

## **Appendix C      Review of Actions in the 2011 Wyong CZMP**

## C.1 Introduction

A list of all actions included in the WCZMP 2011 from the final implementation schedule and from the Action Plans detailed in Part B of Volume 1 Supporting Information to the WCZMP 2011 was compiled. Each of the 72 actions was then reviewed to determine if it remains relevant to this revised Wyong CZMP 2017, particularly with regard to the revised hazard mapping. The review also considered changes in legislation or management focus since 2011, and if the action has been implemented in part or full. Recommendations were then made regarding the action, being to either:

- retain the action without change,
- retain the action with changes,
- amalgamate the action with others,
- propose an alternative action (see New Actions below), or
- exclude the action from the revised Wyong CZMP 2017.

The list of actions, discussion of the review and recommendations for this Wyong CZMP 2017 are detailed in Table C-1. The review of the actions also guided the development of new and alternative actions, which better addressed the aims and intent of this Wyong CZMP 2017, as noted below.

## C.2 Recommended New Actions

A list of new actions recommended for inclusion in the Wyong CZMP 2017 is provided in Table C-2.

When the list of new actions are combined with the actions to be retained from Wyong CZMP 2011 (with and without changes and amalgamations), a total of 42 actions are proposed. These 42 actions form the Implementation Schedule outlined in the Wyong CZMP 2017 (see Section 3.5). Details to assist Council (and others) to implement these actions are provided in the Implementation Schedule.

## Review of Actions in the 2011 Wyong CZMP

Table C-1 Review of Actions in the Wyong CZMP 2011

2011 Ref. No.	Action	Comments (from WCZMP 2011)	Implementation Schedule Category	Location (if relevant)	Action Plan(s) from Supporting Volume 1 Part B	Relevant to CZMP 2017	Recommended changes to Action	Recommended Action for CZMP 2016
A83	Secure funding for and maintain a coastal zone management coordinator position	To facilitate streamlined implementation of key strategies in the plan. 1 FTE for the entire period of implementation of the CZMP	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	Yes (see Action 14)	Action already commenced. Action should be to continue position.	Maintain a coastal zone management coordinator position
A1	Acquire new high resolution LiDAR data at regular intervals (approximately 5 years)	LiDAR data, combined with aerial photogrammetry and satellite imagery provides a rapid process for evaluating changes to coastal terrain and terrestrial coastal ecology as sea level rises. It reduces field survey requirements and provides data for ongoing modelling and evaluation.	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	Yes, with changes (see Action 3)	Council is already running a very efficient beach monitoring program using UAV's to collect aerial photogrammetry after storms. A new action to reflect the current monitoring program is required, with this action now changed to showing support for the existing 2-3 yearly NSW Government Lidar collection program. Another new action recommended is for Council to lobby the NSW Government to commence a regular marine LiDAR collection program.	Continue to demonstrate support for the existing NSW 3-yearly Lidar collection program.
A12	Establish an asset register and maintenance program for major council infrastructure in the coastal risk areas, such as stormwater systems sea walls and sewage pumping stations	For streamlined asset and infrastructure management, including condition records, storm impacts. Some monitoring of dredged sand already occurs.	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire. [Specific assets/ locations not given]	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	Yes, with changes (see Action 25)	It is likely that the Council already has AMPs across different departments / units. Rather than develop separate registers for coastal risk, the existing AMPs should be appended, to make note potential coastal risk to any asset or infrastructure in the coastal zone. The responsibility for appending the asset management plans should rest with the managers of the AMPs (not the Environment Unit). Note, this revised action may be split into 2 to 3 actions, to separate the responsibility towards the appropriate Council departments.	For all major council assets, document the risk of coastal hazard (immediate, high, low, geotechnical), and the preferred asset replacement action to manage that hazard (relocate, retrofit / redesign, manage to fail) in the Asset Management Plan, as follows. • Document in the Asset Management Plan the hazard type (erosion, wave run up, geotechnical) and risk of impact (immediate, high, low, none for geotechnical) for all transport assets (roads, etc.), stormwater assets (pits, pipes etc.), sewerage assets (pump stations, rising mains, gravity mains), water infrastructure, public buildings (SLSCs, community halls etc.), and any other major Council assets that are within the area affected by coastal hazards as shown on the hazard maps. • Determine an appropriate hazard management action for assets at immediate risk, then assets at high risk. The hazard management action should as a minimum consider relocation of the asset, retrofit/redesign, protection (providing the works will not adversely affect the adjacent beach), or manage to fail. • The appropriate hazard management action shall be listed in the Asset Management Plan and included in the asset replacement cost. • The hazard management action shall be implemented either: when the asset is due for replacement (due to other factors, i.e. wear and tear); or the coastal hazard impact is imminent, as indicated by a specific monitoring trigger point. • Inform the Monitoring program of those assets at immediate risk, to be checked for breaching of triggers.
A67	Establish a detailed monitoring program to clarify how sand placed on North Entrance beach is redistributed and to facilitate a review to provide more effective sand retention	Monitoring using a combination of ground survey and remote sensing will calibrate models, underpin management reviews and help landowners understand how sediment budget processes can best be managed to protect assets.	Adaptive management and knowledge enhancement	North Entrance, The Entrance Beaches; The Entrance Channel.	Lake and Sea Interactions Action Plan (Section 10.0)	Yes, with changes (see Action 10)	Parts of Action A13 and A68 have been combined with this action, to become a specific study into the dynamics of The Entrance and adjacent beaches. Regular beach monitoring will be conducted through Action A1. Ongoing use of dredged sand on North Entrance Beach is recommended in Action A9.	Investigate the sediment transport dynamics of The Entrance channel and adjacent beaches. The study should include: - A detailed monitoring program to track how dredged sand placed on North Entrance beach is redistributed to adjacent beaches / the Entrance channel; - The potential effects of sea level rise on currents and sediment transport / deposition in The Entrance (through "coastal recession"), and the subsequent implications for dredging and sand placement on adjacent beaches; - Recommendations for a program of sand placement on North Entrance that yields greater retention of the sand on the beach. Council could consider pursuing this action as a research project in partnership with a University.

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A37	Work with NSW government to provide most up to date method for assessing coastal erosion and recession hazards, including the interaction of coastal recession and processes operating at the entrance to Tuggerah Lake	More reliable models of coastal processes provide better predictions of the actual behaviour of beaches and dunes in storm conditions, <i>el Nino/la Nina</i> cycles and with rising sea level. Council will also review and refine hazard assessments for beaches and dunes that have bedrock at shallow depths.	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No	The most important contribution Council can make to improve the understanding the coastal processes in Wyong is to monitor beach change before and after storms. This is already underway, as re-iterated through Action A1. Improvements in coastal modelling capabilities are already progressing through academic institutions, independent consultancies, and OEH. This remains the most efficient method for improving assessment techniques. The original intent of this action (as stated in Sup Vol 1 Part B p89) was that Council would not fund a local scale research project to develop a coastal process model, but could opt to be part of a broader research project. This original intent would be better served through support for a research project specific to Wyong. Most notably, research into sediment transport dynamics between The Entrance and adjacent beaches is recommended as a revised Action A67.	None
A15	Conduct a regular technical review of the validity and effectiveness of management actions	The focus of this review is on the science and engineering - whether actions have achieved the predicted improvement in coastline conditions or resilience.	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No, action to instead be noted as part of review process outlined in CZMP 2015	This action will necessarily be outlined as part of the review process for the CZMP. Effectiveness of management actions would be reviewed through implementation of the plan. At 10 years when the plan is fully revised, the effectiveness of actions should be tested by repeating the risk assessment, and determining if the level of risk has been reduced by implementing the management action(s).	None
A38	Review and update the assessment of coastal erosion and recession hazards as new information from IPCC, Australia and NSW Governments becomes available, and using best available techniques	Improve the resolution and certainty of inputs to erosion and recession analysis. The outcomes of these reviews will inform planning and on ground works priorities, including review of LEP and DCP clauses.	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No, action to instead be noted as part of review process outlined in CZMP 2015	This action will necessarily be outlined as part of the review process for the CZMP. At 10 years, it is expected that a full review of coastal hazards assessments will be conducted in combination with the preparation of the next CZMP to cover the subsequent 10 year period.	None
A13	Conduct research into specific coastal issues	Research topics include sediment dynamics at The Entrance; response of frontal dune morphologies to sea level rise; feasibility of offshore sand supplies for beach nourishment <i>Additional notes from</i> Council will commission further studies of sediment dynamics in The Entrance channel, with sea level rise. These studies will help determine whether additional sand could be dredged from The Entrance for beach nourishment purposes. Sand use for emergency beach nourishment or to fill geotextile bags must comply with relevant Ministerial guidelines. <i>Additional Notes from Part B, Section 7.0 Table 7.2 p88.</i> Potential hydrodynamic impacts of breaching of the sandy barrier at Budgewoi, was also listed as a potential research topic.	Adaptive management and knowledge enhancement	[not specified]	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	Yes, amalgamated with other action(s) (see Action 10)	Elements of this action recommending a study for The Entrance and adjacent beaches, including effects of sea level rise, have been incorporated into a revised Action A67. Such a study is specific to Wyong, and would provide very useful insight into the management of existing erosion problems in the Entrance area. Offshore sand studies already have their own action (A61). Investigation of different dune morphology's response to sea level rise is generic to the entire of NSW, and better handled through an OEH or other state-wide supported academic investigation. Such an investigation is also unlikely to change how the Wyong coast should be managed over the next 10 years.	See Action A67 for elements relating to The Entrance.

