Clarence River Estuary

Coastal Management Program
Stage 1: Scoping Study

Volume 2: Appendices

Final Draft Report

August 2022

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Acknowledgement of Country:

Clarence Valley Council and Hydrosphere Consulting acknowledge the Yaegl, Bundjalung and Gumbaynggirr peoples, Traditional Custodians of the lands discussed in this report and pay tribute and respect to the Elders both past and present and emerging of these nations.

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CLARENCE RIVER ESTUARY COASTAL MANAGEMENT PROGRAM STAGE 1: SCOPING STUDY

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APPENDIX 1 RELEVANT STATE, REGIONAL AND LOCAL MANAGEMENT PLANS

This Appendix provides a summary of management plans relevant to catchment, estuary and coastal management in the study area. References, glossary and abbreviations are included in Volume 1.

1. STATE AND REGIONAL PLANS

Plan	Relevance to the CMP for the Clarence River Estuary
NSW Plans and Strategies	
Marine Estate Management Strategy	The *Marine Estate Management Strategy 2018-2028* (MEMS, MEMA, 2018) provides an overarching strategic approach to the coordinated management of the NSW marine estate i.e. the coastal waters, estuaries, lakes, lagoons and coastal wetlands. The Strategy considers the ten MEMA management principles as well as priority threats for the marine estate as identified in the NSW marine estate TARA (BMT WBM, 2017). The Strategy sets out nine initiatives and a set of associated objectives and key actions to address these priority threats and seeks to balance economic growth, use and conservation of the marine estate. This Scoping Study considers the key state-wide threats as well as priority threats to environmental assets and to social, cultural and economic benefits for the North Region as identified in the TARA. In developing strategies and actions for the CMP, the principles and management initiatives of the MEMS will be considered and any alignment identified.
NSW Maritime Infrastructure Plan 2019-2024	The NSW Maritime Infrastructure Plan (Transport for NSW, 2018) sets out a strategic and coordinated approach to prioritising and delivering maritime infrastructure in NSW. The aim is to maximise the benefits of investment in maritime infrastructure for recreational and commercial boaters, including the commercial fishing, aquaculture and tourism sectors and provide certainty to industry. The emphasis of this Plan is on regional ports managed by the state and other significant coastal waterways that support strategically important boating activity amongst commercial fishing and aquaculture businesses, recreational boaters and tourism. The plan identifies key opportunities, emerging trends and user needs of the boating sector and considers waterway user activity, existing infrastructure and broader economic performance at locations along the NSW coast. Key investment locations include the Clarence River.
Coastal Dredging Strategy	The NSW Coastal Dredging Strategy 2019 – 2024 (DPIE, 2019a) outlines waterway user benefits and other expected favourable outcomes, state-wide priority dredging preferences over the next 2 years, environmental and statutory approvals and funding need to maintain healthy and accessible waterways in NSW. The strategy identifies the state government as being responsible for the dredging of navigational channels in key investment locations identified in the NSW Maritime Infrastructure Plan (Transport for NSW, 2018) and in navigational channels providing access to state owned maritime infrastructure, while councils maintain other navigational channels (i.e. local waterways). The strategy identifies dredging in the lower Clarence River, specifically the entrance channels to Iluka and Yamba boat harbours with nourishment potential on Whiting Beach as a key investment opportunity.

Plan	Relevance to the CMP for the Clarence River Estuary
Regional plans	
North Coast Regional Plan 2036	The North Coast Regional Plan 2036 (NSW Government, 2017) will guide the NSW Government's land use planning priorities and decisions to 2036. The Plan recognises the spectacular environment and vibrant communities of the region. The regional priority identified in the plan for the Clarence Valley and relevant to the coastal zone is to identify opportunities to expand nature-based, adventure and cultural tourism by leveraging Clarence Valley's natural and heritage assets. Housing in Yamba is identified to support housing growth. Other relevant priorities identified are to protect the Clarence River and regionally important farmland in the Clarence, Nymboida and Orara Valleys, which support local aquaculture and agriculture ventures and recreation and tourism activities.
North Coast Regional Strategic Weed Management Plan (2017 - 2022)	North Coast Local Land Services has developed the North Coast Regional Strategic Weed Animal Management Plan (NCLLS, 2021a) to provide a basis for a co-operative and co-ordinated approach to weed management on the North Coast. The plan focuses on managing weeds to improve the region's biosecurity. The vision of the plan is to protect the North Coast's environment, landscape, livelihood, cultural and lifestyle values from weeds by strengthening the sustainability of the natural environment, primary industries, and local communities in the region. The plan outlines a framework and range of priorities and actions to achieve the plans vision, goals and objectives. The general focus of the plan is about community support and fostering relationships between management partners.
North Coast Local Strategic Plan 2021 - 2026	North Coast Local Land Services has developed the North Coast Local Strategic Plan 2021 - 2026 (NCLLS, 2021b) to ensure that it is meeting its mission of improving primary production and better management of natural resources across the North Coast region. The plan outlines the flagship programs and core services and identifies the opportunities, risks and threats to the North Coast and considers how the NSW strategies, plans and frameworks will help address and inform the best services and programs to achieve local purpose, aims and priorities.
North Coast Regional Strategic Pest Animal Management Plan (2018 - 2023)	North Coast Local Land Services has developed the North Coast Regional Strategic Pest Animal Management Plan 2018 – 2023 (NCLLS, 2018). The purpose of the plan is to protect the economy, environment and community, through strategic management of the region's pest animals. The plan outlines how government, industry and the community can work together and share the responsibility to prevent, eradicate, contain or manage pest animals to achieve a balance in economic, environmental and social outcomes. The plan identifies regional priority pest animal species and goals and activities to manage them. Priority species relevant to the CMP study area include cane toads, feral cats, feral goats, wild deer, wild horses, wild dogs, foxes, wild horses and feral pigs.

Plan	Relevance to the CMP for the Clarence River Estuary
Draft Regional Water Strategy North Coast: Strategy	The Draft Regional Water Strategy North Coast: Strategy (DPIE, 2021a) was developed with the latest climate evidence to plan and manage the water needs of the region over the next 20 – 40 years. The plan encompasses the LGAs of Clarence Valley, Coffs Harbour, Kempsey, Armidale, Bellingen, Port Macquarie – Hastings and Nambucca Valley across Anaiwan, Biripi, Bundjalung, Dunghutti, Githabul, Gumbaynggirr and Yaegl Nations. The strategy aims to conserve and enhance the environment, support the economy and encourage community engagement. Directions and actions are listed in the plan to support key goals. The strategy reviews climate modelling, existing plans and studies to expand on existing NSW Government commitments. New options are detailed, and steps are outlined around finalising and implementing the strategy. Following consultation on the draft strategy (DPIE, 2021a), the NSW Government released a consultation paper and shortlisted actions in May 2022 (DPE, 2022a). Key challenges for the region were identified as: • Declining catchment and river health. • Aboriginal people's rights and access to water. • Competition for low flows. • Water security for North Coast region industries. • Saltwater intrusion into freshwater sources. • Water availability for North Coast towns and communities. The draft strategy includes three regional priorities and shortlist of proposed actions to support these priorities (DPE, 2022). The are many overlaps between the proposed actions and the CMP for the Clarence River Estuary and some actions in the Regional Water Strategy (DPE, 2022b) recognise the need to address these overlaps although the implementation plan, timing, funding and responsibilities have not yet been developed. The strategy is expected to be finalised following consultation on the draft strategy in 2022.
Integrated Forestry Operations Approvals	Integrated Forestry Operations Approvals (IFOAs) under the Forestry Act 2012 set environmental rules for how forestry operations can be carried out in State Forests and Crown Timber Lands in NSW. The Coastal IFOA (combining the previous plan for the Upper North East with other coastal NSW regions) includes new rules to protect plants, animals, ecosystems, soils and waterways during native forestry operations on State Forests. These include minimum standards to preserve important wildlife habitat, which will be complemented by existing protected areas such as habitat corridors, old growth forest, rainforests, streams and wetlands. The EPA regulates Forestry Corporation of NSW's compliance with the IFOAs.
Private Native Forestry Plans	Private native forestry (PNF) is the management of native vegetation on private property for sustainable logging and timber production. Harvesting timber for the purposes of PNF requires approval through a private native forestry plan (PNF Plan). A PNF Plan is a legally binding agreement between a landholder and Local Land Services (LLS). Once a PNF Plan is entered into landholders must conduct PNF operations in accordance with the minimum operating standards set out in the PNF Codes of Practice. The EPA is responsible for monitoring compliance with the PNF Plan and relevant PNF Code of Practice and undertaking associated enforcement activities.

2. LOCAL PLANS AND STRATEGIES

Integrated Planning and Reporting

The IP&R framework is established under Chapter 13 of the *Local Government Act 1993* and is the main mechanism by which councils comprehensively plan for, and report on, their asset management and service delivery responsibilities within a local government area. The *Coastal Management Act 2016* requires that CMPs are given effect through the IP&R framework. This will include performance auditing powers to ensure that programs are appropriately implemented. This means that CMPs and identified coastal management activities are aligned with broader community strategic plans, reflect community priorities and are feasible, financially viable and able to be resourced.

The Clarence Community Strategic Plan (CSP, *The Clarence 2027*, CVC, 2017) was developed after extensive public engagement and reflects the community's aspirations and sets the broad parameters that guide decision making until 2027. The delivery program sets out what is to be achieved over four years and the operational plan details projects that are to be completed each year (Figure 1).

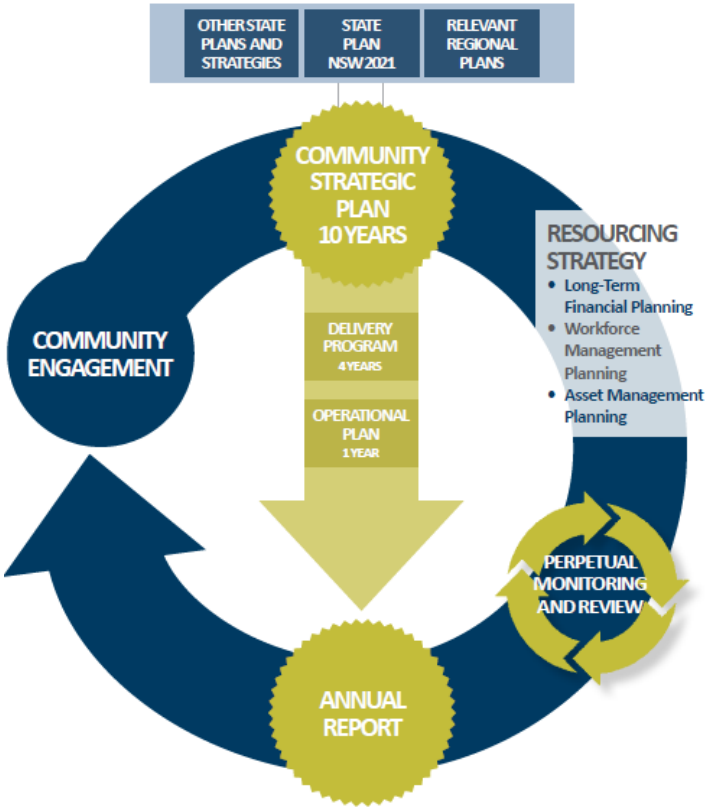


Figure 1: Clarence Valley Council's IP&R Framework

Source: CVC (2017)

Protection of wetlands, natural environment and wildlife was flagged as a key opportunity for attention in the community consultation undertaken during development of the CSP. Beach access and river access were seen as Council's strengths.

The CSP will assist in guiding the development of the CMP for the coastline and estuaries. The CSP Vision and Mission are:

- Vision: To make the Clarence Valley a community full of opportunity.

- Mission: To plan and deliver services valued by the community.

Within the Environment theme, objectives, strategies and actions relating to coastal management are summarised in Table 1.

Table 1: CSP, Delivery Program and Operational Plan objectives, strategies and actions

Strategies	Actions	KPI / Milestone / Statistics
Objective 4.1 – To preserve and enhance our natural environment:		
Strategies 4.1.1 Managing our coastal zone, waterways, catchments and floodplains in an ecologically sustainable manner.	Prepare CZMPs, and Floodplain Management Plans	Number of programs and plans prepared Number of floodplain works completed
	Conduct water quality and water use education activities	Number of projects implemented
Strategy 4.1.2 Promoting sustainable natural resource management.	Protect and maintain Council reserves	Rehabilitated 100 ha of Council reserves
	Implement control of biosecurity matter (weeds)	Targeted Weeds Action Program (WAP) created
	Bush regeneration activities	857 km of high risk corridors treated and controlled
	Deliver native flora and fauna education activities	Response to requests for improved threatened species management
Objective 4.2 - To foster a balance between development and the environment considering climate change impacts		
Strategy 4.2.2: Plan, resource and respond to natural hazards and disasters taking into account impacts from climate change.	Implement Biodiversity Strategy and Bush Fire Risk Management Plan activities	Biodiversity Strategy priority actions implemented including design an assessment process to review compliance, Roadside Vegetation Management Plan
Strategy 4.2.4: Promote and encourage sustainable and innovative agricultural practices.	Develop and implement water efficiency plans	Annual water consumptions level maintained through ongoing community education
Strategy 4.2.5: Educate the community, business and industry about sustainable practices in the home, at work and in public places	Facilitate multiple learning events to deliver education programs	Over 50 environmental learning events per year with more than 1000 attendees

Source: CVC (2021a)

Local Strategic Planning Statement

The CVC *Local Strategic Planning Statement* (LSPS, CVC, 2020e) sets the direction for land use planning in the Clarence Valley for the next 20 years. It includes priorities to manage growth and development, protect the environment and the character of spaces and places, and actions that Council will work on with the

community to achieve its vision. Priorities within the statement relevant to the development of the CMP include:

- Plan for a growing population and provide safe, healthy resilient and sustainable places for communities to grow.
- Preserve and enhance the local character and heritage of diverse places and communities.
- Enable the development of industrial and employment land and the movement of freight and goods.
- Protect agricultural land and increase opportunities for access to locally produced fresh food and economic growth.
- Promote the growth of sustainable tourism.
- Preserve and enhance the natural environment.
- Encourage ecologically sustainable development.
- Plan for safer, more disaster resilient communities.

Local Environmental Plan and Development Control Plans

The Clarence Valley Local Environmental Plan (LEP) 2011 makes local environmental planning provisions for land in Clarence Valley in accordance with the relevant standard environmental planning instrument under section 3.20 of the *Environmental Planning and Assessment Act 1979*. The LEP also includes local provisions for development on land subject to riverbank erosion (Part 7, Clause 7.6 of the LEP):

7.6 Development on land subject to riverbank erosion

(1) The objectives of this clause are as follows -

(a) to avoid significant adverse impacts on development and the environment as a result of riverbank soil erosion,

(b) to ensure land uses are compatible with riverbank erosion processes and risks.

(2) This clause applies to land identified as "Riverbank Erosion Area" on the Riverbank Erosion Planning Map.

(3) Development consent must not be granted to the carrying out of any development on land to which this clause applies unless the consent authority is satisfied that -

(a) the proposed development is not likely to adversely affect, or be adversely affected by, riverbank erosion, and

(b) the development is designed, sited and will be managed to avoid any adverse environmental impact from exposure to riverbank erosion or, if that impact cannot be avoided, after having taken into consideration feasible alternatives, the development is designed, sited and will be managed to minimise that impact or to mitigate that impact if that impact cannot be minimised, and

(c) there is no immediate threat to any building from riverbank erosion, and

(d) provision has been made for the relocation, modification or removal of the development if required as a result of a threat to the development from riverbank erosion.

The Riverbank Erosion Planning Map identifies some areas of erosion risk within the study area.

DCPs provide detailed planning and design guidelines to support the planning controls in the LEP. The *Residential Zones DCP 2011* (CVC, 2011a) requires consideration of the NSW Coastal Policy and *NSW Coastal Design Guidelines* (Coastal Council of NSW, 2003). Development in the coastal zone must comply with the principles of the NSW Coastal Policy. Development within the coastal zone in Clarence Valley LEP 2011 requires consideration of a number of matters related to access, impacts on coastal processes and the scenic and visual impacts of proposed development in the coastal zone before granting consent to development. The *NSW Coastal Design Guidelines* must also be considered in the design of new buildings and additions in areas within the coastal zone.

Rural Lands Strategy (Draft)

The CVC *Rural Lands Strategy* (draft for public exhibition, Localé Consulting, 2022a; 2022b) will provide a framework for managing growth, change and development of rural land in the Clarence Valley to the year 2041 (a 20-year timeframe). It seeks to address and pre-empt a range of issues including land-use conflict and sustainability while incorporating social, cultural, economic and environmental values. Focus areas are:

1. Facilitate effective land use planning for rural areas.
2. Elevate the importance of rural lands within Council and the community.
3. Engage with government and industry to leverage support.
4. Develop supporting infrastructure that enables opportunities.

Many of the recommendations in the draft Strategy are consistent with the CMP objectives and will assist in improving management of the coastal zone.

Coast and Estuary Management Plans

The following plans will be consolidated into the CMP for the Clarence River Estuary:

- *Clarence River Estuary Management Plan* (Umwelt, 2003).
- *Coastal Zone Management Plan for Wooloweyah Lagoon* (White, 2009a).
- *Broadwater Clarence Estuary Plan of Management* (Department of Environment and Conservation, 2006).
- *Management Options for the Shark Creek Drainage System* (Foley, 2009).
- *Identification and Assessment of Potential Improvements in Land & Water Management of the Swan Creek System (Working Paper and Management Plans)* (Robert J Smith & Associates, 2000).
- *Management Plan for Micalo Island* (DPI, 2006a).
- *Ulmarra Riverbank Management Plan* (CRCC, 2000).
- *Woodford Dale Riverbank Erosion Management Plan* (Gary Blumberg and Associates, 2004).

- *Little Broadwater Management Plan* (DPI & CVC Floodplain Services, 2006).
- *Riparian Action Strategy* (CVC, 2010b).
- *Palmers Island Riverbank Plan* (Maclean Shire Council, 1995).

Other Relevant Council Plans

- *Riverbank Protection Policy* (CVC, 2019a).
- *Clarence Valley Regional Economic Development Strategy 2018 – 2022* (Department of Premier and Cabinet, 2018).
- *The Biodiversity Strategy 2020-2025* (CVC, 2020d).
- *Clarence Valley Open Space Strategic Plan* (Parkland Environmental Planners & Strategic Leisure Group, 2012).
- *Clarence Valley Council Greenhouse Gas Emissions Reduction and Renewable Energy Targets* (100% renewables, 2018).
- *Clarence Valley Community Energy and Emissions Reduction Strategy* (100% renewables, 2021).

Crown Reserves Plans of Management

- *Generic Plan of Management – Community Land, Crown Reserves and Other Public Places* (CVC, 2021b).
- *Caring For Our Riverside Parks and Reserves: A Strategy for Management Riverside Recreation and Riparian Vegetation* (Succession Planning, 2009).
- *Grafton Waterfront Precinct Plan of Management* (CVC, 2021c).
- *Theo Tulk Reserve Plan of Management* (CVC, 2006).
- *Plan of Management Ferry Park Reserve* (CVC, 2020b).
- *Lake Kolora Plan of Management* (Maclean Shire Council, 2004b).

National Park Plans of Management

The *National Parks and Wildlife Act 1974* requires that a plan of management be prepared for each National Park and Nature Reserve:

- *Broadwater National Park, Bundjalung National Park and Iluka Nature Reserve Plan of Management* (NSW National Parks and Wildlife Service, 1997)
- *Statement of Management Intent – Everlasting Swamp National Park and State Conservation Area* (OEH, 2016).
- *Yuraygir National Park and Yuraygir State Conservation Area Plan of Management* (NSW National Parks and Wildlife Service, 2003a).
- *Clarence Estuary Nature Reserve Plan of Management* (NSW National Parks and Wildlife Service, 2011a).

- *Yaegl Nature Reserve Plan of Management* (NSW National Parks and Wildlife Service, 2011b).
- Other plans:
    - Mororo Creek Nature Reserve and Chatsworth Hill State Conservation Area are managed under the *Mororo Creek Nature Reserve and Chatsworth Hill State Conservation Area Plan of Management* (National Parks and Wildlife Service, 2012).
    - Woodford Island Nature Reserve is managed under the *Woodford Island Nature Reserve Plan of Management* (National Parks and Wildlife Service, 2010).

APPENDIX 2 LEGISLATION

This Appendix provides a summary of legislation relevant to catchment, estuary and coastal management in the study area. References, glossary and abbreviations are included in Volume 1.

Coastal Management Act 2016

The *Coastal Management Act 2016* communicates the NSW Government's vision for coastal management. The Act reflects the vital natural, social, cultural and economic values of coastal areas and promotes the principles of ecologically sustainable development in managing these values. The Act establishes requirements for the preparation of CMPs under guidance provided by the Coastal Management Manual (OEH, 2018b).

The legislative and policy framework introduced by recent 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 Act provides for the integrated management of the coastal environment of NSW consistent with the principles of ecologically sustainable development for the social, cultural and economic well-being of the people of the state. The Act:

- Establishes high level statutory objectives for integrated coastal management in NSW.
- Defines the NSW coastal zone as being made up of four distinct 'coastal management areas' and sets out specific management objectives for each of those areas.
- Establishes a new independent coastal advisory body, the NSW Coastal Council.
- Requires local councils to embed coastal management within the Integrated Planning and Reporting (IP&R) framework established in the *Local Government Act 1993*. This approach will ensure that coastal management needs inform, and are informed by, councils' overall service delivery, financial and asset management planning responsibilities.
- Provides for public authorities to take into consideration the objectives and processes to achieve integrated management of the NSW coast.

The objectives of the Act are to "manage the coastal environment of New South Wales in a manner consistent with the principles of ecologically sustainable development for the social, cultural and economic well-being of the people of the State, and in particular:

(a) to protect and enhance natural coastal processes and coastal environmental values including natural character, scenic value, biological diversity and ecosystem integrity and resilience, and

(b) to support the social and cultural values of the coastal zone and maintain public access, amenity, use and safety, and

(c) to acknowledge Aboriginal peoples' spiritual, social, customary and economic use of the coastal zone, and

(d) to recognise the coastal zone as a vital economic zone and to support sustainable coastal economies, and

(e) to facilitate ecologically sustainable development in the coastal zone and promote sustainable land use planning decision-making, and

(f) to mitigate current and future risks from coastal hazards, taking into account the effects of climate change, and

(g) to recognise that the local and regional scale effects of coastal processes, and the inherently ambulatory and dynamic nature of the shoreline, may result in the loss of coastal land to the sea (including estuaries and other arms of the sea), and to manage coastal use and development accordingly, and

(h) to promote integrated and co-ordinated coastal planning, management and reporting, and

(i) to encourage and promote plans and strategies to improve the resilience of coastal assets to the impacts of an uncertain climate future including impacts of extreme storm events, and

(j) to ensure co-ordination of the policies and activities of government and public authorities relating to the coastal zone and to facilitate the proper integration of their management activities, and

(k) to support public participation in coastal management and planning and greater public awareness, education and understanding of coastal processes and management actions, and

(l) to facilitate the identification of land in the coastal zone for acquisition by public or local authorities in order to promote the protection, enhancement, maintenance and restoration of the environment of the coastal zone, and

(m) to support the objects of the Marine Estate Management Act 2014."

State Environmental Planning Policy (Resilience and Hazards) 2021

The *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP) consolidates and repeals the provisions of the Coastal Management SEPP, SEPP 33 – Hazardous and Offensive Development and SEPP 55 – Remediation of Land. Chapter 2 (Coastal Management) of the Resilience and Hazard SEPP is the key environmental planning instrument for land-use planning in the coastal zone and delivers the statutory management objectives for each of the four coastal management areas that make up the coastal zone:

- CWLRA - Coastal wetlands and littoral rainforests area: support high value biodiversity that are particularly sensitive to development. This management area is defined in the Act as land which displays 'the hydrological and floristic characteristics of coastal wetlands or littoral rainforests and land adjoining those features. This area focusses on protecting well established and more extensive vegetation communities (as opposed to single trees or isolated stands). The maps include a 100 m proximity area, applying to all land use zones, around coastal wetlands and littoral rainforests. The objectives of the CWLRA within the Act are to:
    - Protect coastal wetlands and littoral rainforests in their natural state, including their biological diversity and ecosystem integrity.
    - Promote the rehabilitation and restoration of degraded coastal wetlands and littoral rainforests.
    - Improve the resilience of coastal wetlands and littoral rainforests to the impacts of climate change, including opportunities for migration.
    - Support the social and cultural values of coastal wetland and littoral rainforest communities.
    - Promote the objectives of State policies and programs for wetlands or littoral rainforest management.

- CVA - Coastal vulnerability area: land which is subject to current and future coastal hazards including beach erosion, shoreline recession, entrance instability, coastal inundation, tidal inundation, slope instability and foreshore tidal erosion. The objectives of the CVA within the Act are to:
    - Ensure public safety and prevent risks to human life.
    - Mitigate current and future coastal hazards.
    - Maintain the presence of beaches, dunes and other natural features.
    - Maintain public access, amenity and use of the coast.
    - Encourage land use that reduces exposure to hazards, including through siting, design, construction and operational decisions.
    - Adopt coastal management strategies that reduce exposure to hazards, in the first instance by restoring or enhancing natural defences such as dunes, and thereafter by taking other action and if taking other action, to:
        - avoid significant degradation or disruption of biological diversity, ecosystem integrity, coastal processes (ecological, biophysical, geological, geomorphological), beach and foreshore amenity, and social and cultural values.
        - avoid adverse offsite impacts, or otherwise restore the land if any impacts are caused by the action to reduce exposure to hazards.
    - Maintain essential infrastructure.
    - Improve community resilience and reduce reliance on emergency responses
- CEA - Coastal environment area: areas that are characterised by natural coastal features such as beaches, rock platforms, undeveloped headlands, coastal lakes and marine and estuarine waters. The area is made up of estuaries and a 100 m landward area, coastal lakes and lagoons and a 500 m landward area and specified sensitive coastal lakes and lagoons. The coastal management area is mapped upstream to one kilometre beyond the highest astronomical tide. The objectives of the CEA within the Act are to:
    - Protect and enhance coastal environmental values and natural processes of coastal waters, estuaries, coastal lakes, coastal lagoons, and enhance natural character, scenic value, biological diversity and ecosystem integrity.
    - Reduce threats to and improve resilience of these coastal environments, including in response to climate change.
    - Maintain and improve water quality and estuary health.
    - Support social and cultural values of the coastal environments.
    - Maintain the presence of beaches, dunes and natural features of the foreshore.
    - Maintain and improve public access, amenity and use of the coast.

- CUA - The coastal use area: land adjacent to coastal waters, estuaries and coastal lakes and lagoons where impacts of development on the use and enjoyment of the beaches, dunes, estuaries and lakes need to be considered. The area starts at the seaward local government boundary, typically the low water mark and extends to the estuary limit (one km landward of coastal waters, estuaries and coastal lakes). The objectives of the CUA within the Act are to:
    - Protect and enhance the scenic, social and cultural values of the coast by ensuring that:
        - the type, bulk, scale and size of development is appropriate for the location and natural scenic quality of the coast.
        - adverse impacts of development on cultural and built environmental heritage are avoided or mitigated.
        - urban design, including water sensitive urban design, is supported and incorporated into development activities.
        - adequate public open space is provided, including for recreational activities and associated infrastructure.
        - the use of the surf zone is considered.
    - Accommodate both urbanised and natural stretches of coastline

The SEPP gives effect to the objectives of the *Coastal Management Act 2016* from a land use planning perspective, by specifying how development proposals are to be assessed if they fall within the coastal zone. This becomes relevant to the preparation of the CMP with regards to the intent and description of recommended actions and their intended approval pathways (if required) under the SEPP. For example, under the Resilience and Hazards SEPP, in order for certain coastal protection works to be undertaken without consent they need to be identified in a certified CMP.

Marine Estate Management Act 2014

The *Coastal Management Act 2016* (s.3(m)) legally supports the objects of the *Marine Estate Management Act 2014*, with the coastal zone forming part of the marine estate. The *Marine Estate Management Act 2014* provides for strategic and integrated management of the whole marine estate – marine waters, coasts and estuaries. The Act does this by:

- Providing for the management of the marine estate consistent with the principles of ecologically sustainable development.
- Establishing two advisory committees, a Marine Estate Management Authority (MEMA) and Marine Estate Expert Knowledge Panel.
- Requiring the development of a Marine Estate Management Strategy to address priority threats identified through the MEMA threat and risk assessment (TARA).
- Facilitating the maintenance of ecological integrity, and economic, social, cultural and scientific opportunities.
- Promoting the coordination of government programs.
- Providing for a comprehensive system of marine parks and aquatic reserves.

Crown Land Management Act 2016

The *Crown Land Management Act 2016* commenced on the 1 July 2018. The Department of Planning and Environment (DPE – Crown Land) is responsible for the management of the Crown Land estate in accordance with this act. DPE – Crown Land may transfer management responsibilities to a reserve trust or to Council. Some areas of Crown Land within the study area are under Council Reserve Trust management. Under the Act, Council will need to categorise and prepare Plans of Management under the *Local Government Act 1993* for these reserves. Any plans that are prepared will need to be consistent with the CMP.

Actions proposed on public land require an understanding of the boundaries of public land (i.e. survey may be required), and the relevant authorisations and appropriate tenure arrangements from public land managers, in particular, where works are proposed on Crown land not under Council management.

Environmental Planning and Assessment Act 2016

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and the EP&A Regulation 2021 provide a framework for environmental planning in NSW. An assessment of the likely impacts of a proposal which may have an impact on the environment is required under the Act prior to a decision to proceed with the proposal. The Act imposes requirements for controlling development under two parts:

- Part 4 of the Act controls development that requires consent or is prohibited under an environmental planning instrument.
- Part 5 of the Act imposes requirements for assessing the impact of development that does not require consent under an environmental planning instrument.

Fisheries Management Act 1994

In NSW, threatened fish (both saltwater and freshwater), their habitat and threatened marine vegetation are protected under the *Fisheries Management Act 1994*. The *Fisheries Management Act* is administered by the NSW Department of Primary Industries – Fisheries (DPI - Fisheries). Under the *Fisheries Management Act*, DPI - Fisheries is responsible for ensuring that fish stocks are conserved and that there is “no net loss” of key fish habitats upon which those stocks depend. DPI - Fisheries achieves this through regulating recreational and commercial fishing and assessing activities under Part 4 and Part 5 of the *Environmental Planning and Assessment Act 1979* that are located on or adjacent to key fish habitats in accordance with the objectives of the *Fisheries Management Act*, the aquatic habitat protection and threatened species conservation provisions in Parts 7 and 7A of the *Fisheries Management Act*, and the associated *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI, 2013). Key fish habitats include, but are not limited to, 3rd order and greater freshwater waterways, Coastal Wetlands and tidal waters up to the Highest Astronomical Tide (HAT) level.

Relevant divisions and sections of the Act include:

- Division 3, Section 199, 200 and 201 dredging and reclamation of water land.
- Division 4, Section 205 harm to marine vegetation.
- Division 8, Section 219 obstruction of fish passage.

- Division 4A, section 220ZGB interfering with threatened species of fish.

A permit to dredge, or to mechanically open an ICOLL entrance is not required under the Act where works are carried out under appropriate Crown land authorisations. However, a permit may be required for harm to marine vegetation and DPI - Fisheries should still be notified and consulted with regards to any action with the potential to impact on fisheries or marine vegetation.

Water Management Act 2000

The objects of the *Water Management Act 2000* are to provide for the sustainable and integrated management of the water sources of the state for the benefit of both present and future generations. The Act is administered by the NSW Natural Resources Access Regulator (NRAR), Water NSW and the DPE - Water. DPE – Water is accountable for the development and implementation of water sharing plans which allocate water for direct use, extraction and environmental needs. The scoping study area lies within the *Water Sharing Plan for the Clarence Unregulated and Alluvial Water Sources 2016*.

Native Title Act 1993 (Commonwealth) and Aboriginal Native Land Rights Act 1983 (NSW)

The *Native Title Act 1993* (Commonwealth) provides a legal process for recognising the rights and interests of Aboriginal and Torres Strait Islander people in land and waters. Native title rights recognise the native title holders' rights to perform certain activities according to their traditional laws and customs. Native title determinations and Indigenous Land Use Agreements are in effect over many parts of the study area.

The *Aboriginal Land Rights Act, 1983* provides land rights for Aboriginal people in NSW. Aboriginal Land Councils can claim land as compensation for historic dispossession of land and to support Aboriginal communities' social and economic development. The principle of self-determination underpins the Act. Land is vested in representative land councils that work to deliver tangible economic, social and cultural benefits to Aboriginal communities in NSW.

Other relevant legislation

Other legislation relevant to the management of the estuary include:

- *Biodiversity Conservation Act 2016.*
- *Heritage Act 1977.*
- *Local Government Act 1993.*
- *Local Land Services Act 2013.*
- *National Parks and Wildlife Act 1974.*
- *State Emergency and Rescue Management Act 1989.*
- *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).*
- *Forestry Act 2012.*

APPENDIX 3 STATUS OF EXISTING MANAGEMENT ACTIONS

This Appendix outlines the status of relevant management actions from previous estuary management plans.

All management actions have been allocated a status (i.e. complete, incomplete, ongoing, in progress, not commenced).

Status:

Not commenced - No progress has been made toward completing this action. Not started.

In progress - Progress is being made toward completing this action. Work has started and is currently being undertaken. The action is currently being completed or in some cases will be completed following the outcome of another action or external factor.

Ongoing - Works are undertaken to fulfill this action periodically, as required or a part of an ongoing works/maintenance program. The status of 'ongoing' refers to the nature of the action requiring constant implementation (i.e. weed and pest management).

Incomplete - Progress has been made toward completing this action however progress has halted and unlikely to continue. Work started or was being undertaken but has stopped (e.g. funding finished).

Complete - Work towards fulfilling this action is complete. Action is complete, no further work/action required.

Costs reported in the Clarence River EMP (Umwelt, 2003) are based on:

Capital costs	Maintenance/extension costs (including staff time)
Low - less than $100,000	Low - less than $10,000
Medium - $100,000 to $500,000	Medium - $10,000 to $100,000
High - more than $500,000 (note that many capital works projects will require investment in excess of $1 million; these are referred to as very high costs)	High - more than $100,000

UNCCMB = (former) Upper North Coast Catchment Management Board

North Coast Water = now Clarence Valley Council

DLWC = (former) Department of Land and Water Conservation

CRCC = (former) Clarence River County Council (now CVC)

References, glossary and abbreviations are included in Volume 1.

Clarence River Estuary Management Plan

The *Clarence River Estuary Management Plan* (Clarence River EMP, Umwelt, 2003) was developed from the *Clarence River Estuary Processes Study* (MHL, 2000). At the time, estuary management was a responsibility of the Department of Land and Water Conservation, in association with local councils. The plan acknowledged that there are major challenges to achieving sustainable management of the Clarence River estuary with many of those challenges deriving from human interactions with sensitive natural estuarine processes. The greatest challenge was to achieve sufficient integration of community aspirations, state and local government policy, quality technical information, best practice solutions and adequate resources, for real and recognisable progress to be made. The plan sought to build on previous work and achievements and guide the management process to meet and maintain the community's aspirations in the long term.

The objective of the EMP was to enhance the estuary's health, productivity and appeal by utilising its resources sustainably in accordance with community, environmental and visitor values and requirements. These values were considered, along with identified issues and stakeholder consultation, to develop a strategic framework with relevant actions. The EMP includes nine key issues including:

- The disturbance/exposure of ASS at shallow depths across large areas of agricultural land on the coastal floodplain, most often by floodplain drains and floodgates.
- The indirect and sometimes unexpected effects of flood protection and floodplain drainage structures on the health of tributary creeks and the main estuary. An integrated approach to floodplain management that addresses multiple interests, including flood risks, agricultural land use and management (including profitability), and the protection of ecological and water quality values is needed.
- Management of sedimentary processes and dredging to stabilise eroding banks, provide safe navigation, and identify sand and gravel resources for regional growth, consistent with the natural variability of the estuary sediment budget.
- Protection and restoration of riparian, wetland and aquatic habitats. This involves identifying the parts of the estuary and floodplain that should be managed for permanent conservation, and also those areas where investment in habitat enhancement can provide the greatest benefits, for the health of the estuary as a whole.
- Management of port and marine industries that provide significant employment growth potential.
- Managing fishery resources – the interaction of the various fishery sectors, protection and restoration of fish habitat and fishery productivity.
- Managing urban growth, with particular attention to the information necessary to select growth sites that minimise risks to natural and cultural values, and provide for cost effective development processes. The provision of integrated and sustainable urban services such as potable water, sewerage and stormwater management is a major issue.
- Improved awareness and management of cultural heritage values, including further participation of the local Aboriginal community in natural resource management.
- The development of an overall management process and structure to overcome fragmentation of decision making and action, lack of systemic focus, poor resourcing and poor accountability. Of

particular interest are mechanisms that can deliver sufficient continuity in management programs to provide for consistent and sustainable management.

Numerous actions (>90) were developed to address the identified issues. A sustainability action plan with three stages was developed as the strategic framework of the EMP. Each stage was created based on high priority actions, with continuing actions to support sustainable management of the estuary. The high priority actions were focused on managing uncertainty and implementation, water cycle management, managing threats to ecological values and managing user interactions.

Coastal Zone Management Plan for Wooloweyah Lagoon

The *Coastal Zone Management Plan for Wooloweyah Lagoon* (CZMP, White, 2009a) provides policies and strategies to guide the long-term management of the lagoon and its catchment. The Plan was developed using information from previous processes and management studies, condition assessment and stakeholder consultation. The key issues identified were future development/land use change, erosion and sedimentation, environmental flows, navigation, fishing (commercial, recreational and aquaculture), on-site sewage management, water quality, acid sulfate soils, bank condition and riparian vegetation, sugar cane, non-sustainable grazing, clearing, cane toads and climate change. The long-term aim of the CZMP for Wooloweyah Lagoon is to protect and enhance environmental, economic and social values.

Management objectives are:

- Improve water quality to reduce sediment, nutrient and oxygen demand loads, and to meet performance targets.
- Maintain and improve ecosystem health and biodiversity of the lagoon, estuary, riparian zone and sub-catchment.
- Ensure future development and land use change has minimal impact on ecosystem health and reduce infilling of the lagoon.
- Raise community awareness of, and protect areas important to, Aboriginal cultural heritage.
- Manage potential impacts of climate change.

The CZMP includes 20 management strategies with actions to achieve these management objectives.

