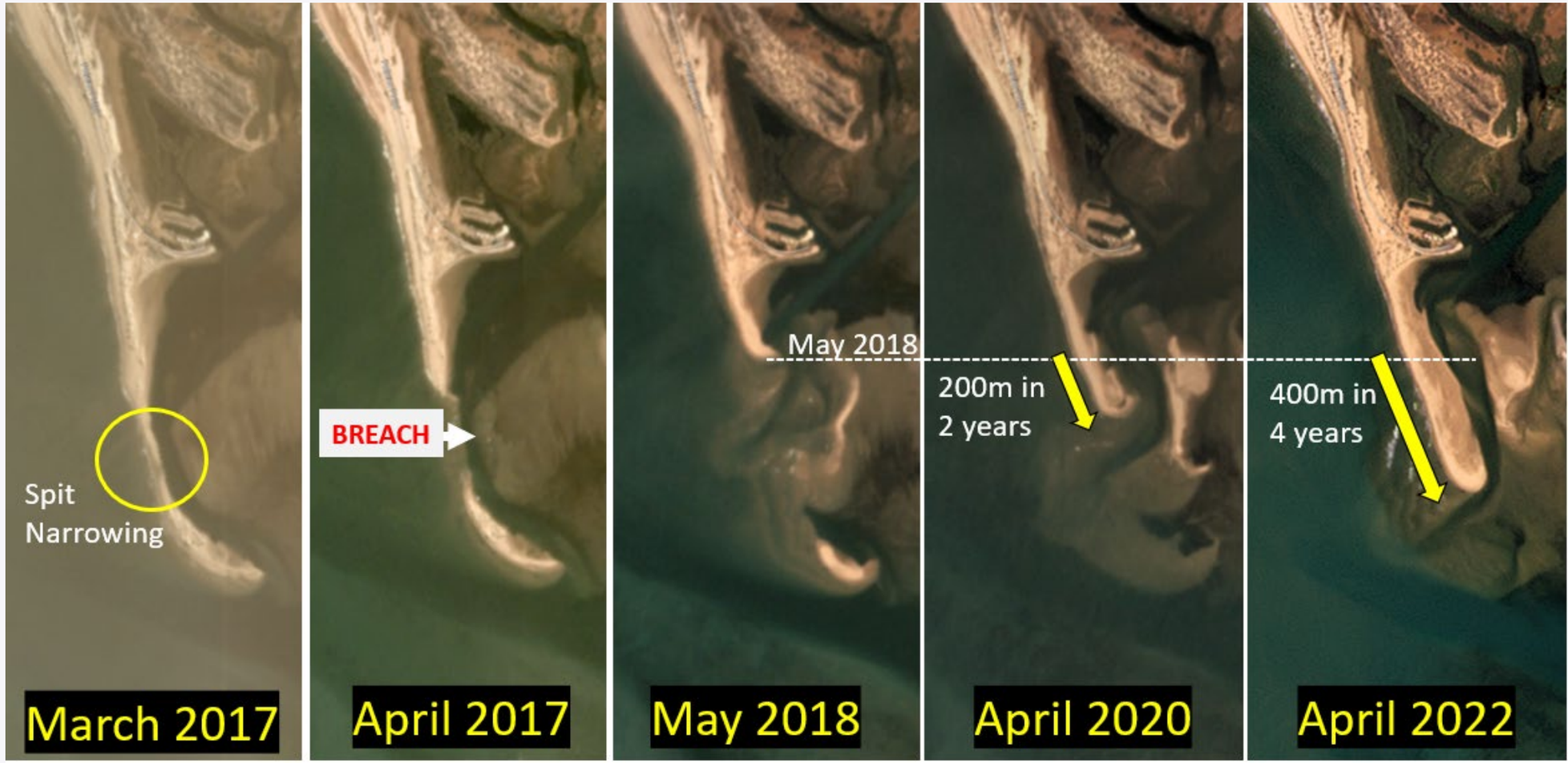
Carnarvon Fascine - Understanding the Dynamics

- The Babbage Island Spit and Fascine Entrance has been very dynamic over the 2017 to 2022 period. Changes have been monitored through regular collection of:
  - Aerial imagery (satellite photos)
  - Survey Data of the land surface
  - Bathymetry data (survey of seafloor)
- Studying the changes to the spit and the entrance has improved the understanding of the general coastal processes.