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A16	Establish a schedule of annual progress reviews and broader program reviews (every 3 to 5 years)	Annual reviews are implementation tracking; broader reviews aligned with other Council and NRM reviews and reporting - key element of adaptive management	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No, action to instead be noted as part of review process outlined in CZMP 2016	This action will necessarily be outlined as part of the review process for the CZMP. Note also that as CZMP 2016 will be integrated into Councils IPR Framework, regular progress reviews will necessarily be conducted.	None
A56	Continue the role of the Tuggerah Lakes Estuary, Coastline and Floodplain Management Committee	A regular venue for liaison between key community and agency stakeholders with Council; supports integration of coastal, estuary and flood risk management.	Adaptive management and knowledge enhancement	Entire coastal zone of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	Yes (see Action 21)	None	Continue the role of the Tuggerah Lakes Estuary, Coastline and Floodplain Management Committee, to support ongoing integration of coastal, estuary and flood risk management.
A17	Report outcomes of management decisions and investment in coastal management to the community on a regular basis	Keep community informed about how risks are being managed and raise awareness about why some actions are more effective than others. Use state of the Environment Report and Council web site	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No	As CZMP 2017 will be integrated into Councils IPR Framework, the outcomes of decisions and investment for the CZMP will necessarily be reported to the community as part of Council's Annual Report.	None
A74	Make Australian GeoGuides, published by Australian Geomechanics Society, available on Council's web site, as reference material for good practice by landowners and council	Provides clear information about geotechnical processes	Adaptive management and knowledge enhancement	Headlands along the coast [specific sites not given]	Geotechnical Hazards Action Plan (Section 11.0)	Yes (see Action 20)	The GeoGuides provide guidance on siting of development, and are already peer reviewed and in production. It is therefore efficient for Council to utilise this existing material	Make Australian GeoGuides, published by Australian Geomechanics Society, available on Council's web site, as reference material for good practice by landowners and council
A89	Develop and continue to refine a 3D geomechanical model for predicting slope instability hazards.	Will facilitate continuous improvement of Council's knowledge and capacity to manage slope instability hazards.	Adaptive management and knowledge enhancement	All rock and indurated sand landscapes along the coast. Cliffs and bluffs with residential development are a priority.	Geotechnical Hazards Action Plan (Section 11.0)	No, alternative action proposed.	3D modelling is extremely expensive, and requires extensive monitoring data as input to generating a reasonable model. A 3D model is only as good as the data underpinning it. In of itself, a 3D model would not provide up-to-date warning data of the likely occurrence of a landslide. It is instead recommended that a monitoring program for locations at high risk from geotechnical hazard be developed. The monitoring program could involve, for example, drilling of boreholes and installation and monitoring of inclinometers (which detect land movement) and piezometers (which detect groundwater depth and flows). Such monitoring data could provide a warning of likely landslide. Furthermore, if at a later date it is decided that 3D modelling would be beneficial for understanding and mapping geotechnical risk, the monitoring program would provide key input data. Notable high priority hot spots for monitoring are: Cabbage Tree Harbour (where residential houses and public access may be at risk); then behind Bateau Bay and Blue Bay (no private houses but there are public safety risks along the accessways. Of lower priority for monitoring, and to contribute to understanding the local geology, old landslips are evident from the topographic data of ridge lines at Crackneck Point and Jenny Dixon Beach.	New Action proposed: Develop a monitoring program for sites at high risk of landslide and geotechnical hazard.
A24	Consider options for government acquisition of private land affected by coastal hazards	Council will work with NSW and Australian Governments to develop an appropriate strategy for high risk locations. Government acquisition of private land in coastal risk areas is not currently supported by any of these levels of government.	Adaptive management and knowledge enhancement	Relevant to the entire coastline where there is existing development in coastal risk areas.	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, as a "future" option (see Approach to Managing Future Risks)	This action does not need to be included in the implementation schedule that covers the next 10 years. The action will be identified as an option for future investigation should an erosion impact occur earlier than predicted over the life of the plan, in combination with other options for current and future coastal erosion risks.	To be noted in "Approach to Managing Future Risks", not within the CZMP Implementation schedule.

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A61	Council will work with the NSW and Australian Government to study the feasibility of offshore sand being used for beach nourishment purposes for maintaining beach area, volume and amenity at key locations.	For instance a large volume of sand would be needed to enhance the dune buffer to prevent overtopping/breakthrough at Budgewoi. Offshore sand supplies are a high cost sand source and Council's decisions will be affected by decisions made for very high profile beaches in the Sydney metropolitan area and the evolution of NSW Government policy over the next 5 to 10 years.	Adaptive management and knowledge enhancement	Most important for North Entrance and Budgewoi, but also relevant to all sandy beaches along the Wyong coastline.	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	As the NSW Government currently prohibits the extraction of sand from offshore waters, this action should be noted as an option for consideration in future CZMPs	May be noted in the "Approach to Managing Future Risks", but won't be included in the current implementation schedule.
A4	Train relevant Council officers in coastal hazard management for coastal risk areas, from strategic planning to emergency response activities and time frames. Share training and coordination management with SES and OEH where feasible.	At this stage, Council officers will not be designated as Authorised Officers for regulation of coastal protection works under the <i>Coastal Protection Act 1979</i> .	Managing significant coastal risks	Applies to all planning and environmental staff, for CPA 1979 regulatory activities along the entire Wyong coastline	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No, alternative action proposed	Elements of emergency management already covered by SES should be removed from this action. This action should focus on training Council staff who work in the coastal zone (so, including works, engineering and parks and recreation, not just environmental staff) regarding the appropriate and legal response to coastal erosion events, particularly at authorised locations. The aim is to "support an informed and consistent approach to coastal ... erosion emergencies across all sections of Council" (Sup Vol Part B p.86). The aim of the action should be to facilitate better implementation of the EASPs and CZMP objectives to avoid ad hoc protection or other works in the coastal zone, particularly where these may leave a legacy of liability on Council for years to come. To support this aim, two additional and related actions are also needed: - A checklist or similar, that defines planning controls and guidelines for Part 5 development and other works undertaken by Council in the coastal zone. - An implementation workshop, to educate all Council units and appropriate staff of the actions they are responsible for implementing in the WCZMP 2017.	New Action proposed, involving training of relevant Council staff regarding appropriate response to coastal erosion events.
A85	OEH will issue certificates for emergency protection works at North Entrance and Hargraves Beach, in accordance with the Emergency Action Sub plan for those locations and the requirements of the Coastal Protection Act 1979	Council's strategy includes provisions to five landholders in immediate coastal risk areas some opportunity for short term coastal protection - as emergency protection works for authorised locations or medium term removable structures.	Managing significant coastal risks	Authorised locations	Emergency Response Management Action Plan (Section 8.0)	No, alternative action proposed.	If or when Council and / or private landholders chose to pursue temporary coastal protection works, this action would be conducted. A specific action to this effect is no longer needed. However, since the WCZMP 2011, there have been changes to the legislation regarding what are now termed "temporary" not "emergency" coastal protection works. An accompanying Code of Practise was also released by the NSW Government in 2013.  The temporary coastal protection works elements of the legislation have been a highly contentious and confusing element of the changes to the CP Act since 2011. The mandated form of these works (see Code of Practise), are considered unlikely to be effective in protecting "hot spot" locations during storms.  The temporary protection works elements of the legislation are thought likely to be removed as part of the replacement of the CP Act with the proposed Coastal Management Act, expected by 2016 or 2017, which would make pursuit of such works obsolete.	New Action proposed: Revise the EASPs to: (a) reflect the current legislation relating to temporary coastal protection works that allows Council to erect such works on their land prior to the occurrence of a storm and; (b) reflect changes to the legislation arising from the NSW Government's coastal reforms.
A57	Identify sand sources which may be used for emergency protection works, either by private landholders or by Council. Ensure necessary approvals are in place to access this sand.	Few appropriate sources are currently available. Linked to investigations in The Entrance and to future opportunities to access off shore sand.	Managing significant coastal risks	Sand demand priority at locations where there is development in immediate coastal risk areas, but likely to be required elsewhere over time.	Emergency Response Management Action Plan (Section 8.0)	No	Action A44 below covers potential beach sand works for managing existing Council beaches. The process for accessing sand for temporary coastal protection works is specified by the Coastal Protection Act 1979 and in the EASPs. Therefore, this action is considered obsolete.	None