Ref.	Type of Action	Action	Timeframe	Status	Comments	Responsible Organisation	Other Stakeholders Responsible/Involved	Cost
Clarence Estuary Management Plan (2003)								
S1	Implementation and Uncertainty	Re-advertise positions on the Estuary Management and reappoint the committee as an implementation steering committee	1-2 years	Ongoing	Council has established the Coast and Estuary Management Committee (CEMC). Committee members are appointed/ re-appointed after each Council election. The CEMC oversees and are involved in the preparation of the current CMP.	Combined local Councils	DLWC and other State agencies, UNCCMB, community and industry organisations	Capital – minimal Maintenance - low
S4	Implementation and Uncertainty	Formalise cross representation on Catchment Board, Water Management Committee and Estuary Management Committee by community, agencies and local government	1-2 years	Completed	See above. CEMC has broad representation from across the committee including a Councillor, Council staff, state government agencies, community members and various industry representatives.	UNCCMB	Estuary Management Committee, Water Management Committee, Vegetation management Committee, Clarence Floodplain Project etc	Capital – minimal Maintenance – low to medium
S7	Implementation and Uncertainty	Formal agreement signed by heads of all major regional groups (Mayors, chairpersons and local members of Parliament). This agreement to be attached to the HRC sponsored Statement of Joint Intent	1-2 years	Not commenced/ No longer relevant	No longer relevant. The Councils have now amalgamated.	Local Councils	State and Federal members of Parliament, NSW Premiers Department	Capital – minimal Maintenance – medium (negotiation and review)
S8	Implementation and Uncertainty	Develop and implement a formal partnership agreement between land holders, relevant state and local authorities and waterway users to provide integrated and effective management of the coastal floodplain. The forum group would prepare (in the first instance) an Integrated Water Cycle Planning context Report for the Clarence estuary	1-2 years	Partially complete	Various management plans and agreements have been prepared and implemented for specfic areas of the floodplain. These agreements are often between Council and landholders relating to floodplain infrastructure and management works.	DLWC (UNCCMB)	CRCC, landholders, other state agencies, local Councils	Capital – minimal for the agreement itself, but the agreement will support other capital investment. Maintenance- medium (agency and community time)
S10	Implementation and Uncertainty	A Water Cycle Management forum should be established to foster integrated water cycle management across the lower Clarence Valley. This group could operate as a subcommittee of the Water Management Committee	1-2 years	Partially complete	Yamba and Iluka STPs ebb-tide release has been implemented.	North Coast Water	All local Councils, EPA, DLWC	Capital – minimal Maintenance – medium (staff time for discussion, negotiation and development of integrated strategy)
S16	Implementation and Uncertainty	A consistent approach in Local Plans to the management of issues that clearly transcend local Council boundaries (eg vegetation management) in terms of studies and management plans required before consent or rezoning is granted. This consistent approach would also include appropriate protective zoning for high value aquatic, intertidal and floodplain habitats.	1-2 years	Completed	Council amalgamation. Single LEP in effect (CVC LEP2011).	Each local Council	PlanningNSW	Capital - minimal Maintenance - medium
S18	Implementation and Uncertainty	Prepare a climate change risk assessment and response plan for the lower Clarence valley	1-2 years	Completed	Climate change risk assessment completed. Climate change policy adopted. Emission reduction strategies prepared. Climate change action plan in progress.	DLWC	Local Councils, CRCC	Capital – minimal (for planning phase), capita costs for any response measures included with those actions. Maintenance costs (risk assessment and response preparation) medium
S19	Implementation and Uncertainty	Ensure that the Catchment Blueprint gives appropriate recognition to the significance of estuary and floodplain management for systemic river health	1-2 years	No longer relevant	Superseded by the NSW coastal management framework	Estuary Management Committee and all local Councils/ County Council	Local community, responsible State agencies (eg DLWC, NSW Fisheries, NPWS, Waterways Authority)	Capital – minimal Maintenance - low
S2	Implementation and Uncertainty	The Estuary Plan Implementation Committee should be jointly funded by all local authorities in the lower Clarence Valley	1-2 years	Partially complete	CEMC. CEMC oversee and are involved in the preparation of the current CMP. An implementation committee has not been established.	Combined local Councils		Capital – minimal Maintenance - medium
S3	Implementation and Uncertainty	The Estuary Management Committee should operate as a joint committee of all lower Clarence LGAs. Whilst Council amalgamations are not being specifically promoted, decisions about estuary management do need to be made across local government boundaries	1-2 years	Completed	No longer relevant. Lower Clarence LGAs have now been amalgamated into CVC.	Combined local Councils	Other community stakeholders	Capital – minimal Maintenance- low to medium (planning for co-ordination)

Ref.	Type of Action	Action	Timeframe	Status	Comments	Responsible Organisation	Other Stakeholders Responsible/Involved	Cost
Clarence Estuary Management Plan (2003)								
S5	Implementation and Uncertainty	Estuary Plan Implementation Committee to oversee implementation of certain actions from the Estuary Management Plan, plus provide a forum for discussion of emerging management issues, new technical information etc	1-2 years	Partially complete	CEMC. Management issues discussed at committee meetings. An implementation committee has not been established.	Combined local Councils	State agencies, industry and community representatives on the Committee	Capital cost - minimal. Maintenance cost - medium.
S9	Implementation and Uncertainty	The local Aboriginal community should be encouraged to participate and preferably should be represented by at least one person on each natural resource committee/board	1-2 years	Partially complete	Aboriginal representative on CVC climate change committee. Yaegl representatives attend CEMC meetings. Local Aboriginal community is a key stakeholder in CMP development.	Aboriginal Community (Land Councils in the first instance) and elders groups	UNCCMB, all natural resource committees, DLWC	Capital – minimal Maintenance - low
S11	Implementation and Uncertainty	The estuary committee should provide advice to the Catchment Board in relation to estuary and catchment wide monitoring of estuary health, rather than a narrower water quality monitoring program (potential indicators are noted in the Estuary Management Study)	1-2 years	No longer relevant	No longer relevant. Catchment board does not exist. Ecohealth program completed in 2014.	Estuary Plan Implementation Committee	UNCCMB, other regional Natural Resource Committees, local Councils	Capital costs likely to be low (unless new data loggers required). Maintenance costs (staff time) potentially high, but shared across several organisations.
S12	Implementation and Uncertainty	Prepare and distribute community information about estuary management, co- ordinate estuary information that is distributed by other organisations (extension advice and monitoring results)	1-2 years	Ongoing	Relevant information is distributed by CVC through social media, Clarence Conversations and to relevant landholders on a needs basis.	Estuary Plan Implementation Committee	Other organisations responsible for preparation and distribution of awareness and training material	Capital – minimal Maintenance - medium
S13	Implementation and Uncertainty	The Estuary Management Committee will provide the UNCCMB with advice about priority locations for actions within the estuarine reaches of the catchment, clarifying broad UNCCMB strategies (eg in relation to weed control, riparian vegetation, cultural heritage) (see W, E and U Actions for immediate advice in this regard)	1-2 years	Ongoing	The CEMC raises relevant estuary managemet issues as they arise. The committee will provide input into the preparation of the CMP at all stages.	Estuary Plan Implementation Committee will supervise necessary studies and report results to UNCCMB	NSW Wader Studies group and other specialist community groups	Capital for communication process – minimal. Capital for other studies is included against those actions. Maintenance – low to medium.
S14	Implementation and Uncertainty	The Estuary Management Committee will prepare an annual report on actions and progress in relation to sustainable management of the estuary. This report will be incorporated into the Annual report of the UNCCMB and will be readily available to the community	1-2 years	Incomplete	CEMC minutes are available on CVC's website.	Estuary Plan Implementation Committee to supervise report preparation, potentially by a combined local government working group	UNCCMB, State agencies and industry/ community representatives	Capital – Minimal Maintenance - medium
S15	Implementation and Uncertainty	The Healthy Rivers Commission will audit performance on actions included in the State government's Statement of Intent	1-2 years	No longer relevant	HRC no longer exists.	HRC	State agencies	Capital – minimal. Maintenance - medium
W1	Water Cycle Management	Establish a water cycle management forum – water and wastewater management priorities at a catchment and estuary scale. Note this action is also listed in relation to integrated management. The forum group will prepare (in the first instance) an Integrated Water Cycle Planning Context Report for the Clarence estuary	1-2 years	Incomplete	CVC prepared an Integrated Water Cycle Management Strategy in 2009 and many actions have been implemented. This will be reviewed on an ongoing basis.	North Coast Water	DLWC, EPA, NPWS, all local Councils	Capital costs for forum is minimal. Maintenance cost medium for staff involvement and negotiation of strategic priorities.
W2	Water Cycle Management	Implement a water demand reduction Strategy across the entire Clarence Valley	1-2 years	Completed	Water Efficiency Strategic Plan reviewed and updated in 2007, 2013 and 2021.	North Coast Water	All local Councils, DLWC, EPA, local community, Water Management Committee	Capital cost – minimal Maintenance cost – high, with actual costs dependent on extent of incentives
W3	Water Cycle Management	Accelerate the provision of sewage services to Iluka	1-2 years	Completed	Iluka sewerage connected in October 2013	Maclean Council	DLWC, EPA, NSW Fisheries, landholders/resi dents	Capital – very high Maintenance – high to medium
W9	Water Cycle Management	Urban growth in the catchment of Lake Wooloweyah should be confined to the existing zoned area, unless a sustainability assessment (see HRC coastal Lakes Report) clearly shows that limited further growth is sustainable in terms of lake health)	1-2 years	Completed	Urban growth areas defined in *North Coast Regional Plan 2036* . Sustainability assessment required for rezonings outside urban growth area.	Maclean Council	PlanningNSW, HRC, local residents	Capital – low Maintenance – medium for planning costs
W13	Water Cycle Management	Modify the design of the Micalo/Shallow channel causeway to enhance water exchange with the main estuary	1-2 years	Completed	Culverts under Shallow Channel installed in June 2008	Maclean Council	CRCC, DLWC, NSW Fisheries, commercial and recreational fishers, local residents	Capital – high (actual costs depends on detailed design) Maintenance costs - medium

Ref.	Type of Action	Action	Timeframe	Status	Comments	Responsible Organisation	Other Stakeholders Responsible/Involved	Cost
Clarence Estuary Management Plan (2003)								
W16	Water Cycle Management	Complete the current trial wetland restoration at Lake Wooloweyah (Estuary Management Program and ASSPRO) and consider implications for management in other parts of the Clarence Floodplain	1-2 years	Incomplete	Project did not progress due to complications.	CRCC	Landholders, NSW Agriculture, NSW Fisheries, NPWS, commercial and recreational fishers, PlanningNSW (re SEPP 14) DLWC (re Crown Land), landholders	Capital – moderate Maintenance moderate
W20	Water Cycle Management	Complete and implement Hotspot management plans for high risk ASS subcatchments (Hotspots Program) – Stage 1 in the first instance, and Stage 2. These plans will address firstly the lower estuary floodplain and islands, Everlasting Swamp and Shark Creek.	1-2 years	Not commenced	Floodplain prioritisation studies and ASS investigations completed for floodplain sub-catchments	DLWC	NSW Agriculture, land holders, CASSP, NSW Fisheries, NPWS, local government (CRCC)	Capital – high Maintenance - medium
W21	Water Cycle Management	Clarify sedimentary process drivers in the estuary - further modelling of effects of structural controls on estuary hydrodynamics, sediment transport and erosion distribution, potential impacts of sea level rise, high and low risk areas for dredging.	1-2 years	Not commenced		DLWC	Maclean Council, Grafton Council etc, Port Authority, Waterway users, dredging contractors and construction industry	Capital medium for development of the model, Maintenance medium – refining model
W26	Water Cycle Management	Complete and implement plans to address ASS and other serious water quality issues in high risk subcatchments not listed under state 1 or 2 of the Hotspots program. Alumy Creek should be included in this action as a priority area.	1-2 years	Ongoing	A large number of managemant plans have been prepared and implemented at various locations across the floodplain.	CRCC	DLWC, landholders, NSW Agriculture, NSW Fisheries, NPWS, commercial and recreational fishers (see Clarence Floodplain Project) State Weir Review Committee	Capital cost – moderate to high, depending on the degree of structural modification required. Maintenance costs – medium to high, for management of awareness and education activities, landholder groups organisation, plan making
W7	Water Cycle Management	No new urban or rural residential subdivisions should be approved in areas with reticulated water unless they are also serviced by reticulated sewage services (or other approved water sensitive effluent management). Iluka is a key example here, as is Lawrence. Rigorous water conservation measures for existing rural residential development that has reticulated water but on- site sewage management. Water conservation devices mandatory in areas with no reticulated sewage (or other approved water sensitive wastewater management).	1-2 years	Completed	Iluka sewerage sceheme completed.CVC has developed an on-site sewerage management policy. Water efficiency Strategic Plan adopted in 2021.	All Local Councils	PlanningNSW, North Coast Water, DLWC, EPA, local residents	Capital - low Maintenance – medium for plan development and guidance
W11	Water Cycle Management	Enforce no discharge of sewage or bilge water from boats in Lake Wooloweyah, Shallow Channel, Oyster Channel and Palmers Channel	1-2 years	Unknown	Enforcement by TfNSW Maritime/EPA	NSW Waterways	Waterway users	Capital – minimal Maintenance – low to medium (staff time)
W12	Water Cycle Management	Other reaches to enforce nil discharge requirements for vessels are Maclean (adjacent to urban area), Yamba Bay, Grafton (whole reach), canal estates and Iluka Bay	1-2 years	Unknown	Enforcement by TfNSW Maritime/EPA	Waterways Authority	Maclean Council, Grafton Council, waterway users	Capital costs minimal Maintenance costs –low to medium re staff time for education and enforcement activity
W14	Water Cycle Management	No dredging of Shallow, Oyster or Micalo Channel should be permitted without a detailed environmental risk assessment that demonstrates that the dredging is a sustainable solution	1-2 years	Ongoing	No dredging has been undertaken to date.	DLWC, Maclean Council	NSW Fisheries, Waterways Authority, Dredging contractors and construction industry, waterway users, residents	Capital costs minimal, Maintenance costs (assessment of alternatives, sustainability assessments medium)
W23	Water Cycle Management	Implement strategic river health monitoring and reporting	1-2 years	Partially complete	No ongoing programs. Ecohealth assessment was completed in 2014/15.	UNCCMB (to co-ordinate local reporting) Links to State level reporting – DLWC, EPA	Local Councils (Local State of the Environment Reports), CRCC, community, NSW Fisheries.	Capital – low to moderate (potentially new data loggers in selected areas, and new aerial photo runs to monitor vegetation characteristics)
W24	Water Cycle Management	Provide community information to enhance awareness and understanding of water cycle management issues	1-2 years	Ongoing	Water efficiency Strategic Plan adopted in 2021 includes education components.	DLWC	Local Councils, North Coast Water, CRCC, EPA, residents, NSW Waterways, EPA	Capital cost – minimal Maintenance cost low to medium
W25	Water Cycle Management	Ongoing improvement of the environmental performance of licensed industries/facilities such as the Harwood Mill, prawn aquaculture and STPs, by use of Environmental Improvement Programs attached as licence conditions	1-2 years	Ongoing	Environment Protection Licences are issued by NSW EPA. EPA has included Pollution Reduction programs (PRP) conditions on various licences.	EPA	Harwood Mill, Aquaculture enterprises, STPs operated by Councils, community, NSW Fisheries	Capital costs for compliance assessment minimal, but capital investment may be required for improved performance (particularly re STPs). Maintenance costs – low – agency time

Ref.	Type of Action	Action	Timeframe	Status	Comments	Responsible Organisation	Other Stakeholders Responsible/Involved	Cost
Clarence Estuary Management Plan (2003)								
E1	Threats to Ecological Values	Undertake a comprehensive assessment of estuarine and floodplain vegetation and habitats, including an assessment of waterbirds and other aquatic fauna and their habitats, to clarify the highest conservation value localities, potential corridors etc – possibly use Stream Health assessment methodology (see Catchment Blueprint)	1-2 years	Not commenced		DLWC	DLWC	Capital cost – minimal Maintenance cost – high mapping and documentation.
E24	Threats to Ecological Values	Assess and prioritise floodplain and estuarine areas (eg intertidal flats) for inclusion in conservation reserves or to be managed for conservation on private land, with particular attention to habitats for migratory and resident waders	1-2 years	Ongoing	Large areas of the floodplain, paricularly within the vicinity of the Broadwater, Shark Creek, Everlasting Swamp, Palmers Channel, lower estuary islands and Wooloweyah Lagoon have been zoned as environmental under the Clarence Valley LEP 2011. Large areas of the Everlasting Swamp are also now National Park	NPWS	NPWS	Capital costs – for assessment process, minimal. Potentially land acquisition costs for areas to be managed as conservation reserves. Maintenance costs for assessment and negotiation process – moderate to high. Also ongoing maintenance costs for management of conservation areas, both on public reserves and on private land (eg using a VCA)
E25	Threats to Ecological Values	Initiate a program to identify and evaluate interactions between estuary users and threatened and/or migratory and resident waterbirds with a view to developing management actions that provide sustainable access to the estuary for both groups.	1-2 years	Not commenced		NPWS, Regional Vegetation Management Committee	NPWS, Regional Vegetation Management Committee	Capital cost minimal, maintenance cost for studies and preparation of guidelines, medium
E3	Threats to Ecological Values	Prepare detailed Crown Lands Plans of Management, focusing on those parcels of Crown Land that can contribute to restoration of ecological values eg as riparian corridors or by improving connectivity. Priority reaches or subcatchments are Lake Wooloweyah, The Broadwater, Main channel near Ashby, Shark Creek, Roberts Creek, Palmers Channel	1-2 years	Ongoing	Council has prepared various management plans for Council managed Crown Lands across the LGA. Council is currently in the process of updating many Plans of Management for Council managed Crown Land. Specific plans of management have not been prepared for non Council managed areas within the areas specified in this action.	DLWC	DLWC	Capital cost for preparation of Plans – minimal, but capital costs will be associated with implementation (eg fencing, replanting etc) Maintenance cost – medium to high (plan preparation).
E5	Threats to Ecological Values	Develop a consistent vegetation regulatory regime across all LGAs to protect rare coastal floodplain habitat types (modelled on Maclean LEP Special Emphasis Areas). The regulatory regime will be consistent with the aims and objectives of the Clarence Regional Vegetation management Plan, covering terrestrial, aquatic and riparian vegetation communities.	1-2 years	Complete	Councils are now amalgamated into CVC. Many rare coastal floodplain habitat types are protected under zonings within the CV LEP 2011 or relevant SEPPs. Vegetation is also managed under the *Clarence Valley Biodiversity Strategy 2020-2025* .	All local Councils	All local Councils	Capital cost minimal Maintenance costs low to medium (higher if included in the larger PlanFIRST review of the regional Plan)
E9	Threats to Ecological Values	Confirm commercial trawl impacts on seagrass in Lake Wooloweyah, and implement management strategies as necessary to reduce detrimental impacts	1-2 years	Partially complete	White (2009b) undertook water quality monitoring within the lagoon to investigate the impact of trawlers on turbidity in the lagoon. It was concluded that monitoring of turbidity did not show any evidence of trawling significantly increasing long-term turbidity within the lagoon. Management strategies have not been identified.	NSW Fisheries	NSW Fisheries	Capital cost minimal, Maintenance costs low to medium (research, discussion and reporting)
E14	Threats to Ecological Values	Continue to implement the Clarence Floodplain Project, particularly in relation to partnership development and adding habitat management to water quality considerations.	1-2 years	No longer relevant	The Clarence Floodplain Project is no longer funded. CVC has adopted a broader strategic merits-based approach to operation and maintenance of floodplain infrastructure within Council ownership.	CRCC	CRCC	Capital cost – high (medium for individual components). Maintenance costs – moderate to high – communication, incentives etc
E15	Threats to Ecological Values	Expedite the development of regionally applicable Partnership Agreements for floodplain management	1-2 years	No longer relevant	CVC has adopted a broader strategic merits-based approach to operation and maintenance of floodplain infrastructure within Council ownership.	DLWC (UNCCMB)	DLWC (UNCCMB)	Capital – minimal for the agreement itself, but the agreement will support other capital investment. Maintenance- medium (agency and community time)
E22	Threats to Ecological Values	Prepare species recovery plans for relevant estuarine and terrestrial species listed under TSCA and FMA (eg Freshwater cod)	1-2 years	Ongoing	The NSW government is repsonsible for the management and conservation of threatened species under the Biodiversity Conservation Act and the Fisheries Management Act.	NPWS, NSW Fisheries	NPWS, NSW Fisheries	Capital cost – minimal, Maintenance cost – medium (staff resources for plan preparation). Other costs for habitat restoration are included with specific actions.
E10	Threats to Ecological Values	Implement the Estuary General and Estuary Prawn Trawl Fishery Management Strategies as finalised in consultation with local fishers on the EIS.	1-2 years	Complete		NSW Fisheries, commercial fishers and Clarence River Fishermans Co-	NSW Fisheries, commercial fishers and Clarence River Fishermans Co- operative	Capital cost – minimal. Maintenance cost – medium (staff resources)

Ref.	Type of Action	Action	Timeframe	Status	Comments	Responsible Organisation	Other Stakeholders Responsible/Involved	Cost
Clarence Estuary Management Plan (2003)								
E12	Threats to Ecological Values	Finalise National Recreational Fishing Survey and make regional data available to assist in assessing the impacts of recreational fishing on fish stocks, and value of recreational fishing to the local community	1-2 years	Complete		NSW Fisheries	NSW Fisheries	Capital cost – minimal. Maintenance cost – medium (Fisheries staff resources for analysis, documentation and reporting of information)
E13	Threats to Ecological Values	Expedite the implementation of the State Indigenous Fisheries Strategy, particularly as it affects Indigenous fishers in the Clarence	1-2 years	Complete		NSW Fisheries	NSW Fisheries	Capital cost – minimal Maintenance cost – high – consultation, document production and implementation advice.
E23	Threats to Ecological Values	Expedite the completion of the NSW Recreational Fishery Strategy and EIS	1-2 years	Complete		NSW Fisheries	NSW Fisheries	Capital cost – minimal. Maintenance cost – high – research, consultation, document production, exhibition, implementation advice
E16	Threats to Ecological Values	Enforce boat speed and no wash regulations for narrow channels (such as Palmers Channel) where boat wakes contribute significantly to bank erosion and restrict recovery of riparian vegetation	1-2 years	Ongoing	TfNSW Maritime regularly patrol and enforce regulations on the Clarence River.	NSW Waterways	NSW Waterways	Capital cost – minimal; Maintenance costs medium (staff time for education and enforcement activity)
E20	Threats to Ecological Values	Maintain strict quarantine controls on vessels entering the estuary and on oyster transfers from other estuaries	1-2 years	Unknown	Oyster Industry Sustainable Aquaculture Strategy 2021.	AQIS	AQIS	Capital costs – minimal; Maintenance cost – medium (staff time)
E21	Threats to Ecological Values	Further develop and implement the Clarence Aquaculture Development Plan	1-2 years	Unknown	Oyster Industry Sustainable Aquaculture Strategy 2021.	NSW Fisheries	NSW Fisheries	Capital costs – minimal Maintenance costs – high for education and training, best practice guidelines etc
U3	Managing User Interactions	Prepare Aboriginal cultural heritage study and plan for NPWS holdings	1-2 years	Complete	Study completed. Cultural mapping project has commenced in consultation with Yaegl community.	NPWS	Local Aboriginal community	Capital - minimal but this study may lead to a need to install protective structures at some locations. Maintenance costs - medium for strategy preparation, medium for ongoing consultation and management
U5	Managing User Interactions	If economically justified and in consultation with representatives of the local Aboriginal community update the Part 5 assessment and development approval and obtain the necessary licences and permits for capital dredging of the main shipping channel, including both sand dredging upstream of the rock bar to Folbigg Point, and enhancing the channel through the entrance rockreef. Continue to consult with representatives of the local Aboriginal community about the management of the Aboriginal heritage values of the rock reef. Note that there is little if any benefit to commercial shipping in dredging the sand unless the rock reef is also dredged and it is most unlikely that one would be undertaken without the other. Note that maintenance dredging would be carried out under SEPP 34.	1-2 years	Ongoing	Transport for NSW Maritime Infrastructure Delivery Office is responsible for maintenance dredging of navigation channels. Mainentenace dredging is carried out by MIDO under the *NSW Coastal Dredging Strategy*.	NSW Waterways Authority	Shipping contractors, DLWC, Maclean Council, Aboriginal community	Capital costs - minimal. Maintenance costs - medium for staff resources to finalise and assess the document.
U6	Managing User Interactions	Consider options for funding dredging of the shipping channel and other boating channels when necessary for navigation safety. All dredging must be consistent with a sand and gravel management strategy based on a sound understanding of the sedimentary process drivers and sediment budget of the estuary. Funding options may include the sale of dredged sand for land fill purposes. Any such filling would be subject to a separate development assessment and licensing process, based on sustainability principles.	1-2 years	Ongoing	Transport for NSW Maritime Infrastructure Delivery Office is responsible for maintenance dredging of navigation channels. Mainentenace dredging is carried out by MIDO under the *NSW Coastal Dredging Strategy*.	NSW Waterways Authority	Shipping contractors, DLWC, dredging contractors, local Councils, Aboriginal community.	Capital cost low, maintenance costs medium
U24	Managing User Interactions	Dredge the shipping channel between the entrance bar and Folbigg Point in accordance with the approved and licensed strategy, provided there is a clear economic justification for the works. Dredge the entrance across the rock reef in accordance with the approved and licensed strategy, subject to consultation with the local Aboriginal community and relevant state agencies about cultural heritage values	1-2 years	Ongoing	Maritime undertook dredging of 30,000 m^3 in 2008 and has approval for this quantity annually. See comment above.	NSW Waterways Authority	Shipping contractors, DLWC, dredging contractors, local Councils, Aboriginal community.	Capital cost - very high. Maintenance costs - ongoing. Monitoring and maintenance activities high.

Ref.	Type of Action	Action	Timeframe	Status	Comments	Responsible Organisation	Other Stakeholders Responsible/Involved	Cost
Clarence Estuary Management Plan (2003)								
U25	Managing User Interactions	Prepare an REF and obtain a standing approval for reshaping of sand bars outside the port entrance and east of the rock reef, with such an approval to be activated only in carefully defined circumstances where navigation is restricted	1-2 years	Not commenced	Transport for NSW Maritime Infrastructure Delivery Office is responsible for maintenance dredging of navigation channels. Mainentenace dredging is carried out by MIDO under the *NSW Coastal Dredging Strategy*.	NSW Waterways Authority	DLWC, Shipping contractors, Maclean Council	Capital cost for REF low, maintenance costs - medium to high. Capital costs for sand management high.
U10	Managing User Interactions	Prepare detailed Crown Lands assessments for all parcels of Crown Land on the estuary bank/shoreline	1-2 years	Not commenced		DLWC/Trusts	Local government, landholders, conservation interests (community), NPWS, recreation interests	Capital costs - low. Maintenance costs - preparation of assessments and plans of management, negotation with landholders - high.
U18	Managing User Interactions	Throughout the Clarence Valley, new land zonings towards more intensive use should only occur after a sustainability assessment has been prepared and evaluated (in consultation with Planning NSW if required under new SEPP and PlanFIRST implementation)	1-2 years	Ongoing		Local Councils	PlanningNSW, HRC, DLWC, NPWS, local community groups	Capital costs - minimal. Maintenance costs - staff time for planing, training and advice, medium to high.
U19	Managing User Interactions	Develop a consistent zoning strategy for all local Councils in the Clarence valley (see PlanFIRST)	1-2 years	Completed	Council amalgamation and CVC LEP 2011	Local Councils	PlanningNSW	Capital - minimal Maintenance - medium
U20	Managing User Interactions	Prepare operational and environmental plans for Yamba and Iluka boat harbours	1-2 years	Unknown	Crown Lands/MIDO/Port Authority responsibility	For formulation: DLWC, commercial fishers, marina Managers, Local Council	For implementation: Local Councils, marine operators, fishing industry, recreational boat owners (local and cruising). EPA will also have an interest in envrionmental performance.	Capital cost - for plan minimal, for implementation potentially moderate. Maintenance costs - plan preparation - medium, with some ongoing management and reporting costs.
U15	Managing User Interactions	Maintain the Pro-Am forum between commercial and recreational fishers.	1-2 years	No longer relevant		Clarence Fishermans Co-op and recreational fishing groups	NSW Fisheries	Capital and maintenance costs very low
U16 and U17		See discussion of fishery management strategies in relation to ecological values. Implementation of these strategies will also address interactions between different fishery sectors		No longer relevant				
U21	Managing User Interactions	Implement river bank management plans for villages and reaches affected by bank erosion (eg Ulmarra and Palmers Island)	1-2 years	Complete but require updating	Riverbank management plans prepared for Ulmarra, Woodford Dale and Palmers Island.	DLWC	Local Councils, North Coast Water, land owners, CRCC	Capital costs - medium to high and potentially requiring ongoing maintenance. Maintenance (landholder awareness and education, planning measures, etc) - medium.
U22	Managing User Interactions	Apply and monitor the success of Clause 39 of the Maclean LEP re the Wooloweyah Special Emphasis Area – sustainability assessments for any intensification of land use	1-2 years	No longer relevant	Superseded by CVC LEP 2011	Maclean Council	HRC, UNCCMB, local residents	Capital – minimal Maintenance – medium (staff time and extension information)
U23	Managing User Interactions	Continue maintenance of flood protection structures by CRCC. This should be done in the context of a review of the Floodplain Risk Management Plan in the light of the Floodplain Partnership Agreement.	1-2 years	Ongoing	CRCC no longer exists. CVC is responsible for management of floodplain infrastructure owned by Council.	CRCC	Landholders, DLWC, NSW Fisheries, NPWS	Capital - high. Maintenance - medium high (estimated CRCC currently spends $360,000 annually on maintenance of flood structures, and more after major floods)
S20	Managing Uncertainty and Implementation	Review progress in implementing the Estuary Management Plan. This review should occur in the first instance after three years.	5 years	Complete	This is the first documented review of the EMP implementation.	Joint local Councils	DLWC, local community	Capital cost - minimal. Maintenance cost - low to medium for consultation and review process.
W4	Integrated Water Cycle Management	Upgrade the Yamba STP	5 years	Complete		Maclean Council	Other local Councils, DLWC, local community	Capital cost very high. Maintenance cost - high (including Load Based Licence fees)
W5	Integrated Water Cycle Management	Implement an integrated stormwater and effluent management strategy for Grafton	5 years	Not commenced		Grafton City Council	DLWC, EPA, NSW Fisheries, NPWS, local community, other Councils	Capital costs - very high. Maintenance costs - high.
W6	Integrated Water Cycle Management	Upgrade the Maclean STP and include services for Ilarwill and Lawrence	5 years	Completed	Scheme commissioned in January 2010	0	DLWC, EPA, other Councils, NSW Fisheries, NPWS, local community	Capital cost - very high. Maintenance costs (including Load Based Licence fees) - high

Ref.	Type of Action	Action	Timeframe	Status	Comments	Responsible Organisation	Other Stakeholders Responsible/Involved	Cost
Clarence Estuary Management Plan (2003)								
W17	Integrated Water Cycle Management	Modify the design and management of operation of floodgates at various sites, consistent with NSW Fisheries guidelines and priorities based on system wide ecological assessment. All modifications must be conducted in consultation with local landholders. As more information about farm profitability and the costs of floodgate management becomes available, it may be that changes to land use, as well as land management are the preferred action for some parts of the floodplain	5 years	Ongoing	Floodplain prioritisation studies completed for floodplain sub-catchments	CRCC	NPWS, NSW Fisheries, landholders, commercial and recreational fishers	Capital costs - very high. Maintenance costs - high.
W22	Integrated Water Cycle Management	Extend River Styles Assessment into the estuary, with particular attention to bank stability and potential channel changes	5 years	Completed		DLWC	Local Councils, CRCC, landholders, Catchment Board	Capital cost - minimal. Maintenance costs - medium to high (less if done as part of W21)
E2	Threats to Ecological Values	In consultation with landholders, enhance riparian vegetation in selected tributaries of the lower estuary. Subcatchments with good connectivity should be a priority, as should selected cane channels. Priority reaches or subcatchments include Coldstream River, Shark Creek, Palmers Channel	5 years	Incomplete/ Ongoing	Small areas of ad-hoc riparian revgeation is undertaken when funding/grants available.	UNCCMB	CRCC, NPWS, DLWC, landholders	Capital - low. Maintenance - high. (negotiation, planning, etc)
E4	Threats to Ecological Values	Formulate and implement incentive arrangements to encourage landholders to change the management of riparian lands on their properties	5 years	In progress	Schemes being developed through MEMS.	UNCCMB	CRCC, NPWS, DLWC, landholders	Capital - low. Maintenance - high. (negotiation, planning, etc)
E6	Threats to Ecological Values	Implement Maclean Council's Biodiversity Strategy, and aspects of Grafton Environmental strategy relating to biodiversity	5 years	Complete/ No longer relevant	CVC prepared the *Biodiversity Strategy 2020-2025*	Maclean Council	Other Councils, CRCC, landholders, NPWS	Capital - minimal. Maintenance - high (further studies, planning controls, etc).
E7	Threats to Ecological Values	Conduct an audit of environmental and noxious weeds in the estuary and floodplain areas —– species, context and function, to determine priority areas for weed control works. The audit should also include weeds (ie unwanted plants) in wader habitat areas.	5 years	Ongoing	CVC manages weeds in accordance with the *Biosecurity Act 2015* and relevant Council policies.	UNCCMB	NPWS, Councils, landholders, wader study group, NSW Agriculture, Clarence Valley Weed Authority.	Capital - minimal. Maintenance - medium to high.
E8	Threats to Ecological Values	Explore further options for voluntary fishery closures to conserve fish and prawn stocks, including Lake Wooloweyah	5 years	Incomplete	DPI Fisheries reviews fishery sustainability	NSW Fisheries	Commercial and recreational fishers, NPWS, local community.	Capital minimal maintenance costs - depend on potential impacts of further closures on existing operators, assessment of relative costs and benefits.
E17	Threats to Ecological Values	Co-ordinate the management of floodgates and other barriers to fish passage with action plans for ASS hot spots and vegetation management	5 years	Ongoing	Floodplain prioritisation studies and ASS investigations completed for floodplain sub-catchments	UNCCMB	CRCC, NSW Agriculture, NSW Fisheries, DLWC, landholders, local Councils	Costs covered in W17 and Floodplain Partnership Agreement
E18	Threats to Ecological Values	Provide opportunities for local community groups to contribute to co-ordinated ecological monitoring program for the estuary and coastal floodplain	5 years	Not commenced		UNCCMB	CRCC, DLWC, NSW Fisheries, local environment groups	Capital - minimal. Maintenance - medium in terms of in kind community contributions
U1	Managing User Interactions	Prepare a sand and gravel resources management strategy for the whole estuary	5 years	Not commenced	DPE Crown Lands regulates extraction industry.	DLWC	Local Councils, construction industry / sand and gravel suppliers, NSW Fisheries, conservation and community interests.	Capital costs (for strategy) - minimal. Maintenance costs for preparation of strategy medium. Capital costs for implementation in terms of targeted dredging are likely to be high, but disbursed over a long period.
U7	Managing User Interactions	Implement the Grafton and Maclean Stormwater Management Plans in relation to actions that support clear benefits in estuary health	5 years	Partially complete	Some actions undertaken	Grafton Council, Maclean Council	UNCCMB, EPA, DLWC	Capital costs - high, but can be reduced by focus on cost benefits. Maintenance costs - high.
U8	Managing User Interactions	Implement the Alumy Creek Management Plan	5 years	Partially complete	Various plans and options reports have been prepared. Some improvements made with fish gates on weir and biological control of some aquatic weeds.	CRCC/Grafton Council	UNCCMB, DLWC, NSW Agriculture, NSW Fisheries, landholders	Capital costs - high. Maintenance costs - high (see Alumy Creek plan for details)
U9	Managing User Interactions	Prepare a DCP for best stormwater practice (water sensitive urban design) for new development in Grafton City and Maclean Shire. This action is a lower priority for other LGAs	5 years	Completed	Parts H, I and J of Residential Zones DCP 2011	Grafton Council, Maclean Council	Other local Councils, PlanningNSW, urban development institute	Capital - minimal. Maintenance - medium.
U11	Managing User Interactions	Prepare a waterway user strategy, focusing on public recreational user access to the foreshore and waterway. This strategy would include identification of potential conflicts between natural values and user aspirations and mechanisms to resolve those conflicts.	5 years	Not commenced		NSW Waterways Authority	DLWC, local Councils, waterway users, marina operators, Chamber of Commerce, fishing industry	Capital - minimal. Maintenance - medium (plan preparation)

Ref.	Type of Action	Action	Timeframe	Status	Comments	Responsible Organisation	Other Stakeholders Responsible/Involved	Cost
Clarence Estuary Management Plan (2003)								
U14	Managing User Interactions	Monitor the use of personal water craft on the estuary. Use community education to encourage use only in open sections of the estuary (away from sensitive habitats) and also to reduce potential conflicts with fishing vessels.	5 years	Not commenced		See U11	See U11	See U11
U24	Managing User Interactions	Maintain a watching brief on studies and statutory management of 2-stroke boat fuels.	5 years	Not commenced		NSW Waterways, EPA	Local boating community	Capital - low. Maintenance - low.
	Long term actions	Implement waterway user strategy (boating facilities)	5-10 years	Not commenced		Yes		
	Long term actions	Implement water way user strategy (shore-based passive recreation)	5-10 years	Not commenced		Yes		
	Long term actions	Water management plans for other specific areas/issues, to be determined as the details and achievements of the Floodplain Partnership Agreement gain momentum.	5-10 years	Ongoing	Various management plans and agreements have been prepared and implemented for specfic areas of the floodplain.	Yes		
	Long term actions	Changes to floodplain land management, through detailed property plans and catchment based management plans (sponsored/brokered through the Floodplain Partnership Agreement).	5-10 years	Ongoing	Various management plans and agreements have been prepared and implemented for specfic areas of the floodplain.	Yes		
	Long term actions	Measures to protect wader habitat, by zoning, acquisition or voluntary conservation agreements and plans of management (public lands)	5-10 years	Not commenced		Yes		
	Long term actions	Restoration and maintenance of riparian habitats will require ongoing attention over this time period	5-10 years	Ongoing		Yes		
	Long term actions	Maintenance of fundamental flood protection and entrance training structures will continue to be required throughout the life of the plan	Ongoing	Ongoing		Yes		
	Long term actions	Further maintenance dredging of the main shipping channel may also be required intermittently in the future, and should be carried out as necessary, provided the dredging is consistent with the sand and gravel management strategy for the estuary	Intermittently	Ongoing				
	Long term actions	Monitoring, reporting, community feedback and reporting, and program review actions. Review of plan every 3 years	Ongoing	Incomplete	The EMP will be replaced by the CMP.	Yes		

Ref.	Type of Action	Action	Timeframe	Status	Comments	Responsible Organisation	Other Stakeholders Responsible/Involved
Coastal Zone Management Plan for Wooloweyah Lagoon (2009)							
WQ-1	Water Quality	Reduce nutrient loads of runoff and receiving waters within the catchment	Short-medium (1-5 years)	Ongoing		CVC	Landholders, NRCMA, DECCW
WQ-2	Water Quality	Implement regular water quality and condition asessment monitoring for the lagoon, channels, drains and creeks	Medium-long (3-10 years)	Incomplete	Ecohealth project included a site in the Lake	CVC	DECCW, NRCMA, SCU, UNE, Landcare
WQ-3	Water Quality	Implement water quality improvement actions for priority drains and their catchments	Medium (3-5 years)	Ongoing	A number of tidal gates installed.	CVC	NRCMA, cane industry, graziers
WQ-4	Water Quality	Reduce sewage impacts on waterways	Medium (3-5 years)	Ongoing	Inspections undertaken. Ebb-tide release constructed in 2015 - treated effluent from Yamba STP no longer discharged to the Lake.	CVC	Landholders
B-1	Biodiversity	Identify and prioritise riparian areas for rehabilitation and regeneration	Medium-long (3-10 years)	Incomplete	Some areas of regeneration.	CVC	Landholders, DECCW, NRCMA, WetlandCare Aus, Landcare
B-2	Biodiversity	Encourage cane toad control	Short (1-3 years)	Ongoing	Undertaken by local volunteeers with assistance from agencies and CVC	CVC	DECCW, NRCMA, cane industry, graziers, landholders
B-3	Biodiversity	Identify and prioritise wetland/floodplain habitats for rehabilitation	Short (1-3 years)	Ongoing	Main priority is salt marsh wetland surrounding ring drain.	CVC	Cane industry, graziers, WetlandCare Aus, NRCMA, DECCW, Industry & Investment NSW, Landcare
B-4	Biodiversity	Implement and encourage uptake of best management practice actions for agricultural activities in the catchment	Short-long (1-10 years)	Ongoing		CVC	Cane industry, graziers, Land & Property Mgt Authority, NRCMA, DECCW, Industry & Investment NSW
B-5	Biodiversity	Develop and implement a shorebird management plan for the Clarence Estuary	Immediate-short (1-3 years)	Complete	Implementaion ongoing.	CVC	Land & Property Mgt Authority, NRCMA, DECCW, WetlandCare Aus
B-6	Biodiversity	Decommission the Taloumbi ring drain and levee	Long (5-10 years)	In progress	Hydrodynamic study completed of Ring drain and surrounding catchment .	CVC	Land & Property Mgt Authority, Cane industry, graziers, WetlandCare Aus, NRCMA, DECCW, Industry & Investment NSW, Landcare
B-7	Biodiversity	Seagrass management and protection	Short-medium (1-5 years)	Incomplete	Seagrass study project by Southern Cross University endorsed by CEMC did not commence.	CVC	Industry & Investment NSW, DECCW (bathymetric survey), professional fishermans association, NRCMA
ES-1	Erosion & sedimentation	Reduce bank erosion along Palmers, Micalo and Oyster Channels	Medium (3-5 years)	Incomplete	Protection was attempted at one site however were ineffective.	CVC	Land & Property Mgt Authority, NRCMA, DECCW, landholders, NSW Maritime, Professional Fishermens Assoc
ES-2	Erosion & sedimentation	Improve navigability of Palmers Channel	Short (1-3 years)	Complete	Dredging occurred in 2011.	CVC	Land & Property Mgt Authority, DECCW, Regional Development Aus, Professional Fishermens Assoc
ES-3	Erosion & sedimentation	Improve environmental flows	Medium (3-5 years)	Ongoing	Shallow Channel opened in 2008, some improvement with Micalo Bridge 2019.	CVC	Land & Property Mgt Authority, DECCW, Regional Development Aus, Professional Fishermens Assoc, NRCMA, landholders
FD-1	Floodgates & drains	Improve water quality, fish passage and habitat in drains	Medium (3-5 years)	Ongoing	A number of tidal gates and winches installed.	CVC	Industry & Investment NSW, DECCW, landholders
D-1	Development	Control of urban growth areas	Ongoing	Ongoing	Urban growth areas defined in MNC Regional Growth Strategy (March 2009). Superceded by North Coast Regional Plan.	CVC	DoP
P-1	Planning	Zone Woolooweyah Lagoon as "W1 Natural Waterway in the revised Clarence Valley LEP in accordance with the NSW planning reforms LEP Standard Template	Short (1-3 years)	Completed	Lagoon is zoned W1 in CVC LEP 2011	CVC	
P-2	Planning	Incorporate a foreshore buffer around Woolooweyah Lagoon to allow for ecosystem processes and expected response to future environmental change	Medium (3-5 years)	Completed	Most of the Lagoon foreshore is zoned E1 and E2 in the CVC LEP 2011	CVC	Land & Property Mgt Authority, landholders
C-1	Cultural	Aboriginal Heritage management	Ongoing	Ongoing		CVC	DECCW
SL-1	Climate change	Incorporate and make provision for potential impacts of climate change in planning instruments, development controls and environmental assessments	Immediate-short (1-3 years)	Ongoing	CVC Climate Change policy adopted 18/5/2010 (amended 19/3/13). CVC LEP 2011 Clauses 5.5 & 7.3. Council is currently developing a climate change action plan. CMP will consider climate change implications.	CVC	DECCW, Cane industry, graziers, Land & Property Mgt Authority, landholders

APPENDIX 4 STAGE 1 STAKEHOLDER CONSULTATION ACTIVITIES

This Appendix provides a summary of previous consultation activities and activities undertaken during the preparation of the Stage 1 Scoping Study. References, glossary and abbreviations are included in Volume 1.

1. PREVIOUS STAKEHOLDER ENGAGEMENT ACTIVITIES

As part of the development and implementation of previous coastal and estuary management planning documents, Council has engaged with stakeholders and the community. Previous engagement activities included:

- *Clarence River Estuary Processes Study* (MHL, 2000):
    - Community survey.
    - Targeted stakeholder groups identified and invited to comment at meetings.
    - Meetings with Estuary Management Committee,
- Clarence Valley Coastline CMP Scoping Study (Hydrosphere Consulting, 2021) – relevant to Wooloweyah Lagoon:
    - Meetings with Clarence Estuary Management Committee.
    - Submissions were invited from government agencies, community groups and the Aboriginal community.
    - Community survey.
    - The Clarence Conversations website included project information, a link to the community survey, useful links, downloads, a discussion forum, questions page and pin map.
- Clarence EMP (Umwelt, 2003):
    - Proposed restructure of Estuary Management Committee – with some responsibility for managing implementation actions in the Floodplain Partnership Agreement.
    - Community survey.
    - Community meetings held at Grafton and Maclean.
- The Broadwater plan of management (Department of Environment and Conservation, 2006):
    - Formation of the Broadwater Wetland Working Group.
    - Letters were sent to local residents with information and pamphlets, informing them of the Ramsar proposal and inviting them to a public forum.
    - Two public forums were held. Public notices, newspaper advertisements, radio and a letterbox drop of fliers with information and invitations.
    - ‘Communiques’ were sent out to relevant stakeholder groups at the end of every Working Group meeting describing discussions from the meeting.
    - Public exhibition.
- *Clarence River Erosion Management Plan* (Maritime Management Centre, 2015):
    - Forums with key stakeholders.

