FREQUENTLY ASKED QUESTIONS

Beach Sand Nourishment Scoping Study: Maintaining Sydney's Beach Amenity against Climate Change Sea Level Rise

Why did the Sydney Coastal Councils Group commission this study?
Beach erosion will be a significant and ongoing issue for coastal communities as a result of climate change. Beach nourishment is identified as a management response to sand loss in a number of existing Coastline Management Plans in Sydney. The Sydney Coastal Councils Group (SCCG) commissioned this study to assess the viability of using marine sands for beach nourishment as an adaptation option to sea level rise.

What is the cost of not acting in response to sea level rise?
Ongoing beach erosion caused by sea level rise will impact on environmental, economic and social sustainability of Sydney's beaches from Cronulla to Palm Beach. Importantly for councils and their residents, loss of access and expenditure by beach visitors can be limited or avoided through beach nourishment.

What are marine sands and where are they located?
Marine sand bodies are geological features that have formed over the past 17,000 years following the end of the last ice age. They are no longer connected to Sydney's ocean beaches by littoral drift transport processes. Potential offshore sand sources have been identified at Providential Head, Cape Banks, the Central Coast and offshore of the rocky cliffs at Bondi and Malabar.

Why are marine sands considered for beach nourishment?
Land based sand reserves in the Sydney region are extremely limited. The majority marine sand reserves are compatible with the requirements for beach nourishment because of grain size compatibility, grain angularity, colour and transport distances.

How would sands for nourishment be extracted?
Based on the wave climate and depth experienced on the Inner Continental Shelf near Sydney, a Trailing Suction Hopper Dredge (TSHD) would be the most suitable dredging equipment for extracting sand. The TSHD operates very much like a floating vacuum cleaner. It sails slowly (1-2) knots over the area to be dredged drawing up sand as it proceeds. Other dredge systems may also be used.

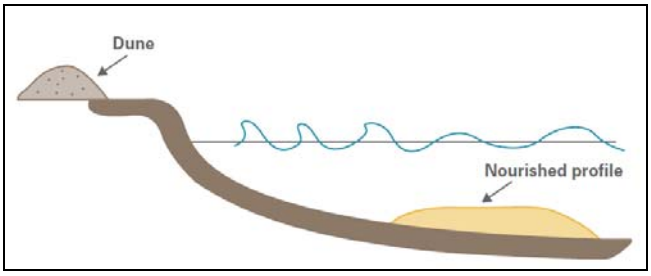

Figure 2: Offshore sand nourishment

How would Sydney beaches be nourished with marine sands?
Beach nourishment utilising offshore placement (profile nourishment) is the simplest, natural and most cost effective way to nourish Sydney beaches. Environmental impacts are likely to be kept to a minimum using this method, with volumes of nourishment sand placed being similar to the volume of sand moved offshore during a severe storm. An offshore nourishment programme would not require closure of the beach and, therefore, most recreational and business activities would continue without disruption.

For more information: on the *Beach Sand Nourishment Scoping Study: Maintaining Sydney's Beach Amenity Against Climate Change Sea Level Rise* contact Sydney Coastal Councils Group at info@sydneycoastalcouncils.com.au

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What are the environmental impacts of beach nourishment?
The impacts of beach nourishment need to be considered in two areas:

When the sand is extracted: The impacts of dredging on benthic invertebrates requires further detailed investigation. Any impacts would be highly localised and short term, persisting until recolonisation occurred. Longer term and wider scale impacts are not expected. Mobile species, such as whales, fish and prawns, and large bivalves would be able to avoid the dredging extraction head by swimming away or burrowing.

When the sand is placed: It is likely that the largest ecological effects of nourishment will occur in the near-shore environment where the sand is deposited. Given that intertidal biota a) live within the sand, b) can survive some degree of burial and c) are adapted to sediment disturbance by waves, any nourishment effects on intertidal biota are likely to be negligible as sand gradually accretes to the beach via wave action.

What are the environmental and social benefits of beach nourishment?
Sea level rise and the associated shoreline recession could result in the permanent loss of beaches in Sydney as well as the environmental and social services they provide. This would have a significant impact on coastal ecosystems, beach amenity and safe public access to foreshore and intertidal areas. Such impacts can be minimised or avoided through beach nourishment.

What are the economic benefits of beach nourishment using marine sands?
The benefits of beach nourishment are associated with the avoidance of impacts associated with the loss of beaches. Beach visitors, local residents and business as well as governments all benefit financially and socially from the existence of beaches in the Sydney region. The benefits of maintaining beaches through sand nourishment include:

- Avoided loss of residential property values attributed to beach amenity;
- Avoided loss of residential property values attributed to proximity to hazard lines;
- Avoided loss of expenditure by beach visitors, including international tourists; and
- Avoided loss of rates revenue from residential property values.

Is Beach Nourishment financially viable?
Examining three case study sites the scoping study aimed to evaluate the costs and benefits of a nourishment program based on engineering, environmental and social considerations. For each of the three case studies, a nourishment program is economically viable. The cost benefit ratio*
for the three case studies were: Collaroy-Narrabeen Beach 1.6, Manly Beach 2.4 and Bate Bay 1.2.

What areas require further investigation?
It is the intent of the SCCG that this study provides a basis to inform all spheres of government and coastal communities of the pros and cons of utilising off shore marine sand sources to facilitate immediate and longer term sand nourishment of Sydney's beaches. Social, environmental and planning considerations that require further investigation include:

- The potential environmental impacts of an offshore sand extraction process.
- The potential social and environmental impacts of a near-shore sand nourishment campaign.
- Future environmental studies required to develop an EIS.
- The planning and approval process for a sand nourishment program.
- Further cost benefit analysis of all beaches likely to lose sand and beach amenity.
- Consideration of safety implications from the loss of beach sand.

***Cost benefit ratio:** a comparison of the value of an investment decision or project with its initial cost. A ratio of greater than one indicates that the project has a positive cost benefit.

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