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A8	Conduct dune stabilisation and revegetation works to encourage sand accretion and stabilisation of frontal dunes, in accordance with Plans of Management for ocean frontage reserves managed by Council.	Prepare vegetation management plans for reserves. Dune enhancement is important for biodiversity, recreational access and ecological resilience in the short to medium term, but less effective as a control for long term recession.	Managing significant coastal risks	Key locations are Budgewoi Beach, Lakes Beach, Soldiers Beach, North Entrance Beach, and Hargraves Beach.	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0) Building Biodiversity Resilience Action Plan (Section 12.0)	Yes, but amalgamated with other action(s) (see Actions 6 & 7)	Other actions that specify dune works have been amalgamated with this action (i.e. A44 in relation to dune heights, A30 in relation to making vegetation management plans, as necessary). This action supports and is supported by A51 (Volunteer Dunecare programs). Furthermore, there is only a generic POM for all reserves at present.	New Action proposed: Conduct dune rehabilitation works to encourage sand accretion, stabilisation and growth of frontal dunes. As necessary, prepare and implement vegetation management plans for the dune rehabilitation works to specify species selection, planning, weed removal and fencing plans for a dune rehabilitation area. Dune stabilisation provides a buffer of sand to be eroded during storm events. Where dune heights are maintained above ~ 7 m AHD, dunes can also act as a suitable barrier to wave overtopping.
A44	Use beach nourishment or beach scraping to reinforce dunes and maintain dune crest heights above 7m at affected locations, and 8 metres at North Entrance	To prevent oceanic overtopping and inundation.	Managing significant coastal risks	Relevant to all beaches and dunes, but particularly at North Entrance, Hargraves, Lakes and Budgewoi Beaches.	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0) Lake and Sea Interactions Action Plan (Section 10.0)	Yes, but amalgamated with other action(s) (see Action 6)	Beach nourishment and beach scraping are separate actions. Due to the high cost, it is recommended that beach nourishment be reserved as a future response only (i.e. "Approach to Managing Future Risks"). It is also noted that re-use of dredged sand on North Entrance Beach (see Action A9) is not technically beach nourishment. This action should instead specify an investigation of the viability of beach scraping in Wyong, and a prioritised listing of any suitable locations. Beach scraping does not add any sand reserves to the beach, and instead acts to enhance and speed up beach recovery. Should it be pursued, beach scraping shall be supported by dune rehabilitation (see new action above). Aims to maintain dune heights to address overtopping noted in this action have been added into the new action: dune rehabilitation (replacing Action A8).	New Action proposed: Investigate the viability of beach scraping on Wyong's beaches, and develop a prioritised list of beaches for which beach scraping may be beneficial.
A9	Continue to dredge sand from the active tidal delta in The Entrance Channel and place the sand on North Entrance Beach. Some sand may also be placed on The Entrance Beach.	Uses locally available sand to manage sediment budget - Council has approval to dredge up to 50,000m3 annually.	Managing significant coastal risks	The Entrance channel, North Entrance Beach and The Entrance Beach	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0) Lake and Sea Interactions Action Plan (Section 10.0)	Yes (see Action 9)	The action should be continued as is. However, it should be noted that the revised Action A67 details an investigation of sand movements from the dredge site. Outcomes of Action A67 should be used to improve this program (when they become available).	Continue to dredge sand from the active tidal delta in The Entrance Channel and place the sand on North Entrance Beach. Some sand may also be placed on The Entrance Beach. Recommended improvements to the dredging and placement program arising from Action A67 should be incorporated into this strategy, when they become available.
A3	Integrate Coastal Emergency Response Management Plan with other elements of Council's DISPLAN	Streamline emergency response procedures.	Managing significant coastal risks	Entire coastline of Wyong Shire	Emergency Response Management Action Plan (Section 8.0)	No	The legal status of EASPs is that they are "sub plans" of the DISPLAN. There is no need for an additional action to combine the EASPs with the DISPLAN	None
A58	Continue to refine understanding of tsunami risk and appropriate warning and emergency response mechanisms.	Tsunami are infrequent on the Australian East Coast, so awareness of potential risks at the local scale is low.	Managing significant coastal risks	Entire coastline of Wyong Shire	Emergency Response Management Action Plan (Section 8.0)	No	Tsunami prediction and response is not the subject of CZMPs, in accordance with NSW legislation and guidelines. It is noted, however, that the NSW Government is currently preparing tsunami modelling and prediction assessments, and appropriate emergency response mechanisms.	None
A60	Involve the TLECFMC informed of progress in implementing the Emergency Response Management Plan/Emergency Action Sub plans and involve the committee in the review of these plans.	Committee is the interface between Council and the community	Managing significant coastal risks	Whole of coast with specific actions for Authorised Locations.	Emergency Response Management Action Plan (Section 8.0)	No	EASPs, as an emergency response tool, are the jurisdiction of the NSW SES.	None
A35	Contribute to development of new tools and communication measures to refine safe egress models during coastal emergencies, particularly when flooding and coastal erosion coincide.	LIDAR models will allow various egress models to be tested and will assist with integration of lake flooding and coastal emergencies.	Managing significant coastal risks	Whole of coast with particular priority for North Entrance, Budgewoi and Hargraves Beach	Emergency Response Management Action Plan (Section 8.0)	No	Communication regarding coastal erosion emergencies is already conducted through Councils Emergency Management Plan, with the BOM and SES as lead agencies for warnings. Egress modelling etc. should be undertaken as part of the Floodplain Risk Management Planning process in close consultation with the SES who is the lead combat agency in flooding and coastal storm events. Flood modelling underpinning the FRMPs should include the combined influences of high ocean water levels and rainfall events, to best determine areas affected by lake and / or sea interactions, which is recommended as a new action from Action A62. This action is therefore considered obsolete.	None