  - Community drop-in sessions.
  - Public information session to present a draft set of proposed management actions for the Clarence River.
  - Proposed to establish a Clarence Riverbank Project Management Committee.
  - Public consultation sessions arranged in each region, with key stakeholders invited.
- Little Broadwater Management Plan (DPI and CVC Floodplain Services, 2006):
  - Meetings with stakeholders and landholders to address scald and remediation works.
- Community Land, Crown Reserves and other Public Places (Generic Plan of Management) (CVC, 2021b):
  - Draft copy of plan put on public exhibition.
  - Two public hearings (Maclean and Grafton).

2. SCOPING STUDY STAKEHOLDER ENGAGEMENT

Aims and Objectives

The aim of the engagement activities in Stage 1 of the CMP preparation were to:

- Increase community and stakeholder understanding of the new legislative and planning framework.
- Establish strong working relationships with community networks and stakeholders which are built on mutual trust and respect.
- Be clear about the coastal management roles and responsibilities of CVC and public authorities.
- Understand community goals and aspirations for the coastal zone and community views on values, opportunities and priorities.
- Understand community motivations for participation and preferred approaches and processes, to encourage increased community interest and willingness to actively participate in coastal management.
- Increase community and stakeholder understanding of the dynamic nature of coastal processes, risks and opportunities and the need to set long-term objectives.
- Determine the engagement activities that are required during the preparation of subsequent stages of the CMP.

Consultation Activities

The stakeholders and consultation activities conducted during Stage 1 of the CMP development are summarised in Table 2. Further detail on the stakeholders is provided in Attachment 1.

Table 2: Scoping Study consultation activities

Stakeholder	Opportunities for Engagement
CEMC	Workshop 1 (November 2021): The proposed direction of the Scoping Study including interested parties, approaches to stakeholder engagement, data collection, key issues and reporting. Workshop 2 (May 2022): Preliminary risk assessment and Scoping Study outcomes. Review of Final Draft Scoping Study.
Aboriginal Community	Official notification of the project and request for registration of interest to Native Title holders, LALCs and Aboriginal community groups. Presentation to Yaegl RNTBC (refer Attachment 2). Proposed on-Country assessments with Yaegl, Western Bundjalung and Bandjalang Native Title holders (refer Attachment 2).
NSW Government agencies	Initial information gathering, site inspections, meetings. Initial letters were sent to NSW government agencies to introduce the project and request input into the development of the Scoping Study. Dedicated agency liaison for initial information gathering phases and to explore existing information. Review of Final Draft Scoping Study.
General Community	Project notification and introduction via direct emails/letters to community groups, business owners, industry representatives and community members. The Clarence Conversations website included project information including the community survey, useful links, downloads, a discussion forum and questions page. Community survey - used to gain feedback from community members on values, issues and ideas for management. An on-line survey was available between 9 November 2021 and 13 January 2022. The survey was accessed from the Clarence Conversations webpage and the survey link was provided to all community groups and industry groups. Social media - The community survey was also advertised on CVC's Facebook page (26/11/2021, 06/12/2021, Figure 2). Review of Final Draft Scoping Study (public exhibition).
Council	Regular communication, information sharing and collaboration.
Neighbouring Councils	Initial information gathering Review of Final Draft Scoping Study (public exhibition).

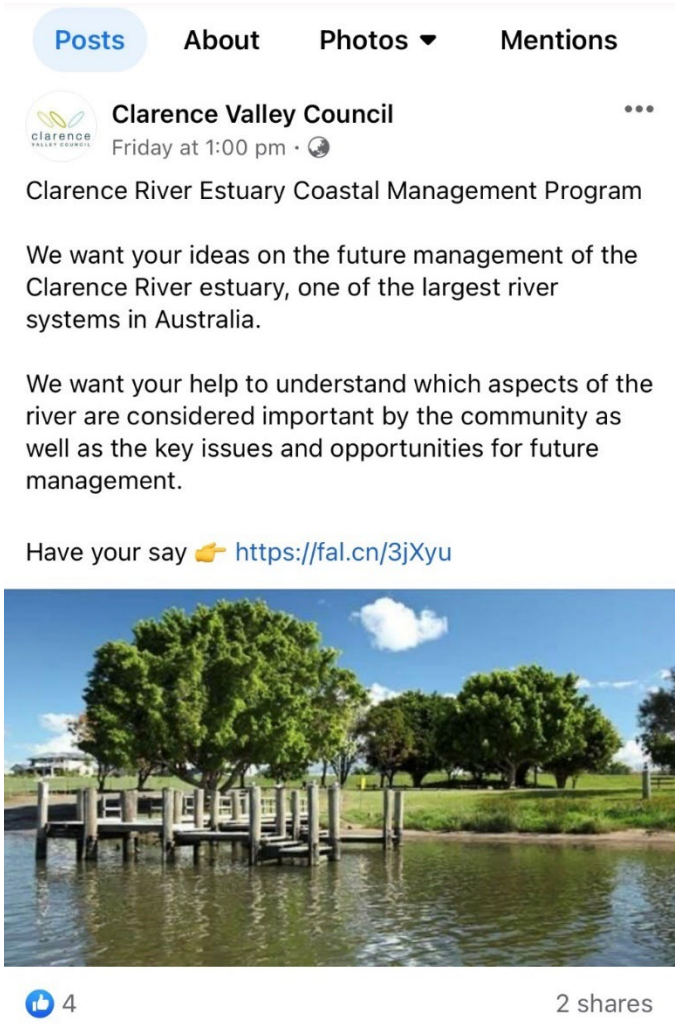


Figure 2: CVC Facebook post advertising the community survey (26/11/2021, 06/12/2021)

3. CONSULTATION OUTCOMES

Community Survey

The community survey was open between 9 November 2021 and 13 January 2022 with 36 on-line surveys completed. This represents a small portion of the population however other methods of engagement were also undertaken to target a wider range of interests.

Most of the surveys were completed by individuals between 40-59 years of age and most (29) respondents live within the study area. Two other respondents live in other areas of the Clarence Valley LGA. The results of the survey provide a good snapshot of community opinion about the study area including popular activities and locations of access, current issues, management priorities and the community's vision for the future of the river and estuaries. The survey and detailed outcomes are provided in Attachment 3. Key outcomes of the survey are:

- The most common activities within the study area (>75% of responses) are wildlife/nature appreciation, swimming, picnicking/BBQs, passive water-based recreation (i.e. kayaking, paddle boarding, sailing) and walking / exercise / dog walking.
- The most popular place to undertake activities is the lower Estuary.
- The most common attributes valued by respondents (>70% of responses) are scenic beauty, environmental value / biodiversity and clean waterways.
- The three most common concerns were poor water quality, marine vegetation (seagrass, mangroves, saltmarsh) loss or degradation and future land use changes. By area, the most common concerns are:
    - Lower estuary: marine vegetation (seagrass, mangroves, saltmarsh) loss or degradation, and sand build-up affecting navigation, water quality.
    - Middle estuary: water quality and floodplain management.
    - Upper estuary: weeds and poor water quality.
    - Entire estuary: riverbank erosion and weeds.
    - Catchment: vegetation clearing and weeds.
- Other issues of concern are:
    - New developments / floodplain development.
    - Commercial fishing.
    - Unreported recreational catches.
    - Mining.
    - Excessive tourism.
    - Stock accessing rivers / agricultural management.

  - Damage to seagrass in Wooloweyah Lagoon.
  - NPWS management.
- The most preferred priorities for funding are improving water quality, improving floodplain management, protecting / improving natural biodiversity, improving riparian vegetation, weed management and addressing riverbank erosion. By area, the preferred management approaches are:
  - Lower estuary: protecting marine vegetation, planning for climate change and protecting / improving natural biodiversity
  - Middle estuary: addressing riverbank erosion, improving floodplain management and planning for and mitigating flooding impacts
  - Upper estuary: weed management and improving recreational facilities
  - Catchment: protection of cultural heritage, public education and improving water quality
- The respondents considered that the following other management approaches should be prioritised for funding:
  - More public and disabled access along river.
  - Commercial fishing management.
  - Agricultural management / support.
  - Drain / floodgate maintenance and repairs.
  - Protection of foreshores and wetlands.

The most important attributes of the Clarence coastline and estuaries in 10 years from now are good water quality (clean water/safe to swim), healthy marine vegetation (seagrass, mangroves and saltmarsh), abundant wildlife, healthy native vegetation (e.g. no weeds, less cleared areas) and an informed community. The majority of respondents wanted to retain the natural beauty, ecological values and clean waterways of the study area.

Feedback Collected on the Webpage

The project webpage included an open forum, question and answer page and pin map. Most contributions to the question page were related to the impacts of surrounding development and invasive weeds on the Everlasting Swamp. Other questions related to seagrass in Wooloweyah Lagoon and trawlers in the estuary and the impacts on wetlands in Yamba from development. The pin map was used to identify the wetland areas in Yamba which has been impacted by weeds. There were:

- 463 visits to the webpage.
- 19 participants who downloaded information
- 42 participant who contributed to a tool (pin map, forum, questions).

A summary of responses received on the Clarence Conversations web page is provided in Attachment 4.

Aboriginal Community

Proposed on-Country assessments with Yaegl, Western Bundjalung and Bandjalang Native Title holders have not yet occurred. CVC will continue to liaise with Native Title holders (refer Attachment 2).

NTSCorp provided additional information from Yaegl RNTBC including background to the native title claims and determinations, the Yaegl Peoples deep and abiding connection to the lands and waters of their traditional country, and particular cultural significance of the waterways, coastline and seas, the importance of strong and mutually beneficial relationships between Yaegl People and the people and organisations working on Yaegl Country, protection of cultural sites of significance, middens and Aboriginal objects, involvement and guidance of Yaegl People throughout the CMP studies and opportunities for Yaegl People to be involved in CMP research activities.

State Government Agencies

Feedback from the NSW government agencies is summarised in Table 3. A full list of agencies contacted is provided in Attachment 1.

Local Government

Neighbouring councils (Kyogle, Tenterfield, Glen Innes Severn, Armidale Regional, Bellingen, Richmond Valley, Coffs Harbour) were contacted for input into the CMP Scoping Study (refer Attachment 1). Feedback received is summarised in Table 4.

Industry and Community Groups

A summary of feedback from the industry and community groups is provided in Table 5. A full list of groups contacted is provided in Attachment 1.

Community Members

A summary of written feedback from individual community members is provided in Table 6.

Table 3: Feedback from NSW government agencies during Scoping Study preparation

Agency	Feedback
National Parks and Wildlife Service	Areas of interest – NPWS and Council management is complementary, alignment with MEMS, understanding coastal issues impacting reserve values, various management aspects, community engagement and involvement of traditional owners, NPWS advice and reserve plans of management. Detailed comments were also provided on floodplain management, marine biodiversity and ecosystem integrity.
DPI - Fisheries	Values - Clarence River estuary provides important environmental, social, cultural and economic values. It provides a vast quantity of key fish habitat which is vital in sustaining commercial, recreational and cultural fisheries. Issues - Key threats and risks relevant to the Clarence River estuary have been identified in previous estuary management studies and many of these are still relevant. Many of the MEMS TARA threats are relevant to the Clarence River estuary. Given that fish kills have previously occurred within the Clarence River estuary as result of poor water quality, it would be expected that the Scoping Study would identify the need for improved management of the major threats to water quality in the estuary including agricultural diffuse source run-off, urban stormwater discharge and modified freshwater flows.
Port Authority	Priorities - maintaining continuous safe and efficient access to the Port of Yamba including but not limited to the safety of the river bar, safe channel depths, maintaining aids to navigation (with TfNSW) and the maintenance of the breakwater at the mouth of the Clarence River. Issues - The need for safe depths of navigation channels and berthing boxes within the Port. CMP should consider upstream erosion to protect riparian land and reduce sediment load. CMP should consider the effectiveness of training walls in the lower estuary. Collis Wall now disconnected from Goodwood Island due to bank erosion. Possible sinking of training walls in lower estuary which may affect water flow and erosion. Management - maintenance dredging program for the bar and inner bar of the Clarence River estuary should be considered. Training walls should be investigated to determine the effects of sinking on water flow and erosion and any need for rectification. Upstream erosion control measures should be prioritised.

Agency	Feedback
DPE - Crown Lands	Provided a summary of roles and responsibilities. Priorities: • Accelerate economic progress in regional and rural NSW. • Protect cultural heritage on Crown land. • Protect environmental assets, improve and expand green space and build climate change resilience. • Strengthen and support evolving community connections. • Working with Native Title holders to ensure that activities authorised on Crown Lands are delivered in accordance with procedural requirements under the Native Title Act 1993 and also relevant Indigenous Land Use Agreements. Values: • The social, cultural, environmental and economic values within the study area are highly varied with respect to Crown land. • The scoping study must acknowledge native title rights and interests determined by the Federal Court. Issues: • The rights and interests of native title holders, including cultural heritage values. • Opportunities for native title holders to participate in natural resource management and caring for country initiatives. • Capacity building and business development for the Yaegl and Western Bundjalung Corporations, should be considered and facilitated as part of developing the CMP. Management: • Meaningful consultation with native title holders and supporting the Yaegl and Western Bundjalung native title corporations • Integrated approach towards developing the CMP, including consultation with relevant Crown land managers. • Activities within the estuary to be managed sustainably. • Roles and responsibilities for management actions on Crown land to be agreed and clearly articulated in the CMP.

Table 4: Feedback from local councils during Scoping Study preparation

Council	Feedback
Kyogle	Water quality issues associated with our unsealed road network and our lack of ability to fund initial sealing program without external funding assistance. Address the issues of Private Native Forestry (PNF) across the catchment. Impacts of mining, pollution (threats to water sources and quality), excessive water use, etc Need to look after the wetlands and soaks. Woodenbong Residents are interested in headwaters projects - Rivercare and Landcare. Impact of intensive agriculture practices - dairies, piggeries, blueberry farms, etc. Sewering the villages (Tabulam and Mallanganee). Extraction rates, licences etc, for both surface and groundwaters as rural population increases. River/catchment restoration projects are generally ad hoc, rely on external funding (which is time consuming and not guaranteed), not necessarily targeting priority areas requiring restoration (but where there is willingness), generally small scale. There is no multi-disciplinary approach to ensure riparian areas are managed, used, protected and rehabilitated in a co-ordinated way. Council's NRM focus for on-ground management at this stage is on Council owned/managed land and there is minimal strategic approach to catchment action. Weed invasion along riparian areas within the upper Clarence catchment is a major issue. Weed definitions are part of this problem (along with lack of available funding to address this issue at the large scale that is required and a lack of a coordinated approach). Impact of some dairies (effluent, compaction, access to riparian areas). Feral deer are an emerging threat in the Kyogle LGA.
Glen Innes Severn	Coastal waterway management essentially must address all sources of water pollution, watercourse erosion and loss of essential native vegetation, and the removal of invasive plant and animal species from water systems and surrounding landscapes. Successful management of environmental issues depends greatly on wide sharing of relevant information that is easy to interpret, and the provision of funding to assist landholders and other key entities to initiate remedial actions.

Table 5: Feedback from industry and community groups during Scoping Study preparation

Group	Feedback
Clarence Canegrowers Association	Overall priorities - ensure that the regulatory framework from all levels of government support landowners to farm their land in a sustainable and viable manner. Overall values - landowners want to manage land sustainably for the future. Overall issues - adequate funding and regulatory settings for the maintenance for floodplain infrastructure. Overall management - seek to work co-operatively with CVC in a partnership to ensure that adequate drainage of the floodplain is achieved. Riparian vegetation: • Priorities - ensure that the correct balance between ecological outcomes and productive use of the land is obtained. • Issues - public land especially in the riparian zone is often weedy, which puts weed pressure on surrounding landholders. • Management - two sites in the South Arm are suggested as suitable riparian rainforest regeneration areas. Requires adequate budget for weed management on public land within the riparian zone. Bank erosion: • Priorities - proactive management of bank erosion, prime agricultural land is valuable and should be protected. • Issues - loss of agricultural land to bank erosion. • Management - obtaining a permit to manage streambank erosion on private land is too difficult. Suggests combination of rock and vegetation is the best solution for managing bank erosion.
Harwood Marine	Values - the Port of Yamba needs to keep its 'first Port of Entry' status Priorities - continue to provide employment, local economic and community benefits Issues - port navigation channels need to be kept at a safe depth to ensure no restriction to port operations. Management - dredging of the area known as the transition, which is upstream of the Goodwood Island wharf, on the first bend near the prawn farm needs to occur

Group	Feedback
Sunshine Sugar	Values: • Cohesive and inclusive action and recognition of industries, that make a positive contribution to water quality management. • The proactive and positive contribution of sugarcane farming to floodplain management. • Would prefer consultation with sugar industry when land use is changing from sugar cane to tree crops / grazing to acknowledge and assess positive contribution of the sugar industry to the region. • Ag services division of Sunshine Sugar assists growers with management of floodgates, drain cleaning, ASS, implementation of drainage management plans and audits of compliance. Priorities - protection of agricultural land for agricultural use, floodplain infrastructure management, farm management, riparian zone management, vegetation management, water quality, ASS issues. Issues: • Difficult/lengthy/costly approval process for drain maintenance for cane growers. • Believes there has been a low level of federal and state government investment in water quality improvement (compared to other areas e.g. Great Barrier Reef). • Concerned about overseas and local investment in agricultural land, and potential change in land use from cane farming to tree crops. Management: • Regulation of changed land use and environmental controls is limited by resources, funding and unclear responsibilities. • ASS self-regulation works well for drains but there is uncertainty over asset management responsibilities for drain outlets. • Complex approval processes - need to progress options for streamlining maintenance approvals processes. • Wants to be involved in CMP development.

Group	Feedback
Ozfish Clarence	Values - urgent and large-scale change throughout the Clarence catchment Priorities - water quality, floodplain wetlands, backswamps and ASS, fish habitat restoration. Issues: • The outbreak of Red Spot disease in 2021 was one of the worst in recent years as a result of poor water quality. • Reconnecting rivers to floodplains and wetlands as the primary means of improving water quality, increasing fish habitat and improving fish stocks in the Clarence River. • Improved floodplain management, especially in areas lower than 1 mAHD. Actions should include reversing land use away from low-productivity agriculture, favouring natural floodplain wetlands with the ability to process and buffer black water and acid sulfate areas. • Larger-scale restoration is still required to connect the riparian zones, especially across the Clarence catchments, to tackle pest fish species numbers in the river, to maintain fish passage for essential fish migration and to provide the vast array of instream and connected wetland fish habitats that are required for a thriving fish community for the Clarence River. • Seagrass loss in Wooloweyah Lagoon was raised in previous management plans however no meaningful action was undertaken and is still a problem. Management: • The CMP should result in specific actions to address these issues rather than frameworks. • Suggest that additional mechanisms to allow greater engagement and transparency of the CMP progress to community and key stakeholders, such as recreational fishers would be valuable. • Suggest that when the new CMP is adopted, a community/NGO engagement process is also implemented, including face to face sessions and potential facilitated community engagement opportunities. • Interested in assisting in the development and implementation of the CMP.

Group	Feedback
Lions Club of Clarence – Environmental	Values - protecting local flora and fauna and improving water quality. Priorities - Council programs that actively engage with community to undertake environmental works such as weed and erosion control would be of great benefit e.g. 'Adopt a Riverbank' program. Issues - water quality monitoring, riverbank erosion, weed control, fertiliser runoff, erosion control, maintaining forest cover, reducing pesticides. Management: • Wants the above issues to be managed to improve riverbank, water quality and habitat. • Would like to be involved and engaged in remainder of study. • Would like to see ongoing and comprehensive water quality monitoring along Clarence River and tributaries. • Wants to see ongoing education campaigns around riverbank erosion, including industry organisations (cane growers / beef co-ops). • Research to assist government to target funding and education programs. • Early micro-targeting for weed control to manage erosion. • Waterway impact assessment to understand risk factors from large sale industries to help landholders and government implement mitigation strategies / management regimes / development approval processes. • Scientific review of known impacts of herbicide use along waterways, close monitoring of the impacts of herbicide and research on innovative weed control. • Targeted education and mitigation programs for cattle graziers to reduce high nutrient runoff • Establishment of off-waterway watering points. • Would like to see opportunities for community groups / individuals to play a positive role in maintaining a healthy waterway.

Group	Feedback
Valley Watch Inc.	Values - healthy and diverse environment. Priorities - protect quality of life in Clarence Valley. Issues - loss of seagrass in Wooloweyah Lagoon, riparian expansion and restoration opportunities, carbon sequestration opportunities, pollution and stormwater, cane toads, environmental levy, community consultation, no mines in Clarence Valley. Management: • Suggests trawling season be changed to align with Clarence River trawling season (reduced by 2 months) and a five-year trial to limit trawling to southern end of Wooloweyah Lagoon. • Wants funding for studies into seagrass loss. • Catch data to be made publicly available. • Economic study proposing Wooloweyah Lagoon be a nursery and habitat for inter-channel species. Valley Inc wish for all 'in kind' assistance offered by residents and community groups to be accepted. • Investigate income opportunities for Indigenous groups (e.g. potential low impact eel farming or camping areas) and work with Indigenous groups to expand riparian zones with bush tucker foods / medicinal flora. • Suggests expanding saltmarsh areas. • Discussions around carbon sequestration and carbon credits to be held with surrounding land holders. • Decommissioning Taloumbi Ring Drain and expansion of Clarence Estuary Reserve at Micalo Island. • Council to employ additional staff to work on opportunities for carbon sequestration funding and form a committee. • Installation of gross pollutant traps, implement ranger inspections at industrial/marine to ensure compliance. • Community education around stormwater and pollution. • Ensure stormwater compliance in subdivisions and management around prawn farm pond water. • Appropriate actions taken to prevent / contain cane toads throughout catchment (planting grasses around CVC assets (STPs, sports fields), private dams. • CVC to investigate environmental levy. • More transparent information publicly available including previous management plans actions, outcomes and progress reports. • Requests all future mineral mining (exploratory and active) be banned and amendments made to Schedule 1 of SEPP (Mining Petroleum Production and Extractive Industries) 2007 and NSW Mining Act 1992.

Group	Feedback
Big River Ski Club Inc	Values - protection of waterways that does not restrict / exclude water activities. Priorities - protecting waterways and bank erosion. Issues - bank erosion occurring 1 km upstream of Corcoran Park (4-5 m in 15 years). Management: • Education of wakeboarders. • Improve boat landing areas around Grafton. • Control bankside vegetation. • Supports current no stop tow-zones and suggests they could be extended post-flooding to protect banks.
Grafton Rowing Club	Values - supporting the community to participate in rowing. Priorities - waterway access and usability. Management - improved access and use of waterway.

Table 6: Feedback from community members during Scoping Study preparation

Contact	Interest	Summary of Response
W. B. W. & J. M. W.	Sportsmans Creek landholders	Values - productive capacity for agriculture, fisheries and biodiversity, liveability and social values (rural and lifestyle village lifestyles), access to the river, estuary and beaches. Priorities – agriculture, water quality, biodiversity enhancement, fisheries production. Issues (General): • Complexity of processes. • Legislation wording is difficult to understand. • Overlapping legislation and bureaucracies making it difficult for small organisations and individuals to navigate. • Conflict between land use and water quality, agriculture and biodiversity, population increase (including jobs) and quality of life. • Mining proposals • Clarence River water diversion and dams Issues (Sportsman Creek): • Conflicting ideals with management of Sportsman Creek Weir. Landholders believe the weir is essential to the productive use of their land, and NSW Fisheries believe the weir impacts water quality, fish health, population recruitment and restricts fish passage. • Impact of NPWS management on surrounding land holders – often conflicting management objectives between NPWS and adjoining land holders. Management: • Provide summaries of legislation which are easy to read and flow charts to illustrate the legislation. • Provide readily accessible support staff to assist individuals and organisations in understanding and complying with legislation and processes. • Community resourcing (capacity building) and workshops to discuss and resolve diverse and conflicting demands on natural resources. • No dams, no mines. • Provide more floodplain management support staff in government agencies. • Provide resources to drainage unions to assist with legislation, capacity building and workshop projects. Install protective devices on each property around Sportsman Creek.

Contact	Interest	Summary of Response
M. M.	Landowner and cane farmer Chatsworth Island	Priorities - Ongoing maintenance of drainage infrastructure (identifies specific drains on Chatsworth Island which have issues). Issues: • Maintains some drains at own expense, even though adjoining landowner's benefit. • Council does not undertake any drain maintenance on his land, although they do some remediation works on an ad hoc basis, assumed to be limited by funding. • Mangrove encroachment into some drains inhibit drainage. • Highway has impacted drainage. Management - would like to see funded maintenance plan detailing actions, works and timeframes for infrastructure associated with properties, and adjoining properties impacted by drainage.
W. D. & J. K.	Landowner and farmer Southgate	Values - continuing farming their land. Priorities - minimising erosion – observed reeds growing in intertidal zone minimise erosion caused by waves. Issues: • Does not want to see land lost (erosion) to the river. • Ulmarra levee is causing bank erosion on property (on opposite side of river). Provided photos showing erosion and document loss of vegetation since 2004. • Concerned continued erosion will result in loss of natural levee on their side of the river. Management - find a solution to ensure the natural riverside levee is not lost.

Contact	Interest	Summary of Response
D. M.	Goodwood Island landholders	Values - improved access to the waterway. Priorities: • To continue to farm in a sustainable manner • Protect loss of prime agricultural land and access roads from streamside erosion Issues: • Bank erosion (threatening access road on property) • Flood levee needs to be completed to provide better flood protection Management - wants ability to repair erosion controls and levee with minimal paperwork.
S. M.	Landowner and cane farmer Woodford Island	Priorities - be able to continue to farmland at Woodford Dale and South Arm. Issues: • Bank erosion damaging roads – only reactive protection occurring, not proactive. • Bank erosion caused by wave action in the intertidal zone. Undercutting trees which are threatening to topple and damage the roads. Management: • Placement of a small amount of rock on the ledge that this erosion has caused will provide good erosion control. • Council to do assessment on where low-cost infrastructure protection (as mentioned above) can be done.

Contact	Interest	Summary of Response
K. M., P. R., S. M. & R. F.	Representing 24 landowners to the north-west and west of Lake Wooloweyah	Priorities: • Maintain productivity of land serviced by the ring drain – to do this drainage systems and floodgates need to operate efficiently. • Do not want drains declared fish habitat. Issues: • Poor functioning of drainage system during wet weather periods. Closing of Outlet 1 has reduced the ability to remove water in a timely manner. This capacity needs to be restored. • Silting occurring 200m either side of Radial 1 in the ring drain, which reduced efficiency of drainage. • Suggests conclusions of NSW Fisheries Productivity Tidal Rehabilitation Report are incorrect, as they do not consider freshwater inflows. Management: • Drain cleaning around Radial 1. • Install extra pipes into the channel to replace those blocked at Radial 1 (priority).
T. M. & J. M.	Landowners on Harwood and Ashby Island that border river.	Values - sustainable farming. Priorities: • Continue to farm sustainably and protect loss of prime agricultural land, and access roads from stream side erosion. • Have installed silt catching structures that have been effective in support mangrove colonisation. Issues: • Erosion on the eastern side of Ashby Island and bank to the east of Martins Point on Harwood Island. • Areas of previously installed rock now require repair. • Face a lot of challenging (‘red tape’) processes and issues when floodplain drains require de-silting. Management: • Would like a clear and simple process in allowing landholder to work in partnership with Council to maintain existing erosion control structures and floodgate outlets in a timely manner. • Would appreciate advise on how to proceed in protecting the riverbank near Martins Point.

Contact	Interest	Summary of Response
S. C.	Landowner on Warregah, Harwood and Chatsworth Islands	Priorities - being able to farm into the future. Issues - Riverbank erosion around the southern tip of Warregah Island Management: • Installation of structure to protect and encourage mangrove growth, to protect banks. • Ability to carry out bank protection work 'without too much paperwork'.
J. L. & J. M. K.	Landholders at Southgate on the river	Issues: • Riverbank erosion alongside property, and in broader river. • Flood levee on southern bank exacerbates erosion during floods • Sand is then dumped onto pastures during floods. • Losing good soil into river through erosion, which then becomes a problem downstream. Management - finding a balance which results in a positive outcome for all parties involved (including those who make a living) and also contributing to the richness and diversity of the Clarence Valley environment.
A. S.	Landowner on floodplain adjoining river near Maclean	Values - flood mitigating works making non-productive land productive Priorities - protecting prime agricultural land from erosion and salt Issues: • Poor maintenance of floodplain drainage infrastructure due to lack of funding, difficult processes ('red tape') and impractical requirements. • Bank erosion caused by wave action and floods. • Riparian vegetation and fertile soil is lost into the river. • Very difficult / impossible to get permits to do rock revetment works. Management: • Previous rock revetment work undertaken by Public Works is now is disrepair and needs maintenance. • 'Red tape' on protecting bank erosion needs to be removed. • Landowners need assistance to complete bank protection works.

Contact	Interest	Summary of Response
T. S.	Sugar cane farmer on Palmers Island. Also a business advisor	Values - river system health. Priorities - health of estuary, sustainability for agricultural land, maintenance of drainage infrastructure, sustainability for fishing and aquaculture industry. Issues: • Floodplain drainage infrastructure issues around Palmers Island, including blocked drains, overgrown drains, malfunctioning 'fish gates', broken lifting device, eroding and broken headwalls and pipes. • In agreeance with other farmers across the valley of similar issues with 'red tape, 'incompetence' and 'lack of funding'. Management: • More funding. • Practical actions and outcomes development in conjunction with landowners. • Transparency with planning, approvals, and implementation. • Timely action.
J. A. & A. A.	Landholder Micalo Island (Oyster Channel)	Issues - bank erosion, exacerbated by boat wash, frustrated with difficult process to undertake any bank protection works, loss of seagrass in Lake Wooloweyah, impacts of trawlers on the lake.

Contact	Interest	Summary of Response
S. M.	Landholder in Lower Clarence (adjacent to Palmers Channel and Lake Wooloweyah)	Values - sustainable farming and associated economic and social benefits. Priorities - floodplains around estuaries and their channels, economic well-being and opportunities, improving disaster resilience. Issues: • Study area of CMP too large. • Floodplain development. • Interactions with freshwater sources. • Climate change – response to climate change can't be to remove important farmland. • Involuntary private land exposure to inundation. Management: • Suggests study area should be within CVC LGA and limited to tidal inundation and oceanic processes. • Suggests utilising expertise of contributors and authors of CMP to support economic activities. Advises environmental restoration and conservation to economic detriment of the community is not a permitted objective of the CMP but must support social, cultural and economic wellbeing of community. Providing education and advice to landholders (and exclusion of obstruction from government bodies) should be included in CMP. • Suggests CMP to manage inundation of floodplain in accordance with NSW Flood Prone Land Policy. • Suggest CMP to include a process for accepting input from freshwater sources (flood mitigation structures). Freshwater flows and local rainfall need to be considered as part of assessment to how human well-being can be supported through ecologically sustainable development. • More funding to invest in disaster resilience and preparedness. • CMP to support development of 'Engines of Growth' (including agriculture). • CMP to maintain flood mitigation infrastructure and not rule it out. • CMP should support land for food production, not favour marine-based opportunities (i.e. fisheries).
P. R.	Floodplain landowner	Provides scientific information about streambank erosion to support other landholder feedback. Provides comments on types of bank erosion protection measures. Discussed difficulties obtaining approval for river bank works. Discusses riparian condition and weeds and suggests that riparian rainforest regeneration should be undertaken at a site near Gulmarrad.

Attachment 1: Stakeholder Contact Register

Clarence Valley Coastline Coastal Management Program Scoping Study: Stakeholder Register

Organisation	Contact Name	Position
Local Government		
Clarence Valley Council	Councillors	CEMC and Council
Clarence Valley Council	Greg Mashiah	Manager Water Cycle
Clarence Valley Council	Scott Lenton	Manager Environment and Regulatory Services
Clarence Valley Council	Murray Lane	Manager Development and Land Use Planning
Clarence Valley Council	Peter Wilson	Coast and Estuary Coordinator
Clarence Valley Council	Peter Wilson (acting)	Floodplain Services Coordinator
Clarence Valley Council	Leeanne Kennedy	Cultural Heritage Officer
Clarence Valley Council	Dr Danny Parkin	Senior Strategic Planner (Public Land/Native Title)
Kyogle Shire Council	Graham Kennett	General Manager
Kyogle Shire Council	Maree Brennan	GIS & Project Officer
Kyogle Shire Council	Scott Ancliff	Community Resilience Officer
Kyogle Shire Council	Sean Mackie	Environment Officer
Kyogle Shire Council	Judy Faulks	Senior Environmental Services Officer
Tenterfield Shire Council		
Glen Innes Severn		
Armidale Regional		
Bellingen	Justine Elder	River and Biodiversity Projects Officer
Richmond Valley Council	Carla Dzendolet	Manager Environmental Health and Sustainability
Coffs Harbour City Council	Kyran Crane	Coast and Environment Officer
NSW Government		
DPIE - Biodiversity Conservation Division	Kym Bilham	
National Parks and Wildlife Service	John Kennedy	Team Leader - Rangers Clarence Area
National Parks and Wildlife Service	Josh Chivers	Senior Project Officer, Coastal Landscapes
DPI-Fisheries	Jonathan Yantsch	Fisheries Manager, Aquatic Ecosystems (North Coast)
DPI-Fisheries	Scott Nichols	Fish Passage/Habitat Action Grants
Transport for NSW - Roads and Maritime (boating safety)	Anna Sedlak	Boating Safety Office
Transport for NSW	Sonia Mckay	
Transport for NSW	Luke Tucker	Boating Safety Officer
Port Authority	Michael Read	Marine Pilot Regional
DPI Fisheries	Sharyn Goldstein	MEMA - Floodplain prioritisation
DPIE - Crown Lands	Derek van Leest	
DPIE - Crown Lands	Catherine Knight	Coastal management specialist
DPIE - Crown Lands	Malcolm Robertson	Senior Project Officer, Coastal Unit
Local Land Services	Nigel Blake	Senior Land Services Officer
Local Land Services	Jenny Higgins	Riverbank Rehabilitation Program
NSW Forestry Corporation	Peter Walsh	Soil and Water Specialist
Heritage NSW (Dept Premier and Cabinet)		
DPI - Agriculture	Jeremy Bright	Macadamia Development Officer
DPI - Agriculture	Melinda Simpson	Blueberries
Aboriginal Groups		
Yaegl Traditional Owners Aboriginal Corporation	Dianne Chapman	
Yaegl Traditional Owners Aboriginal Corporation	Bill	CEO
Yaegl Traditional Owners Aboriginal Corporation	Helen Orr	Land Tenure and Notifications Officer
Yaegl Traditional Owners Aboriginal Corporation	Mishka Holt	NTS Corp
Birrigan Gargle LALC		
Yaegl LALC	Noeline Kapeen	
Grafton-Ngerrie LALC		
Mudyala Aboriginal Corporation	Aneika Kapeen	CEO
Baryugil Square LALC		
Jubullum LALC	Cal Davis	Acting CEO
Jana Ngalee LALC		
Muli Muli LALC	David Morgan	Administrator
Muli Muli LALC	Matthew Green	CEO
Bogal LALC		
Glen Innes LALC		
Dorrigo Plateau LALC	Cathy Thomas	CEO
Guyra LALC	Pauline Ale	
Armidale LALC		
Moombahlene LALC	Helen Duroux	
Ngullingah Jugun (Our Country) Aboriginal Corporation	Helen Orr	NTS employee
Ngullingah Jugun (Our Country) Aboriginal Corporation	Mishka Holt	NTS Corp
Ngullingah Jugun (Our Country) Aboriginal Corporation	Jane Baldwin	Contact person/secretary
Bandjalang Aboriginal Corporation Prescribed Body Corporate	Rebecca Woods	CEO
Bandjalang Aboriginal Corporation Prescribed Body Corporate	Tara	
Bandjalang Aboriginal Corporation Prescribed Body Corporate	Claire Bartram	NTS Corp
Bandjalang Aboriginal Corporation Prescribed Body Corporate	Mishka Holt	NTS Corp
Githabul Nation Aboriginal Corporation	Nathaniel Ord	Contact person/secretary
Githabul Nation Aboriginal Corporation	Gabriel Boota	Board member
Industry Groups		
Clarence River Fishermens Cooperative	Danielle Adams	General Manager
Clarence River Ferries		
Clarence Canegrowers	Peter Rose	Industry Representative
Oystergrowers	Allan (Joe) Brooks	Clarence Shellfish Co-ordinator

Clarence Valley Coastline Coastal Management Program Scoping Study: Stakeholder Register

Organisation	Contact Name	Position
Aquaculture??		
Clarence Canegrowers		
Clarence Canegrowers	Peter Rose	Canegrowers Representative CEMC
Clarence Canegrowers	Ross Farlow	Chairman, Clarence Canegrowers
Clarence Canegrowers	Brendan Reeves	Manager, Clarence Canegrowers
Australian Macadamia Society	Jolyon Burnett	CEO
Australian Blueberry Growers Association	Rachel Mckenzie	Executive Director
Cattle?		
Harwood Marine	Ross Roberts	See below
NSW Farmers	Mark Bulley	Regional Services Manager - North Coast and Tablelands
Sunshine Sugar	Malcolm Warren	Agricultural Manager
Sunshine Sugar	David Wood	General Manager Operations
Sunshine Sugar	Ian McBean	Corporate Services Manager
Community Groups/Representatives		
Ozfish Clarence	Angus Fanning	Program Manager - NSW Coasts
Ozfish Clarence	Peter Pryor	Clarence River Chapter President
Ozfish Clarence	Demara Gates	Project Officer NSW North Coast
Sportsmans Creek Drainage Union	Jo Wearing	Chairperson
Sportsmans Creek Drainage Union	James Zuill	President
Swan Creek Floodplain Management Committee	Ross Lawson Leonie Hebbard	Chairperson
CEMC rep (Angourie)	Imelda Jennings	
CEMC rep (Gulmurrad)	Peter Maslen	
CEMC rep (Brooms Head)	Kevin Sheehan	
CEMC rep (Harwood Marine)	Ross Roberts	
CEMC rep (Councillor)	Greg Clancy	
Clarence Environment Centre		
Clarence Valley Conservation Coalition		
Clarence Landcare	Debbie Repschlager	Coordinator
Jaliigirr Biodiversity Alliance	James Birnie	Jaliigirr Biodiveristy Alliance Contact
Upper Clarence Combine Landcare	T Moody	
Clarence Valley Conservation in Action	Jan Armstrong	
Clarence Catchment Alliance		
Lions Club of Clarence - Environmental	Tracy Pateman	
Hopeful Disruptions - Care for Biirrinba		
Wooloweyah Landcare	Carolyn Eddy	
Iluka Landcare	David Lohde	
Yamba Landcare	Barbara Whale	
Maclean Landcare	Wendy Plater	
Valley Watch	Ros Woodward	
Marine Rescue	Iluka Yamba	
SES		Deputy Commander Northern Zone
Yamba District Chamber of Commerce		
Iluka Chamber of Commerce		
Maclean District Business Chamber		
Ratepayers Association of Iluka		
Ulmarra Village Inc	Steve Pickering	
Big River Ski Club Inc.		
Rest Point Family Hotel Social Fishing Club Inc		
Grafton District Anglers Club		
Lower Clarence Amateur Rowing and Sculling Club Inc		
Big River Sailing Club	Hariet Woodrow	Commodore
Iluka Rowing & Aquatic Club Inc.		
Grafton Rowing Club Inc	Earl Cruikshank	
Grafton Dragon Boat Club		
Clarence River Sailing Club		
Port of Yamba Yacht Club		
Additional letters received		
Community	Doug and Paula Moss	Goodwood Island landholders
Community	WB & JM Wearing	Sportsmans Creek landholders
Community	Michael Madden	Landowner and cane farmer Chatsworth island
Community	Warren Doust and Joy Kirby	Landowner and farmer Southgate
Community	Stuart McSwan	Landowner and cane farmer Woodford Island
Community	Kerryanne Mackay	Representing 24 landowners to the north-west and west of Lake
Community	Tim and Jo McMahon	Landowners on Harwood and Ashby Island that border river.
Community	Shaun Messer	Landowner Palmers Channel and Lake Wooloweyah
Community	Shane Causely	Landowner on Warregah, Harwood and Chatsworth Isalnds
Community	JL and JM Kirby	Landholders at Southgate on the river.
Community	Andrew Skinner	Landowner on floodplain adjoining river near Maclean
Community	Tim Small	Sugar cane farmer on Palmers Island. Also a business advisor.
Community	Jan and Allan Armstrong	Landholder Micalo island (Oyster Channel)

