These data can also be found on <a href="#">SEED</a> by mid-2020.</p> <p><i>Contact: <a href="#">Peter Scanes</a> - EES, <a href="#">Aaron Wright</a> - EES</i></p>
<p>1.5.1 <i>In progress</i></p>	<p><b>Commenced research and monitoring of water quality and ecosystem health in estuaries and focus catchments.</b></p> <p>As part of the Strategy, EES is delivering a program of monitoring of water quality and estuary health in NSW estuaries. This program provides new data for approximately 40 estuaries every year. EES is working with local government to add additional sites and times to the monitoring program using consistent methods so that the data are compatible with the statewide program and can be analysed in the same way. The methods for sampling and analysis of data are already documented in a <a href="#">report on the</a></p>

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[website](#). We encourage new monitoring programs to be consistent with the methods that are being used for the statewide program as detailed in the published report.

The report identifies indicators that support the implementation of the Risk-based Framework as they provide a measure of whether the estuaries and major tributaries are achieving the community environment values and uses. They help set a benchmark of the extent of land use management needed to improve and/or protect the community values and uses.

Work has occurred with local communities in the Tilba Tilba Lake region. Monitoring methods and indicators are being developed that are appropriate for community application. These will help communities to assess the impacts and benefits from restoration works such as riparian fencing and revegetation.

*Contact: [Peter Scanes](#) - EES, [Aaron Wright](#) - EES*

## Initiative 2: Delivering healthy coastal habitats with sustainable use and development

Taking action to improve the management of foreshore and waterway structures to protect the marine environment. Read more here: <https://www.marine.nsw.gov.au/strategy-implementation/putting-strategy-into-action/delivering-healthy-coastal-habitats-with-sustainable-use-and-development>

*Initiative Lead:*

Marcus Riches (DPI – Fisheries) – [marcus.riches@dpi.nsw.gov.au](mailto:marcus.riches@dpi.nsw.gov.au)

<b>Action 2.1</b>	<b>Assess and manage cumulative and legacy impacts for estuary entrance modification and dredging.</b>
Spatial extent & key LGAs	Statewide
<b>Sub-action</b>	<b>Progress on deliverables</b> <i>Deliverables listed below in bold are taken directly from the Strategy's implementation plan.</i>
2.1.2 <i>In progress</i>	<p><b>Standard engineering drawings and work method statements for practical design features that can be incorporated into maintenance and upgrade works at existing training walls to maximise aquatic habitat and recreational values.</b></p> <p>Breakwaters and training walls are large pieces of coastal infrastructure that fix the position of river entrances or create sheltered harbours. By reducing wave action, directing river flows and sand movement some breakwaters cause other unintended or undesirable impacts. Yet, many breakwaters are important places for residents and visitors. This project gathers information to demonstrate some of those impacts with a literature review that is largely complete.</p>

	<p>The project also contributes to addressing these impacts with development of guidelines highlighting ways for breakwater owners to maximise the benefits from breakwaters and minimise the impacts. An audit of existing breakwater features to determine sites where multi-use and eco features have been incorporated is largely complete. The audit found the diversity of structures and their site-specific nature limited the opportunity to develop standard drawings. Instead, draft guidance notes for breakwater maintenance project managers have been prepared and refined at an expert workshop held in Ballina in March 2020. The majority of breakwaters are owned and managed by the NSW Government. Liaison has occurred with some local councils that own and manage breakwater structures. The final audit report and guidelines will be complete by mid-2020.</p> <p>Contact: <a href="#">Patrick Dwyer</a> – DPI Fisheries</p>
<p>2.1.3 In progress</p>	<p><b>An audit of commercial dredging activities undertaken on Crown land within estuaries and on ocean beaches.</b></p> <p>A Crown land audit of commercial dredging and extraction approvals has been largely completed. Recommendations arising from the audit to contemporise DPIE Crown Lands' processes for issuing and managing commercial dredging and extraction licences will be developed and report finalised. The following councils are affected by this work (i.e. that have a Crown lands commercial dredging authorisation) are: (north - south) Tweed; Lismore; Richmond Valley; Clarence Valley; Coffs Harbour; Bellingen; Nambucca; Kempsey; Port Stephens; Lake Macquarie; Central Coast; Hawkesbury; Shoalhaven; Bega Valley.</p> <p>Contact: <a href="#">Catherine Knight</a> – DPIE Crown Lands</p>

\*Note sub-action 2.1.1 was not funded under the strategy and work has not progressed in Stage 1.