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A6	Include clauses in the Wyong LEP and DCP to restrict new development in immediate coastal hazard planning zones and to control the type and design of development in 2050 and 2100 coastal hazard planning zones. Refers to erosion and recession risks, coastal inundation risks and geotechnical risks.	Measures to be considered include: - No new development will be approved within the immediately coastal risk area. All development within the 2050 coastal risk area will require development consent (complying development does not apply). - Appropriate designs for new development in the 2050 coastal erosion hazard area and the 2100 coastal erosion hazard area to including, for example, modular development which can be relocated landward as the coastal erosion scrap recedes. - Prohibit new subdivisions, vulnerable development (including nursing homes and hospitals) or other development that intensifies land use in the 2050 or 2100 coastal risk areas.	Managing significant coastal risks	Whole of coastal risk areas	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, with changes (see Action 17)	Action to be amended to refer to the Wyong DCP Chapter 3.5 Coastal Hazards, currently in progress by Council. Action to also be combined with Action A18. Action will note that DCP should continue to be updated as new planning approaches for coastal hazards are developed, and new coastal hazard / risk information arises.	Implement Wyong DCP 2013 Chapter 3.5 Coastal Hazards. Continue to update the DCP as new planning approaches and / or new information regarding coastal risk are released.
A18	Introduce clauses into the Wyong LEP and DCP to include timed consents as a planning option for development in the 2050 coastal risk area.	Before the expiry date of the timed consent the proponent must apply for and obtain an extension of time, or relocate the structure landward on the block (where this is feasible) or remove the development. - Council will review the LEP and DCP at 5 year intervals, using best available knowledge about risks and the cost effectiveness of planning controls.	Managing significant coastal risks	Whole of coastal risk areas	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Timed consents remain an option for developers to meet the requirements of Wyong DCP Chapter 3.5. A separate action to specifically state this is not required.	None
A20	Use zoning and other planning measures to provide land for retreat of important coastal ecological communities, where possible	Allow for roll back of coastal dune landforms and associated ecological communities, within risks associated with additional development.	Managing significant coastal risks	Whole of coastal risk areas	Building Biodiversity Resilience Action Plan (Section 12.0)	No, alternative action proposed.	Given that in general there is limited land in public ownership that is not already of appropriate zoning for use as a retreat buffer, it is recommended that a new action be developed, to recommend new / amended DCP provisions to provide buffers around wetland and other coastal ecological communities for sea level rise migration, as part of new developments (including infill and re-developments). DCP Chapter 3.4 Conservation Areas for Northern Wyong Shire provides for the maintenance or improvement of green corridors, conservation links and habitat networks in Northern Wyong Shire, when developments are proposed in such areas as specified on a map accompanying the DCP. DCP Chapter 3.10 Wetlands Management requires an assessment for any proposed development of the wetland buffer, and any proposed mitigation measures to retain and preserve that environment.	New Action proposed: Update DCP Chapter 3.10 Wetlands Management to include consideration of migration buffers for sea level rise for wetland communities.
A33	Place notation on s149 certificates of all properties within immediate, 2050 and 2100 coastal risk areas; and also properties within the 2100 coastal risk area for geotechnical hazards; and coastal inundation risk areas.	To ensure that landowners and potential land owners are informed of coastal risk affecting their property.	Managing significant coastal risks	Whole of coastal risk areas	Coastal Knowledge and Community Involvement Action Plan (Section 7.0) Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, with changes (see Action 18)	Appropriate wording for Section 149 notifications of coastal hazard is still under discussion within the Department of Planning and Environment (DPE). The action should be progressed via negotiations with DPE on appropriate wording. Note also that the areas affected by Coastal Hazards will be delineated by the latest Coastal Hazards maps given in the CZMP, and denoted as "immediate, high and low risk" areas.	Undertake negotiations with DPE to develop appropriate notification of coastal hazard on Section 149 Planning Certificates.



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A62	Reference maps showing areas affected by coastal inundation in the Wyong LEP	Require that development applications in areas affected by coastal inundation to take the inundation hazard into account. Floor levels for new developments in inundation areas must consider the 1% AEP storm wave run up for each beach.	Managing significant coastal risks	Where coastal inundation will interact with lake and catchment inundation [Not specified if such mapping has been completed for Wyong]	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No, alternative action proposed.	Inundation Hazard maps can be conflicting and confusing, especially where there is overlap with existing Flood Planning maps. The hierarchy for the use of Inundation Hazard Maps is as follows. Areas affected by immediate (i.e. present day) wave overtopping: in general, it is expected that immediate wave overtopping hazard areas will lie seaward of immediate coastal erosion hazard areas. However, there are existing and sufficient provisions for wave overtopping within DCP Chapter 3.5 Coastal Hazards. Future wave overtopping hazards are only appropriate to the upkeep and replacement of existing coastal protection structures, or the construction of new coastal structures, but not sandy dunes. It is not possible to project the likely future height of sandy dunes, and so, the future potential for wave overtopping. The future wave overtopping hazard is therefore only relevant to hard shorelines that can be expected to exist in future (new or existing). Again, wave overtopping is adequately managed for future development through DCP Chapter 3.5 Coastal Hazards. For inundation within coastal lakes/lagoons: - Are ocean water levels already included in flood modelling for Tuggerah (and other) Lakes? - If yes, the FRMP for the Lake(s) and associated planning controls will already manage coastal inundation. No further maps or controls are required; - If no, this action shall be modified to require combined flood modelling that includes ocean water level events. This allows creation of a single, combined floor planning level and a single set of planning controls.	New actions proposed: Update Draft Chapter 3.5 Coastal Hazards to include controls for wave overtopping, including consideration of sea level rise for proposed new or modifications to existing coastal structures (e.g. seawalls).  Check existing flood modelling for coastal lakes, and if not already done so, include ocean water levels within the flood assessment, then update Flood Planning levels and associated planning documents to reflect the new modelling outcomes.
A80	Zone ocean front land that is within the immediate coastal risk area for open space or environment protection	Encourage over time, lower intensity and lower risk development, consistent with Council's long term managed retreat policy. These zones also facilitate roll back of coastal ecological communities.	Managing significant coastal risks	All immediate coastal risk areas	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	The rezoning of private land to restrict development is generally unpalatable, difficult to achieve, and requires Council to pay compensation to landholders. Minimising development intensity in hazardous areas (as this action is intended to do) is already being actioned through the DCP Chapter 3.5 Coastal Hazards. Excluding private lands, there are no substantial public lands in the immediate hazard zone that are not already appropriately zoned. This action was therefore considered redundant.	None
A72	Construct properly engineered toe protection at the base of the steep unstable slope at Cabbage Tree Harbour.	To stabilise the slope and prevent ongoing toe trimming by wave action.	Managing significant coastal risks	Cabbage Tree Harbour	Geotechnical Hazards Action Plan (Section 11.0)	No	This action has been implemented	None
A66	Review the structural integrity of The Entrance sea wall and schedule structural upgrades as necessary to balance risk and cost	The wall is part of a major tourism area and protects community infrastructure, including road, parking and pedestrian promenade	Managing significant coastal risks	The Entrance southern shore	Lake and Sea Interactions Action Plan (Section 10.0)	Yes (see Action 11)	Hazard lines have assumed this seawall is sufficient to provide protection at present. Further investigation and upgrades are a high priority to provide for continued functioning of this seawall as a protection structure.	Review the structural integrity of The Entrance sea wall and schedule structural upgrades as necessary
A10	Council may protect public assets and infrastructure in the short term with properly engineered geotextile structures, with a life of up to ten years. Council may build protection structures for public assets that are vulnerable in the 2050 and 2100 planning periods, but only for major assets with long asset life, whose function will not be compromised by other aspects of climate change.	Intended to provide protection from storm bite erosion to community assets such as surf clubs and pumping stations, over the asset life or until the asset can be relocated landward. Council will not approve new major infrastructure (such as main roads and sewerage systems) in the 2050 or 2100 coastal risk areas, except where it can be protected in a cost effective manner that does not increase risks to other coastal values.	Managing significant coastal risks	Surf clubs with major assets in immediate hazard zone [Specific clubs not given].	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, amalgamated with other action(s) (see Action 25)	Any decision to protect, relocate or otherwise manage the coastal risk to public assets shall be determined through Action A12, via the existing AMPs. Through this process, for each major asset the decision to relocate, redesign (and protect), or abandon the asset will be made. Siting and design of new assets shall be managed via the checklist specified as a new action. Council is already within its rights to build short or long term protection works, provided it goes through the development assessment process, can demonstrate that offsite impacts can be managed, and can equitably fund the works (noting that in general, State and Federal grant programs will preference spending on public assets, before private assets).	See Action A12 for existing assets, with a new action proposed for future assets: Prepare a checklist or Council guideline outlining planning controls (similar or the same as detailed in the DCP Chapter 3.5 Coastal Hazards, and the geotechnical development controls (to be developed through new action replacing A69) that shall apply to all Council works (developments, infrastructure etc.) in the coastal zone. This should capture Part 5 developments, strategic planning for major infrastructure and other works not requiring development consent.