Attachment 2: Consultation with Native Title Holders

CLARENCE VALLEY COASTAL MANAGEMENT PROGRAMS

Presentation to Yaegl RNTBC

13 December 2021

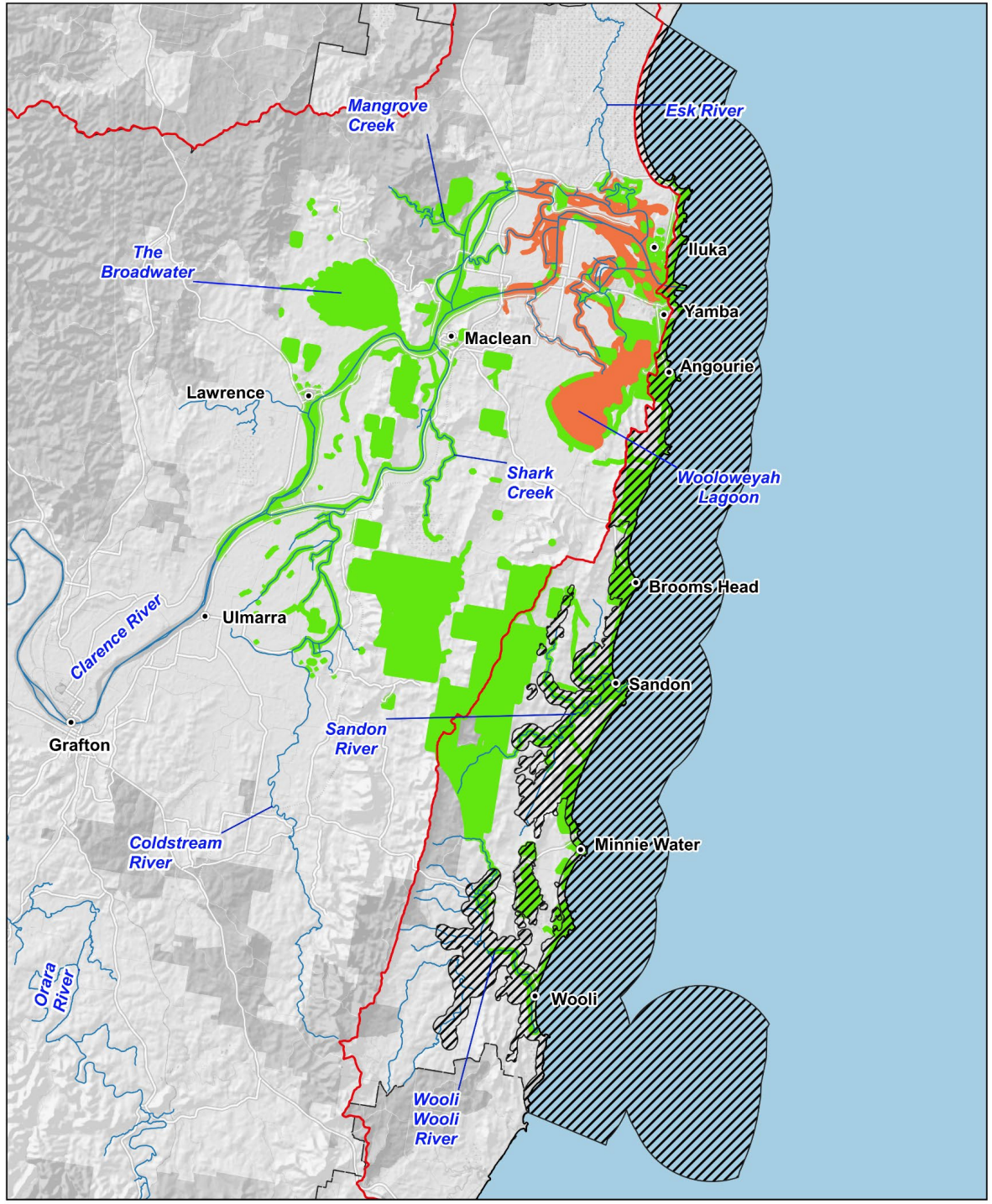
COASTAL MANAGEMENT PROGRAMS

- Councils are required to prepare CMPs under *Coastal Management Act 2016* and *State Environmental Planning Policy (Coastal Management) 2018*
- Current Estuary Management Plans and Coastal Zone Management Plans will be updated to CMPs
- The CMPs will provide an integrated strategy for the coordinated management of the coastal zone (including estuaries) into the future.
- Clarence Valley Council will prepare two CMPs:

1. Clarence Valley coastline and smaller estuaries
2. Clarence River estuary

Hydrosphere Consulting

STUDY AREAS



Legend

- Clarence River study area
- Clarence coastline CMP study area
- Waterway
- Towns

Native Title exists (non-exclusive)

- Yaegl People #1
- Yaegl People #2

STAGES TO DEVELOP A CMP

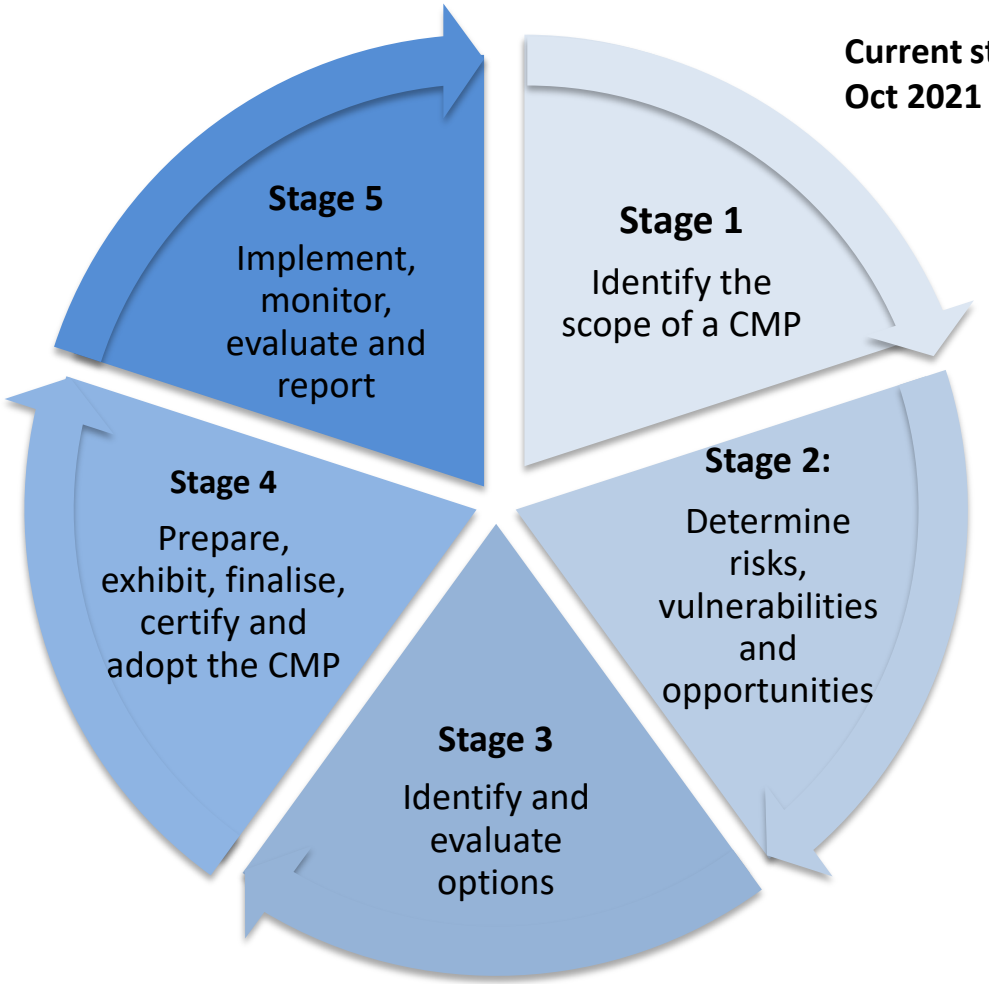
Clarence Valley Coastline and Estuaries

Coastal Management Program

Stage 1: Scoping Study

Final Report

March 2021



Current stage - Clarence River estuary: Oct 2021 – July 2022

Current stage - Clarence coastline: Nov 2021 – July 2022

STAGE 1 SCOPING STUDY FOR ESTUARY

- Review progress made in managing issues
- Document the understanding of the current situation
- Identify the focus of the new CMP – studies and projects
- Gather stakeholder ideas, issues to be addressed and future involvement

STAGE 2 DETAILED STUDIES FOR COASTLINE

- Key threats identified in Scoping Study:
  - Coastal hazards – beach erosion, shoreline recession, coastal inundation, slope instability/landslip, tidal inundation
- Detailed studies identified for Stage 2:
  - Shire-wide assessment of coastal hazards with focus on known hotspots (Shark Bay/Woody Bay, Whiting Beach, Yamba Main Beach, Brooms Head, Sandon, Wooli)
  - Review of slope stability risk – Pilot Hill, Cakora Point
- Detailed risk assessment
- Review of planning requirements

COMMUNITY CONSULTATION

- Clarence River Estuary Coastal Management Program | Clarence Conversations
- Community survey – link on above page
- Clarence Valley Coastline Coastal Management Program (Stages 2-4) | Clarence Conversations
- Agencies, community, industry – invitation to provide input
- Meetings with Registered Native Title Bodies and Holders
- Coast and Estuary Committee meetings

ENGAGEMENT WITH FIRST NATIONS PEOPLE

We want to:

- Better understand the cultural significance of the landscape and waterways
- Better understand the influence of catchment activities, hazards and environmental change on cultural values
- Promote effective participation
- Facilitate sharing of cultural knowledge
- Provide a forum for early and ongoing engagement

- What do you want us to consider in the development of the management plans?
- What are the issues that need to be addressed?
- How do you wish to be involved in the CMP development and implementation?

Proposed Scope for Engagement with Yaegl Native Title holders - Clarence River Estuary Coastal Management Program (CMP) Scoping Study and Clarence Coastline and Estuaries CMP Stages 2 - 4

Clarence Valley Council and Hydrosphere Consulting acknowledge the Yaegl peoples continuing connection to the Clarence Valley and the land and waters discussed in the CMPs. The Yaegl Native Title holders are key stakeholders in the development of the CMPs.

Introduction

Clarence Valley Council (CVC) is currently preparing two Coastal Management Programs (CMPs) for the Clarence Valley LGA - the Clarence Valley Coastline and Estuaries CMP (Coastline CMP) and Clarence River Estuary CMP (Clarence River CMP). CMPs are prepared under a five-stage process as shown on Figure 1.

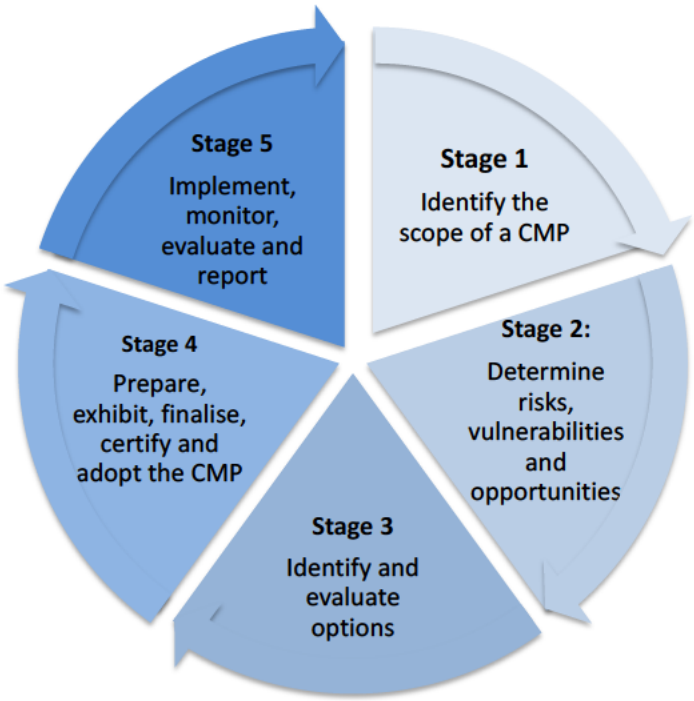


Figure 1: CMP process – five stages

Stage 1 of the Coastline CMP was completed in March 2021 with stages 2-4 currently underway. Stage 1 of the Clarence River CMP is currently being prepared. Hydrosphere Consulting has been engaged by CVC to undertake both the current projects.

The CMPs will set the long-term strategy for the coordinated management of the Clarence coastline and estuaries with a focus on achieving the relevant objectives for each coastal management area from the *Coastal Management Act 2016*. The CMPs will incorporate management actions and strategies to address key threats and support a diversity of natural values and human uses for a range of timeframes (immediate, 20 years, 50 years and 100 years). Management actions will be developed for the next ten years to balance and manage uses so that they are compatible with the environmental, social and economic values of the Clarence Valley coastal zone. Longer-term pressures such as climate change and sea level rise will be considered in the formulation of management actions to ensure resilience against future threats and the conservation of these values for future generations.

The study areas for both projects relative to Yaegl Native Title areas are illustrated in Figure 2. The study area for the Coastline CMP encompasses the coastal zone from the Clarence Valley LGA

boundary in the north (Shark Bay/Ten Mile Beach) south to the southern LGA boundary south of Wooli. This study area also includes the small coastal waterways such as Mara Creek, Lake Arragan, Lake Cakora, Sandon River, Wooli Wooli River and the freshwater lakes of Minnie Water and Lake Hiawatha. The lands of the Yaegl people are located within the study area. The Clarence River CMP study area encompasses the entire Clarence River catchment although CMP actions are focussed on the coastal zone. The Clarence River catchment is located within the lands of the Yaegl, Gumbaynggirr and Bundjalung nations. **T**he Clarence coastal zone is defined as the areas mapped in the State Environmental Planning Policy (Coastal Management) 2018.

Figure 2 illustrates the Yaegl Native Title determinations (Yaegl People #1 and #2) over parts of both the Coastline CMP and Clarence River CMP study areas. Not all Native Title areas are within the coastal zone.

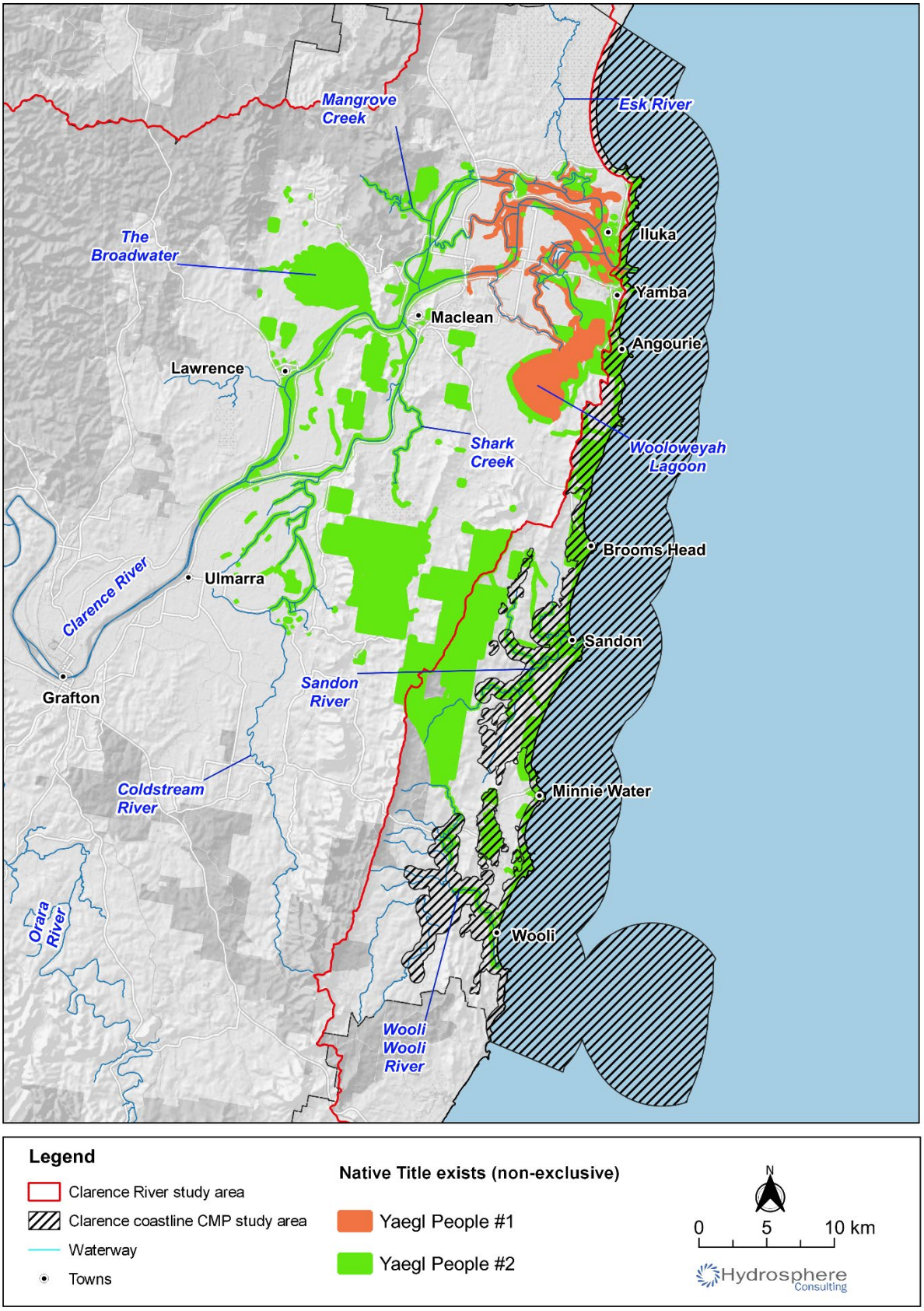


Figure 2: Clarence Valley CMP study areas and Yaegl Native title areas

Goals/objectives of First nations involvement

The overall goals/objectives of First Nations involvement in the CMP process are as follows:

- Develop a collaborative relationship and shared understanding of the project.
- Increase participation and involvement of First Nations people in management of Country and decision-making.
- Identify opportunities for ongoing involvement in CMP implementation including monitoring and implementation actions.

Involvement so far

Robyn Campbell (Hydrosphere Consulting) who is the project manager for both projects had several discussions with Yaegl administration staff and NTSCorp representatives throughout late 2021 and early 2022. Robyn met with the Yaegl RNTBC at a meeting on 13 December 2021 and provided a presentation introducing and explaining the two CMP projects and inviting Yaegl involvement. At that meeting, it was highlighted that the project team wants to:

- Better understand the cultural significance of the landscape and waterways.
- Better understand the influence of catchment activities, hazards and environmental change on cultural values.
- Promote effective participation.
- Facilitate sharing of cultural knowledge.
- Provide a forum for early and ongoing engagement.

At the meeting, the RNTBC Directors had the following suggestions/requests:

- Hydrosphere to liaise with NTS Corp about Native Title Act requirements and the relationship to the CMP development process/framework. Initial discussions have been held with Helen Orr and further information will be obtained from Council and the NSW Department of Planning and Environment. NTSCorp will also provide a formal submission in response to Hydrosphere's request for input into the CMP projects during January 2022.
- The Directors identified the need to overlay CMP findings (e.g. threats) and cultural mapping (nearly complete). Training in cultural mapping outcomes and application (e.g. for Council) is proposed by the group.
- The Directors would like to arrange a cultural induction for the study team with Directors and other holders along the Clarence River and other coastline sites. This is the subject of this document.
- Ongoing involvement of holders, sea rangers, land management teams in CMP development and implementation is supported with appropriate compensation.
- A follow-up meeting with Native Title holders is proposed and potentially on a regular basis.
- The RNTBC would like Leeanne Kennedy, CVC to also attend future meetings and be involved in these Council projects.
- The Directors expressed support for ongoing engagement in the CMP development process, commencing with the above actions.

Proposed On Country meeting

An initial on Country meeting with Yaegl Native Title holders is proposed. It is envisaged that the initial meeting will involve the project team meeting and yarning with Native Title holders on country. This initial meeting will promote the development of a relationship between the team and the Native Title holders. It is expected to be a conversation starter and open the dialogue between

the team and the Native Title holders. It is envisaged to be the first of a series of meetings/ conversations to be held throughout the development of the CMPs. We recognise that relationships require trust and trust takes time to develop and as such project consultation will be an ongoing and evolving process.

During the initial meeting, we would like to ask:

- What do Native Title holders want us to consider in the development of the CMPs?
- What are the issues that need to be addressed in the CMPs?
- How do Native Title holders wish to be involved in the CMP development and implementation?

Throughout the CMP development, Council and the project team will be able to provide additional information as it becomes available.

Objectives

The specific objectives of the meeting and future engagement with Yaegl Native Title holders are to:

- Introduce and initiate a working relationship between the project and Native Title holders.
- Communicate project information to Native Title holders.
- Understand Native Title holders' cultural significance, values/stories and current uses of the estuary and coastline.
- Understand Native Title holders' concerns/issues about the estuary and coastline.
- Encourage involvement of Native Title holders in the future stages of the CMP projects.

The initial cultural meeting will be an informal, conversational meeting on country at a central site on Country within the Lower Clarence. Some suitable sites may be Flinders Park, Pilot Hill, Turners Beach or Reedy Creek in Yamba or McLachlan Park or the foreshore at the boat ramp in Maclean. This initial gathering would involve an initial cultural induction and project discussions. We will discuss expectations from both parties and the best approach to meeting the needs of the project team and Native Title holders. It is envisaged that future discussions with Native Title holders on Country will be required to discuss site-specific issues. However, during the initial meeting we will determine the need for future meetings and focus of these meetings.

We propose to hold the meeting during the week of Monday 14 February – Friday 18 February 2022.

Allowances

For the initial meeting the project team will consist of two Hydrosphere Consulting team members (Robyn Campbell and Uriah Makings) and two CVC personnel (Leanne Kennedy and Peter Wilson).

We suggest the attendance of two Native Title representatives who are able to provide knowledge and information relating to the CMP project. For the initial meeting we propose a 2-hour duration. A fee of [redacted]) is available for the initial meeting. This can be provided to Yaegl RNTBC as lump sum for suitable dispersion.

Details of further meetings will be confirmed after the initial meeting.

Please contact Robyn Campbell, Hydrosphere Consulting on 0421 145 027 (email: robyn@hydrosphere.com.au) or Peter Wilson, CVC on 6641 7358 (email: peter.wilson@clarence.nsw.gov.au) to discuss this proposal.

Proposed Scope for Engagement with Bandjalang Native Title holders - Clarence River Estuary Coastal Management Program (CMP) Scoping Study and Clarence Coastline and Estuaries CMP Stages 2 - 4

Clarence Valley Council and Hydrosphere Consulting acknowledge the First Nations continuing connection to the Clarence Valley and the land and waters discussed in the CMP. Native Title holders are key stakeholders in the development of the CMPs.

Introduction

Clarence Valley Council (CVC) is currently preparing the Clarence River Estuary CMP (Clarence River CMP). CMPs are prepared under a five-stage process as shown on Figure 1.

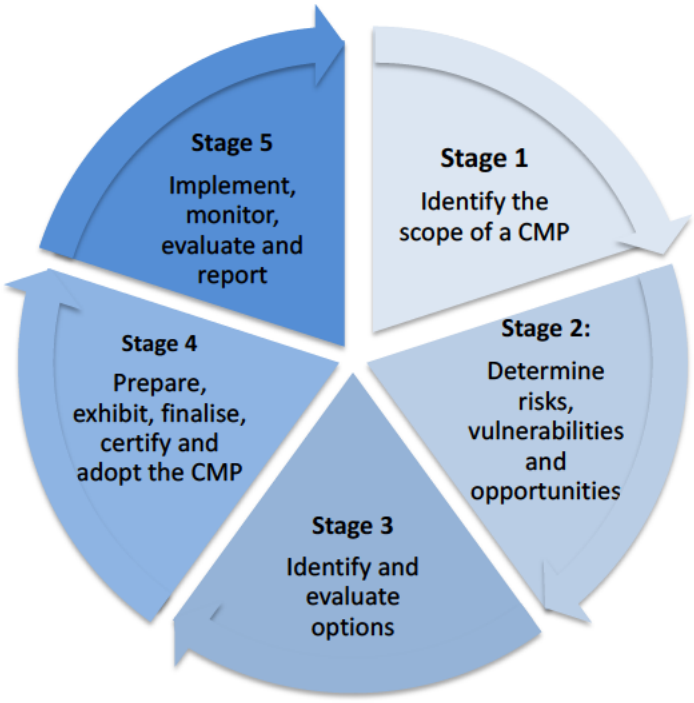


Figure 1: CMP process – five stages

Hydrosphere Consulting has been engaged by CVC to prepare the Stage 1 Scoping Study.

The CMP will set the long-term strategy for the coordinated management of the Clarence River estuary with a focus on achieving the relevant objectives for each coastal management area from the *Coastal Management Act 2016*. The CMP will incorporate management actions and strategies to address key threats and support a diversity of natural values and human uses for a range of timeframes (immediate, 20 years, 50 years and 100 years). Management actions will be developed for the next ten years to balance and manage uses so that they are compatible with the environmental, social and economic values of the Clarence River coastal zone. Longer-term pressures such as climate change and sea level rise will be considered in the formulation of management actions to ensure resilience against future threats and the conservation of these values for future generations.

The study area for the Clarence River CMP encompasses the entire Clarence River catchment although CMP actions will be focussed on the coastal zone. The coastal zone is defined as the areas mapped in the *State Environmental Planning Policy (Coastal Management) 2018.* Figure 2 illustrates the areas of Bandjalang Native Title determinations (Bandjalang People #1, #2 and #3) within the Clarence River CMP study area. Not all Native Title areas are within the coastal zone with small areas

overlapping the coastal zone in the upper Esk River catchment and Sportsmans Creek near Everlasting Swamp.

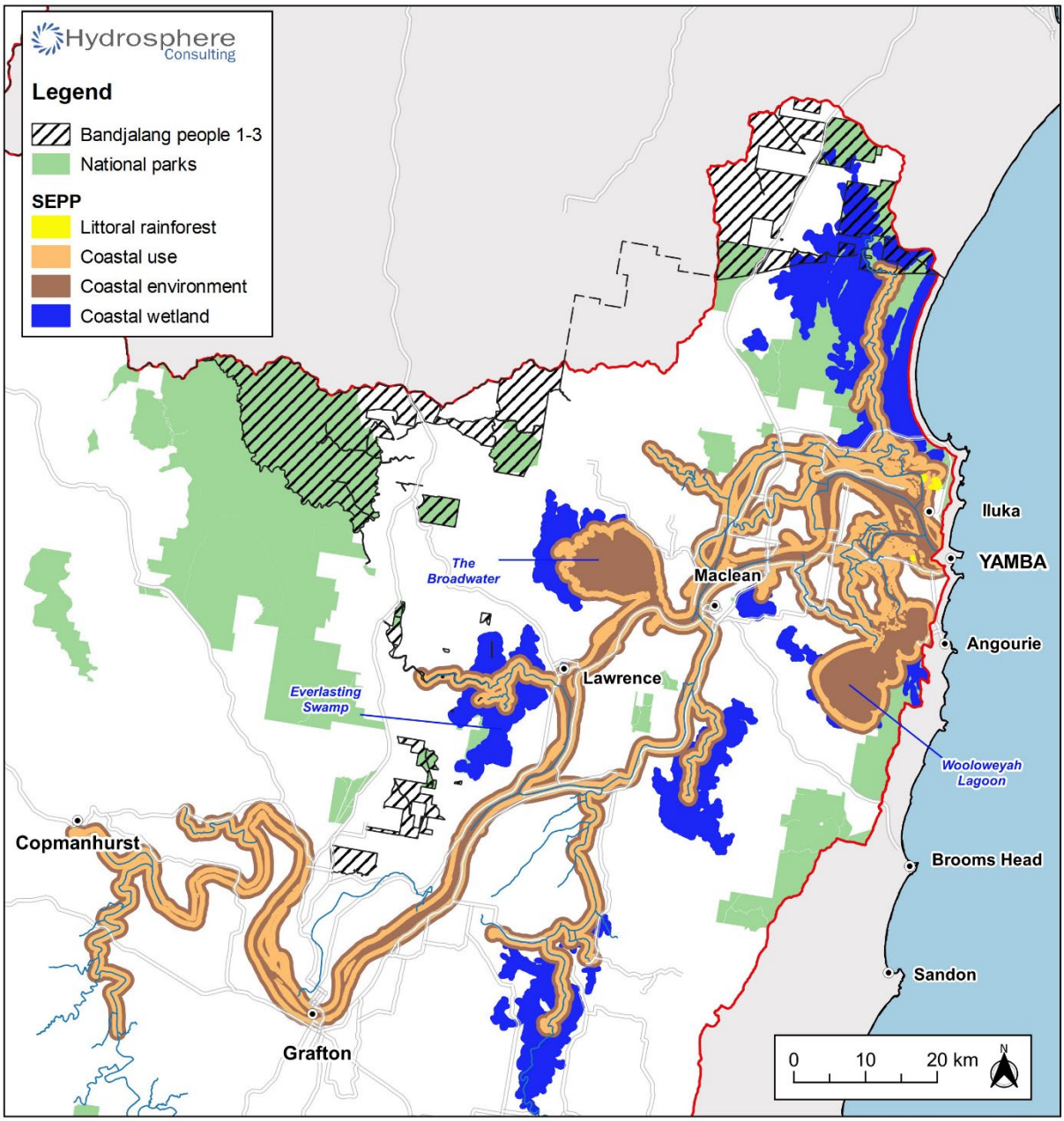


Figure 2: Clarence River coastal zone (Coastal Management SEPP areas) and Bandjalang Native title areas

Goals/objectives of First nations involvement

The overall goals/objectives of First Nations involvement in the CMP process are as follows:

- Develop a collaborative relationship and shared understanding of the project.
- Increase participation and involvement of First Nations people in management of Country and decision-making.
- Identify opportunities for ongoing involvement in CMP implementation including monitoring and implementation actions.

Involvement so far

Robyn Campbell (Hydrosphere Consulting) who is the project manager for the project has provided initial correspondence to Rebecca Woods (Bandjalang Aboriginal Corporation) and Clare Barcham (NTSCorp). Through this correspondence a request for an on-country assessment by the Bandjalang Aboriginal Corporation Prescribed Body Corporate was made.

Proposed On Country meeting

An initial on Country meeting with Bandjalang Native Title holders is proposed. It is envisaged that the initial meeting will involve the project team meeting and yarning with Native Title holders on country. This initial meeting will promote the development of a relationship between the team and the Native Title holders. It is expected to be a conversation starter and open the dialogue between the team and the Native Title holders. It is envisaged to be the first of a series of meetings/ conversations to be held throughout the development of the CMP. We recognise that relationships require trust and trust takes time to develop and as such project consultation will be an ongoing and evolving process.

During the initial meeting, we would like to ask:

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- What are the issues that need to be addressed in the CMPs?
- How do Native Title holders wish to be involved in the CMP development and implementation?

Throughout the CMP development, Council and the project team will be able to provide additional information as it becomes available.

Objectives

The specific objectives of the meeting and future engagement with Bandjalang Native Title holders are to:

- Introduce and initiate a working relationship between the project and Native Title holders.
- Communicate project information to Native Title holders.
- Understand Native Title holders' cultural significance, values/stories and current uses of the estuary and coastline.
- Understand Native Title holders' concerns/issues about the estuary.
- Encourage involvement of Native Title holders in the future stages of the CMP projects.

The initial cultural meeting will be an informal, conversational meeting at a suitable site on Country. Bandjalang Native Title holders may be able to recommend a suitable location. This initial gathering would involve an initial cultural induction and project discussions. We will discuss expectations from both parties and the best approach to meeting the needs of the project team and Native Title

holders. It is envisaged that future discussions with Native Title holders on Country will be required to discuss site-specific issues. However, during the initial meeting we will determine the need for future meetings and focus of these meetings.

We propose to hold the meeting during early March 2022.

Allowances

For the initial meeting the project team will consist of two Hydrosphere Consulting team members (Robyn Campbell and Uriah Makings) and two CVC personnel (Leanne Kennedy and Peter Wilson).

We suggest the attendance of two Native Title representatives who are able to provide knowledge and information relating to the CMP project. For the initial meeting we propose a 2-hour duration. A fee of [redacted] is available for the initial meeting. This can be provided to Bandjalang RNTBC as lump sum for suitable dispersion.

Details of further meetings will be confirmed after the initial meeting.

Please contact Robyn Campbell, Hydrosphere Consulting on 0421 145 027 (email: robyn@hydrosphere.com.au) or Peter Wilson, CVC on 6641 7358 (email: peter.wilson@clarence.nsw.gov.au) to discuss this proposal.

Proposed Scope for Engagement with Western Bundjalung Native Title holders - Clarence River Estuary Coastal Management Program (CMP) Scoping Study and Clarence Coastline and Estuaries CMP Stages 2 - 4

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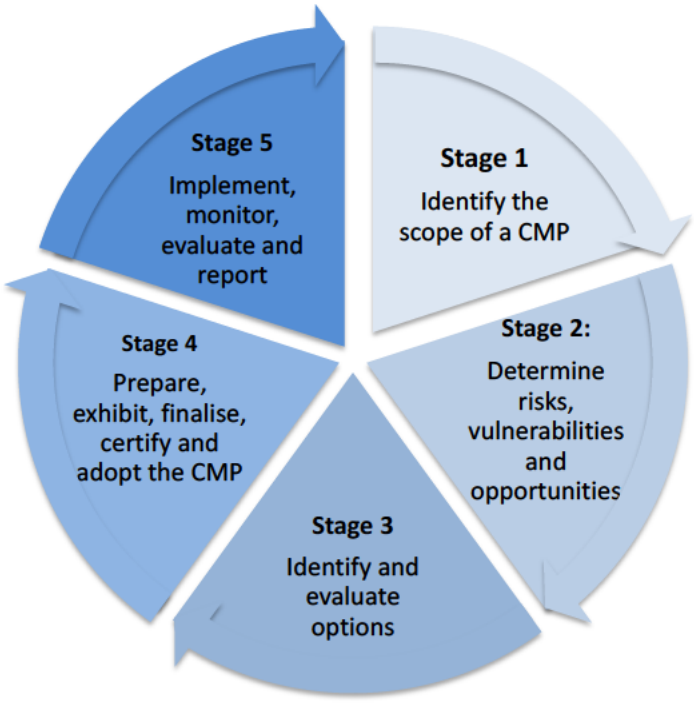

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The study area for the Clarence River CMP encompasses the Clarence River catchment although CMP actions are focussed on the coastal zone. The coastal zone is defined as the areas mapped in the *State Environmental Planning Policy (Coastal Management) 2018* (Figure 2). Figure 2 illustrates the areas of Western Bundjalung Native Title determinations (Western Bundjalung Part A and Part B) within the Clarence River CMP study area. The Western Bundjalung Part A claim encompasses a large

portion of the Clarence River catchment, including parts of the river itself, extending from the estuary zone at the junction of Moleville Creek downstream of Copmanhurst upstream through Tabulam to the head of the Clarence at the junction of the Maryland River. It also encompasses major tributaries of Boonoo Boonoo, Cataract and Timbarra Rivers. Not all Native Title areas are within the coastal zone with small areas overlapping parts of the main River and Whiteman Creek between Copmanhurst and Seelands.

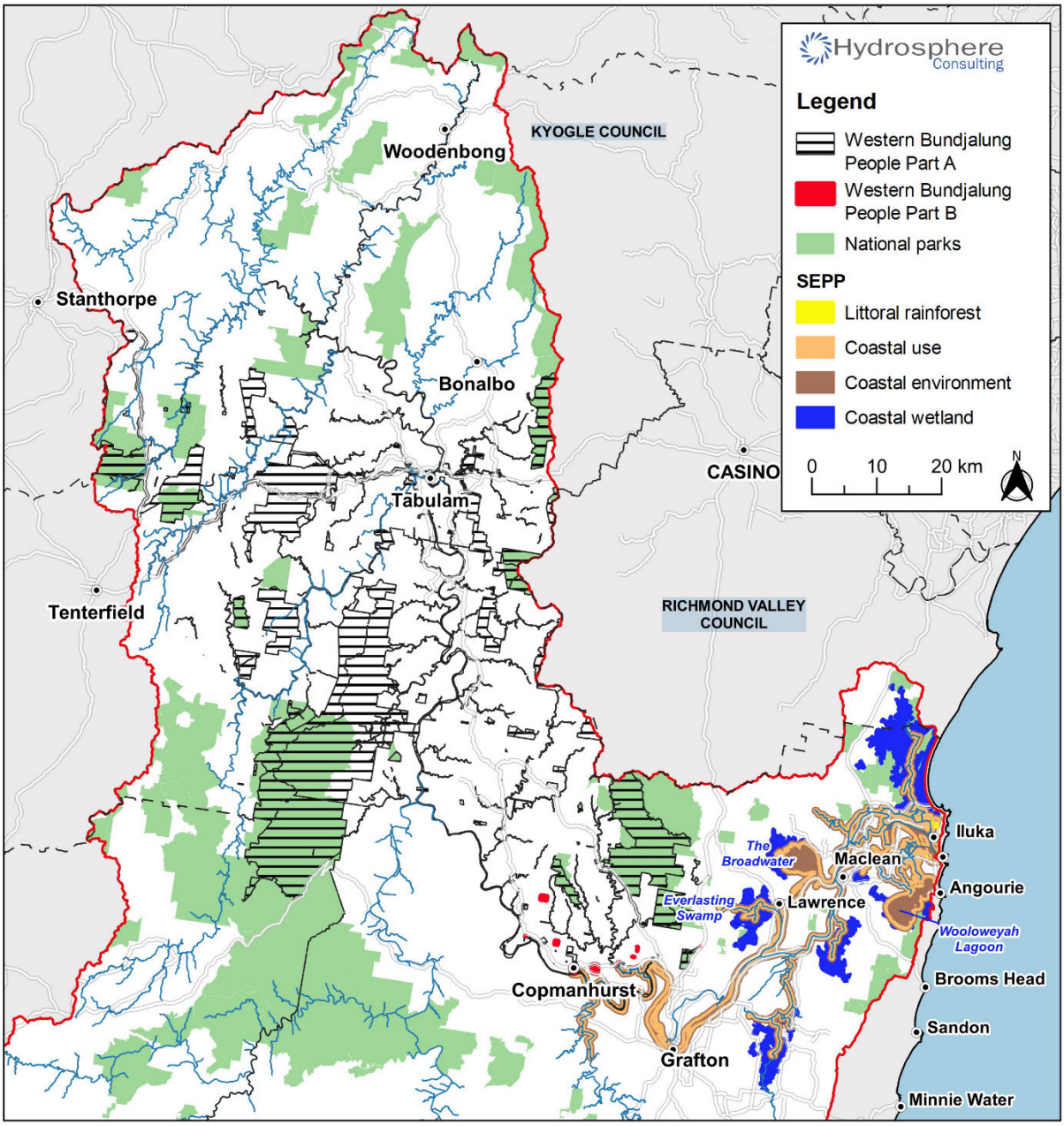

Figure 2: Clarence River coastal zone (Coastal Management SEPP areas) and Western Bundjalung Native title areas

Goals/objectives of First nations involvement

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- Develop a collaborative relationship and shared understanding of the project.
- Increase participation and involvement of First Nations people in management of Country and decision-making.
- Identify opportunities for ongoing involvement in CMP implementation including monitoring and implementation actions.

Involvement so far

Robyn Campbell (Hydrosphere Consulting) who is the project manager for the project has provided initial correspondence to Ngullingah Jugun RNTBC and had initial conversations and correspondence with Jane Baldwin. This proposal is for an initial on-country assessment by the project team with relevant Native title holders.

Proposed On Country meeting

An initial on Country meeting with Western Bundjalung Native Title holders is proposed. It is envisaged that the initial meeting will involve the project team meeting and yarning with Native Title holders on country. This initial meeting will promote the development of a relationship between the team and the Native Title holders. It is expected to be a conversation starter and open the dialogue between the team and the Native Title holders. It is envisaged to be the first of a series of meetings/ conversations to be held throughout the development of the CMP. We recognise that relationships require trust and trust takes time to develop and as such project consultation will be an ongoing and evolving process.

During the initial meeting, we would like to ask:

- What do Native Title holders want us to consider in the development of the CMPs?
- What are the issues that need to be addressed in the CMPs?
- How do Native Title holders wish to be involved in the CMP development and implementation?

If preferred, we are happy to attend a online or in person meeting to discuss the project.

Throughout the CMP development, Council and the project team will be able to provide additional information as it becomes available.

Objectives

The specific objectives of the meeting and future engagement with Western Bundjalung Native Title holders are to:

- Introduce and initiate a working relationship between the project and Native Title holders.
- Communicate project information to Native Title holders.
- Understand Native Title holders' cultural significance, values/stories and current uses of the estuary and coastline.
- Understand Native Title holders' concerns/issues about the estuary.
- Encourage involvement of Native Title holders in the future stages of the CMP projects.

The initial cultural meeting will be an informal, conversational meeting on country at a suitable site on Country within the coastal zone. This initial gathering would involve an initial cultural induction and project discussions. We will discuss expectations from both parties and the best approach to

meeting the needs of the project team and Native Title holders. It is envisaged that future discussions with Native Title holders on Country will be required to discuss site-specific issues. However, during the initial meeting we will determine the need for future meetings and focus of these meetings.

We propose to hold the meeting during March or April 2022. Potential meeting sites are Mountain View Park or Moleville Rocks.

Allowances

For the initial meeting the project team will consist of two Hydrosphere Consulting team members (Robyn Campbell and Uriah Makings) and two CVC personnel (Leanne Kennedy and Peter Wilson).

We suggest the attendance of two Native Title representatives who are able to provide knowledge and information relating to the CMP project. For the initial meeting we propose a 2-hour duration. A fee of [redacted] is available for the initial meeting. This can be provided to Western Bundjalung RNTBC as lump sum for suitable dispersion.

Details of further meetings will be confirmed after the initial meeting.

