

TWEED SAND BYPASSING

Tweed River Entrance Dredging: Employing a Flexible Placement Strategy


28th NSW Coastal Conference

Matthew Harry - Coastal Management Unit, NSW Department of Industry
 Adrian Barwick - Coastal Management Unit, NSW Department of Industry
 Celine Roux - Coastal Impacts Unit, Qld Department of Environment and Science

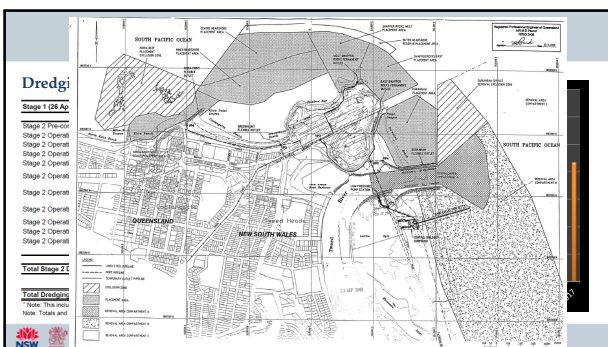
TWEED SAND BYPASSING

Tweed Sand Bypassing (TSB)

- TSB is a joint coastal management initiative of the New South Wales and Queensland State Governments.
- The objectives of the Project are to:
 - Establish and maintain a safe, navigable entrance to the Tweed River, and
 - Restore and maintain the coastal sand drift to the southern Gold Coast beaches.
- These objectives are set out in both the NSW and Qld legislation, and are achieved in perpetuity through the use of permanent sand bypassing jetty and recurrent dredge.
- Tweed River Entrance Sand Bypassing Company (TRESBCo - a subsidiary of McConnell Dowell Constructors) is responsible for the operation and maintenance of the sand bypassing system as detailed in the Concession Agreement (CA) made in 1999



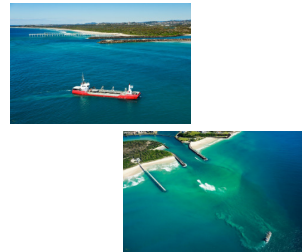
Restoring Coastal Sand Drift - Improving Boating Access



TWEED SAND BYPASSING

Entrance Management

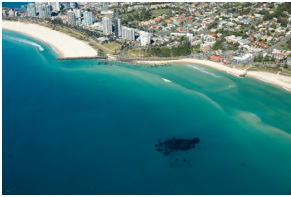
- Placement areas for dredged sand had been in use with minimal changes since operational dredging commenced
- Limited placement options through existing contractual arrangement
- Approval for additional placement areas had been obtained over time although not utilised
- Identified a need for flexibility in responding to project objectives and stakeholder feedback



Restoring Coastal Sand Drift - Improving Boating Access

TWEED SAND BYPASSING

TSB operations and stakeholder consideration - Qld

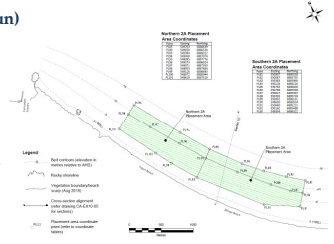


- Ministerial Feasibility Study into TSB operational enhancements (2011)
 - Additional Dredge Placement Areas potentially located along Bilimga and Tugun beaches about three kilometres to the north of the project placement areas, and also in deeper waters further offshore of the existing Point Danger to Coolangatta nearshore sand placement areas
- Consideration of the community concerns regarding Coolangatta / Kirra sand volumes and the exposure levels of Kirra reef
- If sand delivery volumes through pumping are high, and dredging is still required, additional placement areas can assist with managing the natural transport rate to Qld

Restoring Coastal Sand Drift - Improving Boating Access

TWEED SAND BYPASSING

2A placement area (Bilimga/Tugun)



- Section 86 approval gained in 2017
- Located approximately 6km from the Tweed River entrance
- Placement area spans -3.5m AHD to -12m AHD
- 95 sub-boxes were developed to allow for targeted placement

Restoring Coastal Sand Drift - Improving Boating Access

TWEED SAND BYPASSING

TSB operations and stakeholder considerations – Fingal

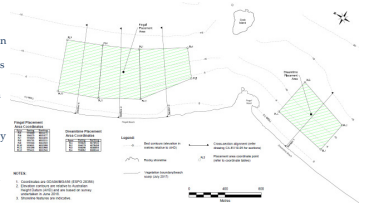


- Ministerial Feasibility Study into TSB operational enhancements (2011)
 - Sand Back-passing by either dredge placement and/or pumping of sand southwards along Letitia Spit Beach
- Fingal provides the opportunity for another placement option to enable TSB to better distribute dredged sand when considering the natural sediment transport rate along Letitia and through to Qld

Restoring Coastal Sand Drift - Improving Boating Access

TWEED SAND BYPASSING

Fingal / Dreamtime placement area



- Development of an REF and implementation of project environmental management plan inclusive of adaptive management measures
- Compliance with Environmental Protection Licence conditions issued by EPA
- Monitoring of water quality and reef ecology
- Notification and consultation with relevant authorities prior to commencement of work