<b>Action 2.2</b>	<b>Assess and manage cumulative and legacy impacts on foreshore development and land use change in the coastal zone.</b>
Spatial extent & key LGAs	Statewide
<b>Sub-action</b>	<b>Progress on deliverables</b> <i>Deliverables listed below in bold are taken directly from the Strategy's implementation plan.</i>
2.2.1 2.2.2 <i>In progress</i>	<p><b>An update to the Coastal Design Guidelines for NSW (2003) to illustrate how an urban design approach can inform development designs and layouts that are more sensitive to the unique natural and urban characteristics of coastal places in NSW, and to guide decision-making about legacy infrastructure in coastal areas.</b></p> <p>2.2.1 and 2.2.2 are focused on the update to the Coastal Design Guidelines for NSW which will include a consideration of issues arising from legacy infrastructure in coastal areas.</p> <p>A review of the <a href="#">2003 NSW Coastal Design Guidelines</a> has now been completed, which included undertaking a gap analysis based on the current legislative framework and best practice in urban design. This review is being used to inform the updated Guidelines. A draft of these Guidelines is expected by mid-2020.</p> <p>Initial comments were sought from all councils in the NSW Coastal zone in late 2019 and further conversations with councils strategic planning departments will inform the update. We can provide information to councils in June 2020 regarding how their feedback has been used to inform the guidelines update.</p> <p>Further comments can be sought through the public consultation process in mid to late 2020.</p> <p>Contact: <a href="#">Phoebe Laing</a> – DPIE PA</p>

<b>Action 2.3</b>	<b>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.</b>
Spatial extent & key LGAs	Richmond River, Clarence River, Hastings River, Macleay River, Tweed River and the North Coast
<b>Sub-action</b>	<b>Progress on deliverables</b> <i>Deliverables listed below in bold are taken directly from the Strategy's implementation plan.</i>
2.3.0 <i>In progress</i>	<p><b>A statewide policy for the management of coastal Crown lands (including submerged lands).</b></p> <p>A draft policy and guidelines have been developed in consultation with marine estate agencies. This policy aligns the management of Crown land with the NSW coastal management framework. It is intended that, once endorsed, this policy will be presented to the NSW Coastal Council.</p> <p>Contact: <a href="#">Catherine Knight</a> – DPIE Crown Lands</p>
2.3.1 <i>In progress</i>	<p><b>Decisions made in accordance with the Coastal Management Program and planning framework to improved coordination in assessment and compliance.</b></p> <p><b>Eight estuary-wide foreshore management strategies that reduce red tape for proposals consistent with the strategies.</b></p> <p>Developing estuary wide domestic Foreshore Structure Strategies will guide and streamline future applications for domestic developments along foreshores (such as pontoons and boat ramps) within estuaries throughout NSW.</p> <p>Currently, domestic foreshore structure proposals are assessed on an ad-hoc basis. Foreshore Structure Strategies will amalgamate all existing legislation, policy and guidelines associated with the current ad-hoc assessment of domestic foreshore structures to form a strategic, upfront method of determining whether domestic foreshore structures would be permitted along the foreshore of the estuary.</p>