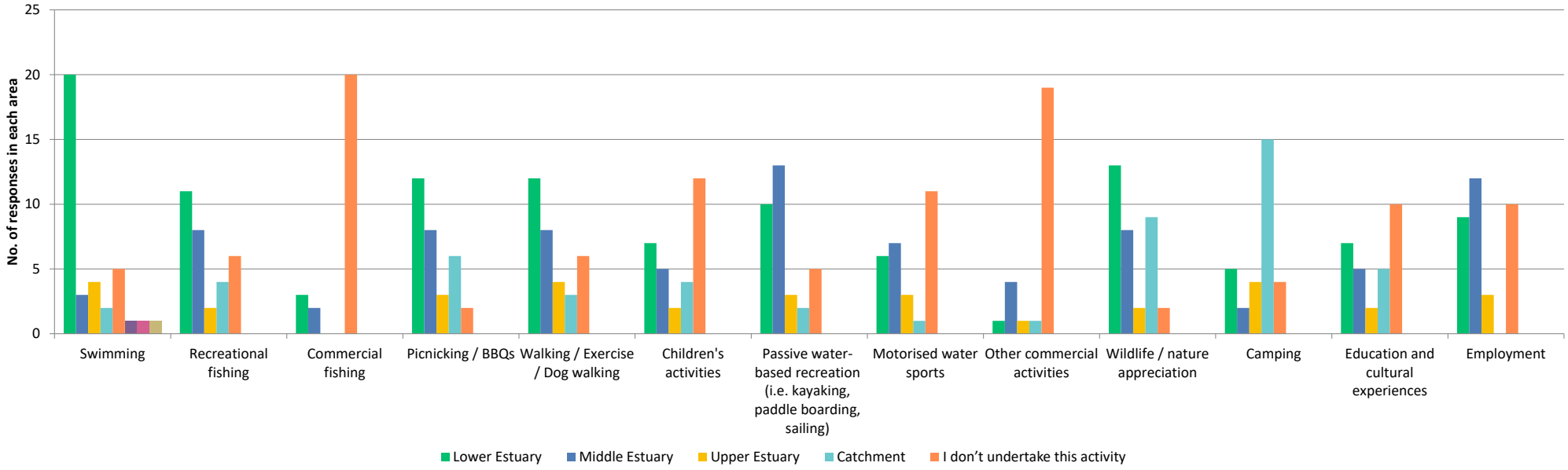
Please contact Robyn Campbell, Hydrosphere Consulting on 0421 145 027 (email: robyn@hydrosphere.com.au) or Peter Wilson, CVC on 6641 7358 (email: peter.wilson@clarence.nsw.gov.au) to discuss this proposal.

Attachment 3: Community Survey Outcomes

1. For each activity, please chose the location where you undertake this activity most often (select one part of the study area for each activity).

	Lower Estuary		Middle Estuary		Upper Estuary		Catchment		I don't undertake this activity		Total
Swimming	59%	20	9%	3	12%	4	6%	2	15%	5	34
Recreational fishing	35%	11	26%	8	6%	2	13%	4	19%	6	31
Commercial fishing	12%	3	8%	2	0%	0	0%	0	80%	20	25
Picnicking / BBQs	39%	12	26%	8	10%	3	19%	6	6%	2	31
Walking / Exercise / Dog walking	36%	12	24%	8	12%	4	9%	3	18%	6	33
Children's activities	23%	7	17%	5	7%	2	13%	4	40%	12	30
Passive water-based recreation (i.e. kayak	30%	10	39%	13	9%	3	6%	2	15%	5	33
Motorised water sports	21%	6	25%	7	11%	3	4%	1	39%	11	28
Other commercial activities	4%	1	15%	4	4%	1	4%	1	73%	19	26
Wildlife / nature appreciation	38%	13	24%	8	6%	2	26%	9	6%	2	34
Camping	17%	5	7%	2	13%	4	50%	15	13%	4	30
Education and cultural experiences	24%	7	17%	5	7%	2	17%	5	34%	10	29
Employment	26%	9	35%	12	9%	3	0%	0	29%	10	34

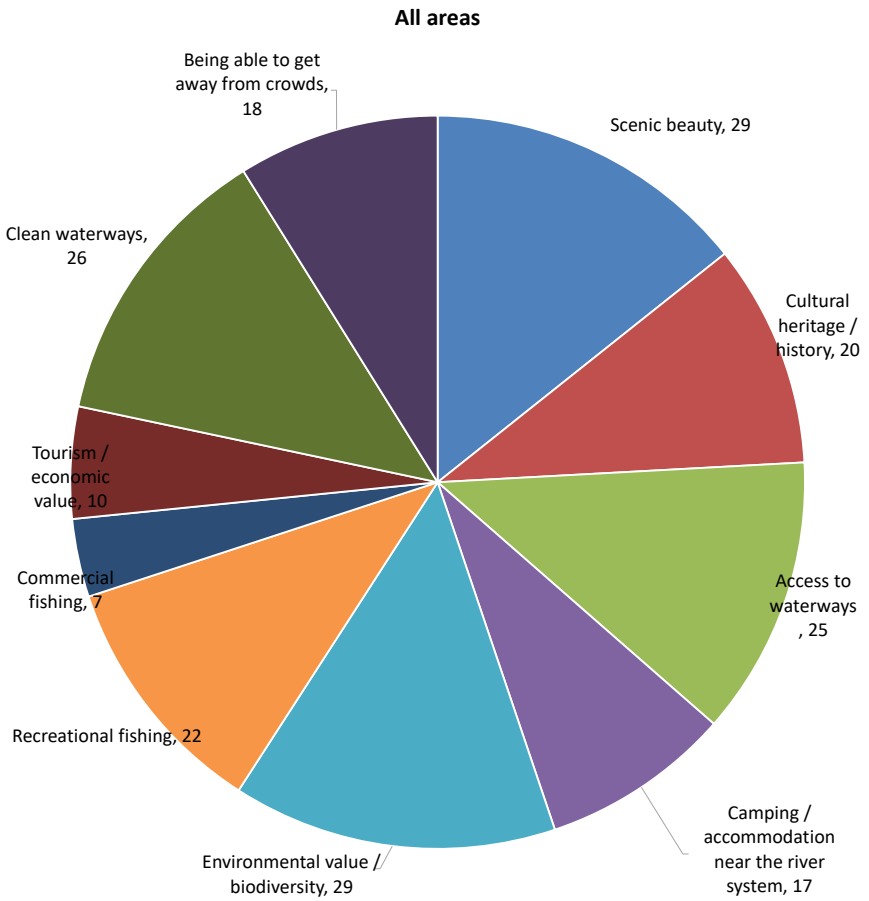
* Percentage results refers to the proportion of responses for each activity.



2. What do you value most about the Clarence River estuary? (Select all that apply).

		Total
Scenic beauty	14%	29
Cultural heritage / history	10%	20
Access to waterways	12%	25
Camping / accommodation near the river system	8%	17
Environmental value / biodiversity	14%	29
Recreational fishing	11%	22
Commercial fishing	3%	7
Tourism / economic value	5%	10
Clean waterways	13%	26
Being able to get away from crowds	9%	18
	Responses	**203**

* Percentage results refers to the proportion of responses for each value



3. Please provide an explanation as to why you chose the options in Question 2 and add more detail about a specific location if relevant (Please limit your response to 100 words or less).

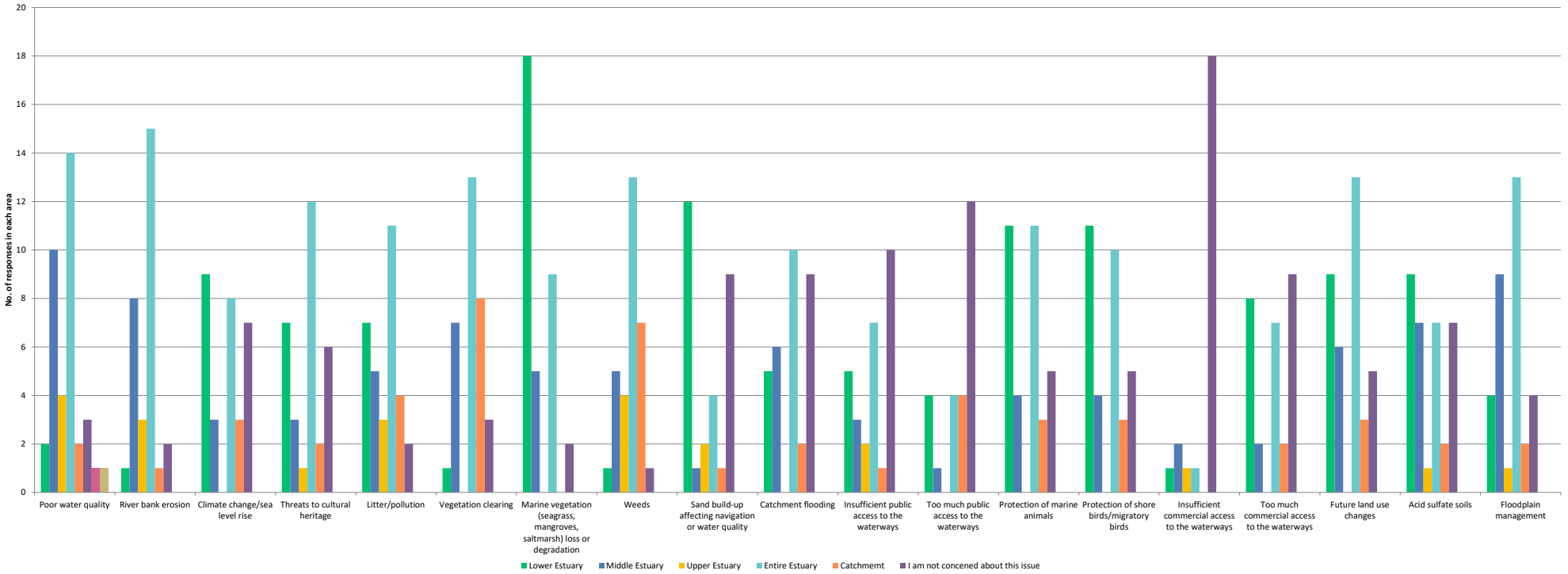
It is the reason we moved to this area. Do not allow commercial development along the river
I use the river primarily as a sailor of a small yacht between Grafton Bridges and Iluka/Yamba. I like to go ashore or by dinghy to go for walks, birdwatching, exploring or visiting businesses in the towns. I camp on board my vessel when I am doing so.
Commercial fishing and sugar cane are the biggest industries without them the river and community would struggle to stay afloat and the rivers been fished for over 100years and still producing beautiful seafood locally and nationally
I'm a commercial fisher of 37 years full time .
The view looking west up the river from Yamba is quite spectacular. The First Nations history and the history of shipping on the Clarence is really interesting. Wildlife in abundance. Nice locations to fish, though some seem to be fished out.
Clarence River supplies a unique lifestyle. Beautiful environment with recreational opportunities close to home, delightful townships with interesting history and friendly inhabitants.
It is a big beautiful river with healthy fish stocks. I didn't select access to waterways as this is becoming more difficult, boat ramps are often over crowded with little parking available (Maclean having the least parking)
Waterways are an environmental feature that needs to be protected and appreciated for their intrinsic value.
The river is not used to it's full potential,.
All development in the Clarence Valley MUST prioritise the protection of Indigenous cultural heritage, Environmental value and biodiversity and clean waterways. Examples of thoughtless overdevelopment are all around on the North Coast. Degradation of waterways and seagrass beds e.g. Lake Wooloweyah due to commercial trawlers is one example Must stop.
Bush camping in the catchment, away from the crowds where you can appreciate the natural beauty. In Lower Clarence, access to waterways for walking, swimming and kayaking as low impact exercise, great for older folks like us and great for mental health
Environment
Access to the river in Grafton is the best break from working in town.
Kayaking and boating in the middle river.
The Clarence River is an extension of my back yard. I enjoy it’s beauty, I like to see it being looked after... I collect food from there but know there is a limit to what I take and the care that needs to be returned. Conserving the biodiversity of our river system is imperative for our generations to come. This has been and is a special place to many of us
The catchment areas mean freedom to enjoy nature and to get away to a private and primitive experience.
I visit the lower estuary area for recreation and family holidays. Yamba, McLean and Iluka are specific locations that I visit. I enjoy the diversity of the area. It's achievable for a day or weekend visit from the Northern Rivers.
All contribute to the aesthetic, cultural, environmental, & social values which enrich our communities & strongly support the Clarence Valley's regional economy.
The Clarence is a huge part of our lives, we visit iluka every chance we get and love to go fishing, not as many fish as when I was a kid. Too many taken by the commercial fishos. We live in Grafton and always walk by the river, picnic, etc and we love camping at lillydale for a quick weekend away from it all.
I enjoy recreational fishing in a diverse river system
The river is a great place for recreational activities such as camping and fishing. The lower estuary seems in great health but the upper estuary seems like it needs to be looked after a bit better. The waterway is much smaller and has been damaged from early settlement.
To see commercial trawlers and fishermen / crabbers scouring the river is totally the wrong way to go

The Clarence River is being loved to death. Loss of large tracts of prime agricultural land to National parks and their mis-management is of major concern. Fish stock reduction through recreation, commercial, enviromental and management if not addressed now will lead to our legacy for future generations.
The clarence river is in my opinion one of the premier water attractions in australia.All of the available attractions in question 2 are available to all, without any financial burden at all.A wonderful part of australia and indeed the wider world
Live and work (agriculture) in the middle estuary - protect agricultural land and the physical and economic environment for it to prosper. My lifestyle values are dependant on the environment, space, waterways and beaches.
Access to water for Stock
Having lived on sportsman's since 1992 being a commercial fisherman and having raised a family in a beautiful healthy environment abounding with nature's wonders.
We need clean and healthy waterways to provide essential drainage to local agricultural land
The Clarence is the life Blood of our communities from the Catchment to the mouth.
The Clarence Valley is the jewel of NSW. Largest east coast catchment with high biodiversity value. I feel the riverbanks and estuary are sorely mistreated and their importance poorly understood by the wider community. I would like to see education and programs that improve riparian zone management and protection of large trees, especially along the bank, as well as catchment wide changes to reduce the sediment load in the river.
Unique natural beauty and health of river, Beachfronts and catchment
Appreciate clean waterways for canoeing, swimming and camping near.

4. In which area are you most concerned about the following issues? (Select all that apply).

	Lower Estuary		Middle Estuary		Upper Estuary		Entire Estuary		Catchmemt		am not concened about this issu		Total
Poor water quality	5.71%	2	28.57%	10	11%	4	40%	14	6%	2	9%	3	35
River bank erosion	3.33%	1	26.67%	8	10%	3	50%	15	3%	1	7%	2	30
Climate change/sea level rise	30.00%	9	10.00%	3	0%	0	27%	8	10%	3	23%	7	30
Threats to cultural heritage	22.58%	7	9.68%	3	3%	1	39%	12	6%	2	19%	6	31
Litter/pollution	21.88%	7	15.63%	5	9%	3	34%	11	13%	4	6%	2	32
Vegetation clearing	3.13%	1	21.88%	7	0%	0	41%	13	25%	8	9%	3	32
Marine vegetation (seagrass, mangroves, saltmarsh) loss or degradation	52.94%	18	14.71%	5	0%	0	26%	9	0%	0	6%	2	34
Weeds	3.23%	1	16.13%	5	13%	4	42%	13	23%	7	3%	1	31
Sand build-up affecting navigation or water quality	41.38%	12	3.45%	1	7%	2	14%	4	3%	1	31%	9	29
Catchment flooding	15.63%	5	18.75%	6	0%	0	31%	10	6%	2	28%	9	32
Insufficient public access to the waterways	17.86%	5	10.71%	3	7%	2	25%	7	4%	1	36%	10	28
Too much public access to the waterways	16.00%	4	4.00%	1	0%	0	16%	4	16%	4	48%	12	25
Protection of marine animals	32.35%	11	11.76%	4	0%	0	32%	11	9%	3	15%	5	34
Protection of shore birds/migratory birds	33.33%	11	12.12%	4	0%	0	30%	10	9%	3	15%	5	33
Insufficient commercial access to the waterways	4.35%	1	8.70%	2	4%	1	4%	1	0%	0	78%	18	23
Too much commercial access to the waterways	28.57%	8	7.14%	2	0%	0	25%	7	7%	2	32%	9	28
Future land use changes	25.00%	9	16.67%	6	0%	0	36%	13	8%	3	14%	5	36
Acid sulfate soils	27.27%	9	21.21%	7	3%	1	21%	7	6%	2	21%	7	33
Floodplain management	12.12%	4	27.27%	9	3%	1	39%	13	6%	2	12%	4	33

* Percentage results refers to the proportion of responses for each activity



5. Please provide an explanation as to why you chose these issues in Question 4? Please add more detail about a specific location if relevant (Please limit your response to 100 words or less).

Too broad a question really. Also, there should be an option to cover the entire river from the headwaters to the mouth.
No boat ramps above maclean and parking facilities ,and poor floodgate management in flood times .
Increased development on the floodplain. Mining in the catchment.
Areas of the river are wet lands as they are prone to flooding. Very concerned about residential development in West Yamba - insufficient drainage and flood mitigation. Look out when the net flood hits. Areas that have never flooded are prone to flooding due to poor management
My biggest concern is the building up of new developments. The developments on Carr's lane yamba is on land that usually goes underwater during king tides and flood, this water will need to go elsewhere now.
Lake Wooloweyah is being degraded by commercial fishing and ther other issues are self explanatory
Our river system needs to be healthy.
All development in the Clarence Valley MUST proritise the protection of Indigenous cultural heritage, Environmental value and biodiversity and clean waterways. Examples of thoughtless overdevelopment are all around on the North Coast. Degradation of waterways and seagrass beds eg Lake Wooloweyah due to commercial trawlers is one example Must stop.
Vegetation removal and earthworks for development of land for residential and commercial purposes can have a big impact on water quality, the environment, and also runoff and flood water behaviour. This is already evident with the Carrs Drive residential development in Yamba impacting on floodwater behaviour and causing some older residential areas being inundated for the first time ever. Carrs Drive farming land used to behave as a flood plain, now with landfill to elevate the new residential areas the water is being forced to go elsewhere....into town.
Worried by flood plain development - this will create a huge problem for the future
I do not think commercial trawlers should be allowed in the middle river and increased public access.
I'm concerned about the excessive commercial fishing of the lower and middle estuary and pollution to our river with the increase in tourism to the area.
Vegetation clearing in the catchment and upper estuary has flow-on effects. Many areas of the riverbank are lacking riparian vegetation or are overrun by weeds. In the lower system, there has been a loss of important habitat such as seagrass.
Unfortunately, I don't know about a lot of these issues. Pity there wasn't a choice to state OVERALL CONCERN of possibile negative impacts, because I AM concerned. Being uneducated, I can only answer to obvious or known facts, therefore I haven't completed a lot of answers in Q 4.
Not being a local to the area, I'm not aware of any issues
Increased commercial activity, particularly marine based industry, urban development close to riverbanks & increased horticulture, is likely to have cascading negative impacts on water quality, river bank stability, riparian zones, migratory & marine wildlife, seaweeds & fish stock. Also concerned that major development proposals are per se incompatible with floodplain risks.
The commercial over fishing of the Clarence river has lead to a lack of fish for the recreational fisherman. Kids find it much harder to catch a fish now.
I am concerned about damage done to the system through commercial fishing. I would like to see better access for recreational fishing and tourism.
The upper estuary appears most in danger.
What's needed is to stop the development of hickey island and protect the sensitive wetlands. Palmers island should be a more commercial based area to service boats and ships as it's away from main boat traffic at the river mouth area
NSWNP purchased part of "Round Mountain". The Conservation area. This area through the previous owner (Micheal Daley) digging drains, has undergone major enviromental damage & the NSWNP have done NOTHING to remediate this since purchasing.

By locking the area up & letting it become overgrown, in times of a major water event, it spills megalitres of acid sulphate enriched & black water into Sportsman's creek.
As the whole world is now facing these issues we on the clarence need to be at the cutting edge in preventing the river being further degraded.there is always room for improvement, and good peer reviewed science will show us the way
Middle estuary selections: because that is where I live and farm. No answer: I do not know enough to have an informed opinion.
Concerned Gont legislation will impact on farmers
Mismanagement of everlasting swamp national park.The absolute mess in everlasting swamp conservation area.False information given to neighbours.Bullying and harassment leading to NPWS aquisitions of property
Letting fisheries and national parks making decisions on water levels without consulting with landowners who know the land and the best way to manage it.
Clean and healthy creeks and drains = clean and healthy river
Concerned about large amount of vessels using Yamba & the management of build up in & on shores also around Mouth of River.
Water quality is a problem for the entire valley, the sediment load comes from a range of practices including land clearing, forestry and poor riparian zone management and these must be addressed at whole of catchment level. There are people who remember swimming in the River when the water was clear. There is little regard for the impact of our land management practices on birds/insects/marine life/all life! Big rivers are unusual in Australia - we should value the complex web of life we have here.
Land and bank degradation in close proximity to waterways is affecting the entire water system
Its important to retain as much vegetation around the waterways for birds and animals. There are a lot of weeds along many parts of the estuary which detract from the beauty and value of some areas.

6. Based on your observations, do you believe there are any other issues or threats to the Clarence River estuary? (Please limit your response to 100 words or less).

30 Answered

6 Skipped

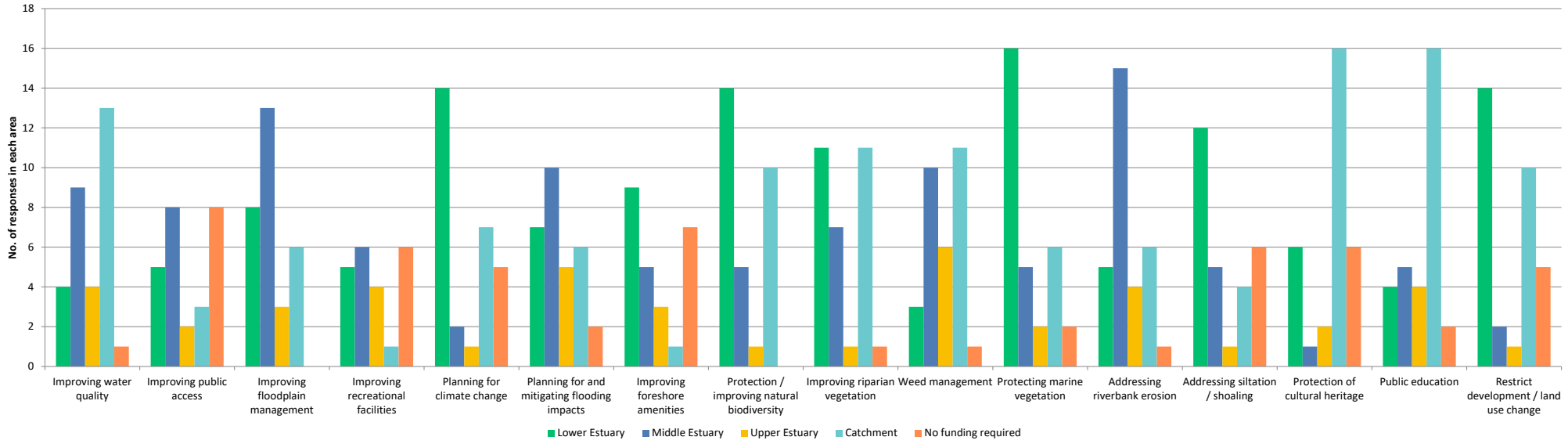
The biggest threat to the lower clarence is the threat of a large industrial port and infrastructure.
Perhaps polluting run off from cane fields.
Lack of fish breeding areas [Swamps , Mangroves]
Recreational catches are unreported and way to high compared to commercial catches locally.
Yes if the mines at the top of catchment goes ahead , it could be deadly for the fishing industry , stop playing with nature .
a)Excessive tourism. There is only so much that can be accommodated before natural values are overwhelmed. b)Failure of all levels of government to fully consider the environment in their decision making.
Loss of sea grass in Lake W. Poor decisions when granting DAs in flood prone areas. Poor maintenance of drains in Lower Estuary eg trees growing out of drains.
Water rising due to developments and lack of consideration to flood plan and current residents.
See above re lake Wooloweyah
The catchment needs to be monitored better, to many creek's and river's chocked.
As above
Land clearing in the catchment and the estuary.
1. Loss of instream habitat; 2. Stock accessing rivers; 3. Diversions to western rivers.
Damage to the sea grass in the Wooloweyah lake is of major concern to the future biodiversity of the whole river system. Lets reduce trawling of the lake before it’s too late!?
Yes, modifications and barriers to hydrological flow. Many developments are being undertaken in wetland areas, displacing water and reducing habitats.
There is always a concern if mining were to take place in the catchment. If there are to be any large areas being cleared in the future, without buffer zones being implemented. There would be a concern also if the Clarence and it's tributaries were to be used for large scale irrigation. Or even for lots of smaller ventures.
No
Sea level rise is still not genuinely addressed in planning and development - in relation to matters involving land be it valley-wide, district or individual lots.
I believe the main threats to the estuary are commercial fishing and land development nearby.
Commercial fishing of the river will put unnecessary pressure on the natural resources and kill off the recreational fishery
The Sportsman's Creek weir has been in place for nearly 100 years. This has effectively created a fresh water wetland with a diverse range of fauna & flora and has allowed agricultural activities to prosper. Academics and public servants are now planning to convert the Everlasting Swamp back to a salt water wetland. This will have dire effects on the encumbent fauna & flora and privately owned land.
My issues are based around the everlasting swamp where lack of appropriate measures are seeing the swamp die, and become a methane pump.Birdlife is disappearing.NPWS have totally mismanaged this wonderful place and no input is being considered by those most affected, namely the parks neighbours.The national park is a disgrace

Dams and water diversion proposed for the Upper Clarence catchments. Diversion of water from the river affects the whole catchment. Diversion always has serious environmental impacts to both the donor and receiving catchments. Sometimes argued to be an advantage in times of flood but usually results in inappropriate use of the Floodplain with large floods consequently having worse impacts on people and the built environment. Once water is diverted it is wanted most when it is dry and extraction affects the whole system. Mining. Disappointed that mines are being advocated by state and federal politicians. The Clarence Valley has already experienced at least one case of poisons leaching down the river from a mine in the upper catchment with disastrous affects on fisheries and no doubt on biodiversity.
Large loss of birdlife in swamp
Mining.pine forests too close to waters edge.
their is a huge lack of activity in maintaining the creeks and drains in the middle estuary, many creeks and drains are overgrown and full of rubbish. this provides both poor drainage and poor water quality.
I think that if the river was allowed to spread back through wetland areas when rising as it has forever. Only closing gates when MAJOR Flooding OCCURS. Instead of FUNNELLING it all out through the mouth.
I believe pesticide and herbicide use is a significant factor in the Clarence Valley - and the Clarence Valley Council is a major contributor. There is an obvious decline in insect numbers year on year (this is an entire east coast problem) and chemical usage is a major factor. I have observed many times ineffective use of weed spraying by the Council (eg spray on one side of the fence but not the other so little point, spraying in windy conditions, spraying regularly beside waterways).
Agricultural mismanagement around waterways and lack of information/support for farmers
Erosion and poor bank condition is obvious along areas where cattle are grazing on the banks / drinking from the estuary.

7. We would like to understand community priorities for future funding. If you could only choose one area to address the listed issues, which area do you think needs it most? (Select one area for each item).

	Lower Estuary		Middle Estuary		Upper Estuary		Catchment		No funding required		Total
Improving water quality	13%	4	29%	9	13%	4	42%	13	3%	1	31
Improving public access	19%	5	31%	8	8%	2	12%	3	31%	8	26
Improving floodplain management	27%	8	43%	13	10%	3	20%	6	0%	0	30
Improving recreational facilities	23%	5	27%	6	18%	4	5%	1	27%	6	22
Planning for climate change	48%	14	7%	2	3%	1	24%	7	17%	5	29
Planning for and mitigating flooding impacts	23%	7	33%	10	17%	5	20%	6	7%	2	30
Improving foreshore amenities	36%	9	20%	5	12%	3	4%	1	28%	7	25
Protection / improving natural biodiversity	47%	14	17%	5	3%	1	33%	10	0%	0	30
Improving riparian vegetation	35%	11	23%	7	3%	1	35%	11	3%	1	31
Weed management	10%	3	32%	10	19%	6	35%	11	3%	1	31
Protecting marine vegetation	52%	16	16%	5	6%	2	19%	6	6%	2	31
Addressing riverbank erosion	16%	5	48%	15	13%	4	19%	6	3%	1	31
Addressing siltation / shoaling	43%	12	18%	5	4%	1	14%	4	21%	6	28
Protection of cultural heritage	19%	6	3%	1	6%	2	52%	16	19%	6	31
Public education	13%	4	16%	5	13%	4	52%	16	6%	2	31
Restrict development / land use change	44%	14	6%	2	3%	1	31%	10	16%	5	32

* Percentage results refers to the proportion of responses for each issue



8. Are there any other management issues which haven't been listed that you believe should be prioritised for funding? Please add more detail about specific locations if relevant. (Please limit your response to 100 words or less).

16 Answered

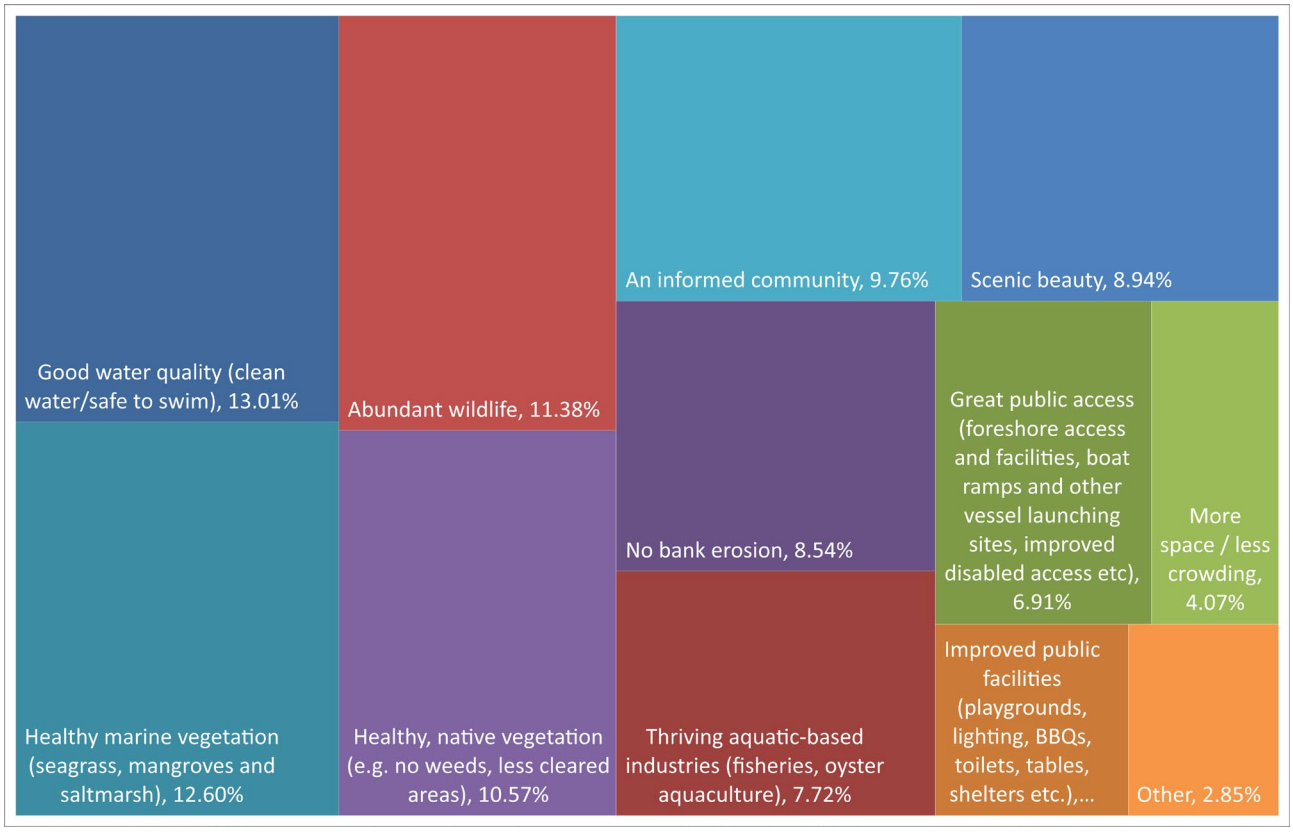
20 Skipped

No
More parking or new boat ramp in Maclean. Upgrade Carr's lane boat ramp facilities. Commercial netting in the Clarence.
Lake Wooloweyah
Up and down the whole Clarence river public access for picnic's.
Disabled access to beaches and waterways in the lower estuary - Turners Beach, Yamba Main Beach and the Yamba Ocean Pool are not wheelchair accessible. It is even difficult to access Main Beach with prams/strollers - why does the footpath access from Queen Street carpark have stairs??! Restricting parking at Yamba Main Beach (Marine Parade) to Surf Club Patrols and disabled access only.
Commercial fishing of the lower/middle estuary between Maclean and Ashby - there won't be anything left for our children! Let the river rest and grow a little. Ease up with the commercial limits.
Hard to choose only one..... But I would love to see a long public walk/bike access along the river so locals and tourists can appreciate the fantastic Clarence. Create employment and education.
Protection of foreshores and native wetlands should be prioritised. Better public areas to allow people to enjoy the natural beauty of the river via walkways and dedicated seating / fishing areas.
Landholders in areas going to be effected by acquisition by NSWNP and saltwater inundation have little or no bargaining power with the authorities and are often "bullied" off their land. A recent case involved the NSWNP indundating part of a land owners property religating this area unproductive & ultimately led to a sale.
The appalling bullying of local landowners, especially those neighbours,targetted for future acquisition,by the fisheries and NPWS.We have over 30 acres of land that are almost permanently covered in water due to NPWS intransigence.A neighbour was forced to sell a large parcel of land to NPWS,against his will as the land became useless for grazing.A huge issue for us going forward
Protecting agricultural land and production. Resolving issues related to Sportsman's Creek Weir by capacity building in community. Aim to enable a plan for the future that does not disadvantage farmers and that delivers well researched and proven environmental benefits to the waterways and swamps of Sportsman's Creek. Requires a project implemented gradually with monitoring of changes and built in capacity to reverse.
If there are land use changes the farmer should be compensated
Drain and creek maintenance, flood gate repairs
Weed and erosion control in the riparian zone.
River access for agriculture reduced
N/A

9. What are the most important attributes you would like the Clarence River estuary to have in 10 years from now? (Select all that apply).

Answer Choices	Responses	
Good water quality (clean water/safe to swim)	13.01%	32
Thriving aquatic-based industries (fisheries, oyster aquaculture)	7.72%	19
Great public access (foreshore access and facilities, boat ramps and other vessel launching sites, improved disabled access	6.91%	17
No bank erosion	8.54%	21
Healthy marine vegetation (seagrass, mangroves and saltmarsh)	12.60%	31
Improved public facilities (playgrounds, lighting, BBQs, toilets, tables, shelters etc.)	3.66%	9
Scenic beauty	8.94%	22
Abundant wildlife	11.38%	28
More space / less crowding	4.07%	10
Healthy, native vegetation (e.g. no weeds, less cleared areas)	10.57%	26
An informed community	9.76%	24
Other	2.85%	7
	Responses	**246**
	Skipped	**1**

Responses
Minimal development along the river. People = destruction
A ferry service from Grafton to Yamba
Disabled access.
As the population grows, it's important to have better walkways that minimise impact on fragile areas.
much less beuracratic oversite,driven by ideology, and far more input from people whose lives and liveliehoods are enmeshed in the clarence river
Thriving rural and village communities.
Dams in the Clarence making use of hydro and irrigation

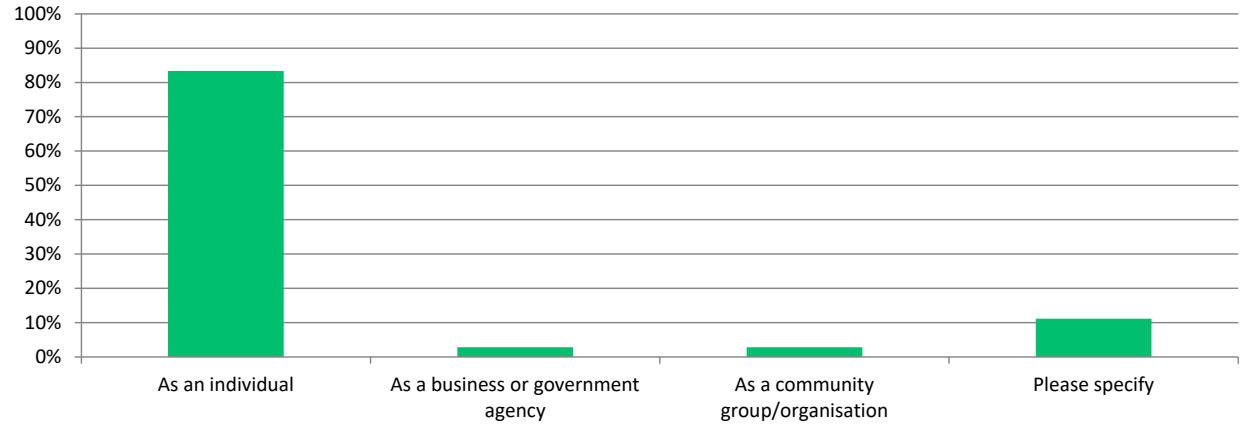


10. Are there any other management issues which haven't been listed that you believe should be prioritised for funding? Please add more detail about specific locations if relevant. (Please limit your response to 100 words or less).

Leave it much as is.
Clean waters, safe for people and wildlife. Much reduced weed infestations, especially along the riverbanks of the middle estuary
Better access around Maclean, water quality improved and better management of the flood gates and flood plains .
Clean, protected and biodiverse. Rehabilitated riverbanks. Powered watercraft off-limits in many areas.
Nice restaurants on the river, more us of the river, a swimming pool in the river and tourism on the river.
Prioritising protection of the natural environment and biodiversity in all development
Retaining it's natural beauty and UNDERDEVELOPED coastal and river areas. The Clarence Valley has the potential to be the jewel of the North Coast, retaining it's natural beauty without developments near the water's edge, and without developments in the catchment impacting on water quality and flood flows. Don't want it to become over developed and over-managed like most other Catchments on the north coast. Keep it as somewhere that families are happy to take their kids for beaches, rivers, camping, walking, kayaking and cycling.....like what holidays used to be like in the 50's, 60's and 70's. There are not many places left on the coast that have the potential to retain that natural charm.
The river has abundance of wildlife for our children to see and experience. Safe places to swim and fish for recreational purposes. Seagrass in the lake - a home for all the babies! Food to be kept local
A healthy system that is looked after by the community
ALL OF THE ABOVE
I would like it to not become overcrowded and inundated with tourist. Also maintain the natural beauty and minimize building facilities.
I would like to see the estuary biodiverse & healthy enough that it adapts well to the changes rising sea levels bring.
More access to the river, ie walkways.
I would like to see fish life improving and the water quality and river banks improved in the upper catchment
Good public facilities, walkways and bbq areas with no commercial development of hickey island. Prime walkway and fishing platform area
To have a thriving diverse ecosystem where fauna & flora and managed agriculture can co-exist.
Hopefully cleaner water, and no more development on and around the river
An environment of clean water, healthy biodiversity and thriving, sustainable farms across the landscape. All supporting a strong commercial sector and a community with a great quality of life.
Dams in the Clarence making use of hydro and irrigation
Same as today with a focus on water quality and bio- diversity
A natural healthy waterway with an abundance of aquatic species and bird life.
Clean and healthy river, creeks and drains. sound banks and functional flood structures
Free of WASTE, Wild life Numbers UP, INVASIVE & NON NATIVE FAUNA & FLORA gone (especially on islands), No Buildings with in 400m of SHORES & BANKS over 2 storeys high.
A healthy and diverse ecosystem that is in balance, clean water, and a community that realises the value of the Clarence River.
Better complete management and future vision
Clean waterways, healthy riparian zone, less weeds.

11. In what capacity are you completing this survey?

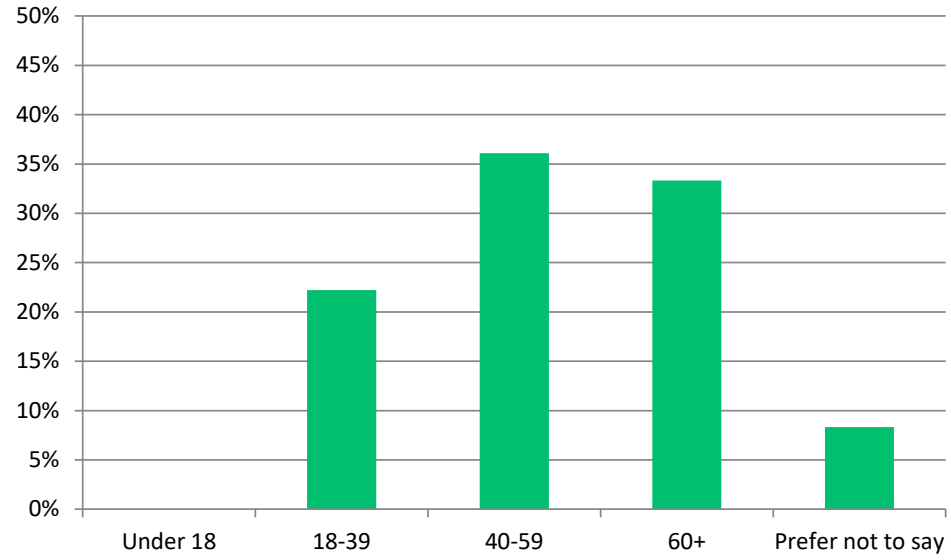
Answer Choices	Responses	
As an individual	83.33%	30
As a business or government agency	2.78%	1
As a community group/organisation	2.78%	1
Please specify	11.11%	4
	Answered	**36**
	Skipped	**0**
individual, family,farmer,business owner		
Farmer		
Farmer		
AS A REPRESENTATIVE OF MY FAMILIES ON THE 6th BOAT FIRST FLEET.		



Question 12 includes personal details which have not been reported for privacy reasons.