Restoring Coastal Sand Drift - Improving Boating Access

TWEED SAND BYPASSING

Concession Agreement Amendment

- TRESBCo contract was amended to allow for Governments to instruct dredging to occur
- Incorporated a Maintenance Dredging Service Order which was not available under the original Concession Agreement
- This allowed for changes to sand delivery payment rates and allowed for updates to the environmental management sub-plans that detail how dredging is to occur

Restoring Coastal Sand Drift - Improving Boating Access

TWEED SAND BYPASSING

Planning for 2019 dredge campaign

Restoring Coastal Sand Drift - Improving Boating Access

TWEED SAND BYPASSING

Decision Aid Tool

- KPIs are based on a sediment volumetric analysis for each pre-defined local compartment
- KPIs consider a range of coastal measures within each local compartment including: bank orientation; bank position; beach width; sand volume deficit; and survey coverage (additionally crest height and volume above threshold at Tweed Entrance)
- for each pre-defined local compartment the historical change in KPI values and their response to the wave climate is assessed

Restoring Coastal Sand Drift - Improving Boating Access

TWEED SAND BYPASSING

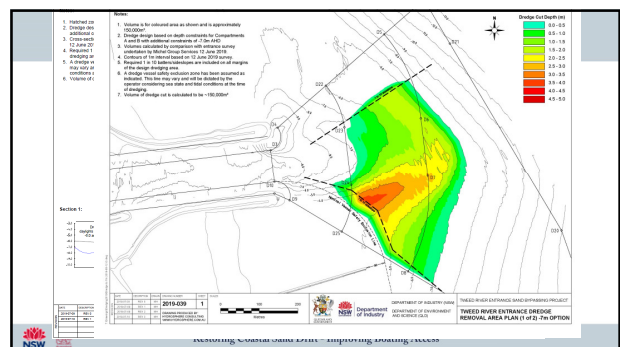
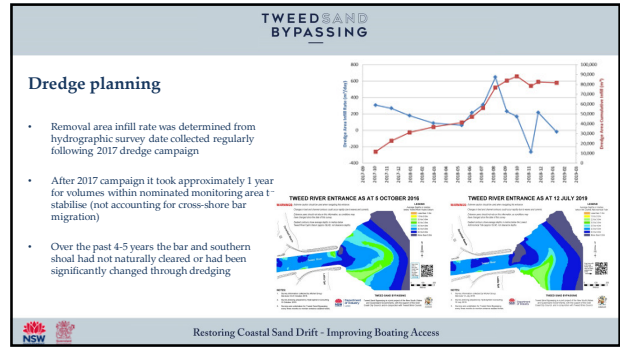
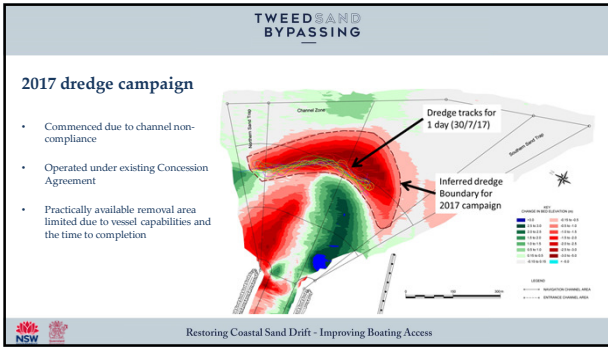
Decision Aid Tool

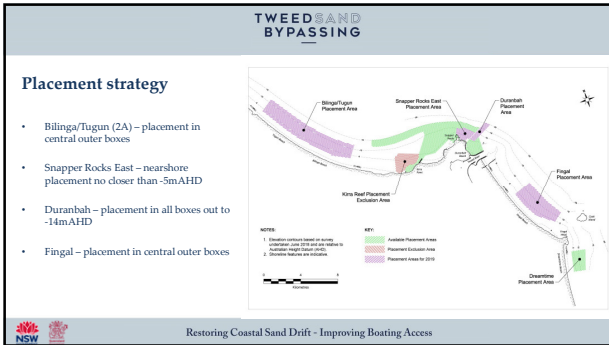
- Sensitivity testing was undertaken using a range of sand delivery limitations available within the tool
- The chosen restrictions were based on a 150,000m³ dredge volume target as well as the anticipated placement requirements
- Placement scenarios were ranked and there were options with or without backpassing
- These results were used as a guide for further planning and data analysis

Total Dredge	110,000	130,000	150,000	170,000
Max Durambah	30,000	50,000		
Minimum QLD	70,000	90,000		
Maximum QLD	120,000	180,000		

Rank	SRE	TwoA	Backpass
1	75,000	75,000	0
2	60,000	45,000	45,000
3	60,000	90,000	0
4	45,000	45,000	60,000
5	45,000	60,000	45,000

