Nambucca Valley Council

Nambucca Coastline and Estuaries Coastal Management Program

Nambucca Valley Council has prepared this document with financial assistance from the NSW Government through the Department of Planning and Environment (DPE). This document does not necessarily represent the opinions of the NSW Government or DPE.

Cover photo: Clockwise from top: View from Nambucca Lookout (NVC, 2020); Coastal viewing platform; Kayaks on the Nambucca River at Macksville (Seen Australia in NVC 2020).

Hydrosphere Consulting Pty Ltd
Suite 6, 26-54 River Street
PO Box 7059, BALLINA NSW 2478
www.hydrosphere.com.au

18-019 NAMBUCCA COASTLINE AND ESTUARIES COASTAL MANAGEMENT PROGRAM

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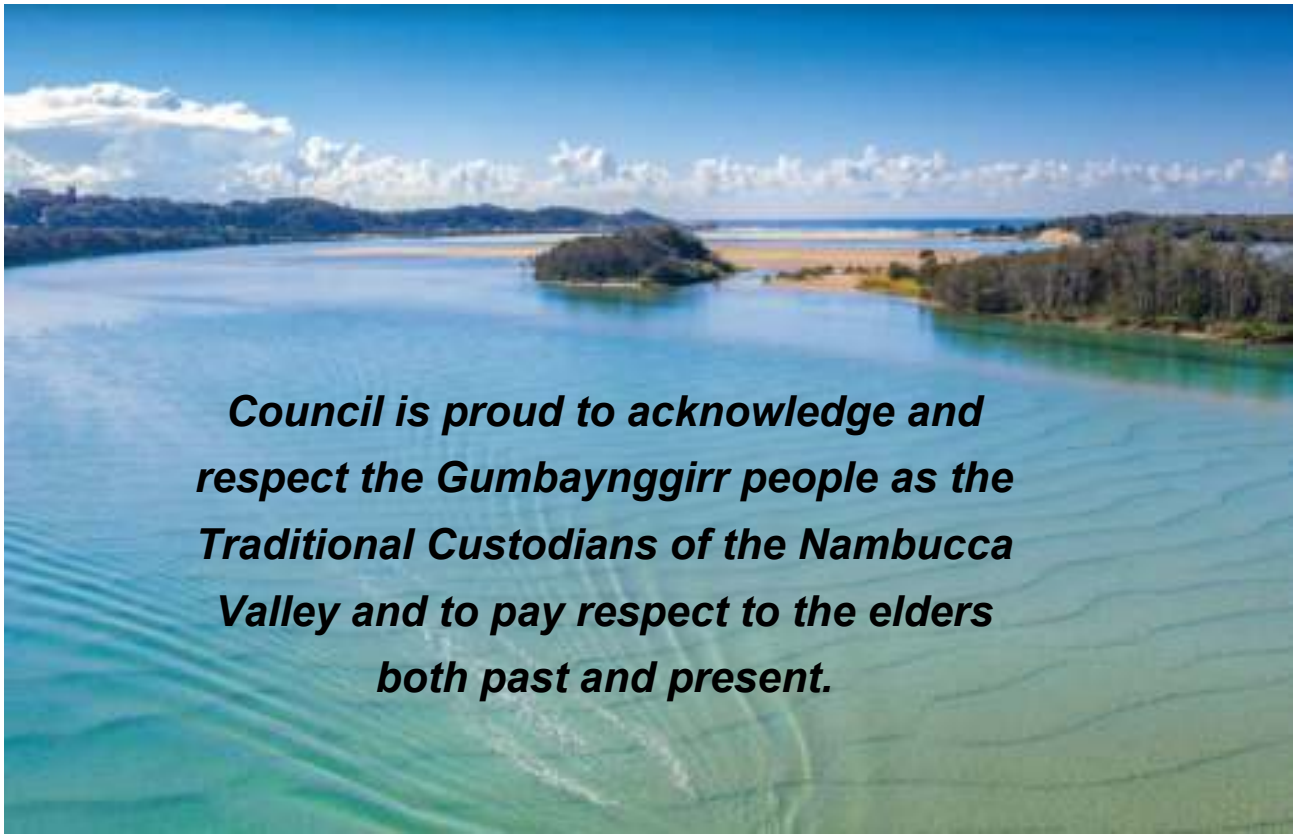

Plate 1: Nambucca Valley Council Acknowledgement to Country

Source: NVC (2020)

EXECUTIVE SUMMARY

The Nambucca coastline and estuaries study area comprises the entire Nambucca Valley Local Government Area (LGA) coastline stretching 25 km from North Valla Beach southwards to Scotts Head and including the Nambucca River estuary, Deep Creek, Swimming Creek and Oyster Creek. The area encompasses a broad range of natural features including sandy beaches, coastal dunes, rocky headlands, marine areas, estuary entrances, littoral rainforest, wetlands/heathlands and estuarine environments. The coastal environment of the valley provides highly valued natural resources, uncrowded areas for nature-based recreation and stunning scenic amenity.

The Nambucca coastline is the traditional land of the Gumbaynggirr people. The sea country including islands, beaches, headlands, rocky shores, ocean and estuarine environments are central to the culture of the Gumbaynggirr people. Evidence of cultural practices and connection to country are still present through items such as fish traps and middens as well as significant places, stories and language that are reflected in the local landscape and traditions of the Gumbaynggirr people.

The area remains relatively undeveloped with small coastal towns and villages home to a small local population including Nambucca Heads, Macksville, Scotts Head Valla Beach and Bowraville at the tidal limit. The core community and environmental values of the study area are associated with its landscape amenity (i.e. geographical features, scenic amenity, views), healthy and diverse natural environments and biodiversity values. The Nambucca Valley LGA is home to a variety of businesses and industries including tourism, oyster aquaculture, commercial fishing, agriculture (e.g. dairying, grazing, horticulture, tree crops), construction, manufacturing, timber processing and aged care and health services. The population increases significantly during holiday periods and the area is facing increasing pressures due to population growth and tourism.

Nambucca Valley Council (NVC) has prepared the Nambucca Coastline and Estuaries Coastal Management Program (CMP) to set the long-term strategy for coordinated management of the coastline and estuaries of the Nambucca Valley LGA. This CMP aims to ensure that the values and benefits of the study area are enhanced and maintained for future generations. NVC will lead the implementation of the CMP for the Nambucca coastline and estuaries and will collaborate with land managers, state government agencies, industry and community representatives to provide effective coastal management outcomes.

The long-term vision for the Nambucca coastline and estuaries is:

"The coastline and estuaries of the Nambucca Valley LGA are healthy, adaptable natural environments supporting abundant wildlife, diverse habitats, a sustainable local economy and significant cultural values. They are safe, peaceful and accessible places for our community and future generations to learn, enjoy and prosper."

The coastline and estuaries are facing numerous threats and pressures that affect the community and environmental values. Over time, many of these pressures are likely to increase due to increasing population, potential land use changes, development within the catchments and the impacts of climate change. Threats were prioritised to assist in identifying the management actions for the CMP. High priority threats were identified as those presenting a high present-day risk to values and uses of the Nambucca coastline and estuaries (Table 1). A summary discussion of key threats provided below.

Table 1: High priority threats identified by the risk assessment

Issue Category	ID	High priority threats
Coastal hazards	T1	Coastal long-term shoreline recession
	T3	Increased risk of slope instability/ landslip
	T5	Tidal inundation

Issue Category	ID	High priority threats
	T6	Disrepair of, or inadequate design of coastal protection structures and infrastructure
Estuarine bank erosion	T12	Flooding
	T15	Historic clearing of riparian vegetation and adjacent habitat
	T16	Uncontrolled stock access to and grazing within the riparian zone
Riparian vegetation and weed management	T19	Dominance of invasive weeds
	T16	Uncontrolled stock access to and grazing within the riparian zone
	T15	Historic clearing of riparian vegetation and adjacent habitat
Entrance management, shoaling and estuary hydraulics	T40	Siltation affecting navigation, water quality (reduced flushing) and aesthetics
	T41	Shoaling of marine sands affecting navigation and marine safety
	T44	Dangerous currents
Threats to biodiversity	T45	Removal, fragmentation and degradation of riparian and adjacent habitat
	T46	Removal of instream (e.g. dead wood) and reef habitat
	T47	Predation and invasion by introduced animals and exotic plants
	T49	Overgrazing by stock resulting in reduction in groundcover, enabling erosion and compaction of soil
	T55	Fire/ altered and inappropriate fire regimes/ frequent burning
Water Quality	T65	Agricultural diffuse source runoff (runoff from large areas of agricultural land and dirt roads with no specific point source)
	T66	Urban stormwater pollution and lack of maintenance of existing controls
	T67	Sewer surcharge and STP overflows
	T77	Drainage/exposure of acid sulfate soils
Cultural Heritage	T85	Threats to Aboriginal cultural practices and heritage

Coastal hazards such as beach erosion, coastline recession, coastal inundation, landslip and the migration of creek and river entrances are key threats impacting the study area today. Due to the relatively undeveloped nature of much of the Nambucca coastline, the coastal hazard risk is comparatively low compared to other more populated coastal areas in NSW. However, these threats are projected to increase over time as the gradual impacts of sea level rise result in the landward migration of the coastline and increased risk of extreme storm events impacting the coastal zone. Key impacts are predicted to include damage to assets, infrastructure and foreshore access, loss of dune vegetation, decreased amenity, public safety risks and tourism impacts.

Entrance management, shoaling and estuary hydraulics are also key threats affecting values and uses of the Nambucca coastal zone. Shoaling of the Nambucca River entrance is often raised as a community concern impacting boating navigation and maritime safety issues. Entrance management is also an ongoing management consideration with inundation and flooding issues. This is particularly a concern for the estuaries containing low-lying built assets and private property such as Deep Creek, where an entrance management policy is in place. Projected sea level rise and climate change are expected to impact estuary

entrances and increase the frequency and severity of catchment and coastal flooding/inundation. Adaptive management approaches will be required to cater for this.

Climate change impacts will also result in a number of additional or emerging risks across the study area, including altered estuary water temperatures, salinity profiles, habitat migration and modified storm frequency and severity.

Bank instability and erosion within the estuaries contributes to loss of land, estuarine vegetation and riparian habitat loss, increased sedimentation and water quality issues. The health of riparian zones also strongly influences estuarine geomorphic condition, biodiversity and the quality of water resources. The main threats to riparian condition within the study area are the dominance of invasive weeds, livestock access and the legacy of historic broad-scale riparian vegetation clearing. A number of other threats to biodiversity have also been identified including increasing development, overgrazing, rubbish dumping and litter, invasive animals and pesticide spray drift.

Water quality is one of the prime estuarine “health” indicators and a key value to community stakeholders, many of whom are concerned about ongoing degradation of water quality from both point and diffuse sources and the perception that water quality affects tourism in the area. Key issues include high turbidity, high nutrient concentrations and low dissolved oxygen. Oyster leases are particularly susceptible to sedimentation and bacterial contamination after rainfall and bacterial contamination is also a human health risk for primary and secondary contact recreation.

Other threats and community concerns included:

- The potential for increased hydrological stress in the catchment areas (particularly in the Deep Creek catchment) due to increased water extraction associated with expanding horticulture in the region.
- There are a range of views in the community regarding decline in fish stocks within the Nambucca River estuary over many years. While there is currently a lack of definitive information regarding the proportional impact of various factors, key contributors include commercial and recreational fishing, local-scale habitat destruction and the decline in estuary health.
- There are a number of highly valued public access assets within the study area including beach access tracks and viewing platforms, lookouts, iconic footbridges, walkways and seawalls. Public access issues identified are associated with overcrowding during peak summer use (e.g. parking), accessibility for those with limited mobility and regular maintenance and repair of access ways including following coastal erosion events.

A lack of knowledge of the impact of human activities on the natural values of the coastline and estuaries has been identified as a barrier to effective management. This threat is exacerbated by high tourism/visitation rates, a lack of coordination between land managers and limited resources for community education and engagement. Lack of compliance with regulations has also been identified by the community as an issue for management. Examples include unauthorised foreshore structures, breach of development consent conditions, camping/vegetation damage in dunes, excessive or inappropriate boating speed and usage, illegal fishing, littering, dogs off-leash in prohibited areas and unauthorised four-wheel drive access on beaches.

This CMP provides a management framework that aims to protect the social, ecological and cultural values associated with the Nambucca coastline and estuaries and to manage conflicting desires for the protection of ecological values and recreational opportunities. The approach is consistent with the long-term vision, the management objectives and community values. The CMP recognises that the coastal zone has suffered impacts from past and current human use and faces current and future pressures including population increases and natural influences such as flooding, sea level rise and climate change.

The CMP provides a suite of coastal planning and management actions that have been developed and prioritised based on the assessed risk of the threats to the study area.

Actions consist of a combination of studies, investigations and on-ground works and were selected to address the key risks. Actions are based on professional consideration of the legal, technical and engineering feasibility, the economic viability and the acceptability of actions to the community and stakeholders. This CMP includes 49 actions that have been developed from the short-listed options and grouped into eleven key strategies for implementation:

1. Management and Governance (MG)
2. Education and Consultation (EC)
3. Local Planning and Development Controls (PD)
4. Manage Risks Associated with Coastal Processes (CP)
5. Improve Water Quality (WQ)
6. Manage Bank Erosion, Protect and Rehabilitate Riparian Zones (BER)
7. Improve Biodiversity Values (BV)
8. Protect Cultural Heritage Values (CH)
9. Facilitate Safe and Sustainable Recreational Use (RU)
10. Actions to be Undertaken by Public Authorities (PA)
11. Monitoring, Evaluation and Reporting (MER) Program

A Business Plan has been developed for the CMP which outlines the key components of the funding strategy for the CMP, including the cost of proposed actions, proposed cost-sharing arrangements and other potential funding mechanisms. Delivery of the Nambucca Coastline and Estuaries CMP is estimated to cost $12,075,000 over 10 years.

The CMP actions are expected to be funded through NVC and state government contributions, monetary grants and volunteer works by community members and organisations. Management actions have been developed for a ten-year period and have been aligned with Council's four-year Delivery Programs under the NSW Integrated Planning and Reporting (IP&R) Framework. This CMP and the progress of the management actions will be reviewed to ensure the actions remain relevant and the implementation of the plan is being achieved.

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1. INTRODUCTION

1.1 Purpose and scope

Nambucca Valley Council (NVC) has prepared this Coastal Management Program (CMP) to set the long-term strategy for the coordinated management of the Nambucca coastline and estuaries with a focus on achieving the relevant objectives for each coastal management area from the *Coastal Management Act 2016* (CM Act). This CMP incorporates 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 have been 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 Nambucca Valley coastal zone. Longer-term pressures such as climate change and sea level rise have been considered in the formulation of management actions to ensure resilience against future threats and the conservation of these values for future generations.

This CMP has been developed in accordance with Stages 1 to 4 of the five-stage process for developing and implementing a CMP, as detailed in the Coastal Management Manual (OEH, 2018). The completed stages supporting this CMP include:

- *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a) which reviewed the status of current issues and management and identifies the focus of the new CMP.
- *Stage 2 Vulnerabilities and Opportunities Study* (Hydrosphere Consulting, 2020b) incorporating a bank condition assessment of the study area to determine and assess estuary bank erosion risks, vulnerabilities and opportunities and inform future management.
- *Stage 3 Options Assessment* (Hydrosphere Consulting, 2020c) which identified and assessed actions to address coastal management issues in an integrated and strategic manner consistent with the provisions of the CM Act.

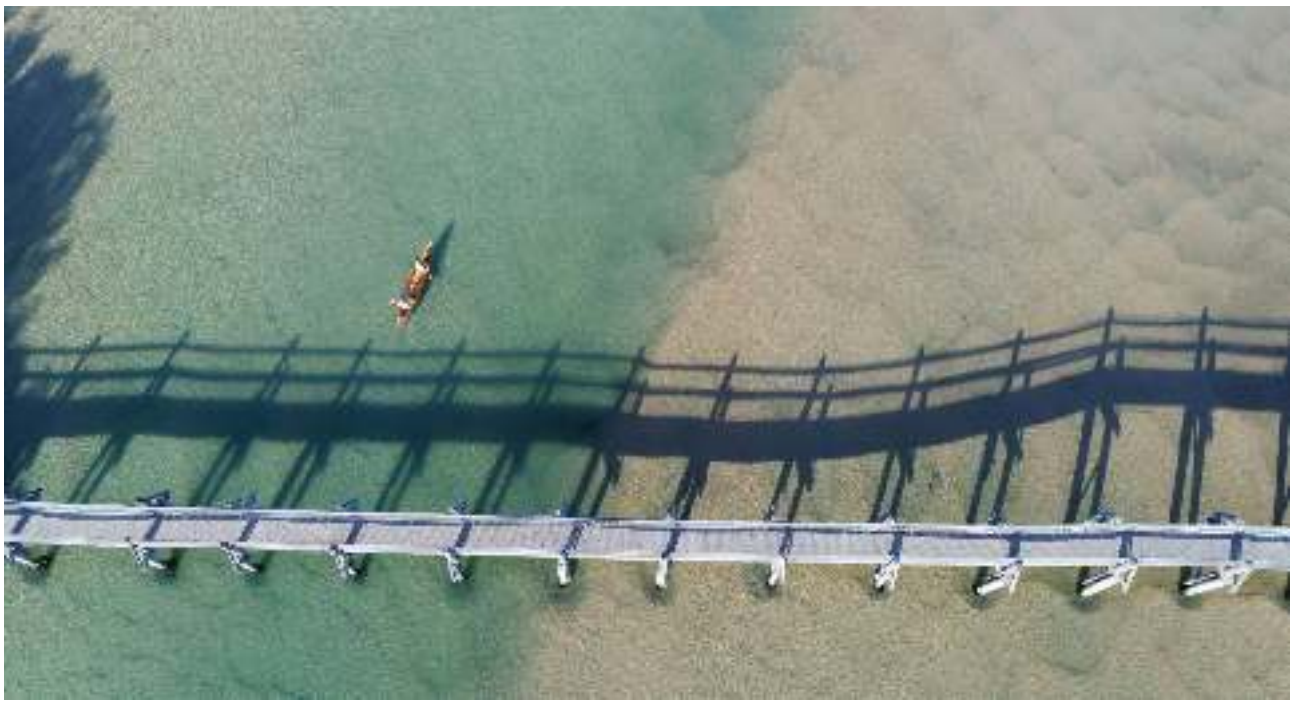


Plate 2: Deep Creek footbridge

Source: Tango Print and Design in NVC (2020).

1.1.1 Consultation undertaken as part of this CMP

Consultation with the community, public authorities and NVC has been undertaken in accordance with a communication and engagement strategy prepared for this CMP. A community survey was conducted during CMP development to engage the community in the project, identify community issues and concerns and facilitate ideas. A public drop-in session was undertaken during the community survey period. Submissions were also received from stakeholders and community members either via mail, email or via the web contact form from the dedicated project webpage. Submissions from key agencies included MIDO, DPI Fisheries, Forestry Corporation of NSW and DPE - NPWS Landforms and Rehabilitation Unit. Outcomes of the consultation activities are discussed in detail in the *Stage 1 Scoping Study* (Hydrosphere Consulting 2020a).

The actions and strategies in this CMP have been developed to target the issues and threats identified during consultation activities and to preserve the community values of the Nambucca coastline and estuaries, detailed in Section 2.1.

The draft CMP and associated documents were publicly exhibited during June/ July 2021. During this time the draft CMP was forwarded to relevant government agencies for comment and consideration. A submissions report (Hydrosphere Consulting, 2021) was prepared at the completion of the exhibition period. This report proposed modifications to the draft CMP prior to its endorsement by Council.

1.2 The Coastal Management Framework in NSW

The CM Act establishes the framework and overarching objects for coastal management in NSW and supports the aims of the *Marine Estate Management Act 2014* (MEM Act) to provide for strategic and integrated management of the whole marine estate – marine waters, coasts and estuaries. The CM Act communicates the NSW Government's vision for coastal management and reflects the vital natural, social, cultural and economic values of our coastal areas and promotes the principles of ecologically sustainable development in managing these values.

The CM Act establishes requirements for the preparation of CMPs. The *State Environmental Planning Policy (Coastal Management) 2018* (CM SEPP) forms part of the broader land-use planning framework in NSW. This is now 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 (and which are set out in the CM Act). Mapping of these areas within the CMP study area are presented in Figure 8 (Section 6). The objectives for this CMP (refer Section 1.4.2) are aligned with the objectives of the CM SEPP as demonstrated in Appendix 1.

In December 2021, the Minister for Planning and Public Spaces announced that the 45 existing *State Environmental Planning Policies (SEPPs)* would be consolidated into 11 new amalgamated SEPPs. As part of this process, the CM SEPP has been rolled into Chapter 2 of the new *State Environmental Planning Policy (Resilience and Hazards) 2021*. The SEPP consolidation is administrative, and no policy changes have been made. The SEPP consolidation does not change the legal effect of the existing SEPPs, with section 30A of the Interpretation Act 1987 applying to the transferred provisions. For clarity, these provisions are still referred to as the CM SEPP in this document.

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 (Figure 1). Further details on the NSW Coastal Management Framework is provided in the *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a).

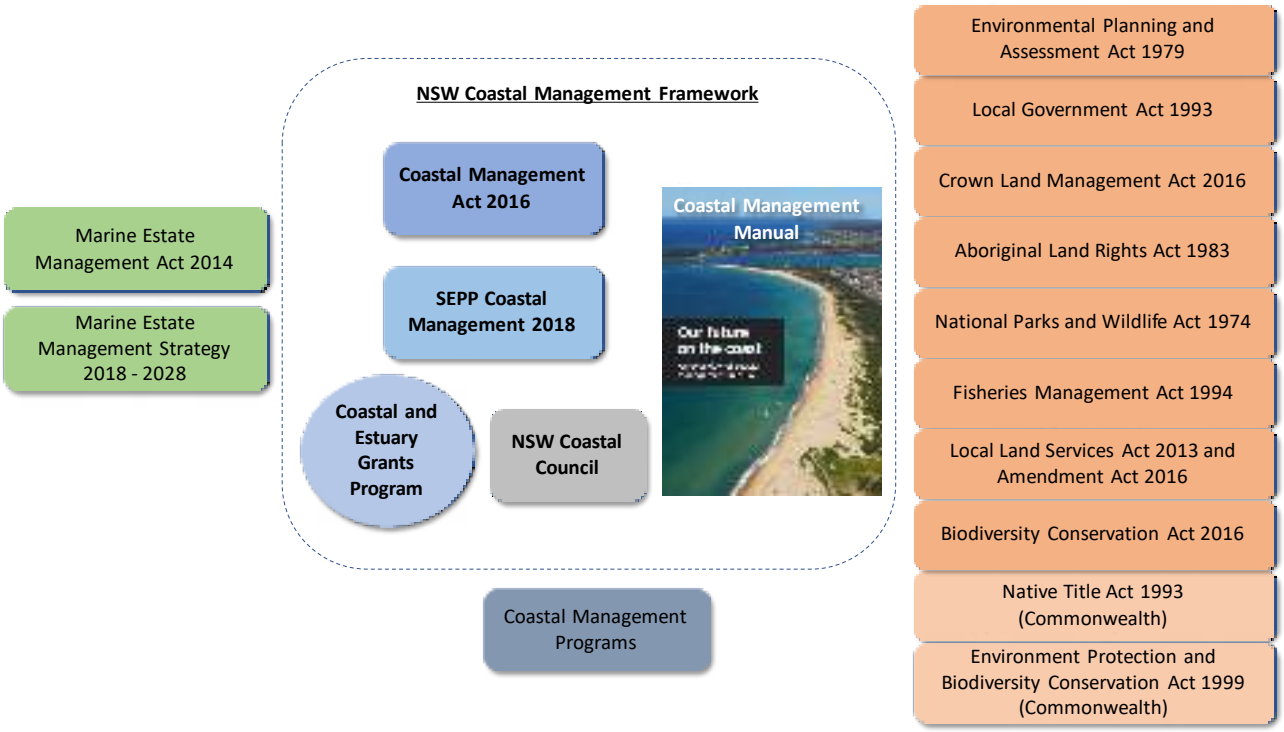


Figure 1: Coastal management framework

1.3 Areas covered by this CMP

Nambucca Valley LGA is located on the Mid North Coast of NSW, approximately halfway between Brisbane and Sydney and 45 km south of Coffs Harbour. This CMP is made in relation to the coastal zone shown in Figure 2, comprising the coastal areas, tidal waterways, foreshores and adjacent lands within the Nambucca Valley LGA. The area covered by this CMP is entirely within the Nambucca Valley LGA (Figure 3). The Nambucca coastline includes 25 km of beaches, dunes, headlands, rock platforms and bluffs from North Valla Beach (immediately south of the entrance to Oyster Creek) and southwards to Scotts Head. The study area also includes the estuaries of the Nambucca River, Oyster Creek, Deep Creek and Swimming Creek. The upper catchments have been considered in development of this CMP to identify threats that have the potential to impact on downstream values within the coastal zone. The majority of the waterway catchments of the study area are located within the Nambucca Valley LGA with the exception of approximately half of the Oyster Creek catchment and small areas of the upper Nambucca River estuary catchment are within Bellingen Shire Council area (Figure 3).

Mapping of coastal management areas within the study area is shown on Figure 8 (Section 6). This CMP encompasses the coastal management areas mapped within the CM SEPP:

- Coastal Wetlands and Littoral Rainforest Area.
- Coastal Environment Area.
- Coastal Use Area.

Although the Coastal Vulnerability Area is not mapped in the CM SEPP, the coastline is subject to coastal hazards and these have also been addressed in this CMP.

The Nambucca coastline sits across two secondary coastal sediment compartments, the Bellinger River and the Macleay River (South West Rocks) compartments (refer Figure 9, Section 6) which NVC shares with Bellingen, Coffs Harbour and Kempsey LGAs.

Figure 2: The Nambucca CMP study area

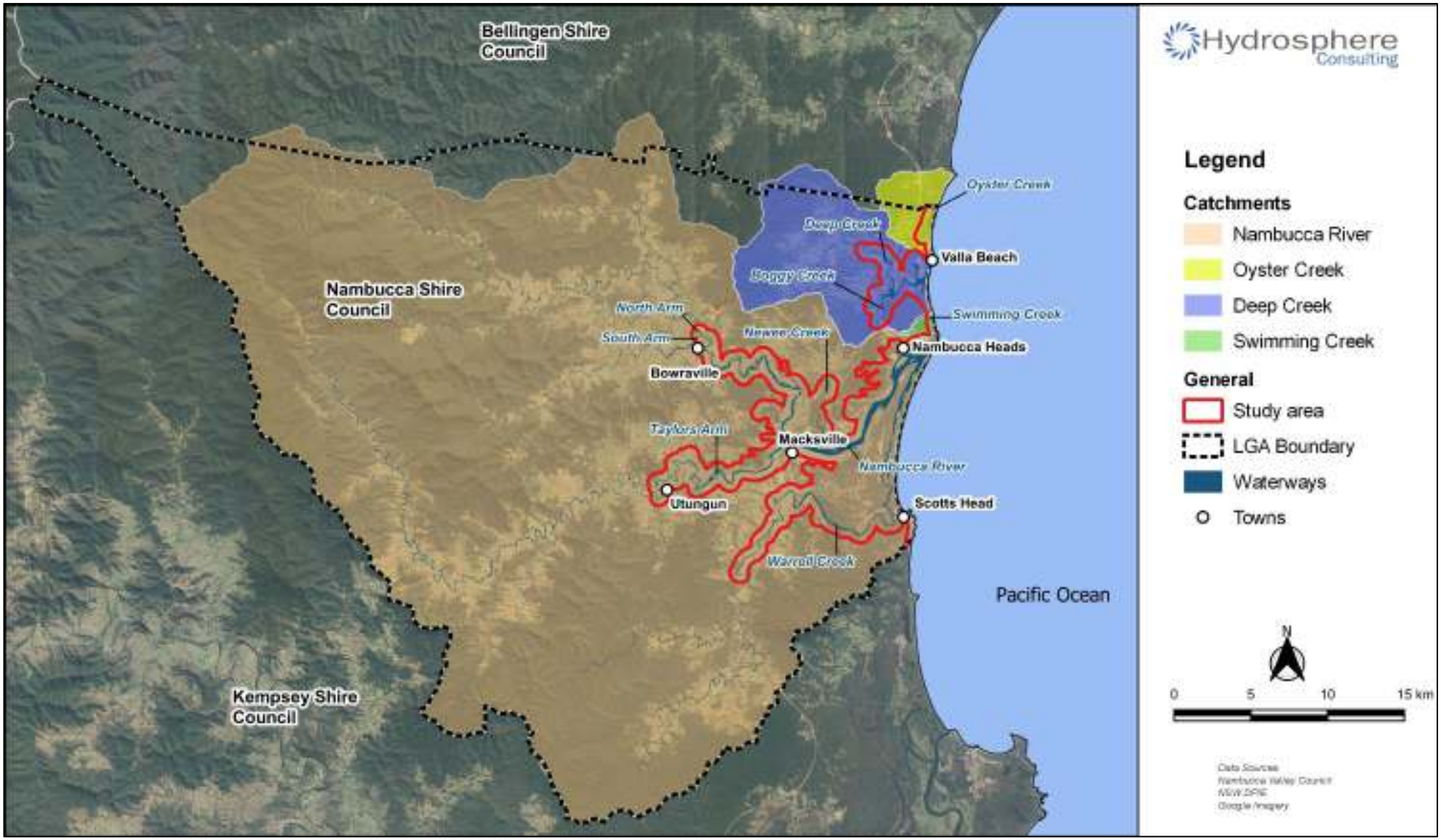
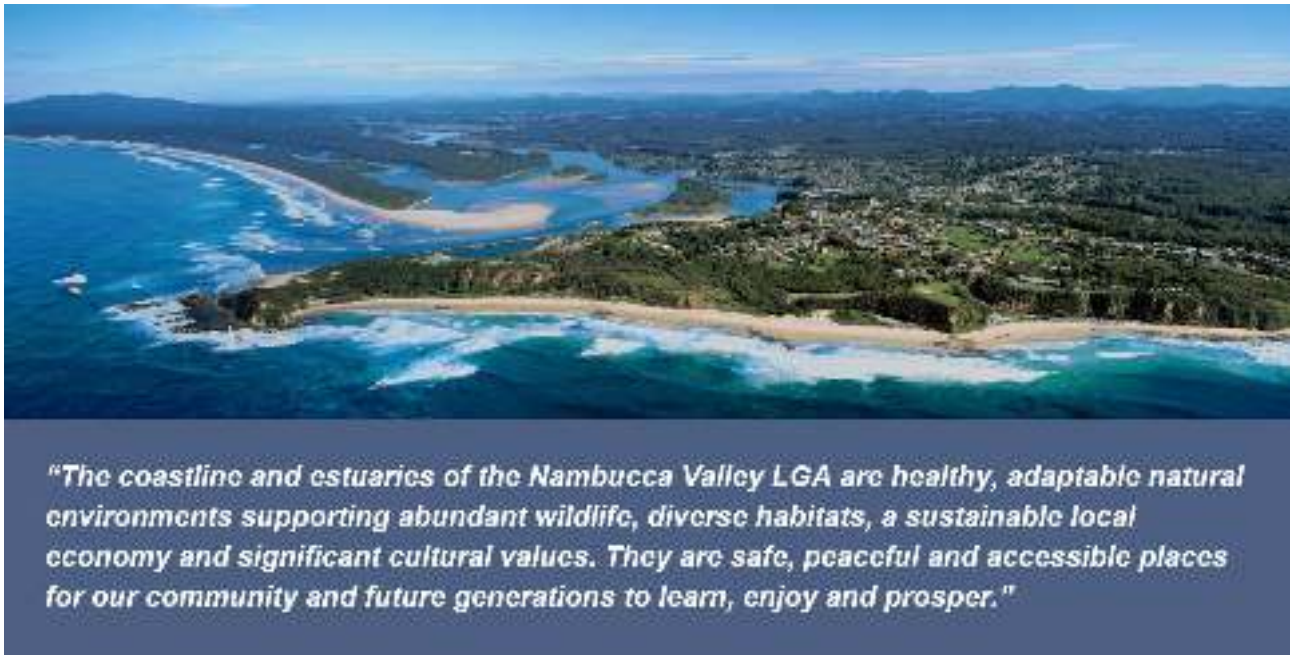


Figure 3: The Nambucca CMP study area showing the connected catchments of the estuaries and coastal creeks and LGA boundary

1.4 Vision, objectives and strategic direction

1.4.1 The vision for the Nambucca coastline and estuaries

The vision statement developed for the Nambucca CMP, consistent with the state's vision and Council's overall strategic direction and community input is as follows:



1.4.2 CMP objectives

Part 1, Section 3 of the CM Act states "*the objects of this 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*". It also sets out 13 objects of the CM Act that must be considered and promoted when preparing a CMP. The values of Nambucca stakeholders and community were identified through consultation undertaken as part of this CMP and are consistent with the CMP Act objectives. The 13 objects of the CM Act and the objectives of the four coastal management areas have been incorporated in this CMP (refer Appendix 1 for details).

Local management objectives for the Nambucca coastline and estuaries have been developed to guide this CMP (Table 2). The objectives have been adapted and collated from the previous *Nambucca River Estuary Management Plan* (BMT WBM, 2008) and the *Nambucca Shire CZMP* (Umwelt, 2012) and updated to reflect current day community uses and values associated with the coastline and estuaries.

Table 2: Nambucca coastline and estuaries local management objectives

Values	CMP Objective
Coastal risk and adaptation to climate change	1. to minimise risks associated with coastal processes, protect important community values and enable residents and visitors to continue to be able to enjoy safe access to an attractive healthy coastal landscape. 2. to guide Council land use and land management strategies and actions so that coastal hazards are taken into account for short and long-term timeframes. 3. to provide good value investment in Council assets in the coastal zone, so that infrastructure for coastline access and enjoyment meets the needs of residents and visitors. 4. to provide clear information about coastal processes and hazards and support community involvement in planning future activities in the coastal zone. 5. to consider the potential implications of sea level rise on the estuary and its surrounds as a result of climate change.
Water quality	6. to maintain and improve water quality within the estuaries and their catchments to support ecosystem function, commercial fishing/oyster production, tourism, and human recreation including swimming.
Natural habitats and biodiversity	7. to protect and enhance habitats to improve the health, biodiversity and scenic value of the Nambucca coastline and estuaries. 8. to encourage and support strategies to improve the health and resilience of the Nambucca coastline, estuaries and respective catchment areas.
Bank erosion	9. Improve overall riverbank condition on all major streams and waterways of the Nambucca Valley to limit future bank erosion.
Cultural heritage and practice	10. to protect areas and items of Aboriginal and European cultural heritage. 11. to understand, protect and respect the aboriginal heritage value of the Nambucca coastline and estuaries including aboriginal peoples' spiritual, social, customary and economic use of the coastal zone.
Community uses, public access and amenity	12. to protect and enhance the recreational, scenic, social and cultural values of the coastline and estuaries. 13. to maintain and improve public access and safety, facilities and infrastructure. 14. to maintain navigation within the lower estuary for shallow draft vessels, consistent with current use. 15. encourage waterway use that causes a minimum of environmental and social impact, and where possible, enhances user amenity through improved safety controls and reduced conflict.
Education, engagement and public opinion	16. to actively engage with the community to achieve greater awareness, education and understanding of management issues and actions. 17. To maintain open lines of communication with the community and local Aboriginal groups in relation to the ongoing management of the estuary. 18. to support public participation in the coastal management and planning process.
Land use planning	19. protect and enhance the existing uses and values of the Nambucca coastline and estuaries in both the short- and long-term by adoption of best practice land use planning and development controls.
Local economy, jobs and prosperity	20. to maintain and improve the viability of existing (and potential future) types of ecologically and commercially sustainable estuary-based industries and enterprises. (achieving objectives 1-19 will contribute to local economic values through enhanced tourism and associated business activity).