	<p>The development of Foreshore Structure Strategies will be undertaken by the Interagency Working Group consisting of DPI Fisheries, DPIE Crown Lands, EES, NRAR, TfNSW, DPIE PA and relevant local councils. Foreshore Structure Strategies will utilise a robust, repeatable and defensible mapping process to assess the entire foreshore of an estuary and then colour code it red, amber or green which will clearly show proponents and assessment agencies where domestic foreshore structures would, may and would not be allowed.</p> <p>A pilot Foreshore Structure Strategy is currently being developed for the lower Richmond River estuary within the Ballina Shire Council LGA. The pilot Lower Richmond River Foreshore Structure Strategy will consist of a map (to be located online) and a companion booklet component. It is anticipated that the Lower Richmond River Foreshore Structure Strategy will be ready for endorsement by the Interagency Working Group by mid-2020.</p> <p>Additional Foreshore Structure Strategies to be developed in the Brunswick after completion of the Lower Richmond River pilot. Interagency working groups have been established for, and include relevant councils for the Tweed River, Clarence River, Nambucca River, Macleay River, Bonville Creek and St Georges Basin.</p> <p>This project is on track for delivery in the Lower Richmond and Brunswick River. Currently working with Ballina Shire Council and Byron Shire Council on draft maps and companion booklet. This project has experienced delays due to unanticipated mapping issues associated with new software and capabilities of mapping layers and limitations associated with Covid-19. Discussions with Council on reference Foreshore Structure Strategies in CMPs is ongoing.</p> <p><i>Contact: <a href="#">Jonathan Yantsch</a> - DPI Fisheries, <a href="#">Emma Wilkie</a> - DPI Fisheries, <a href="#">Hayley Leczkowski</a> - DPI Fisheries</i></p>
<p>2.3.2 <i>In progress</i></p>	<p><b>Two estuary-wide intertidal marine vegetation management strategies to improve management of the threats and risks that are: cumulative, take some time to become evident, and are remote from the activity.</b></p> <p>Intertidal marine vegetation (mangroves and saltmarsh), known as macrophytes, provide many valuable services that contribute to community wellbeing in the coastal zone and beyond. These systems are important for fisheries production, foreshore protection, biodiversity values and carbon sequestration.</p>

They also provide cultural and social values. Yet many of these systems are degraded due to current and legacy anthropogenic impacts. Furthermore, because of their location in the intertidal macrophytes and the services they provide are vulnerable to sea level rise impacts.

A methodology has been developed to model macrophyte potential now and in the future. The model is being applied to the Richmond and the Tweed estuaries to inform planning and management decisions, via marine vegetation strategies, to maximise the values these systems provide. The methodology use GIS to identify macrophyte potential in estuaries based on:

1. geomorphic condition in landscape
2. anthropogenic impacts we have on these areas
3. maps indicating the vulnerability of tidal wetlands to sea level rise (Strategy sub-action 3.1.1).

Draft estuary specific models for the Richmond and Tweed estuaries will be complete by mid-2020. These models will inform further consultation with Tweed Shire Council and the relevant councils in the Richmond River estuary, to be undertaken in the second half of 2020, to enable completion of marine vegetation strategies for those estuaries. Local councils provided key GIS layers to inform some of the anthropogenic impacts have been incorporated into the estuary specific models.

These model outputs including other outputs such as the proximity of marine vegetation to existing reserved estate areas and potential sites for the most effective intertidal macrophyte offsets.

A collaboration with the University of Wollongong to undertake a first pass assessment of blue carbon storage, preservation, generation and permanency for NSW.

Pending on Stage 2 funding, our priority areas have been chosen based on some of the key threats on intertidal marine vegetation. This include several estuaries on the NSW South Coast.

Contact: [Patrick Dwyer](#) – DPI Fisheries, [Emma Asbridge](#) – DPI Fisheries

2.3.3  
*In progress*

**Three bank management strategies that reduce red tape for proposals and prioritise environmentally friendly approaches.**

Developing estuary wide Bank Management Strategies will reduce red tape and prioritise environmentally friendly approaches to foreshore bank management proposals within estuaries throughout NSW.

