

WOOLI BEACH COASTAL MANAGEMENT

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Abstract

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Wooli Beach is recognised by the NSW Government as a coastal erosion 'hotspot' and coastal risk threatens both the beach and the adjacent village. The Wooli community has a long involvement with the development of a Coastal Zone Management Plan (CZMP). Coastal hazard investigations commenced in the mid-1990s and implementation of management strategies has been largely ineffective in mitigating risk, particularly to property.

Increasing community awareness of local coastal hazards, 'grass roots' action and building better working relationships between the community and government has been a significant feature in moving towards adoption of a revised CZMP. Recognition of community preference for 'soft' management options led to an investigation of potential sand sources and their feasibility for nourishment of Wooli Beach. This investigation did not take into account legislative or administrative constraints, or land tenure.

A revised CZMP for Wooli Beach now proposes beach nourishment, sourcing sand from Yuraygir National Park and Solitary Islands Marine Park as the main on-ground action to reduce coastal risk to the environment and built assets. The Beach Nourishment Scheme (BNS) is designed to provide an effective buffer for up to a 50 ARI year storm.

The proposed sand extraction is inconsistent with the *NSW Coastal Policy* and the *National Parks and Wildlife Act 1974*. Sand extraction is acknowledged to have environmental consequences that are a cost of providing added erosion buffering for the village. Other management actions would reduce risk to human life and assets and further educate the community, whilst keeping an eye to the future. Investigation of a land swap scheme is a lower priority action included in the CZMP aiming to maintain the Wooli community over a longer timeframe.

This paper reflects on the history of coastal management at Wooli and the current direction, which seeks to implement more effective management, build on improved working relationships across State and Local Government and the Wooli community, and repair trust.

Background

Wooli Beach is one of two erosion "hotspots" in the Clarence Valley, the other being Brooms Head Beach, and one of 15 along the NSW Coast. Several coastal hazard and management planning investigations, including consultations with the community and government agencies, have taken place at Wooli since the mid-1990s all of which have contributed to the development of the current draft Wooli Beach CZMP. The main formative studies were the coastal hazard definition study (PBP, 1997), the draft Wooli

Village CMP (WP, 2010), and the draft Emergency Action Sub-Plan (CVC, 2012). The draft Wooli CZMP was submitted to the Minister for Planning for certification under the *Coastal Protection Act 1979* in June 2015. The Minister is currently making his assessment of whether the CZMP meets the requirements of the Act and the minimum requirements of the Guidelines for Preparing CZMPs (OEH, 2013). See update in Summary.

The shoreline distance covered by the CZMP extends 6.6 km from the entrance of the Wooli Wooli River in the south to Wilsons Headland in the north. The CZMP area includes parts of Yuraygir National Park (NP), Solitary Islands Marine Park (MP), Crown reserves and unalienated Crown land. The CZMP area is shown in **Figure 1**. An aerial oblique photo showing part of Wooli Beach, the lower reaches of the Wooli Wooli River and the narrow spit of land accommodating the original Wooli Village is presented in **Plate 1**. Note that a reference to Wooli Village in this paper generally refers to the original village, shown in the insert to **Figure 1**, not the newer northern subdivision.



Figure 1 – Area covered by CZMP



Plate 1 – Lower reaches of Wooli Wooli River, the southern part of Wooli Beach and original village area located along the threatened spit (Source OEH)

The purpose of the Wooli CZMP is to describe actions that address the main issues of risk to persons and assets, pressures on coastal ecosystems and use of the coast. A mechanism for implementing the actions must also be provided, with clear links identified between the CZMP and other plans. The scope of the investigations required an understanding of the coastal hazard to 2100 and identification of options to manage the coastal issues and hazards. The CZMP would have a life of 10 years after which it would need to be reviewed and updated.

Implementation of the CZMP actions would be managed by the Clarence Valley Council (CVC) Coast and Estuary Management Committee.

Coastal Values and Issues

Wooli offers a highly valued beach amenity that has been impacted intermittently by storm erosion, most notably in 1954, 1974, 1996 and 2009. Beach uses include swimming, surfing, fishing, walking and four-wheel driving (4WD). There are 13 formal beach access points. Issues associated with access relate to the design, safety and maintenance of the beach accesses, public safety during erosion events, the impact of informal access tracks on the dune and damage to the incipient dune from 4WDs. Community and other uses are shown in Error! Reference source not found..

Areas of natural value covered by the CZMP are recognised by their inclusion in Yuraygir NP and the Solitary Islands MP. Six endangered ecological communities (EECs) are considered to occur in the general Wooli area including lowland and littoral rainforest, coastal saltmarsh, swamp forest and freshwater wetlands (CVC, 2006). The main issues for coastal ecosystems are vegetation damage, weeds and bushfires.

Coasts and wetlands generally are considered to be of high Aboriginal cultural heritage value, in particular foredunes, hind dunes (mainly near waterbodies) and high ground which generally overlooks waterbodies. Potential damage to recorded and unrecorded sites from coastal erosion is an issue, as is informal access through sensitive dune