1.5 Existing management arrangements

Existing land tenure (public) within the study area is shown on Figure 10 (Section 6). Most of the Nambucca coastline and land immediately landward of the hind dune is in public ownership as National Park, Crown reserve or Council managed Crown land (community land). Land adjoining the estuaries is predominantly privately owned with small areas of Crown land, and a large parcel of land under Native Title by the Gumbaynggirr people in lower Warrell Creek. The Crown land reserve at Scotts Head is managed by the NSW Crown Holiday Parks Trust.

Within the wider catchments, the majority of land is privately owned with significant areas of State Forest, encompassing approximately 22% of the broader Nambucca/Warrell/Taylors Arm catchment and National Park extending over a further 17%. Private land also dominates the Deep Creek catchment with National Parks and State Forests comprising 6% and 14% of the catchment, respectively. The remainder of land in both catchments constitutes a variety of Crown land and road reserves.

The following organisations, community groups, industry groups and government agencies have a role in the management of study area and the surrounding catchments.

- NVC has a central role in managing the coastline and estuaries and is responsible for preparing the Nambucca CMP which sets out the long-term strategy for management of the coastal zone. NVC is also directly responsible for managing Council assets and infrastructure and land dedicated as Crown reserves under its jurisdiction.
- Gumbaynggirr people – Native Title by the Gumbaynggirr people exists over South Beach (also known as Forster Beach) and adjacent land to the east of Warrell Creek and the Gumma Peninsula and Islands in the lower Nambucca River estuary (refer Figure 2). The traditional owners of the study area are committed to the sustainable management of these areas.
- Nambucca Local Aboriginal Land Council (LALC) region extends from the northern boundary of the Nambucca LGA south to Macksville. The traditional owners manage Gumma Indigenous Protection Area (IPA) comprising much of Gumma Point along with three small islets in the lower Nambucca River estuary and is dedicated by its traditional owners, the Baga Baga and Ngambaa clan of the Gumbaynggirr people, for biodiversity conservation and cultural heritage protection.
- Unkya LALC region extends from Macksville, south to Scotts Head.
- Bowraville LALC region covers the mid and upper Nambucca River catchment including the town of Bowraville.
- The Department of Planning and Environment – Environment, Energy and Science (DPE – EES) works closely with local councils and communities to reduce threats from flood risk and coastal storms and ensures that people in NSW are well informed about these risks and better equipped to adapt to climate change. DPE – EES also works with local councils and communities to maintain or improve the health of estuaries/ lakes and enhance the recreational experience.
- DPE – Crown Lands is directly responsible for management of all submerged land (the beds of rivers, lakes and lagoons) and Crown reserves within the study area. DPE – Crown Lands appoints Crown land managers and ensures that Crown land is administered and managed in accordance with the *Crown Land Management Act 2016*. Any actions in the CMP that are located on or affect Crown land that is administered by DPE - Crown Lands, will require authorisation under the *Crown Land Management Act 2016* (e.g. leases and licences).
- National Parks and Wildlife Service (NPWS) is directly responsible for management of National Parks Estate under the *National Parks and Wildlife Act 1974* (refer Figure 10). NVC and NPWS continue to share information and collaborate on specific projects as required, (for example cultural burning activities, bank stabilisation activities, animal control and education).

- The NSW Department of Primary Industries – Fisheries (DPI Fisheries) administers the *Fisheries Management Act 1994* (FM Act) and the *Marine Estate Management Act 2014* (MEM Act). Under the FM 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 they 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 FM Act, the aquatic habitat protection and threatened species conservation provisions in Parts 7 and 7A of the FM Act and the associated and *Policy and Guidelines for Fish Habitat Conservation and Management* (2013 Update). Key fish habitats include third order and greater freshwater waterways, Coastal Wetlands and tidal waters up to the Highest Astronomical Tide (HAT) level;

  Under the MEM Act, DPI Fisheries is responsible for ensuring strategic and integrated management of the whole marine estate – marine waters, coasts and estuaries. The MEM 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 and Marine Estate Expert Knowledge Panel;
  - Requiring the development of a Marine Estate Management Strategy (MEMS) to address priority threats identified through threat and risk assessment;
  - Facilitating the maintenance of ecological integrity and economic, social, cultural and scientific opportunities;
  - Promoting the coordination of government programs; and
  - Providing for a comprehensive system of marine parks and aquatic reserves.
- The Marine Estate Management Authority (MEMA) advises the NSW Government on the management of the NSW marine estate under the *Marine Estate Management Act 2014.* The Authority brings together the heads of the NSW Government agencies with key marine estate responsibilities (DPI, DPE (EES and Planning and Assessment) and Transport for NSW, TfNSW). MEMA ensures policies and programs address priority issues, are well coordinated, efficient, evidence based and result in positive outcomes and undertakes threat and risk assessments, develops management strategies, promotes collaboration between public authorities and fosters consultation with the community
- Forestry Corporation of NSW leads policy, industry development, science and research for the NSW wood and product manufacturing industry.
- TfNSW – Maritime is the key agency with statutory and policy responsibilities related to the safety and accessibility of NSW waterways for recreational and commercial vessels. TfNSW has a significant role in informing, supporting, and promoting safe, responsible and sustainable use on NSW waterways. TfNSW undertakes navigational assessments and identifies priority areas and hazards, manages the resulting impacts and improves access and safe navigation.
- The Maritime Infrastructure Delivery Office (MIDO) is a branch of TfNSW responsible for the development and delivery of maritime infrastructure across NSW that supports recreational boating, fishing, tourism, and a range of other recreational and commercial activities. A number of relevant programs are currently managed through MIDO including:
  - Coastal Infrastructure Program (i.e. management of the lower estuary v-wall, breakwall and training walls).
  - NSW Coastal Dredging Strategy.

  - NSW Boating Access Dredging program.
  - NSW Boating Now program.
- North Coast Local Land Services (NCLLS) plays a key role in the management of catchment activities and natural resources relevant to estuary catchments and through the facilitation of relationships between landholders and key environmental organisations.
- Nambucca Valley Landcare (NVL) is a non-profit community organisation which encourages and supports sustainable natural resource management within the Nambucca River catchment. The organisation undertakes a range of projects with landholders, volunteer groups, and government agencies including river restoration, farm planning and bush regeneration.
- Scotts Head Dunecare - a non-profit community organisation undertaking dune rehabilitation, bank stabilisation and dune revegetation within the vicinity of Scotts Head.
- Valla Beach Bushcare - a non-profit community organisation undertaking dune rehabilitation, bank stabilisation and bushland revegetation within the vicinity of Valla Beach.
- Nambucca River Oyster Farmers – there are three areas in the Nambucca River between Macksville and Nambucca Heads classified by the NSW Food Authority for the harvesting of oysters.
- NSW Crown Holiday Parks – there are two holiday parks located on Crown land within the study area managed by Reflections (NSW Crown Holiday Parks) at Scotts Head and Nambucca Heads. The foreshore crown reserves fronting the village of Scotts Head is largely managed by this Crown Trust Manager.
- Nambucca River, Creeks, Estuaries and Coastline Management Committee (NRCECMC). The Committee is represented by key local stakeholder groups including government organisations, Councillors, the three LALCs and special environmental and interest groups. The committee ensures that the interests and views of these groups are understood and provides advice to Council on coastal and estuary management.
- Agencies and organisations responsible for wildlife rescue such as NPWS, SCU Marine Science Centre and WIRES.

1.6 Regional and local strategies

The study area is currently managed in accordance with various regional and local level planning instruments, strategies and management plans implemented by Council and other stakeholders. Figure 4 provides an outline of the key management plans and documents relevant to this CMP. The status of the recommended actions in the current plans is detailed in the *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a).

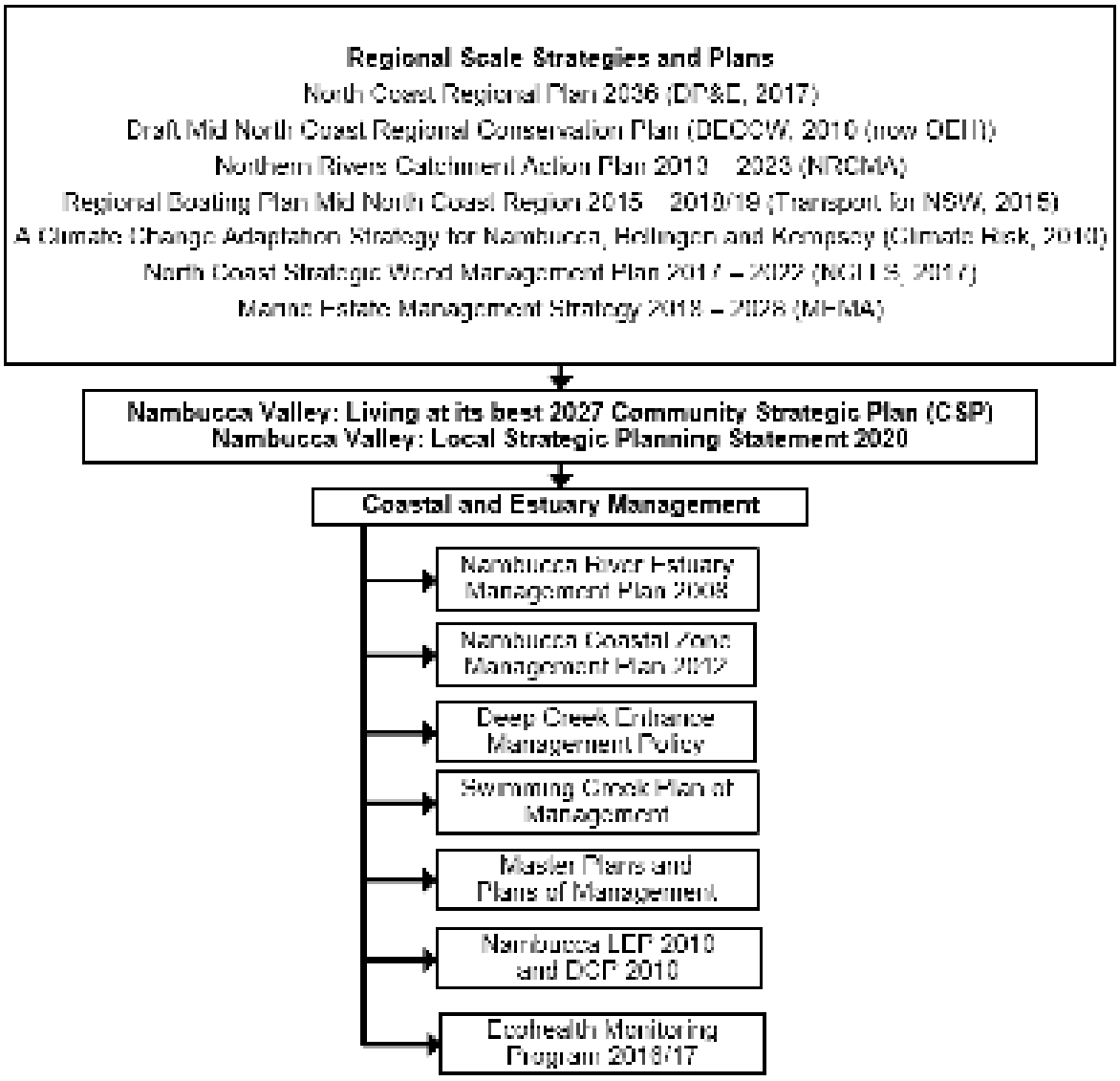


Figure 4: Regional and local strategies and management plans for Nambucca coastal and estuary management

There also are numerous other management programs being implemented by NVC, government agencies, statutory bodies and community groups addressing components of estuary and coastal zone management in parallel with the primary management plans and programs.

1.6.1 North Coast Regional Plan 2036

The *North Coast Regional Plan 2036* (DPE, 2017) provides an overarching strategy for the next two decades that reflects community and stakeholder aspirations and opportunities for the North Coast region. The Plan identifies several aims relevant to the Nambucca coastline and estuaries including:

- *Goal 1 – The most stunning environment in NSW*. The Nambucca coastline and estuaries provide not only intrinsic value but contain highly valued natural areas which improve community lifestyles, health and wellbeing. The areas natural resources contribute to a significant tourism industry which capitalises on the natural assets of the region.
- *Direction 2 - Enhance biodiversity, coastal and aquatic habitats, and water catchments*. The Nambucca coastline and estuaries are identified as one of the areas of high environmental value that is integral to maintaining the biological diversity of the North Coast. The Plan recommends using an

evidence-based approach to protecting important assets that will help to maintain diversity and habitat for flora and fauna.

- *Direction 3 - Manage natural hazards and climate change.* The Plan identifies a number of threats and hazards relevant to Nambucca coastline and estuaries including coastal erosion, sea level rise, storms and floods. The Plan acknowledges CMPs and associated controls as the key planning mechanism to deal with these hazards, increase all-hazard disaster preparedness and build community capacity and resilience.

1.6.2 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 MEMS management principles as well as priority threats for the marine estate as identified in the NSW marine estate threat and risk assessment (TARA, BMT WBM, 2017).

Stage 1 of the MEMS focused on addressing the most severe threats to the health of the marine estate, particularly water pollution, which was identified as the greatest threat to the marine estate by the NSW community and through the evidence-based TARA (BMT WBM, 2017). Some MEMS management actions have included pilot projects in Stage 1 in specific locations along the NSW coast. Other management actions have state-wide benefits, such as the application of a risk-based framework for water quality in estuaries and their main tributaries.

1.6.3 Previous coastline and estuary management plans

The two core local management plans are the *Nambucca Coastal Zone Management Plan* (Umwelt, 2012) (certified) and the *Nambucca River Estuary Management Plan* (BMT WBM, 2008). No specific estuary management plan is presently in place for the Deep Creek estuary however the entrance is managed in accordance with the *Deep Creek Entrance Management Policy* (NSW, 2013). More recently, the report for the *Nambucca EcoHealth Project 2016-2017* (Mika *et al*., 2018) provides management recommendations for the Nambucca and Deep Creek estuaries relating to hydrology, water quality, riparian vegetation and geomorphic condition. Management of Swimming Creek was previously provided for in the *Swimming Creek Plan of Management* (NSC, 1995). This CMP has been developed through consideration of the existing management arrangements. In some cases, this CMP updates and improves various management strategies with current knowledge and understanding of issues.

1.6.4 Integrated Planning and Reporting

The Integrated Planning and Reporting (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. The CM Act 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 *Nambucca Valley: Living at its Best 2027 Community Strategic Plan* (CSP), sits above all other Council plans and policies in the planning hierarchy. The CSP identifies long term priorities, outcomes and aspirations for the future of the community and the local government area. Council uses this document to guide and inform their decision making and planning for at least the next ten years. The NVC *Local Strategic Planning Statement* (LSPS) (NVC, 2020) provides a vision for the Nambucca Valley, details the special

characteristics which contribute to local identity and shared community values and provides a summary of actions to manage growth and change into the future. The Delivery Program and Operational Plan identifies all key activities to be undertaken by Council during its elected term, and which year the activities are to be undertaken. The CSP has assisted in guiding the development of the Nambucca CMP through its strong aspiration to care for the natural environment. The CMP actions have been organised and scheduled with consideration of NVC's IP&R framework, Delivery Program and Operational Plan and associated reporting requirements.

Importantly, this CMP refers to maintenance, improvement and provision of Council assets or infrastructure. While this CMP makes many recommendations with respect to assets it is not the intention of this program to replace or duplicate any Council Asset Management Plan, strategy, register or database. Council's Integrated Planning and Reporting framework provides for asset management planning for which the risks and actions identified in this plan should be a consideration in Council's Asset Management Program.

2. PROCESSES, VALUES AND THREATS

This section provides a summary of the values and threats to the Nambucca coastline and estuaries which are detailed in the supporting information for this CMP (*Stage 1 Scoping Study* Hydrosphere Consulting (2020a); and *Stage 2 Vulnerabilities and Opportunities Study.* The risk assessment completed as part of Stage 1 and Stage 2 identified and prioritised the threats to be addressed by this CMP (refer Section 2.3.11).

2.1 Physical character

2.1.1 Open coast

The open coast typically comprises sandy embayments with no or very limited rocky reef, apart from a large rocky reef offshore of Shelly Beach, Beilbys Beach and Main Beach adjacent to Nambucca Heads. Forster Beach/South Beach and South Valla Beach are classified as long, sandy barrier beaches. Several small pocket beaches located between two headlands are also present including Little Beach, Scotts Head, and Entrance Beach (located between Wellington Rock and the breakwall). Shelly Beach, Beilbys Beach, Nambucca Main Beach and North Valla Beach are all narrow, sand mantle beaches which can erode during storms to reveal exposed bedrock (Umwelt, 2012). Bedrock cliffs and bluffs are located primarily at Scotts Head, Nambucca Heads and Valla Beach and are subject to rock falls and undercutting by wave action. The coastal zone of the study area is affected by storm surges resulting in estuarine flooding, wind induced localised coastal currents, rip currents and a predominate south to south-easterly wave climate (Umwelt, 2012).

The Nambucca coastline and beaches are part of the regional sediment transport system sitting across two secondary coastal sediment compartments, the Bellinger River to the north and the Macleay River to the south as shown in Figure 9 (Section 6, Maps). Nambucca's beaches are influenced by and respond to sand transport processes across regional scales. Changes to sediment volumes and/or transport processes within the region can result in temporary and/or permanent changes to other beaches and shorelines at other locations. It is therefore vital to consider regional impacts of any coastal management actions affecting sediment transport (e.g. break wall construction or modifications and coastal dredging programs etc.).

Plate 3: Nambucca coastline, Wellington Rock

Source: NSC (2018)

2.1.2 Nambucca River estuary

The Nambucca River estuary is a mature, wave dominated inter-barrier estuary with an open, trained entrance. Training works were constructed along the northern shoreline at Nambucca Heads during the late 1890s and early 1900s with various historical large-scale dredging undertaken up until the 1940s. The estuary was last dredged in 1977 with works undertaken west of the V-wall which subsequently infilled rapidly.

The lower Nambucca River estuary is shallow with a continually changing regime. Normal tidal and wave conditions result in an increasing constriction of the entrance and flood tide shoals resulting in elevated flood levels, reduced storm tide penetration, smaller tidal ranges and shorter flushing time, whereas flooding removes large amounts of sediment and deposited material (including entire islands) and reverses the hydrodynamic impacts (BMT WBM, 2006). Shoaling of Warrell Creek is also compounded by bank instability and dunal slips (BMT WBM, 2006) which add to the tidal flushing time in excess of 60 days (WBM, 2000 *in* GECO Environmental, 2005).

Plate 4: Nambucca River Estuary

Source: DPIE (2020)

2.1.3 ICOLLs

Oyster Creek is a small shallow ICOLL with an estuary area of just 0.1 km² and average depth of 0.4 m (DPIE, 2020). It has a relatively small catchment of 16 km², is surrounded by nature reserve and typically remains closed for long periods (Luffman, 1999) resulting in poor flushing (Plate 5). Part of the Oyster Creek catchment is within the Bellingen Shire LGA.

Deep Creek displays characteristics of both a barrier estuary and a saline coastal lake (Plate 5). It has an estuary area of 1.7 km² located within a relatively narrow bedrock valley (DLWC, 2000). The relatively large catchment size of the ICOLL (94 km²) results in an entrance that is typically open although the shallow entrance results in limited tidal exchange (NSC, 2013a). Wave deposited sand gradually infills the entrance area and increases the berm height and can result in closure of the ICOLL particularly during prolonged dry periods. The lower creek is situated parallel to the Holocene sand barrier of Hylands Beach/ South Valla Beach and exists at the northern end of the beach. Entrance morphology is highly variable with the position

of breakout varying by up to 600 m across the beach, the most common position being approximately 450 m south of Valla Headland (DLWC, 2000).

When open, Swimming Creek exits across the beach approximately 500 m to the north of the main surf beach. The creek is essentially a very low energy and often stagnant channel incorporating aspects of both ephemeral entrance lagoons and coastal intermittent streams. The majority of the estuarine area is located immediately behind and parallel to the hind dune with a series of deep pools retaining water in the lower section (Redman and Greenaway, 1995). The entrance is located immediately adjacent to the 4WD beach access track which is fringed by a damaged rock revetment and debris. Whether this material is impacting on the entrance alignment and opening behaviour of the creek is unknown.

Plate 5: Left: Oyster Creek; Right: Deep Creek

Source: DPIE (2020)

2.2 Community values and uses of the coastal zone

Consultation as part of this CMP has shown that for many Nambucca Valley community members, interaction with the coast and estuaries is a year-round daily part of life. The beaches and waterways provide a place for social interaction with the majority of respondents visiting these locations with other adults, as well as a moderate proportion (29%) of survey respondents bringing along a companion animal.

The most commonly stated community values from the community survey were:

- Scenic beauty.
- Relaxing/ peaceful.
- Environmental value/ ecosystems/ habitats.
- Good swimming area.
- Good for picnics/ BBQs.
- Good for tourism/ economy.
- Good for passive water-based activities.
- Ability to take dogs and off-leash dog walking.
- Good surf conditions.

- Good fishing.
- Cultural heritage value/ history.

Plate 6: Left: The V-Wall, a popular, easily accessible fishing spot with deep-water access. Right: 4WD beach access at South Beach

Common recreational pursuits listed by popularity include wildlife watching/ nature appreciation, walking swimming, passive viewing from lookouts/ platforms, exercise, paddling activities, picnics/ BBQs, fishing, surfing/ wave riding, dog walking and activities with children. Other, less popular activities included motorised water sports, cycling, educational and cultural experiences, camping, four-wheel driving, spearfishing, sailing, bush/ dune regeneration, scuba diving/ snorkelling, bait collecting, and as places for reflection/ contemplation.

Usage is concentrated in the Nambucca River estuary and Nambucca Heads beaches with over 40% of survey respondents visiting these areas daily. Within the Nambucca River estuary, most of this usage is concentrated between Macksville and the entrance, and within Warrell Creek as far as Gumma Reserve/ Boultons Crossing with the entrance area being by far the most popular usage location overall (BMT WBM, 2006). Other highly frequented parts of the study area include Deep Creek, visited by 27% of respondents daily and South Valla Beach frequented by 48% of respondents a few times a week.

Community assets within the study area include beach and estuary access ways, viewing platforms, surf clubs, roads, a weir, car parks, caravan parks, seawalls, pontoons/ wharves/ landings, floodplain drainage infrastructure (e.g. floodgates), amenities, signage, sewage treatment plants (STPs) and water and power supply infrastructure. Council assets along with risk ratings (with and without treatment for coastal hazards) and estimated replacement costs are listed in an asset register provided in the Stage 1 Scoping Study (Hydrosphere Consulting, 2020a).

Council has previously estimated that the value of coastline public infrastructure at risk exceeds $4.5 million (Umwelt, 2012). It is noted the coastal zone for this CMP has been extended to include estuaries and other landscapes identified in this program. The value of the assets in the coastal zone far exceeds this value.

2.2.1 Culture and heritage

The Nambucca coastline is the traditional land of the Gumbaynggirr people. The estuaries, beaches and headlands are of great significance to the local Aboriginal people who are committed to the management of these areas. The Gumbaynggirr people's ongoing use and relationship to country is recognised with their successful Native Title determinations and land claims over lands and coastal waters along the coastline as detailed in Section 1.4. There are a number of different archaeological sites and places within the study area including shell middens, open camp sites, waterholes/ wells, burials/ cemeteries (including the cemeteries at

Stuart Island, Bowraville and Warrell Creek), story/ ceremonial places, Aboriginal Reserves and missions, places of conflict as well as places of contemporary social value (McIntyre-Tamwoy, 2003).

The Nambucca river estuary was the 'lifeblood' of early European settlers to the area and was the main means of transporting goods up until the 1920s before the introduction of rail (BMT WBM, 2006). European heritage in the Nambucca River estuary is centred around cedar-getting with a several timber mills previously located in the lower estuary (RDM *et al.,* 2010) and ship building concentrated around Macksville and the Taylors Arm including Franks Wharf, the Old Government Wharf and the slipway and Drogher remnants at Kings Point (BMT WBM, 2006). The Breakwall and associated quarry, V-wall and the "Glen" boarding house are also listed as places of significance by RDM *et al.* (2010).

2.3 Snapshot of Issues

2.3.1 Community concerns

The community survey canvassed the local community on a number of topics associated with the Nambucca coastline and estuaries. The feedback indicated that community members were concerned about a broad range of issues with the majority of concerns centred around the Nambucca River, Deep Creek and Swimming Creek estuaries. The top ten issues of concern to the community (i.e. ranked by greatest count of responses) were:

1. Litter/ marine debris.
2. Habitat loss or degradation.
3. Poor water quality.
4. Beach erosion/ shoreline recession.
5. River bank erosion.
6. Conflicts of use (e.g. swimming & watercraft; beach access & shorebirds).
7. Entrance management.
8. Climate change/ sea level rise threats.
9. Foreshore vegetation/ weeds.
10. General access to waterways.

In specific locations, other key issues of community concern not listed above include:

- Deep Creek: siltation/ shoaling and conflicts of use.
- Swimming Creek: algal blooms and aquatic weeds.
- Nambucca River estuary: siltation/ shoaling and general access to waterways.
- Warrell Creek: Siltation/ shoaling and aquatic weeds.
- North Valla Beach, South Valla Beach, Nambucca Heads Beaches and Forster Beach: General access to waterways, sufficiency of disabled access, and quality and sufficiency of recreational facilities.
- Forster Beach and Scotts Head Beach: General access to waterways, sufficiency of disabled access, quality and sufficiency of recreational facilities, and aquatic weeds.

A suite of other specific issues were raised by the community. Recurring themes include:

- Excessive availability of beach access for recreational trail biking and four wheel driving; the lack of enforcement of licensing, speeding and driving in restricted areas (on dunes and in no-go zones); erosion and trampling caused by motorised vehicles; and the conflict of use issues that arise, i.e. safety of shorebirds and their nests, and safety of beach users including children and dog walkers. This is of particular concern for the North Valla and Swimming Creek 4WD access locations.

Suggestions were made to increased regulation and enforcement of this activity, and to reduce the availability of access.

- The abundance of allocated off-leash dog areas; irresponsible dog owners (not picking up faeces/ leaving bags on beaches/ letting dogs roam in on-leash areas) and the associated health and safety risks; the lack of enforcement of both off-leash and on-leash areas.
- A lack of facilities such as boardwalks, fishing cleaning facilities, access facilities for both boats (especially in Deep Creek) and non-motorised water sports, and sufficient and suitably designed seating for the elderly.
- Commercial fishing (primarily netting in Warrell Creek) and the perceived impact on fish stocks, recreational fishing and tourism.
- Perceived inadequacy of the Deep Creek Entrance Management Policy in:
    - recognising the estuary's environmental values;
    - managing water quality for recreational and biodiversity purposes (particularly being a recreational fishing haven); and
    - managing long inundation periods which cause vegetation changes (mangrove die-off in particular).
- Lack of boating restrictions contributing to erosion and causing safety and amenity issues as well as conflicts of use between boats/ jet skis and swimmers/ passive estuary users. A 4 km speed limit adjacent to urban areas in Deep Creek was suggested.
- Access for, and safety of swimmers in the vicinity of the V-wall due to conflicts with boats/ jet skis and dangerous currents. Suggestions were made to make this area a passive recreational use area only and/ or to incorporate a tidal pool in the inner harbour.
- Runoff from construction sites (most recently, the Hyland Park subdivision) and newly developed areas (e.g. rubber laden runoff from the new highway service centre into Boggy Creek).
- Sand shoaling and siltation, and the need for dredging for navigational and safety purposes, particularly the lower Nambucca River estuary and Warrell Creek.
- Needs for further community education around the importance of amenity and wildlife habitats, and on climate change threats and impacts.
- Illegal camping, and the associated disturbance to vegetation, littering, defecation, and lighting of fires.
- Inappropriate land use practices in the catchments, the abundance of blueberry farms and the use of pesticides in horticulture; and logging on highly erodible steep slopes in the upper catchments.
- Perceived impact from, or lack of understanding of level or risk from discharge and/or beneficial reuse of treated effluent from STPs.
- Frustration at Council's management of the coastline and estuaries to date, in particular, within the Deep Creek catchment which has no existing management program other than the entrance management policy.

These findings reiterate those of the *Nambucca River Estuary Management Study* (BMT WBM, 2006), identifying that many residents' concerns are concentrated about the ability of the Nambucca River estuary to sustain peak levels of waterway use and the combined impacts of sedimentation, decreasing water quality, overfishing and impacts of inappropriate development. Some management issues, such as shoaling, entrance management of Deep Creek, commercial fishing, 4WD access and dog accessible areas are controversial due to strong opposing viewpoints in the community.

2.3.2 Coastal hazards

Coastal hazard vulnerability along the coastline has been mapped by SMEC (2009) for infrastructure at risk and reported in *Nambucca Shire CZMP* (Umwelt, 2012). There are existing provisions for consideration of coastal hazards in the Nambucca Local Environmental Plan (LEP) and Development Control Plan (DCP) for currently mapped coastal hazard areas.

Coastal hazards have not been re-assessed as part of the preparation of this CMP with existing hazard information from the *Nambucca Shire CZMP* (Umwelt, 2012) deemed suitable for use, supplemented by Council's proposed coastal hazard monitoring program.

Beach erosion

Beach erosion of the sandy shoreline has been occurring in the central and southern areas of Nambucca Valley LGA resulting in undermining and collapse of some beach access points, reduced accessibility to and from the beach and amenities (e.g. surf club, car park), public safety risks presented by a steep scarp face, loss of long established dune vegetation and loss of amenity. The threat has already eventuated at Nambucca Heads Surf Club impacting on the access stairs in 2012 (Plate 7) and similarly, Forster Beach (Scotts Head) Surf Club access way in 2016. The key areas at risk of extreme storm events, as identified through a risk assessment in the CZMP (Umwelt, 2012) are at Shelly Beach, Beilbys Beach and Nambucca Heads Main Beach. A less extreme, but high risk also exists for South Valla and North Valla beaches.

Plate 7: Left: Nambucca Main Beach Surf Club access stairs damaged by storm events; Right: Main Beach Surf Club after replacement of access stairs

Source: NSW (2012), NSW (2016)

Shoreline recession

Over the past few years, significant shoreline recession has been observed at Scotts Head, as well as immediately to the north of Swimming Creek (Plate 8) including loss of dune volume and vegetation. The current erosion scarp at Swimming Creek is within but approaching the SMEC (2009a) mapped immediate hazard line at Swimming Creek. At Scotts Head, the shoreline at the eastern end of Reflections Holiday Park appears to have breached the 2009 mapped "immediate zone of wave impact and slope adjustment" (based on comparison with December 2017 Google Earth imagery). Recession at Beilby's Beach (Plate 8), Nambucca Heads (near the river entrance) and losses at Valla Beach have previously been noted by Umwelt (2012).

Dredging occurring in the regional sediment transport system such as Crown licensed extraction at Back Creek (approximately 20,000 m^3 annually which is up to 40% of the available sediment of approximately 50,000 m^3 annually) has unknown effects on local sand replenishment in the Nambucca coastline.


Plate 8: Left: Vegetation debris on receding shoreline north of Swimming Creek entrance (December 2018); Right: recession of beach at Ulrick Drive carpark (north end of Beilby's Beach) causing undercutting and collapse of the road surface (July 2018)

Slope instability/landslip

The rocky headlands and bluffs experience rock falls and undercutting by wave action which present a public safety risk and a low risk to property and infrastructure. Ten high priority landslip areas have been identified at Main Beach, Wellington Drive and Riverside Drive within the lower Nambucca River estuary and at Scotts Head and North Valla as mapped by SMEC (2009b).

The cliff behind the White Albatross Holiday Park at Nambucca Heads (lot 7016/1056524) has a history of subsidence and/or instability (C. Knight, pers. comm., 2019) and was not included in the previous studies. This cliff has subsequently been mapped within the coastal zone (coastal use area and coastal environment area). Whilst not subject to wave action, undercutting or significant wetting and drying processes from tides, the cliff is still likely to experience weathering from chemical changes associated with frequent salt spray, weathering from high winds and may be subject to structural failure.

Coastal inundation

A present-day risk of overwash and overtopping exists for the berm at the Nambucca River entrance and whilst overwash is likely to be frequent, no infrastructure is at risk in this location (SMEC, 2009a). Coastal inundation at Deep Creek is likely across the entrance berm if the frontal dune is low enough to allow overtopping during a major storm. Overtopping would potentially affect the existing carpark, picnic area and toilet block immediately behind the entrance (SMEC, 2009a) at South Valla Beach.

Tidal inundation

No detailed local mapping for tidal inundation is currently available for the study area. However, the Federal government's online tidal inundation model, Coastal Risk Australia (2020) provides a visual, conservative indication of those places at risk from tidal inundation in the present day. The key risk from present day tidal inundation is when high tides occur in combination with catchment flooding. This risk was assessed in the *Nambucca Shire Floodplain Risk Management Study* (WMAwater, 2016) which assessed the risk of catchment flooding in combination with tidal inundation for present day scenarios as well as consideration of sea level rise scenarios of an increase of 0.4 m by 2050 and 0.9 m by 2100, consistent with the coastal hazard mapping undertaken for the study area.

Plate 9: Left: Tidal inundation of Stuarts Island causeway (December 2012); Right: Inundation of the foreshore of Bellwood Park (December 2012)

Source: J. Ashby at www.witnesskingtides.org

2.3.3 Entrance management, shoaling and estuary hydraulics

The state of the entrance of each estuary varies naturally in response to prevailing catchment runoff, sedimentation (from upstream sources or localised banks) and coastal conditions. Anthropogenic drivers of entrance change include entrance modifications such as training walls (i.e. Nambucca River estuary), and dredging and mechanical openings (i.e. Deep Creek).

The Nambucca River entrance works and the state of the entrance have a significant effect on the hydrodynamics of the river and subsequent effects on tidal flushing, sedimentation/ erosion, ecological habitats and flooding (BMT WBM, 2006). The entrance management works result in high velocity flood and ebb tide currents and wave and current energy are focussed on sections of the estuary foreshore resulting in erosion such as at Bellwood Park. Waves are more likely to penetrate the estuary on the flood tide. Breakthrough of the berm immediately to the south of the entrance can also occur during floods (Umwelt, 2012). The typically shoaled nature of the entrance affects navigation such that navigability of the lower estuary, Warrell Creek and the entrance bar is limited to shallow draft vessels, typically recreational boats and some small commercial fishing vessels. The passage of small recreational vessels can also be difficult at low tide downstream of Stuarts Island.

Council has been responsible for mechanical opening of the Deep Creek entrance since 1991 and presently carries out opening of the entrance in accordance with the *Deep Creek Entrance Management Policy* (NSC, 2013a). Until development of the policy, Council mechanically opened the entrance four times in the preceding 22 years. This was primarily in response to requests from property owners affected by inundation of low-lying pasture and landscaped gardens, but also from residents concerned about water quality, vegetation dieback, bank destabilisation, reduced aesthetics and odour (Gadd, 2000; NSC, 2013a).