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A11	Council may grant development consent to private landholders to install temporary, but properly engineered structural protection, such as sand structures, to protect existing private assets in the immediate coastal risk area	Must be installed on private land and be designed to withstand a 1 in 20 year event. The intent is to provide protection for up to ten years. Development applications will be considered on a merit basis. Council will consider applications for the construction of permanent rock sea walls to protect existing houses which are located in the <b>immediate hazard zone</b> only if: - all affected properties along a section of beach are involved/included - the wall is built entirely on private property - the wall will have minimal impact/risk in terms of erosion at the ends - the landholders agree to contribute to the ongoing cost of beach nourishment to maintain beach amenity for the agreed life of the rock wall Landholders are responsible for ongoing maintenance of the structure, as per standards specified by the Office of Environment & Heritage (Department of Premier and Cabinet) and Council public safety and access are not compromised.	Managing significant coastal risks	Considered for North Entrance, Hargraves Beach and Blue Bay	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Temporary coastal protection works, as defined by <i>the Coastal Protection Act, 1979</i> , are dictated by the EASPs for the relevant locations. Further notation of this as an action in therefore not considered necessary. It should be noted that the temporary protection works elements of the legislation are likely to be removed as part of the replacement of <i>the Coastal Protection Act, 1979</i> with the proposed Coastal Management Act.	None
A21	Prepare a schedule of trigger points for action - for relocating existing community infrastructure and public assets to outside coastal risk areas.	Linked to risk profile and asset life.	Managing significant coastal risks	Applies to all coastal hazard planning zones along the Wyong Shire coastline. Priority to assets in immediate hazard areas. [Specific assets and locations not given].	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, amalgamated with other action(s) (see Action 25)	General guidance on what measurable coastal processes can be used as triggers shall be given in the CZMP. Action A12 requires trigger points to be noted for assets at immediate risk, with the existing monitoring program to be used to test for breaching of triggers.	See Action A12 for discussion of developing triggers for assets; and New Actions for trigger monitoring.
A22	Council will plan for the relocation of surf clubs out of coastal risk areas when major upgrades of facilities are due.	Council manages six surf clubs and associated infrastructure. Council will work with surf clubs to identify services/facilities which must remain within the immediate coastal risk area. Council will prepare details designs and REF for providing interim (up to 10 years) protection for existing surf clubs and major access infrastructure at surf clubs which are at immediate risk.	Managing significant coastal risks	All surf clubs in WSC	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, amalgamated with other action(s) (see Action 12)	Combine with Action A12, to form part of information appended to the asset management plans. Note that Council only owns 4 surf clubs: clubs at Lakes & North Entrance beaches are leased directly from the crown by the SLSCs.	See Action A12
A23	Council will design some surf club buildings and other infrastructure for retreat during erosion emergencies	Relocatable structures are an option both for surf clubs and for private buildings in the 2050 coastal risk area.	Managing significant coastal risks	All surf clubs in WSC	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes amalgamated with other action(s) (see Action 23)	This action would be captured by the new action proposing a checklist for all new Council developments	See new action proposed: Prepare a checklist or Council guideline outlining planning controls that shall apply to all Council works in the coastal zone.
A70	Review stormwater drainage system in the vicinity of geotechnical hazard areas to ensure they do not discharge runoff where it could trigger a landslide.	Some geotechnical processes are exacerbated by inappropriate management of surface and groundwater flows.	Managing significant coastal risks	All cliffs and bluffs within coastal hazard planning zone or where stormwater drains to these zones.	Geotechnical Hazards Action Plan (Section 11.0)	Yes, with changes (see Action 26)	Requires a separate study overlaying geotechnical hazard maps with stormwater assets, and inspecting each, to determine if and where stormwater drainage may contribute to a landslide risk. Cost: Minor consultancy, separate project. Recommended timeframe: 4 year delivery plan.	Undertake an inspection of stormwater outlets within the geotechnical hazard zones, to determine if they may contribute to landslide risk. This shall involve: 1. Overlaying the geotechnical hazard maps and stormwater assets in GIS, to identify if and where such assets may exist 2. Inspection of those stormwater assets within geohazard areas

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A71	Review Plans of Management for coastal reserves affected by slope instability hazards and ensure that the PoM takes slope instability hazards into account.	Consider drainage, lookouts and walking tracks. Gosford Council DCP 163 is an example	Managing significant coastal risks	Norah Head and southern sections of Wyrrabalong National Park are priorities, then all headland reserves in Council management.	Geotechnical Hazards Action Plan (Section 11.0)	Yes, with changes (see Action 40)	Expand action to include open coastal hazards (erosion, overtopping). Combine with Action A79 to include POMs for Coastal Holiday Parks (Crown or Council owned/managed). Action will require written agreement from NPWS for the POMs relating to national parks land.	Undertake review of Plans of Management for community, crown and national parks land, including POMs for Holiday/Tourist Parks, to include provision for coastal hazards (erosion, overtopping) and geotechnical hazards. [Action will require written approval from NPWS]. The action could be undertaken when the POMs are due for review.
A90	Further investigate the interaction of coastal erosion and geotechnical hazards in areas where both types of hazard may apply now or within the 2100 planning period.	Recession hazard is reduced where there is a bedrock base, current recession assessments have assumed full sand profiles.	Managing significant coastal risks	Where rock terrain is overlain by a thin mantle of beach/dune sand. Dunes immediately adjacent to headlands are an example.	Geotechnical Hazards Action Plan (Section 11.0)	No	This action has been completed as part of the hazard review given in the WCZMP 2017. Future revision of all hazard assessments is recommended after 10 years as part of the Plan review process.	None.
A81	Conduct a benchmark survey of the condition of coastal ecological communities.	Will extend survey coverage already completed, such as for rock platforms (HCRMA)	Managing significant coastal risks	Locations to be selected with partner organisations, for representative coverage of coastal ecological communities.	Building Biodiversity Resilience Action Plan (Section 12.0)	Yes, with minor additions (see Action 38)	Keep action, and include that the outcomes of survey should be mapped and uploaded to GIS systems. It is presumed this action applies to land outside of the National Parks and Reserves.	Conduct a benchmark survey of the condition of coastal ecological communities. Outcomes of survey should be mapped and uploaded to GIS systems. Location: action applies to land outside of the National Parks and Reserves.
A32	Where feasible establish conservation agreements for high value ecological communities in coastal reserves.	No conservation agreements, negotiated with OEH or HCRMA currently exist in Wyong Shire. Results of A81 will contribute to selection process.	Managing significant coastal risks	Locations to be negotiated by Department of Lands and other landholders.	Building Biodiversity Resilience Action Plan (Section 12.0)	Yes (see Action 39)	It is presumed that this action applies only to high value conservation lands outside of existing NPs.	Where feasible establish conservation agreements for high value ecological communities in coastal reserves. Applicable locations will be based upon outcomes of Action A81.
A75	Continue to work with OEH to protect nesting and roosting habitats for protected shorebirds such as Little Tern.	Bird habitats are disturbed by pedestrians, dogs and vehicles	Managing significant coastal risks	Norah Head rock platform is a key site identified by HCRMA	Building Biodiversity Resilience Action Plan (Section 12.0)	Yes (see Action 37)	Update action to make note that sites other than Norah Head may exist, and should be included in this action.	Continue to work with OEH to protect nesting and roosting habitats for protected shorebirds such as Little Tern. Locations used as nesting sites can vary seasonally. This action shall include identification of sites to be protected on a seasonal basis, to capture all nesting and roosting sites in the LGA.
A5	Enhance community awareness of coastal hazards and emergency response management actions, using tools such as web site, face to face meetings, information boards at beaches, and media coverage.	Priority action in first two years of the plan.	Community Engagement	Relevant to all beaches in the shire, but priority beaches are Curtis Parade and Hutton Road, North Entrance; Cabbage Tree Harbour; Blue Bay; Hargraves Beach [i.e. the authorised locations]	Coastal Knowledge and Community Involvement Action Plan (Section 7.0) Emergency Response Management Action Plan (Section 8.0)	No, alternative action proposed.	For the wider community, information regarding coastal erosion emergencies should focus on storm warnings and advice to stay indoors and off the beaches and dunes during such conditions. Such warnings are already issued by the BOM and SES, and Council is not required to replicate this role. With regard to actions that can be undertaken by landowners during storms, this is limited to temporary coastal protection works only at Authorised Locations (noting that the legislation permits these works to be installed well before a storm warning is issued). As there are only 5 Authorised Locations in the Wyong LGA, education regarding these works is not required for the broader community. Furthermore, Stage 2 of the coastal reforms has indicated that elements relating to temporary coastal protection works are not likely to be included in the new legislation. Until the new legislation is in place, it is recommended that education regarding temporary coastal protection works be stalled. Community education regarding the varying nature of beaches would be valuable, to build the resilience of the community during periods of beach erosion, when accessways and beaches may be temporarily inaccessible. A new action for this is recommended.	New Action proposed: Undertake an education program explaining to the community the dynamic and varying nature of beaches. The education shall aim to build the resilience of the community during periods of beach erosion, when accessways and beaches may be temporarily inaccessible. Through building the community's understanding of the coast, the education program shall also aim to empower the community to provide relevant feedback on coastal management options and initiatives. Education activities are also an opportunity to promote the database of coastal events (see Action A65).  A separate action has been formulated to assess the condition of beach accesses after storm events, and restrict access and undertake repairs as required (see new action B15).
A14	Involve community in data collection and record keeping through NRM monitoring programs	Community involvement in monitoring means that additional data can be collected. Dune care groups already provide a good model for how this could evolve.	Community Engagement	Whole of coastline, but priority for locations of high ecological value and where there are active community groups	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No.	The intent of this action to involve the community in data collection remains valid. Given the extremely detailed information coming from drone survey, the assistance of the community in monitoring will be best served through Action A65, and supported by Action B11 and B13.	None