Development of Bank Management Strategies will be undertaken by the Interagency Working Group consisting of DPI Fisheries, DPIE Crown Lands, EES, NRAR, TfNSW, DPIE PA and relevant local councils.

Development of Bank Management Strategies will incorporate an investigation into causes and types of estuarine bank erosion and a review of existing best management practice bank treatment options. It will then match common types of erosion with preferred best management practice treatment methodologies, with the outcome of this step being the creation of a decision support tool.

The decision support tool will be a robust, repeatable and defensible tool which will be applied to the relevant estuary to create a Bank Management Strategy. The resulting Bank Management Strategy, which will consist of online mapping and an explanatory companion document, will provide a strategic, upfront guide that specifies the best practice erosion control treatment method for a particular segment of foreshore within the estuary. This Bank Management Strategy can be used by land owners proposing erosion control treatment works and assessing agencies to determine the most environmentally friendly erosion control treatment approach.

Pilot Bank Management Strategies are currently being developed for the Tweed and Brunswick Rivers within the Tweed and Byron Shire Council LGAs respectively. It is anticipated that these pilot Bank Management Strategies will be ready for endorsement by the Interagency Working Group in mid to late 2020. DPI Fisheries is currently reviewing the decision support tool with testing and validation of the tool being undertaken both by desktop and in the field (Tweed River). Field testing of tool will begin in Brunswick River in late May. Discussions with Council on reference Bank Management Strategies in CMPs is ongoing.

Upon completion of the pilot Bank Management Strategies (pending Stage 2 funding), additional Strategies are planned to be developed for the Nambucca River, Bellingen and Kalang Rivers, Macleay River, Clarence River, Manning River, Hawkesbury River, Parramatta River, Hunter River, Shoalhaven

	<p>River, Clyde River and St Georges Basin. Relevant councils will be notified, and Interagency Working Groups will be formed for these locations.</p> <p>Contact: <a href="#">Jonathan Yantsch</a> - DPI Fisheries, <a href="#">Emma Wilkie</a> - DPI Fisheries, <a href="#">Hayley Leczkowski</a> - DPI Fisheries</p>
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<b>Action 2.4</b>	<b>Re-establish resilient coastal floodplains and connectivity within coastal catchments.</b>
Spatial extent & key LGAs	Statewide focus; Richmond & North Coast, Singleton.
Sub-action	<b>Progress on deliverables</b> <i>Deliverables listed below in bold are taken directly from the Strategy's implementation plan.</i>
2.4.1 <i>(see also 1.2.7)</i> <i>In progress</i>	<p><b>A collaborative, multi-agency approach to coastal and floodplain management that provides for improved economic, social and environmental resilience across these landscapes.</b></p> <p>The interagency working group is meeting regularly and considering a variety of options to reduce the complexity of coastal floodplain infrastructure management, balanced with improved water quality outcomes, through regulatory change (see sub-action 1.2.7). Agencies involved in the project include DPIE Water, DPIE Crown Lands, DPIE PA, DPI Fisheries, NRAR and EES (EPA, Biodiversity Conservation). The group is also facilitating collaborative work and ease of interagency communication and input into to a range of other projects occurring under Initiative 2, such as the foreshore structure, marine vegetation and bank management strategies and updated coastal design guidelines.</p> <p>Contact: <a href="#">Kylie Russell</a> – DPI Fisheries</p>
2.4.2 <i>In progress</i>	<p><b>Fish passage works planned or completed at priority barriers in coastal rivers.</b></p> <p>DPI Fisheries is currently undertaking remediation of two high priority coastal fish passage obstructions. These are on track for delivery by the end of 2020 calendar year.</p>