There is no entrance management policy for Swimming Creek and it is typically managed in its natural state. However, an emergency opening of the entrance was undertaken in early 2018 to mitigate water quality impacts in the creek as a result of a burst sewer pipeline. Placement of rubble and rocks at the entrance has occurred in an attempt to minimise erosion of a beach access track during entrance opening events, however this had limited success (Plate 10). When open, the entrance of Swimming Creek migrates across the beach and can scour across the toe of the frontal dune system (Umwelt, 2012). historically Council received complaints from the community regarding the smell and appearance of water quality in Swimming Creek.

Plate 10: Erosion control at Swimming Creek entrance (September 2018)

The entrance to Oyster Creek is closed for long periods resulting in a poorly flushed ICOLL (DECC NPWS, 2008). Historically, large storm surges in the 1960s resulted in erosion of the frontal dune such that the entrance almost broke through to the swales behind (B. Sharmann, pers. comm. *In* DECC NPWS, 2008). Given its location and the immediate surrounding National Park, State Rail and DPE – Crown Land, Council receives limited community feedback about the management of this system. The entrance is managed by NPWS under the *National Parks and Wildlife Act 1974*. To date there has been no need for any mechanical interference with the entrance which operates in its natural state.

Mechanical opening of an entrance to any ICOLL requires a licence under the *Crown Land Management Act 2016* and approval under the FM Act.

2.3.4 Climate change impacts

Threats from a changing climate and warming oceans are broad ranging, however, key threats to the study area have been identified (BMT WBM, 2006; Umwelt, 2012; Climate Risk, 2010a; BMT WBM, 2017) including:

- Sea level rise resulting in:
    - Coastal inundation, primarily an increase in ‘wet areas’ in the Nambucca River estuary, i.e. low-lying areas along Wellington Drive, Bellwood Park and in the lee of the breakwall (i.e. the caravan park).
    - Increased tidal propagation into Nambucca River estuary resulting in changing tidal velocities, storm tide inundation, changed geomorphology (shoaling, bank stability and erosion) and migration of estuarine vegetation communities (saltmarsh in particular).
    - Increased salinity in the upper estuary reaches and subsequent impacts to vegetation communities and distribution of fauna species.
    - Aquifer salinity.
    - Increased coastal erosion and recession.
- A shift towards dominant El Nino conditions and therefore a more southerly wave climate and enhanced longshore drift.
- Increased storminess from tropical cyclones and resultant effects e.g. stronger winds and larger storm surges and a greater flood risk.

- Increased ocean acidification.
- Climate and sea temperature rise resulting in physical, vegetation and wildlife disturbances.
- Inadequate zoning and planning for medium and long-term coastal risks.
- Barriers to migration of vegetation communities with sea level rise (particularly saltmarsh communities).
- Decreased winter runoff, increased average warming, extreme temperatures and changing rainfall leading to decline in potable water quantity and quality, reduced environmental flows, increased bushfire risk, degradation of riparian vegetation and expansion of invasive species.
- Impacts to urban and recreational assets and infrastructure from tidal inundation and extreme weather events (e.g. breaching of protection structures, inundation of estuary access infrastructure, roads, housing, stormwater mains, sewer mains, playgrounds etc.).
- Reduced tourism.
- Council liability associated with existing approvals and legal issues associated with current and future development.
- Potential impacts to future urban release areas including bushfire, flooding, tidal inundation and isolation.

A detailed assessment of risk from coastal hazards for the 2050 and 2100 planning periods was undertaken for the coastal zone within the certified CZMP (Umwelt, 2012) including consideration of beach erosion, long term recession, coastal inundation, geotechnical instability, migration of creek and river entrances and stormwater discharges.

Hazard zones have been established for immediate, 2050 and 2100 planning periods and a risk assessment undertaken on threats to assets, amenity areas, facilities, coastal protection and community infrastructure and private property. Potential risks to assets and infrastructure identified from future coastal erosion and recession hazards were documented in SMEC (2009). Potential risks to assets and infrastructure identified from future coastal erosion and recession hazards are also identified in SMEC (2009).

Mapping of coastal inundation risk for 2050 has not been undertaken, however 2100 mapping can be used as a conservative risk estimate for 2050 hazards.

2.3.5 Estuarine bank erosion

Bank instability and erosion is a key threat within the estuaries and contributes to loss of land, estuarine vegetation and riparian habitat loss, increased sedimentation and water quality issues. The processes leading to bank erosion can be attributed to a range of influences, some of which occur naturally, but are often exacerbated by factors such as land clearing, cattle access, boat wake or inappropriate foreshore structures. The bank condition assessment undertaken as part of Stage 2 of the CMP (Hydrosphere Consulting 2020b) indicated that whilst banks in Newee Creek, Blackbutt Creek, Tilly Willy Creek and the upper reaches of Warrell Creek were generally in relatively good condition, a significant portion of banks within the remaining estuary areas were experiencing moderate to high levels of instability (Figure 5). North Arm was determined to be the most unstable reach with the highest overall levels of bank instability. Taylors Arm, Deep Creek, Lower Warrell Creek and the Lower Nambucca estuary also showed significant levels of bank instability (Hydrosphere Consulting, 2020b).

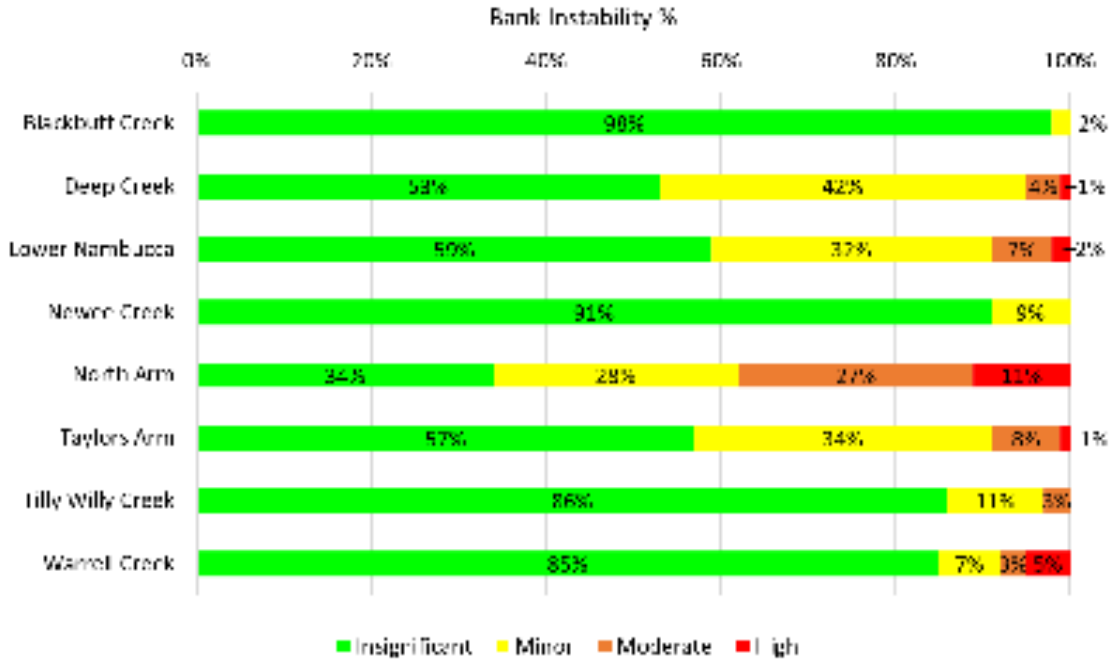


Figure 5: Bank instability extent across the study area

Plate 11: Left: Unstable unconsolidated sand banks in Warrell Creek (July 2018); Right: Severe bank instability and undercutting on the South Arm, upstream of Bowraville (July 2018)

Numerous bank rehabilitation measures have been implemented throughout the Nambucca River and Warrell Creek estuaries, primarily focusing on the protection of reaches in good condition and rehabilitation in slightly degraded areas with a high likelihood of return to good condition, as well as rehabilitation of strategic reaches requiring reinforcement (BMT WBM, 2008). Works include control of stock access, weed control, revegetation with native species and bank protection works (e.g. retard structures, pin groynes, engineering log jams, rock chute, rock revetment and bank battering, rock toe protection). Numerous upper catchment bank rehabilitation works have recently been undertaken or are planned for future execution by Landcare in accordance with River Reach Plans.

2.3.6 Riparian vegetation and weed management

The main stressors to riparian condition in the study area are invasive weeds, livestock access and past riparian vegetation clearing resulting in reduced riparian continuity and fragmentation (GECO Environmental, 2005).

The bank condition assessment undertaken as part of Stage 2 of the CMP also assessed riparian vegetation condition (Figure 6). Blackbutt Creek, Newee Creek and Warrell Creek were assessed as having the highest proportion of riparian vegetation in good condition while North Arm, Taylors Arm and Tilly Willy Creek had the highest proportions of poor riparian vegetation condition. Significant weed coverage was mainly observed in the upper parts of the systems particularly in Taylors Arm and North Arm. A high occurrence of Camphor Laurel (*Cinnamomum camphora*) was observed in the upper estuaries, Cassia (*Senna* spp.) was prevalent in the mid to lower estuary and Lantana (*Lantana camara*) was present throughout. These results are consistent with previous mapping of riparian condition by Mika *et al.* (2018) and GECO Environmental (2005) which identified the poorest riparian condition in North Arm followed by Taylors Arm and the Nambucca River.

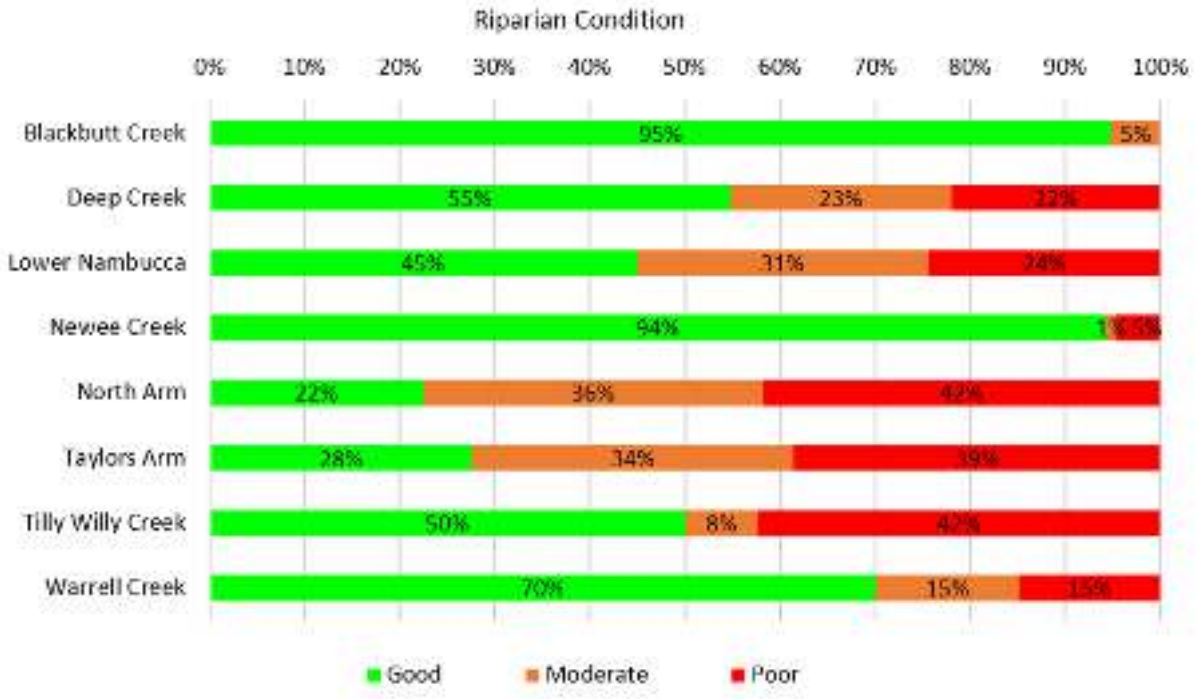


Figure 6: Riparian condition extent across the study area

The influence of past vegetation clearing and physical stressors such as trampling and grazing were noted to be affecting recruitment of native riparian vegetation (Mika *et al*., 2018). Stock access was specifically an issue identified in the upper Nambucca River estuary sites, on Taylors Arm and Newee Creek (Mika *et al*., 2018). Stock impacts have previously been identified impacting on mangroves in the North Arm and affecting saltmarsh areas along the main arm of the Nambucca River and south of Watts Creek. Inappropriate riparian clearing has also been observed in the rural residential reaches of Warrell Creek and in road reserves downstream of the Macksville Pacific Highway bridge (BMT WBM, 2006).

Many landholders have adopted strategies for improving riparian vegetation either through direct planting efforts or changed management approaches but wide-scale restoration practices are hampered by funding and labour resources, complex approval processes, difficulties associated with fencing on river banks, introduced species outcompeting natives during regeneration efforts and the impact of increasing boat traffic on existing vegetation (GECO Environmental, 2005). Riparian vegetation management efforts have typically focussed on protection and restoration of high value reaches in good condition, as appropriate from a biodiversity perspective.


Plate 12: Left: Parrots Feather and Hymenachne in the Nambucca River at East Bowraville (July 2018); Right: Riparian revegetation on Stuart Island

Source: NSC (2018)

2.3.7 Threats to biodiversity

Key threats to biodiversity in the estuaries and coastal zone are discussed in BMT WBM (2006), Umwelt (2012) and NSC (2018) as follows:

- Loss of habitat through extensive riparian and adjacent habitat clearing (MEMA TARA regional priority threat, BMT WBM (2017), modification and fragmentation including clearing on private land (e.g. for forestry and agriculture) and foreshores, clearing of understorey, loss of nest trees and historic dredging and reclamation.
- Removal of aquatic (e.g. dead wood) and reef habitat.
- Inconsistencies between Council's planning framework and mapping of protected habitats (e.g. coastal wetlands and Endangered Ecological Communities (EECs) including swamp oak floodplain forest, swamp sclerophyll forest and freshwater wetlands). It is desirable that the Nambucca LEP and DCP fully reflect the conservation status of these protected communities.
- Predation and invasion by introduced animals (e.g. feral cats, Indian mynas (*Acridotheres tristis*), mosquito fish (*Gambusia holbrooki*), cane toads (*Rhinella marina*), dogs and foxes).
- Introduced plants (MEMA TARA regional priority threat, BMT WBM (2017) (e.g. Bitou Bush).
- Soil disturbance (uncontrolled stock access / erosion/ nutrient and pathogen introduction).
- Overgrazing resulting in reduction in groundcover, enabling erosion and compaction of soil.
- Foreshore development (MEMA TARA regional priority threat, BMT WBM (2017), urban and industrial development and inadequate planning controls.
- A lack of knowledge/ mapping of the ecosystems present in urban creeks and drains (for example, Tilly Willy Creek and Bellwood Creek.
- Reduction of food resources to higher order predators (e.g. marine mammals and birds of prey).
- Unrestricted pedestrian access in sensitive habitats such as dunes and riparian zones.
- Hydrological stress and pesticide spray drift from horticultural activities, in particular, blueberry growing and spraying in the Deep Creek catchment.
- Dumping of rubbish and green waste.

- Illegal plant collection (e.g. of epiphytes).
- Illegal removal/vandalism of coastal vegetation (e.g. to preserve private property views).
- Fire/ altered and inappropriate fire regimes/ frequent burning (particularly Swamp Oak wetlands, Littoral rainforest and Twining Glycine (*Glycine clandestine*)).
- Barriers to migration of estuarine communities (particularly salt marsh) with sea level rise.
- Marine fauna entanglements (e.g. by discarded fishing nets, fishing line, litter etc.).
- Marine fauna boat strike.

2.3.8 Water quality

Water quality is one of the prime estuarine "health" indicators and a key value to the community. Many of the key economic industries in the local area are impacted by poor water quality including tourism, aquaculture (oyster production) and commercial fishing. Many community members are concerned about ongoing degradation of water quality from both point and diffuse sources.

Results from a comprehensive water quality monitoring program over the 2016/17 period is provided in the Nambucca EcoHealth Project 2016/18 (Mika *et al.*, 2018). Sampling was undertaken in the Nambucca River and Deep Creek estuaries. EcoHealth monitoring results (Mika *et al.*, 2018) indicated that overall, water quality in the Nambucca catchments is of poor quality (D grade). Specifically, water quality was poorest in Newee Creek estuary and Taylors Arm estuary, both receiving a grade of F (very poor) due to concentrations of nutrients several times the DPE trigger thresholds. The Nambucca River, Deep Creek and Warrell Creek estuaries all reported poor water quality (D, D and D+ grades respectively).

The following causes of poor water quality have been identified.

- Sewage effluent and on-site wastewater management (MEMA TARA regional priority threat, BMT WBM (2017). Council has implemented numerous management actions to reduce the impact of wastewater systems on waterways including reduced wastewater discharge to waterways, monitoring systems to reduce incident response times and prevent overflows and pump station spills, implementation of NVC *On-site Sewage Management Plan* (NSC, 2013c) and ongoing upgrades to the sewerage network. Potential remaining issues include:
    - Overflows from manholes, sewers, pumping stations and sewage treatment plants (STPs) due to a variety of circumstances (e.g. root intrusion, human error, infrastructure damage, illegal connections of stormwater to sewer, poor maintenance/ aging assets, infiltration, power outages and mechanical failures). Each STP has a Pollution Incident Response Management Plan to address such incidents.
    - Community perception of impacts to fisheries and aquaculture from discharge of treated effluent from Macksville STP to the Nambucca River (which occurs via diffuser on the riverbed). In particular, East Street drain outlet in Macksville has been identified as a source of poor water contamination contributing to oyster harvest zone closures.
    - Whilst effluent from Bowraville STP is beneficially reused for irrigation, excess water can be discharged to the Nambucca River. Council is in the process of upgrading the treatment process to improve the quality of treated effluent discharged from Bowraville STP.
    - The adequacy of the sand dune exfiltration system at Scotts Head STP adjacent to Warrell Creek is unknown.
    - Frequent complaints of odour and poor water quality and associated community perception that this is caused by Nambucca STP when Deep Creek entrance is closed. The Nambucca STP discharges to swamp forest draining to Deep Creek.

- Other industrial sources which have current Environment Protection Licences regulating pollution of waters include the Nambucca Waste Management Facility and Landfill, aggregate and road construction industries for the Pacific Highway upgrade, sand and gravel extraction industries, a quarry and a concrete casting facility. Past operations (e.g. extractive industry operations in the Nambucca River estuary and at Deep Creek) may have had ongoing environmental impacts on water quality and geomorphology.

Key diffuse sources of water pollution have been identified in previous management plans and studies and include:

- Agricultural diffuse source runoff (MEMA TARA regional priority threat and key state-wide threat, BMT WBM (2017) including bank erosion, insufficient riparian buffering and banks directly impacted by stock access and grazing (BMT WBM, 2006). Unsealed (dirt) roads have also been identified as a major source of sediment to waterways with a recent study of unsealed roads in Yarriabini National Park estimating average sediment delivery of 3.4 tonnes per hectare for a 1 in 10 year event (Alluvium, 2020).
- Urban stormwater (MEMA TARA regional priority threat and key state-wide threat, BMT WBM (2017) discharged from the four major urban centres, lack of Water Sensitive Urban Design (WSUD) strategies and lack of management of the few existing gross pollutant traps (GPTs) within the LGA (Figure 7).
- Sediment laden runoff from steep slopes in the highly erodible Nambucca Beds geology of the upper catchments. Particular concerns include forestry operations and road works in these areas (Eddie, 2018).
- Poor erosion and sediment controls from construction sites resulting in sediment plumes (e.g. in Warrell Creek in 2004) as well as Hyland Park (Gadd, 2000).
- Poor geomorphic condition (i.e. bed instability) of the waterways in the upper catchment as mapped by NCLLS (2014).
- Loss of riparian vegetation and instream macrophytes which otherwise protect banks and can contribute to significant nutrient removal.
- Hydrological modification of wetlands including drainage (MEMA TARA regional priority threat and key state-wide threat, BMT WBM (2017) and installation of levees, floodgates and weirs resulting in export of acidity, metals including iron and aluminium, nutrients and bacterial contamination either by groundwater flow or surface runoff, e.g. from Gumma Gumma Swamp (Tefler and Birch, 2014).
- Damaged and/or inoperable floodgates and lack of understanding of management responsibilities and management regimes for floodgates (Figure 7).
- Urban development resulting in large increases in total suspended solids (TSS), and moderate increases in Total Nitrogen (TN) (based on modelling undertaken by Letcher *et al*. (2007)).
- Pet and wild fauna faeces e.g. within Beer Creek catchment (Telfer and Birch, 2009).
- Pesticide use in horticulture areas (predominantly in the Deep Creek catchment) and in roadside weed management (Hydrosphere Consulting, 2020a).
- Fertiliser use in areas of pasture improved grazing lands within Watts Creek catchment (Telfer and Birch, 2009).
- Amplification of effects of poor flushing. The entrance condition of estuaries can contribute to reduced flushing times and eutrophication. The condition of the entrance of the Nambucca River estuary does not appear to have any significant effect on water quality in the estuary (BMT WBM, 2006) however notable deterioration of water quality in Deep Creek and Swimming Creek is observed during closure of these ICOLLs.

Figure 7: Left: Gross Pollutant Trap at Bellwood Park; Right: damaged floodgate at East Street, Macksville (July 2018)

2.3.9 Hydrology, connectivity and water extraction

Wetland and floodplain modifications have been undertaken in several areas, primarily in the Nambucca River estuary including Gumma Creek, Watt Creek and Congarinni. These modifications include installation of levees, weirs, floodgates, culverts, agricultural and stormwater drains. Most floodplain modifications were installed for flood and inundation protection to increase agricultural productivity. The installation of floodgates and other drainage modifications in the study area have historically resulted in modified freshwater and tidal flows, reduced hydraulic connectivity and fish passage, drainage and lowering of the ground surface elevation, subsequent soil salinity and acidity changes and changes to vegetation regimes (and subsequent biodiversity impacts) such as the localised expansion of *Casuarina glauca* into areas that previously supported saltmarsh or mangroves (BMT WBM, 2006).

The potential for increased hydrological stress in the catchment due to increased water extraction associated with expanding horticulture in the region has been raised as a key community concern. The Deep Creek catchment has been identified as a key area of concern associated with expanding horticulture in this area. There is currently a lack of information regarding local extraction rates and impacts on waterways however hydrological stress from over-extraction may result in reduced streamflow, stagnation, stratification, increased temperatures and other water quality impacts, reduced aquifer recharge and impacts to groundwater dependent ecosystems and threatened species.

2.3.10 Governance, education and compliance

Many organisations are involved in the management of the study area from the Federal to the local level and including private landholders, volunteers and community groups (refer Section 1.4). The study area comprises a complex mix of land ownership and management arrangements including national parks and nature reserves, road and rail reserves, Crown land reserves and submerged land, Council owned and Council managed land and private freehold land. Effective management of the coastal zone depends on a high degree of collaboration and support amongst these land managers.

Some sectors of the community have a high level of understanding and engagement regarding the key threats to estuary and coastal values, however, there remains a large portion of the general community who are uninformed, mis-informed and/or disengaged as to the sensitivities of the study area. This presents some risk that is exacerbated by high tourism/visitation rates, and limited resources for community education and engagement.

The study area experiences a lack of community compliance with regulations (impacted by awareness/education/engagement as noted above). Council and state government regulators (e.g. DPI Fisheries, TfNSW – Maritime and NPWS) have limited resources (i.e. officers and funding) to optimally manage the study area. Key examples of non-compliance include unauthorised foreshore structures, breach of development consent conditions, camping/vegetation damage in dunes, excessive/inappropriate boating speed/usage, illegal fishing, littering/dumping, dogs off-leash/ in prohibited area and unauthorised vehicles on beaches.

The development and implementation of this CMP improves community awareness and engagement through a significant level of community and stakeholder consultation, and the identification of specific actions regarding ongoing education, engagement and participation in coastal management.

Preparation and implementation of a CMP is also subject to a degree of risk associated with:

- Election promises.
- Media profiles.
- Political support for climate change mitigation and adaptation.
- Political support which limit actions involved with certain activities, e.g. development, tourism, certain recreational activities (e.g. boating), fishing etc.
- Ad hoc release of state and federal funding associated with political cycles and the integration of that funding with more frequent local government funding cycles.
- Ideological beliefs of community members.
- The need for land managers to consider the desire of the local community whilst also balancing the community expectation of actions that may not be appropriate in the study area. Community understanding of the CMP process and uptake of the key findings and actions can be increased through early engagement.

2.3.11 Influence of projected population growth, demographic changes and future use of land within the study area

The Nambucca Valley LGA has experienced substantial population growth over time, with 2016 levels about 8% above 2001 levels, equivalent to about 1,500 extra residents. However, this rate of growth is lower than the rates of growth for Sydney (+21%) and regional NSW (+12%) over the same period (NSW Government, 2018). Population within the Nambucca Valley LGA is projected to increase by 0.2% (50 additional people) per year from 2016 to 2036 with a trend towards an ageing population into the future (NVC, 2020) while visitor numbers also demonstrate an upward trend, with 10% more visitors in 2016 compared to 2015 (Destination NSW, 2016).

The number of development applications received by Council in 2021 was 415 by October 2021 (three quarters of the year). There has been a significant increase in the number of applications across the valley in recent years which is anticipated to influence local demographics in future. The number and value of applications determined in 2018, 2019 and 2020 was 339 with a value of $60 million, 345 with a value of $80 million and 442 with a value of $120 million respectively. There are a number of factors that may be contributing to the increase including an exodus from metropolitan areas due to the global pandemic, availability of residential land supply and affordable land prices. The 2021 Census will provide a greater understanding of these changes. Population increases will place more pressure on the local coastal systems and demand for infrastructure in these areas.

Seasonal tourism influx during holiday periods is considerable with the total number of visitors to the Nambucca Valley LGA reported as 228,000 per year (4-year average as at June 2017) (Clare Ellis

Consulting, 2018). This represents a greater than 10-fold increase in the local resident population of the LGA, with highest tourist numbers concentrated in coastal towns of Scotts Head, Nambucca Heads and Valla Beach. Tourism pressures can impact coastal habitats through increased recreational use including use of off-road vehicles, visual impacts and access issues associated with overcrowding. These pressures are likely to increase with population and tourism growth.

Future urban growth areas from the North Coast Regional Plan 2036 (NSW Government, 2017) include housing at Macksville, Valla and Scotts Head, employment lands at Macksville and Valla, and to direct future growth away from important farmland and towards Macksville, Nambucca, Bowraville, Valla and Scotts Head (i.e. within the coastal zone). The Valla Urban Growth Area includes over 70 ha of sensitive land zoned as Environmental Management under the LEP (refer Figure 11, Section 6).

2.3.12 High Consequence Low Probability Events

It is a mandatory requirement for a CMP to address high consequence, low probability events that may impact the coastal area under consideration.

In this CMP a tsunami threat is assumed to have a low potential to impact the coastline, however Council has not undertaken any modelling to support this assumption. Based on observations and modelled coastal hazard areas, the most at-risk assets would include public reserves, facilities and infrastructure fronting beaches and the immediate coastline. Other less obvious at-risk locations potentially include:

- Urban development and infrastructure beyond the dune system in the vicinity of Swimming Creek and Swimming Creek Road, Nambucca Heads including the Caravan Park.
- Urban development and infrastructure beyond the dune system in the vicinity of Banksia Crescent, Scotts Head.
- The Caravan Park, Bowling Club and local infrastructure beyond the dune system in Scotts Head.
- The Caravan Park and infrastructure at the V-wall Nambucca Heads.
- Urban development and infrastructure located in the inner harbour area including Wellington Drive, Gordon Park and Bellwood.

The state government and Local Emergency Management Committee have developed Tsunami Emergency Management Plans. Should the unlikely event of a tsunami be identified it is likely there would be sufficient time to evacuate and warn the community of the threat.

2.4 Risk assessment

Following the identification of the key issues within the study area, a first - pass (or preliminary) risk assessment and gap analysis was completed as part of the *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a). This assessment prioritised risks and identified those that needed to be further investigated in subsequent stages of the CMP. Following detailed *Bank Condition Assessment* completed as part of Stage 2, the risk assessment was refined and updated with new information and included in the *Stage 2 Vulnerabilities and Opportunities Study* (Hydrosphere Consulting, 2020b).

Threats to the Nambucca CMP study area and corresponding risk levels identified by the risk assessment are summarised in Table 3 as current and future risk (20 year, 50 year and 100 year). The threats were reviewed with respect to the coastal management area extents and their objectives. This review deemed the existing *CM SEPP* mapping to be suitable at present for addressing the high priority issues for the Nambucca coastline and estuaries.

Table 3: Risk assessment results for Nambucca coastline and estuaries

Issue category	ID	Threats (use, activity or stressor)	Current Risk	20-year Risk	50-year Risk	100-year Risk
Coastal hazards	T1	Storm surge and storm bite coastal erosion	Moderate	Moderate	High	High
	T2	Coastal long-term shoreline recession	High	High	High	High
	T3	Increased risk of slope instability/ landslip	High	High	High	High
	T4	Coastal inundation including wave propagation into estuaries	Moderate	Moderate	High	High
	T5	Tidal inundation	High	High	High	High
	T6	Disrepair of, or inadequate design of coastal protection structures and infrastructure	High	High	High	High
	T7	Stormwater erosion in the coastal zone	Moderate	Moderate	Moderate	High
Climate change impacts	T8	Increased storminess	Moderate	Moderate	High	High
	T9	Increased salinity in the upper estuary	Low	Moderate	High	High
	T10	Average warming and extreme temperatures	Low	Moderate	High	High
	T11	Anthropogenic barriers to migration of vegetation communities with sea level rise	Moderate	Moderate	High	High
Estuarine bank erosion	T12	Powered vessels and towing	Moderate	Moderate	Moderate	High
	T13	Wind waves	Moderate	Moderate	Moderate	High
	T14	Historic clearing of riparian vegetation and adjacent habitat	High	High	High	High
	T15	Uncontrolled stock access to and grazing within the riparian zone	High	High	High	High
	T16	Past gravel extraction contributing to ongoing poor geomorphic condition	Moderate	Moderate	Moderate	Moderate
	T17	Flooding	High	High	High	High
	T18	Accumulation of flood debris impacting bank stability	Moderate	Moderate	Moderate	High
Riparian vegetation and weed management	T19	Dominance of invasive weeds	High	High	High	High
	T16	Uncontrolled stock access to the riparian zone	High	High	High	High
	T15	Historic clearing of riparian vegetation and adjacent habitat	High	High	High	High
	T20	Community concern about pesticide use (e.g. catchments and roadside weed spraying)	Low	Low	Low	Low
Public use and access	T21	Not enough public recreational access and facilities	Moderate	Moderate	Moderate	Moderate
	T22	Poor condition and inadequate foreshore access and parking during summer peak use	Low	Moderate	Moderate	High

Issue category	ID	Threats (use, activity or stressor)	Current Risk	20-year Risk	50-year Risk	100-year Risk
	T23	No linkage of coastal pathways	Low	Low	Low	Low
	T24	Not enough mobility infrastructure	Low	Moderate	Moderate	Moderate
	T25	Insufficient maintenance of access infrastructure to minimise safety risks	Low	Moderate	Moderate	Moderate
	T26	Insufficient, or inappropriate public education and signage (land-based signage)	Moderate	Moderate	Moderate	Moderate
	T27	Litter and marine debris	Moderate	Moderate	Moderate	High
	T28	Conflict of use between off-leash dogs (at both on-leash and off-leash areas)	Low	Low	Moderate	Moderate
	T29	4WD/ motorbikes on beaches (ambiguity of permitted areas; lack of enforcement)	Moderate	Moderate	Moderate	High
	T30	Illegal camping in coastal and foreshore areas	Moderate	Moderate	Moderate	High
	T31	Conflicts of use between cyclists and other users of footpaths and boardwalks	Low	Low	Moderate	Moderate
	T32	Use of recreational drones disturbing amenity and birdlife	Minimal	Minimal	Low	Moderate
	T33	Trampling and unfenced access to coastal vegetation	Low	Low	Moderate	Moderate
	T34	Public safety risks from faecal contamination of waterways	Moderate	Moderate	Moderate	High
	T35	Public safety risks from marine life (e.g. shark bite, stingers)	Moderate	Moderate	Moderate	Moderate
	T36	Lack of exclusion areas and regulatory restrictions (speed and usage controls)	Moderate	Moderate	High	High
	T37	Irresponsible usage (e.g. speeding) and lack of enforcement	Moderate	Moderate	High	High
	T38	Lack of understanding habitat sensitivities and locations; impacts to sensitive habitats	Moderate	Moderate	High	High
	T39	Marine noise pollution	Low	Low	Low	Low
Entrance management, shoaling and estuary hydraulics	T40	Siltation affecting navigation, water quality (reduced flushing) and aesthetics	High	High	High	High
	T41	Shoaling of marine sands affecting navigation and marine safety	High	High	High	High
	T42	Artificial entrance management (risk of unintended impacts on water quality, salinity regimes, vegetation etc.)	Moderate	Moderate	Moderate	Moderate
	T43	Closure of ICOLLs (likely to decrease in frequency with SLR)	Moderate	Moderate	Low	Minimal
	T44	Dangerous currents	High	High	High	High

Issue category	ID	Threats (use, activity or stressor)	Current Risk	20-year Risk	50-year Risk	100-year Risk
Threats to biodiversity	T45	Removal, fragmentation and degradation of riparian and adjacent habitat	High	High	High	High
	T46	Removal of instream (e.g. dead wood) and reef habitat	High	High	High	High
	T47	Predation and invasion by introduced animals and exotic plants	High	High	High	High
	T48	Soil disturbance through uncontrolled stock access/ erosion/ nutrient and pathogen introduction	High	High	High	High
	T49	Overgrazing by stock resulting in reduction in groundcover, enabling erosion and compaction of soil	High	High	High	High
	T50	Development including catchment, foreshore, reducing land for habitat	Moderate	High	High	High
	T51	Unrestricted pedestrian access in sensitive vegetation communities (e.g. dunes)	Moderate	Moderate	Moderate	Moderate
	T52	Pesticide spray drift	Low	Low	Low	Low
	T53	Dumping of rubbish and green waste	Moderate	Moderate	Moderate	Moderate
	T54	Illegal plant collection	Low	Low	Low	Low
	T55	Fire/ altered and inappropriate fire regimes/ frequent burning	High	High	High	High
	T56	Inconsistencies in planning framework	Low	Low	Low	Low
Recreational and commercial fishing and aquaculture	T57	Commercial ocean trawl and ocean haul	Moderate	Moderate	Moderate	Moderate
	T58	Commercial trap and line	Moderate	Moderate	Moderate	Moderate
	T59	Estuary general fishing	Moderate	Moderate	Moderate	Moderate
	T61	Recreational boat and shore-based line and trap fishing	Moderate	Moderate	Moderate	Moderate
	T62	Recreational hand gathering	Low	Low	Low	Low
	T63	Oyster aquaculture	Low	Low	Low	Low
	T64	Marine debris, including monofilament fishing line, bait bags and microplastics	Moderate	Moderate	Moderate	High

Issue category	ID	Threats (use, activity or stressor)	Current Risk	20-year Risk	50-year Risk	100-year Risk
Water quality	T65	Agricultural diffuse source runoff (runoff from large areas of agricultural land and dirt roads with no specific point source)	High	High	High	High
	T66	Urban stormwater pollution and lack of maintenance of existing controls	High	High	High	High
	T67	Sewer surcharge and STP performance and overflows	High	High	High	High
	T68	On-site wastewater management (e.g. failing septic systems)	Moderate	Moderate	Moderate	Moderate
	T69	Pet and wild fauna faeces	Low	Low	Low	Low
	T70	Logging on steep, highly erodible soils (i.e. of the Nambucca Beds)	Moderate	Moderate	Moderate	Moderate
	T71	Urban development	Moderate	Moderate	High	High
	T72	Construction industries	Moderate	Moderate	High	High
	T73	Other licensed industrial sources (e.g. sand and gravel extraction, quarries	Moderate	Moderate	High	High
	T74	Pesticide and fertilizer runoff	Moderate	Moderate	High	High
	T75	Poor geomorphic condition (i.e. bed instability)	Moderate	Moderate	Moderate	Moderate
	T76	ICOLL poor water quality	Moderate	Moderate	Low	Minimal
	T77	Drainage/exposure of acid sulfate soils	High	High	High	High
Hydrology, connectivity and water extraction	T78	Water extraction, likely to increase with expansion of the horticultural industry	Moderate	High	High	High
	T79	Hydrological modifications of wetlands and floodplain drainage works	Moderate	Moderate	High	High
	T80	Floodgate design, operation and maintenance	Moderate	Moderate	High	High
Governance, education and compliance	T81	Insufficient governance	Moderate	Moderate	Moderate	Moderate
	T82	Lack of awareness, education and engagement	Low	Low	Low	Low
	T83	Compliance	Low	Low	Low	Low
Political risk	T84	Political risk (e.g. ad hoc release of state and federal funding associated with political cycles, ideological beliefs, and differing community priorities and expectations etc.)	Moderate	Moderate	Moderate	Moderate
Cultural Heritage	T85	Threats to Aboriginal cultural practices and heritage	High	High	High	High
	T86	Threats to European cultural heritage	Moderate	Moderate	Moderate	Moderate

Threats were prioritised to assist in determining the importance of management action as part of subsequent stages of the CMP. High priority threats are those presenting a high present-day risk to values and uses of the Nambucca coastline and estuaries. The high priority threats relevant to each coastal management area are shown in Table 4.