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A51	Council will continue to support Landcare/Coastcare groups to maintain and enhance the condition and function of native vegetation on coastal dunes, including weed removal and replanting.	Builds on existing successful projects such as Weeds of national significance at Budgewoi, Norah Head, North Entrance and Lakes Beach South. Action combines community enjoyment of the coastal landscape with major ecological condition benefits.	Community Engagement	To be determined in consultation with HCRCMA, but likely to include further work at North Entrance, Budgewoi, Hargraves Beach and at Soldiers Beach and Blue Bay	Building Biodiversity Resilience Action Plan (Section 12.0)	Yes (see Action 7)	Only renaming of Coastcare as Dunecare is required to update this action. This action would be supported by new action: dune management by Council, and supports new action: beach scraping investigation.	Council will continue to support Dunecare groups to maintain and enhance the condition and function of native vegetation on coastal dunes, including weed removal and replanting.
A46	Maintain a close working relationship with surf clubs and Surf Life Saving Australia re beach patrols, beach safety information and beach environment information	The surf lifesaving community is a valuable partner in the management of the coastal zone.	Community Engagement	All patrolled beaches along the coast	Access, Recreation and Tourism Action Plan (Section 13.0)	No, alternative action proposed.	The role of paid lifeguard and volunteer lifeguard services in terms of beach patrols; and disseminating beach safety information (such as during erosion events) is already well established. Instead, a new action is recommended, to utilise the available audience and resources of the surf clubs as a platform to provide education relevant to coastal management.	New action proposed: Undertake education through the existing surf clubs and surf lifesaving community regarding periods of erosion and recover) and the valuable role of dune vegetation. The education of surf club members could also include the location and sensitivity of nesting shorebirds, where they occur on or near patrolled beaches.
A76	Prepare and/or review Plans of management and Master Plans for the main recreational beaches along the Wyong coastline	Upgrade shade and picnic facilities at the high profile beaches in accordance with Plans of Management. Review design and integrity of beach access structure, stormwater outlets, and viewing platforms. Align action with plans for relocation of surf clubs.	Community Engagement	Examples include Mazlin Reserve, and reserves at main beaches - Toowoona, Shelly, Soldiers, The Entrance, North Entrance and Lakes Beach.	Access, Recreation and Tourism Action Plan (Section 13.0)	No, alternative action proposed.	Rather than developing or reviewing POMs, it is suggested that a review of recreational facilities be undertaken to prioritise plans for upgrades, with follow-up on the ground works. This action would follow on from an inventory of all minor recreational assets in the coastal zone.	Three new actions are proposed: Undertake an inventory of all recreational assets in the coastal zone, including notation of current condition, to form a new or updated Asset Management Plan Asset locations should also be logged in GIS. In GIS, overlay the Asset database with the coastal hazard maps, to determine those assets within the immediate coastal risk zone and geotechnical hazard zones, and append this information to the AMP. Develop a post-storm monitoring program for recreational infrastructure on the beaches, particularly beach accessways. This will be important in cases where the EASPs are not activated. Develop a prioritised program of upgrades and additions to recreational infrastructure along the coast, based on asset condition, coastal or geotechnical risk, and recreational demand.
A79	Review Plans of management for Crown Coastal Holiday Parks and Crown Reserves, to reflect climate change hazards and sea level rise.	These parks are a major social and economic asset for Wyong Shire	Community Engagement	Toowoona Bay, Norah Head, Sun Valley and Blue Lagoon	Protecting Cultural Landscapes Action Plan (Section 14.0)	Yes, amalgamated with other action(s) (see Action 40)	Action intent included in Action A71.	See Action A71.
A52	Review access ways at high profile beaches, foreshore and headland reserves and provide disabled access	Include disabled access considerations in Plans of Management	Community Engagement	Consider Toowoona Bay as a priority because flat and protected beach	Access, Recreation and Tourism Action Plan (Section 13.0)	Yes, amalgamated with other action(s) (see Action 29, 30, 31)	Action intent to be included with new actions outlined for Action A76.	Amalgamated into the new action proposed for Action A76
A48	Assess the safety and suitability of ocean boats launching ramps and associated facilities and identify necessary upgrades/need for new facilities	Include review of structural integrity of ramps at Cabbage Tree Harbour with sea level rise; also trailer parking, ramp capacity and interaction with other users.	Community Engagement	Cabbage Tree Harbour	Access, Recreation and Tourism Action Plan (Section 13.0)	No	Norah Head boat ramp in Cabbage Tree Harbour completely replaced and opened in 2015 founded to existing bed rock with wider and more even ramp with vehicular access above predicted Sea Level rise.	None



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A47	Plan routes and develop a coastal walk along full length of the Wyong Coast, and mountains to sea walk.	Potential tourism opportunity, plus encourage outdoor recreation.	Community Engagement	Priority areas include Norah Head to Budgewoi, The Entrance and North Entrance area and extensions of existing paths in National Park lands.	Access, Recreation and Tourism Action Plan (Section 13.0)	Yes, with changes (see Action 32)	Shared Path is in construction on western side of Wilfred Barrett Drive within road reserve between The Entrance North and Noraville – first stage scheduled for opening September 2016 . Feasibility studies rejected eastern side due to instability of dunal systems, coastal conditions and prohibition of constructed shared paths from National Park.  Future coastal dunal walks will be modelled on the Coast to Lake path and beach walk between the Entrance Channel and Toowoona Bay completed in 2012 to locate fixed infrastructure on stable foundations off dunal systems and use signage to direct movement over routes subject to instability from coastal processes consistent with NPWS track guidelines. This will better manage impacts and be consistent with the Plan of Management for Wyrabalong National Park.  The ability to make the path a shared use path (e.g. for bikes / mountain bikes) or disabled accessible should also be investigated, to maximise its tourism potential.	Continue to construct coastal walks when and where feasible.  Future coastal dunal walks shall be modelled on the Coast to Lake path and beach walk between the Entrance Channel and Toowoona Bay completed in 2012 to locate fixed infrastructure on stable foundations off dunal systems and use signage to direct movement over routes subject to instability from coastal processes, consistent with NPWS track guidelines.  Shared usage of the path, such as with bikes/mountain bikes, or disabled access, should also be considered. The investigation should determine the need for this action compared with other coastal priorities.
A50	Develop a design theme for coastal information, interpretation and safety signage.		Community Engagement	High usage/high profile sites as first priority - Shelly Beach, Toowoona Bay.	Access, Recreation and Tourism Action Plan (Section 13.0)	No	Master Plan process will encompass this action. Beach safety signs are designed by Council with consideration of SLSNSW and other recommendations.	None
A53	Conduct regular surveys of beach users in relation to facilities and services.	Provides regular feedback on the condition of the coast and outcomes of investment in recreational facilities.	Community Engagement	Entire coastline of Wyong Shire	Access, Recreation and Tourism Action Plan (Section 13.0)	Yes, with changes (see Action 21)	The surveys should also include questions regarding the community's views and understanding of coastal risks, including sea level rise, and potential options for managing such risks in future.	Conduct regular surveys of beach users to determine recreational usage and demand patterns, and views and understanding of coastal risks and risk management.
A77	Document stories of Aboriginal attachment to the Wyong coastline.	Identify with the Aboriginal community which information to use in interpretative material about the coast, and where such information should be placed.	Community Engagement	Relevant to entire coastline of Wyong Shire. Specific locations determined in consultation with Aboriginal community.	Protecting Cultural Landscapes Action Plan (Section 14.0)	Yes (see Action 41)	Amalgamation of concepts given in Action description and comments has been recommended only.	Liaise with the local Aboriginal community to determine which information should be used in interpretative signage along the coast.
A78	Monitor the condition of known Aboriginal sites on coastal land under Council's care and control.	Include protection measures in plans of management for coastal reserves.	Community Engagement	Relevant to entire coastline of Wyong Shire. in Council care and control. Specific locations determined in consultation with the local Aboriginal community.	Protecting Cultural Landscapes Action Plan (Section 14.0)	No, alternative action proposed	New action proposed, to develop a decision support tool to determine the most appropriate course of action for Aboriginal assets at risk from coastal hazards. The preferred course of action may not always include protection, and other options (including relocation) should be outlined in the decision support tool.	New Action proposed: Liaise with the LALC, NPWS and other appropriate stakeholders to develop a procedure or decision support tool that outlines the protocols to be followed if significant Aboriginal sites are threatened or uncovered by erosion (See New Actions table for further details)
<b>Actions listed in the Action Plans in Supporting Information Volume 1 (but not included in the implementation schedule of the CZMP 2011)</b>								
A59	Liaise with SES and OEH about shared training and coordinated management of coastal emergencies	Subject to agreements with the NSW Government, Council officers may be authorised officers in relation to regulation of emergency protection structures (see also Action A4). However WSC has decided not to take up the option of training its officers to be Authorised Officers under the CPA 1979.	Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Emergency Response Management Action Plan (Section 8.0)	No.	The EASPs already outline the roles and responsibilities of Council in a coastal erosion emergency. SES remains the lead combat agency during flood and storms. As this process is already clearly defined through the NSW State Storm Plan and associated legislation, this action is considered obsolete.	None
A19	Use clauses in the LEP and DCP to identify appropriate development in coastal risk areas (such as relocatable structures) and to allow for mandatory demolition in certain circumstances.		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Current DCP approach is appropriate.	None
A26	Council may build and maintain sea walls to protect existing public assets that are vulnerable in the 2050 and 2100 planning horizons.	This action would only be used for major assets with a long asset life, whose function will not be compromised by other aspects of climate change or changing community requirements.	Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Generally, for risks not expected to eventuate until 2050 and 2100, we would not recommend action until there is a clear trajectory and monitoring evidence that the risk is occurring and imminent. (i.e., avoid adapting too early).	None