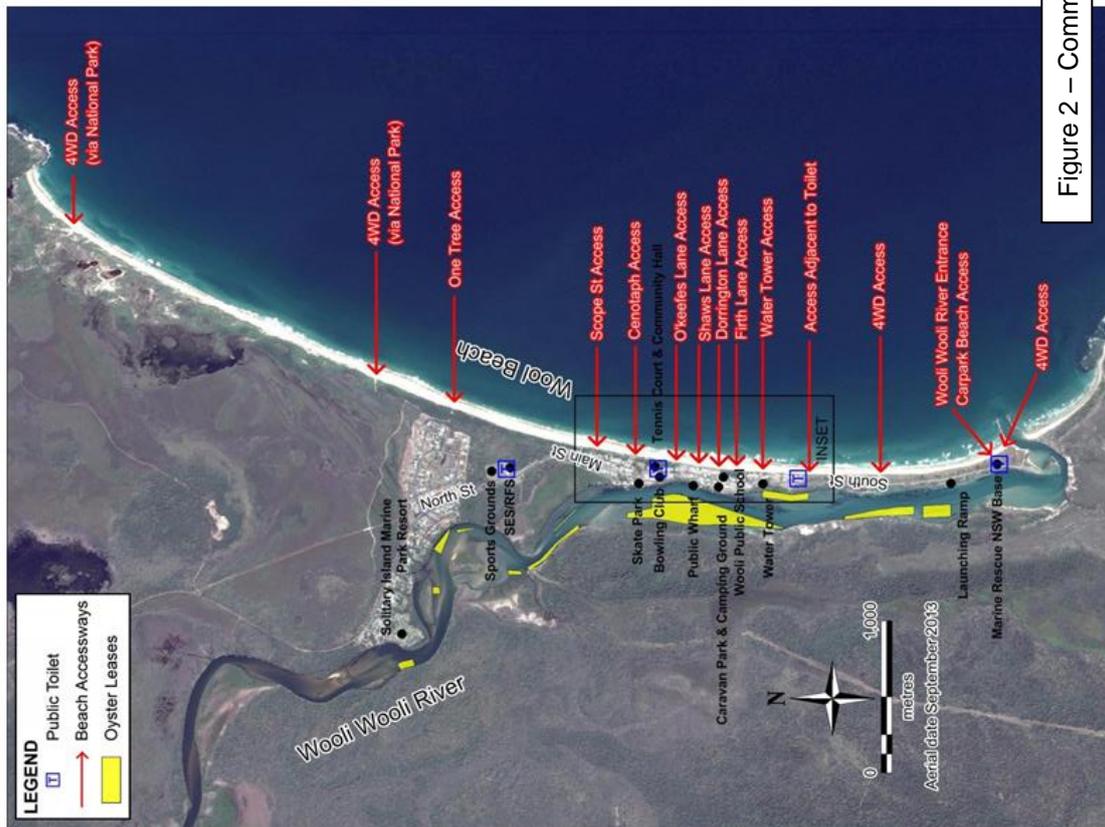
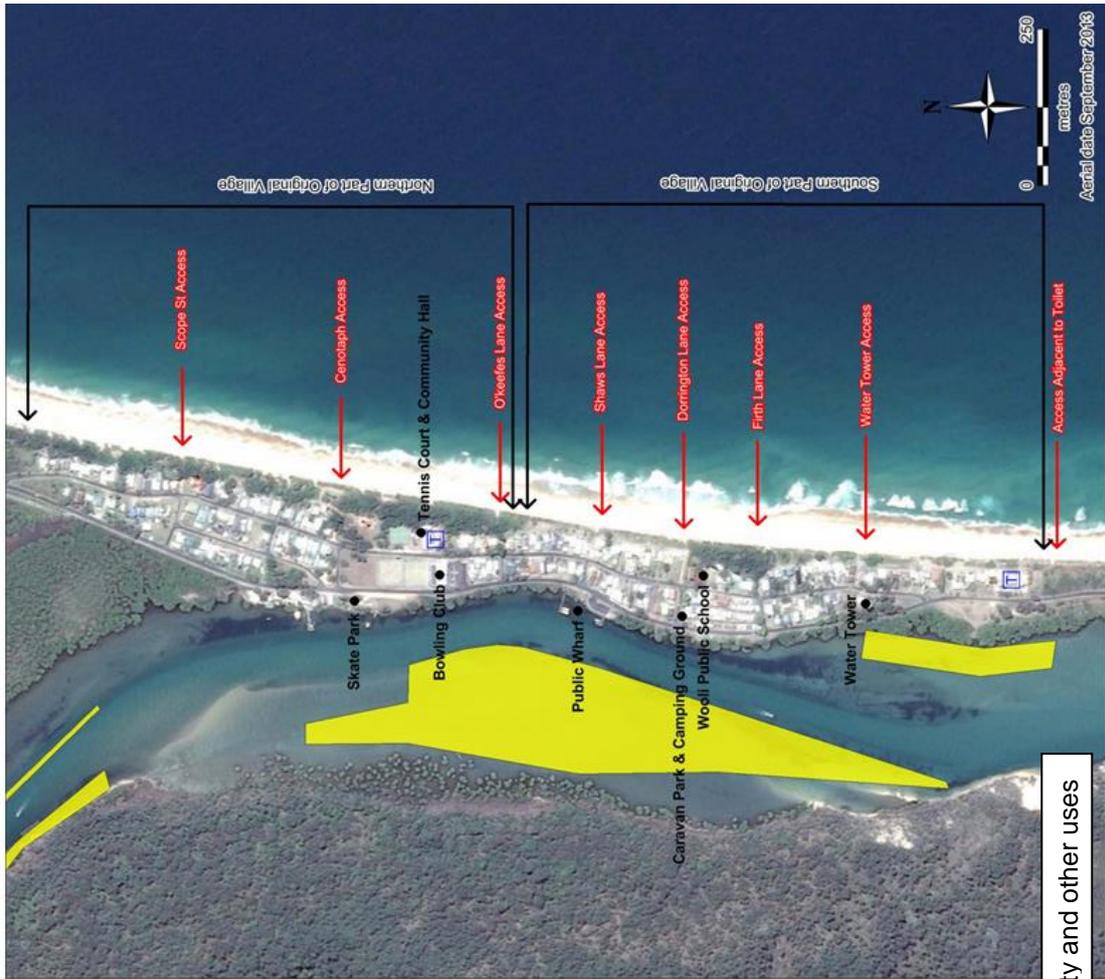


Figure 2 – Community and other uses

areas, and new development or redevelopment particularly if earthworks are involved. It is noteworthy that there are no non-indigenous heritage items or heritage conservation areas identified for the Woolli Village.

Coastal Hazards and Risks

Coastal hazards and hazard mapping for Woolli Beach was initially carried out by Patterson Britton & Partners (1997) and later reviewed by WorleyParsons (WP 2010). Beach erosion of up to 15 m has occurred during past major storms, and average beach recession has ranged between 0.3 and 0.5 m/yr, with 0.4 m/yr applying to the village (1942 – 2006). The entrance to the Woolli Woolli River is trained and stable, although the spit is narrow immediately north of the original village and vulnerable to breakthrough. The impacts of climate change need to be taken into account to define future hazards. Hazard mapping for the original Woolli Village is shown in **Figure 3**.