Table 4: High priority threats identified by the risk assessment (CWLRA – Coastal Wetlands Littoral Rainforest Area, CUA – Coastal Use Area and CEA – Coastal Environment Area)

Issue Category	ID	High priority threats	CWLRA	CUA	CEA
Coastal hazards	T1	Coastal long-term shoreline recession		✓	✓
	T3	Increased risk of slope instability/ landslip		✓	✓
	T5	Tidal inundation	✓	✓	✓
	T6	Disrepair of, or inadequate design of coastal protection structures and infrastructure		✓	✓
Estuarine bank erosion	T12	Flooding	✓	✓	✓
	T15	Historic clearing of riparian vegetation and adjacent habitat	✓	✓	✓
	T16	Uncontrolled stock access to and grazing within the riparian zone	✓	✓	✓
Riparian vegetation and weed management	T19	Dominance of invasive weeds	✓	✓	✓
	T16	Uncontrolled stock access to and grazing within the riparian zone	✓	✓	✓
	T15	Historic clearing of riparian vegetation and adjacent habitat	✓	✓	✓
Entrance management, shoaling and estuary hydraulics	T40	Siltation affecting navigation, water quality (reduced flushing) and aesthetics			✓
	T41	Shoaling of marine sands affecting navigation and marine safety			✓
	T44	Dangerous currents			✓
Threats to biodiversity	T45	Removal, fragmentation and degradation of riparian and adjacent habitat	✓	✓	✓
	T46	Removal of instream (e.g. dead wood) and reef habitat	✓		✓
	T47	Predation and invasion by introduced animals and exotic plants	✓	✓	✓
	T49	Overgrazing by stock resulting in reduction in groundcover, enabling erosion and compaction of soil	✓	✓	✓
	T55	Fire/ altered and inappropriate fire regimes/ frequent burning	✓	✓	✓
Water Quality	T65	Agricultural diffuse source runoff (runoff from large areas of agricultural land and dirt roads with no specific point source)	✓	✓	✓
	T66	Urban stormwater pollution and lack of maintenance of existing controls	✓	✓	✓
	T67	Sewer surcharge and STP performance and overflows	✓	✓	✓
	T77	Drainage/exposure of acid sulfate soils		✓	✓
Cultural Heritage	T85	Threats to Aboriginal cultural practices and heritage	✓	✓	✓

3. COASTAL MANAGEMENT ACTIONS

3.1 Assessment of coastal management options

Potential management options were identified to address the identified risks and threats and documented in the *Stage 2 Vulnerabilities and Opportunities Study* (Hydrosphere Consulting, 2020b). The assessment incorporated management solutions proposed and/or implemented as part of previous studies and plans of management as well as additional actions to address key pressures and threats identified in the Scoping Study. A total of 285 individual actions were assessed in terms of current status of actions, relevance to the study area and likelihood of success in addressing the key threats. The preliminary assessment of management options identified 55 options for further consideration and assessment as part of the *Stage 3 Options Assessment* (Hydrosphere Consulting, 2020c).

The *Stage 3 Options Assessment* assessed and prioritised the short-listed coastal management options that address issues, reduce exposure to coastal hazards and take advantage of opportunities, consistent with provisions in Section 14 and 15 of the CM Act. This was achieved through examining the feasibility, viability and acceptability of coastal management options and considering the following factors:

- Promoting and achieving the objects of the CM Act.
- Meeting the coastal management objectives within the coastal management areas.
- The environmental, social, cultural and economic context and potential impacts.
- The feasibility of coastal management actions determined by effectiveness, technical viability, ecological sustainability and legal/approval risk of the management approach.
- Viability of implementation determined by anticipated cost, availability of resources, time and commitment and anticipated benefits.
- The acceptability of the risks to Council, key stakeholders such as public authorities and the community, including willingness to contribute to the upfront and ongoing maintenance costs.

Results of the Stage 3 multi-criteria assessment were presented as ranked management actions recommended for implementation as part of the Nambucca CMP.

Plate 13: Left - Bank erosion mitigation; Right – Coastal viewing platform

3.2 Development of coastal zone management strategies and actions

Actions have been developed from the short-listed options and grouped into eleven key strategies for implementation:

1. Management and Governance (MG)
2. Education and Consultation (EC)
3. Local Planning and Development Controls (PD)
4. Manage Risks Associated with Coastal Processes (CP)
5. Improve Water Quality (WQ)
6. Manage Bank Erosion, Protect and Rehabilitate Riparian Zones (BER)
7. Improve Biodiversity Values (BV)
8. Protect Cultural Heritage Values (CH)
9. Facilitate Safe and Sustainable Recreational Use (RU)
10. Actions to be Undertaken by Public Authorities (PA)
11. Monitoring, Evaluation and Reporting (MER) Program

The strategies consist of a combination of studies, investigations and on-ground works within the coastal zone. Some actions require additional research or assessment prior to implementation of on-ground works. This is to ensure the appropriate effort, funding and geographical focus of on-ground works is undertaken.

Some actions will require approval from other agencies such as licences or authorisations for work on Crown land or permits under the FM Act. Authorisation may also be required under the *Native Title Act 1993* or the *Aboriginal Land Rights Act 1983*. It is important that appropriate approval pathways are determined prior to progressing with on ground implementation of actions.

Management strategies and actions have been developed for a ten-year period. This CMP and the progress of the management actions should be reviewed to ensure the actions remain relevant and the implementation of the plan is being achieved.

The recommended management actions have been described in terms of:

- Action ID – code for each action for easy reference.
- Priority – each action has been assigned a priority according to importance and urgency for implementation (Table 5). The ranking is based on multi-criteria analysis completed as part of *Stage 3 Options Assessment* (Hydrosphere Consulting, 2020c).

Table 5: Priority Ranking

Priority	Description
Fundamental (F)	Actions that are critical for successful implementation of the CMP and important for long-term effective management
High (H)	Actions of high importance in addressing key threats and issues
Medium (M)	Actions considered of medium importance in addressing threats and issues
Low (L)	Actions considered of low importance in addressing threats and issues

- Threats addressed – management issue or threat addressed by the action.
- Description – an outline of the scope of works required.
- Lead Organisation – responsible for implementation of the action.
- Support Organisation(s) - may be required and/or requested to assist in implementation of the action, either through on-ground works, in-kind contributions or as a potential funding or information source. The Business Plan (Section 3.6) provides a breakdown of any proposed cost-sharing arrangements between Lead and Support Organisation(s) where applicable.
- Indicative Cost – an estimate of total costs for implementation over the ten-year life of the plan is provided (2020$). Where actions require Council staff resources, actual costs have only been applied where it is expected that implementation will exceed current resourcing levels and additional funding is required. The Business Plan (Section 3.6) provides a breakdown of action costs including capital, operational/ maintenance costs. Cost estimates cover the tasks listed in the actions (including preliminary investigations, environmental assessment, approvals and implementation) unless otherwise stated. Cost estimates provided in the action descriptions are preliminary only and are based on the best available information.
- Potential Funding Source – the CMP actions are expected to be funded through Council and state government contributions, monetary grants and in-kind contributions. Identification of grants and successful application is an important component of this CMP. A summary of potentially relevant and available grant schemes is given in Section 3.6. It is important to note that many grants and funding sources are only available up to a limited budget and as such, the available grants are changing from year to year. It will be necessary to keep abreast of current funding availability throughout the implementation of the CMP. In most cases it is expected that in-kind contributions will be provided by Council. Collaboration with educational institutions may also provide opportunities for research projects.

  Where actions are implemented through an existing program, additional expenditure and funding have not been included. Similarly, where a study/review is required to determine the appropriate level of expenditure, the cost of the review has been estimated in the action planning. Implementation costs should be confirmed by the results of the review.
- Indicative Timeframe – indicative timeframe for implementation and alignment with Council's Delivery Program (DP). Based on the priorities developed in this CMP, timeframes for management actions have been estimated, pending funding availability. The assumed start date for CMP implementation is 1 July 2022, following Council adoption and certification of the Plan. The CMP has a planning timeframe of ten years therefore the duration of the Plan implementation period is from 1 July 2022 to 30 June 2031. Timing of the delivery of actions should be based on the priorities developed for this CMP but will also depend on the availability of funding.
- Performance targets – performance targets for each action which can be used to measure the level of success. Identified targets incorporate those consistent with Council's CSP and targets specific to each action where applicable.

3.3 Actions to be implemented by Council

The actions to be implemented by NVC for each management strategy are listed in Table 6.

Council's Asset Management Plan and Valuation System holds Council's complete record of assets identified in the coastal zone. Council's Asset Management Program shall take this CMP into consideration.

Table 6: Management actions to be implemented by Council – costs and timing of these actions are indicative and subject to further investigation, funding availability and Council resources

ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisations	Indicative cost (10 year)	Indicative timeframe	Performance Targets
Management and Governance									
MG1	F	Environmental Levy funding for implementing the CMP	Specific allocation from NVC's Environmental Levy provides funds for implementing the coast and estuary program. Continue as a key funding source. Review adequacy of funding amounts and recommend changes as appropriate.	N/A	NVC	-	No additional cost: Environmental Levy provides approx. $400,000 each year	Ongoing	Review adequacy of funding amounts and recommend changes as appropriate.
MG2	F	NRCEMC to oversee CMP implementation	Continue oversight of CMP by Committee. Ensure adequate representation of all key local stakeholder groups in management of study area. Consider formalising a regular meeting frequency (e.g. quarterly) during CMP implementation and more regularly as needed to discuss implementation milestones, funding and emerging issues etc.	N/A	NVC	NRCECMC	No additional cost (staff time)	Ongoing	Meetings held twice a year (minimum).
MG3	M	Memorandum of understanding (MoU) between NVC and NPWS	Document and agree on roles and responsibilities in areas where there is overlap.	T26, T28, T29, T30, T37, T38	NVC	NPWS	No additional cost (staff time)	Year 1-2	MoU in place by Year 3

ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisations	Indicative cost (10 year)	Indicative timeframe	Performance Targets
Education and Consultation									
EC1	F	NVC Coastline and Estuary Educational Program	Design and implement an integrated Coastline and Estuary Educational Program to educate and promote understanding of the natural attributes of the coastline and estuaries, sensitivities and key issues and encouraging low-impact use/practices to protect key sites. May involve installation/ replacement of signage at key locations, leaflets/flyers, webpage, posters, information days/activities, school programs, educational videos, updates to Councils Webpage information. Target groups include local construction industry (erosion and sediment controls), boating users, agricultural industry, oyster industry, tourists/tourism sector, foreshore Crown land managers (e.g. caravan parks), school groups, general public, residents close to sensitive systems (e.g. swimming creek) etc. Key topics to be included in the program are: a) Cultural heritage education and awareness- education regarding cultural heritage significance of study area (e.g. Signposting to identify and explain areas that have cultural significance, school programs etc.) b) Estuary shoaling education - raise community awareness of coastal/estuary processes to increase the level of understanding of shoaling mechanisms and associated implications as well as the consequences of intervention measures. c) Improve recognition of Crown land areas in the lower estuary, particularly those around existing facilities that may promote greater connectivity and tourist related usage of the area d) Provide information on the ecological, cultural and commercial values of the Nambucca coastline and estuaries and to facilitate changes in behaviour of individuals and groups which affect specific threats, e.g. relating to litter and plastics, illegal dumping, species identification and habitat values (e.g. saltmarsh, mangroves, seagrass). e) Prepare a summary factsheet of CMP actions. f) Develop an education program to connect with beach permit process, 4WD impacts, dog ownership responsibilities. g) Develop a strategy to address known roosting locations of significant local shore birds including temporary fencing and signage, with an aim to avoid potential impacts from dogs and vehicles. h) Publish important technical studies regarding the Nambucca Coastline and Estuary on NVC website to maintain public access to key information. Key documents include *Nambucca River Estuary Management Study* (BMT WBM, 2006); *Nambucca River Estuarine Geomorphology Physical Condition and Mapping* (Geco Environmental, 2005); and *Nambucca Valley River and Catchment Management Study* (Lyall & Macoun Consulting Engineers, 1999) and supporting studies.	This action may be applicable to other threats identified in this CMP	NVC	EES, NRCECMC, EPA, TfNSW	$130,000	Ongoing	Planning and design of program complete by end Year 1. Implementation and education underway Year 2. Many of these actions will be undertaken as a key part of placemaking. As an example the Nambucca River Foreshore Walk will use foreshore signage to educate and promote awareness on cultural values and environmental themes.
EC2	F	Consultation with local Indigenous community	Ongoing consultation with the local indigenous community regarding coastline and estuary values/ indigenous knowledge of ecology, seasonal cycles, identifying threats and issues to be addressed and greater involvement of indigenous community in coastline and estuary management.	T85	NVC	NRCECMC	No additional cost (staff time)	Ongoing	Consultation commenced Year 1. Meetings held twice a year (minimum).

ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisations	Indicative cost (10 year)	Indicative timeframe	Performance Targets
EC3	M	Consultation with NRAR and DPE-Water regarding regulation of water extraction	Consult with NRAR and DPE-Water regarding management of water extraction under the Nambucca Water Sharing Plan (2016). Consultation will aim to highlight the threats and implications of water extraction on estuary health and seek to ensure adequate oversight and enforcement of water sharing plan rules and regulations.	T78	NVC		No additional cost (staff time)	Ongoing	Consultation commenced Year 1
Local Planning and Development Controls									
PD1	M	Review environmental mapping and ensure consistency with NLEP and DCP	Review environmental mapping (e.g. coastal management areas, EECs, marine vegetation). Overlay with NLEP zoning. Consider future likely areas for migration of estuarine vegetation with sea level rise (refer Tidal Inundation Assessment – ME3). Consider provisions of NLEP and DCP to ensure appropriate protection of these sensitive environments, aid community awareness and assist in ease of the development application processes. This review will include a review of the adequacy of buffers to sensitive environments in the DCP 2010.	T1, T2, T3, T4, T5, T11,	NVC	EES, DPI Fisheries	$20,000	Year 2	Review complete end of Year 2
PD2	M	Review coastal hazard planning and development controls	Review Coastal Hazards chapter of the Nambucca DCP as part of next DCP Housekeeping Amendment to ensure it adequately addresses the *Coastal Management Act 2016* and associated guidelines.	T1	NVC	-	No additional cost (staff time)	In line with NVC policy	Review and update existing DCP controls as part of next DCP Housekeeping Amendment
PD3	M	Section 10.7 certificates identify coastal hazard risk	Section 10.7 certificates identify coastal hazard risk for affected properties (2050 and 2100 limits of the Stable Foundation Zone) (ongoing implementation). S10.7 certificates to be updated as required by legislative changes.	T1	NVC		No additional cost (staff time)	Ongoing	All Section 10.7 certificates identify coastal hazard risk
Manage Risks Associated with Coastal Processes									
CP1	M	Maintain and/or upgrade existing coastal protection infrastructure	Continue maintenance/ replacement works listed below and shown on Figure 12 and Figure 13: • South Valla seawall, Valla Beach • Thompson Street seawall, Valla Beach • Main Beach seawall, Nambucca Heads • Shelly Beach seawall, Nambucca Heads • V-wall and associated training walls • Scotts Head seawall Based on results of Coastal Hazard Monitoring Program (MER2), identify where additional works are required and associated costs. Undertake maintenance, redesign/reconstruction as informed by MER2 or as a result of an emergency management response. Feasibility assessment and designs should be explored to replace or improve existing seawalls as their performance deteriorates or they become unsafe for the community. Improvements should be designed to optimise public use and amenity as well as performance as a coastal protection structure. Coastal protection structures encompass all legal structures present to the tidal limit of rivers and creeks in the Nambucca Valley. Existing coastal protection structures are mapped and included as Figure 12 and Figure 13. These structures should be maintained and improved as necessary to protect public assets/ infrastructure and private land. Pursuant with the Coastal Management SEPP, existing coastal protection structures may be maintained and improved under Part V of the *Environmental Planning and Assessment Act 1979*.	T6, T4, T5, T12-T18	NVC	EES, DPE-Crown Lands, MIDO	Unknown – to be informed by MER2	As required	As required by MER2

ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisations	Indicative cost (10 year)	Indicative timeframe	Performance Targets
CP2	M	Review of Deep Creek ICOLL entrance management policy	Review efficacy of the existing Deep Creek entrance management strategy since its implementation in 2012 (e.g. effect on flooding, water quality, Fish health and inundation of EECs such as Swamp Oak forest etc.). Update as appropriate.	T42, T43,	NVC	EES, DPE-Crown land	$20,000	Year 2	Review complete and updated policy adopted by NVC by Year 2
CP3	M	Swimming Creek debris removal	Remove debris from swimming Creek (e.g. concrete, bricks, tyres, timber).	T27, T53, T66,	NVC	-	$20,000	Year 2	Debris removed by Year 2
CP4	M	Periodic beach scraping	Review previous beach scraping works and determine success, design revised beach scraping works and gain pre-emptive approval and funding for beach scraping. Carry out beach scraping works as needed to assist beach recovery after erosion events and informed by the Coastal Hazard Monitoring Strategy (MER2).	T1, T2, T7	NVC	EES, DPE–Crown Land	$250,000 (allowance of $25,000/yr)	Ongoing	Design and pre-approvals complete by Year 1. Beach scraping undertaken as needed.
CP5	M	Dune Management	Coastal weed management and dune stabilisation in co-operation with North Coast Weeds Advisory Committee, Coastcare, Landcare and other community groups. Weed management may include weed removal, assisted bushland regeneration, planting, fencing etc. These activities will be combined with other works including coastal protection works and beach access rationalisation, as necessary.	T19, T47, T51	NVC	EES, DPE–Crown Land, NPWS	$200,000	Ongoing	IP&R reporting annually shows continued work occurring.
CP6	H	Maintenance and upgrade of coastal community infrastructure (beach access, pathways, footbridges etc.)	Maintain and consolidate beach accesses and accesses to sensitive environments such as creeks and wetlands as well as connecting pedestrian paths, coastal lookouts, parking areas, furniture, shelters, landscaping, amenities and other facilities that direct or guide beach users through the sensitive coastal environment. These facilities are important for user safety and also the protection of the local dune, river, creek, wetland systems and coastal vegetation. Pedestrian footbridges provide important community access to the beach and also provide a high use attraction for visitors. Upgrade, maintenance and/ or replacement of pedestrian footbridges and associated access trails is required at: • Valla Beach footbridge • Hyland Park footbridge (in progress) • Black Rock footbridge	T21, T22, T23, T24, T25, T45, T51, T31, T33	NVC	Crown land manager, NPWS	$7,000,000. While a figure has been provided to support this action, it does not represent the full cost of maintenance and upgrade requirements for community infrastructure at risk from coastal processes. The budget provides an allowance to address priority matters over the life of the program (see note 1).	Year 1 -10	Beach accesses, lookout, footbridges, connecting paths and other community facilities at or providing access to local beaches are improved or replaced.

ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisations	Indicative cost (10 year)	Indicative timeframe	Performance Targets
Improve Water Quality									
WQ1	H	On-site Sewage Management (OSSM) Strategy implementation	Continue implementation of NVC's OSSM Plan. Incorporate sites to assess known OSSM problem areas into Water Quality Monitoring Program.	T68	NVC	-	No additional cost (staff time)	Ongoing	As detailed in OSSMs
WQ2	H	Investigate and remove illegal connections of stormwater to sewer	Assess urban residential areas to identify properties with illegal stormwater to sewer connections. These connections can allow large volumes of stormwater to enter the sewage system during high rainfall leading to sewage overflows and pollution events. Smoke testing can be used to quickly identify illegal connections. Development information to educate residents on the issues associated with stormwater inflow to the Reticulated Sewerage Network.	T66, T67, T71	NVC	-	$100,000 for initial investigations. Future implementation cost to be determined.	Year 1	Investigation complete Year 1
WQ3	H	Lower Nambucca Estuary Water Quality Study: Management Strategy and Newee Creek Study remaining site-specific works	Incorporates all remaining actions from the strategy considered to be relevant and suitable today and addresses current issues affecting the study area. Action to include review and rationalisation of proposed works to determine those of most benefit.	T65, T66, T71, T74, T77, T81, T82	NVC	EES, DPE–Crown Land, TfNSW	$200,000	Ongoing	As detailed in Study
WQ4	H	Rural Lands Coastal Zone Water Quality Improvement Strategy	Programs focussed on improving land management to reduce diffuse source pollution and improve water quality. Potential examples include on-farm property scale plans and actions to improve drainage, fertiliser management, exclude stock access to natural waterways, manage run-off from dirt roads, maintain grass cover and buffer zones etc. Target coastal zone areas identified by DPE - EES Estuary Health Risk Dataset, EcoHealth Monitoring and local strategies (e.g. sub-catchments of Deep Creek, North Arm, Buckra Bendinni Creek, Gumma Gumma Swamp, Newee Creek etc.).	T14, T15, T16, T20, T38, T45, T48, T49, T52, T63 T65, T68, T70, T74, T77, T78, T79, T82, T84	NVC	EES, LLS/MEMA, DPE–Crown Land, TfNSW	$500,000	Ongoing	Consultation with rural landholders in target areas as an ongoing exercise. Potential properties for works identified. Property plans developed as required. Ongoing implementation.

ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisations	Indicative cost (10 year)	Indicative timeframe	Performance Targets
WQ5	H	Unsealed Road Improvement Strategy	Undertake an unsealed road assessment to quantify the relative contribution of sediment and turbidity from dirt roads to the estuary and provide cost estimates and works prioritisation. Progressively implement a rural roads improvement program, sealing roads in priority locations within the coastal zone see Figure 14. Where it can be demonstrated that unsealed roads outside of the coastal zone may have an impact on the coastal environment (i.e. during the assessment) they should also be addressed.	TT71, T66, T65,	NVC		$75,000 for unsealed road assessment. Implementation costs would be identified as part of this assessment (see note 1).	Ongoing	Unsealed road assessment complete Year 1. Unsealed roads prioritised on an annual basis and targeted for works.
WQ6	M	Best practice erosion and sediment control guidelines for construction sites	Ensure effective sediment controls where soil disturbance occurs, for example, during early phases of land development or construction. Education, promotion and compliance with best practice erosion and sediment control guidelines for construction sites.	T65, T66, T70, T71	NVC	-	No additional cost (staff time)	In line with NVC policy	Review and update existing DCP controls as part of next DCP Housekeeping Amendment
WQ7	M	Support sustainable aquaculture industries within the Nambucca River estuary	NVC actions to include regular communication with Nambucca Oyster Growers and DPI Fisheries to: • Communicate outcomes of CMP actions, results of monitoring actions and on-ground works. • Work together to ensure best practice industry environmental guidelines are implemented.	T63, T73,	NVC	DPI-Fisheries	No additional cost (staff time)	Ongoing	Ongoing support through CMP implementation.
WQ8	M	Stormwater management	Develop stormwater management plans to investigate issues and determine management actions required. Key locations identified in the coastal zone include: Swimming Creek catchment, Macksville, Nambucca Heads, Scotts Head, Bowraville, and Valla Beach urban areas. Smaller villages should also be given consideration as a lower priority once main urban centres are addressed. These stormwater management plans should be resourced for implementation.	T8, T17, T53, T64, T66, T69, T71, T72, T73, T74, T82,	NVC	EES, NSW Crown Holiday Parks Trust (Scotts Head)	$320,000 for plan development. The development of the stormwater management plans will guide implementation costs which are anticipated to be significant (see note 1).	Year 3	Stormwater plan developed by year 3. Ongoing implementation as resources are available.
WQ9	H	Wastewater management	Continue to work with EPA to improve performance of sewerage systems. Identify risk and impact of sewage spill from existing pump stations/pipes with a view to upgrading priority systems. Investigate upgrade of Macksville STP including assessment of feasibility of ceasing direct (treated) effluent discharge to river.	T67, T84, T71	NVC	EPA	No additional cost (staff time); Some actions may require funding assistance to support improvements.	Ongoing	As detailed in PRPs.

ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisations	Indicative cost (10 year)	Indicative timeframe	Performance Targets
Manage Bank Erosion, Protect and Rehabilitate Riparian Zones									
BER1	H	Nambucca Bank Management Strategy	Develop and implement an estuary-wide Bank Management Strategy. . Key tasks to develop the strategy are: • Undertake ground-truthing and landholder consultation for priority and opportunity sites identified in the 2019 *Bank Condition Assessment - Nambucca River and Deep Creek* (Hydrosphere Consulting, 2020) to confirm sites. Site mapping is provided on Figure 21 to Figure 23 and described in Table 10, Section 6: Maps). • Identify additional priority sites of concern due to changes in erosion since previous survey (e.g. due to major flooding events etc.). • Identify any suitable locations for oyster reef restoration projects to promote shoreline protection and water quality improvements. • Utilise any tool/ guidance available through Initiative 2 of the MEMS (e.g. Bank Management Decision Support Tool) to review bank erosion mapping and assist in developing site-based plans. • Consult with landholders/ land managers as necessary to explain proposed works and confirm willingness to participate. • Prepare site specific bank management plans detailing required works, timing and detailed costing. • Prepare and finalise landholder agreements where necessary, including arrangements for ongoing maintenance. • Implement bank management works at key sites. In addition to the areas shown in Figure 21 to Figure 23 the following locations require further investigations or alternative solutions to address shoreline protection: • The high use beach on the inner-harbour side of the V-wall in Nambucca Heads. This area experiences wave overtopping and river scour. Opportunities for stabilisation and protection of the beach should be investigated including in-river structures such as small river fillets or groynes to assist sand accretion on the beach. This action may also be combined with other works including BER3 – Riparian Restoration/River Reach Plans. Areas that are supported by landowner interest/ partnerships and part of priority works identified in WQ5 investigation should be targeted.	T12-T18, T19-T20,	NVC	EES, DPE–Crown Land, DPI Fisheries	$470,000	Ongoing	Works to continue targeting priority locations mapped in the *Bank Condition Assessment - Nambucca River and Deep Creek* (Hydrosphere Consulting, 2020). Strategy completed in Year 2 detailing site-specific on-ground works including new sites as needed. Ongoing implementation.
BER2	H	Review and update the Nambucca River Estuary Riverbank Restoration Guide (2010)	Review guidelines to reflect current legislation and ensure alignment with Environmentally Friendly Seawalls Guide (OEH, 2009).	T12-T18	NVC	EES, DPE–Crown Land	No additional cost (staff time)	Year 2	Updated guide published and publicly available Year 2
BER3	M	Riparian Restoration/ River Reach Plans	Seek resources and funding to implement Nambucca Valley Landcare River Reach Plans. On-ground works vary according to site and may include bank erosion controls, weed management, assisted bushland regeneration, riparian fencing instalment/ improvement to exclude stock and allow for protection of estuarine macrophytes, recovery of native riparian vegetation, manage run-off from dirt roads and reduced faecal matter in waterways.	T19-T20, T65,	NVC	EES, DPE–Crown Land, NPWS	$600,000	Ongoing	$60,000 funding for on-ground implementation of River Reach Plans per year.

ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisations	Indicative cost (10 year)	Indicative timeframe	Performance Targets
Improve Biodiversity Values									
BV1	H	Targeted restoration in high value habitats identified as degraded	Based on the results of monitoring program (MER3), target priority areas for works. Management priorities should be based on the area and condition of remnant vegetation and adjacent land uses, restoration potential and overall values.	T19-T20, T33, T38, T45, T47, T48, T49, T50, T54,	NVC	EES, DPI Fisheries, LLS MEMA	$250,000	Ongoing	2 ha habitat restoration per year (20 ha over life of CMP).
BV2	H	Improve protection of high value habitats particularly riparian vegetation	Shire-wide stewardship site feasibility assessment, highlighting properties in the shire that may have significant natural resource value if protected into perpetuity. Potential to provide funding for Land for Wildlife conservation agreements in cooperation with NV Landcare	T45, T47, T50, T55, T38	NVC	EES, DPI Fisheries, LLS (MEMA)	$115,000 ($25,000 for feasibility assessment. $10,000/yr contribution for Land for Wildlife conservation agreements)	Ongoing	Site feasibility assessment complete Year 3. Ongoing implementation
BV3	M	Acquisition of Gumma Gumma Swamp ASS areas and remediation to continue in consultation/ agreement with local landholders	Effective management of Gumma Gumma Swamp needs to be undertaken holistically. Investigate the acquisition of land identified previously in NSC (2015b) and feasibility of restoration works to remediate ASS. Engagement with landholders is required. Continue to work with local landholders to address restoration works at priority locations. Note that DPI Fisheries involvement in this action is dependent on successfully accessing additional funding.	T45, T77, T79, T80,	NVC	DPI-Fisheries	Acquisition costs are unknown. $215,000 restoration/ maintenance budget	Ongoing	2 ha habitat restoration per year (20 ha over life of CMP).
Protect Cultural Heritage Values									
CH1	H	Protect Aboriginal and European cultural heritage items and places	Council to undertake appropriate consultation with relevant bodies when designing work/ projects in the coastal zone. Recommendations from the *Nambucca Valley Council Aboriginal Cultural Heritage Management Plan* to be addressed in any future works or projects in areas of significance. Consultation to consider *Our Place on Country Aboriginal Outcomes Strategy 2020-23* (DPIE, 2020).	T85, T86	NVC	EES	No additional cost (staff time)	Ongoing	Consultation undertaken as required.

ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisations	Indicative cost (10 year)	Indicative timeframe	Performance Targets
Facilitate Safe and Sustainable Recreational Use									
RU1	H	Review and implement existing place-based strategies and plans and prepare new place-based plans as necessary for coastal reserves and recreational areas	Review and implement existing strategies supporting recreational use of the reserves in the coastal zone. New and existing strategies and plans should incorporate best practice urban design and placemaking principles in their preparation and importantly address pressures on the local environment. The aim will be to provide strategic master planning that supports placemaking, facility improvement, open space/ environmental management and having better linked coastal villages, towns and communities. Key tasks include: a) Improve safety at V-Wall and along break wall Including the short wall recreation area and surrounds. b) Consider the creation of alternative safe swimming locations in the lower estuary including enclosing a swimming area and protect from sharks and/or other shark management options (e.g. monitoring, tagging, smart drum lines etc.). c) Access for passive recreational craft – develop concept plans for access ramps and associated recreational activities at Tewinga or Wirrimibi, Henstock Reserve (Warrell Creek), Welshes Park (Talarm), Scotts Head Warrell Creek with facility upgrades to support passive recreational use. Concept plans will consider use and consolidation of unnecessary assets. d) Develop concept plans for future boat ramps and associated recreational activities at Tewinga or Wirrimibi, Henstock Reserve (Warrell Creek), Welshes Park (Talarm). Concept plans will consider use and consolidation of unnecessary assets. e) Nambucca River Master Plan remaining site-specific works - incorporate all remaining actions from the River Master Plan considered to be relevant and address current issues affecting the study area. Action to include review and rationalisation of proposed works to determine those of most benefit. Also consider recommendations of the *Nambucca Aboriginal and Cultural Heritage Study* (McIntyre-Tamwoy, 2003) and any other relevant information when reviewing proposed actions. f) Prepare new place-based designs or plans for localities that Council considers necessary due to increase in use, environmental degradation, community feedback or economic potential. Where Council is the appointed Crown Land Manager of a Crown reserve classified as ‘community land’ under the *Local Government Act 1993*, Council is required to have an adopted Plan of Management (PoM). It will be important that there exists alignment between the CMP, place-based plans and PoM that are prepared for Crown land.	T6, T21, T22, T23, T24, T25, T26,	NVC	EES, DPE–Crown Land, DPI Fisheries, TfNSW	$250,000 for development of place-based plans. Implementation costs would be identified in these plans.	Ongoing	Strategy completed Year 1. Ongoing implementation
RU2	H	Sustainable tourism	Promote the natural values of the estuary and sustainable use and support the valuable tourism industry of the Nambucca Shire.	T26, T38, T82, T84, T85, T86	NVC		No additional cost (staff time)	Ongoing	As detailed in *Nambucca Shire Strategic Tourism Plan 2018 – 2023* (Claire Ellis and Wray, 2018)

ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisations	Indicative cost (10 year)	Indicative timeframe	Performance Targets
RU3	M	Boating and waterway usage strategy	Maintain and improve access at existing boating facilities including minor dredging activities at access points as required. Prepare a Boating and Waterway Usage Strategy to maintain and enhance safe, responsible and ecologically sustainable recreational boating and water sports activities. Rationalise and improve access points, boat ramps and associated facilities, signage, education and vessel speed in sensitive locations.	T12, T21, T22, T25, T36, T38, T39, T40, T41, T44,	NVC	EES, DPE–Crown Land, TfNSW	$480,000	Ongoing	Strategy developed Year 3. Maintain and improve access at boat ramps as required in strategy.

Note 1: This action forms part of Council's Asset Management responsibilities. Any reference to costs associated with delivery of this action should refer to the relevant infrastructure plans and strategies endorsed by Council including Council's Delivery Program, Asset Management Program and Valuation System.

3.4 Actions to be undertaken by public authorities

The actions to be implemented by public authorities (PA) are listed in Table 7.