	<p>Priority sites have been identified in Tweed Shire, Byron Shire, Kyogle, Lismore City, Richmond Valley, Clarence Valley, MidCoast, Singleton, Liverpool City, Sutherland Shire, Shoalhaven City, and Eurobodalla Shire. An overview of this is available on the <a href="#">‘re-connecting fish habitats’</a> webpage.</p> <p>Works are under way to design and construct a fishway at Jerrys Plains Weir on the Hunter River in partnership with AGL Macquarie. An online article will be developed for the Jerrys Plains site and will be located on the marine estate website. Initial hydraulic analysis has been completed and fishway design criteria identified in preparation for detailed fishway design. A prefabricated rock ramp fishway is the preferred design. An agreement is in place for works at a second site on the Richmond River.</p> <p>We encourage contact from councils if road crossings or weirs are being investigated for upgrade/replacement to determine if they correspond to identified priority sites.</p> <p><i>Contact: <a href="#">Scott Nichols</a> – DPI Fisheries, <a href="#">Dr Matthew Gordos</a> – DPI Fisheries</i></p>
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<b>Action 2.5</b>	<b>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 will be integrated into the Monitoring Program.</b>
Spatial extent & key LGAs	Statewide
<b>Sub-action</b>	<b>Progress on deliverables</b> <i>Deliverables listed below in bold are taken directly from the Strategy’s implementation plan.</i>
2.5.1 <i>In progress</i>	<b>Statewide assessment of stability and fragmentation of estuarine vegetation over time.</b>

	<p>Since the beginning of Stage 1, maps of estuarine vegetation (seagrasses, mangroves, saltmarshes) have been completed for the following estuaries (north to south): Wallis Lake, Pittwater, Port Jackson, Lake Illawarra, Lake Conjola, Burrill Lake, Wagonga Inlet.</p> <p>Preliminary habitat maps have been prepared for Botany Bay, Minnamurra River, Jervis Bay, St. Georges Basin and are pending field validation (delayed due to Covid-19 travel restrictions).</p> <p>The most recent habitat maps for each estuary are available on the <a href="#">Fisheries NSW Spatial Data Portal</a>.</p> <p>Estimates of habitat fragmentation will be develop for the above estuaries in Stage 2 and will be made available together with summaries of change in habitat areas over time.</p> <p>Contact: <a href="#">Tim Glasby</a> – DPI Fisheries</p>
<p>2.5.2 In progress</p>	<p><b>New methods for assessing condition of vegetation using remote sensing.</b></p> <p>Methods for estimating condition of mangroves are being trialled in Port Stephens using multispectral satellite and drone imagery. Methods for discriminating different species of saltmarsh and mangrove plants are also being developed.</p> <p>Contact: <a href="#">Tim Glasby</a> – DPI Fisheries</p>
<p>2.5.3 In progress</p>	<p><b>Maps of pressures on estuarine habitats.</b></p> <p>A method for mapping artificial structures in estuaries (pontoons and jetties) is being developed. One map is available for Pittwater which can be made available on request. Once maps are available for other estuaries they will be uploaded to the <a href="#">Fisheries NSW Spatial Data Portal</a>. The extent of damage to mangroves and saltmarshes from the 2019/2020 bush fires is currently being prepared for all affected estuaries. The fire-affected south coast estuaries are: Berrara Creek, Narrawallee Inlet, Burrill Lake, Tabourie Lake, Durras Lake, Clyde River, Tomaga River, Candlagan Creek, Twofold Bay and Wonboyn Lake. North coast estuaries include: Wallis Lake, Khappinghat Creek, Manning River, Camden Haven, Lake Innes and Lake Cathie.</p> <p>Contact: <a href="#">Tim Glasby</a> – DPI Fisheries</p>



## Initiative 3: Planning for climate change

Understand, adapt and increase resilience, to help mitigate the impacts of climate change on the NSW marine estate. Taking action to identify marine environments and species at threat from climate change. Read more here:

<https://www.marine.nsw.gov.au/strategy-implementation/putting-strategy-into-action/planning-for-climate-change>

*Initiative Lead:*

Melinda Coleman (DPI Fisheries) – [Melinda.coleman@dpi.nsw.gov.au](mailto:Melinda.coleman@dpi.nsw.gov.au)