There are 44 dwellings, one business premises and four foreshore reserves at immediate erosion risk from storms. This increases to 94 dwellings, two businesses and six foreshore reserves by 2050, and 159 dwellings and six businesses by 2100. By 2100, 87% of all dwellings in the original village would be impacted by beach erosion. The risk at 2050 extends to the water tower, the Public School and the South Terrace roadway.

By 2100, in absence of protection works, hazard mapping indicates that the shoreline of original village would essentially erode back to the eastern bank of the river in a 100 year ARI storm. No structures or rock protection are proposed as this is inconsistent with the amenity and character of the village, and community feedback has identified a preference for actions that provide additional resilience against current storm erosion hazard while maintaining beach amenity.

Based on the probability of major storm events over the next 50 years and likely consequences of a range of storm events, risk levels are assessed as low for the vegetated dunes, medium for beach accessways, and high for the foreshore reserves and dwellings located within 17.5 m of the dune crest. The remainder of foreshore dwellings are assessed to be at medium risk.

Management Options

The following management options were considered and reported on over the past 15 to 20 years through ongoing coastal management investigations to address risks to assets shown in **Figure 3**:

- property relocation, voluntary purchase or acquisition
- public assets/ services relocation/ modification
- land swap
- beach nourishment (sand from Woolli Woolli River and dune fields)
- beach sand back-passing (moving sand from northern to southern part of beach)
- planning and development controls
- beach monitoring (to gain a better understanding of coastal hazards)
- seawall (full length)
- seawall (partial)
- groyne field and nourishment
- massive beach nourishment (sand sourced outside Woolli area)
- beach scraping (moving sand across the beach from the swash zone to the dune)

- dune management

More recently the Woolli sand sources study (RHDHV, 2015) added to this body of information as discussed later in this paper, see Beach Nourishment Scheme and subsequent section dedicated to the sand sources study.

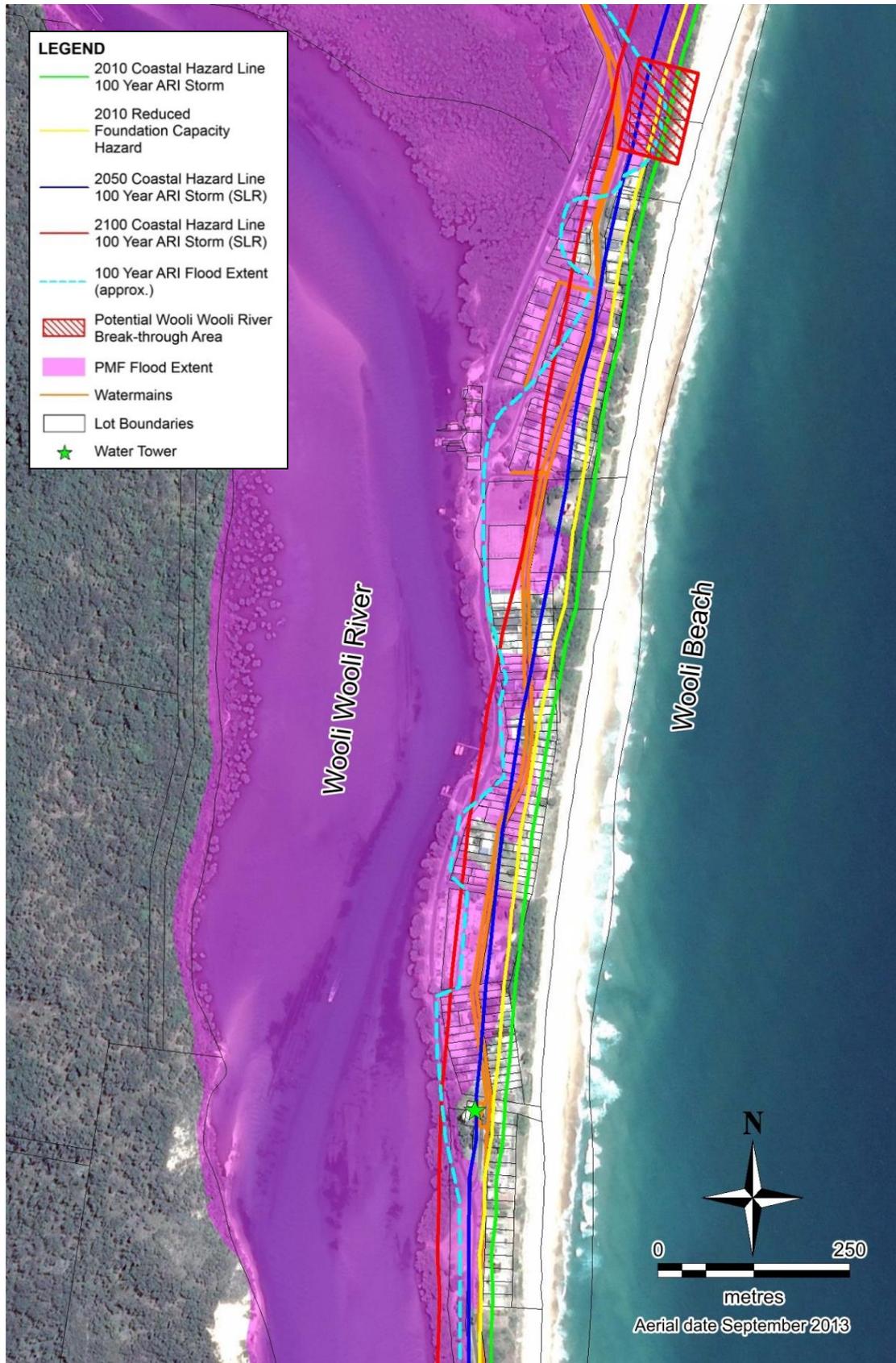


Figure 3 –Hazard mapping for original Woolli Village

Re-evaluation of the options developed in 1997 (PBP) and 2010 (WP) sought to establish whether they were feasible, reasonable and able to be funded.