Restoring Coastal Sand Drift - Improving Boating Access





TWEED SAND BYPASSING

2019 dredged sand placement allocation including the use of backscap boxes

3A (Tugun/Bilinga)			Snapper Rocks East			Duranbah			Fingal		
Box	Capacity (m ³)	Placement volume	Box	Capacity (m ³)	Placement volume	Box	Capacity (m ³)	Placement volume	Box	Capacity (m ³)	Placement volume
2A21	11,879	4,000	SRE202	8,453	7,000	D001	8,038	4,000	F10	7,477	3,000
2A22	27,338	2,000	SRE203	4,882	4,000	D004	2,217	2,000	F20	20,003	3,000
2A26	11,991	4,000	SRE203A	1,730	1,000	D005	3,217	3,000	F25	7,249	3,000
2A27	27,331	2,000	SRE205	9,574	8,000	D006	2,588	2,000	F26	20,415	3,000
2A41	9,372	4,000	SRE206	7,515	7,000	D007	2,608	2,000	F31	6,840	3,000
2A42	21,086	2,000	SRE206A	2,380	2,000	D008	3,808	3,000	F32	20,133	3,000
2A46	9,300	4,000	SRE208	11,725	8,000	D009	3,345	3,000	F37	6,113	3,000
2A47	22,368	2,000	SRE209	10,616	10,000	D010	4,057	4,000	F38	20,153	3,000
2A51	8,841	4,000	SRE209A	3,764	3,000	D011	3,939	3,000	F43	5,187	3,000
Sub-total	172,811	39,000	Sub-total	61,440	54,000	Sub-total	48,247	26,000	Sub-total	134,483	39,000
All capacity based on 2018			All capacity based on 2018			All capacity based on 2018			All capacity based on 2018		
Total fill capacity			416,972			Total placement volume			159,000		

Restoring Coastal Sand Drift - Improving Boating Access



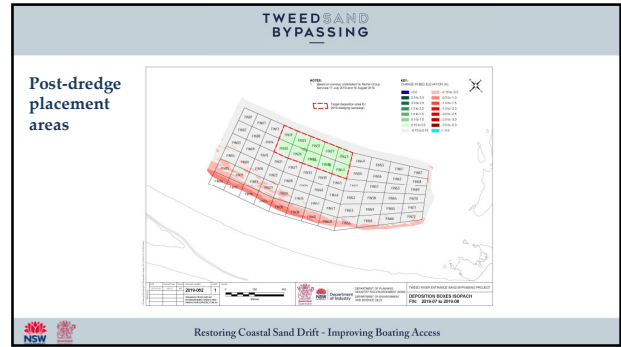
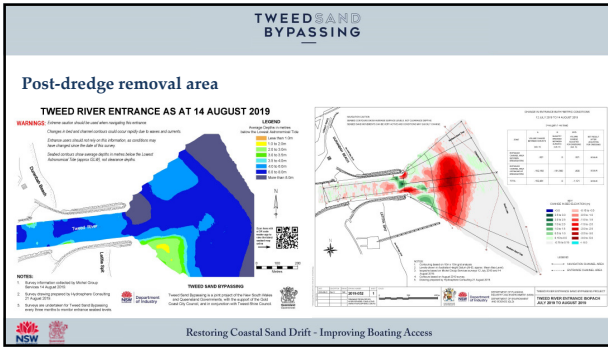
TWEED SAND BYPASSING

2019 TSB dredge campaign summary

- 14 July to 8 August (3 1/2 weeks)
- 150 loads with production rate of approximately 9,000m³ per day
- Cycle between SRE/Dbah and the additional placement areas depending on tides and time of day

Placement Area	Proposed Allocation (m ³)	Delivered Volume as at 8/08/2019 (m ³)	Placement Volume remaining as at 8/08/2019 (m ³)
2A (Tugun/Bilinga)	30,000	29,899	101
Snapper Rocks East	54,000	54,060	-60
Duranbah Beach	36,000	36,035	-35
Fingal	30,000	31,366	-1,366
TOTAL	150,000	151,360	-1,360

Restoring Coastal Sand Drift - Improving Boating Access



TWEED SAND BYPASSING

Lessons learnt

- Communications plan was effective, regular updates to TSB App, dedicated page on TSB website and a media release
- Working within the new placement areas at Tugun/Bilanga and Fingal did not increase community feedback (good or bad)
- Tweed River boating representatives very happy with the clear navigation channel and the impact on bar crossings
- TRESBCo expressed satisfaction with the dredge contractor and the contractual arrangements with the Governments
- Lessons learnt workshop to be held with the dredge contractor to discuss technical and logistical improvements that can be made

TWEED SAND BYPASSING

Restoring Coastal Sand Drift - Improving Boating Access

TWEED SAND BYPASSING

Future dredging strategy

- Extend entrance dredge area further south to target the removal of sand build up on the 'southern lobe'
- Continue to monitor Letitia sand volumes and shoreline position, consult with Fingal community and Tweed Shire Council to consider:
 - Dredging placement (requires amendment to EPL)
 - Neansbee nourishment through rainbowing
- Continue to monitor removal area infill rates to better understand entrance dynamics and to determine a long term sustainable dredge volume

TWEED SAND BYPASSING

Restoring Coastal Sand Drift - Improving Boating Access