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A27	Council may grant development consent to permit the construction and maintenance of sea walls to protect existing private assets affected by coastal recession, with specific conditions		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Unnecessary notation.	None
A29	Council will consider a shire wide levy to provide funds for managing climate change impacts on community assets along the coast, such as sewerage systems, roads and public beach accessways		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Use of a levy is considered to be a funding option, not an action in itself	None
A7	Require removal of existing development within immediate coastal hazard zones, when the landward margin of the zone of wave impact is within 5 metres of the structure		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Council already has powers to order demolition of structures for public safety reasons. This action would appear alarming to the community	None
A43	Advise occupiers of property that is affected by coastal inundation risks by adding a notation on s149 certificates for the property and by direct communication e.g. with rates notices, letters.		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	See notes for A62.	None
A65	Maintain a database with information about coastal inundation episodes, including dates, context, photographs, impacts and responses		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, with changes. (see Action 36)	Expand the action to collect information about past events, and coastal erosion events also.	Develop and maintain a database of coastal events, including inundation events and erosion events on the beaches. The database could commence with a search and request to the general public for information on past events (date, location, impact, photographs, response). The database would then be maintained with collection of this data for future events. To provide ongoing data, the database should be advertised during other coastal hazard education activities (see New Action B11).
A68	Council will commission further studies of sediment dynamics in the Entrance channel, with sea level rise.	This is likely to include a hydrodynamic model to test sediment budget changes in the entrance channel as sea level rises. Further research is also necessary to clarify the relationship between lake flood levels, coastal recession and oceanic inundation hazards at Lakes Beach area.	Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Lake and Sea Interactions Action Plan (Section 10.0)	Yes, amalgamated with other action(s) (see Action 10)	The intent of this action has been combined with Action A67.	None
A69	Council will introduce planning clauses in the LEP and DCP with consistent requirements for appropriate geotechnical assessments of proposed development within the zone bounded by the immediate hazard line and 2100 low geotechnical hazard line (assessments prepared by a properly qualified geotechnical practitioner). No new development will be approved within immediate geotechnical hazard areas.		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Geotechnical Hazards Action Plan (Section 11.0)	No, alternative action proposed.	At present, the geotechnical hazard areas have been included within DCP Chapter 3.5 Coastal Hazards, however the controls specified for these hazard areas are the same as that for coastal hazards. Such controls may not be applicable, especially in areas subject to geotechnical risk not driven by coastal processes. The new hazard maps in the WCZMP 2017 identify areas subject to "geotechnical hazard" driven by other processes separate to coastal processes, and these areas are also not able to be delineated as "immediate, high, and low" as per the coastal hazard nomenclature. The DCP controls therefore require urgent review and update to reflect controls for geotechnical hazard, preferably as a separate Geotechnical Hazard Chapter in the DCP. If required, there are also separate LEP optional clauses available for geotechnical hazards.  A new action to complete these more appropriate changes to the LEP / DCP to manage geotechnical hazards is recommended.	New Action proposed: Update the LEP and / or DCP to include appropriate provisions for managing geotechnical hazards.

## Review of Actions in the 2011 Wyong CZMP

2011 Ref. No.	Action	Comments (from WCZMP 2011)	Implementation Schedule Category	Location (if relevant)	Action Plan(s) from Supporting Volume 1 Part B	Relevant to CZMP 2017	Recommended changes to Action	Recommended Action for CZMP 2016
A82	LEP zoning and DCP clauses will discourage land use intensification and reduce risk in areas with a high probability of geotechnical hazards		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Geotechnical Hazards Action Plan (Section 11.0)	No	New action proposed for Action A69 will encompass this action.	
A88	Council will include information about geotechnical hazards affecting infrastructure in the coastal zone, such as stormwater drains, sewer reticulation and pumping systems, in its asset data base and will take geotechnical hazards into account when planning upgrades, relocation or other major system maintenance activities. Council will set out appropriate design requirements in the LEP, which will apply to Council activities, projects by other government agencies and private development		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Geotechnical Hazards Action Plan (Section 11.0)	Yes, amalgamated with other action(s) (see Action 23 & 25)	These are two separate actions. Elements relating to managing existing assets have been combined into Action A12. Elements relating to design requirements for Council strategic planning of new assets have been combined into new Action (Prepare a checklist or Council guideline outlining planning controls that shall apply to all Council works in the coastal zone).	
A73	Repeat LiDAR surveys of the coast at approximately 5 year intervals. Analyse high resolution digital terrain data at 5 yearly intervals to identify any changes in the terrain of areas affected by geotechnical hazards		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Geotechnical Hazards Action Plan (Section 11.0)	No	LiDAR is already collected at 2-3 yearly intervals by the NSW Government. As noted in Action A1, Council should continue to note their support for this collection program.	
A30	Strengthen vegetation communities on dunes by preparing, implementing (including monitoring effectiveness) vegetation management plans that include species selection, planting, weed removal, fencing etc.	Action expands on vegetation management component on A8	Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Building Biodiversity Resilience Action Plan (Section 12.0)	Yes, amalgamated with other action(s) (see Action 6)	Intent of this action has been included with the new action: dune rehabilitation by Council.	None
A55	Review off leash dog exercise areas in terms of compliance and feedback from users and make changes as necessary to minimise negative impacts on other users and values		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Access, Recreation and Tourism Action Plan (Section 13.0)	No	Off-leash dog access areas are already monitored and reviewed through other more relevant Council strategic plans and policies.	None