Generally, all the options were assessed to be technically feasible. However, built structures were not considered reasonable based on cost and environmental and beach amenity impacts, and massive beach nourishment (whole compartment) was discounted primarily on cost. Options involving relocation of dwellings were generally not considered reasonable due to social impacts, however, there is some cautious support for a public/ private land swap to allow people to stay at Woolli should no other options be helpful over the longer term.

Modification of public assets and services is considered reasonable. Beach nourishment, sand back-passing, beach scraping and dune management are considered reasonable and affordable. The Woolli Dune Care group has been very active since 2012 undertaking dune rehabilitation and revegetation. Beach monitoring is considered reasonable and affordable, and CVC and the Woolli chapter of the Coastal Communities Protection Alliance (CCPA) are currently undertaking survey and other monitoring activities. Planning and development controls have been applied since the 1990s and further refinements in this regard are proposed.

CZMP Actions

Management Actions are summarised in **Table 1**, which indicates how each action would be implemented, many of which would be under existing plans or programs. Where actions are implemented under this CZMP, costs and funding arrangements are included.

Funding for the Beach Nourishment Scheme (BNS), a priority action under the CZMP, would be apportioned in consideration of the benefits it provides to both private and public lands. A special levy or charge applied under the *Local Government Act 1993* to benefiting landowners is one method to assist in funding implementation of the Scheme. Other funding and financing schemes are currently being investigated by the NSW Government as part of the Stage 2 Coastal Reforms and hence, additional or alternative funding options may be available to implement the CZMP, including the BNS.

CVC is responsible for implementing actions under the CZMP and would consult with relevant stakeholders. In principle agreement to the actions in the CZMP by other agencies was sought as part of the exhibition of the Draft CZMP.

Table 1 – CZMP Implementation Schedule

Management Strategy	Action	Implementation through other plan/ program/ legislation or funding arrangements under CZMP	Priority	Timeframe/ Frequency
Beach Nourishment Scheme (BNS) Pre-implementation	Detailed design	application submitted to OEH	High	2015-2016
	Design and obtain approvals for beach scraping works adjacent to original Woolli village	\$7,500 CVC / \$7,500 OEH application submitted to OEH and CVC staff time not costed	High	Scraping works to be undertaken when the beach profile displays a low swale adjacent to the main dune and a higher berm level at the front of the beach
	Environmental impact assessment	\$40,000 CVC/ \$40,000 OEH application submitted to OEH	High	2016
	Approvals documentation	CVC staff time not costed	High	2017
	Detailed funding plan over likely life of BNS	CVC staff time not costed	High	2016-2017
BNS Implementation	Beach nourishment campaigns	CVC/ OEH/ benefiting landowners	High	2018 and every 5 years thereafter
BNS Monitoring	Nearshore wave and current monitoring	\$25,000 CVC/ \$25,000 OEH	High	2018-2020 (continuous)
	Sand tracing	\$150,000 CVC/ \$150,000 OEH	High	2018-2020 (2-3 campaigns/yr)
Routine Beach Monitoring	Beach camera monitoring	current activity by CCPA	High	Ongoing - to be reviewed post beach nourishment
	Beach surveys (including beach pole monitoring)	current activity (quarterly) by CCPA	High	Ongoing post storm with current frequency to be reviewed post beach nourishment
	Photogrammetry	OEH through CM Program	High	2018 and every 1-2 years thereafter
	Offshore wave data collection	OEH/ MHL through CM Program	High	Ongoing
	LiDAR (alternative to photogrammetry)	LPI through current program	Low	2018 and 1-2 years thereafter (if photogrammetry unavailable)
Emergency Management	Implement EASP and review periodically (e.g. post storm event)	Clarence Valley DISPLAN	Very High	Review when hazard lines and risk assessments are updated and in accordance with process in EASP
Community Education	Update community on CZMP implementation and coastal management matters relevant to Woolli	Local community newsletter and CCPA	Very High	Ongoing
	Encourage landowners to manage their assets to	EASP and local community newsletter	Medium	Ongoing

Management Strategy	Action	Implementation through other plan/ program/ legislation or funding arrangements under CZMP	Priority	Timeframe/ Frequency
	reduce, where practical, the risk from current and future coastal hazards and coastal management matters relevant to Wooli			
Planning and Development Controls	Amend coastal risk planning map to be consistent with 2100 hazard line in WP (2010a).	Clarence Valley (CV) LEP 2011	High	2015
	Update information on Section 149 Certificates	Environmental Planning and Assessment (EP&A) Act 1979 and Regulation 2000	High	2015
	Include provisions that no new subdivisions or LEP amendments would be permitted that increase intensity of development seaward of 2100 hazard line	CV LEP 2011 and Development Control Plan (DCP) 2011	High	2015
	Prepare and implement revised development control provisions for Wooli to more effectively implement Clause 7.5 of the CV LEP 2011.	Clarence Valley DCP 2011 and EP&A Act 1979 for new development proposals/ Development Applications (DAs)	High	2015
	Review Sea Level Rise Policy	CVC Policy Register	Medium	When new data is available, when State Gov. policy changes and/ or as specified in the Policy
Town Services Contingency Strategy	Plan for relocation/ modification/ redesign of utilities etc potentially at risk	not costed, requires input of Telstra, Essential Energy & other service providers	Medium	2020
Beach and Dune Management	Suitable sand from Wooli Wooli River to be placed on Wooli Beach	CVC/ NSW Government Rescuing our Waterways Program (or equivalent)	Low	If/ when dredging required for safe navigation
	Beach and dune rehabilitation, revegetation and weed control	Crown Lands and CVC/CCRT through Dune Care, Yuraygir NP and SIMP management programs	High	Ongoing (note plans/ programs may need review following implementation of BNS)