*Due to funding constraints in Stage 1, the investment in climate change was substantially limited to research and monitoring (actions 3.1 and 3.5 only). The commencement of the remaining actions is dependent on Stage 2 funding.*

<b>Action 3.1</b>	<b>Enhance mapping of estuarine communities (such as saltmarsh and mangroves) to identify those communities most at threat from sea level rise expected under 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.</b>
Spatial extent & key LGAs	Statewide
<b>Sub-action</b>	<b>Progress on deliverables</b> <i>Deliverables listed below in bold are taken directly from the Strategy's implementation plan.</i>
<b>3.1.1</b> <i>In progress</i>	<b>Maps indicating the vulnerability of tidal wetlands to sea level rise.</b>  Action 3.1 is focused on predictive modelling based on mapping from action 2.5.  First pass predictive modelling has been tested in eight estuaries; Manning River, Wallis Lake, Hawkesbury River, Tilba Lake, Tweed River, Lake Macquarie, Port Hacking and Lake Conjola.

	<p>Predictive maps of future wetland distribution have been completed for all estuaries with significant wetlands north of the Manning River and are being generated for estuaries between the Manning River and Sydney for completion mid-2020. Stage 2 will refine the above work. This work will be shared with councils via an online spatial data package through SEED.</p> <p>The following resources have been used to inform this work:</p> <ul style="list-style-type: none"> <li>• <a href="#">NSW Estuary Tidal Inundation Exposure Assessment Report</a></li> <li>• <a href="#">A Regional Scale Approach to Assessing Current and Potential Future Exposure to Tidal Inundation in Different Types of Estuaries</a></li> <li>• <a href="#">Mapping the habitats of NSW estuaries</a></li> </ul> <p>Contact: <a href="#">Tim Glasby</a> – DPI Fisheries, <a href="#">Michael Hughes</a> – EES</p>
<p>3.1.1 <i>In progress</i></p>	<p><b>Method for prioritising sites for potential future protection.</b></p> <p>This project is using data on previous losses of intertidal wetland habitat and predicted future losses due to sea level rise. As such, it will be progressed when results of the first pass assessment described above are available for all NSW estuaries, pending Stage 2 funding. This project will be integrated with Action 2.3.2 (marine vegetation management strategies).</p> <p>Contact: <a href="#">Tim Glasby</a> – DPI Fisheries</p>

<p><b>Action 3.5</b></p>	<p><b>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 Marine Integrated Monitoring Program.</b></p>
<p>Spatial extent &amp; key LGAs</p>	<p>Statewide</p>

<b>Sub-action</b>	<b>Progress on deliverables</b> <i>Deliverables listed below in bold are taken directly from the Strategy's implementation plan.</i>
<p>3.5.1 <i>In progress</i></p>	<p><b>Research and monitoring programs to fill knowledge gaps and assess the condition of key habitats within the marine estate.</b></p> <p>Subtidal monitoring of entire state has been completed and baseline data secured. A presentation on the results of the statewide baseline was given at the 2019 NSW Coastal Conference. Additional knowledge gaps have been filled and monitoring done. Two peer reviewed scientific papers are publicly available:</p> <ul style="list-style-type: none"> <li>• <a href="#"><u>Environmental drivers and indicators of change in habitat and fish assemblages within a climate change hotspot</u></a></li> <li>• <a href="#"><u>Costs and benefits of towed videos and remotely operated vehicles for sampling shallow reef habitats and fish</u></a></li> </ul> <p>This is the first two years of a ten year monitoring program. Long term data is required to robustly detect change.</p> <p>Various smaller projects are under way to fill priority knowledge gaps relating to climate change. Any data will be communicated and published once research is complete. Much of this will feed into the Marine Integrated Monitoring Program, and the other sub-actions within Initiative 3 which begin in Stage 2 (pending funding).</p> <p>Contact: <a href="#"><u>Melinda Coleman</u></a> – DPI Fisheries</p>

# Appendix A. Strategy and CMP integration contacts