Table 7: Management actions to be implemented by other public authorities (other than NVC)

Action ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisation	Indicative cost (10 yr)	Indicative timeframe	Performance Targets
PA1	H	DPI Fisheries education program	DPI Fisheries undertakes community educational program on current threats and impacts to fish/fish habitat and current fish management practices targeted to Nambucca LGA. The current program is targeted at developers and local councils.	T45, T46, T50, T51, T64, T65, T66	DPI-Fisheries	NVC	No additional cost (staff time)	Year 2, Year 4, Year 6, Year 8, Year 10	Education Workshop held every 2 years in Nambucca
PA2	H	Marine Vegetation Strategy	The Marine Vegetation Strategy (MVS) is a state-wide program currently being undertaken by DPI Fisheries as part of the MEMS to develop estuary specific plans to manage estuarine vegetation. The strategies aim to provide scientific evidence to support and guide the protection of existing and potential future coastal wetlands. Outputs include state-wide mapping of macrophyte potential that can be used to identify priority offset locations, rehabilitation sites and areas where management initiatives should be directed. It is anticipated that this work and priority areas in the Nambucca CMP study area will be available for use in the CMP implementation phase.	T11, T5	DPI-Fisheries	NVC, EES	No additional cost. Costs included in the MEMS. NVC staff time to review mapping and recommendations.	Year 3-6	Reporting and mapping complete Year 6
PA3	H	Plan of Management for Crown reserve 65963 Scotts Head	NSW Crown Holiday Parks Trust is required to prepare a PoM in accordance with the requirements of the *Crown Land Management Act 2016*. The PoM should address matters of relevance contained in this CMP and issues raised by the community including: • Coastal foreshore vegetation management. • Beach access. • Consultation with the community regarding masterplan arrangements.	T81, T84	NSW Crown Holiday Parks Trust	DPE – Crown Lands, NVC.	$80,000	Year 2-3	New PoM adopted for the Crown reserve in Scotts Head in accordance with *Crown Lands Management Act 2016.* *The PoM will be reviewed every 5 years.*
PA4	M	Coastal hazard assessment	Agencies/authorities to undertake assessment of the need for coastal hazard mapping in areas under their control not currently covered by existing mapping (present day and relevant long-term planning scenarios). Assessments should refer to the state-wide exposure assessment, supplemented with local scale assessments where required.	T1, T2, T3, T4, T5, T6, T7, T81	NPWS	NVC	No additional cost (staff time)	Year 2	Preliminary assessment of need for mapping and suitability of existing state-wide assessment by Year 2

Action ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisation	Indicative cost (10 yr)	Indicative timeframe	Performance Targets
PA5	L	Consider alternative location for Marine Rescue facilities or purchase of alternative (shallow-hulled) boating equipment	Undertake an assessment of the suitability of alternative marine rescue equipment and the possibility of relocation of marine rescue assets and infrastructure.	T40, T41, T81	Marine Rescue NSW	NVC	No additional cost (staff time)	Year 1	Assessment complete Year 1

3.5 Monitoring, Evaluation and Reporting Program

The actions to be implemented as part of the Monitoring Evaluation and Reporting (MER) Program are listed in Table 8.

Table 8: Monitoring, Evaluation and Reporting Program

ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisations	Indicative cost (10 year)	Indicative timeframe	Performance Targets
MER1	F	Water Quality Improvement Monitoring Program	Development of a targeted and integrated water quality monitoring program consistent with other CMP actions and existing monitoring (e.g. EcoHealth program). Design of program will involve determination of aims and objectives, selecting key sites, appropriate monitoring methods, frequencies and reporting of results. Monitoring will aim to assess the impact of both point source and diffuse source pollution on estuary water quality. Establish an integrated water quality database as central storage location for data. Include consideration of runoff from intensive horticultural uses, faecal coliforms in recreational areas and aquaculture industries. Explore sites for integrated telemetered multi-probe stations. Seek opportunities for citizen science programs to assist with monitoring.	T64, T65 -T77, T78, T79, T80	NVC	EES	$380,000 ($20,000 for design of program, $40,000 per year allowed for monitoring)	Every three years starting Year 1/Year 2	Design of program complete by end Year 1. Implementation underway by start Year 2. Annual reporting
MER2	H	Coastal Hazard Monitoring Program	Design and implement a Coastal Hazard Monitoring Program to underpin Council's adaptive management of coastal risks. The strategy would incorporate: a) Assessment of condition and effectiveness of coastal protection infrastructure, public access, coastal event response etc. b) Determine whether trigger points for changing coastal risk management approaches have been reached. c) Consider the recent NSW Government state-wide exposure assessment and compare to previous coastal hazard assessment projections. Based on the above determine the need to update existing coastal hazard assessment and mapping or supplement with local scale assessments in high-risk areas. Seek opportunities for citizen science programs to assist with monitoring.	T1 – T8	NVC	EES, NSW Crown Holiday Parks Trust	$100,000-$150,000	Ongoing	Design of program complete Year 3. Interim report at Year 4 to report on outcomes and any required works
MER3	M	Habitat condition monitoring	Monitor condition of habitats of high ecological and/or conservation value e.g. saltmarsh, wetlands, littoral rainforests, riparian zone and floodplain wetlands. Monitoring program to track the health and condition of key habitats. Targeted to areas of previous works (e.g. Stuart Island, Watt Creek, Deep Creek, Macksville, Sand Island, Lower Nambucca, Wirmrimbi and various coastal wetlands and riparian areas). Mapping of condition required. Seek opportunities for citizen science programs to assist with monitoring.	T5, T8, T10, T11, T45, T50, T55, T64	NVC	EES, DPI-Fisheries Seek opportunities to engage with Universities in respect to this action	$120,000	Every three years starting in Year 2	Reporting and mapping complete Year 2, Year 5, Year 8, Year 10
MER5	M	Tidal inundation assessment	Detailed tidal inundation assessment of the estuaries for a variety of future sea level rise scenarios with assessment or risk to estuary assets and infrastructure.	T5	NVC	EES, DPI-Fisheries	$20,000	Year 2	Reporting and mapping complete Year 2
MER6	M	Floodplain drainage mapping	Accurately map the drainage system on the floodplain, assessing the acid and blackwater discharge priorities consistent with studies undertaken by MEMA (Floodplain Prioritisation Studies).	T79, T80	NVC	EES, DPI-Fisheries	$25,000	Year 3	Reporting and mapping complete Year 3

ID	Priority	Action	Description	Threats	Lead Organisation	Support Organisations	Indicative cost (10 year)	Indicative timeframe	Performance Targets
MER7	M	Fish passage and wetland connectivity review	Review current status of wetland connectivity and fish passage barriers including consultation with DPI Fisheries, Council, landholders (and any drainage boards) regarding location of structures and management practices, mapping of impediments to connectivity and prioritisation of barriers for removal/ modification.	T45, T46, T50, T78, T79, T80	NVC	NVC, EES, DPI Fisheries	$20,000	Year 4	Reporting and mapping complete Year 4
MER8	M	Monitor success of current/ previous 4WD management actions	Monitor performance of existing actions, permits and management relating to the use of 4WDs and motorbikes on beaches. Adaptive management responses will be determined as result of the monitoring program	T29, T30, T83	NVC	NPWS	No additional cost (staff time)	Ongoing	IP&R reporting annually
MER9	M	Companion animal management	Continue to regulate and monitor performance of existing actions and management relating to the use of off-leash and on-leash dog areas.	T28, T83	NVC	-	No additional cost (staff time)	Ongoing	IP&R reporting annually
MER10	M	Traffic study at key locations	Traffic study of beach parking areas at Scotts Head to identify opportunities for improved layout. Consider alternative access arrangements for beach parking areas at Main Beach Nambucca Heads.	T21, T22	NVC	EES; NSW Crown Holiday Parks Trust	$15,000	Year 3	Reporting complete Year 3
MER11	F	Review of CMP progress	Documentation of the effectiveness of the proposed strategies and actions will be reported as part of Council's State of the Environment (SoE) Reporting and IP&R framework including progress towards the performance targets included for each action.	T81, T84	NVC	-	No additional cost (staff time)	Annually (IP&R reporting). Every three years (SoE reporting)	CMP progress included in IP&R and SoE reporting
MER12	F	10-year review of CMP	The CMP and the specified management actions should be reviewed to ensure they are being achieved and are resulting in the desired outcomes. A ten-year review (or earlier if warranted by legislative or management changes or improved scientific understanding) of the CMP is required to consider: a) Results of the SoE Reporting. b) Results of IP&R Reporting. c) Review of status of CMP actions including overall success and any barriers to the effective implementation. d) Any new or updated scientific or demographic knowledge. e) Data provided by MER actions 1-9. f) Prevailing community attitudes, government policy and strategic planning status.	T81, T84	NVC	NRCECMC, EES	$50,000	Yr 10	Review and reporting undertaken by end Yr 10. Adoption and certification of the amended CMP as required.

3.6 Whether the CMP identifies recommended changes to the relevant planning controls, including any proposed maps

Mapping of coastal management areas has been completed by DPE (2017) and is shown in Figure 8 (Section 6). This CMP encompasses the coastal management areas mapped within the *Coastal Management State Environmental Planning Policy* 2018 (CM SEPP): Coastal Wetlands and Littoral Rainforest Area, Coastal Environment Area and Coastal Use Area. Although the Coastal Vulnerability Area is not mapped in the CM SEPP, the coastline is subject to coastal hazards and these have also been addressed in this CMP. This CMP provides a management framework to guide coastal management and planning for the Nambucca coastline and estuaries, in response to the relevant objectives for each coastal management area from the *CM Act*. No changes to the current coastal management areas are proposed as part of this CMP.

4. BUSINESS PLAN

The CMP actions are expected to be funded through NVC and state government contributions, monetary grants and volunteer works by community members and organisations. Some actions are funded under Council's normal operating budgets or through existing programs and grants. It will not be possible for NVC to implement all actions identified in this CMP without additional sources of funding. As such, identification of grants and the submission of successful funding applications is an important component of this CMP. A list of current possible sources of external federal, state and local funding is provided below. However, it is important to note that many grants and funding sources change year to year, are only available up to a limited budget, or require significant co-funding commitment. Accurate estimates of project costs, particularly for on ground works cannot be developed until survey and design tasks have been completed, with these tasks often incurring significant costs. It will be necessary to remain informed of current funding availability throughout the implementation of the CMP and take advantage of funding opportunities as they arise. In each case, the precise amount of funding available will not be known until it has been awarded.

Agencies other than NVC with responsibility for delivery of actions in this CMP have not yet provided their commitment to implementation, however NVC will liaise with these agencies to confirm their support during finalisation of the document. Delivery of the actions will depend on the availability of funding and resources which is yet to be confirmed. The timeframe of implementation will be influenced by the availability of resources and funding.

Potential sources of funding identified for the CMP actions are:

- NVC funds - generated through levies, rates, fees and charges, investment revenues, loans, property management and operating grants.
- NSW Coastal and Estuary Grants Program - certification of this CMP will facilitate eligibility for funding of key actions through the NSW Coastal and Estuary Grants Program. Actions will be prioritised for future applications for external funding and contributions from the budgets of relevant Council programs. Funding is provided by the NSW Government and administered by DPE – EES to support local government work to improve the health of NSW coasts and estuaries under two streams:
    - Planning stream – for planning and studies including investigation, design and cost-benefit analyses for infrastructure works recommended in a certified CMP.
    - Implementation stream for each of the four coastal management areas with priority given to projects that reduce risk from coastal hazards and projects that enhance environmental resilience and the natural environment.
- Increasing Resilience to Climate Change program – a partnership program between Local Government NSW (LGNSW) and DPE – EES to encourage:
    - Implementation of actions to address identified climate risks.
    - Regional consideration of climate change impacts in decision making.
    - Implementation of climate change adaptation actions beyond business-as-usual projects and programs.
    - Enhanced adaptive capacity.
- Crown Reserves Improvement Fund Program – administered by DPE – Crown Lands for:
    - Development and maintenance projects and to improve land and facilities on Crown land. Funding under this program is subject to a competitive grant application process and eligibility requirements which may change from year to year and in accordance with departmental priorities.

- Clean Coastal Catchments On-Farm Grants Program - administered by LLS as part of the Marine Estate Management Strategy. Commencing in November 2020 grants are now available for horticulture farms (blueberry, blackberry, raspberry and greenhouse vegetables) to keep nutrients on-farm and to make operations more productive, profitable and environmentally sustainable. Local farmers can apply for grants of up to $10,000 for on-farm infrastructure.
- The NSW Environment Trust – administered by DPE - EES to fund a broad range of projects which enhance the environment of NSW. Relevant streams include environmental education, protecting our places (for the sharing and protection of Aboriginal Cultural knowledge and the protection, restoration and enhancement of culturally significant Aboriginal Land), education, research, restoration and rehabilitation projects and waste avoidance and resource recovery.
- The NSW Community Building Partnership program – administered by the NSW Department of Premier and Cabinet for infrastructure projects that deliver positive social, environmental and recreational outcomes that promote community participation, inclusion and cohesion. This program supports projects involving the construction of new community infrastructure, the refurbishment, repair and maintenance of existing community infrastructure and the purchase of capital equipment with a minimum individual asset value of more than $2500.
- NSW EPA Waste Less, Recycle More initiative - a set of programs including “Council Litter Prevention Grants”, managed by the NSW Environment Protection Authority and NSW Environmental Trust. The initiative includes programs for local government, business, industry and the community.
- Commonwealth Community Led Grants - Indigenous Advancement Strategy grant funding for Aboriginal people and communities to devise strategies that will support their community and the people living in it and to carry out projects that address an emerging need or opportunity.
- Recreational Fishing Trust – administered by DPI Fisheries, provides support to support a wide range of projects including those which support recreational fishing enhancement, aquatic habitat rehabilitation, fishing education and research on fish and recreational fishing.
- NSW Boating Now Program – administered by MIDO.
- NSW Boating Access and Dredging Program – administered by MIDO, provides funding for dredging projects which improve the accessibility of waterways for recreational and commercial waterway boaters and other users.
- Walking and Cycling program – administered by TfNSW, provides funding for projects that encourage people to walk or cycle as part of their everyday travel.
- Regional roads funding assistance is available to Local Government through several grant programs.
- The Emissions Reduction Fund – administered by the Australian Government Clean Energy Regulator. The scheme provides incentives to reduce carbon emissions by providing opportunities to wan Australian Carbon Credit Units. Types of projects which can participate include those which increase soil carbon, reduce livestock emissions or expand opportunities for environmental carbon sink plantings and reforestation.
- Landcare Grants - Landcare Australia works with governments, corporate and philanthropic organisations and donors to facilitate funding for good quality, hands-on projects and programs that will improve environmental outcomes for the Landcare community.
- Land for Wildlife - a voluntary property registration scheme that aims to assist landholders to maintain wildlife habitats on their land. Land for Wildlife in NSW is co-ordinated by non-government organisations, community groups and local councils. These regional arrangements are co-ordinated state wide by the Community Environment Network (CEN) in partnership with DPE-EES. The CEN works with interested local organisations who run local Land for Wildlife Programs. Nambucca Valley

Landcare is the regional provider, operating throughout the Nambucca catchment area. Regional delivery includes site assessments, advice on suggested management strategies and actions for the property support and encouragement for landholders to conduct nature conservation activities on their land. Registration is free and non-binding. The good faith agreement between the CEN and landholders does not change the legal status of the properties, and information is confidential.

- Coastcare Grants - Coastcare grants support community groups working on projects across Australia. Grants support Landcare and Coastcare groups with projects like dune protection, revegetation of native coastal environments, protection of endangered coastal species habitats, collection and prevention of storm water pollution, weed and non-native plant removal, and control of human access to sensitive and vulnerable areas.

Table 9: Business Plan - costs and timing of these actions are indicative and subject to further investigation, funding availability and Council resources

ID	Management Action	Priority	Total 10 yr cost	Total capital costs	Total operational costs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Potential funding source(s)	Cost benefit distribution (private vs. Public)	Business Plan Category
			$'000	$'000	$'000	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032			
Management and Governance																		
MG1	Environmental Levy funding for implementing the CMP	F				no additional cost										a	100% public	1
MG2	NRCEMC to oversee CMP implementation	F				no additional cost										a	100% public	1
MG3	MoU between NVC and NPWS	H				no additional cost										a	100% public	1
Education and Consultation																		
EC1	NVC Coastline and Estuary Educational Program	F	**130**	**20**	**110**	20	30	10	10	10	10	10	10	10	10	a,b,e, g, j	100% public	2
EC2	Consultation with local Indigenous community	F				no additional cost										a, h	100% public	1
EC3	Consultation with NRAR and DPE-Water regarding regulation of water extraction	M				no additional cost										a	100% public	2
Local Planning and Development Controls																		
PD1	Review environmental mapping and ensure consistency with NLEP and DCP	M	**20**	**20**			20									a,b	100% public	2
PD2	Review coastal hazard planning and development controls	M				no additional cost										a	100% public	1
PD3	Section 149 certificates identify coastal hazard risk	M				no additional cost										a	100% public	1
Manage Risks Associated with Coastal Processes																		
CP1	Maintain and/or upgrade existing coastal protection infrastructure	M				costs to be informed by MER2										a,b, c, d	100% public	3
CP2	Review of Deep Creek ICOLL entrance management policy	M	**20**		**20**		20									a,b, c, d	100% public	2
CP3	Swimming Creek debris removal	M	**20**		**20**		20									a, b	100% public	1
CP4	Periodic beach scraping	M	**250**		**250**	25	25	25	25	25	25	25	25	25	25	a, b	100% public	1
CP5	Dune Management	M	**200**		**200**	20	20	20	20	20	20	20	20	20	20	a,b, c, d, r, p	100% public	2
CP6	Maintenance and upgrade of coastal community infrastructure	H	**7000**	**6000**	**1000**	700	700	700	700	700	700	700	700	700	700	a,b, c, d, r, p	100% public	2
Improve Water Quality																		
WQ1	On-site Sewage Management (OSSM) Strategy implementation	H				no additional cost										a	100% public	1
WQ2	Investigate and remove illegal connections of stormwater to sewer	H	**100**		**100**	100										a	100% public	1
WQ3	Lower Nambucca Estuary Water Quality Study: remaining site-specific works	H	**200**		**200**	20	20	20	20	20	20	20	20	20	20	a,b,c, d, l, q, r	100% public	2
WQ4	Rural Lands Coastal Zone Water Quality Improvement Strategy	H	**500**		**500**	50	50	50	50	50	50	50	50	50	50	a,b, l, m, n, o, q	100% public	2
WQ5	Unsealed Road Improvement Strategy	H	**75**		**75**	75										a, b, c, d, f, m, o, s	100% public	1
WQ6	Best practice erosion and sediment control guidelines for construction sites	M				no additional cost										a	100% public	1
WQ7	Support sustainable aquaculture industries within the Nambucca River estuary	M				no additional cost										a	100% public	1
WQ8	Stormwater management	M	**320**	**320**				320								a,b, e	100% public	2
WQ9	Wastewater management	M				no additional cost										a	100% public	1
Manage Bank Erosion, Protect and Rehabilitate Riparian Zones																		
BER1	Nambucca Bank Management Strategy	H	**470**	**20**	**450**	20	50	50	50	50	50	50	50	50	50	a,b,d,q	100% public	2
BER2	Review and Update the Nambucca River Estuary Riverbank Restoration Guide	H				no additional cost										a	100% public	1
BER3	Riparian Restoration/ River Reach Plans	M	**600**		**600**	60	60	60	60	60	60	60	60	60	60	a,b,d, q, p	100% public	2
Improve Biodiversity Values																		
BV1	Targeted restoration in high value habitats identified as degraded.	H	**250**		**250**	25	25	25	25	25	25	25	25	25	25	a,b, i, n, q	100% public	2
BV2	Improve protection of high value habitats particularly riparian vegetation	H	**115**	**25**	**90**		35	10	10	10	10	10	10	10	10	a,b, i, n, q	100% public	2
BV3	Acquisition of Gumma Gumma Swamp ASS areas and remediation	M	**215**	**TBA**	**215**			100	50	25	10	10	10	10		a,b, i, n, q	100% public	3
Protect Cultural Heritage Values																		

ID	Management Action	Priority	Total 10 yr cost	Total capital costs	Total operational costs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Potential funding source(s)	Cost benefit distribution (private vs. Public)	Business Plan Category
			$'000	$'000	$'000	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032			
CH1	Protect Aboriginal and European cultural heritage items and places	H				no additional cost											100% public	1
Facilitate Safe and Sustainable Recreational Use																		
RU1	Review and Implement existing Place Based Strategies and prepare new strategies	H	**250**	**100**	**150**		250									a,b,d, f, h, i, j, l, q	100% public	2
RU2	Sustainable tourism	H				no additional cost										a	100% public	1
RU3	Boating and waterway usage strategy	M	**480**		**480**	30	50	50	50	50	50	50	50	50	50	a,b,d, j, k	100% public	2
Actions to be Undertaken by Other Public Authorities																		
PA1	DPI Fisheries education program	H				no additional cost										i, a	100% public	1
PA2	Marine Vegetation Strategy	H				no additional cost										s, a	100% public	1
PA3	Plan of Management for Crown Reserve 65963 Scotts Head	H	**80**	**80**			40	40								s, a	100% public	1
PA4	Coastal hazard assessment	M				no additional cost										a,b, c, d, p	100% public	1
PA5	Consider alternative location or equipment for Marine Rescue	L				no additional cost										a,b,f	100% public	1
Monitoring, Evaluation and Reporting Program																		
MER1	Water Quality Improvement Monitoring Program	F	**380**	**40**	**340**	20	40	40	40	40	40	40	40	40	40	a,b	100% public	2
MER2	Coastal Hazard Monitoring Program	H	**150**	**150**			150									a,b	100% public	1
MER3	Habitat condition monitoring	H	**120**		**120**		30			30			30		30	a,b, c, i	100% public	2
MER5	Tidal inundation assessment	M	**20**		**20**		20									a,b, c, i	100% public	2
MER6	Floodplain drainage mapping	M	**25**		**25**			25								a,b, c, i	100% public	2
MER7	Fish passage and wetland connectivity review	M	**20**		**20**				20							a,b, c, i	100% public	2
MER8	Monitor success of current/ previous 4WD management actions	M				no additional cost										a	100% public	1
MER9	Companion animal management	M				no additional cost										a	100% public	1
MER10	Traffic study at key locations	M	**15**	**15**				15								a	100% public	2
MER11	Review of CMP progress	F				no additional cost										a	100% public	1
MER12	10 year review of CMP	F	**50**	**50**	**0**										50	a, b	100% public	2
TOTALS			**12075**	**6840**	**5235**	**1165**	**1655**	**1560**	**1130**	**1115**	**1070**	**1070**	**1100**	**1070**	**1140**			

1. Years correspond to start of calendar year i.e. 2023 is Year 1 (start 1st January 2023) etc.

2.Timing may be dependent on certification of CMP and approval of funding where applicable.

3. Shaded cells - actions with no additional costs allocated as part of this CMP. Many of these actions require staff time assumed to be covered under existing staffing budgets.

4. Business Plan Categories:

Category 1 – economic analysis complete, action funded under normal operating budget or existing programs and grants and not expected to impact on current resourcing levels.

Category 2 – economic analysis complete, action subject to funding.

Category 3 – no economic analysis, action subject to detailed costing, economic analysis and funding.

5. Operational costs include maintenance costs

6. Potential Funding Sources (subject to grant availability and approval):

a. NVC funds - NVC
b. NSW Coastal and Estuary Grants Program - DPE-EES
c. Increasing Resilience to Climate Change program - DPE-EES
d. Crown reserves Improvement Fund Program- DPE–Crown Land
e. The NSW Environment Trust - DPE-EES
f. The NSW Community Building Partnership program - NSW Department of Premier and Cabinet
g. NSW EPA Waste Less, Recycle More initiative - EPA
h. Commonwealth Community Led Grants – Commonwealth of Australia
i. Recreational Fishing Trust – DPI Fisheries
j. NSW Boating Now Program – MIDO
k. NSW Boating Access Dredging Program – TfNSW-Maritime
l. Walking and Cycling program - TfNSW
m. Regional Roads Funding Assistance – NSW Local Government
n. The Emissions Reduction Fund – Australian Government Clean Energy Regulator
o. Clean Coastal Catchments On-Farm Grants Program – LLS (MEMA)
p. NPWS funds – DPE-NPWS
q. Landcare – Landcare Australia
r. Coastcare - Coastcare Australia
s. Marine Estate Management Authority – MEMS implementation

5. $100,000 for initial investigations. Possible additional costs as the program progresses.

5. COASTAL ZONE EMERGENCY ACTION SUBPLAN

The Coastal Zone Emergency Action Subplan (CZEAS) for the Nambucca Coastline forms part of this CMP and is included in full as Appendix 1. The CZEAS applies to the beaches and coastal communities within the NVC LGA. It details arrangements to manage coastal emergency events relating to coastal erosion, cliff instability and coastal inundation. The purpose of this subplan is to provide emergency response actions in order to:

- Protect human life and public safety.
- Minimise damage to property and assets.
- Minimise impacts on social environmental and economic values.
- Not create additional hazards or risks.

6. MAPS

Mapping is provided in the following section as follows:

- Figure 8: Coastal Management Areas for the Nambucca coastline and estuaries - data obtained from the NSW Government spatial services.
- Figure 9: Secondary coastal sediment compartments relevant to the study area - data obtained from the NSW Government spatial services.
- Figure 10: Existing land management responsibility for public land - the existing land management arrangements within the catchment were interpreted from lot data obtained from the NSW Government spatial services and Land Register data obtained from NVC as well as discussions with Council.
- Figure 11: Urban growth area map for the Nambucca Local Government Area.
- Figure 12: Deep Creek Coastal Protection Structures
- Figure 13: Nambucca River Coastal Protection Structures
- Figure 14: State, Regional and Local Roads and Boating Facilities
- Figure 15: Sewer reticulation
- Figure 16: Water reticulation
- Figure 17: Community infrastructure (Valla Beach and Hyland Park)
- Figure 18: Community infrastructure (Nambucca Heads)
- Figure 19: Community infrastructure (Scotts Head)
- Figure 20: Community infrastructure (Macksville and Bowraville)
- Figure 21: Recommended bank management sites on North Arm (top) and Taylors Arm (bottom)
- Figure 22: Recommended bank management sites on upper (top) and lower (bottom) Warrell Creek
- Figure 23: Recommended bank management sites on the Nambucca River (top) and Deep Creek (bottom)