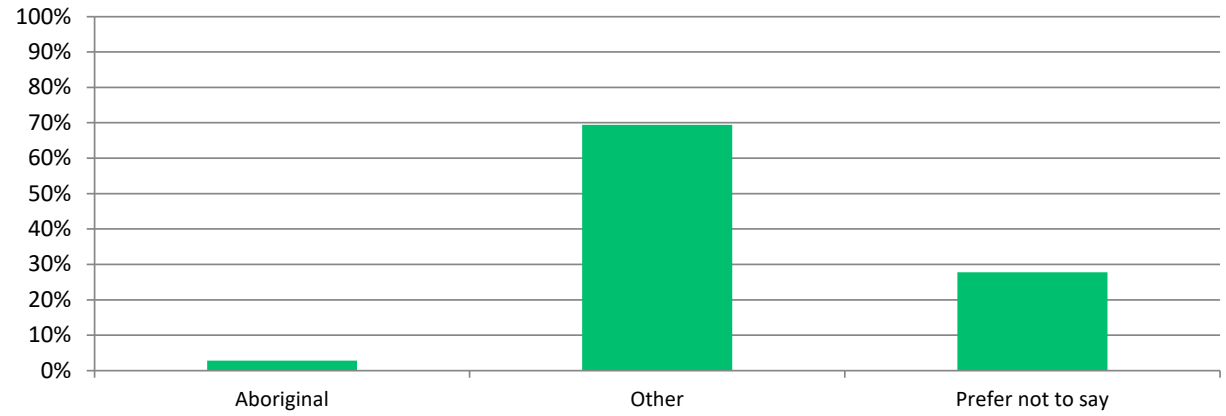
13. What is your age?

Answer Choices	Responses	
Under 18	0.00%	0
18-39	22.22%	8
40-59	36.11%	13
60+	33.33%	12
Prefer not to say	8.33%	3
	Answered	**36**
	Skipped	**0**



14. Is your heritage…

Answer Choices	Responses	
Aboriginal	2.78%	1
Other	69.44%	25
Prefer not to say	27.78%	10
	Answered	**36**
	Skipped	**0**



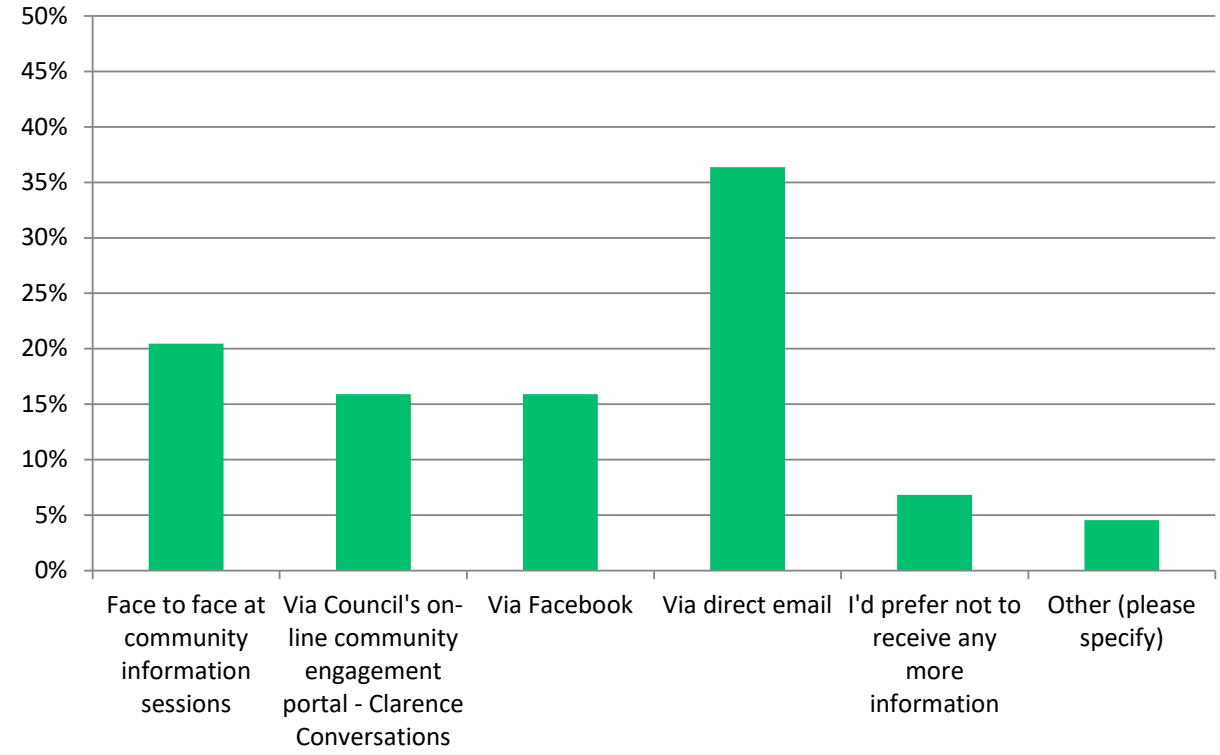
15. In what suburb do you live?

Response	No.
Angourie	2
Ashby	2
Banyabba	1
Ballina	3
Coldstream	1
Cowes, Vic	1
Coutts Crossing	1
Glenugie	1
Great Marlow	1
Gulmarrad	3
Iluka	3
Lawrence	4
Lower Southgate	2
Maclean	1
Mermaid Beach, Qld	1
Palmers Channel	1
South Grafton	1
Wells Crossing	1
Wooloweyah	1
Yamba	5
Responses	36

	No.	%
Within study area	29	81%
Within LGA	2	6%
Outside LGA	5	14%
All responses	**36**	**100%**

16. How would you prefer to receive further information regarding this project?

Answer Choices	Responses	
Face to face at community information sessions	20.45%	9
Via Council's on-line community engagement portal - Clarence Conversations	15.91%	7
Via Facebook	15.91%	7
Via direct email	36.36%	16
I'd prefer not to receive any more information	6.82%	3
Other (please specify)	4.55%	2
	Responses	**44**
Via online, radio & print advertising & mail outs to letterboxes, in addition to community information sessions.		
By phone		



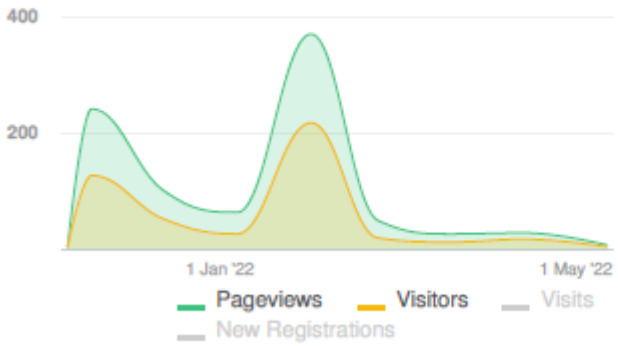
16. And finally, is there any other information you wish to provide to the study team? Additional comments can be provided here or on the Clarence Conversations webpage. For further information please go to https://www.clarenceconversations.com.au/

No
I live in Yamba. But the survey will not accept Yamba. So In desperation I entered Iluka
Stop developing/raising flood plains!
We have a great river and waterways us them
This survey design was probably chosen with mobile phones in mind rather than clunky old laptops. It was near impossible to 'swipe' the full range of choices.
Yeah no one really cares a lot about the amount of emphasis out on cultural heritage now they are turning into greedy land developers
The study team should include ALL stake holders not just public servants
The issues around bullying and land usage and acquisition,are I believe paramount
There should be a major focus on regenerative agriculture as this is the way to increased carbon capture and storage, better water quality, increased profitability for landholders and the community, etc.The science is available, tested,peer reviewed and sound.Many of the problems associated with the clarence would be solved quickly and effectively.Please include this in your review as it is vital for our future environmentally as well as financially
Sportsman’s creek weir should remain in place for its heretige value and to protect one of the most pristine tributaries on the Clarence with a world class bass habitat
I am a member of the Lions Club of Clarence (Environment) but have responded as an individual. We have an interest as a Club in this study but we were unable to consult fully within the Club in advance of this deadline (a meeting to discuss priorities had to be cancelled at the last moment). If it is at all possible for us to engage as a Club as the project unfolds this would be great.

Attachment 4: Clarence Conversations web page engagement

Summary of webpage engagement November 2021 to 5 June 2022.

Visitors Summary



Highlights

TOTAL VISITS	MAX VISITORS PER DAY	NEW REGISTRATIONS
515	60	2

ENGAGED VISITORS	INFORMED VISITORS	AWARE VISITORS
42	149	423

Aware Participants	423
Aware Actions Performed	Participants
Visited a Project or Tool Page	423

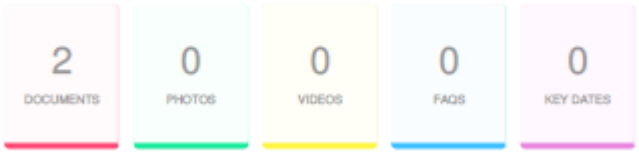
Informed Participants	149
Informed Actions Performed	Participants
Viewed a video	0
Viewed a photo	0
Downloaded a document	25
Visited the Key Dates page	0
Visited an FAQ list Page	0
Visited Instagram Page	0
Visited Multiple Project Pages	81
Contributed to a tool (engaged)	42

Engaged Participants	42		
Engaged Actions Performed	Registered	Unverified	Anonymous
Contributed on Forums	0	0	0
Participated in Surveys	1	0	34
Contributed to Newsfeeds	0	0	0
Participated in Quick Polls	0	0	0
Posted on Guestbooks	0	0	0
Contributed to Stories	0	0	0
Asked Questions	4	3	0
Placed Pins on Places	1	0	0
Contributed to Ideas	0	0	0

ENGAGEMENT TOOLS SUMMARY

Tool Type	Engagement Tool Name	Tool Status	Visitors	Contributors		
				Registered	Unverified	Anonymous
Forum Topic	Public Forum	Published	4	0	0	0
Qanda	Questions	Published	35	4	3	0
Place	Clarence River and estuary places that are important to you	Published	34	1	0	0
Survey Tool	Survey - we'd love your feedback	Draft	77	1	0	34

INFORMATION WIDGET SUMMARY



Widget Type	Engagement Tool Name	Visitors	Views/Downloads
Document	Overview of coastal management in NSW	17	23
Document	Clarence Estuary Toolkit	12	14

Q and A

Q&A Question	Contributor	Admin Response
Hi, will seagrass mapping of Lake Wooloweyah be completed prior to this CMP being published. All seagrass has been lost since the Lake Wooloweyah CZMP was published in 2009. Mapping of seagrass was an outstanding action from this management plan. Failure to acknowledge total seagrass loss will impact the ability of the CMP to adequately manage issues in the lake.	N. O.	Thanks for your question N.O, The first stage (of five stages) is to complete a scoping study, which looks and existing information, information gaps and undertakes stakeholder engagement. At this early stage I cannot advise what additional information or studies will be undertaken during the development of the CMP or recommended as an action in the CMP. The whole process of CMP development will take at least two years.
That's a lovely photo of the park. It was taken cattle grazed the area. On a tour of the park last week I found it over gr own with weeds (cobblers peg, wire grass, scotch thistles, mile a minute vine) at times they were higher than the car. Clearly the NSWNP's have lost the battle with the weeds. Very few birds were observed. There were no brolgas and Jabiru or black swans because their habitat has been overgrown and they forage or take-off. The trees that have been planted 50% have died and half of the remainder are unhealthy. I have observed the park for 30 years (pre & po st NSWNPS) and I have given it a health rating of 4/10	J. H.	Thank you for your input to the CMP project. There have been significant additions to the original Everlasting Swamp State Conservation Area in recent years. A project is underway to review the management of water regimes to improv e values including ecological, cultural, water quality etc. A restoration plan is being prepared by NPWS to further guide this work, and a reserve Plan of Management is also in preparation. While the Park is the responsibility of NPWS, the CMP will consider broad issues of weeds, biodiversity and floodplain management.

Q&A Question	Contributor	Admin Response
Are you aware that a very beautiful and significant wetland area located next to the mighty Clarence River is under a cloud because at the headwaters of the magnificent Everlasting Swamp there is currently a proposal to place an industrial scale solar power plant, which can and most likely will impinge on the catchment area? A possible example its feed water can be contaminated and assorted wildlife, water life, bird life this being the most vulnerable due to a number of reasons one of which would be the Lake effect from the solar panels themselves on its unique bird life. There are so many issues with this kind of power plant and its placement is just sad completely at odds to the natural surrounding area. It's parallel to the Clarence so run off to the East will go straight into the river. The waters from the swamp / wetlands on the Western side of the Solar Plant then also eventually flow to the Clarence so if there was to be a contamination mishap it will damage and pollute both the swamp and our Clarence River.	L.	Thank you for your input into the CMP project. The Clarence River Estuary CMP will consider broad themes and issue s including the potential impacts of land use changes, including urban and industrial development, on the estuary.The Clarence Valley Solar Farm Project is State Significant Development (SSD) under Part 4 of the Environmental Planning and Assessment Act 1979 with the Department of Planning and Environment (DPE) the determining agency (not CVC) under the delegation of the Minister for Planning and Public Spaces. The proponent of the development is required to prepare an Environmental Impact Statement (EIS) and Development Application (DA) for submission to the DPE for determination. The EIS will document how the proposal impacts a range of matters including biodiversity, heritage, land, visual amenity, noise, transport, water (including an assessment of the likely impacts of the development on surface water and groundwater resources and measures proposed to monitor, reduce and mitigate these impacts), hazards, social, economic and waste. Proponents of SSD are typically required to consult with the community, local Council and other key government agencies throughout the project planning process.

Q&A Question	Contributor	Admin Response
There are current development plans to build an industrial sized solar farm (Clarence Valley Solar Farm) at 58 Boorma ns Lane, Lower Southgate. This development is proposed to cover 300 acres and positioned between on a ridge bet ween the Clarence River to the east and Warragai and Bluey Creek to the west. These 2 creeks feed the Everlasting Swamp National which is a critical wet land and estuary system. The solar panels contain a number of heavy metals. Given the frequency of major hail storms in this specific area this development poses a serious environmental risk. I tr ust this issue can be considered within the current study.	A. W.	Thank you for your input into the CMP project. The Clarence River Estuary CMP will consider broad themes and issue s including the potential impacts of land use changes, including urban and industrial development, on the estuary. The Clarence Valley Solar Farm Project is State Significant Development (SSD) under Part 4 of the Environmental Planning and Assessment Act 1979 with the Department of Planning and Environment (DPE) the determining agency (not CVC) under the delegation of the Minister for Planning and Public Spaces. The proponent of the development is required to prepare an Environmental Impact Statement (EIS) and Development Application (DA) for submission to the DPE for determination. The EIS will document how the proposal impacts a range of matters including biodiversity, heritage, land, visual amenity, noise, transport, water (including an assessment of the likely impacts of the development on surface water and groundwater resources and measures proposed to monitor, reduce and mitigate these impacts), hazards, social, economic and waste. Proponents of SSD are typically required to consult with the community, local Council and other key government agencies throughout the project planning process.

Q&A Question	Contributor	Admin Response
Good morning. Will the wetlands adjacent Orion Drive/Yamba Road, Yamba, be included in this work? This area is rapidly being overrun by invasive vines which are killing the natural growth (such as the casuarinas). There are also example of prickly pear in this locale. In addition there is one (small) example of a native orchid - the only one for miles - growing on a tree near the footpath and its future is in jeopardy due to encroaching vines.	B. K.	Thank you for your input into the CMP project. The wetlands adjacent to Orion Drive/Yamba Road are located within the project study area. Weeds are acknowledged as an issue, not only within the vicinity of the estuary but across the entire catchment. Weeds are one of the most significant and costly environmental threats in Australia. The North Coast Regional Strategic Weed Management Plan 2017-2022 outlines the primary objectives and strategies for managing priority weeds for the NSW North Coast and the responsibilities of the various stakeholders. CVC is the local control authority responsible for administering the Biosecurity Act 2015 for weeds in the local government area. CVC's approach to weed management is linked to the legislation which follows a regional risk-based approach contained in the NS W Weeds Action Program (funded by the NSW Government) and aims to control new problem weeds before they become a bigger problem in the region.

Q&A Question	Contributor	Admin Response
An EIS is currently being prepared for an industrial solar project at lower Southgate. The "No Solar For Southgate" group has identified alarming effects this development will have on our waterways and beautiful environment. In previous answers you refer this project as a SDD and appears to be beyond the control of CVC. But I would hope that CVC in conjunction with NSW Dept of Planning, Industry and Environment work towards implementing policies and regulations that prevent this type of industrial development happening in our Valley in areas that are totally inappropriate and unsuitable. We need to protect our waterways and the pristine environment in our valley.	M. F.	Hi M.F, Thank you for your feedback. We appreciate your concern regarding the proposed industrial scale solar energy generating facility at Boormans Lane, Lower Southgate and Dilkoon Road, Dilkoon and the potential impacts to the surrounding environment from the development. We are unable to provide comment at this early stage of the proposal. The studies and assessments undertaken as part of the Environment Impact Study (EIS) will provide further detail on any likely impacts at each stage of the proposed development. This will include appropriate measures to avoid imp acts on the surrounding environment. The Planning Secretary's Environmental Assessment Requirements (SEARs) also requires the EIS to include detailed assessments on the suitability of the land for the proposed development and impacts to existing land uses on the site and adjacent land, including a land use conflict risk assessment. Other key issues to be addressed by the EIS are biodiversity, heritage, visual amenity, noise, transport, water, economic, waste, social impacts and potential hazards. We will be undertaking detailed consultation with affected landowners surrounding the development. During this consultation, we will discuss likely and potential impacts of the development to ensure they are considered as part of the EIS assessments.
A while back I travelled down the river and just past Harwood I noted trawlers netting in the river. I can understand why, but there were about 5 or 6 operating and this must be detrimental to the river environment as this is a regular occurance. Should we stop all commercial fishing in the river and make it a sanctuary where only recreational fishing is allowed? I believe this would be beneficial to the majority who live in our river community.	R. M.	Thank you for your input. We note your concerns and will include them in the CMP Scoping Study. Future CMP actions relating to commercial and recreational fishing access will be the responsibility of DPI - Fisheries who are participating in the CMP development process.

Q&A Question	Contributor	Admin Response
HALFWAY CREEK HAS A NAME, GURRUUJA! Stop the Lies! Stop the Theft! It's time to show You have respect! I ask that Clarence Valley Council show genuine acknowledgement, respect, dignity and honor to the Gumbaynggirr and Wehlubal Nation by changing the name 'Halfway Creek', back to it's original name, sound, language and vibration, 'Gurruuja'. This is the original name as handed down by Babba Alec Randall (now deceased), a Lorejanyjbarr (Loreman and Knowledge holder of Gumbaynggirr Nation). This information can also be found with Muurrbay Aboriginal Language Cooperation, situated in Baga-Baga (Nambucca Heads). It can also be sourced from their Gumbaynggirr Language Dictionary. Proverbs Chapter 22:28, states clearly; 'Remove not the ancient landmark, which thy fathers have set.' Romans 13:9, clearly states for the commandments, “You shall not commit adultery, You shall not murder, You shall not steal, You shall not covet,” and any other commandment, are summed up in this word: “You shall love your neighbor as yourself.” Imagine for example, if China invaded and changed the name 'Halfway Creek' to 黃人溪 (huáng rén xī), 'Yellow man's Creek'. Is it not the same? This is why it is important to show respect, acknowledgment, honor and dignity through treating other's as you would treat yourself. Change the name to the original place name.	G.	Thank you for your input. Your enquiry has been taken onboard and forwarded to Council's Cultural Heritage Officer to discuss with community and CVC will respond in due course.
Gurruuja is the name for Halfway Creek. Change the name, stop privateers/pirateers!	G.	

APPENDIX 5 ECOHEALTH REPORT CARDS

This appendix provides the available report cards from the Ecohealth Project (Ryder et al., 2014). The report card for the Mann-Nymboida sub-catchment was not available.

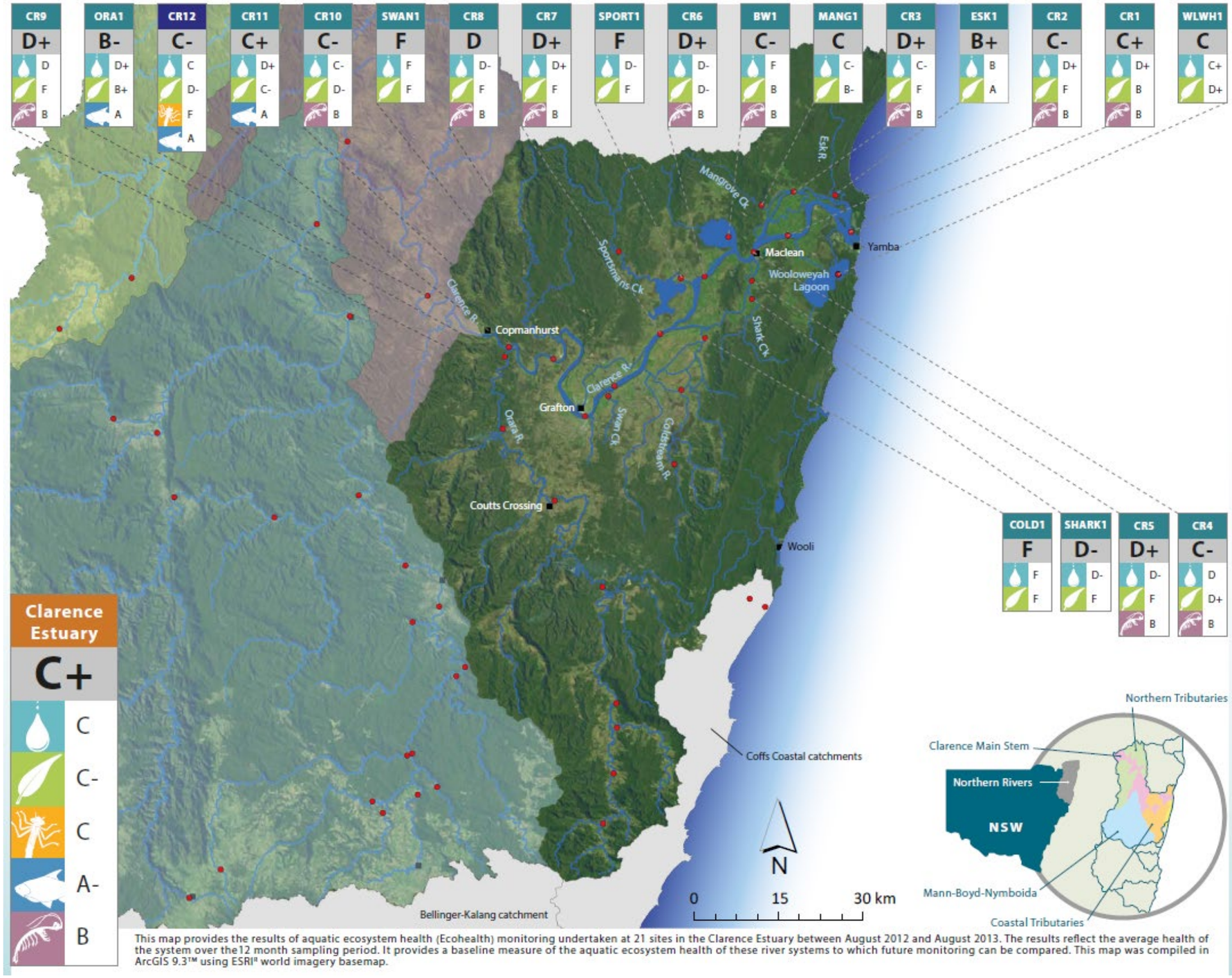
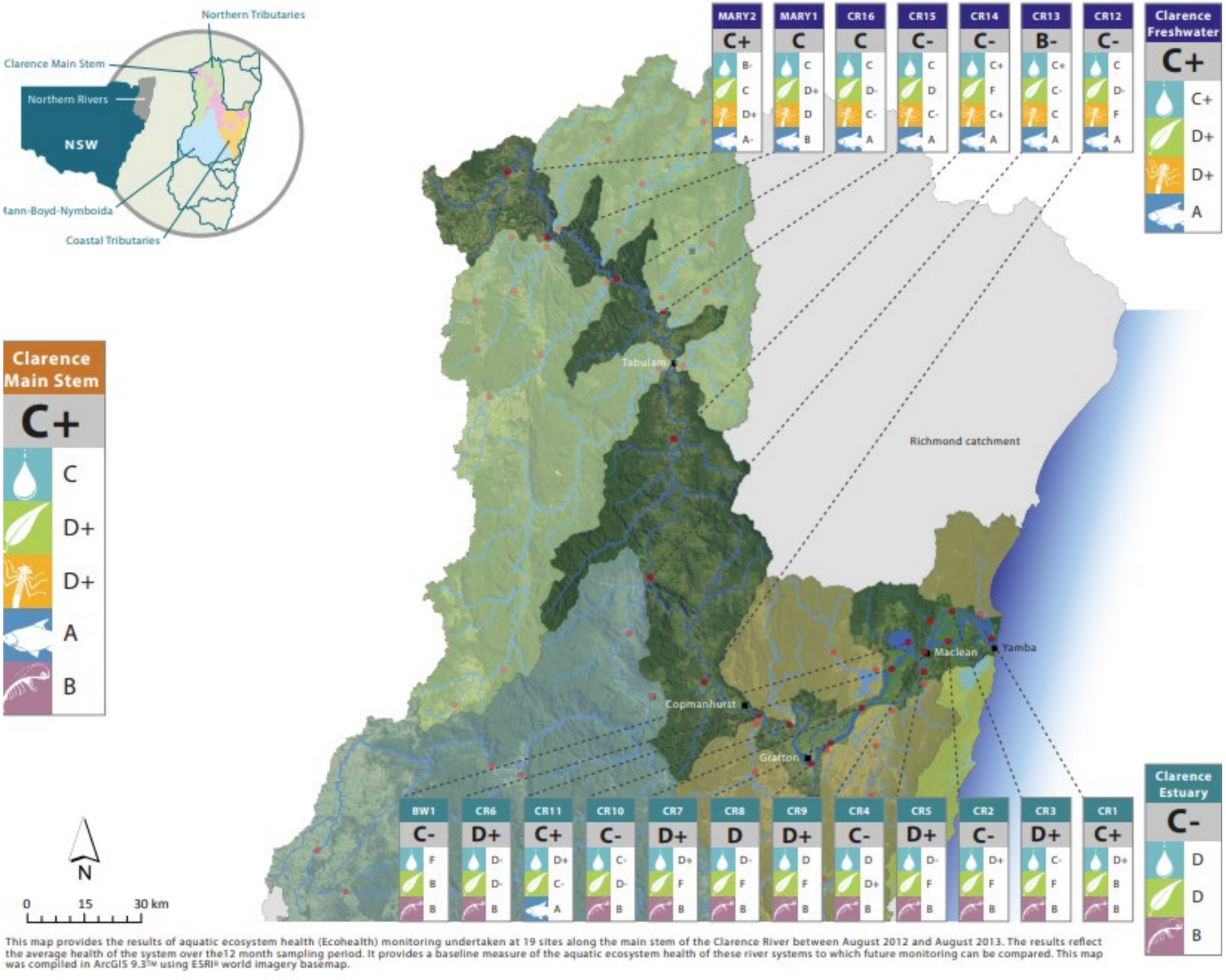


Figure 3: Clarence estuary Ecohealth report card

Source: Ryder *et al.* (2014)



This map provides the results of aquatic ecosystem health (Ecohealth) monitoring undertaken at 19 sites along the main stem of the Clarence River between August 2012 and August 2013. The results reflect the average health of the system over the12 month sampling period. It provides a baseline measure of the aquatic ecosystem health of these river systems to which future monitoring can be compared. This map was compiled in ArcGIS 9.3™ using ESRI® world imagery basemap.

Figure 4: Clarence main stem Ecohealth report card

Source: Ryder *et al.* (2014)

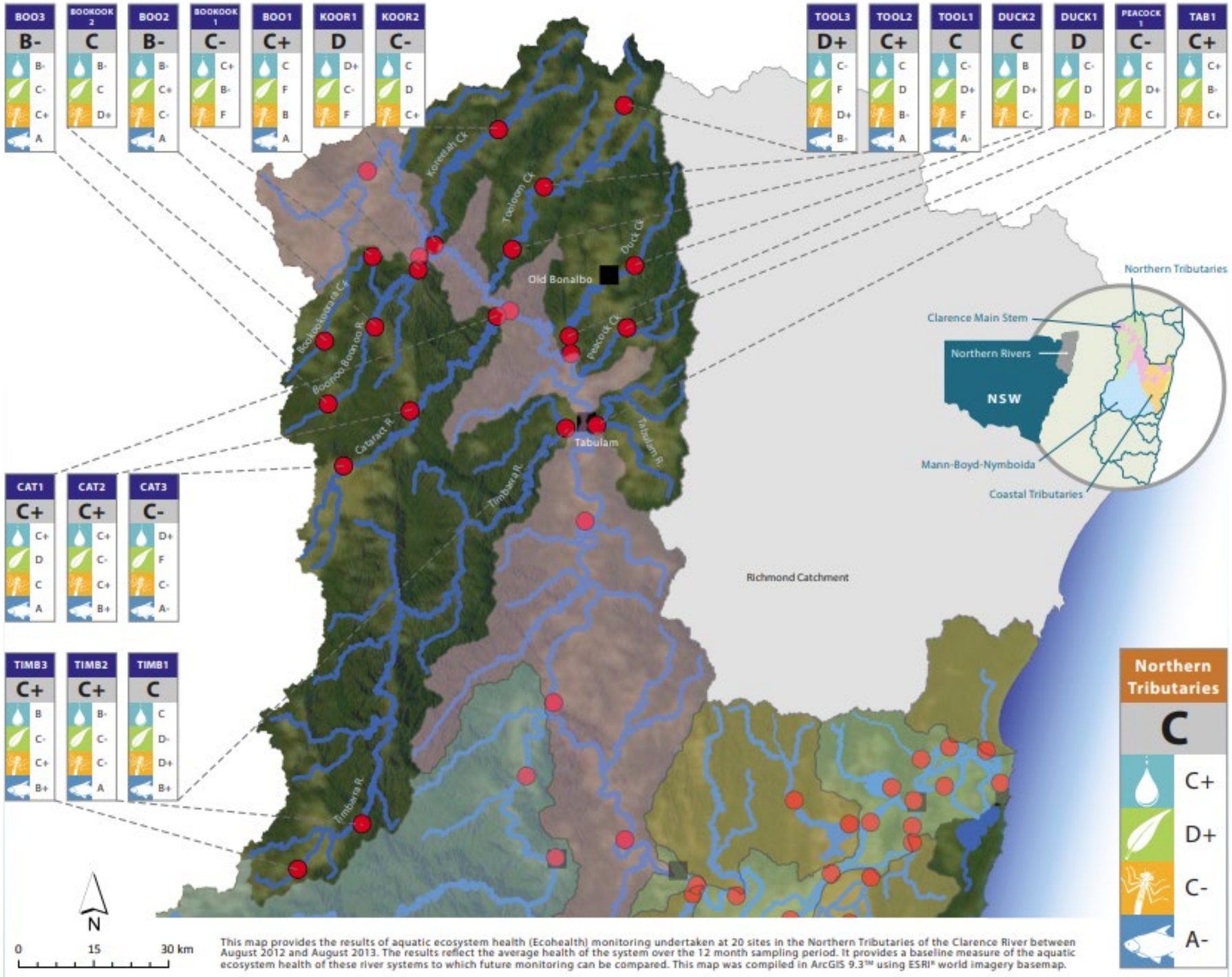


Figure 5: Northern tributaries Ecohealth report card

Source: Ryder *et al.* (2014)

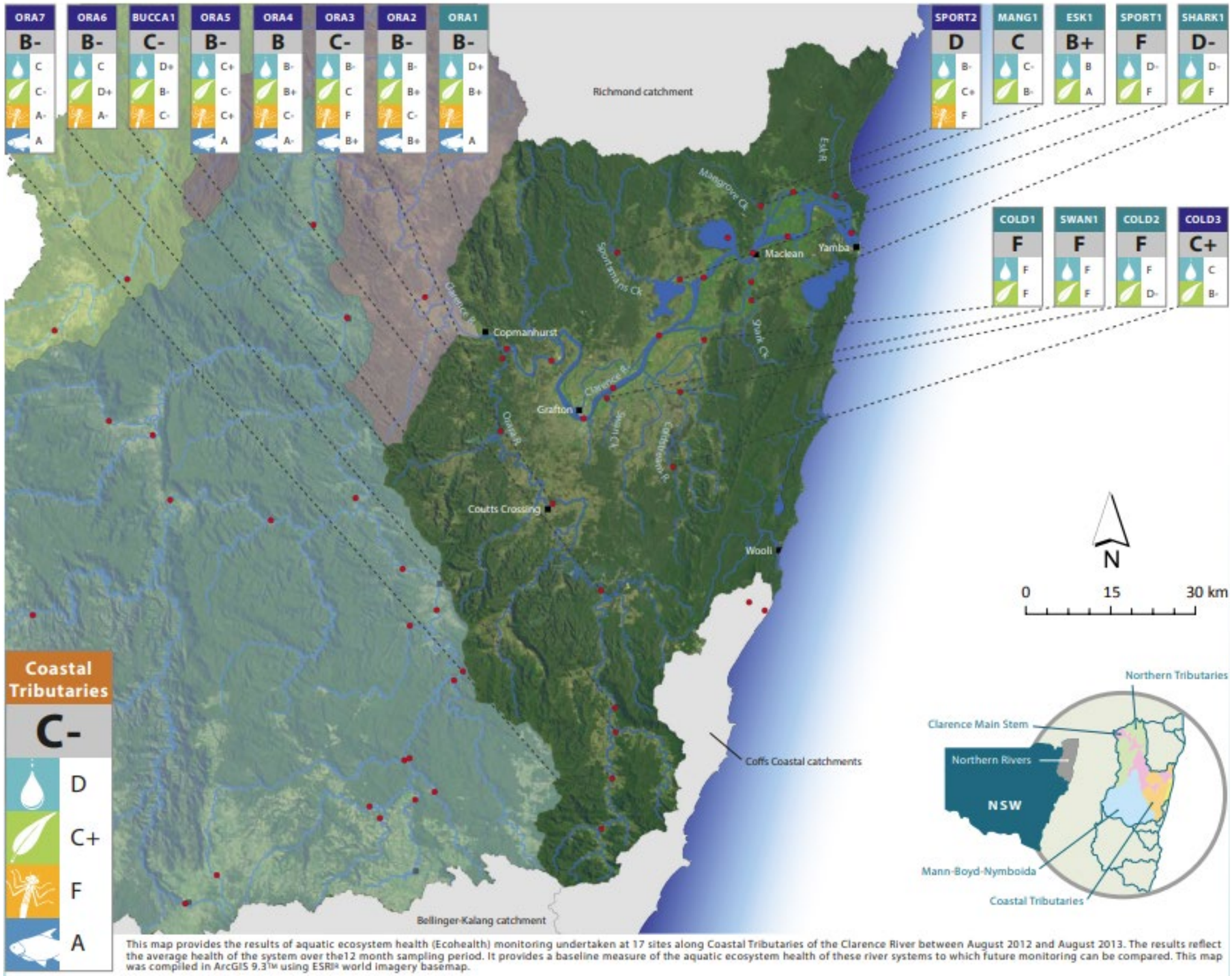


Figure 6: Coastal tributaries Ecohealth report card

Source: Ryder *et al.* (2014)

APPENDIX 6 FIRST-PASS RISK ASSESSMENT AND GAP ANALYSIS

This Appendix provides a summary of the first pass risk assessment undertaken during the preparation of the Stage 1 Scoping Study. References, glossary and abbreviations are included in Volume 1.

1. OBJECTIVES

The objectives of the first pass risk assessment and information gap analysis are:

1. To identify potential management issues/ threats within the study area and assess the risk to known values and assets.
2. To identify gaps in knowledge relating to each issue and assess the importance of addressing each knowledge gap to allow for effective future management.
3. To establish if the risk and gap in knowledge warrants further investigation or detailed assessment.

The risk assessment and gap analysis were combined into one process to streamline the investigation and identify where gaps in knowledge will hinder successful future management of issues.

2. RISK ASSESSMENT METHODOLOGY

Key information sources are background literature (summarised in Volume 1), stakeholder feedback (Appendix 4) and the status of actions from previous management plans (Appendix 2). The priority threats identified in the TARA for the Marine Estate (BMT WBM, 2017) were also considered.

The risk assessment process identifies credible threats, the likelihood of the threat occurring given existing controls, the consequences to environment, social and economic values and public safety should the event occur and applies a risk rating. The risk assessment is consistent with AS/NZS ISO 31000: *Risk Management – Principles and Guidelines* and the framework adopted for the TARA (MEMA, 2015). CVC's *Enterprise Risk Management Procedure* (CVC, 2020d) defines the approach for identifying, analysing, evaluating, treating, reporting and escalating risks. The methodology uses the risk assessment process and qualitative scales outlined in the following tables to assess the risk of identified issues impacting the values and assets of the study area under current management practices. The consequence of each threat considered potential impacts as listed in Table 7. The likelihood of each threat (Table 8) was based on existing studies and observations where available.

Threats are presented for the following categories with impacts and risks identified separately for each category. Threats may be repeated in different categories as the impacts, knowledge and potential risk treatments are different:

- Water quality.
- Hydrology, connectivity and water extraction.
- Riparian condition.
- Estuarine bank erosion.
- Sea level rise.
- Climate change.
- Cultural heritage.
- Biodiversity.
- Public use and access.
- Governance, regulation and funding.
- Planning controls.

Table 7: Qualitative measures of consequence or impact

		Financial	People	Environment	Governance & Reputation	Legal & Regulatory	Service & Project Delivery
		Financial impacts	*Safety & Wellbeing impacts*	*Environmental impacts*	*Credibility, political impacts*	*Regulatory, Compliance & Legal impacts*	*Service, project, strategic or delivery program impacts*
5	Catastrophic	> $1M financial loss or >30% adverse impact on budgeted income or expenses. External audit qualification. Threatens financial sustainability. May require State government intervention.	Multiple loss of life, permanent disability or extensive injuries to several people. Substantial long-term impact on morale or community, prosecution for breach of legislation (WHS). Long term duration lost time injury.	Detrimental long-term environmental impact. Extensive release. Total destruction of a species, habitat or ecosystem. Requires over 10 years repair. National media interest. Criminal prosecution.	Substantiated, public embarrassment. Total loss of stakeholder trust that takes many years to repair. Sustained negative national or state media coverage lasting more than 1 week. Minister or Regulator involved in issue resolution.	Significant breach leading to investigation by external agency resulting in successful prosecution or sacking of Senior Officers, Council / elected representatives. Administrator appointed.	Inability to deliver critical programs and/or services for >7 days. > 4 weeks project time slippage. Significant adverse impact on services visibly obvious to key stakeholders. Major scope changes and noticeable quality degradation require redesign. Requires immediate Crisis Management and activation of Business Continuity Plan.
4	Major	$500K to $1M financial loss or 20-30% adverse impact on budgeted income or expenses. Internal Auditor or Auditor General review qualification. Major, longer-term negative implications for Council's ability to finance delivery of capital projects and/or services.	Single death, or long-term disabling injuries to one or more people (staff or public). Major localised impact on morale of wider community. One off major breach of legislation (WHS). Medium duration lost time injury of greater than 1 month.	Medium term damage, regional impact. Release spreading off site contained with external assistance. Medium-term (5-10 years) environmental damage. State media interest. Multiple community complaints. Notification to authority required. Civil prosecution.	Substantiated, public embarrassment. Some loss of stakeholder trust that takes many months to repair. Significant adverse media at state level lasting up to 1 week. Local member attention. Major internal inquiry required.	Major breach or systemic breaches leading to investigation by external agency e.g. ICAC resulting in negative findings, fines or penalties.	Severe and widespread decline in services. Relationship with stakeholders / key suppliers becomes strained. Inability to deliver critical programs and / or services for 4-7 days. 3-4 weeks project time slippage. Noticeable quality degradation requires remediation and Council approval, possible safety issues. Requires activation of Business Continuity Plan
3	Medium	$150K to $500K financial loss or 10-20% adverse impact on budgeted income or expenses. Medium term impacts on Council's ability to finance delivery of capital projects and/or services requiring some trade-offs between initiatives and service levels.	Substantial short-term impact on morale or community. Minor breach of legislation (WHS/employment laws). Serious injury or multiple minor medical treatment. Short duration lost time injury greater than 5 days.	Environmental damage is evident. On-site release contained with assistance. Medium-term (2-5 years) environmental damage. Local media interest. Repeat community complaints. Regulatory enforcement action (e.g. fine, notice, order).	Substantiated, public embarrassment. Moderate media profile (front page, one day). Significant concerns from key stakeholders or substantial increase in number of complaints. Short-term negative media extends to major metropolitan press. An internal inquiry may be required.	Technical breach of legislation resulting in small fine or warnings. Investigation finding technical breach of legislation and improvement notices issued. A high threat of legal action.	Inability to deliver critical programs, and/or services for 2-3 days. 1-2 weeks project time slippage. Decline in council or key supplier service levels that cause a disruption to key stakeholders. Management attention required.
2	Minor	$50K to $150K financial loss or 5-10% adverse impact on budgeted income or expenses. Some minor impacts on funding of individual initiatives and services requiring supplementary funding or reprioritisation.	Some short-term localised impact on staff morale, community or customer relations. Minor injuries or illness from normal activities treated by first aid. Lost time 5 days or less.	Environmental impact is evident. On-site release immediately controlled. Up to 2 years recovery period. Does not impair the overall condition of the habitat or ecosystem.	Substantiated, low impact, low media profile (not front- page news) from individual stakeholders. Small amount of short-term, non-recurring negative local media.	Minor breach of legislation, isolated complaint or incident where there is a threat of legal action that can be resolved by management.	Some delays in meeting stakeholder expectations. < 1 week project time slippage. Minor disruption in single area of Council. Noticeable decline in service levels. Unscheduled short-term disruption for up to 1 business day. Managed through routine processes.

		Financial	People	Environment	Governance & Reputation	Legal & Regulatory	Service & Project Delivery
		Financial impacts	*Safety & Wellbeing impacts*	*Environmental impacts*	*Credibility, political impacts*	*Regulatory, Compliance & Legal impacts*	*Service, project, strategic or delivery program impacts*
1	Insignificant	<$50K financial loss or up to 5% adverse impact on budgeted income or expenses. Minimal or no adverse impact on Council's overall finances.	Localised concerns by staff, community or customers. Minimal impact on staff morale. Minor incident or 'near miss'. No lost time.	Negligible environmental impact. Isolated release only. No corrective action needed. No impact on the overall condition of the habitat and ecosystem.	Unsubstantiated, low profile media exposure. Minor isolated concerns raised and resolved by day-to-day management. Little to no public or media interest.	Minor non-compliance, complaint or isolated breach resolved by day-to-day management.	Scheduled interruptions. An inconvenience with minimal or no adverse impact on projects or other service activities. Unscheduled interruptions for less than 4 hours. Little or no impact on delivery program.