## Review of Actions in the 2011 Wyong CZMP

Table C-2 New Actions Recommended for the Wyong CZMP 2017

NEW Ref. No.	Action Detail for CZMP 2017	Comments / relationship to existing actions.
B1	Continue to conduct the beach sand monitoring program after storms, using the most efficient technology (currently UAV (drone) collection of aerial photogrammetry). The monitoring data shall also be used to check if and when trigger points for council assets at immediate risk are reached (with a listing of council assets determined through Action A12). The data shall also be invaluable for review of hazard studies; and effectiveness of management actions through a repeated risk assessment, at time of plan review (10 years).	Action updates and replaces Action A1. (see Action 1)
B2	Lobby NSW government to collect marine LiDAR (out to 30 - 40 m water depth) at regular intervals (10 yearly).	Action updates and replaces Action A1 (see Action 2)
B3	Develop a monitoring program for sites at high risk of landslide and geotechnical hazard. High Priority Sites: Cabbage Tree Harbour, behind Bateau Bay, behind Blue Bay. Low Priority Sites: Old landslips evident from ridge lines at Crackneck Point and Jenny Dixon Beach.	Action updates and replaces Action A89 (see Action 4)
B4	Undertake training of relevant Council staff regarding appropriate response to coastal erosion events	Action updates and replaces Action A4 (see Action 24)
B5	Conduct dune rehabilitation works to encourage sand accretion, stabilisation and growth of frontal dunes. As necessary, prepare and implement vegetation management plans for the dune rehabilitation works to specify species selection, planning, weed removal and fencing plans for a dune rehabilitation area.	Action updates and replaces Action A8, and captures relevant elements of A44 (see following notes) and A30 (regarding vegetation management plans). Dune stabilisation provides a buffer of sand to be eroded during storm events. Where dune heights are maintained above ~ 7 m AHD, dunes can also act as a suitable barrier to wave overtopping (see notes from Action A44). (see Action 6)
B6	Investigate the viability of beach scraping on Wyong's beaches, and develop a prioritised list of beaches for which beach scraping may be beneficial.	Action updates and replaces Action A44 (see Action 8)
B7	Update DCP Chapter 3.10 Wetlands Management to include consideration of migration buffers for sea level rise for wetland communities.	Action updates and replaces Action A20 (see Action 22)
B8	Update Draft Chapter 3.5 Coastal Hazards to include controls for wave overtopping, including consideration of sea level rise for proposed new or modifications to existing coastal structures (e.g. seawalls).	Action updates and replaces Action A62 (see Action 16)
B9	Check existing flood modelling for coastal lakes, and if not already done so, include ocean water levels within the flood assessment, then update Flood Planning levels and associated planning documents to reflect the new modelling outcomes.	Action updates and replaces Action A62 (see Action 12)

## Review of Actions in the 2011 Wyong CZMP

NEW Ref. No.	Action Detail for CZMP 2017	Comments / relationship to existing actions.
B10	Prepare a checklist or Council guideline outlining planning controls (similar or the same as detailed in the DCP Chapter 3.5 Coastal Hazards, and the geotechnical development controls (to be developed through Action 19) that shall apply to all Council works (developments, infrastructure etc.) in the coastal zone. This should capture Part 5 developments, strategic planning for major infrastructure and other works not requiring development consent.	See notes for Action A10 (as secondary, Action A23 and Action A88). (see Action 23)
B11	Undertake an education program explaining to the community the dynamic and varying nature of beaches. The education shall aim to build the resilience of the community during periods of beach erosion, when accessways and beaches may be temporarily inaccessible. Through building the community's understanding of the coast, the education program shall also aim to empower the community to provide relevant feedback on coastal management options and initiatives.	Action updates and replaces Action A5 Education activities are also an opportunity to promote the database of coastal events (see Action A65). (see Action 34)
B12	Undertake site specific studies to determine feasible options to manage erosion hot spots	Wyong CZMP 2011 and this review were not able to provide the detailed options assessment and economic cost benefit analysis, funding modelling, business case, and intensive community consultation required to definitively select an action to be implemented at the erosion hot spots, some of which have already exceeded the sand volume trigger buffering them from direct impact to property after the June 2016 storms. The need for site-specific studies is imminent. (see Action 5)
B13	Undertake education through the existing surf clubs and surf lifesaving community regarding beach processes (periods of erosion and recovery) and the valuable role of dune vegetation. The education of surf club members could also include the location and sensitivity of nesting shorebirds, where they occur on or near patrolled beaches.	Action updates and replaces Action A46. (see Action 35)
B14	Undertake an inventory of all recreational assets in the coastal zone, including notation of current condition. The inventory shall form a new or updated Asset Management Plan for recreational infrastructure, and asset locations should also be logged in GIS. In GIS, the Asset database should be overlain with the hazard maps, to determine those assets within the immediate coastal risk zone and within geotechnical hazard zones. This information should be appended to the AMP.	This action provides for asset database update for minor recreational assets, similar to Action A12. An inventory of recreational assets and their current condition is required, for review against coastal and geotechnical hazard risks and to determine priorities for new facilities (see replaced Action A76 below). As recreational facilities are not expected to last longer than around 25 years, only the immediate coastal risk zone is relevant to the planning and replacement of recreational facilities. The inventory shall also include coastal access structures such as stairways and lookouts within geotechnical hazard zones. (see Action 29)

## Review of Actions in the 2011 Wyong CZMP

NEW Ref. No.	Action Detail for CZMP 2017	Comments / relationship to existing actions.
<b>B15</b>	Develop a post-storm monitoring program for recreational infrastructure on the beaches, particularly beach accessways. This will be important in cases where the EASPs are not activated. The monitoring program should make note of any general need for repairs also.	Beach accessways are expected to be damaged by coastal erosion from time to time because these assets must necessarily exist within the immediate hazard zone. (see Action 31)
<b>B16</b>	Develop a prioritised program of upgrades and additions to recreational infrastructure along the coast, based on asset condition (as identified through the recreational asset inventory, see New Action B14), coastal or geotechnical risk (including risks to public safety), and recreational demand (as supported by regular community surveys, see Action A53).	Action replaces and updates Action A76. As required, the facility upgrades may be facilitated through new or revised Masterplans or Plans Of Management at a beach location. Improvements to beach accessways shall also cater for suitable disabled access. The upgrade program should also make use of the post-storm monitoring data, to prioritise works if needed (see new Action above). (see Action 30)
<b>B17</b>	Liaise with the LALC, NPWS and other appropriate stakeholders to develop a procedure or decision support tool that outlines the protocols to be followed if significant Aboriginal sites are threatened or uncovered by erosion. The Decision Support Tool may include: - Persons to be notified if sites are uncovered (i.e. LALC, NPWS); - Monitoring for sites under threat, until a course of action is decided; - The range of options available to manage the threat (e.g. relocate, protect, allow to be eroded) and the pros and cons of the options; - The preferred action for particular types of sites/artefacts (e.g. protection for middens, relocation for burial sites etc.).	This action updates and replaces Action A78 (see Action 42)
<b>B18</b>	Update the LEP and / or DCP to include appropriate provisions for managing geotechnical hazards.	This action updates and replaces Action A69. At present, the geotechnical hazard areas have been included within DCP Chapter 3.5 Coastal Hazards, however the controls specified for these hazard areas are the same as that for coastal hazards. Such controls may not be applicable, especially in areas subject to geotechnical risk not driven by coastal processes. The new hazard maps in the WCZMP 2017 identify areas subject to "geotechnical hazard" driven by other processes separate to coastal processes, and these areas are also not able to be delineated as "immediate, high, and low" as per the coastal hazard nomenclature. The DCP controls therefore require urgent review and update to reflect controls for geotechnical hazard, preferably as a separate Geotechnical Hazard Chapter in the DCP. If required, there are also separate LEP optional clauses available for geotechnical hazards. (see Action 19)



## Review of Actions in the 2011 Wyong CZMP

NEW Ref. No.	Action Detail for CZMP 2017	Comments / relationship to existing actions.
<b>B19</b>	Undertake an implementation workshop, to educate staff from relevant Council units of the actions they are responsible for implementing in the WCZMP 2017.	As the new WCZMP will require input and implementation by all facets of Council, from environmental staff, to planning staff, to engineering and asset management, and on the ground works crews, it is recommended that each of the departments of Council be made aware of their responsibilities through the WCZMP. An implementation workshop to bring all the staff together and inform them of the purpose, intent and their responsibilities for the WCZMP is recommended as an inclusive way to educate all relevant staff.  (see Action 15)
<b>B20, B21</b>	Actions B20 and B21 replicate the asset management plan updates recommended in Action A12, but separate actions are required to separate the assets according to their management within Council. Therefore, transport and stormwater assets are covered by Action A12, sewer and water assets by Action B20 and remaining major Council assets, such as SLSCs are covered by Action B21.	Replicate Action A12, but for sewer, water and other council assets.  (see Action 27 and 28)
<b>B22</b>	Revise the EASP(s) to: (a) reflect the current legislation relating to temporary coastal protection works; (b) provide appropriate advice on emergency actions for the remainder of the coast (i.e. outside of the "hot spots") and (c) reflect changes to the legislation arising from the NSW Government's coastal reforms in future.	This action updates and replaces Action A85  (see Action 33)