Management Strategy	Action	Implementation through other plan/ program/ legislation or funding arrangements under CZMP	Priority	Timeframe/ Frequency
Beach Access Management	Minor and localised beach scraping at, and maintenance of, formal beach accessways	EASP (and CZMP)	High	Ongoing (when public safety is unacceptable and sufficient sand is on the beach)
	Install fencing to direct pedestrians to formal accessways and rehabilitate informal 'private' tracks	Dune Care Program	Medium	2017
	Manage vehicle access	Beach Access or Vehicles on Beaches Policy (or similar)	High	Ongoing
Conservation of Aboriginal sites	Protect/ conserve known and unknown middens etc	EP&A Act 1979 and Regulation 2000 and National Parks and Wildlife Act 1974	High	Ongoing
CZMP Implementation and Review	Supervision of BNS implementation by sub-committee of CVC Coast and Estuary Management Committee	staff/ agency/ volunteer time not costed	High	After certification of CZMP
	Revise/ update CZMP	CVC/ OEH through CM Program	Low	Once actions are implemented, if significant issues arise or within 10 years (whichever occurs first)
	Prepare a revised coastal hazard study	\$25,000 CVC / \$25,000 OEH	Low	2023 to coincide with the second round of BNS nourishment
Trigger Actions	Geotextile groynes and/ or additional beach nourishment, or other actions	cost dependent on design CVC/ OEH/ benefiting landowners	Low	If trigger point reached (i.e. less than 155,000 m ³ of sand in front of southern part of original village)
Investigate Land Swap Scheme	Public land suitability study for residential use	staff time not costed, requires input from Crown Lands & Dept. Education	Low	2020 (investigation only) Implementation of scheme if trigger point reached and other actions unsuccessful

Beach Nourishment Scheme (BNS) Priority On-ground Management Action for Woolli Beach

A BNS was identified as a priority action to mitigate current risks to the environment and built assets at Woolli Beach at the original village. The approach is to “hold the line” against sediment budget recession and protect the village from a 50 year ARI storm event (Error! Reference source not found. and **Figure 5**). The BNS does not consider Sea Level Rise (SLR) projections directly, but focuses on current risk. The BNS relies on comprehensive monitoring to confirm performance and design optimisation prior to renourishment campaigns so that it is prudent and affordable.



Figure 4- Areas for property protection analysis

BNS provisional program:

1. Commence as soon as possible “well structured” and “targeted” beach monitoring including aerial/ beach surveys, wave and current measurements, and sand tracing.
2. Design the BNS, undertake Environmental Assessment (REF/EIS), seek necessary legislative amendments and/or approvals.
3. Undertake Nourishment Campaign 1 (NC1) ~ 60,000 m³ opposite southern half of original village within 3 years (2018). This is designed to maintain a protective buffer to dwellings from a 50 year storm (195 m³/m storm demand) and account for sediment budget recession over the subsequent 5 years.
4. Continue with monitoring.

5. After the 5 years, undertake NC2 (2023), also limited to the southern half of village, and also involving ~60,000 m³.
6. Continue monitoring and NCs at 5 yr intervals. Nourishment to extend to northern half of original village in approximately 20-30 yrs.
7. Implement Trigger Action Plan (TAP) if sand reserve in front of village falls below 50 year ARI storm buffer. TAP may involve one or more of the following:
 - Increased beach nourishment.
 - Inclusion of geotextile container groyne(s) to contain sand placements.
 - Initiation of land swap scheme.
 - Other actions determined at the time.