Source: CVC (2020e)

Table 8: Qualitative measures of likelihood under current management practices

LIKELIHOOD		Description	Qualification
5	Almost Certain	The event is expected to occur in normal circumstances. There has been frequent past history.	Several times a year. Greater than 90% chance of occurring.
4	Likely	The event will probably occur. Some recurring past event history.	Once a year. Between 70% and 90% chance of occurring.
3	Possible	The event may occur at some time. Some past warning signs or previous event history.	Once every 5 years. Between 30% and 70% chance of occurring.
2	Unlikely	The event could occur in some circumstances. Some history within local government or community.	Once every 20 years. Between 5% and 30% chance of occurring.
1	Rare	The event may occur but only in exceptional circumstances. No recent event history.	Once every 50 years or more. Less than 5% chance of occurring.

Source: CVC (2020e)

Table 9: Qualitative risk estimation

RISK LEVEL RATING		Likelihood				
		1 - Rare	2 - Unlikely	3 - Possible	4 - Likely	5 - Almost Certain
Consequence	5 - Catastrophic	Moderate	High	High	Extreme	Extreme
	4 - Major	Low	Moderate	High	High	Extreme
	3 - Medium	Low	Moderate	Moderate	High	High
	2 - Minor	Low	Low	Moderate	Moderate	High
	1 - Insignificant	Low	Low	Low	Low	High

Source: CVC (2020e). The last cell in the above matrix (Insignificant – Almost Certain) is assumed to be High (red).

The risk assessment evaluates the current day risk and considers how the risk level is likely to change in the future (i.e. over 20, 50 and 100 years). This includes assessment of how factors such as climate change, increasing development pressures and population increase will impact these risks. Where available, future risk levels have been assigned based on data for these risks. In other cases, a qualitative assessment has been undertaken considering the expected future changes.

The first-pass risk assessment considers the risk to estuary values from categories of issues and key threats, although it is acknowledged that the threat will vary across the catchment and consequences may be

different for each stakeholder. The assessment typically focusses on the detrimental, rather than the beneficial impacts of the threat. The potential highest consequence level to any asset or value was used for the assessment.

A Risk Assessment Workshop was held in August 2021 with council and agency representatives to discuss the first-pass risk assessment and gap analysis. At the workshop, a draft risk assessment was presented and discussed. The main aim of the workshop was to gain concurrence on the risk rating of the identified threats, data gaps and recommended Stage 2 studies. The workshop attendee list, presentation slides and feedback on the draft risk assessment are included in Attachment 1.

3. GAP ANALYSIS

Accurate and detailed information about risk and consequence is necessary to assist decision makers generate effective management strategies which identify and prioritise future actions and investment or justify a business-as-usual approach. The risk assessment also identifies knowledge gaps related to each issue and the importance of resolving each knowledge gap to allow for effective future management of the issue using the scale outlined in Table 10. The gap analysis considered the level of existing information, the current studies underway or planned to address key knowledge gaps as well as stakeholder feedback.

Table 10: Importance of knowledge to management of the Clarence River

Priority	Description
Low	This knowledge is not required for management decisions/ actions/ planning – academic interest only.
Medium	The knowledge would improve the effectiveness of management.
High	Management action required within the timeframe of this CMP cannot proceed effectively without this knowledge.

Table 11: Threats, preliminary risk assessment and knowledge gaps

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
Water Quality												
T1. Acid sulfate soil (ASS) runoff	Clarence River Floodplain. Highest priority ASS areas – Sportsman Creek, Swan Creek, Gulmarrad/ East Woodford Island, Taloumbi/ Palmers Channel, Coldstream River Harrison *et al*. (2021).	Increased acidity of river (lower pH). Release of heavy metals (e.g. aluminium, iron, arsenic etc.). Reduced ecosystem health (e.g. fish kills, red spot disease etc.). Human health risks due to poor water quality. Stock health risks due to poor water quality. Reduced commercial aquaculture/ oyster farming viability/ value. Reduced commercial fishing viability/ value. Reduced tourism value.	Remediation practices for ASS and blackwater associated with floodplain drainage has been the focus of many scientific journal articles. General management principles are summarised in various documents. Implementation of the remediation principles and prioritisation of areas in the Clarence is being undertaken in many current initiatives e.g. Harrison *et al*. (2021) Floodplain Prioritisation Study, Glamore *et al.* (2018) Everlasting Swamp Hydrodynamic modelling, CVC active floodgate management plans, Sugar cane industry best-practice guidelines, LEP planning constraints for new disturbance.	Major	Almost certain	Extreme	Extreme	Extreme	Extreme	Remediation strategies for ASS and blackwater generated from floodplain drainage are well known, understood and accepted. Many strategies have been implemented by landowners, industry and councils. However these actions have been small scale and have not reduced the impact of acid and blackwater on the estuary. If further improvements to water quality are desired, further changes to current drainage systems are required. Existing studies do not currently provide the level of detail required to implement on-ground actions. These include the environmental, social and economic impacts of different strategies, detailed costing and community perspectives and interests in contributing to change. Support from landholders/ land managers and the community has not been established for large-scale changes in priority areas. Implementing some large-scale strategies in priority areas may require a strategic approach to guide potential land acquisition or compensation for changes in land use. Stakeholder consultation will be undertaken as part of the next phase of the Floodplain Prioritisation Study through the MEMS. There is a need to identify the currently available tools to facilitate land use change in the lowest lying backswamps including the role of land zoning in the priority management areas. Additional information on the impact of coastal inundation resulting from sea level rise is also required. NPWS will review the management of water regimes to improve ecological and cultural values in Everlasting Swamp National Park. A restoration plan is being prepared by NPWS to further guide this work, and a reserve Plan of Management is also in preparation.	High	Additional investigation of T1 and T2 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. Results of the current and proposed studies (MEMS, and NPWS) are expected to be available for Stage 3 of the Clarence River CMP to enable CMP stakeholders to assess the available options for inclusion in the CMP. These include the environmental, social and economic impacts of implementing further strategies, the detailed costing of these and landowner support. Mapping of coastal/ tidal inundation extents for various likelihoods and planning horizons will inform future consideration of management options for Stage 3 of the Clarence River CMP (refer S6).
T2. Blackwater events	Lowest lying areas of Clarence River Floodplain. Highest priority areas: Coldstream River, Sportsmans Creek, Swan Creek Harrison *et al*. (2021).	Extremely low (near zero) oxygen concentration in water. Reduced ecosystem health (e.g. fish kills, disease etc.). Human health risks due to poor water quality. Stock health risks due to poor water quality. Reduced commercial aquaculture/ oyster farming viability/ value. Reduced commercial fishing viability/ value. Reduced tourism value.		Major	Almost certain	Extreme	Extreme	Extreme	Extreme			

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T3. Agricultural diffuse source runoff (PT)	All rural areas	Export of sediment and associated pollutants to waterways. Increased suspended sediment in waterways (i.e. high turbidity/ 'dirty' water). Nutrient export. Eutrophication. Fertiliser/ pesticide contamination. Faecal contamination. Reduced commercial aquaculture/ oyster farming viability/ value. Reduced commercial fishing viability/ value. Reduced tourism value.	MEMS review of *NSW Diffuse Source Water Pollution Strategy* (DECC, 2009). Relevant industry 'best practice' and self-regulation.	Major	Almost certain	Extreme	Extreme	Extreme	Extreme	There is no agreed catchment-wide prioritisation of areas to target works and provide a strategic approach to address agricultural diffuse runoff. The Estuary Health Risk Dataset identified sub-catchments with high sediment and nutrient runoff. MEMA will review and update the Diffuse Water Pollution Strategy to 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.	High	**S1. <u>Identification of priority diffuse pollution sources/ locations for on-ground works</u>** Develop a high-resolution catchment model to assess the risk of impact of nutrients and sediment on the estuary and to assist in prioritising works in the CMP building on and updating previous work. Identify potential projects and partnerships for consideration in Stage 3 of the CMP as well as funding and policy requirements for works on public and private land. Projects/locations to be identified for potential demonstration/ showcase rehabilitation sites.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T4. Bank erosion	All areas (exacerbated by floods)	Export of sediment and associated pollutants to waterways. Increased suspended sediment in waterways (i.e. high turbidity/ 'dirty' water). Nutrient export. Reduced commercial aquaculture/ oyster farming viability/ value. Reduced commercial fishing viability/ value. Reduced tourism value.	Rock revetment and other bank management measures at some locations. CVC Riparian Action Strategy (2010). Riparian revegetation/ rehabilitation programs at some locations. NSW Government Riverbank Rehabilitation Program (commencing June 2022).	Major	Almost certain	Extreme	Extreme	Extreme	Extreme	Ryder *et al.* (2014) included an assessment of geomorphic condition (bank and bed condition) at selected sites throughout the catchment (Ecohealth). Previous studies have documented the estuarine geology and geomorphology (e.g. Hashimoto, T. R and Hudson, J (1999); Nair, H., (2011)) and erosion assessments and riverbank management plans have been prepared for high-risk locations (Ulmarra, Woodford Dale, Palmers Island, Seelands). However, there is a lack of comprehensive, up to date bank stability and riparian condition mapping including for previous unmapped areas of the catchment and a lack of robust, repeatable, evidence-based approach to selection of best practice management bank treatments. There is also a lack of strategic planning for protection of council infrastructure at risk from bank erosion. A bank management decision support tool (DST) prototype and accompanying bank assessment methodology is currently being developed by DPI - Fisheries under the MEMS. The Riverbank Rehabilitation Program will include identification of priority sites for restoration following floods.	High	Identify high risk locations and potential projects as part of S4: Identification of priority riparian restoration projects/ locations of on-ground works and S5: Strategy for protection of priority Council infrastructure and assets from bank erosion.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T5. Urban stormwater discharges (PT)	Clarence Main Stem (particularly Grafton, Yamba, Maclean, Iluka)	Export of sediment and associated pollutants to waterways. Increased suspended sediment in waterways (i.e. high turbidity/ 'dirty' water). Nutrient export. Contamination from hydrocarbons, faecal matter, fertiliser/ pesticides etc. Reduced commercial aquaculture/ oyster farming viability/ value. Reduced commercial fishing viability/ value. Reduced tourism value.	Former Council urban stormwater management plans (Grafton, 2001) and Maclean (2004), CVC Residential DCP 2011	Medium	Almost certain	High	High	High	High	The EPS identified urban runoff as having an insignificant contribution to estuary nutrient loadings, however, this study was based on assumptions and is outdated. Current urban stormwater impact and relative contribution of pollution compared to other catchment sources is unknown. The effectiveness of urban stormwater management controls has not been assessed.	Mod	Water quality monitoring to assess current impacts and to track changes over time as part of S10: Develop a method of assessing and reporting estuary health. **S2. <u>Development/ review of urban stormwater management strategies</u>** Review and update existing urban stormwater management plans and identify water quality improvement strategies.
T6. Treated sewage effluent (PT)	Urban areas with centralised sewage systems - Clarence River Estuary (Clarenza, Coutts Crossing, North Grafton, Woodford Island, Baryulgil), upper catchment (Bonalbo, Woodenbong/Muli Muli, Urbenville), Mann-Nymboida-Boyd (Dorrigo)	Nutrient export. Eutrophication. Faecal contamination.	Licensed discharges regulated by EPA. Monitoring and reporting undertaken in accordance with licence. Breaches of licence conditions are addressed by licence holders in accordance with EPA directions.	Medium	Possible	Mod	Mod	Mod	Mod	Current level of impact of treated effluent on receiving environments and current contribution compared to other sources is unknown.	Mod	Additional investigation of T6 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. Water quality monitoring to assess current impacts and to track changes over time as part of EPL monitoring and S10: Develop a method of assessing and reporting estuary health.
T7. Septic runoff (e.g. failing septic systems) (PT)	All non-urban areas	Nutrient export. Eutrophication. Faecal contamination.	On-site Sewage Management Strategies implemented by local councils. Investigations into sewering villages (e.g. Mallanganee, Tabulam).	Medium	Possible	Mod	Mod	Mod	Mod	Impact of on-site sewerage systems on receiving environments has been assessed for some villages. Current contribution compared to other sources is unknown.	Mod	Additional investigation of T7 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. Water quality monitoring to assess current impacts and to track changes over time as part of S10: Develop a method of assessing and reporting estuary health.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T8. Sediment runoff from land clearing, construction/ development sites (PT)	All	Export of sediment to waterways. Increased suspended sediment in waterways (i.e. high turbidity/ 'dirty' water).	DA conditions, erosion and sediment control requirements in DCP. MEMS construction sediment project aims to reduce run-off from construction sites into NSW waterways.	Medium	Possible	Mod	Mod	Mod	Mod	Current level of impact on receiving environments and current contribution compared to other sources is unknown.	Mod	Additional investigation of T8 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. Water quality monitoring to assess current impacts and to track changes over time as part of S10: Develop a method of assessing and reporting estuary health. MEMS construction sediment project is expected to provide guidance on standard planning conditions for controlling run-off.
T9. Sediment runoff from unsealed roads (PT)	All non-urban areas	Export of sediment to waterways. Increased suspended sediment in waterways (i.e. high turbidity/ 'dirty' water).	Council road sealing programs (although generally prioritised for safety rather than environmental reasons).	Medium	Likely	High	High	High	High	Current level of impact on receiving environments and current contribution compared to other sources is unknown.	Mod	Priority CMP projects to be identified through S1 Identification of priority diffuse pollution sources/ locations for on-ground works. Water quality monitoring to assess current impacts and to track changes over time as part of S10: Develop a method of assessing and reporting estuary health.
T10. Licensed industrial activities	All – various locations	Export of pollutants to waterways (e.g. nutrients, harmful chemicals, pathogens, organics etc.).	Licensed discharges regulated by EPA. Monitoring and reporting undertaken in accordance with licence. Breaches of licence conditions are addressed by licence holders in accordance with EPA directions.	Medium	Possible	Mod	Mod	Mod	Mod	Current level of impact of industrial point source pollution on receiving environments and current contribution compared to other sources is unknown.	Mod	Additional investigation of T10 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. Water quality monitoring to assess current impacts and to track changes over time as part of S10: Develop a method of assessing and reporting estuary health.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T11. Sand/ gravel extraction	Estuary – various locations	Bank instability and associated water quality impacts. Changes in river morphology Increased turbidity generation during works and associated down-current sedimentation. Release of acid sulfate soils	Sand and gravel extraction is licensed/ regulated by DPE – Crown Lands and EPA.	Major	Possible	High	High	High	High	Initiative Two of the MEMS includes an action to audit and assess the commercial dredging and extraction operations occurring on Crown land in NSW, and the framework for licensing and compliance under the *Crown Land Management Act 2016*. DPE – Crown Lands prepared "*Audit of Commercial Dredging and Extraction on Coastal Crown Land*" the audit identified opportunities to improve the management and administration of Crown Land licences to achieve better outcomes for the marine estate including three licensed operations in the Clarence River.	-	Additional investigation of T11 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. Council should work with DPE - Crown Lands, EPA and other stakeholders to implement the recommendations of the Crown Lands audit.
T12. Navigation maintenance dredging (PT)	Lower estuary – various locations	Changes in river morphology. Sedimentation	NSW Coastal Dredging Strategy (MIDO)	Minor	Likely	Mod	Mod	Mod	Mod	Impacts of dredging operations are assessed on a project-by-project basis. Existing knowledge is considered adequate for future management.	-	-
T13. Contaminated land (e.g. industrial processing, quarries, marinas etc.)	Estuary – various locations	Export of pollutants to waterways (e.g. harmful chemicals, hydrocarbons, nutrients, organics etc.).	EPA register of contaminated land, regulated under the *Contaminated Land Management Act 1997*.	Medium	Possible	Mod	Mod	Mod	Mod	Current level of impact on receiving environments and current contribution compared to other sources is unknown.	Mod	Priority CMP projects to be identified through S1 Identification of priority diffuse pollution sources/ locations for on-ground works. Water quality monitoring design to consider assessment of current impacts and to track changes over time as part of S10: Develop a method of assessing and reporting estuary health.
T14. Cattle dip sites	All – various locations	Export of pollutants to waterways (e.g. pesticides).	Managed by the DPI (dip decommission team). High risk sites being addressed.	Medium	Possible	Mod	Mod	Mod	Mod	Some North Coast studies indicate that most dip sites are located on heavier textured soils that adsorb chemicals and pose negligible risk to waterways. Dip sites on sandy textured soils pose a greater risk to waterways. Previous studies have not comprehensively assessed all potential contaminants.	Low	Additional investigation of T14 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. Water quality monitoring design to consider assessment of current impacts and to track changes over time as part of S10: Develop a method of assessing and reporting estuary health.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T15. Pesticide and herbicide pollution	All – particularly for cropping areas with high pesticide use near waterways.	Export of pollutants to waterways (e.g. pesticides and herbicides).	Chemicals regulated by EPA and NSW government under *Pesticides Act 1999*. Monitoring undertaken in drinking water catchments in accordance with ADWG.	Medium	Possible	Mod	Mod	Mod	Mod	The level of current pesticide and herbicide use, pollution and impacts throughout the catchment waterways is unknown.	Mod	Pesticide/ herbicide monitoring strategy to establish a catchment-wide baseline and ongoing monitoring to track changes over time as part of S10: Develop a method of assessing and reporting estuary health.
T16. Bushfire (impacts on water quality)	All – particularly bushland areas	Increased erosion risk. Increased nutrient and sediment load to waterways. Related social and economic factors.	Emergency response RFS, NPWS fire management plans, planning controls. Some research is available on water quality impacts post-bushfire. Cultural burning.	Major	Likely	High	High	High	High	Existing knowledge is considered adequate for future management.	-	-
T17. Chemical/ fuel spills	All – particularly road crossings	Export of pollutants to waterways (e.g. hazardous chemicals, hydrocarbons etc.).	HAZMAT clean-up by first responders (e.g. RFS), EPA monitoring and assessment/ reporting.	Medium	Possible	Mod	Mod	Mod	Mod	Existing knowledge is considered adequate for future management.	-	-

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T18. Litter, solid waste and microplastics (PT)	All	Visual pollution Harm to wildlife through ingestion, choking, suffocating etc. Habitat structure modifications. Leaching of toxic chemicals (e.g. from breakdown of plastics).	*Protection of the Environment Operations Act 1997* regulates littering in NSW. Education programs include EPA's Litter Prevention Program, container deposit scheme, rubbish bins, community clean up days (e.g. annual clean up Australia day), post-flood river and shoreline clean-up, public education campaigns (e.g. Don't be a tosser!). NE Waste conducts local education programs.	Minor	Likely	Mod	Mod	Mod	Mod	Documented occurrence/scale of litter and microplastics issues in the Clarence River catchment.	Low	**S3. <u>Investigate scale of litter and microplastics issues</u>** The EPA Litter Prevention Kit and Local Litter Check provide tools to carry out assessments.
T19. Estuary prawn trawling (PT)	Wooloweyah Lagoon and other areas open to estuary prawn trawling (generally upstream to Ulmarra)	Turbidity. Release of sediment and nutrients.	Fishery regulation and management.	Medium	Likely	High	High	High	High	Various studies e.g. Woodhouse (2001) report that the operation of trawlers and nets in the shallow depths of Wooloweyah Lagoon causes high mixing and disturbance to the bottom habitats such as seagrass beds and sediments, resulting in increased turbidity. However, the contribution of trawling to turbidity (compared to land-based water quality threats) in Wooloweyah Lagoon and the other parts of the estuary is unclear.	Mod	Additional investigation of T19 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. DPI - Fisheries is responsible for monitoring the impacts of commercial trawling and managing the sustainability of the estuary fishery. Water quality monitoring design to consider assessment of current impacts and to track changes over time as part of S10: Develop a method of assessing and reporting estuary health.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T20. Long fetch and strong winds increasing turbidity	Wooloweyah Lagoon, The Broadwater, likely other locations	Resuspension of fine sediment and decreased settling causing turbidity. Release of sediment nutrients.	-	Medium	Almost certain	High	High	High	High	Various studies e.g. Woodhouse (2001) and White (2009b) discuss causes of poor water quality in Wooloweyah Lagoon including wind resuspension of bottom sediments and the large southerly fetch.	-	-
T21. Future development, urban growth	Yamba, Gulmarrad, James Creek, Clarenza, Junction Hill – potential impact to all of estuary.	Increased urban run-off and associated water quality impacts. Impacts to floodplain processes. Increases many other threats such as litter/waste, urban runoff and biodiversity impacts.	Land use planning and development controls	Medium	Almost certain	High	High	Extreme	Extreme	-	-	-
Hydrology, connectivity and water extraction												
T22. Modified freshwater flows (PT)	All areas (artificial barriers, water extraction etc.).	Modified flow patterns Water quality impacts (reduced flushing). Altered flow-dependent cues for fish migration affecting breeding etc. Increased sedimentation. Aquatic habitat degradation. Impacts on groundwater dependent ecosystems.	Council floodplain asset management plans. Management of water extraction is addressed in the Clarence River Water Sharing Plan (CRWSP) administered by NRAR and DPIE-Water. Regional Water Strategy being developed by DPIE includes options for waterway health improvements. Council IWCM Strategy being developed to address town water supply requirements.	Major	Almost certain	Extreme	Extreme	Extreme	Extreme	CRWSP was published in 2016 (review planned for 2026). Limited monitoring of water licensing compliance.	Mod	Additional investigation of T22 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. CMP to include consultation with agencies responsible for managing extraction regarding CRWSP review progress and implications for waterway health.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T23. Proposal to dam the Clarence River	Upper catchment	Modified flow patterns Water quality impacts (reduced flushing). Altered flow-dependent cues for fish migration affecting breeding etc. Aquatic habitat degradation.	Option of an inland diversion from east of the Great Dividing Range to the Border Rivers region has been proposed.	Catastrophic	Unlikely	High	High	High	High	Options for improving water security for the Border Rivers Region are being investigated as part of the NSW Government's Regional Water Strategy. The option of an inland diversion scheme has been investigated in the past and found to be unacceptable due to excessive costs, marginal benefits and significant environmental implications but is included in the long list of options in the Border Rivers Regional Draft Regional Water Strategy (DPIE, 2021a).	-	Additional investigation of T23 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. CMP to include consultation with agencies responsible for water source development regarding implications for the health of the Clarence River.
T24. Hydrological modification of wetlands and floodplain drainage works (PT)	Clarence River Main Stem and floodplain, including Wooloweyah Lagoon and channels	Acid sulfate soil impacts (refer T1) Blackwater impacts (refer T2) Sedimentation. Aquatic habitat modification and degradation. Inundation of agricultural land and associated loss of production. Inundation of urban areas.	Drainage and floodgate management plans. CVC floodplain structural works review (WRL, 2021). Structural mitigation works review BMT, 2021). Hydrodynamic modelling for Everlasting Swamp (WRL, 2018). Industry best-practice management guidelines. Planning controls for new developments and ASS management.	Major	Almost certain	Extreme	Extreme	Extreme	Extreme	Refer T1. Acid sulfate soil (ASS) runoff and T2. Blackwater events.	-	-
T25. Floodgate design, operation and maintenance (PT)	Clarence River Main Stem and floodplain, including Wooloweyah Lagoon and channels			Medium	Likely	High	High	High	High	Council has assessed the relative flood risk mitigation benefits of existing structural flood risk mitigation works on the Lower Clarence floodplain. Refer also T1. Acid sulfate soil (ASS) runoff and T2. Blackwater events.	-	Additional investigation of T25 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. CMP Stage 3 to consider the application of options to site specific locations (relevant to all land owners/ managers across the floodplain) with reference to outcomes of existing studies. This may include the identification of any further studies required to manage the natural resource management impacts associated with flood mitigation activities (e.g. detailed survey, hydrological options studies).

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T26. Catchment flooding (from River)	All areas	Loss/ damage to riverbanks, land, infrastructure and assets. Loss of life. Economic loss. Poor water quality (sedimentation, pollutant transport).	Floodplain risk management plans. NSW Flood Prone Land Policy.	Catastrophic	Almost certain	Extreme	Extreme	Extreme	Extreme	Council's flood model adopted in 2014 will be updated with structural modifications (e.g. highway) within the catchment and calibrated to March 2022 floods.	High	Additional investigation of T26 and T27 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. To be undertaken as part of Council's flood and stormwater management planning. Riparian restoration priority locations to be addressed as part of S4 - Identification of priority riparian restoration projects/ locations of on-ground works.
T27. Stormwater inundation	All urban areas		Council stormwater management works. Development control plan.	Major	Likely	High	High	High	High			

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
Riparian condition												
T28. Clearing of riparian and adjacent habitat (PT)	All	Loss of or reduced value of riparian and estuarine vegetation and habitat. Reduced buffering capacity of riparian land to protect water quality. Bank instability. Increased susceptibility to floods. Siltation. Reduced amenity. Reduced tourism value.	Various riparian revegetation/ rehabilitation programs at some locations by agencies, community and industry groups. CVC Riparian Action Strategy (2010). NSW Government Riverbank Rehabilitation Program (commencing June 2022).	Major	Almost certain	Extreme	Extreme	Extreme	Extreme	Ryder *et al.* (2014) included an assessment of geomorphic condition (bank and bed condition) at selected sites throughout the catchment (Ecohealth). Erosion assessments and riverbank management plans prepared for high-risk locations (Ulmarra, Woodford Dale, Palmers Island, Seelands) Lack of comprehensive, up to date bank stability and riparian condition mapping including for previous unmapped areas of the catchment. Lack of robust, repeatable, evidence-based approach to selection of best practice management bank treatments. Lack of reporting of riparian restoration projects and monitoring of improvements. A bank management decision support tool (DST) prototype and accompanying bank assessment methodology is currently being developed by DPI - Fisheries under the MEMS. The Riverbank Rehabilitation Program will include identification of priority sites for restoration following floods.	High	**S4. <u>Identification of priority riparian restoration projects/ locations of on-ground works</u>** Develop a high-resolution catchment model (such as MCAS-S) to assess the causes of bank instability and impact of riparian condition on the estuary and to assist in prioritising works in the CMP. Detailed and current data are required to provide meaningful modelling outcomes. Identify potential projects and partnerships for consideration in Stage 3 of the CMP. Projects/ locations to be identified for potential demonstration/ showcase rehabilitation sites.
T29. Lack of suitable buffer zones between land use and waterways	All		LEP and DCP planning controls in some areas. NRAR policy and guidelines and related legislation. State Forestry protocols.	Major	Almost certain	Extreme	Extreme	Extreme	Extreme			
T30. Dominance of invasive weeds	All		Riparian revegetation/ rehabilitation programs underway at some locations. CVC management of priority weeds. CVC Riparian Action Strategy (2010). EcoHealth (2014).	Major	Almost certain	Extreme	Extreme	Extreme	Extreme			
T31. Uncontrolled stock access to and grazing within the riparian zone (PT)	All		Stock exclusion (fencing and watering) at some locations.	Major	Almost certain	Extreme	Extreme	Extreme	Extreme			

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
Estuarine bank erosion												
T32. Catchment flooding	All	Bank and bed instability. Loss of agricultural land and productivity. Infrastructure (stormwater, roads, water, sewer etc.) damage. Erosion to and loss of riparian and estuarine vegetation and habitat. Navigation hazards. Reduced amenity. Reduced tourism value. Council liability and legality issues.	CVC Riparian Action Strategy (2010). Flood studies and floodplain management plans. Some bank management works. Boating speed limits and Maritime NSW regulation. Boating controls and river bank remediation works in some areas (e.g. Seelands). Riparian revegetation/ rehabilitation programs at some locations. Stock exclusion (fencing and watering) at some locations.	Major	Almost certain	Extreme	Extreme	Extreme	Extreme	Refer T4 - Bank erosion and T26 - Catchment flooding.	High	**S5. <u>Strategy for protection of priority Council infrastructure and assets from bank erosion</u>** Consider tools, data and guidance from MEMS work underway and outcomes of other CMP studies (S4, S6) to identify priority infrastructure protection strategy. Identify potential projects for consideration in Stage 3 of the CMP.
T33. Powered vessels and towing (PT)	All navigable waterways			Medium	Almost certain	High	High	High	High			
T34. Wind waves	All			Minor	Almost certain	High	High	High	High			
T35. Historic clearing of riparian vegetation and adjacent habitat (PT)	All			Major	Almost certain	Extreme	Extreme	Extreme	Extreme			
T36. Stock grazing of riparian and marine vegetation (PT)	All			Major	Almost certain	Extreme	Extreme	Extreme	Extreme			
T37. Gully erosion and bed lowering	All - particularly in areas of highly dispersible soils and steep erodible country (e.g. north and north-west portion of catchment)			Minor	Almost certain	High	High	High	High			

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
Sea level rise												
T38. Increasing tide/ sea levels	Tidal extent – Clarence Main Stem, Wooloweyah Lagoon and coastal tributaries	Degradation or loss of assets and infrastructure. Unsafe or loss of access to waterways. Increased frequency of flooding and inundation. Loss of riparian vegetation. Migration of estuarine and riparian vegetation communities. Loss of amenity. Public safety risks. Reduced tourism value. Damage to cultural heritage sites. Council liability and legality issues. Changing tidal velocities. Storm tide inundation. Changed geomorphology (shoaling, bank instability and erosion). Migration of estuarine vegetation communities. Compromised assets (e.g. stormwater, sewerage, roads, floodgates). Related social and economic factors.	Floodplain infrastructure (e.g. floodgates, levees etc.) prevent tidal ingress in some areas of the floodplain. Levee systems in some areas.	Medium	Almost certain	High	Extreme	Extreme	Extreme	Coarse assessment available from Coastal Risk Australia and OEH (2018c). However, a higher level of understanding of local inundation extent and frequency with climate change and the associated risk is required. Risks associated with various management approaches (maintenance or modification of floodplain management assets) and associated funding requirements to mitigate risks is unknown.	High	**S6. <u>Assessment of coastal inundation risk</u>** Coastal inundation modelling/ assessment is being undertaken as part of Stage 2 for the Clarence Coastline CMP (coastline areas only). Detailed inundation assessment of the estuary for a variety of future sea level rise scenarios and floodplain management scenarios is required. Assessment of risk to estuary assets and infrastructure is required once hazard mapping is available.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T39. Anthropogenic barriers (i.e. physical barriers, land use and planning constraints) to migration of vegetation communities with sea level rise	Tidal extent – Clarence Main Stem, Wooloweyah Lagoon and coastal tributaries	Loss of marine vegetation.	MEMS state-wide *Marine Vegetation Management Strategy* currently under development	Medium	Likely	High	High	Extreme	Extreme	Locations and extent of barriers to estuarine vegetation migration with sea level rise have not been assessed. The MEMS state-wide *Marine Vegetation Management Strategy* currently under development – assessment and mapping will address knowledge gaps once available.	-	Additional investigation of T39 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. MEMA state-wide *Marine Vegetation Management Strategy* currently under development is expected to guide estuary management planning.
T40. Increased salinity in the upper estuary		Habitat changes and decline in potable/ stock water quality.	Floodplain infrastructure (e.g. floodgates, levees etc.) prevent tidal ingress in some areas of the floodplain.	Minor	Likely	Mod	High	Extreme	Extreme	Floodplain prioritisation study (T1 and T2) considered sea level rise impacts.	-	Additional investigation of management options as part of the Clarence River CMP is not recommended.
Climate change												
T41. Average warming and extreme temperatures (PT)	All	Increased flooding risk. More severe droughts. Increased number of hot days and higher rates of evaporation. Reduced stream flows. Increased bushfire risk. Loss of biodiversity (particularly coastal floodplains, wetlands, saltmarsh and mangroves). Increased water temperatures. Increased acidification of estuaries. Enhanced mobilisation of acidity and metals.	CVC climate adaptation programs.	Minor	Almost certain	High	High	Extreme	Extreme	Comprehensive CSIRO/ BOM climate projections and climate change research studies are available.	-	Additional investigation of T41 and T42 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. CMP to consider outcomes of studies/ data to guide management planning.
T42. Increase in extreme weather events (e.g. prolonged dry periods and increased frequency and magnitude of storms/ flood events (PT)				Medium	Almost certain	High	High	Extreme	Extreme			

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T43. Increase in mosquito-borne diseases	All	Human health impacts due to increased incidence of mosquito-borne diseases associated with increased temperatures, sea level rise and extreme rainfall events.	NSW Health conducts surveillance of mosquito populations and disease transmission and provides information and advice.	Minor	Possible	Mod	High	Extreme	Extreme	Existing knowledge is considered adequate for future management.	-	-

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
Cultural heritage												
T44. Lack of recognition of cultural values and connection to Country and specifically to water.	All	Loss of or damage to items of heritage significance or cultural heritage values. Lack of recognition and protection of Native Title rights.	Native Title determinations and Indigenous Land Use Agreements (ILUA) over various parts of the study area. Some project specific engagement activities. Consultation with local groups, organisations and land managers in developing the CMP.	Medium	Likely	High	High	High	High	Limited public information/ understanding about Clarence River cultural values/ stories. Lack of knowledge of traditional management practices. Impact on Native Title rights cannot be determined until CMP actions are developed.	High	**S7. <u>Identify mechanisms for protection of Native Title rights in CMP development and implementation</u>** Liaise with Native Title holders to understand impact on Native Title rights and develop required mechanisms in accordance with requirements of relevant legislation.
T45. Lack of involvement of First Nations people in decision making and river management				Medium	Possible	Mod	Mod	Mod	Mod			**S8. <u>Cultural recognition/ awareness project(s) communicating cultural values of the river and connection to Country</u>** Development of all CMP projects in collaboration with First Nations groups to increase involvement in waterway management and increase understanding of cultural values and traditional management practices. Continue and enhance targeted consultation with First Nations community and land managers at all stages of the CMP. Identify First Nations groups and organisations with capacity and interest to be involved in CMP actions.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T46. Damage to Aboriginal cultural heritage items/ sites	All – various locations	Loss of or damage to items of heritage significance or cultural heritage values.	Cultural heritage assessment as part of approval processes, AHIMS, Heritage NSW. CVC/Yaegl cultural mapping project commenced. LEP 2011 controls.	Major	Likely	High	High	High	High	Location and nature of Aboriginal cultural heritage items/ sites is being documented with Yaegl people. Limited mapping for other Nations.	Mod	**S9. <u>Cultural mapping</u>** Review and update cultural mapping projects across the LGA to locate and conserve sites and items and provide input into planning and development controls. Consult with First Nations groups to design/develop a cultural mapping project potentially based on the process undertaken by Yaegl. Work with Yaegl to finalise their mapping project.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
Biodiversity												
T47. Clearing of riparian and adjacent habitat (PT)	All	Refer T20 – T23	Refer T20 – T23	Major	Almost certain	Extreme	Extreme	Extreme	Extreme	Refer T20 – T23	Mod	S4: Identification of priority riparian restoration projects/ locations of on-ground works.
T48. Terrestrial weeds	All	Loss of biodiversity. Displacement of native species. Alteration of native habitats. Reduced recruitment of native riparian vegetation. Reduced habitat availability. Water quality impacts. Reduced amenity. Related social and economic factors.	Managed by various agencies and local government under *Biosecurity Act 2015*, NSW Weeds Action Program, *National Parks and Wildlife Act 1974*, state and local biodiversity strategies and management plans. Community groups such as Landcare and Bushcare undertake weed management throughout the catchment. The *NSW Biosecurity Strategy 2013-2021* includes broad scale monitoring of pests, diseases and weeds.	Major	Almost certain	Extreme	Extreme	Extreme	Extreme	There is no catchment-wide documented occurrence/scale of invasion by exotic plants in the Clarence River catchment. The *NSW Biosecurity Strategy 2013-2021* is expected to guide weed management in the region.	-	High risk locations and potential projects through S4: Identification of priority riparian restoration projects/ locations of on-ground works.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T49. Predation and invasion by feral animals/ pest species (PT)	All	Loss of biodiversity. Displacement/predation of native species and livestock. Alteration/degradation of native habitats. Damage fences and other infrastructure. Water quality impacts (e.g. carp). Reduced amenity. Related social and economic factors.	Managed by various agencies and local government under *Biosecurity Act 2015*, *North Coast Regional Strategic Pest Animal Management Plan 2018-2023*, *National Parks and Wildlife Act 1974*, state and local biodiversity strategies.	Medium	Almost certain	High	High	High	High	Documented occurrence/scale of invasion by feral animals/pest species in the Clarence River catchment.	Low	Additional investigation of T49 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. Existing regulation and strategies are expected to guide pest management in the region.
T50. Habitat disturbance from sand/ gravel extraction (PT)	Estuary – various locations	Habitat loss. Pollution. Contamination. Hydrological changes.	Sand and gravel extraction is licensed/ regulated by DPE – Crown Lands.	Medium	Likely	High	High	High	High	Refer T11 - Sand/ gravel extraction	High	Additional investigation of T50 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. Results of the current audit by DPE – Crown Lands are expected to be available for Stage 3 of the Clarence River CMP to enable CMP stakeholders to review the proposed measures.
T51. Habitat disturbance from mining (PT)	All – particularly upper catchment	Habitat loss. Pollution. Contamination. Hydrological changes.	State government granted leases and assessment process.	Major	Possible	High	High	High	High	While the potential impacts of mining on estuary health is significant and knowledge of required mitigation strategies is limited, the granting of mining leases is regulated by the state government through processes separate to the CMP.	-	Additional investigation of T51 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. CMP to include consultation with agencies responsible for mining leases regarding implications for waterway health.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T52. Aquatic weeds	e.g. Water hyacinth (*Eichhornia crassipes*) and Parrots feather (*Myriophyllum aquarium*) in smaller tributaries, modified waterways and floodplain drains e.g. Alumy Creek	Water quality impacts (e.g. reduced dissolved oxygen). Degradation of aquatic habitats. Loss of biodiversity. Displacement of native species. Alteration of native habitats. Reduced amenity/aesthetics. Asset damage. Increased water loss through transpiration. Related social and economic factors.	Managed by various agencies and local government under *Biosecurity Act 2015*, NSW Weeds Action Program, *National Parks and Wildlife Act 1974*, state and local biodiversity strategies and management plans. Community groups such as Landcare and Bushcare undertake weed management throughout the catchment.	Medium	Almost certain	High	High	High	High	Existing knowledge is considered adequate for future management.	-	-
T53. Foreshore development and land clearing for agriculture or urban development (PT)	All	Water quality impacts. Degradation of aquatic habitats. Loss of biodiversity. Reduced amenity. Related social and economic factors.	Vegetation management policies and legislation, development controls, land use planning	Medium	Almost certain	High	High	Extreme	Extreme	Refer T20 – T23	Mod	S4: Identification of priority riparian restoration projects/ locations of on-ground works.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T54. Loss of estuarine vegetation (mangroves, saltmarsh, seagrass)	Tidal extent, particularly Wooloweyah Lagoon	Loss and/or degradation of aquatic habitats/ protected marine vegetation. Loss of biodiversity. Reduced fish stocks.	Mapping of estuarine vegetation extents at various times. DPI - Fisheries policy and guidelines for protection of estuarine vegetation.	Major	Likely	High	High	High	High	Loss of seagrass in Wooloweyah Lagoon is a key community concern and contributing factors (sedimentation, turbidity, nutrients, water depth) have been well documented although the relative contribution of land-based and water-based activity to seagrass degradation is unclear. The MEMS Floodplain Prioritisation Study and Council floodplain drainage management strategies will consider the downstream sedimentation impacts of floodplain drainage. The MEMS private foreshore structures strategy will manage access to waterways while also protecting the public foreshore and sensitive environmental areas. MEMS marine vegetation strategies will identify current and future threats to mangroves and saltmarsh in the Clarence River estuary and identify priority areas for the protection of healthy mangrove and saltmarsh areas and rehabilitation of degraded areas. The FRDC project *Knowledge for Productivity: Phase 1 – Lake Wooloweyah* (WRL, 2021) investigated the habitat-fishery linkages and provided strategic priorities for repair of habitat in combination with enhancement of tidal flows and resulting increases in tidal habitat. Further investigation into costs and benefits and mechanisms for land use change to facilitate tidal habitat is required. DPI - Fisheries is responsible for monitoring the impacts of commercial trawling and managing the sustainability of the estuary fishery.	High	Additional investigation of T54 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. Results of the current and proposed studies (MEMS, and FRDC) are expected to be available for Stage 3 of the Clarence River CMP to enable CMP stakeholders to assess the available options for inclusion in the CMP. These include the environmental, social and economic impacts of implementing further strategies, the detailed costing of these and landowner support. The CMP will include ongoing stakeholder collaboration to develop landholder and industry incentives for land use change.
T55. Barriers to fish passage	All – various locations	Interrupting spawning or seasonal migrations. Restricting access to preferred habitat and food resources. Increasing the chance of predation and disease. Reduced fish stocks.	DPI - Fisheries policy and guidelines. DPI - Fisheries projects (e.g. weir removal).	Medium	Almost certain	High	High	High	High	Existing knowledge is considered adequate for future management.	-	-

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T56. Bushfire (impacts on biodiversity)	All – particularly bushland areas	Fauna mortality. Reduced vegetation cover. Displacement of native species. Alteration of fauna habitats. Increased erosion risk. Increased nutrient and sediment load to waterways. Water quality impacts. Related social and economic factors.	NPWS fire management plans Cultural burning practices	Catastrophic	Likely	Extreme	Extreme	Extreme	Extreme	Existing knowledge is considered adequate for future management.	-	-
T57. Forestry activities	Forestry operational areas and private native forestry (upper catchment areas).	Loss of biodiversity Reduced vegetation cover. Displacement of native species. Alteration of fauna habitats. Increased erosion risk. Increased nutrient and sediment load to waterways. Water quality impacts.	Forestry Commission NSW operations approval, Private Native Forestry agreements	Medium	Likely	High	High	High	High	Existing knowledge is considered adequate for future management.	-	Additional investigation of T57 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. Water quality monitoring to assess risks to track changes over time as part of S10: Develop a method of assessing and reporting estuary health.
T58. Commercial fishing (estuary general) (PT)	Mainly lower and mid estuary.	Reduced fish stocks. Loss and/or degradation of aquatic habitats/ protected marine vegetation. Loss of biodiversity.	Commercial rules and regulations including fishing closures under the *Fisheries Management (General) Regulation 2019*	Medium	Possible	Mod	Mod	Mod	Mod	DPI - Fisheries is responsible for monitoring the impacts and managing the sustainability of the fishery. MEMS Initiative 6: Sustainable fishing and aquaculture includes a number of research programs to allow for effective management.	-	Additional investigation of T58 and T59 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP.
T59. Commercial fishing (estuary trawling) (PT)				Major	Possible	High	High	High	High			