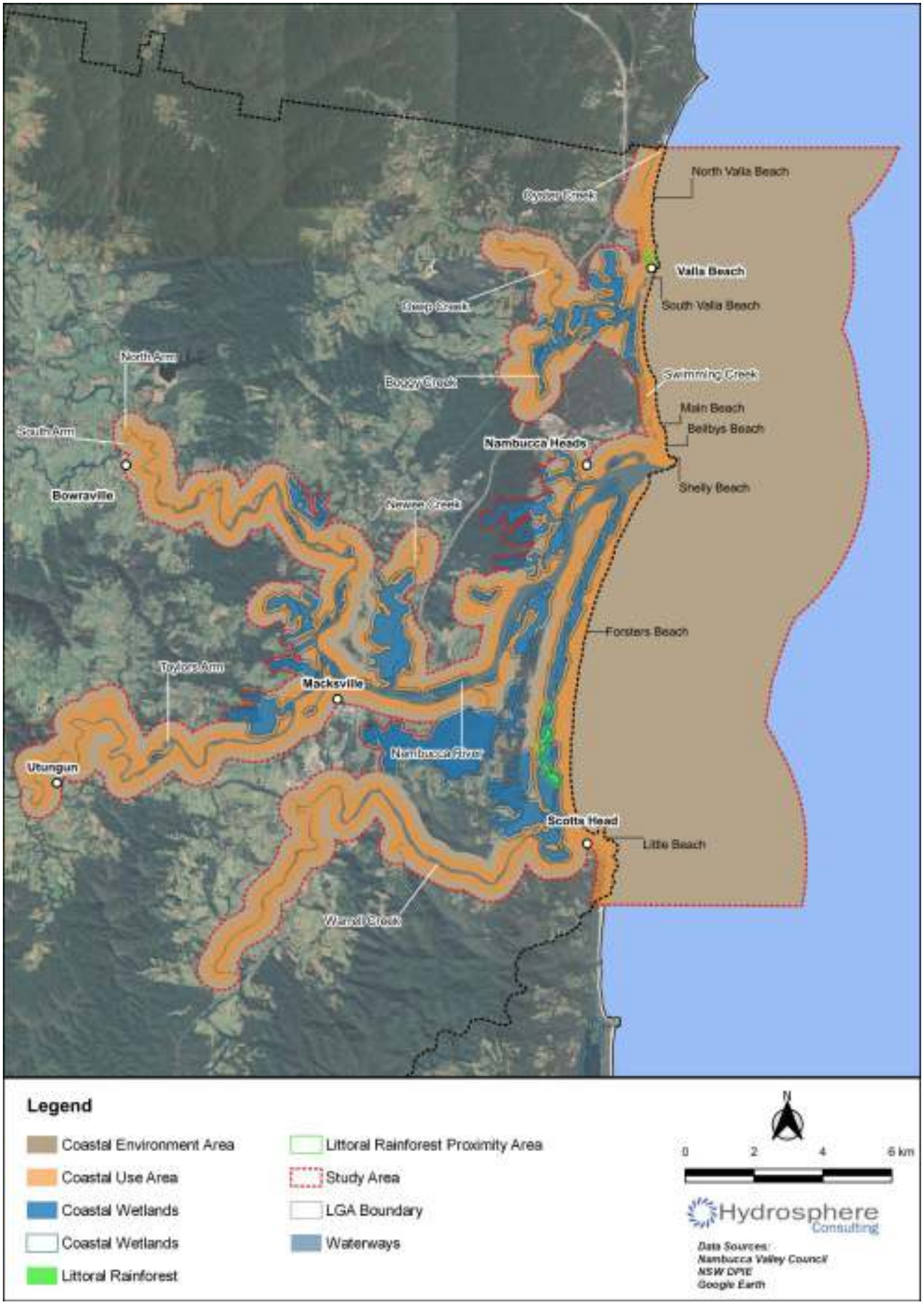


Figure 8: Coastal Management Areas for the Nambucca coastline and estuaries

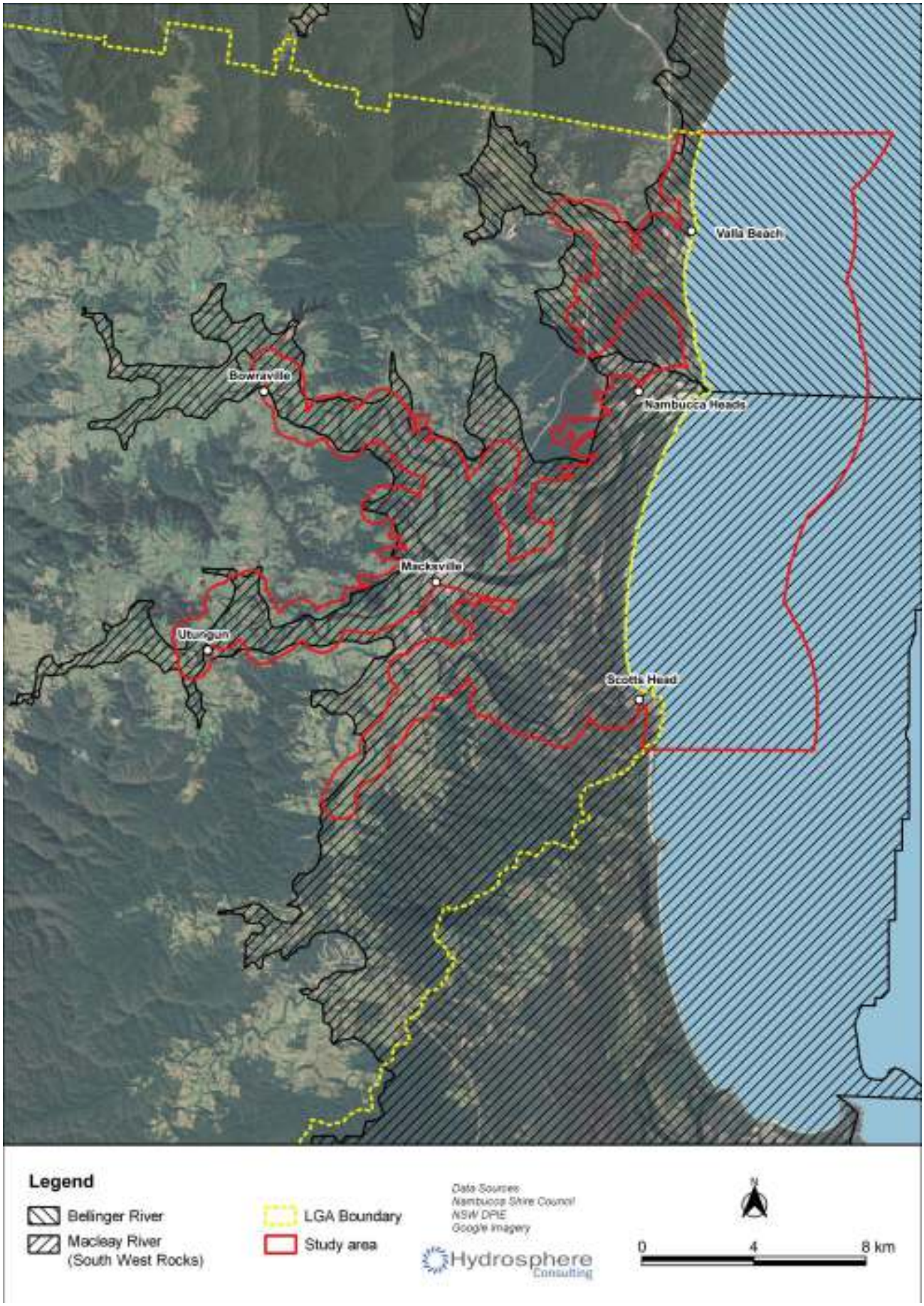


Figure 9: Secondary coastal sediment compartments relevant to the study area

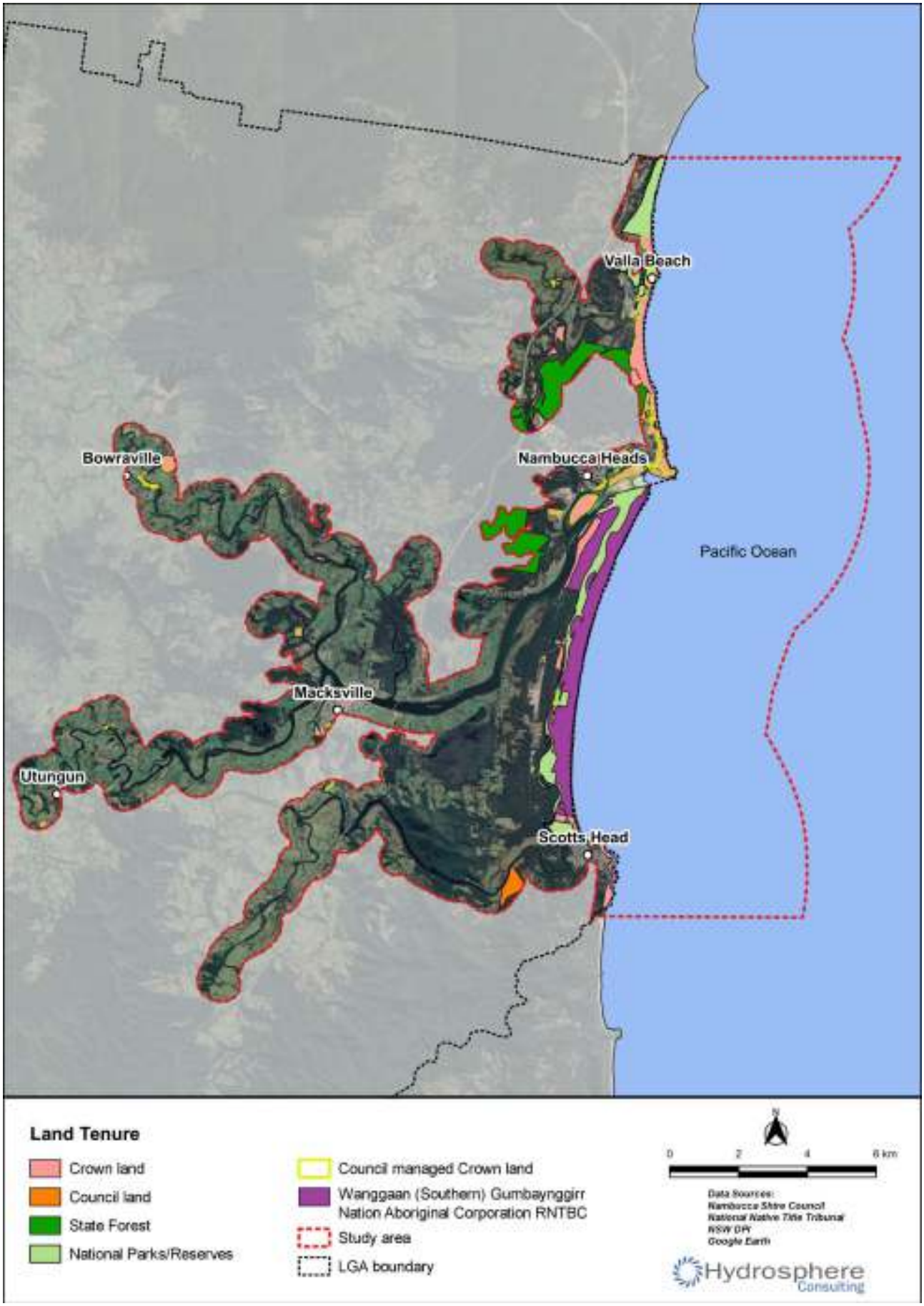


Figure 10: Existing land management responsibility for public land

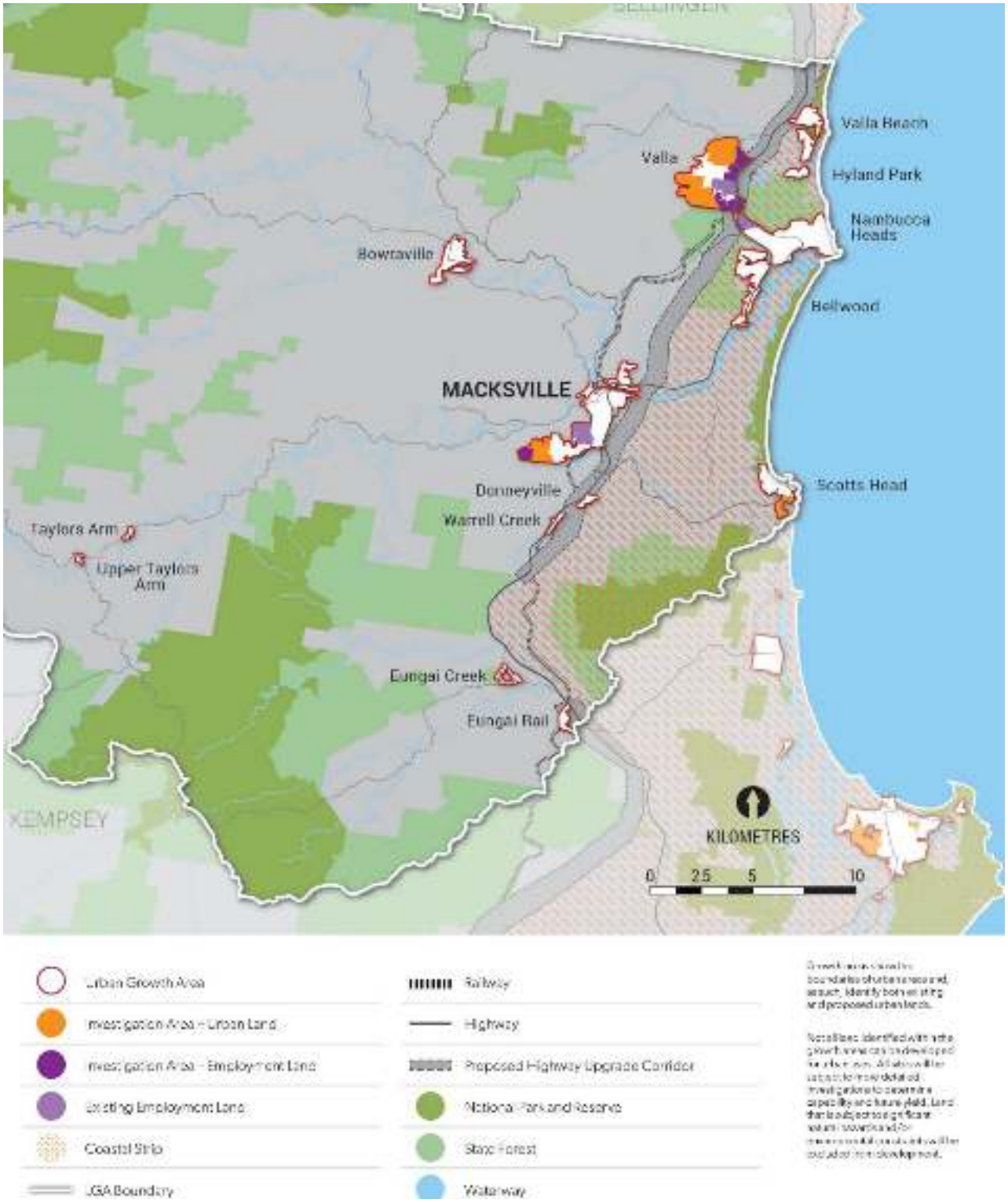


Figure 11: Urban growth area map for the Nambucca Local Government Area

Source: North Coast Regional Plan 2036 (NSW Government, 2017)

Figure 12: Deep Creek Coastal Protection Structures

Source: Map provided by Nambucca Valley Council

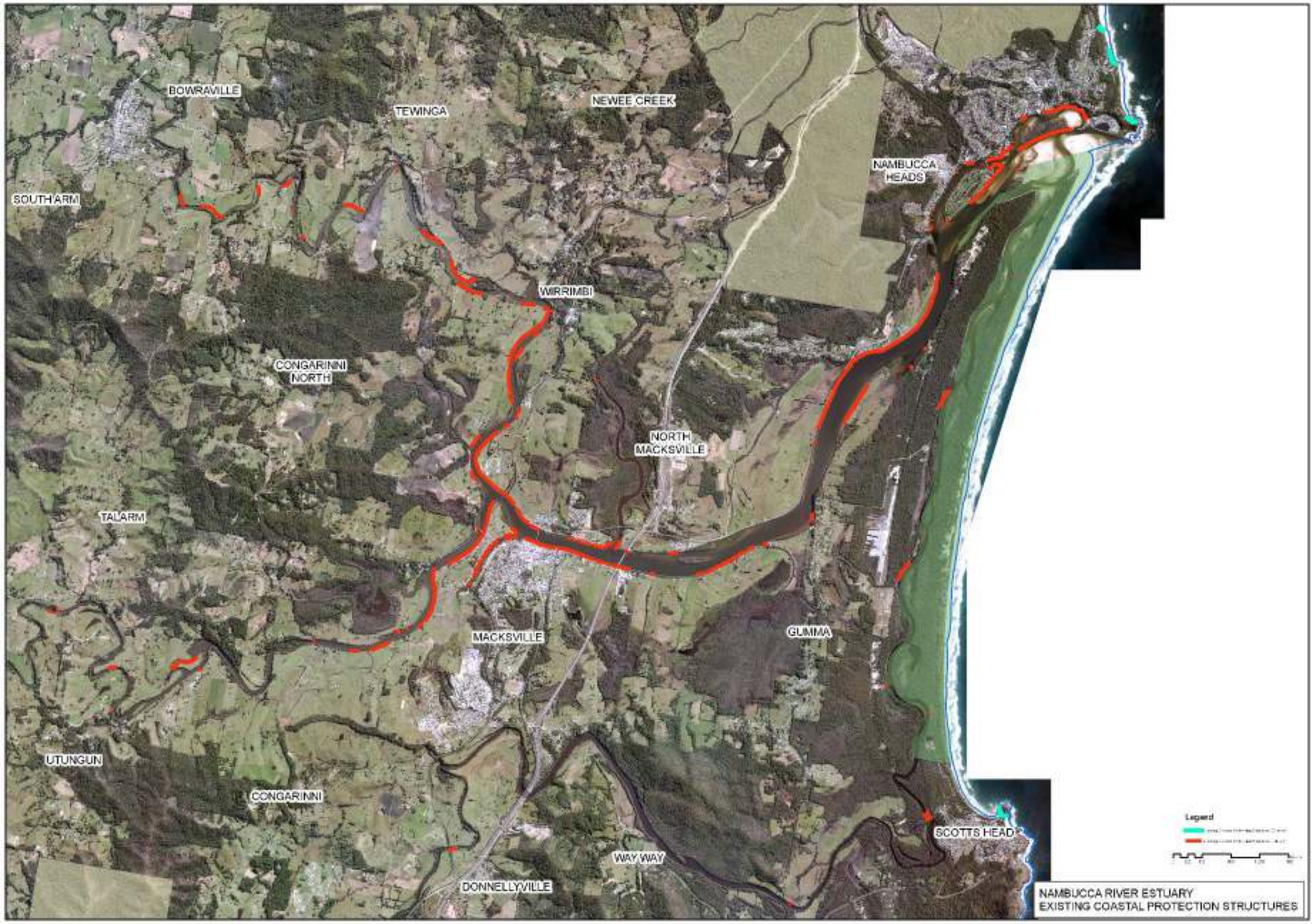


Figure 13: Nambucca River Coastal Protection Structures

Source: Map provided by Nambucca Valley Council

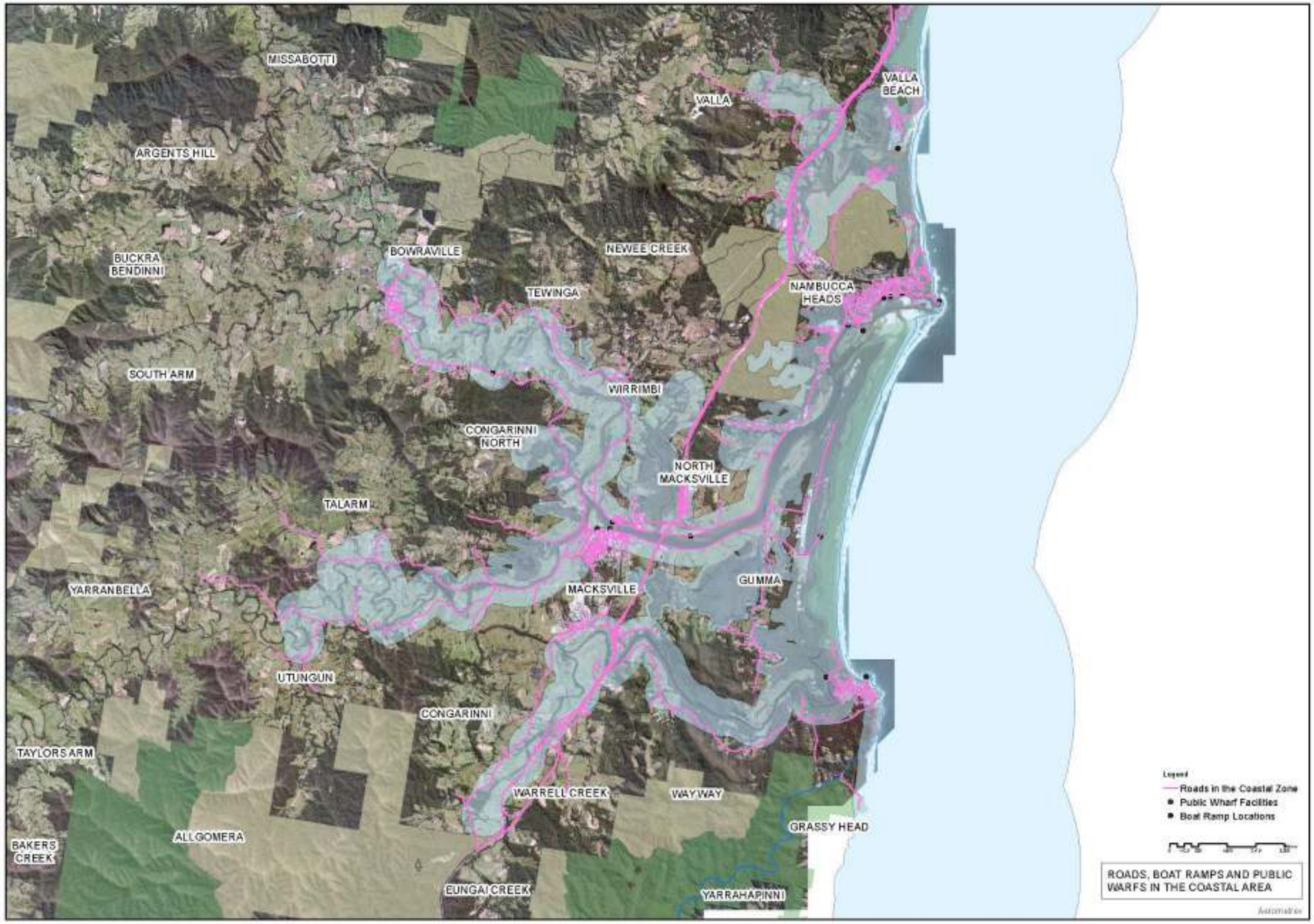


Figure 14: State, Regional and Local Roads and Boating Facilities

Source: Map provided by Nambucca Valley Council

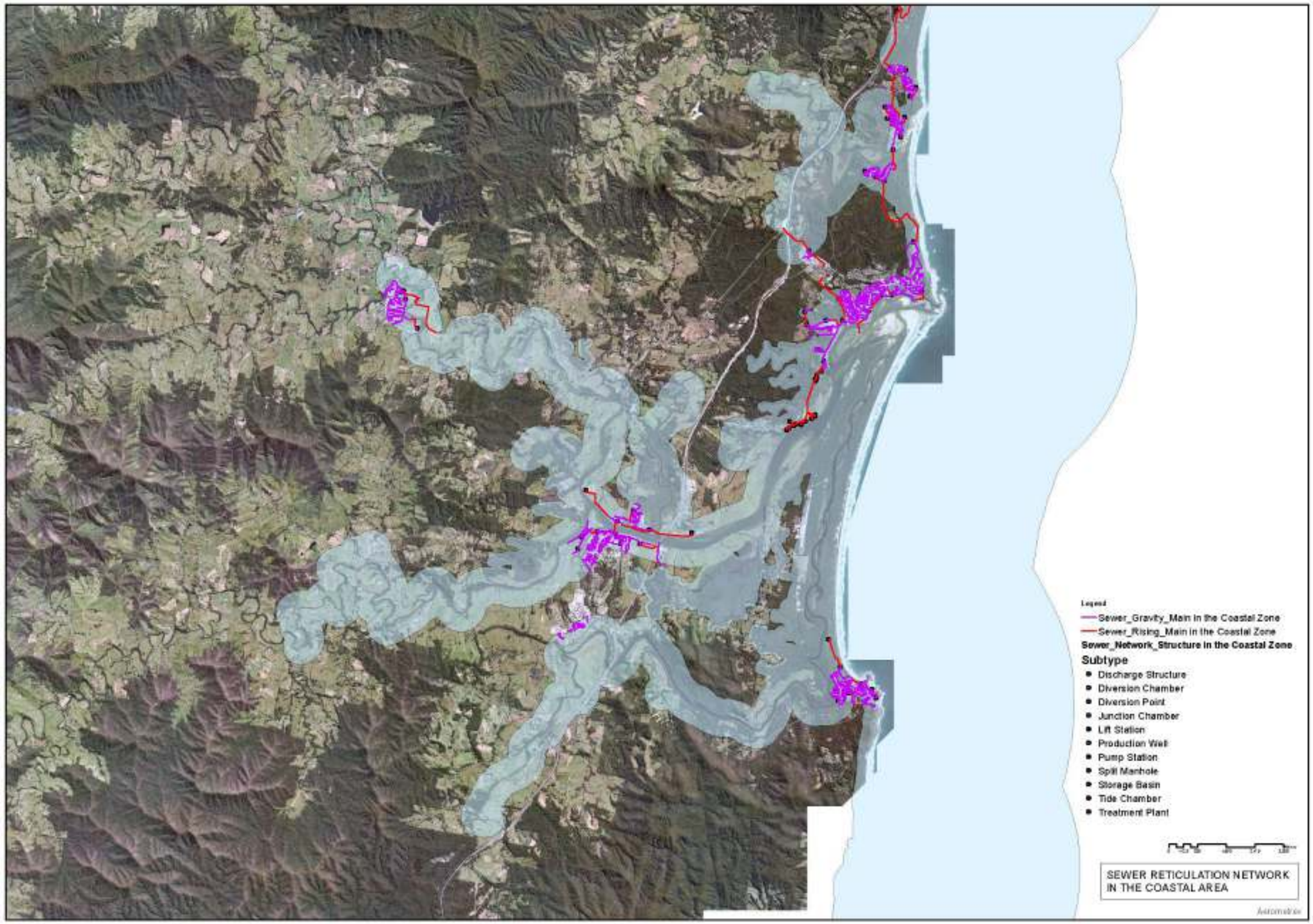


Figure 15: Sewer reticulation

Source: Map provided by Nambucca Valley Council

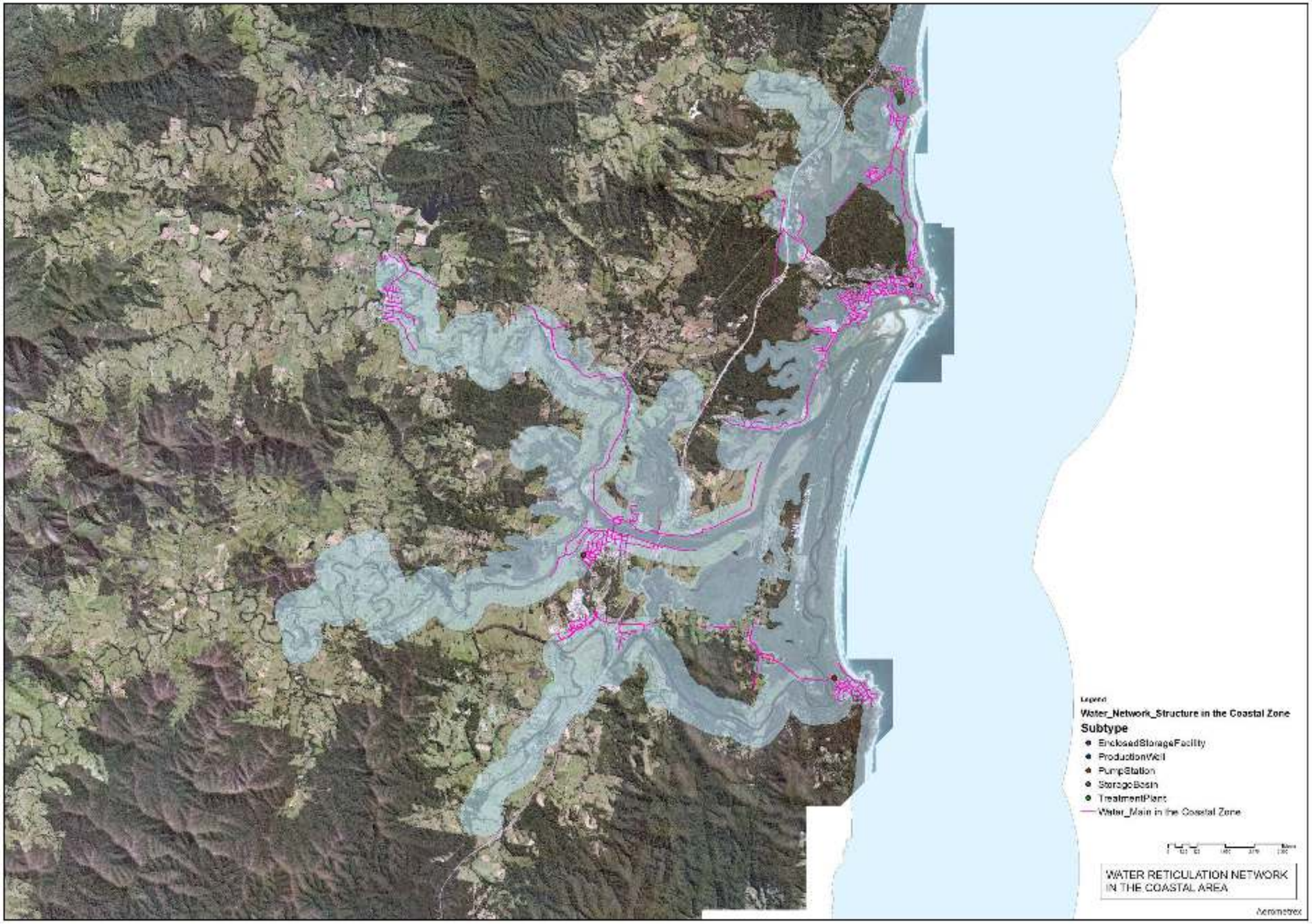


Figure 16: Water reticulation

Source: Map provided by Nambucca Valley Council

Figure 17: Community infrastructure (Valla Beach and Hyland Park)

Source: Map provided by Nambucca Valley Council

Figure 18: Community infrastructure (Nambucca Heads)

Source: Map provided by Nambucca Valley Council

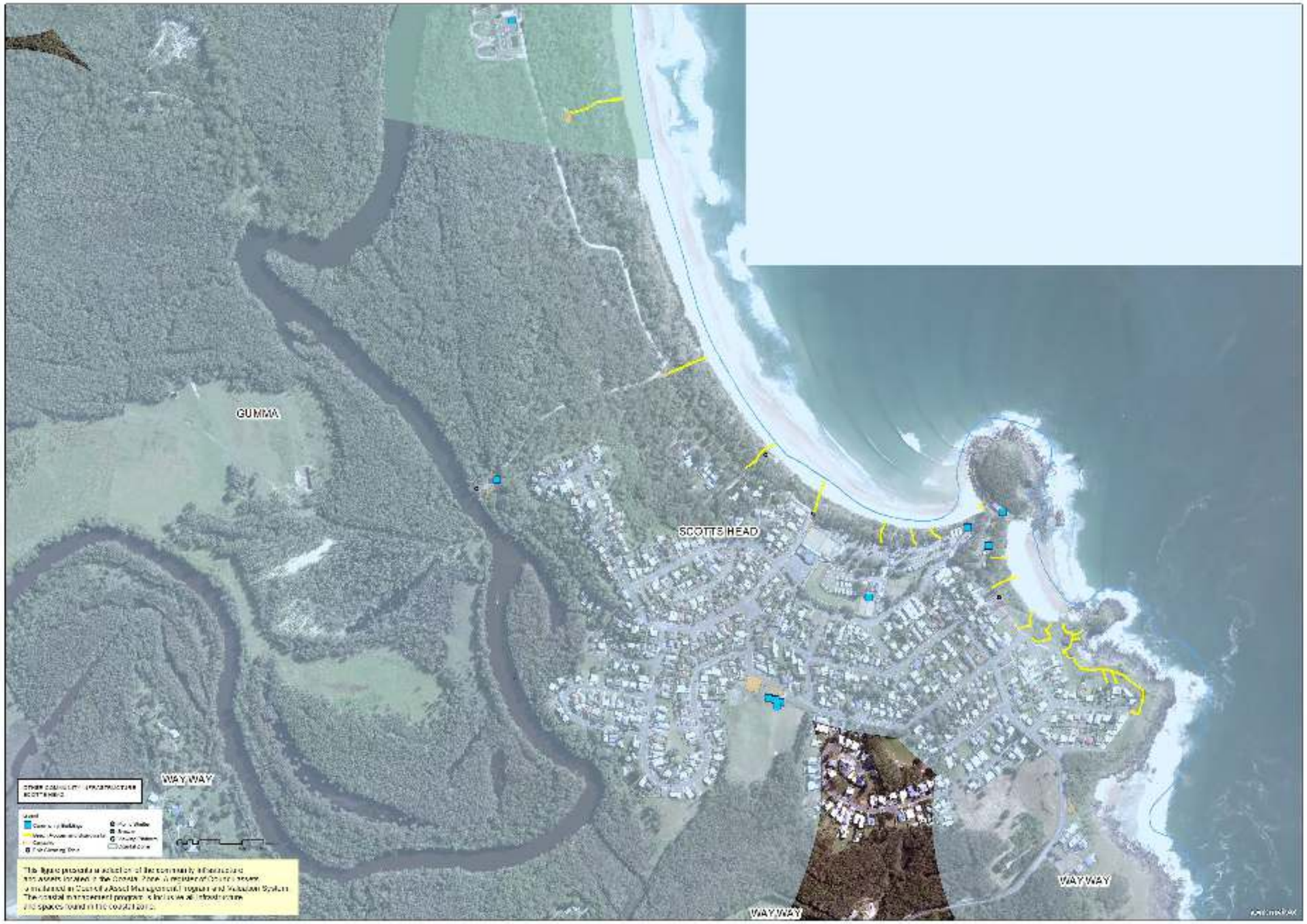


Figure 19: Community infrastructure (Scotts Head)

Source: Map provided by Nambucca Valley Council

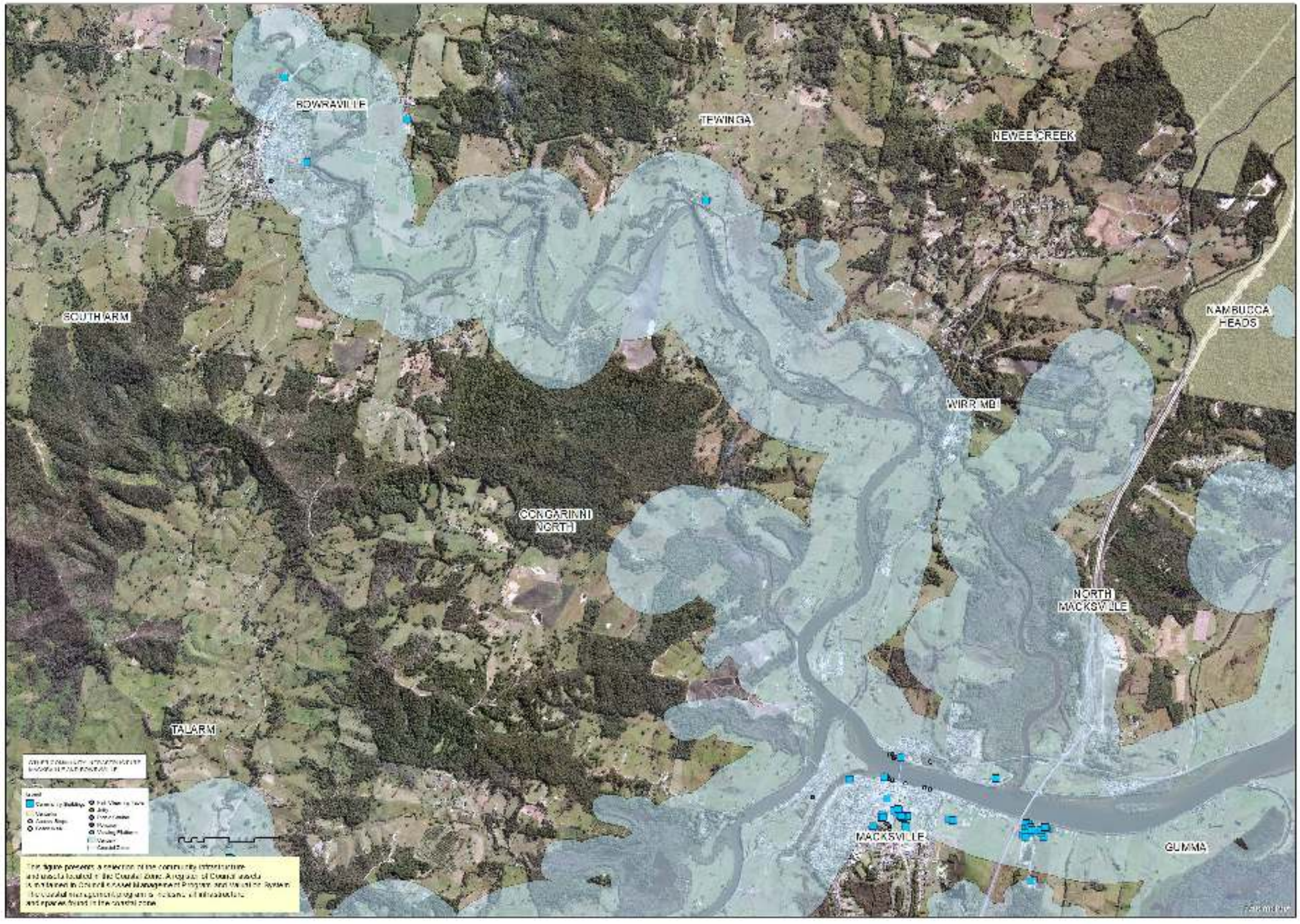


Figure 20: Community infrastructure (Macksville / Bowraville)

Source: Map provided by Nambucca Valley Council

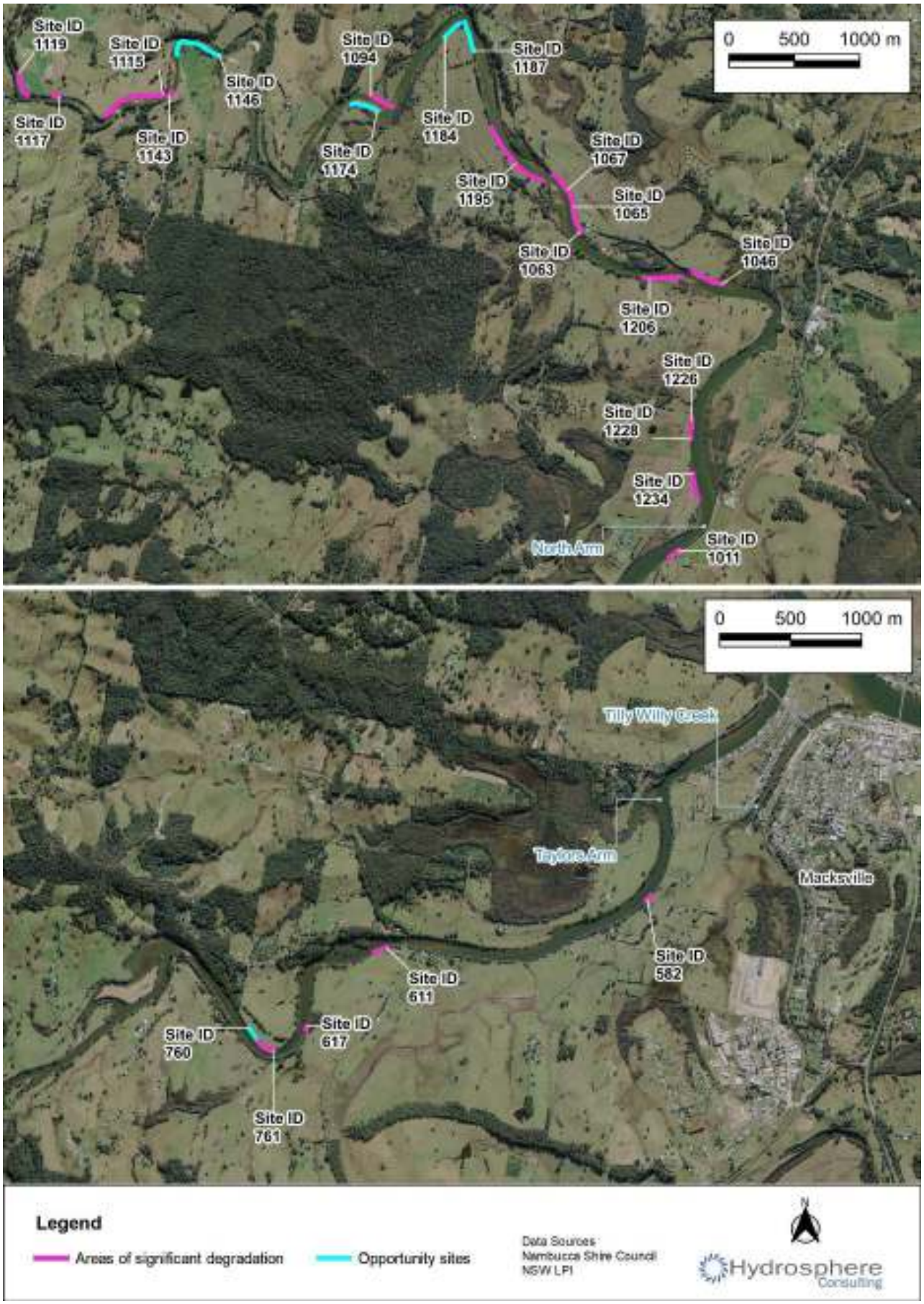


Figure 21: Recommended bank management sites on North Arm (top) and Taylors Arm (bottom)

Figure 22: Recommended bank management sites on upper (top) and lower (bottom) Warrell Creek

Figure 23: Recommended bank management sites on the Nambucca River (top) and Deep Creek (bottom)

Table 10: Bank stabilisation priority sites and opportunities identified as part of CMP Stage 2 Bank Condition Assessment completed April 2019

Location	Opportunity	Total Combined Length	Identified Causes of Instability	Site IDs	Representative Photos	
					Priority site	Opportunity site
North Arm	<u>Priority sites</u> Sites with high instability and riparian vegetation in poor condition.	2,670 m	Natural meander, cattle access, Boat/wind waves	1119, 1117, 1115, 1143, 1094, 1195, 1065, 1066, 1067, 1063, 1206, 1046, 1226, 1228, 1234, 1011		
	<u>Opportunity sites</u> Sites with easy access and potentially improved with stock exclusion fencing and revegetation. Sites present insignificant, minor and moderate instability. Stabilisation would prevent future erosion.	1,017 m	Cattle access, natural meander	1146, 1174, 1184, 1187		
Taylors Arm	<u>Priority sites</u> Sites with high instability and riparian vegetation in poor condition.	270 m	Natural meander, wind/boat waves, cattle access	761, 617, 611, 582,		
	<u>Opportunity site</u> Grassy section of bank devoid of riparian vegetation and showing minor instability. Easily accessible and would benefit from stock exclusion fencing and revegetation.	123 m	Cattle access and boat/wind waves	760		

Location	Opportunity	Total Combined Length	Identified Causes of Instability	Site IDs	Representative Photos	
					Priority site	Opportunity site
Nambucca River	<u>Priority sites</u> Sites with high instability and riparian vegetation in poor condition.	90 m	Public access and structure causing erosion	243 and 251		
	<u>Opportunity site</u> Grassy section of bank devoid of riparian vegetation in an urban area would benefit from revegetation.	36 m	Boat/ wind waves and poor riparian vegetation.	905		
Warrell Creek	<u>Priority sites</u> Sites with high instability and riparian vegetation in poor condition.	309 m	Natural meander	419, 823, 819		N/A
Deep Creek	<u>Opportunity sites</u> Sites with poor riparian vegetation, generally with grass to the edge of the banks. Sites present insignificant and minor instability however are easily accessible and could be significantly improved with stock exclusion fencing and/or revegetation to prevent future erosion.	1,715 m	Natural meander, cattle access, boat/ wind waves	90, 169, 171, 172, 174,175, 176	N/A	

Notes:
Works at these locations may be subject to landholder agreement/ negotiations and willingness to participate.
Bank erosion can change over time and in response to climatic events (e.g. major floods). The above sites are based on 2019 survey and ground-truthing of sites is required to confirm sites and plan detailed works prior to on-ground work (refer Action BER 1, Table 6).