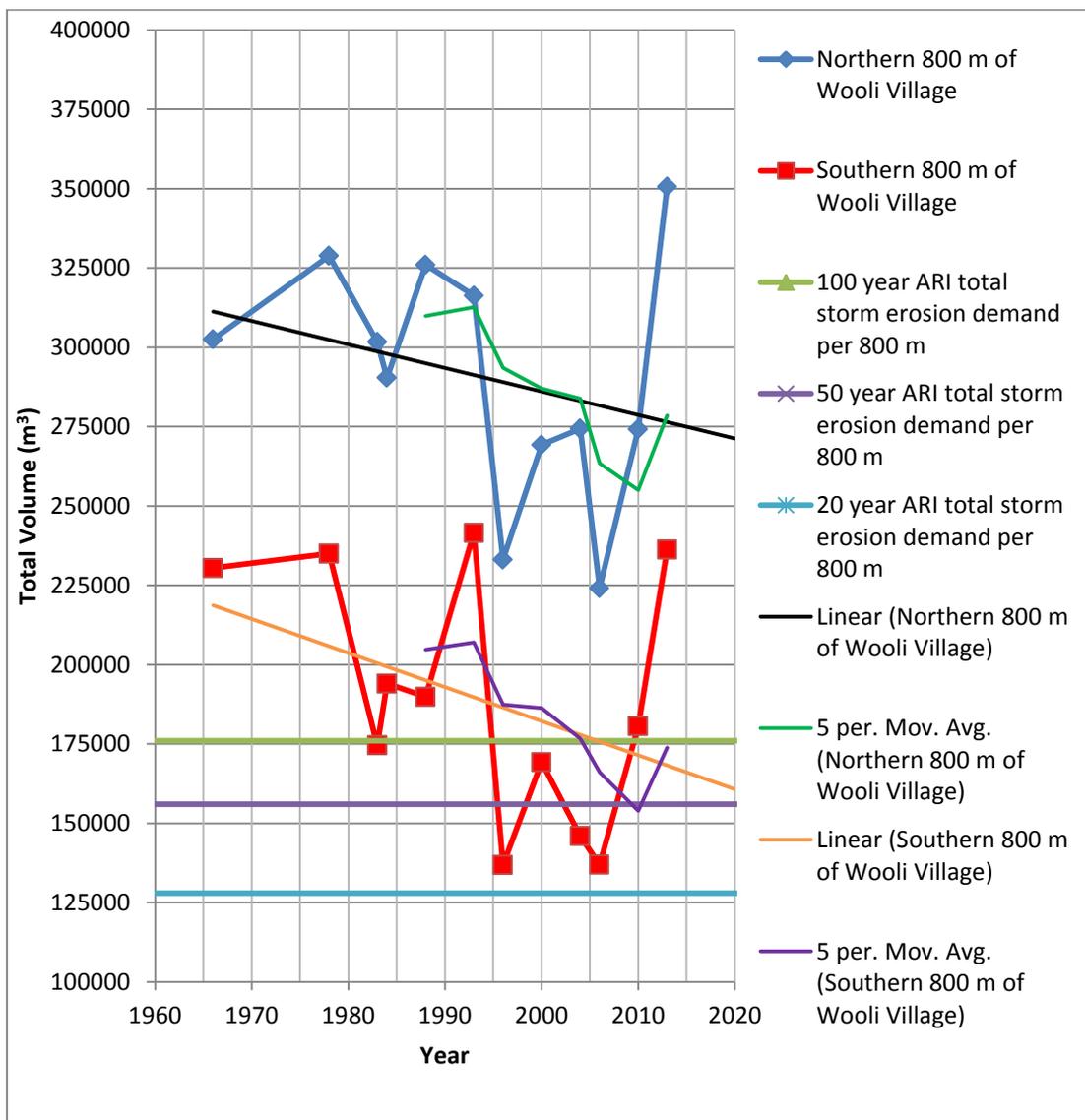


Figure 5 - Total volume of sand in front of the southern and northern 800 m of Wooli Village above mean sea level based on available photogrammetry and storm erosion demand

CVC would endeavour to obtain the design nourishment volume required, ie 60,000 m³ for each campaign. However, if the 60 000m³ of sand cannot be obtained, then the maximum available sand volumes should be used for beach nourishment and the effects monitored. Where this situation occurs, a reduction in the protective benefit of the nourishment would occur if nourishment campaigns remained at 5-year intervals.

Alternatively, nourishing at shorter intervals with lesser sand volumes could achieve the design protective buffer.

The cost of the proposed BNS is estimated at \$2.1 million per nourishment campaign. Monitoring in the first three years after sand placement is estimated at \$350,000 (i.e. approximately \$116,700 per year). It is assumed that existing monitoring and data collection would be ongoing under current funding arrangements (i.e. has not been accounted for in the BNS costs).

CVC recognises that the BNS is inconsistent with the *NSW Coastal Policy* 1997, in particular Strategic Action 5.2.9, due to the proposal to source sand from within Yuraygir NP. However, CVC considers that this inconsistency is justified in the circumstances of the case. Current legislation would require amendment in order to enable the sand extraction, and revocation of part of the Yuraygir NP would appear to be the most efficient solution.

It should be noted that emergency management and community education actions are assigned 'Very High' priority in this CZMP (**Table 1**) as these actions aim to reduce risk to public safety and effectively save lives in both the immediate and longer term, especially during storm events.

Investigation of Sand Sources for Nourishment of Woolli Beach

Background

CVC, in liaison with the Woolli community and the NSW Office of Environment and Heritage (OEH), investigated the feasibility of utilising different sources of sand for nourishment of Woolli Beach and other beaches in the area. This investigation was carried out concurrently with the update of the Woolli CZMP which identified beach nourishment as the preferred option to address the immediate erosion problem.

Large quantities of sand are required to nourish Woolli Beach to protect Woolli Village from storm erosion and long term recession. Preliminary investigations established that 60,000 m³ of sand placed within the next 3 years, and thereafter every 5 years, should 'hold the line' of Woolli Beach fronting the village for storm events up to 50 year ARI event. If protection against less intense storm events was acceptable, then the initial 3 year sand placement window could be increased however the subsequent placement rate would remain unchanged at approximately 12,000 m³ per year. It should be noted that other beaches on the NSW North Coast are also threatened and feasible sand reserves to potentially nourish a number of beaches are limited.

Scope and Key Outcomes

The *Investigation of Feasibility of Utilising Sand Sources for Beach Nourishment in Vicinity of Woolli, NSW* (RHDHV, 2015) examined small (**Figure 6**) and large (**Figure 7**) potential sand sources in the Woolli Woolli River, at the northern end of Woolli Beach and in the adjacent dunes near Wilsons Headland; and offshore sand reserves off Woody Head and Cape Byron, between Wilsons Headland and North Solitary Island, and further offshore extending to 35 m water depths in the general vicinity of the Woolli embayment.