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T60. Recreational fishing – shore-based and boat – based line and trap fishing, hand gathering (PT)	All – particularly lower estuary	Reduced fish stocks Loss and/or degradation of aquatic habitats/ protected marine vegetation. Fishing waste/ litter (e.g. fishing line, hooks, traps, nets sinkers etc.) posing threat to wildlife. Loss of biodiversity.	Recreational fishing rules and regulations including fishing closures under the *Fisheries Management (General) Regulation 2019.* Recreational fishing surveys carried out by DPI - Fisheries to inform adaptive management. Recreational Fishing Management Strategy and Environmental Assessment undertaken by DPI - Fisheries.	Minor	Possible	Mod	Mod	Mod	Mod	DPI - Fisheries is responsible for monitoring the impacts and managing the sustainability of the fishery. MEMS Initiative 6: Sustainable fishing and aquaculture includes a number of research programs to allow for effective management.	-	Additional investigation of T60 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP.
T61. Insufficient public land available to establish stewardship sites to offset loss of native vegetation through land development	All	Net loss of biodiversity from the region.	*Biodiversity Conservation Act 2016* and the *State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017.* Biodiversity Offset Scheme.	Medium	Likely	High	High	High	High	Impacts of biodiversity legislation reforms have been identified including a lack of potential stewardship sites. Existing knowledge is considered adequate for future management.	-	Additional investigation of T61 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. On-ground options to consider opportunities for establishment of stewardship sites.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T62. Litter, solid waste and microplastics (PT)	All	Harm to wildlife through ingestion, choking, suffocating etc. Habitat structure modifications. Water quality impacts (T18).	*Protection of the Environment Operations Act 1997* regulates littering in NSW. Education programs include EPA's Litter Prevention Program, container deposit scheme, rubbish bins, community clean up days (e.g. annual clean up Australia day), post-flood river and shoreline clean-up, public education campaigns (e.g. Don't be a tosser!). NE Waste conducts local education programs.	Minor	Possible	Mod	Mod	Mod	Mod	Documented occurrence/scale of litter and microplastics issues in the Clarence River catchment.	Low	S3: Investigate scale of litter and microplastics issues.
Public use and access												
T63. Pathogens present in water	All – particularly high recreational use areas.	Human health impacts (primary contact recreation and drinking water supplies).	Monitoring of pathogens in CVC drinking water catchments.	Major	Possible	High	High	High	High	Beachwatch data from 2000s. Current level of human health risk is unknown for many areas.	Mod	Water quality monitoring to assess risks to human health and to track changes over time as part of Develop a method of assessing and reporting estuary health.
T64. Limited or lack of access infrastructure / recreational facilities (PT)	All	Restricted public access. Construction of unauthorised access points. Erosion. Public safety risks. Reduced amenity. Reduced tourism value.	Boating Now program. Some foreshore reserve upgrades by CVC.	Minor	Unlikely	Low	Low	Mod	Mod	While there is a good understanding of access needs and requirements in the lower estuary, Yamba, Iluka, Maclean there is a lack of understanding of recreational access and	Low	Additional investigation of T64 - T69 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T65. Conflicting uses of waterways (PT)	All – particularly lower estuary	Conflict between different waterway uses (e.g. active and passive boating), residents and land managers. Reduced amenity. Reduced tourism value. Noise disturbance.	Boating speed limits/ regulations enforced by Transport for NSW Maritime.	Minor	Possible	Mod	Mod	Mod	Mod	infrastructure needs in other parts of the study area. There are currently master plans for many of the water front precincts of the towns and villages. MEMS private foreshore structures strategy will manage access to waterways while also protecting the public foreshore and sensitive environmental areas. Dredging managed by MIDO under Coastal Dredging Strategy.		
T66. Loss of public access (by private development or government area closures) (PT)	All	Restricted public access. Construction of unauthorised access points. Erosion. Public safety risks. Reduced amenity. Reduced tourism value.	Public reserves along foreshore.	Minor	Possible	Mod	Mod	Mod	Mod			
T67. Insufficient, or inappropriate public education and signage (e.g. outdated or non-existent)	All	Reduced awareness and compliance with regulations. Public safety risks. Reduced amenity.	Education signage at some locations. Council education campaigns.	Minor	Possible	Mod	Mod	Mod	Mod			
T68. Shoaling or siltation affecting navigation	Various locations within estuary	Public safety risks. Loss of access for boats and industry. Reduced amenity.	Dredging in various locations as needed.	Medium	Likely	High	High	High	High			
T69. Anti-social behaviour and unsafe practices (PT)	All	Public safety risks. Reduced amenity. Noise disturbance. User conflict.	Transport for NSW Maritime, NSW Police	Minor	Possible	Mod	Mod	High	High			

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
Governance, Regulation, Funding												
T70. Lack of comprehensive, integrated ecosystem monitoring strategy and reporting system	All	Decision makers do not have reliable information to support management activities and to best direct investment into catchment health. Reduced community understanding/ awareness of river health issues and management actions.	The Ecohealth project (Ryder *et al.,* 2014) provided a snapshot of catchment waterway health. No whole-of-catchment assessment has been undertaken since then. Clarence River is not included in state government water quality monitoring programs. Some project or industry specific monitoring (e.g. cane industry)	Medium	Likely	High	High	High	High	Existing programs not centrally co-ordinated, are not integrated or catchment-wide and do not provide holistic analysis or presentation of issues. The Ecohealth project provided recommendations for future monitoring and reporting. While stakeholder feedback indicates a strong preference for on-ground action over further studies, monitoring will be required on an ongoing basis to address key questions relating to priority threats, ongoing ecosystem health and the effectiveness of management and investment in catchment actions in an integrated manner as well as provide information on the issues to the community.	Medium	**S10. <u>Develop a method of assessing and reporting estuary health</u>** Address key questions relating to priority threats, ongoing ecosystem health and the effectiveness of management and investment in catchment actions similar to the state-wide water quality monitoring program should be undertaken by NSW Government to convey outcomes to stakeholders. Identify Aboriginal groups and organisations with capacity and interest to be involved in monitoring actions. Proposed monitoring and reporting strategy to be considered for inclusion in CMP.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T71. Inadequate, inefficient regulation (agencies) (PT)	All	Conflict and delays in implementing management approaches. Inability to address some of the key threats with meaningful solutions. Poor public perception. Ongoing environmental impacts. Inefficient use of resources. Lack of action. Ad-hoc, ill-informed, and/or illegal environmental works. Community frustration.	Multiple agencies with responsibility for catchment management with limited coordination and no overriding body responsible for management.	Major	Likely	High	High	High	High	Regulatory tools and resources are not available to Council to influence water pollution, estuarine vegetation or biodiversity impacts. MEMA will review and update the Diffuse Water Pollution Strategy to 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.	High	Additional investigation of T71 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. Stakeholder engagement is considered a key part of all CMP stages. Ongoing mechanisms for collaboration between stakeholders should be considered in the CMP. MEMA is developing a risk-based framework for regional waterway health in the Richmond River catchment (barriers and opportunities for the effective management of diffuse source water pollution within the Richmond River catchment) which may provide outcomes relevant to the Clarence River CMP.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T72. Lack of collaboration in existing studies, programs and on-ground works	All	Lack of alignment of plans/policies. Lack of collaboration, cooperation and resource support. Differing opinions, values, policies and management approaches. Conflict and delays in implementing management approaches. Inability to address some of the key threats with meaningful solutions. Poor public perception. Ongoing environmental impacts. Inefficient use of resources. Lack of action. Ad-hoc, ill-informed, and/or illegal environmental works. Community frustration.	Multiple land managers/ landholders. Various MEMS projects. Various agency, industry and community led projects. Council maintains a database of existing assets and programs. The CMP Scoping Study has attempted to collate the status of existing works but this is incomplete.	Minor	Almost certain	High	High	High	High	There are many projects being undertaken in the catchment although findings are generally not made available and some have been undertaken without effective collaboration with councils and other stakeholders. Grant funded industry/community projects are often undertaken without adequate reporting and information sharing. This creates difficulties assessing the success of works and identifying future priorities.	Mod	All studies and works undertaken as part of the CMP should consider the effectiveness of existing and past projects. **S11. <u>Develop a database of on-ground works</u>** Collaborate with stakeholders to collate details and map locations of completed and proposed on-ground works. Include resources (e.g. restoration guidelines, past lessons learnt, study findings, species lists etc.) and be available online as a public resource. Ensure adequate long-term database maintenance arrangements are in place. Monitoring of effectiveness of on-ground works to be undertaken as part of S10: Develop a method of assessing and reporting estuary health.
T73. Lack of funding and resourcing for catchment, coastal and floodplain management	All	Inadequate management to address issues. Exacerbation of floodplain issues. Lack of resources to support management activities and enforce regulations. Lack of resource to maintain on-ground works over the long-term. Community frustration and distrust.	Council budgets External grant funding (usually establishment and short-term maintenance only)	Major	Almost certain	Extreme	Extreme	Extreme	Extreme	Level of community support for increased council and community funding for waterway health projects (e.g. environmental levy or section 496b coastal protection charge).	High	**S12. <u>Establish community priorities for waterway health, willingness to pay and potential funding options</u>** Community consultation to gauge level of support for Council to direct funds and resources into waterway health projects and identify council, landholder and other stakeholder responsibilities.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T74. Limited understanding of existing management actions including their effectiveness	All – particularly areas with investment/ management works	Decision makers do not have reliable information to support management activities and to best direct investment into catchment health. Reduced community understanding/ awareness of river health issues and management actions.	Project specific monitoring in some locations.	Minor	Almost certain	High	High	High	High	No comprehensive approach to tracking and reporting on the effectiveness of management actions.	High	S10: Develop a method of assessing and reporting estuary health should include a targeted monitoring program to track effectiveness of management actions in specific areas or different land uses/ targeted management actions. S11: Develop a database of on-ground works will allow documentation of the effectiveness of management actions.
T75. Barriers to implementation of drainage works	Clarence River Floodplain	Priority actions to address key issues affecting river health are not implemented.	Multi-agency approval required for drain clearing for floodgate operation	Medium	Almost certain	High	High	High	High	MEMS coastal drainage management project will identify options to reduce complexity, time and costs associated with the approval requirements for agricultural drainage structures and activities on NSW coastal floodplain and improve the environmental outcomes from these activities, particularly water quality.	-	Additional investigation of T75 knowledge gaps is not recommended as part of Stage 2 of the Clarence River CMP. Bringing about high-level planning changes is unlikely to be feasible within the scope of the CMP and will require state government action and collaboration. The CMP will include ongoing opportunities for collaboration with government agencies to identify required changes to local planning controls.
T76. Lack of community awareness of the marine estate, associated threats and benefits, regulations and opportunities for participation (PT)	All	Reduced community understanding/ awareness of river health issues and management actions. Reduced incentive/opportunities for community to 'do the right thing' and being actively involved in river restoration.	Council, industry and government agency education programs, workshops, fact sheets, landholder assistance/ extension projects etc.	Medium	Likely	High	High	High	High	Existing knowledge is considered adequate for future management.	-	Community engagement is considered a key part of all CMP stages. S10: Develop a method of assessing and reporting estuary health should include community engagement and education strategies. To be integrated with Aboriginal cultural heritage programs.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T77. Overlap and inefficiencies with available grant programs	All	Lack of alignment of plans/policies. Lack of collaboration, cooperation and resource support. Differing opinions, values, policies and management approaches. Conflict and delays in implementing management approaches.	Multiple state and federal grant programs	Minor	Likely	Mod	Mod	Mod	Mod	Existing knowledge is considered adequate for future management.	-	-
T78. Delays to projects due to Crown Lands licence processing times	All	Projects on Crown Land (e.g. most in-stream works) have long start-up periods. Reduced community confidence. Potential to affect grants and funding with limited timeframes.	Applications prepared for Crown Lands licences as required. Processing times depend on the nature of works, status of land and consultation requirements.	Minor	Possible	Mod	Mod	Mod	Mod	Existing knowledge is considered adequate for future management.	-	-
T79. Lack of compliance with regulations (by users) (PT)	All	Erosion and sediment export from development sites. Chemical/pollutant export from industrial sites. Land clearing. Littering. Damage to sensitive environments. Over-extraction of water.	Regulation and enforcement (limited by available resources). A lack of resources to effectively oversee development sites and ensure compliance with conditions particularly erosion and sediment control requirements. Complaints reported to regulator.	Medium	Likely	High	High	High	High	Current level of impact on receiving environments and current contribution compared to other sources is unknown.	Mod	S3 (Identification of priority point source pollution sources/ locations for on-ground works) and S10 (Develop a method of assessing and reporting estuary health) will assist in identifying level of impact. The CMP will include ongoing opportunities for collaboration with regulatory agencies.

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
Planning Controls												
T80. Inadequate land use planning and development controls	All	Inappropriate development and land use. Pollutant export to waterways. Lack of protection for sensitive areas (e.g. riparian buffer zones).	LEPs, DCPs. Some council land use planning. State government agency approvals.	Minor	Likely	Mod	Mod	Mod	Mod	Proposed management options may require changes to land zoning / planning legislation and mapping and support by the state government.	Mod	Bringing about high-level planning changes is unlikely to be feasible within the scope of the CMP and will require state government action and collaboration. The CMP will include ongoing opportunities for collaboration with government agencies to identify required changes to land use planning controls.
T81. Inaccurate or incomplete mapping of Resilience and Hazards SEPP Coastal Wetland and Littoral Rainforest area	Coastal zone	Inappropriate development and land use. Difficulty in gaining approvals for minor or routine works.	Resilience and Hazards SEPP mapping based on repealed SEPP 14 (Coastal Wetlands), updated in 2012, SEPP 26 (Littoral Rainforests) based on mapping prepared in 2003 and updated prior to adoption of the SEPP	Medium	Likely	High	High	High	High	Detailed vegetation mapping is not available for the study area. Accuracy of coastal management areas cannot be confirmed with available mapping.	Mod	**S13. <u>Confirm accuracy of SEPP Coastal Wetland and Littoral Rainforest Area with detailed vegetation type mapping and ground-truthing</u>** If the NSW Government detailed vegetation mapping becomes available during Stage 2 or 3 this would be a good opportunity to undertake a review of the mapping with updated mapping potentially to be included in the SEPP via planning proposal.
T82. Inaccurate or incomplete mapping of Resilience and Hazards SEPP Coastal Use Area	Coastal zone	Inappropriate development and land use.	Resilience and Hazards SEPP mapping of 500 m landward extent from open ocean boundary and 250 m landward extent.	Minor	Possible	Mod	Mod	Mod	Mod	Resilience and Hazards SEPP mapping is considered suitable for future management.	-	-

Threat	Location	Potential impacts	Current management approach	Present day risk			Future Risk			Assessment of Knowledge Gaps		Recommendation for Clarence River CMP Stage 2 studies
				Consequence	Likelihood	Current Risk	20-year	50-year	100-year	Knowledge gap	Priority	
T83. Limited mapping of Resilience and Hazards SEPP Coastal Environment Area	Coastal zone	Inappropriate development and land use. Catchment influences on health of the coastal zone are not appropriately managed or regulated.	Resilience and Hazards SEPP mapping based on sensitive coastal lakes and their catchments, estuaries mapped upstream to one km beyond the HAT plus a 500 m landward component and NSW coastal waters (does not include large areas of the catchment).	Major	Likely	High	High	High	High	Resilience and Hazards SEPP mapping may be reviewed as part of CMP development if other mechanisms and process for catchment management are not available.	High	Updated mapping potentially to be included in SEPP via planning proposal, to be addressed as part of Stage 2 for the Clarence Valley Coastline CMP (refer T84).
T84. Inappropriate development within coastal hazard areas	Coastal zone	Potential asset and infrastructure risk.	CVC LEP and DCP provisions require updating. Resilience and Hazards Coastal Vulnerability Areas are not mapped.	Major	Possible	High	High	High	High	Coastal hazard areas are not mapped in the Resilience and Hazards SEPP.	Mod	Coastal hazards to be assessed as part of S6 - Assessment of coastal inundation risk. Updated mapping potentially to be included in SEPP via planning proposal, to be addressed as part of Stage 2 for the Clarence Valley Coastline CMP.

Attachment 1: Risk Assessment Workshop presentation slides, attendance list and feedback

CLARENCE RIVER COASTAL MANAGEMENT PROGRAM

Risk Assessment Workshop

4 May 2022

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WORKSHOP FORMAT

- Acknowledgement of Country
- Welcome, introductions and apologies
- Initial presentation
  - Workshop aims
  - Recap CMP stages, Scoping Study progress and study area
  - Purpose of risk assessment and methodology
- 11.00 am: Break
- Discussion/feedback
  - Highest risk threats
- 12.30 pm: Lunch
- 1.00 pm: Further discussion/feedback
  - Data gaps and Stage 2 detailed studies
- 2.30 pm: Wrap up

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WORKSHOP AIMS

- Continue liaison with estuary CMP stakeholders
- Gain concurrence on the risk assessment outcomes
- Enable completion of the Scoping Study – Forward Plan

3

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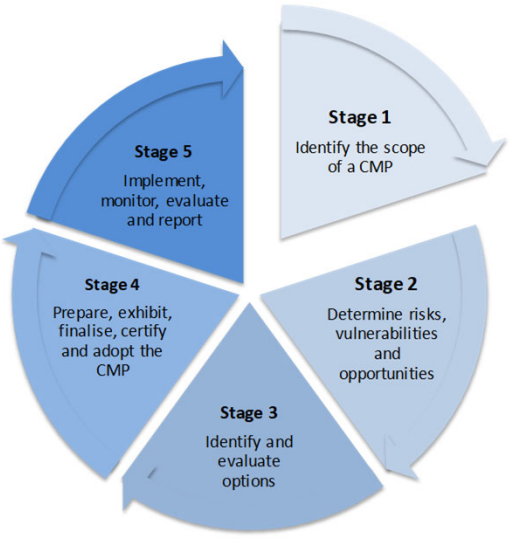
STAGES TO DEVELOP A CMP



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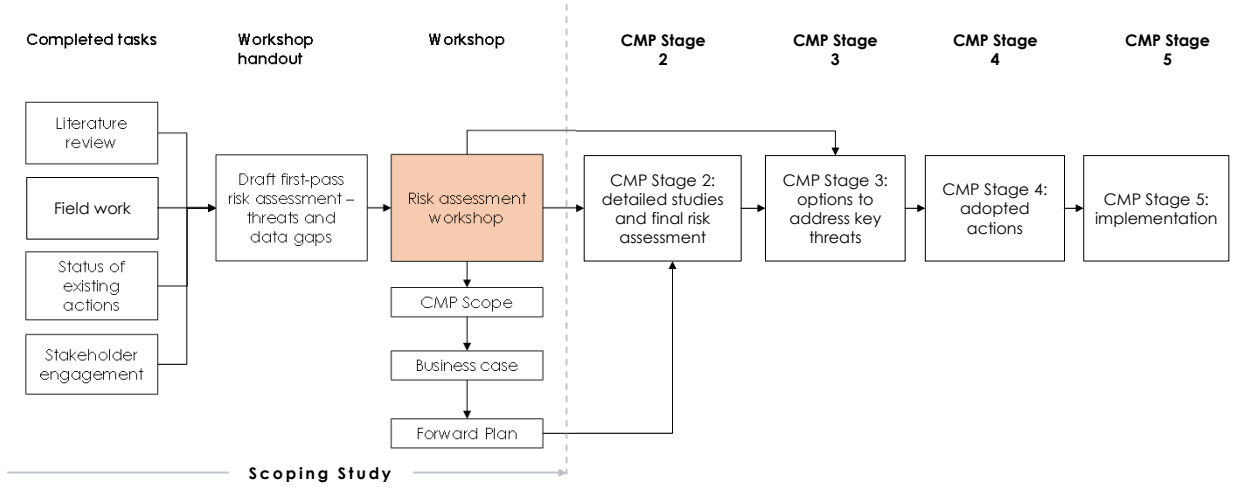
SCOPING STUDY PROGRESS



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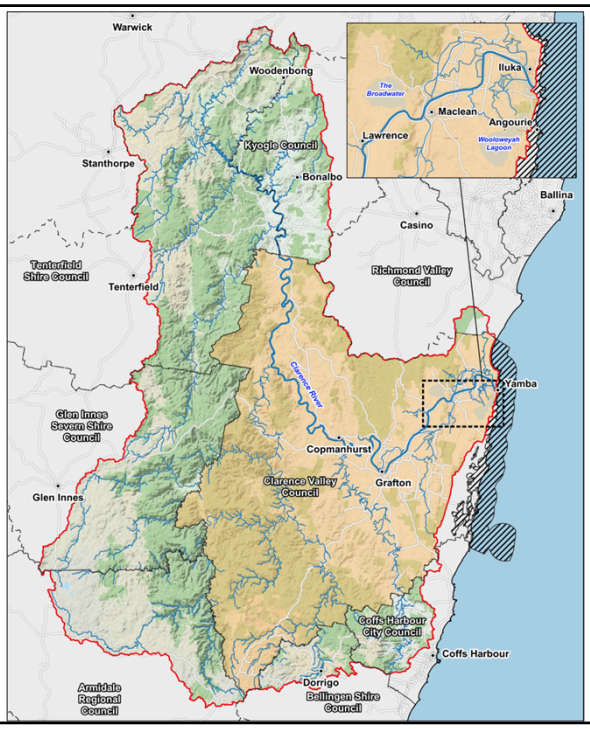
STUDY AREA

Legend

- Clarence River CMP study area
- Clarence Coastline and Estuaries CMP study area
- Clarence Valley LGA within study area
- National Parks/ State Forests/ Conservation areas
- LGA
- Waterways
- Roads
- Towns



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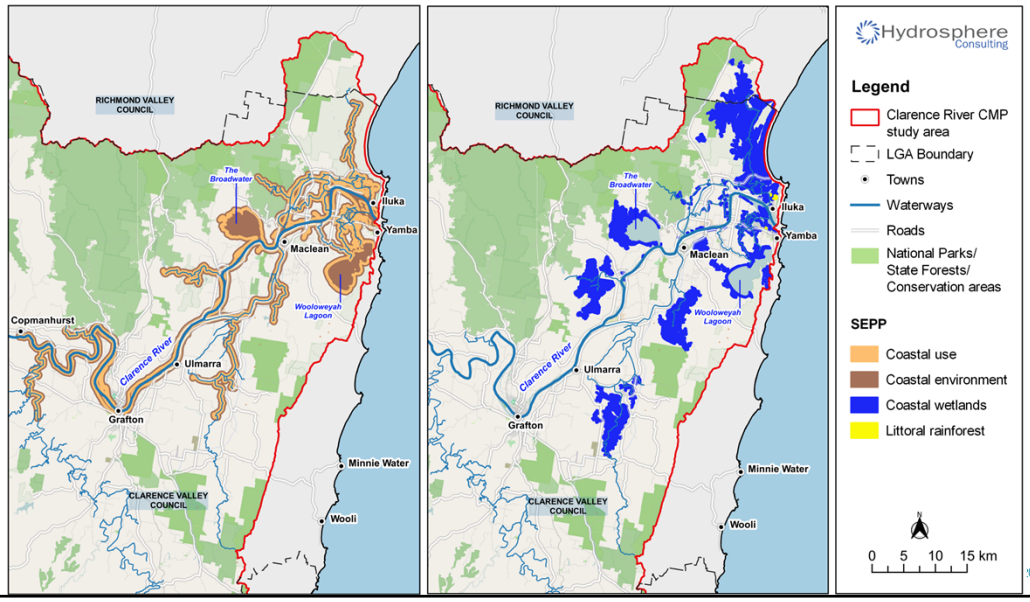
COASTAL ZONE



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RISK ASSESSMENT

- Identify knowledge gaps and where management action is required
- CVC's Enterprise Risk Management Procedure defines the approach for identifying, analysing, evaluating, treating, reporting and escalating risks
- **Risk = consequence of threat + likelihood of threat occurring**
- Threat/causal factor = event, substances, human activities or conditions that may cause environmental damage, loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption
- Consequence – considers magnitude, sensitivity and duration of the impacts of the threat
- Likelihood – chance that threat will occur in the timeframe (now, 20, 50 and 100 years)

Risk Assessment Workshop 9/05/2022 8

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CONSEQUENCE AND LIKELIHOOD

- Consequence focuses on environmental impacts, social impacts and service/project delivery:
  - Insignificant, minor, medium, major, catastrophic

LIKELIHOOD		Description	Qualification
5	Almost Certain	The event is expected to occur in normal circumstances. There has been frequent past history.	Several times a year. Greater than 90% chance of occurring.
4	Likely	The event will probably occur. Some recurring past event history.	Once a year. Between 70% and 90% chance of occurring.
3	Possible	The event may occur at some time. Some past warning signs or previous event history.	Once every 5 years. Between 30% and 70% chance of occurring.
2	Unlikely	The event could occur in some circumstances. Some history within local government or community.	Once every 20 years. Between 5% and 30% chance of occurring.
1	Rare	The event may occur but only in exceptional circumstances. No recent event history.	Once every 50 years or more. Less than 5% chance of occurring.

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RISK

RISK LEVEL RATING		Likelihood				
		1 - Rare	2 - Unlikely	3 - Possible	4 - Likely	5 - Almost Certain
Consequence	5 - Catastrophic	Moderate	High	High	Extreme	Extreme
	4 - Major	Low	Moderate	High	High	Extreme
	3 - Medium	Low	Moderate	Moderate	High	High
	2 - Minor	Low	Low	Moderate	Moderate	High
	1 - Insignificant	Low	Low	Low	Low	High

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GAP ANALYSIS

Priority	Description
Low	This knowledge is not required for management decisions/ actions/ planning – academic interest only.
Moderate	The knowledge would improve the effectiveness of management.
High	Management action required within the timeframe of this CMP cannot proceed effectively without this knowledge.

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THREAT AND RISK ASSESSMENT

- Categories, threats (T1 – T83), locations, potential impacts, management approach
- Consequence, likelihood, current risk, future risk (20, 50, 100 years)
  - Priority for actions through CMP or other process
- Knowledge gap, priority, recommendations for Stage 2 studies
  - CMP Stage 2 studies or other process

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HIGHEST RISK THREATS

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HIGHEST RISK THREATS - WATER QUALITY

- T1: Acid sulfate soil runoff
- T2: Blackwater events
- T3: Agricultural diffuse source runoff
- T4: Bank erosion
- T5: Urban stormwater
- T9: Sediment runoff from unsealed roads
- T11: Sand/ gravel extraction
- T16: Bushfire
- T18: Litter, solid waste and microplastics
- T19: Estuary prawn trawling
- T20: Long fetch and strong winds
- T21: Future development, urban growth

Blackwater, CVC

Soil runoff, Clarence Landcare

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HIGHEST RISK THREATS – HYDROLOGY, CONNECTIVITY AND WATER EXTRACTION

- T22: Modified freshwater flows
- T23: Hydrological modification of wetlands and floodplain drainage works
- T24: Floodgate design, operation and maintenance
- T25: Catchment flooding
- T26: Stormwater inundation

Source: EPA

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HIGHEST RISK THREATS – RIPARIAN CONDITION

Photo: Transport for NSW (2015)

- T27: Clearing of riparian and adjacent habitat
- T28: Lack of suitable buffer zones between land use and waterways
- T29: Dominance of invasive weeds
- T30: Uncontrolled stock access to and grazing within the riparian zone

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HIGHEST RISK THREATS – BANK EROSION

- T31: Catchment flooding
- T32: Powered vessels and towing
- T33: Wind waves
- T34: Historic clearing of riparian vegetation and adjacent habitat
- T35: Stock grazing of riparian and marine vegetation
- T36: Gully erosion and bed lowering

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HIGHEST RISK THREATS – SEA LEVEL RISE AND CLIMATE CHANGE

- T37: Increasing tide/ sea level
- T38: Anthropogenic barriers to migration of vegetation communities with sea level rise
- T40: Average warming and extreme temperatures
- T41: Increase in extreme weather events

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HIGHEST RISK THREATS – CULTURAL HERITAGE

- T43: Lack of recognition of cultural values and connection to Country and specifically to water
- T45: Damage to cultural heritage/ items/ sites

Beiirrinba (Clarence River), Frances Belle Parker, 2001

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HIGHEST RISK THREATS – BIODIVERSITY

- T46: Clearing of riparian and adjacent habitat
- T47: Terrestrial weeds
- T48: Predation and invasion by feral animals/pest species
- T49: Habitat disturbance from sand/ gravel extraction
- T50: Habitat disturbance from mining
- T51: Aquatic weeds
- T52: Foreshore development and land clearing for agriculture and urban development
- T53: Loss of estuarine vegetation (mangrove, saltmarsh, seagrass)
- T54: Barriers to fish passage
- T55: Bushfire
- T56: Forestry activities
- T58: Commercial fishing (estuary trawling)
- T60: Insufficient public land available to establish stewardship sites to offset loss of native vegetation through land development

Source: CRCC

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HIGHEST RISK THREATS – PUBLIC USE AND ACCESS

- T62: Pathogens present in water
- T67: Shoaling or siltation affecting navigation

Source: CRCC

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HIGHEST RISK THREATS – GOVERNANCE, REGULATION AND FUNDING

- T69: Lack of comprehensive, integrated ecosystem monitoring strategy and reporting system
- T70: Inadequate, inefficient regulation (agencies)
- T71: Lack of compliance with regulations (by users)
- T72: Lack of funding for catchment and coastal management
- T73: Limited understanding of existing management actions and their effectiveness
- T74: Barriers to implementation of drainage works
- T75: Lack of community awareness of the marine estate, associated threats and benefits, regulations and opportunities for participation
- T78: Lack of compliance with regulations

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HIGHEST RISK THREATS – PLANNING CONTROLS

- T80: Inaccurate or incomplete mapping of Coastal Management SEPP Coastal Wetland and Littoral Rainforest area
- T81: Limited mapping of Coastal Management SEPP Coastal Environment area
- T83: Inappropriate development within coastal hazard areas

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DISCUSSION/FEEDBACK ON APPROACH

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DETAILED STUDIES

- Significant stakeholder support for on-ground works rather than more studies
- However, some prioritisation studies and strategic planning is recommended to focus efforts and ensure cost-effectiveness
- S1 to S13 are recommended for inclusion in the CMP – to be led by CVC with support from agencies, community groups and industry
- Other data gaps are being addressed through other projects (e.g. MEMS, Coastline CMP, council or industry/community projects) or cannot be fully addressed by local government (limited responsibilities, state government policy, state-wide issue)
- CMP will need to incorporate outcomes from Stage 2 (updated risks and opportunities), Stage 3 (options that are the responsibility of local government) and Stage 4 (actions) but can include actions to be undertaken by other agencies

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PROPOSED DETAILED STUDIES FOR CMP STAGE 2 – PLANNING FOR ON-GROUND WORKS

- S1: Identification of priority diffuse pollution sources for on-ground works
- S4: Identification of priority riparian restoration projects/location for on-ground works
- S5: Strategy for protection of priority Council infrastructure and assets from bank erosion
- S11: Develop a database of on-ground works

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PROPOSED DETAILED STUDIES FOR CMP STAGE 2 – CULTURAL HERITAGE

- S7: Identify mechanisms for protection of Native Title rights in CMP development and implementation
- S8: Cultural recognition/ awareness project(s) communicating cultural values of the river and connection to Country
- S9: Cultural mapping

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PROPOSED DETAILED STUDIES FOR CMP STAGE 2 – SUPPORTING STUDIES

- S2: Development/ review of urban stormwater management strategies
- S6: Assessment of coastal inundation risk
- S10: Develop a method of assessing and reporting estuary health
- S12: Establish community priorities for waterway health, willingness to pay and potential funding options
- S13: Confirm accuracy of SEPP Coastal Wetland and Littoral Rainforest Area with detailed vegetation type mapping and ground-truthing

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OTHER PROGRAMS

- ASS, blackwater, hydrological modifications, floodplain drainage/ private floodgate design, operation and maintenance – existing MEMS and NPWS (Everlasting Swamp) studies
- Planning proposal to update SEPP Coastal Hazards and Coastal Environment Area mapping – Coastline CMP
- Point source pollution – EPA licensing
- Marine vegetation and foreshore structure strategies – MEMS studies
- Sustainable fishing and aquaculture – DPI Fisheries, MEMS studies
- Sand/ gravel extraction – DPE – Crown Lands licence audit
- Catchment flooding – Council flood management strategies
- Estuarine vegetation protection - DPI Fisheries, MEMS

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DISCUSSION/FEEDBACK ON APPROACH

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NEXT STEPS

- Update risk assessment and provide report on workshop outcomes
- CMP scope, Forward Plan
- Scoping Study – draft for CEMC review – July 2022

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- Thank you all for your time and input

Clarence River Estuary CMP Scoping Study – First Pass Risk Assessment Workshop, 4 May 2022

Invited Stakeholders and Attendees

Name	Company	Attended (in person/online)
Peter R. Wilson	Clarence Valley Council	In person
Greg Mashiah	Clarence Valley Council	In person
Scott Lenton	Clarence Valley Council	Online – left at lunch
Murray Lane	Clarence Valley Council	Did not attend
Alex Wells	Clarence Valley Council	In person
John Kennedy	NPWS	In person – left before lunch
Josh Chivers	NPWS	Apologies
Jonathan Yantsch	Department of Primary Industry (DPI) - Fisheries	In person
Sharyn Goldstien	DPI Fisheries	Online
Kylie Russell	Department of Primary Industry (DPI) - Fisheries	Apologies
Derek Van Leest	Department of Planning and Environment (DPE) - Crown Lands	Apologies
Malcolm Robertson	DPE - Crown Lands	Apologies
Grant Nelson	DPE - Crown Lands	Did not attend
David Tritton	DPE - Crown Lands	Online - left before lunch, re-joined ~2pm
Nigel Blake	North Coast Local Land Services	Online
Danielle Adams	CEMC, Clarence River Fishermen's Cooperative	Apologies
Peter Rose	CEMC	In person
Greg Clancy	CEMC, Clarence Valley Councillor	In person
Peter Maslen	CEMC, Gulmurrad representative	In person
Ros Woodward	CEMC, Valleywatch	In person
Imelda Jennings	CEMC, Angourie representative	In person
Kevin Sheehan	CEMC, Brooms Head representative	Non-attendance

Name	Company	Attended (in person/online)
Ross Roberts	CEMC, Harwood Marine	Apologies
Leeann Ball	Harwood Marine	In person
Peter Pryor	OzFish Clarence River Chapter	Did not attend
Sophie Pryor	OzFish	Online
Marc Daley	DPE – Biodiversity Conservation Division	Apologies
Marcello Sano	DPE – Biodiversity Conservation Division	Apologies
Ben Fitzgibbon	DPE – Biodiversity Conservation Division	Online – left at 11.30 am, re-joined at 1pm.
Bill	Yaegl RNTBC	Did not attend
Dianne Chapman	Yaegl RNTBC	Did not attend
Rebecca Woods	Bandjalang Prescribed Body Corporate	Did not attend
Jane Baldwin	Ngullingah Jugun Aboriginal Corporation	Did not attend
Robyn Campbell	Hydrosphere Consulting	In person, facilitator/ presenter
Uriah Makings	Hydrosphere Consulting	In person

Robyn Campbell

From: Robyn Campbell
Sent: Friday, 20 May 2022 12:38 PM
To: 'Peter R. Wilson'; 'Greg Mashiah'; 'Scott Lenton'; 'Murray Lane'
Cc: 'John Kennedy'; 'Josh Chivers (Josh.Chivers@environment.nsw.gov.au)'; 'Jonathan Yantsch'; 'malcolm.robertson@crownland.nsw.gov.au'; 'Nigel Blake (Nigel.Blake@lls.nsw.gov.au)'; 'Danielle Adams - CRFC (dadams@crfc.com.au)'; 'Peter Rose'; 'Ross Roberts '; 'Greg Clancy'; 'Peter Maslen (rpmaslen@bigpond.net.au) (rpmaslen@bigpond.net.au)'; 'Ros Woodward'; 'Clarence River Chapter'; Uriah Makings; 'Marc Daley'; 'Sharyn Goldstien'; 'Imelda Jennings (Imelda.grant@bigpond.com)'; 'Kevin Sheehan (cakora@kellyswoodyard.com) (cakora@kellyswoodyard.com)'; 'Leeann Ball'; 'Sophie Pryor'; 'Marcello Sano'; 'alex.wells@clarence.nsw.gov.au'; 'david.tritton@crownland.nsw.gov.au'; 'kylie.russell@dpi.nsw.gov.au'; 'grant.nelson@crownland.nsw.gov.au'; 'leeannb@hardwoodmarine.nsw.gov.au'; 'yaegltoac@outlook.com'; 'Dianne Chapman'; 'ngullingahjugunac@hotmail.com'; 'bandjalangmanager@gmail.com'; 'Rebecca Woods (bandjalangceo1@gmail.com)'
Subject: Clarence Estuary CMP - Risk assessment workshop outcomes
Attachments: CRCMP Scoping Study Risk Assessment Workshop 270422.pdf; CR CMP Scoping Study risk assessment workshop attendees.pdf

Hi Pete
The Risk Assessment Workshop was held on 4 May 2022 with Council staff, CEMC members, agency and other stakeholder representatives to discuss the first-pass risk assessment. At the workshop, the draft risk assessment provided prior to the meeting (report dated 20 April 2022) was presented and discussed. The main aim of the workshop was to gain concurrence on the risk rating of the identified threats, data gaps and recommended Stage 2 studies.
The workshop attendee list and presentation slides are attached. Comments on the draft risk assessment are summarised below.
The draft risk assessment will be updated as part of the Scoping Study based on feedback received and agreed changes.

The group provided general agreement with the risk assessment outcomes and proposed CMP approach. Discussion topics and feedback provided by the attendees during the workshop are listed below (most items are included in the draft risk assessment):

- The risk assessment needs to identify all potential threats whether they are the responsibility of Council or other agencies in accordance with the integrated planning approach.
- Many related reports have been undertaken by government agencies but are not accessible at this stage.
- Lack of funding is a significant barrier to effective management.
- While catchment flooding is identified as a threat, it will be addressed through Council's flood planning. The CMP will not directly address flood management, planning controls and emergency response.
- CVC should determine the priorities for the CMP which may include actions that are outside the coastal zone – these will need to be identified separately as they will not be part of a certified CMP. However, they may be eligible for funding under the Coast and Estuaries program or other programs depending on funding priorities.
- Concerns have been raised about the impacts of the West Yamba urban development.
- Sand/mudflats provide important shorebird habitat.
- Information sources for aquatic and terrestrial biodiversity could be included in the CMP Scoping Study. Fauna should not be overlooked.
- A publicly available database on e-DNA (identifying fauna species accessing waterways) is being developed.
- A better understanding of sedimentary processes within the Clarence River is required to better inform management decisions. An action to undertake a study of sedimentary process was in the original EMP but was never undertaken.

- The MEMS breakwater project acknowledges entrance changes and provides guidance for habitat restoration.
- Not all stormwater impacts are listed in the risk assessment.
- Mining has the potential to have a major impact on the river system. Some current impacts around old Cangai mine. Potentially catastrophic impacts in the future.
- Need to highlight the threat of forestry activities, current management arrangements and potential impacts.
- Need to highlight the threat of the proposed inland diversion of the Clarence River.
- Need to engage community for citizen science. Lots of desire form various groups and landholders across the Clarence to be involved. Lots of opportunity for rehabilitation, lots of community support to do good things. Change of demographic in rural areas from agricultural to lifestylers – many of whom have the desire to look after the environment. Many proposals to convert/restore marginal farming land to wetlands. Community members may be cost effective resources for delivery of some actions e.g. monitoring.
- Groundwater extraction, associated issues and protection strategies should be covered in the Scoping Study.
- There has been a significant number of studies on commercial fishing impacts on biodiversity e.g. bi-catch. Fishers are proactive in adopting environmental improvements. Commercial fishing was rated a lower priority threat for environmental impacts in the MEMA TARA.
- The Clarence is in relatively good condition compared to other north coast estuaries but management still needs to be proactive and there is a threat related to complacency.
- There is a risk that the CMP relies on other studies e.g. MEMS but that the project outcomes are not timely, relevant or fit for purpose. Continued engagement and collaboration are required.
- Significant amounts of funding have been spent in other estuaries (e.g. Richmond) and similar commitment to the Clarence would provide significant outcomes.
- Flood restoration work should be considered in the development of on-ground actions.
- Ongoing maintenance/funding of works needs to be incorporated in on-ground actions.
- Potential inclusion of Clarence in state-wide water quality monitoring to be investigated by DPE.
- DPI Fisheries bank management strategy project (MEMS) aims to streamline approval process for bank management works.
- Use of cultural mapping as a potential LEP planning layer.
- Coastal inundation assessment should consider impacts on public land and access and options for relocation of areas that may be inundated.
- The CMP should be a “living” document, continuously updated and focusing on key issues.
- Yaegl native title holders are interested in capacity building, opportunities for caring for country and financial independence.
- The CMP should consider how ILUAs and native title act notifications are incorporated.

Feedback was also invited following the workshop. The following additional feedback was received:

- Additional verbal information on Native Title Act notifications and CMP development was provided by David Tritton, DPE – Crown Lands.
- Peter Rose provided comments by email 12/5/22.
- Information on the LLS Riverbank Rehabilitation Program was obtained from LLS (Riverbank Rehabilitation Project - Website - Local Land Services (nsw.gov.au))

We appreciate everyone’s contribution to this project.

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