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GLOSSARY AND ABBREVIATIONS

4WD	Four Wheel Drive/ing
ABS	Australian Bureau of Statistics
Acid sulfate soils (ASS)	Acid sulfate soils are the common name given to soils containing iron sulfides. When the iron sulfides are exposed to air and produce sulfuric acid, they are known as actual acid sulfate soils. The soil itself can neutralise some of the sulfuric acid. The remaining acid moves through the soil, acidifying soil water, groundwater and, eventually, surface waters.
AHD	Australian Height Datum
Amenity	A desirable or useful feature or facility of a building or place
BSC	Bellingen Shire Council
CEN	Community Environment Network
CHCC	Coffs Harbour City Council
CMA	Coastal Management Area
CM Act	Coastal Management Act 2016 – the legislation under which this Scoping Study has been prepared.
CMP	Coastal Management Program
CSP	Community Strategic Plan
CZMP	Coastal Zone Management Plan
DCP	Development Controls Plans
DPI	(NSW) Department of Primary Industries
DPE	Department of Planning & Environment
DPI Fisheries	NSW Department of Primary Industries – Fisheries
Ecosystem	Refers to all the biological and physical parts of a biological unit (e.g. an estuary, forest, or planet) and their interconnections.
EEC	Endangered Ecological Communities
EES	Environment, Energy and Science (a Division of DPE)
EMP	Estuary Management Plan
EMS	Estuary Management Study
EPA	NSW Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Estuarine	Part of the river channel with a mix of fresh water and salt (tidal) water
FM Act	*Fisheries Management Act 1994*
Foreshore	That part of the shore that lies between the mean high tide mark and the mean low tide mark
ha	Hectares
HAT	Highest Astronomical Tide
Hydrology	The study of water and its properties, including precipitation onto land and returning to oceans
ICOLL	Intermittently Closed and Open Lakes and Lagoons

IP&R	Integrated Planning and Reporting
IPA	Indigenous Protection Area
IPCC	Intergovernmental Panel on Climate Change
KSC	Kempsey Shire Council
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
LSPS	Local Strategic Planning Statement
MEMA	Marine Estate Management Authority
MEMS	Marine Estate Management Strategy
MER	NSW Natural Resources Monitoring, Evaluation and Reporting Strategy
MHL	Mainly Hydraulics Laboratory
MHWM	Mean High Water Mark
MSL	Mean Sea Level
NCLLS	North Coast Local Land Services
NPWS	National Parks and Wildlife Service
NSC	Nambucca Shire Council (now known as Nambucca Valley Council)
NVC	Nambucca Valley Council (previously Nambucca Shire Council)
NSW	New South Wales
OEH	Office of Environment and Heritage (now DPE - EES)
PoM	Plan of Management
Riparian	Of, on or relating to the banks of a watercourse
RNTBC	Registered Native Title Body Corporate
Sedimentation	The deposition or accumulation of sediment
SEPP	State Environmental Planning Policy
SLSC	Surf Life Saving Club
SOE	State of Environment
STP	Sewerage Treatment Plant
TARA	Threat and Risk Assessment
Terrestrial	Living or growing on land (not aquatic)
TN	Total Nitrogen - The concentration of inorganic ions of phosphorus (predominately HPO42- and PO43-) in water. These ions are available to be used by aquatic biota
Turbidity	A measure of the amount of light-attenuating particles in a water body
TSS	Total Suspended Solids - All particles suspended in water that do not pass through a 1.2µm filter

Appendix 1. COASTAL ZONE EMERGENCY ACTION SUBPLAN

Coastal Zone Emergency Action Subplan

For the Nambucca Coastline

Disclaimer:

Nambucca Valley Council has prepared this document with financial assistance from the NSW Government through the Department of Planning and Environment (DPE). This document does not necessarily represent the opinions of the NSW Government or DPE.

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Hydrosphere Consulting Pty Ltd
Suite 6, 26-54 River Street
PO Box 7059, BALLINA NSW 2478
www.hydrosphere.com.au

18-019 COASTAL ZONE EMERGENCY ACTION SUBPLAN FOR THE NAMBUCCA COASTLINE

REV	DESCRIPTION	AUTHORS	REVIEW	APPROVAL	DATE
0	Draft for Client Review	K. Menzies	R. Campbell	M. Howland	7 Dec 2020
1	Draft for Public Exhibition	K. Menzies	M. Howland	M. Howland	19 May 2021
2	Issued as Final				30 Nov 2021
3	Minor edits	K. Pratt	M. Howland	M. Howland	25 July 2022

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FIGURES

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1. INTRODUCTION

This Coastal Zone Emergency Action Subplan (CZEAS) forms part of the Nambucca Coastal Management Program (CMP) (Hydrosphere Consulting, 2022). This CZEAS applies to the beaches and coastal communities within the Nambucca Valley Council Local Government Area.

1.1 Purpose

This CZEAS details arrangements for the four emergency phases (prevention, preparation, response and recovery) to manage coastal emergency events relating to coastal erosion, cliff instability and coastal inundation. The purpose of this subplan is to provide emergency response actions in order to:

- Protect human life and public safety.
- Minimise damage to property and assets.
- Minimise impacts on social environmental and economic values.
- Not create additional hazards or risks.

1.2 Objectives and scope

Although the Coastal Vulnerability Area is not mapped in the *State Environmental Planning Policy (Resilience and Hazards) 2021*, the Nambucca coastline is subject to the coastal hazards of beach erosion, coastal inundation and cliff instability which have been addressed in the CMP through the following actions:

- Coastal hazard planning and development controls.
- Coastal hazard monitoring program.
- Ongoing maintenance and/or upgrade of existing coastal protection infrastructure.
- Periodic beach scraping works as needed to assist beach recovery after erosion events.
- Dune management.

This CZEAS is consistent with the objects of the *Coastal Management Act 2016* (CM Act section 3) and the relevant management objectives for the coastal vulnerability area (section 7 of the CM Act) specifically to prioritise actions that support the continued functionality of essential infrastructure during and immediately after a coastal hazard emergency and to improve the resilience of coastal development and communities by improving adaptive capacity and reducing reliance on emergency responses.

The CZEAS is also consistent with the emergency management provisions addressed in the state, regional and local emergency management plan (EMPLANs) and state and local flood plans (Figure 1).

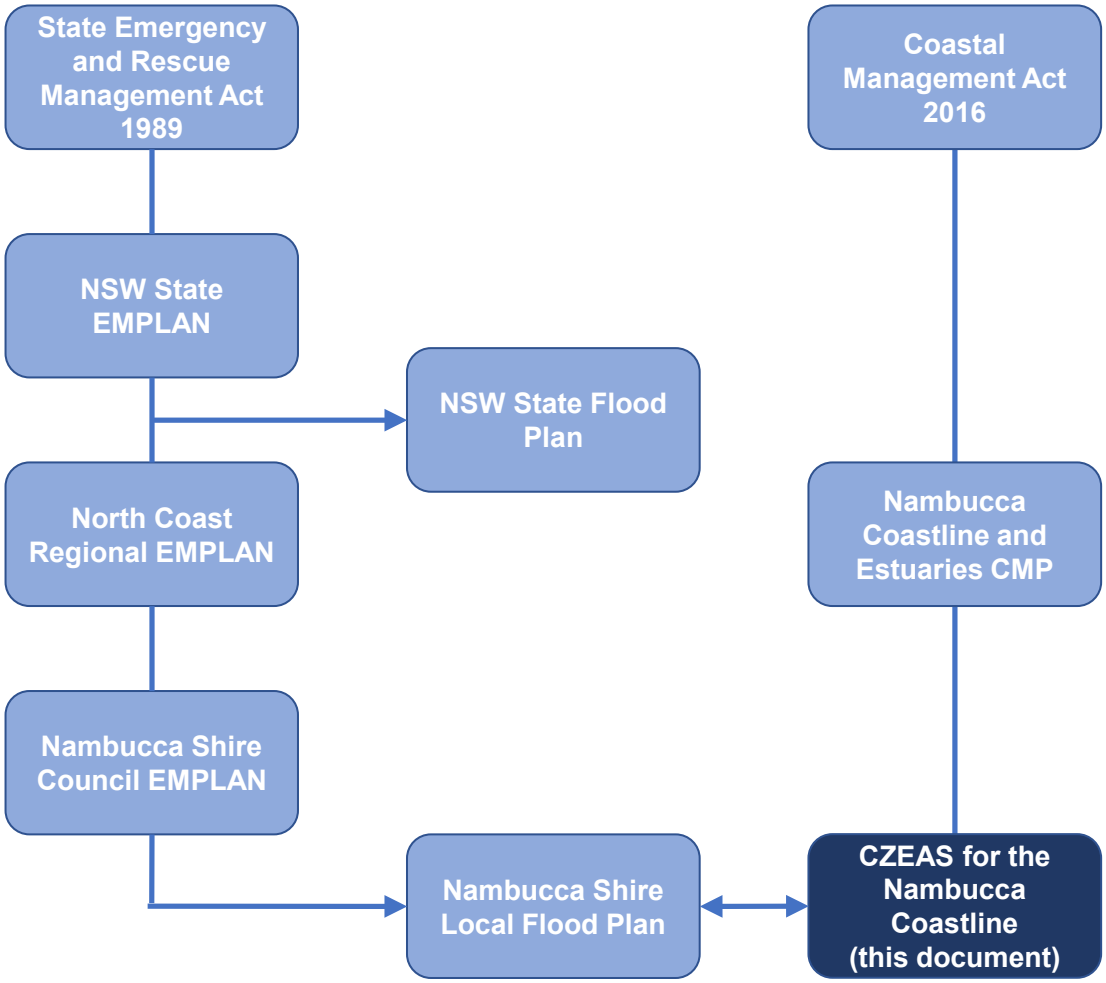

Figure 1: Legislative context

This CZEAS details:

- The triggers which define when a 'coastal emergency' is occurring (Section 5).
- Areas at risk during coastal emergencies (Section 2).
- Agency roles and responsibilities during coastal emergencies (Section 3).
- Communications required before during and after an emergency (Section 4) to inform the public and potentially affected property owners about their responsibilities during a coastal emergency and what actions they are and are not permitted to undertake.
- The actions required to mitigate, prepare for, respond to and recover from coastal emergencies (Section 6).
- Identifies the potential location and types of works that may be undertaken for the protection of property and assets (Section 6.2).

Actions to be implemented in the four phases of emergency management (Figure 2) are included in this CZEAS.

Figure 2: Coastal management emergency response phases

Source: DPIE (2019)

The actions detailed in this subplan depend on resource availability at the time of the emergency. If local agencies and available resources are insufficient to cope with the emergency, they will be supported by those at district level and if necessary, the state level.

1.3 Consultation

Public authorities involved in the implementation of this CZEAS will be provided a copy of the draft CZEAS for review and comment. The final CZEAS will address any feedback received.

2. AREAS AT RISK

Coastal hazard vulnerability has been mapped by SMEC (2009) for coastline areas and infrastructure at risk. The Coastal Zone Management Plan (Umwelt, 2012) developed a register and maps of assets at risk based on this mapping (Appendix 1).

2.1 Beach erosion

Erosion of the sandy shoreline has been occurring in the central and southern areas of Nambucca Valley LGA resulting in undermining and collapse of some beach access points, inaccessibility to and from the beach and amenities (e.g. surf club, car park), public safety risks presented by a steep scarp face, loss of long established dune vegetation and loss of amenity. A list of key sites to be monitored during storm events (Table 1) has been developed based on hazard mapping (SMEC, 2009) and the asset registers (Umwelt, 2012).

Table 1: Key sites and assets potentially at risk due to beach erosion

Area	Site	Assets to monitor
Valla Beach	South Valla Beach	Beach accessways, car park, amenities
	North Valla Beach	Beach accessway, 4WD beach access point
Nambucca Heads	Shelley Beach	Amenities, beach access ramps, boat ramps, fish cleaning facilities, car park, picnic facilities, picnic area, accessways
	Beilbys Beach	Beach access ramp, car park, Beilbys beach road, accessways
	Main Beach	Main Beach roadway, beach access ramp, boat ramp, car park, picnic area, seawall, surf club, beach accessways, stormwater infrastructure
	Swimming Creek	Beach access, 4WD access, Swimming Creek erosion controls
Scotts Head	Frontal dune at Forster Beach	Beach access, 4WD access
	South-east end of Forster Beach	Seawall in front of car park, boat ramp, stormwater drain at beach access

2.2 Coastal inundation

Sites outlined by SMEC (2009) and the asset registers (Umwelt, 2012) with potential risk of inundation by waves during a storm event are detailed in Table 2.

Table 2: Sites with potential inundation risk

Area	Site	Potential inundation Risk Sites
Valla Beach	South Valla Beach	Carpark, picnic area and toilet block near Deep Creek entrance

Area	Site	Potential inundation Risk Sites
Nambucca Heads	Main Beach	Nambucca Heads Main Beach Surf Lifesaving Club
	V-wall	Waves could potentially overtop the main breakwater east of the V-wall (between the V-wall and Wellington Rocks) resulting in a hazard to pedestrians at the walkway behind the breakwall
		Low-lying sections of Riverside Drive
		White albatross caravan park and carpark at potentially at risk of flooding
		Low-lying sections of Wellington Drive
Scotts Head	South-east end of Forster beach	Scotts Head Surf Lifesaving Club and adjacent carpark, day reserve area

2.3 Landslip

The rocky headlands and bluffs experience rock falls and undercutting by wave action which present a public safety risk and a low risk to property and infrastructure. Key sites were identified in the *Nambucca Valley Council Coastal Slope Instability Hazard Study* (SMEC, 2011) which are presented in Table 3 along with an additional site (cliff behind White Albatross Holiday Park) with a history of subsidence and/or instability which was identified in the CMP. These key landslip risk sites will be key monitoring points during extreme weather (refer Appendix 1).

Table 3: Keys sites presenting geotechnical hazards

Area	Site	Key Landslip Risk Sites	Hazard zone (SMEC, 2011)
Valla Beach	North Valla Beach	Southern Headland	Hazard Zone vbA
		Sea cliffs south of North Valla Beach	Hazard Zone vbB
Nambucca Heads	Nambucca River	Wellington Drive	Hazard Zone nhT
		Cliff behind White Albatross Holiday Park	NA
		Road cuttings and scarp upslope of Riverside Drive	Hazard Zone nhI
		Downslope fill batter of Riverside Drive	Hazard Zone nhH
	Main Beach	Car Park at Main Beach	Hazard Zone nhAM
		Western side of access road to Main Beach	Hazard Zone nhAN
Scotts Head	Forster Beach	Cutting behind SLSC	Hazard Zone shI
	Little Beach	Western end of Little Beach (adjacent to Elephant Head)	Hazard Zone shD
		Corner of Mathew and Vernon Streets	Hazard Zone shF

3. AGENCY ROLES AND RESPONSIBILITIES

Personnel and agencies with roles and responsibilities under this CZEAS are listed in Table 4.

Table 4: Roles and responsibilities

Agency	Responsibility

Nambucca Valley Council (NVC)	• Carrying out (or authorising and coordinating) of emergency coastal protection works to protect public assets from coastal erosion and inundation.
	• Closing unsafe beach accessways.
	• Combat agency for coastal erosion emergencies caused by severe weather or storm activity. During coastal erosion from ocean storms, responsibilities include:
	  o Assist NSW State Emergency Services (SES) with reconnaissance of coastal erosion risk areas.
	  o Liaise with the NSW SES Local Controller to provide advice regarding the need for response actions by the NSW SES such as evacuations.
	  o Activate this plan.
	• To assist, at their request, the Police, SES, and the Local Emergency Operations Controller (LEOCON) in dealing with a coastal emergency.
	• Provide engineering resources required for response and recovery.
	• For coastal erosion that is ***not*** caused by storm activity yet requires emergency management, NVC would provide a range of support to the LEOCON who are the agency responsible for emergency management.
	• Maintaining and updating the CZEAS as necessary.
	• Provide information on the status of roads and beach accessways.
	• Provide back-up radio communications.
	• In the event of evacuations, assist with making facilities available for the domestic pets and companion animals of evacuees.

NVC Local Emergency Operations Controller (LEOCON)	• Monitor emergency operations. • Controlling and coordinating the emergency management of coastal erosion that is not caused by storm activity, as per action 1.4.3 of the *NSW State Storm Plan* (State Emergency Management Committee, 2018a). • When requested by a combat agency, to co-ordinate the provision of resources support. LEOCON may assume control from the combat agency if the situation can no longer be contained. Where necessary, this should only be done after consultation with the Regional Emergency Operations Controller (REOCON) and agreement of the combat agency and with the appropriate level of control (NSC, 2016).
NVC Local Emergency Management Officer (LEMO)	• Provide support to the Local Emergency Management Committee (LEMC) and LEOCON in accordance with the Nambucca EMPLAN (NSC, 2016).

Agency	Responsibility

NSW State Emergency Services (NSW SES) Nambucca Shire Unit Members	• Acts as the Combat Agency for damage control and the coordination of community evacuation during the following coastal zone hazards as per the *Nambucca EMPLAN* (Nambucca Shire Council, 2016):
	  ○ Flooding
	  ○ Storms
	  ○ Tsunamis
	• Carry out required response tasks. These may include:
	  ○ Assist in the collection of flood and coastal erosion/inundation information for the development of intelligence
	  ○ Evacuation
	  ○ Delivery of warnings
	  ○ Assisting with road closures and traffic control operations
	• Not authorised to undertake coastal protection works (such as placement of rocks or geotextile sand containers).

NSW SES Local Controller	• Dealing with floods as per the *Nambucca Shire Local Flood Plan* (NSW SES, 2013).
	• Identify and monitor people and/or communities at risk of flooding and coastal erosion.
	• Provide an information service in relation to:
	  ○ Coastal erosion
	  ○ Coastal inundation
	  ○ Road conditions and closures
	  ○ Confirmation of evacuation warnings and evacuation orders
	• Direct the evacuation of people and/or communities.
	• Ensure caravan parks are advised of flood/ coastal inundation warnings.
	• Coordinate the collection of flood and coastal erosion/inundation information for development of intelligence.

The Ambulance Service of NSW	• Assist with the evacuation of at-risk people (i.e. elderly, frail, disabled, sick)
Australian Government Bureau of Meteorology (BoM)	• Provide severe weather warnings, preliminary flood warning, flood warning, flood watch, severe thunderstorm warning or a warning for severe ocean conditions or flash flooding warnings for the Nambucca Shire.

Marine Rescue NSW	• Assist the NSW SES with:
	  ○ Evacuation warnings and evacuation orders.
	  ○ The conduct of evacuations.
	  ○ Resupply operations.

Agency	Responsibility

NSW Police Force	• Responsible as the combat agency for landslip occurrences.
	• When requested by NSW SES, required to assist in flood operations (where suitable trained and suitable equipment is available) including assistance with:
	  o The warning and/or evacuation of at-risk communities.
	  o Flood rescue operations.
	  o Monitoring / reconnaissance of flood prone areas.
	  o Resupply of isolated communities and/or properties.
	  o Property protection tasks including sandbagging.
	• Conduct road and traffic control operations in conjunction with council.
	• Coordinate the registration of evacuees.
	• Secure evacuated areas.

Surf Life Saving NSW	• Assist the NSW SES with the warning and/or evacuation of at-risk communities;

Nambucca River Marine Rescue Squad – Volunteer Rescue Association (VRA)	When requested by NSW SES, required to assist in flood operations (where suitably trained and suitable equipment is available) including assistance with:
	  o The warning and/or evacuation of at-risk communities.
	  o Flood rescue operations.
	  o Monitoring / reconnaissance of flood prone areas.
	  o Resupply of isolated communities and/or properties.
	  o Property protection tasks including sandbagging.

Fire and Rescue NSW (FRNSW)	• When requested, and when FRNSW training and equipment is suitable, assist combat agencies with response and recovery operations. • During floods and storms, provide assistance to the NSW SES in accordance with the Memorandum of Understanding between FRNSW and SES.
Local Emergency Management Committee (LEMC)	• Council advisory committee including representatives from the above agencies.
DPE – Environment Energy and Science (EES)	• Oversee the delivery of the NSW Coastal legislation including financial support through the Coastal Management Program and technical advice to council and state agencies. This will include assistance with the identification of risks in areas which are subject to coastal erosion, the preparation and implementation of management plans and programs and associated mitigation and management actions. • Advise the NSW SES about conditions which may lead to coastal erosion. • Provide storm damage response teams to assist the NSW SES and National Parks and Wildlife Service. • Provide related advice on coastal hazards to the NSW SES on request.

4. COMMUNICATION BEFORE, DURING AND AFTER AN EMERGENCY EVENT

NVC will provide information about anticipated coastal emergency events to residents near the hazard zones and community representatives from the SLSCs, holiday park and nearby businesses through the following mechanisms:

- Provide routine emergency management briefings to communicate the strategy outlined in this plan including coastal emergency triggers, areas at risk, roles and responsibilities and response action plan.
- Provide emergency management information (in the form of signage and brochures) at local community centres.
- In consultation with the SES and BoM, provide information about approaching coastal emergencies on its website.
- Coordinate with the SES to ensure residents are aware of urgent hazards during emergency events, and provide assistance with door-to-door communication as necessary.
- Place barriers and sign at beach accessways that are closed due to coastal erosion impacts.
- Provide up to date information on Council's website regarding beach accessway closures and re-openings.

5. TRIGGERS FOR EMERGENCY ACTION

The following events and triggers will activate the Response Phase:

- Storm bite is eroding or expected to erode key sites and assets identified in Table 1.
- Waves are threatening to overtop the key inundation risk sites identified in Table 2.
- When a severe weather warning, preliminary flood warning, flood warning, flood watch, severe thunderstorm warning or a warning for severe ocean conditions or flash flooding is issued by the BoM.
- Signs of cliff instability during severe weather or strong waves (refer below).
- Evidence leads to an expectation of flooding, coastal erosion or landslip within 24 hours in the NVC LGA considering the predicted wave height and tidal range and the condition of the beach and accessways.

Signs of cliff instability caused by severe weather include:

- Open cracks or steps along contours.
- Bulging in the lower part of the slope.
- Trees leaning down slope or with exposed roots.
- Debris/fallen rocks at the foot of a cliff.
- Tilted power poles or fences.
- Cracked or distorted structures.

Consideration should be given to the following factors which may contribute to cliff failure/ landslips (SMEC, 2011):

- Undercutting of slopes by sea storms.
- Wave action removing fallen debris.
- Periodic wetting of slope material by waves and mist leading to frequent repeated cycles of wet/dry conditions as well as variations in temperature of slope material.
- Prolonged rainfall with water percolating into rock mass defects causing washout of fines and reduction of rock mass strength.
- High winds which remove sand, aiding the infiltration of salt spray into defects.
- Earthquakes.

Once this Response Phase is triggered, Council will activate this plan and follow the actions detailed in Section 6.

6. EMERGENCY RESPONSE ACTION PLAN

6.1 Prevention, Preparation, Response and Recovery Actions

Council's ability to undertake the actions identified in this subplan will be dependent on the availability of resources during emergency events. Actions must not conflict with or impede SES or DPE actions. Actions must not put personnel staff or volunteers in danger. Emergency protection works must not be undertaken during extreme weather unless tide variations permit works to be undertaken safely.

Table 5: Coastal Emergency Actions Phase 1 - Prevention

Action ID		Timing	Action
1.1	Planning	Within 6 months of EMPLAN updates	Through the Local Emergency Management Committee (LEMC), consult with SES, DPE, Local Police, LEOCON, FRNSW to ensure the Local Emergency Management Plan and evacuation procedures are consistent with this CZEAS.
1.2	Update	Within 3 months of Coastal Hazard Monitoring Program outcomes	Review and update this CZEAS with any updates from the Coastal Hazard Monitoring Program undertaken as part of the CMP implementation.
1.3	Consultation	Ongoing	Provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency from beach erosion, coastal inundation or cliff instability and the types of responses that are and are not permitted.
1.4	Consultation	Ongoing	Provide updates to the wider community as necessary via Councils website, through information sessions.

Table 6: Coastal Emergency Actions Phase 2 - Preparation

Action ID		Timing	Action
2.1	Update	Every 6 months	Ensure emergency contact information is available for staff and the community and details are up to date.
2.2	Planning	Within 6 months	Develop coastal monitoring proforma to track coastal change over time as well as establish monitoring locations for when this plan is activated.
2.3	Consultation	Within 6 months	Hold an information session for council staff outlining emergency responses within this plan and ensuring relevant personnel have the copies of the plan.
2.4	Planning	Within 12 months	Determine procedures and obtain approvals necessary to access sites to potentially place and remove geotextile sand containers or rock bags (refer section 6.2) and undertake beach scraping at Scotts Head.
2.5	Planning	Within 12 months	Ensure geotextile sand containers or rock bags, signage to close beach accessways and signage warning pedestrians of coastal inundation are available for use during coastal emergencies.
2.6	Planning	Ongoing	Ensure appropriate plant, equipment and experienced personnel are available for protection of assets at risk.

Action ID		Timing	Action
2.7	Monitoring	Ongoing	Regular monitoring of coastal conditions, tide, wave height and weather condition forecasts for indication of approaching coastal hazards (triggers for emergency action).

Coastal emergency response actions which apply to the whole Nambucca coastline are outlined in Table 7. Specific response actions for Valla Beach, Nambucca Heads and Scotts Beach are detailed in Section 6.2 including details of potential emergency coastal protection works.

Table 7: Coastal Emergency Actions Phase 3 - Response

Action ID		Timing	Response action
3.1	Communication	Response Phase activated	In conjunction with SES, advise landholders, residents, SLSCs, public authorities and other organisations that a coastal emergency is occurring.
3.2	Monitoring	Response Phase activated	Monitor events and triggers that will activate the Response Phase.
3.3	Preparation	Response Phase activated	Place appropriate equipment on standby (back up radios, geotextile sand containers or rock bags, signs and barricades etc.).
3.4	Monitoring	Response Phase activated	Investigate any unauthorised coastal works and monitor as necessary.
3.5	Closure	Signs of cliff instability recognised during monitoring	Close access to potentially affected sites. Seek professional coastal or geotechnical engineering advice where major infrastructure is believed to be at threat. Advice should also be sought from DPE, local Police and SES where appropriate.
3.6	Closure	Waves cause or likely to cause inundation of areas with public access	Close off access to potentially affected sites, erect barricades and signs.
3.7	Closure	Beach access is unsafe due to: • Broken or protruding steps, slats, platforms, posts, metal post, chains, wires, concrete or rubble. • A sudden drop off greater than 0.5 m. • Dangerous waves or excessive wave runup. • Otherwise deemed unsafe.	Close off access to potentially affected sites, erect barricades and signs.
3.8	Closure	Upon coastal inundation, erosion impact or cliff instability affecting roads.	Close roads and affected areas and erect barricades and signs as necessary.

Action ID		Timing	Response action
3.9	Closure	As required	Shutdown water and sewer infrastructure affected by beach erosion, coastal inundation or cliff instability hazards.
3.10	Assistance	As required	Support SES actions.
3.11	Respond	As required - only if safe to do so.	Install geotextile sand containers or rock bags to address beach erosion, coastal inundation or cliff instability if safe to do so. Refer Section 6.2 for sites which may require geotextile sand containers or rock bags.
3.12	Communication	Response Phase activated	Release media information as necessary to keep community informed.

Table 8: Coastal Emergency Actions Phase 4 - Recovery

Action ID		Timing	Response action
4.1	Inspection	Following a coastal emergency, or as necessary	Conduct/ organise detailed inspections of sites potentially affected by beach erosion and coastal inundation and assess damage to assets and the natural environment.
4.2	Inspection		Conduct detailed inspection of sites at risk of landslip for signs of cliff instability. Assess the structural integrity of any damaged infrastructure. Seek professional geotechnical advice as required.
4.3	Restoration		Where beach erosion has caused a large escarpment/ drop off (>0.5 m) at frontal dunes, pedestrian accessways beaches or within 1.5 m of built assets (car parks, SLSC, roadways, pedestrian paths) Council will remediate the area to restore safe beach access (refer Section 6.2).
4.4	Restoration		Arrange for permanent repair of damaged assets or the rehabilitation of the environment. Maintain emergency protection works until permanent repair can be undertaken. If emergency works are to be removed, describe the pathway for removal
4.5	Communication		Continue communication protocols as necessary.
4.6	Restoration		Remove or manage beach debris prioritising the most visited beaches.
4.7	Inspection		Assess the structural integrity of any damaged infrastructure. Seek professional advice as required.
4.8	Restoration		Remediate/ replace any damaged infrastructure.
4.9	Restoration		Rehabilitate damaged dune systems coordinating with Landcare/ Dunecare groups.
4.10	Monitoring		Monitor beach response to beach scraping and renourishment.
4.11	Preparation		Replenish emergency response supplies.

Action ID		Timing	Response action
4.12	Record		Record coastal emergency impacts and response actions (Section 6.4).
4.13	Review	Within 6 months following plan activation or as necessary.	Critically review this CZEAS and update as necessary to improve the effectiveness of coastal emergency response actions.

6.2 Area specific response actions

6.2.1 Valla Beach

Vehicle access to Valla Beach following a coastal emergency is as follows:

- South Valla Beach – No formal access. Informal access via the carpark (between the amenities block and the fence) if necessary.
- North Valla Beach – at the 4WD access point (accessed via Cockburn Street).

Table 9: Emergency response actions for Valla Beach

Area	Action ID	Response Actions
South Valla Beach	V3.1	Monitor the performance of the seawall at South Valla Beach following a storm event. Repair and maintain if necessary.
	V3.2	Use geotextile sand containers or rock bags to prevent further erosion at South Valla Beach amenities and carpark area if: • The amenities block and carpark are deemed to be at risk; • subsequent storms are forecast which would likely cause further erosion; or • the mouth of Deep Creek migrates north and threatens the carpark and amenities block.
North Valla Beach	V3.3	Assess the cliff stability at Valla Headland following a storm to ensure the car parks and accessways are safe and stable. Seek professional geotechnical advice if the cliff presents any signs of cliff instability. Place geotextile sand containers at the pedestrian beach accessway if it is being impacted by erosion and subsequent storms are forecast.
	V3.4	Inspect the footbridge following severe storms and/or heavy rainfall to ensure the footings are secure and the bridge is safe to use.
	V3.5	Close the 4WD beach accessway at North Valla Beach as necessary.

6.2.2 Nambucca Heads

Vehicle access to the beaches to undertake recovery actions is as follows:

- Shelley Beach – access via the boat ramp.
- Main beach – access via the boat launch near the SLSC.
- Beilbys Beach – via Shelley Beach access.
- Swimming Creek Beach – via the 4WD access (adjacent to Swimming Creek entrance).

Table 10: Emergency response actions for Nambucca Heads

Area	Action ID	Response Actions
Shelleys Beach	N3.1	Geotextile sand containers or rock bags may be used to temporarily protect assets at risk of being damaged due to landslips or erosion or to reinforce existing rock revetment if scour is occurring. Monitor the seawall at the carpark and amenities block. Maintain and repair as necessary.
Beilbys Beach	N3.2	Geotextile sand containers may be used to protect the dunes and/or beach accessways if subsequent severe weather is forecast which may impact the dunes.
Main Beach	N3.3	Monitor the performance and condition of seawalls at the SLSC and car park. Maintain and repair as necessary. Geotextile sand containers or rock bags may be used as necessary to protect beach access ramp, boat ramp, car park, picnic area, seawall, surf club, beach accessways, stormwater infrastructure.
Swimming Creek	N3.4	Monitor Swimming Creek erosion controls. Maintain and repair as necessary.
V-wall	N3.5	Close pedestrian access and erect warning signs as necessary. Alert owners and residents of White Albatross caravan park if the area is at risk of coastal inundation.
Nambucca River	N3.6	Monitor riverside Dr and Wellington drive for coastal inundation. Close and/or erect warning signs as necessary.

6.2.3 Scotts Head

Access to the beach to undertake emergency recovery activities is at the boat ramp at the south of Forster Beach. If access via the boat ramp is not possible there is a 4WD accessway further north along Forster Beach (near the sewage treatment plant).

Table 11: Emergency response actions for Scotts Head

Area	Action ID	Response Actions
South Forster Beach	S4.1	Where beach erosion has caused a large escarpment/ drop off at the frontal dunes and/ or at pedestrian accessways to Forster Beach, Council will undertake beach scraping to move sand back from the beach face to the frontal dune and to place sand at any eroded accessways to restore safe beach access.
	S4.3	Geotextile sand containers or rock bags may be used to temporarily protect the seawall in front of the car park, the boat ramp, stormwater infrastructure and beach accessways at risk of being damaged due to landslips or erosion.
North Forster Beach	S4.4	Geotextile sand containers may be used to protect the dunes and/or beach/ 4WD accessways if subsequent severe weather is forecast which may impact the dunes.

6.2.4 Priority for accessway repair and reopening

When multiple accessways are damaged, Council will give priority to restoration of access in the following locations:

1. Beach access at SLSC.
2. Beach accessways from public reserves with car parking and other beach user facilities.
3. Beach accessways that are critical to along shore public access such as community walking or cycling paths.
4. Other accessways.

6.3 Emergency coordination centres

The key coordination centre will be the Council Administration Centre. Alternative centres outlined in Table 12 may be also be used as required.

Table 12: Alternative emergency response coordination centres

Beach	Emergency coordination centre
Valla Beach	Community Hall (Valla Beach Road)
Nambucca Heads	Nambucca Heads SLSC or RSL
Scotts Head	Scotts Head SLSC or Holiday Park

6.4 Recording coastal emergency impacts and response actions

After a coastal emergency, Council will record the following details in order to maintain effective emergency response actions and understand any changes in coastal conditions over time:

- Details of any erosion, coastal inundation, landslips or cliff instability and the weather conditions under which they were caused, including photographs, location of assets and infrastructure that were damaged and details of the extent of the damage.
- Details of any emergency protection works undertaken including the cost and the installation date.
- Review and update (if required) the emergency response action plan in consultation with the SES and any other relevant agencies.

GLOSSARY AND ABBREVIATIONS

Term	Definition
Beach erosion	Landward movement of the shoreline and/or a reduction in beach volume, usually associated with storm events or a series of events, which occurs within the beach fluctuation zone (Office of Environment and Heritage, 2018).
Beach scraping	Also referred to as 'nature assisted beach enhancement' (NABE) is a mechanical intervention to speed up the natural processes of berm and foredune recovery after a storm event (Office of Environment and Heritage, 2018).
BoM	The Bureau of Meteorology
Cliff instability	Refers to geotechnical instabilities on coastal cliffs and bluffs, including rock falls, slumps and landslides.
Coastal emergency	An emergency due to actual or imminent coastal inundation, coastal erosion or cliff instability which (a) threatens endangers, or threatens to endanger, the safety or health of persons; or (b) destroys or damages, or threatens to destroy or damage, any property or the natural environment.
Coastal inundation	When land that is usually 'dry' to become inundated by sea water.
Combat Agency	The agency identified in the DISPLAN or in this subplan as the agency primarily responsible for controlling the response to a particular emergency. (*SERM Act 1989*).
CZEASP	Coastal Zone Emergency Action Subplan (this document)
DISPLAN	Local Disaster Plan.
Emergency coastal protection works	Emergency coastal protection works may comprise the placement of sand, or the placing of geotextile sand containers prior to or during an emergency for a period of not more than 90 days.
Nambucca Valley Council Local Emergency Management Committee (LEMC)	The committee constituted under the State Emergency and Rescue Management Act 1989 for the local government area, responsible for the preparation of the local EMPLAN and local flood plan.
Local Emergency Operations Controller (LEOCON)	A Police Officer appointed by the District Emergency Operations Controller as the Local Emergency Operations Controller for the Local Government Area.
Nambucca EMPLAN	Nambucca Local Emergency Management Plan
SERM Act	State Emergency and Rescue Management Act 1989
Site Controller	A police officer appointed by and subject to the direction of the local emergency operations controller (LEOCON) to be responsible for determining the site, establishing site control and controlling on the ground response to an emergency. Until the LEOCON appoints a Site Controller, the Senior Police Officer will assume control.
Storm Bite	The quantity of unconsolidated (or sandy) material removed during an erosion event.