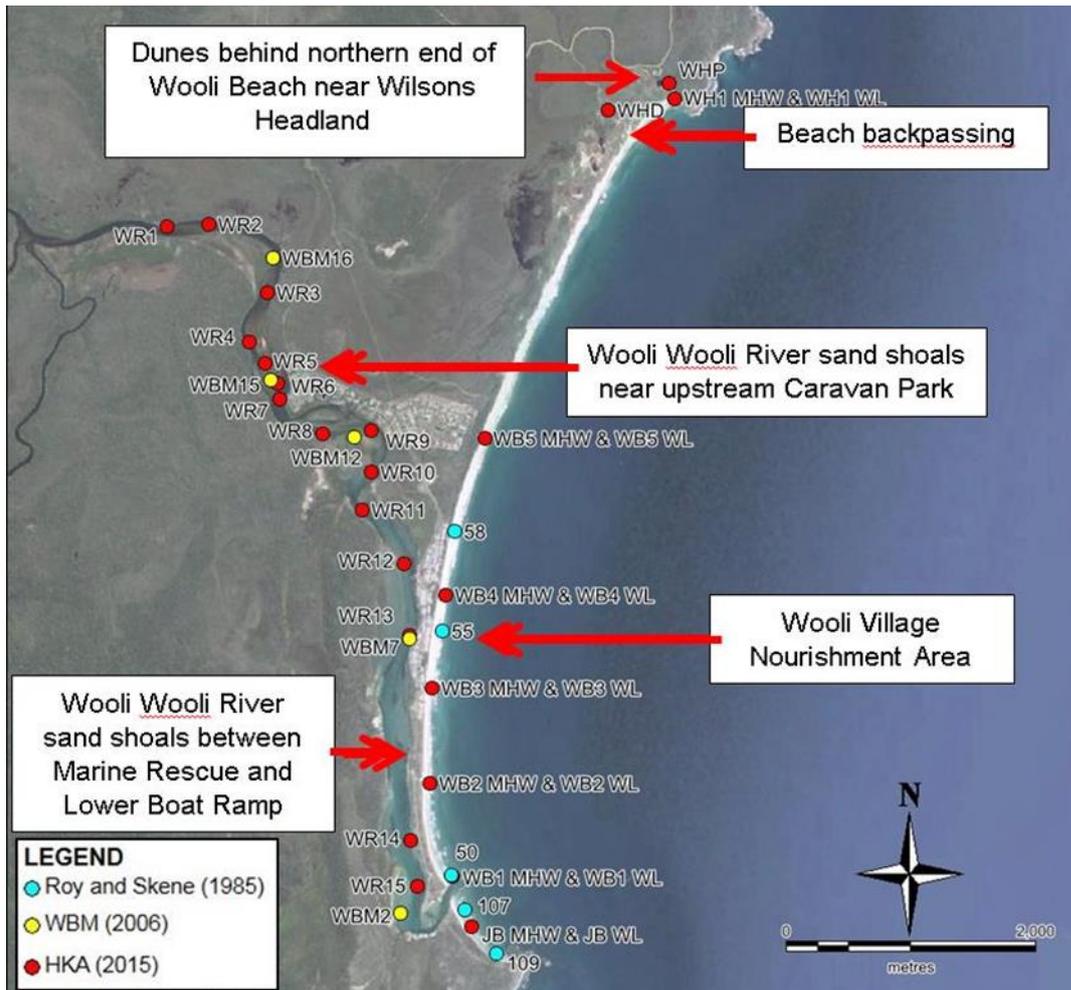


Figure 6 - Location of small scale sand sources

The investigation involved:

- collation and review of background information
- engineer field inspections and preliminary investigations
- sand replenishment requirements at Woolli Beach and other regional beaches
- identification and technical feasibility assessment of potential “small” and “large” scale sand sources
- assessment of nourishment compatibility
- cost estimate for sourcing and placing sand
- consideration of the coastal planning context and legislative planning constraints
- identification of gaps in technical information.

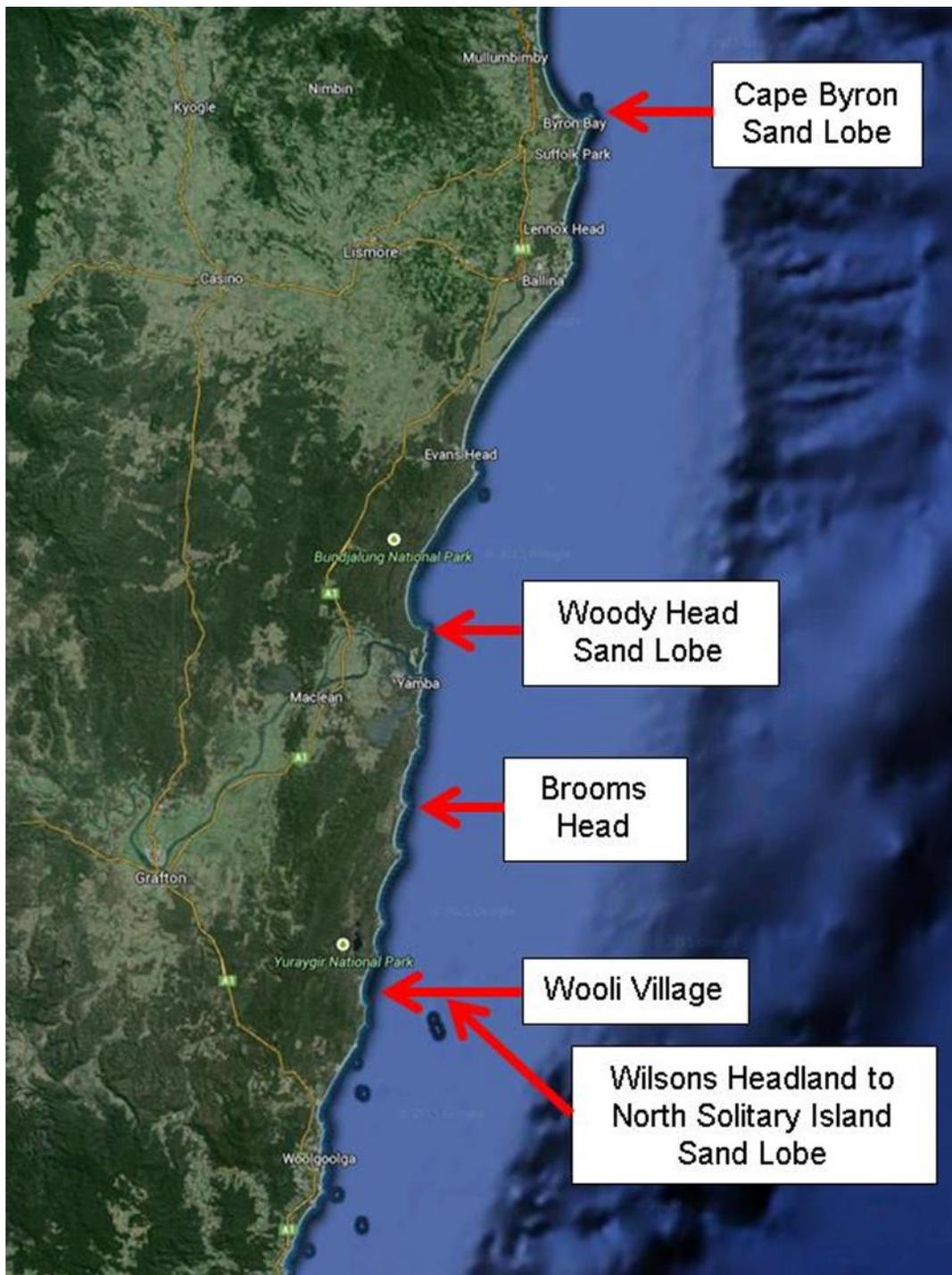


Figure 7 - Location of large scale sand sources

Background information was obtained from various coastal and flood studies (1985-2013), reports on offshore sand sources (1983–2007), legislative and policy documents (2012–2015) and beach scraping (2001-2012). The distribution of riverine, beach and offshore surface sediments in the region was characterised and sediment budget concepts discussed. Typical surface sediment grain sizes were reported. “Massive and recurrent nourishment volumes to protect Wooli Village ($1\text{Mm}^3 + 70,000 \text{ m}^3/\text{yr}$, PBP 1997) and Brooms Head Beach ($40,000 \text{ m}^3$ for amenity and $6,500 \text{ m}^3/\text{yr}$ for total recession) were investigated and reported. Sand lobe sources off Wooli (30-40 m depth) and Woody Head (25–40 m depth) were also documented, and the Cape Byron lobe was investigated in some detail. Engineering and ecological considerations around beach scraping have been reported in NSW, mainly in relation to work at New Brighton Beach in Byron Shire.

