



Review of the Belongil EOS – Operational Controls

Review Items	Discussion and Context within the EOS	Response
<p>Water Level Controls: 1.0m AHD watch 1.1m AHD immediate breach 1.2m AHD upper limit</p>	<p>A total of five different breach/water level management options were assessed in the EOS (2019): No artificial opening; 1.0m AHD trigger level; 1.2m AHD trigger level; 1.0m AHD watch level and 1.2m AHD trigger level; and 1.4m AHD trigger level. A qualitative approach was adopted based on how the potential outcomes will affect the management objectives developed.</p> <p>The EOS (2019) options assessment considered indicated there is a high degree of uncertainty surrounding the outcomes that would result if the opening level of the estuary is raised (i.e., water level controls increased). Many of the values identified by the stakeholders and the community would be threatened if the opening level was raised significantly. As a result of the assessment of the issues relative to the desired objectives, and significant uncertainty associated with raising the opening level, the EOS recommended minimal change to the opening level to limit the impacts on the catchment. However, to allow more time to reach favourable opening conditions it was recommended that a 1.0 m AHD watch level and 1.1 m AHD immediate breach level be implemented. The Decision Support Framework also specifies 1.2m AHD as a maximum trigger level/act level if it is safe to do so.</p>	<p>There is less uncertainty surrounding the outcomes associated with the present opening regime due to the long-term monitoring data available for the past 20 years of stable management, and as such the current management regime is preferred in the short term. However, with SLR the opening level should increase/ be raised incrementally over time, particularly in light of the recent IPCC Sixth Annual Report (AR6) which indicates an increasing rate of GMSL rise (recorded at 3.7mm/yr between 2006 and 2018 (high confidence)), i.e. a rate faster than what was previously recorded. This raising of the opening level should be based on monitoring and if opening is required more frequently (e.g. every month) then the opening level could be raised. The 1.0m AHD and 1.1m AHD are consistent with the previous draft EOS and currently work from an operational perspective though controlling WLS and maintaining levels below a certain height will become increasingly hard to achieve in the future (when the entrance is both open and closed) due to SLR.</p> <p>Key outcome: The current breach/water level controls are workable now but will need to rise in parallel with rise in ocean levels. Long-term planning is needed through the CMP and Flood Plans to mitigate the risk of flooding in Byron Bay into the future.</p>



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Excavation Depth	<p>Artificial opening is achieved using an excavator to dig a pilot channel 3m wide across the closed beach barrier with a depth of approximately 0.2 m below water level. The pilot channel is noted to be the base channel area and clarification should be made that this channel size does not include the width needed for battering of the sides. For example, depending on the depth of sand to be excavated and sand reserves on Belongil Beach, the area required for suitable batter slope of the channel may require 10m either side.</p> <p>Previous openings: The creek mouth was mechanically opened on the 7 June, 2019, however, the excavated channel was unsuccessful and had closed by the following morning. The channel filling in was likely due to strong swells and limited rainfall (dominant ocean conditions preventing the breakout). Another channel was excavated on the 11th June, 2019 which successfully opened the mouth. The opening was unsuccessful on the first attempt and likely due to no rainfall to maintain an effective breach and minimal opening depth against the ocean conditions.</p> <p>An opening was undertaken on 19 March 2021 with water levels of 1.24m AHD and rainfall forecast of up to 100mmm in the next 72 hours. A large swell event was forecast for 21/03/21. While the opening completed on 19 March was successful (the creek was flowing when team left site), large swells, high tides and rainfall led to water levels remaining high before starting to subside and showing tidal influence on 24/03.</p>	<p>The EOS has 0.2m depth and this has proved to not be sufficient for creating effective channel formation and opening of the creek. Mechanical opening has needed to be attempted twice on some occasions. A shallow dig appears to be unsuccessful to create a channel during any kind of swell event or high ocean levels.</p> <p>Key outcome: An excavation depth of 0.2m below water level has not proven to result in an effective opening, and the channel depth should be deeper. The EOS should allow excavation depth up to 0.5m below water level. The pilot channel (3m) does not include the batter slopes.</p>