REFERENCES AND FURTHER READING

DPIE (2019) *Guideline for preparing a coastal zone emergency action subplan*

Nambucca Valley Council (2016) *Nambucca Valley Council Local Emergency Management Plan* (Nambucca EMPLAN)

North Coast Regional Emergency Management Committee (2018) *North Coast Regional Emergency Management Plan*

NSW SES (2013) *Nambucca Shire Local Flood Plan*

Hydrosphere Consulting (2022) *Nambucca Coastal Management Program*

Office of Environment and Heritage (2018) *Coastal Management Glossary*

State Emergency Management Committee (2018a) *New South Wales Storm Plan*

State Emergency Management Committee (2018b) *New South Wales State Emergency Management Plan* (NSW EMPLAN)

State Emergency Services (2018c) *New South Wales State Flood Plan*

SMEC (2009) *Nambucca Shire Coastal Hazard Study*

SMEC (2011) *Coastal Processes and Hazard Definition Study: Nambucca Landslip Risk Report*

Appendix 1. MAPS

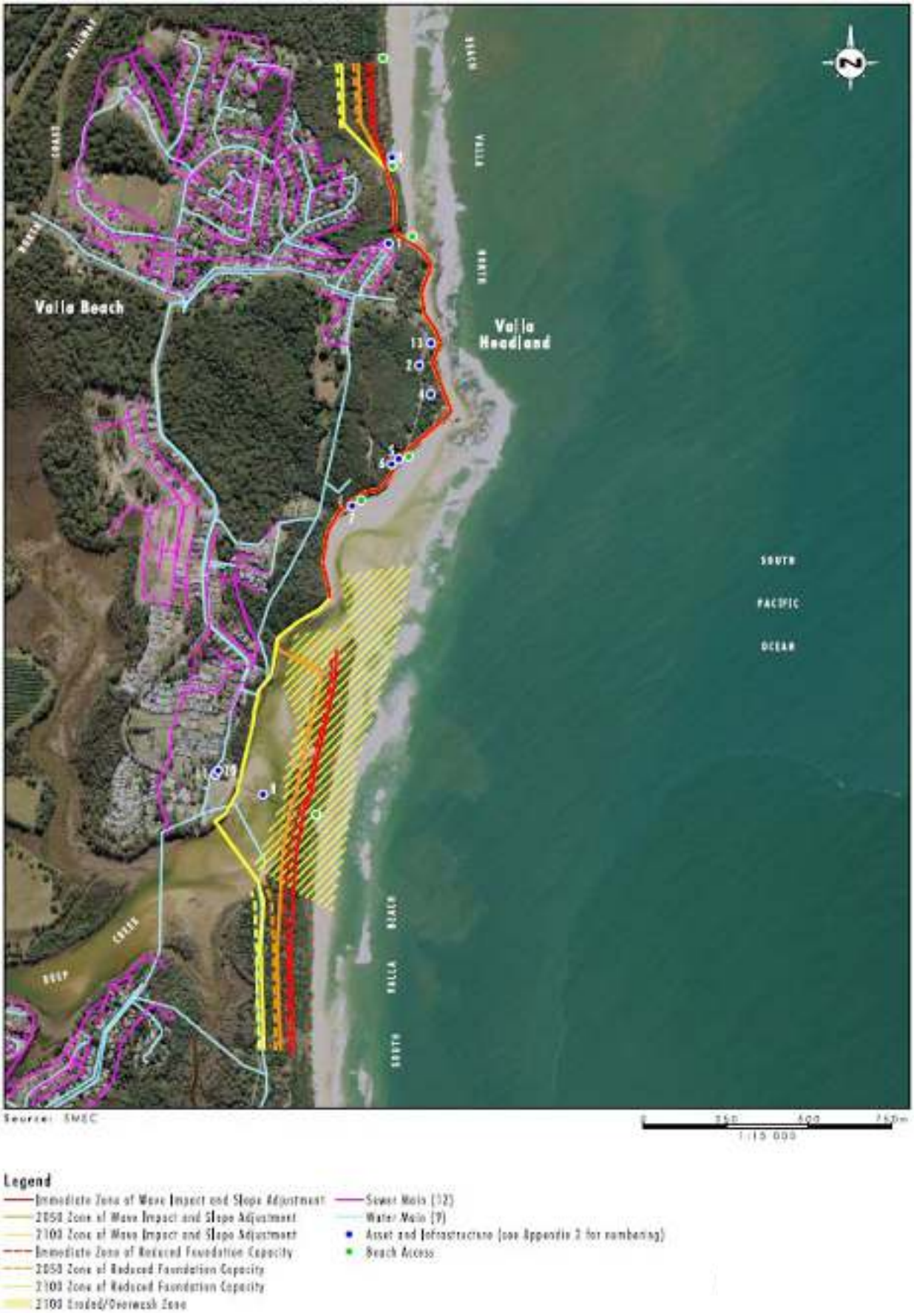

Figure 3: Hazard zones - Valla Beach

Source: SMEC (2009)

Figure 4: Hazards Zones – Nambucca Heads (South)

Source: Umwelt (2012)

Figure 5: Hazard zones - Nambucca Heads (North)

Source: Umwelt (2012)

Figure 6: Hazard zones - Scotts Head

Source: Umwelt (2012)

Table 13: Valla Beach asset register

	2011 - Valla Beaches	
	Built Environment	Hazard Description
1	Valla North Carpark & beach access	Coastal Erosion, Currently in poor condition inadequate separation of carpark from surrounding vegetation
2	Valla Road to carpark	Landslip from headland
3	Valla Beach 4WD Access Point	Coastal Erosion, Vehicle/pedestrian conflict
4	Middle Valla lookout 2 & carpark	Slope stability
5	South Valla Car Park	Coastal Erosion
6	South Valla Amenities	Erosion, storm damage, instability
7	Valla Car Park 3 & beach access	Coastal Erosion
8	Valla Footbridge over Deep Creek	Timber in bridge degraded. Erosion of sand around pylons Coastal erosion & overtopping of spit
9	Valla Water mains	Coastal Erosion
10	Valla Ocean View Drive Shelter	Erosion, storm damage, instability
11	Valla Ocean View Drive Amenities	Erosion, storm damage, instability
12	Sewer main	
13	Middle Valla lookout 1	Slope stability

Source: Umwelt (2012)

Table 14: Nambucca Heads asset register

	2011 - Nambucca Heads Assets	
	Built Environment	**Hazard Description**
1	Beilby's Beach Access Ramp	Coastal Erosion
2	Beilby's Beach Car Park	Coastal Erosion
3	Beilby's Beach Road	Coastal Erosion
4	Main Beach Roadway	Coastal Erosion, landslip
5	Main Beach Access Ramp	Coastal Erosion
6	Main Beach Boat Ramp	Coastal Erosion
7	Main Beach Carpark	Coastal Erosion, land slip
8	Main Beach Headland Hall & Amenities	
9	Main Beach Picnic Area	Coastal Erosion, retaining wall collapsed
10	Main Beach Sea Wall	Coastal Erosion & Wave Impact
11	Main Beach Stormwater Infrastructure	Coastal Erosion
12	Main Beach Surf Club	Reduced Foundation, coastal erosion & long term recession, storm damage, invasive species behind club
13	Park above main beach	
14	Shelly Beach Fish Cleaning Facilities	Coastal Erosion, Storm Bite, Long Term Recession
15	Shelly Beach Amenities	
16	Shelly Beach Beach Access Ramps	Coastal Erosion
17	Shelly Beach Boat Ramp	Coastal Erosion, Storm Bite, Long Term Recession
18	Shelly Beach Car Park	Coastal Erosion, Storm Bite, Long Term Recession
19	Shelly Beach Lookout Rotunda	
20	Shelly Beach Picnic facilities	Coastal Erosion
21	Shelly Beach Road	Coastal Erosion, Landslip
22	Shelly Beach Sea wall - Car park	Coastal Erosion, Storm Bite, Long Term Recession
23	Shelly Beach Sea wall - Picnic Area	Coastal Erosion, Storm Bite, Long Term Recession
24	Swimming Creek Beach Access, 4WD Access	Coastal Erosion,
25	Swimming Creek BIG4 Nambucca Beach Holiday Park, inc amenities etc.	Coastal Erosion
26	Swimming Creek Bridge	Coastal Erosion,
27	Swimming Creek Carpark	Coastal Erosion
28	Swimming Creek Erosion Controls	Coastal/Storm Erosion
29	Swimming Creek Residential Properties x 8	Coastal Erosion
30	Swimming Creek Road	Coastal Erosion
31	Swimming Creek Sewer Main	Coastal Erosion
32	Swimming Creek Stormwater Infrastructure	Coastal Erosion,
33	Swimming Creek Water Main	Coastal Erosion

Source: Umwelt (2012)

Table 15: Scotts Head asset register

	2011 - Scotts Head Assets	
	Built Environment	**Hazard Description**
1	Holiday Park	Coastal Erosion
2	Bowling Club & Greens	Coastal Erosion
3	Youth Camp	Coastal Erosion
4	Surf Club	Coastal Erosion, Land Slip (med-long term)
5	Car park	Coastal Erosion
6	Sea wall - Car park	Significant Coastal Erosion
7	Boat Ramp	Already impacted by Coastal Erosion, difficult to access beach
8	Storm water drain at beach access	Coastal Erosion
9	Stormwater Infrastructure 1	Coastal Erosion
10	Stormwater Infrastructure 2	Coastal Erosion
11	Stormwater Infrastructure 3	Coastal Erosion
12	Stormwater Infrastructure 4	Coastal Erosion
13	Weir Reserve Amenities	Coastal Erosion
14	Water Main	Coastal Erosion
15	Sewer Main 1	Coastal Erosion
16	Sewer Main 2	Coastal Erosion
17	BBQ facilities	Coastal Erosion
18	Ocean St	Coastal Erosion
19	Scotts Head lookout	Coastal Erosion/cliff stability

Source: Umwelt (2012)

Figure 7: Sites of slope instability

Source: SMEC, 2011 (Adapted from SMEC, 2009)

Appendix 2. COASTAL MANAGEMENT PROGRAM CHECKLIST

The DPE Coastal Management Program Checklist tool is provided below with details of how this CMP meets the relevant requirements for certification under Section 17 *Coastal Management Act 2016*. This checklist steps through the relevant statutory requirements in the following sections:

- Section 1 follows the relevant statutory requirements set out in the *Coastal Management Act 2016 (*Table 11*)*.
- Section 2 follows the Mandatory Requirements (MR) set out in the *NSW Coastal Management Manual* (2018) – Part A (Table 12)
- Section 3 meets the objects of the *Coastal Management Act 2016* and management objectives for the coastal management areas covered by this CMP (Table 13 to Table 15).

Table 11: Section 1 Statutory requirements set out in the *Coastal Management Act 2016*

CM Act 2016	Issue	Where documented in CMP/Additional notes
s13(2)	A coastal management program may be made in relation to the whole, or any part, of the area included within the coastal zone.	Section 1.3: Areas covered by this CMP. The area covered by this CMP is entirely within the Nambucca Valley LGA.
s14(3)(a)	In preparing a coastal management program, a local council must: • consider and promote the objects of this Act. (Refer section 3 of the Checklist)	The objects of the CM Act are reflected in the local objectives developed for this CMP, see Section 1.4. Also refer Table 13 to Table 15.
s14(3)(b)	In preparing a coastal management program, a local council must: • give effect to the management objectives for the coastal management areas covered by the program. (Refer section 3 of the Checklist)	The management objectives for the coastal management areas are reflected in the objectives of this CMP, see Section 1.4. Also Refer Table 13 to Table 15.
s14(3)(c)	In preparing a coastal management program, a local council must: • consider the State and regional policies and plans prescribed by the regulations for this section	Legislation relating to the management of the Nambucca coastline and estuaries is considered in Section 1.2, 1.5, and relevant state and regional policies in Section 1.6.
s15(1)(a)	A coastal management program must: • identify the actions required to address those coastal management issues in an integrated and strategic manner.	Section 3 provides the coastal management actions required to address the identified coastal management issues. A detailed multi-criteria assessment of the options was conducted, including assessment of the direct and indirect influence on the threats to the study area, in order to identify suitable actions for the CMP. This assessment is described in Section 3.1 and provided in full in the *Stage 3 Options Assessment* (Hydrosphere Consulting, 2020c).
s15(1)(c)	A coastal management program must: • identify how and when those actions are to be implemented, including those to be implemented by local councils under Chapter 13 of the Local Government Act 1993, those to be implemented under environmental planning instruments and development control plans under the Environmental Planning and Assessment Act 1979 and those to be implemented by public authorities (other than the local council).	Sections 3.3, 3.4, and 3.5 provide details of how and when actions are to be implemented, and responsibilities for implementation (lead and support), including NVC and other public authorities. The implementation tables also indicate those actions to be implemented through changes to the LEP, DCP or other planning documents. The Business Plan (Section 4) and action implementation tables Sections 3.3, 3.4, and 3.5 provide details to enable the actions to be implemented through council's IP&R Framework (e.g. timing, costs and targets).
s15(1)(d)	A coastal management program must: • identify the costs of those actions and proposed cost-sharing arrangements and other viable funding mechanisms for those actions to ensure the delivery of those	Sections 3.3, 3.4, and 3.5 provides details of estimated costs for the actions. The Business Plan in Section 4 details further the estimated costs, timing and potential funding mechanisms for implementing the actions in the CMP.

CM Act 2016	Issue	Where documented in CMP/Additional notes
	actions is consistent with the timing for their implementation under the coastal management program.	
s15(1)(e)	A coastal management program must: • if the local council's local government area contains land within the coastal vulnerability area and beach erosion, coastal inundation or cliff instability is occurring on that land, include a coastal zone emergency action sub plan.	The Coastal Zone Emergency Action Subplan for the Nambucca coastline and estuaries is included in Appendix 1.
s15(4)	A coastal management program must not include the following: a) matters dealt with in any plan made under the State Emergency and Rescue Management Act 1989 in relation to the response to emergencies b) proposed actions or activities to be carried out by any public authority or relating to any land or other assets owned or managed by a public authority, unless the public authority has agreed to the inclusion of those proposed actions or activities in the program.	a) The CMP does not deal with these matters. b) NVC has lead responsibility for all actions except for actions PA1 to PA5. Agencies other than NVC with responsibility for delivery of actions in this CMP have not yet provided their commitment to implementation, however NVC will liaise with these agencies to confirm their support during finalisation of the document.
s16(1)	Before adopting a coastal management program, a local council must consult on the draft program with: a) the community b) if the local council's local government area contains: i. land within the coastal vulnerability area, any local council whose local government area contains land within the same coastal sediment compartment (as specified in Schedule 1) ii. an estuary that is within two or more local government areas (as specified in Schedule 1), the other local councils c) other public authorities if the coastal management program: i. proposes actions or activities to be carried out by that public authority ii. proposes specific emergency actions or activities to be carried out by a public authority under the Coastal Zone Emergency Action Subplan relates to, affects or impacts on any land or assets owned or managed by that public authority	a) Section 1.1.1 discusses consultation undertaken as part of this CMP including public exhibition of the Draft CMP. b) NVC will liaise with Bellingen, Coffs Harbour and Kempsey local councils who share the same sediment compartments as Nambucca during finalisation of the CMP. c) i. Agencies other than NVC with responsibility for delivery of actions in this CMP have not yet provided their commitment to implementation, however NVC will liaise with these agencies to confirm their support during finalisation of the CMP. ii. The SES and other relevant public authorities will be consulted regarding the EASP during finalisation of the CMP.

Table 12: Section 2 Mandatory Requirements set out in *NSW Coastal Management Manual* (2018) – Part A

Mandatory Requirement		Where documented in CMP/Additional notes
MR2	A CMP is to consider a range of timeframes and planning horizons including immediate, 20 years, 50 years, 100 years and (if council considers it relevant based on expert advice) beyond.	The timeframe of risks assessed are summarised in Section 2.4 include the current timeframe. 20 years, 50 years, 100 years. Timeframes for the risk assessment is discussed in detail in *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a) and *Stage 2 Vulnerabilities and Opportunities Study* (Hydrosphere Consulting, 2020b).
MR3	A CMP is to consider a broad range of coastal management issues and management actions with a focus on achieving the objects and objectives of the *Coastal Management Act 2016*.	The range of coastal management issues are summarised in Section 2 and discussed in detail in *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a) and *Stage 2 Vulnerabilities and Opportunities Study* (Hydrosphere Consulting, 2020b). A broad range of management actions were assessed as part of the *Stage 3 Options Assessment* (Hydrosphere Consulting, 2020c) and refined and presented in Section 3. The coastal management actions identified in Section 3 address priority coastal management risks. Table 6, Table 7, and Table 8 in Section 3 list the identified coastal management threats addressed by each action.
MR4	A CMP must include the rationale for selecting the area to be covered by a CMP and identify whether it applies to: i. all or part of the coastal zone of one local government area; or ii. all or part of the coastal zone of adjoining local government areas that share a coastal sediment compartment or estuary (where adjoining local government areas share a coastal sediment compartment or estuary - refer to Schedule 1 of the *Coastal Management Act 2016* - a CMP that addresses an area comprising that coastal sediment compartment or estuary must reflect this regional context).	Section 1.3: Areas covered by this CMP. i. The area covered by this CMP is entirely within the Nambucca Valley LGA. ii. NVC will liaise with Bellingen, Coffs Harbour and Kempsey local councils who share the same sediment compartments as Nambucca during finalisation of the CMP.
MR5i	A CMP must identify: • any proposed amendments to mapping of the relevant coastal management areas.	N/A – no changes proposed at this time (refer Section 3.6).
MR5ii	A CMP must identify: • evidence to support any proposed amendments or additions to the area of the four coastal management areas in the relevant area.	N/A – no changes proposed at this time (refer Section 3.6).

Mandatory Requirement		Where documented in CMP/Additional notes
MR5iii	A CMP must identify: • information about these proposed amendments that can support the preparation of a planning proposal and, in particular, that could be forwarded along with a planning proposal to the Greater Sydney Commission (if the planning proposal relates to the Greater Sydney Region) or the Minister (for elsewhere) to inform a Gateway determination under section 3.34 of the Environmental Planning and Assessment Act 1979.	N/A – no changes proposed at this time (refer Section 3.6).
MR6i	During preparation of a CMP, a council is to identify the scope of the CMP	Section 1.1 and detailed in *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a).
MR6ii	During preparation of a CMP, a council is to: • determine and assess coastal risks, vulnerabilities and opportunities (including without limitation risks to environmental, social and economic values and benefits).	The range of coastal risks, vulnerabilities and opportunities are summarised in Section 2 and discussed in detail in *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a) and *Stage 2 Vulnerabilities and Opportunities Study* (Hydrosphere Consulting, 2020b).
MR6iii	During preparation of a CMP, a council is to: • evaluate and select coastal management options	Section 3.1 and detailed in *Stage 3 Options Assessment* (Hydrosphere Consulting, 2020c).
MR8i	A CMP must: • describe how the objects of the *Coastal Management Act 2016* have been considered and promoted in preparing the CMP [Refer section 3 of the Checklist]	The objects of the CM Act are reflected in the local objectives developed for this CMP, see Section 1.4. Also refer Table 13 to Table 15.
MR8ii	A CMP must: • provide a description of how the objectives of the coastal management areas covered by the CMP have been given effect to in preparing the CMP.	The management objectives for the coastal management areas are reflected in the objectives of this CMP, see Section 1.4. Also Refer Table 13 to Table 15 for discussion of how the objectives of each of the coastal management areas covered by the CMP have been given effect to in preparing the CMP .
MR8iii	A CMP must: • identify the key coastal management issues affecting the areas to which the CMP is to apply and how these have been considered.	The range of coastal management issues are summarised in Section 2 and discussed in detail in *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a) and *Stage 2 Vulnerabilities and Opportunities Study* (Hydrosphere Consulting, 2020b). The high priority threats relevant to each coastal management area are shown in Table 4. The coastal management actions identified in Section 3 address priority coastal management threats. Table 6, Table 7, and Table 8 in Section 3 list the identified coastal management threats addressed by each action. Also Refer Table 13 to Table 15.

Mandatory Requirement		Where documented in CMP/Additional notes
MR8iv	A CMP must: • identify any coastal management actions required to address those key coastal management issues in an integrated and strategic manner.	Programmed management actions required to address issues are identified in Sections 3.3, 3.4, and 3.5. Table 6, Table 7, and Table 8 in Section 3 list the identified coastal management threats addressed by each action.
MR8v	A CMP must: • identify how the coastal management actions in (iv) have been considered and evaluated (including, without limitation, how the council has evaluated the coastal management actions in light of the functions and responsibilities council has under legislation other than the *Coastal Management Act 2016)*.	Section 3.1 and detailed in *Stage 3 Options Assessment* (Hydrosphere Consulting, 2020c).
MR8vi	A CMP must: • identify any environmental protection works, on land identified as 'coastal wetlands' or 'littoral rainforests' on the Coastal Wetlands and Littoral Rainforests Area Map under the *State Environmental Planning Policy (Coastal Management) 2018*, that are proposed to be carried out by or on behalf of a public authority.	While the exact locations of many on-ground actions will be confirmed during CMP implementation, the following actions are likely to occur within areas mapped as Coastal Wetlands and Littoral Rainforests. This includes areas of Gumma Gumma Swamp, Lower Warrell Creek, Newee Creek, Deep Creek and the lower Nambucca River estuary and associated wetlands. • Strategy: Improve Biodiversity Values; Actions: BV1, BV2 and BV3 • Strategy: Manage Bank Erosion, Protect and Rehabilitate Riparian Zones; Actions: BER1, BER2 and BER3 • Strategy: Improve Water Quality; Actions WQ3, WQ4, WQ5, WQ6
MR8vii	A CMP must: • identify any coastal protection works that are proposed to be carried out by or on behalf of a public authority.	Section 3, coastal management actions CP1-CP6 under Strategy CP: Manage Risks Associated with Coastal Processes (Table 6).
MR8viii	A CMP must: • set out the recommended timing for the proposed coastal management actions.	The proposed timing of actions is specified in the Business Plan (Section 4).
MR8ix	A CMP must: • identify a proposed monitoring, evaluation and reporting program in relation to the CMP, including by identifying key indicators, trigger points and thresholds relevant to the CMP	The proposed monitoring, evaluation and reporting program in relation to the CMP is provided in Section 3.5.
MR8x	A CMP must: • include a business plan	Business Plan (Section 4).
MR9i	The business plan included in the CMP must identify: • all proposed coastal management actions identified elsewhere in the CMP.	The Business Plan (Section 4) includes all management actions identified in the CMP.

Mandatory Requirement		Where documented in CMP/Additional notes
MR9ii	The business plan included in the CMP must identify: • the full proposed capital, operational and maintenance costs, and recommended timing, of proposed coastal management actions	Business Plan (Section 4)
MR9iii	The business plan included in the CMP must identify: • any proposed cost-sharing arrangements and any other viable funding mechanisms for the proposed coastal management actions to ensure delivery of those actions is consistent with the timing for their implementation under the CMP	Business Plan (Section 4)
MR9iv	The business plan included in the CMP must identify: • the distribution of costs and benefits of all proposed coastal management actions.	Business Plan (Section 4)
MR10	Where coastal hazards have been identified in a coastal management area, a CMP must identify proposed coastal management actions for those hazards.	Refer Section 3, coastal management actions CP1-CP6 under Strategy CP: Manage Risks Associated with Coastal Processes (Table 6), actions PA2 and PA4 (Table 7) and actions MER2 and MER5 (Table 8).
MR11	If the *Coastal Management Act 2016* requires that a Coastal Zone Emergency Action Subplan be prepared, it must identify any requirements for how emergency coastal protection works, within the meaning of the *State Environmental Planning Policy (Coastal Management) 2018*, are to be carried out.	Coastal Zone Emergency Action Subplan (Appendix 1).
MR12i	A CMP must demonstrate how a council has considered: • projected population growth and demographic changes	Section 2.3.11 considers the influence of projected population growth and land use changes. This is detailed further in detail in *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a).
MR12ii	A CMP must demonstrate how a council has considered: • projected use of coastal land for infrastructure, housing, commercial, recreational and conservation purposes.	Section 2.3.11 considers the influence of projected population growth and land use changes. This is detailed further in detail in *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a). Actions PD1-PD3 under Strategy PD: Local Planning and Development Controls incorporate provisions as appropriate to control development in the coastal zones at risk of current or future coastal hazards.
MR13i	A CMP must demonstrate how a council has considered: current and future risks, at timeframes of immediate, 20 years, 50 years, 100 years and (if council considers it relevant based on expert advice) beyond	The timeframe of risks assessed are summarised in Section 2.4 include the current timeframe. 20 years, 50 years, 100 years. Timeframes for the risk assessment is discussed in detail in *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a) and *Stage 2 Vulnerabilities and Opportunities Study* (Hydrosphere Consulting, 2020b).

Mandatory Requirement		Where documented in CMP/Additional notes
MR13ii	A CMP must demonstrate how a council has considered: (if council considers it relevant) current and future risks of potentially high consequence, low probability events that may affect the relevant area	Section 2.3.12: High Consequence Low Probability Events.
MR13iii	A CMP must demonstrate how a council has considered: • the effects of projected climate change and how it may affect the relevant area.	Climate change impacts are summarised in Section 2.3.4 of this CMP and discussed in detail in *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a).
MR13iv	A CMP must demonstrate how a council has considered: • the local and regional scale effects of coastal processes.	Summarised in Section 2 of this CMP and discussed in detail in *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a).
MR13v	A CMP must demonstrate how a council has considered: • the ambulatory and dynamic nature of the shoreline and how it may affect the relevant area.	Summarised in Section 2 of this CMP and discussed in detail in *Stage 1 Scoping Study* (Hydrosphere Consulting, 2020a).
MR14	A CMP is to include the following sections: 1. Executive summary; 2. Introduction; 3. A snapshot of issues; 4. Actions to be implemented by the council or by public authorities; 5. Whether the CMP identifies recommended changes to the relevant planning controls, including any proposed maps; 6. A business plan; 7. Coastal zone emergency action subplan, if the *Coastal Management Act 2016* requires that subplan to be prepared; 8. Monitoring, evaluation and reporting program; 9. Maps; 10. Reference list	The CMP has been formatted according to Mandatory Requirement 14 with the following alterations to allow for better document flow, better reflection of the subject matter and to sufficiently cover the local issues of importance: • Snapshot of issues is renamed “Processes, Values and Threats”, with sub-sections for local issues. • Actions to be implemented by the council or by public authorities introduced under the main heading “Coastal Management Actions”. • “Whether the CMP identifies recommended changes to the relevant planning controls, including any proposed maps” is included under the main heading of “Coastal Management Actions”. • Coastal Zone Emergency Action Subplan provided as Appendix 1 to allow for access and use, independent of the CMP as needed.
MR15	A draft CMP must be exhibited for public inspection at the main offices of the councils of all local government areas within the area to which the CMP applies, during the ordinary hours of those offices, for not less than 28 calendar days before it is adopted. This mandatory requirement does not prevent community consultation, or other consultation, in other ways.	Section 1.1.1 - The draft CMP and associated documents were publicly exhibited during June/ July 2021 in accordance with Mandatory Requirement 15.

Mandatory Requirement		Where documented in CMP/Additional notes
MR16	When implementing a CMP, a council must: • carry out the monitoring, evaluation and reporting program in the CMP (MER) • monitor key indicators, trigger points and thresholds identified in the MER	A MER program is provided in Section 3.5 with performance targets provided in action descriptions Sections 3.3, 3.4, and 3.5.
MR17	Councils must report on the implementation of a CMP through the IP&R framework on an annual, four yearly and ten-yearly basis.	MER11: Review of CMP progress includes annual reporting of CMP progress towards performance targets as part of the IP&R framework. The Business Plan (Section 4) and action implementation tables Sections 3.3, 3.4, and 3.5 provide details to enable the actions to be implemented through council's IP&R Framework.
MR18	When an adjoining council or a public authority is affected, or is likely to be affected, by implementation of some aspect of a CMP, a council must liaise with that authority when implementing that aspect of the CMP.	Agencies other than NVC with responsibility for delivery of actions in this CMP have not yet provided their commitment to implementation, however NVC will liaise with these agencies to confirm their support during finalisation of the CMP. The SES and other relevant public authorities will be consulted regarding the CZEAS during finalisation of the CMP.
MR19	Councils must maintain sufficient information and records about its management of the relevant parts of the coastal zone that will enable it to demonstrate: i. how the CMP has been implemented; and ii. what has been achieved in connection with the CMP, including whether coastal management actions have been carried out within the timeframes identified in the CMP	A MER program is provided in Section 3.5, Including action MER11: Review of CMP progress and MER12: 10-year review of CMP.

Table 13: Management objectives for the coastal wetlands and littoral rainforests area (Section 6 *Coastal Management Act 2016*)

No.	Management objective	Where documented in CMP / Additional notes.
a)	to protect coastal wetlands and littoral rainforests in their natural state, including their biological diversity and ecosystem integrity	Section 1 of this CMP states – "Nambucca Valley Council (NVC) has prepared this Coastal Management Program (CMP) to set the long-term strategy for the coordinated management of the Nambucca coastline and estuaries with a focus on achieving the relevant objectives for each coastal management area from the Coastal Management Act 2016 (CM Act)". The CMP also focuses on the protection of specific local objectives (Table 2), based on the community values for the estuary. Several of these local objectives align with this management objective. For example, CMP Objective 7 - to protect and enhance habitats to improve the health, biodiversity and scenic value of the Nambucca coastline and estuaries and Objective 8 - to encourage and support strategies to improve the health and resilience of the Nambucca coastline, estuaries and respective catchment areas. Action MER3 includes a prioritisation of significant estuarine vegetation areas at risk of coastal squeeze and includes consideration of lands that may be suitable for upslope migration of coastal wetlands and littoral rainforest. Several management strategies and actions generally promote CM Act Management Objective 6(2)(a) including (but not limited to): • Improve Biodiversity Values (Actions BV1-3). • Manage Bank Erosion, Protect and Rehabilitate Riparian Zones (Actions BER1-3). • Improve Water Quality (Actions WQ1-9). • Facilitate Safe and Sustainable Recreational Use (RU1-3) • Education and Consultation (Actions EC1-3). • MER Actions (MER1,3,4,7)
b)	to promote the rehabilitation and restoration of degraded coastal wetlands and littoral rainforests	
c)	to improve the resilience of coastal wetlands and littoral rainforests to the impacts of climate change, including opportunities for migration.	
d)	to support the social and cultural values of coastal wetlands and littoral rainforests.	Protect Cultural Heritage Values (Action CH1); Facilitate Safe and Sustainable Recreational Use (RU1-4) and Education and Consultation (Actions EC1-3) support social and cultural values and address local issues affecting these values.

No.	Management objective	Where documented in CMP / Additional notes.
e)	to promote the objectives of State policies and programs for wetlands or littoral rainforest management.	Refer a) (above) Additional relevant sections in this CMP include: • Description of the Coastal Management Areas (Section 1.3). • The CMP vision and Coastal Management Objectives (Section 1.4). • Existing management arrangements (Section 1.5), Regional and local strategies (Section 1.6). • Actions related to research, monitoring and mapping (Actions MER1-8). • Actions related to communication and education (Actions EC1-3). The CMP is considered to generally promote the intentions (where relevant) of: • *Coastal Management SEPP 2018.* • NPWS park management policies. • The MEMS.

Table 14: Management objectives for the coastal environment area (Section 8 *Coastal Management Act 2016*)

No.	Management objective	Where documented in CMP / Additional notes.
a)	to protect and enhance the coastal environmental values and natural processes of coastal waters, estuaries, coastal lakes and coastal lagoons, and enhance natural character, scenic value, biological diversity and ecosystem integrity,	This CMP contains a suite of actions to protect and improve the environmental values and natural processes of the Nambucca coastline and estuaries. The CMP has a focus on addressing the key issues of concern including Improve Biodiversity Values (Actions BV1, BV2, BV3); Manage Bank Erosion, Protect and Rehabilitate Riparian Zones (Actions BER1-3); Improve Water Quality (Actions WQ1-9); Facilitate Safe and Sustainable Recreational Use (RU1-4) and Education and Consultation (Actions EC1-3).
b)	to reduce threats to and improve the resilience of coastal waters, estuaries, coastal lakes and coastal lagoons, including in response to climate change,	This CMP contains actions to address the threat of continued water quality decline through Improve Water Quality (Actions WQ1-9). Climate change impacts including flooding and sea level rise threats are addressed through planning actions (Actions PD1-4) and actions to be implemented as part of the Strategy - Manage Risks Associated with Coastal Processes (Actions CP1-7).
c)	to maintain and improve water quality and estuary health,	This CMP contains actions to address the threat of continued water quality decline through Improve Water Quality (Actions WQ1-9); and estuary health through Improve Biodiversity Values (Actions BV1, BV2, BV3); Manage Bank Erosion, Protect and Rehabilitate Riparian Zones (Actions BER1-3); Facilitate Safe and Sustainable Recreational Use (RU1-4) and Education and Consultation (Actions EC1-3).

No.	Management objective	Where documented in CMP / Additional notes.
d)	to support the social and cultural values of coastal waters, estuaries, coastal lakes and coastal lagoons,	This CMP contains actions to support social and cultural values through the Strategies - Protect Cultural Heritage Values (Action CH1); Facilitate Safe and Sustainable Recreational Use (RU1-4) and Education and Consultation (Actions EC1-3) support social and cultural values and address local issues affecting these values.
e)	to maintain the presence of beaches, dunes and the natural features of foreshores, taking into account the beach system operating at the relevant place,	Coastal hazards are addressed in Manage Risks Associated with Coastal Processes (Actions CP1-7).
f)	to maintain and, where practicable, improve public access, amenity and use of beaches, foreshores, headlands and rock platforms.	This CMP contains actions to improve public access and amenity through the Strategy - Facilitate Safe and Sustainable Recreational Use (RU1-4)

Table 15: Management objectives for the coastal use area (Section 9 *Coastal Management Act 2016*)

No.	Management objective	Where documented in CMP / Additional notes.
a)	to protect and enhance the scenic, social and cultural values of the coast by ensuring that: (i) the type, bulk, scale and size of development is appropriate for the location and natural scenic quality of the coast, and (ii) adverse impacts of development on cultural and built environment heritage are avoided or mitigated, and (iii) urban design, including water sensitive urban design, is supported and incorporated into development activities, and (iv) adequate public open space is provided, including for recreational activities and associated infrastructure, and (v) the use of the surf zone is considered,	Strategy: Local Planning and Development Controls (Action PD1) includes actions to control development in the coastal zones at risk of current or future coastal hazards. Action WQ8 ensures best-practice stormwater treatment systems are installed and maintained, and the continuation of low-impact land management practices in the catchment. Action PD2 ensures that adequate public open space is provided for recreational activities and associated infrastructure and that these activities have minimal impact on the natural environment.
b)	to accommodate both urbanised and natural stretches of coastline.	