Land-based inspections were made and 38 surface sediment samples collected from a range of sites along the Clarence Valley coastline were analysed to characterise native beach and borrow reserve sand compatibility for beach nourishment. Nourishment overfill factors, the ratios of borrow material required to perform the same protective function as native beach material, varies widely from 1.02 to in excess of 10 for Wooli Beach, and from 1.02 to 8 for Brooms Head Beach. An overfill factor of 1.05 is recommended as a feasible maximum.

Expert advice on dredge plant logistics and preliminary costings was obtained to source and transport quantities of sand ranging from less than 10,000 m³ to 2,000,000 m³ to Wooli Beach and other affected regional beaches. Cutter Suction Dredgers (CSD) and Trailer Hopper Suction Dredgers (TSHD) are recommended for land/ river and offshore dredging respectively. All up costs to dredge, transport and place sand range upwards from approximately \$10/m³ (TSHD delivering 2,000,000 m³). The most feasible sand sources for moderate scale nourishment of Wooli Beach (provisional estimate 60,000 m³) are identified as backpassing from the northern portion of the beach supplemented by dry-winning of sand from the adjacent dunes near Wilsons Headland (**Plate 2**). The dunes above mean high water mark (MHW) at the northern end of Wooli Beach are located within Yuraygir NP. This dual source is costed at between approximately \$26 and \$33/m³ depending on the sourcing split and subject to design development. All costings presented are based on the best available information at the time, and would be subject to review and refinement as part of the design development of any sand sourcing project.



Plate 2 – Wooli Beach viewed to the south from near Wilsons Headland

Permissibility of Sand Mining/Dredging and Beach Nourishment

Relevant legislation enables dredging the Wooli Wooli River and using dredged sand for beach nourishment on the beach above MLWM (Clarence Valley LGA) or below MHWM (Solitary Islands MP). Currently removal of sand from Yuraygir NP is prohibited. For removal to occur there would need to be an Act of Parliament, amendment of the *National Parks and Wildlife Act 1974*, the *NSW Coastal Policy*, and the plan of management for the park or other legal remedy, e.g. excision of part of the Yuraygir NP and conversion to Crown land estate.

It is permissible to extract sand for conservation purposes such as beach nourishment from over 90% of the Wilsons Headland to South Solitary Island Sand Lobe where this overlaps the Solitary Islands MP. This would be subject to the normal environmental impact assessment process. Relevant legislation enables offshore sandmining outside the Solitary Islands MP, however, the applicable reserved blocks within NSW coastal waters would need to be put up for a licence by the Minister. It would be preferable if a new licence category was introduced, e.g. for beach nourishment purposes.

Obviously there would be environmental constraints to dredging and offshore sandmining and extensive consultation would be required, particularly in relation to removal of large volumes of sand.

Data Gaps

Further technical information and investigation is required to verify and develop the preferred sand sourcing and delivery scheme including updated photogrammetry to confirm the desirable beach corridor and depth for backpass sourcing, additional sediment sampling and borehole drilling, and topographic survey. Sustainable sourcing from backpassing and the dune field is unlikely to exceed say 12,000 m³ per year on average (60,000 m³ divided by 5). If monitoring and surveys conclude sediment loss from the nourishment area on Wooli Beach is larger than anticipated and the proposed 'hold the line' scheme is insufficient and more sand is required, then the offshore source from the southern region of the Wilsons Headland to North Solitary Island lobe is favoured as it contains a large volume of sand which is reasonably compatible. However, due to the cost of mobilising and demobilising a suitable dredge, to be economically viable any such offshore project would realistically involve removal and reuse of a large volume of sand. Such a project could involve nourishing Wooli Beach and other regional beaches.

Obtaining planning and environmental approvals and/ or policy amendments are needed to support both the use of sand from Wooli Beach backpassing/ dune field and Wilsons Headland to North Solitary Island offshore sand sources. Notably extraction of sand from Yuraygir NP is inconsistent with the 1997 *NSW Coastal Policy*.

The sand sources investigation was funded under the NSW Governments Coastal Management Program and by CVC.

Summary

- The original Wooli Village is currently at significant risk from coastal erosion and longer term recession.

- The significance of the risks is recognised by the NSW Government – Woolli Beach is classified as a coastal erosion ‘hotspot’.
- There is a strong preference by the community for management that offers resilience for the beach and retains beach amenity.
- The significance of the issue demands that management solutions beyond the existing legislative and policy framework are considered.
- The Coastal Zone Management Plan (CZMP) proposes to reduce, but not eliminate risk, by implementing a Beach Nourishment Scheme (BNS) for the original Woolli Village where private land and assets are at greatest current threat from coastal erosion. This action is not a long term protective measure, however it would add resilience to the beach and village.
- A coordinated monitoring program is proposed to enable the success of the scheme to be determined and provide data to indicate when modifications to the scheme may be required through an adaptive management approach.
- Implementation of the BNS strategy is acknowledged to have environmental consequences, however, in the circumstances, it is considered to be the most sustainable and reasonable solution.
- A range of complementary management actions are also proposed to reduce the current level of risk. These measures include an emergency action plan, development controls, dune and beach access management, and conservation of Aboriginal heritage.
- A recent update by OEH on progress on CZMP certification is that given the National Parks & Wildlife Service and Crown Lands have not supported two actions, namely sand extraction from Yuraygir NP and investigation of the land swap, the Minister is unable to certify the draft CZMP under the Coastal Protection Act. The draft CZMP is still with the Minister/ OEH.

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