- Attempting to open the Fascine entrance over the past 5yrs whilst it has been adjusting to its ‘new equilibrium’ state would have been problematic due to sedimentation of dredged areas.

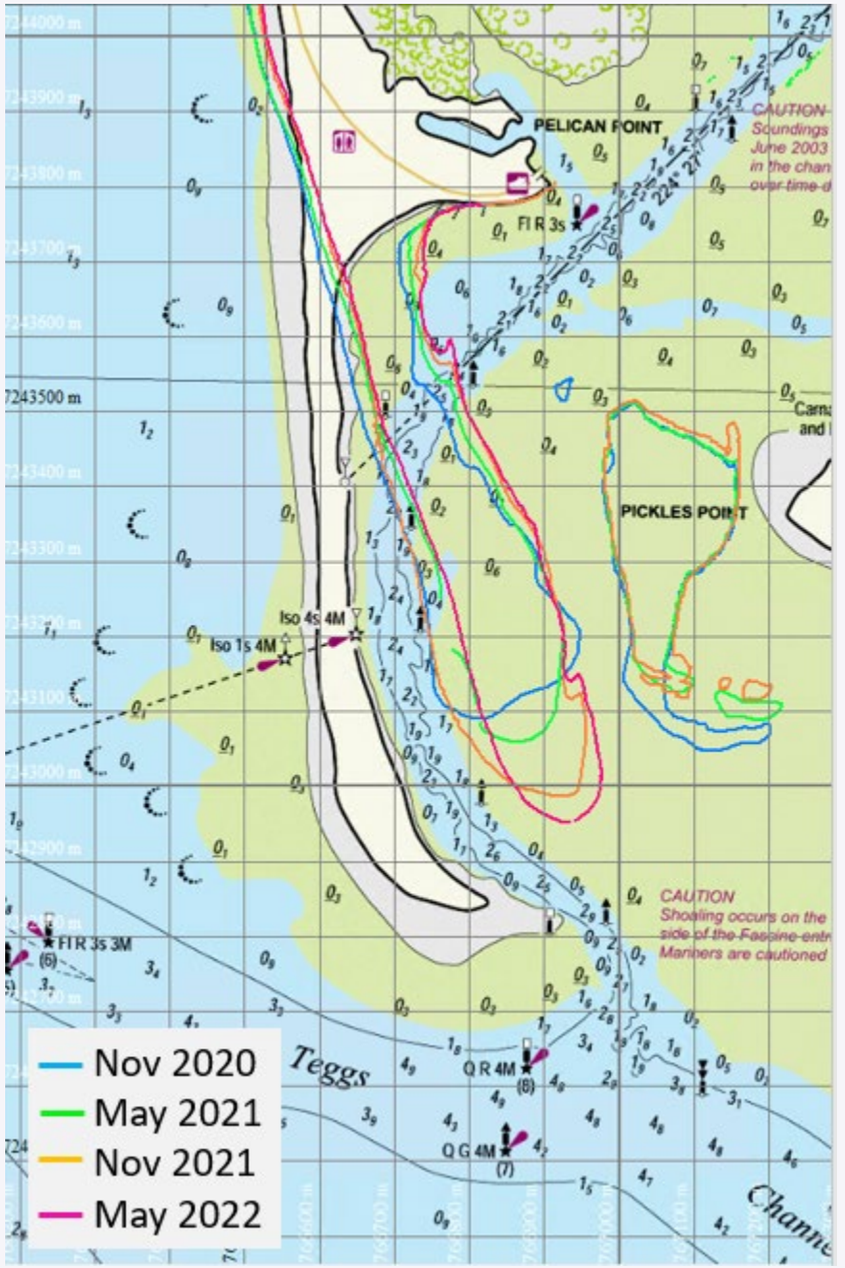
Changes to the Babbage Island Spit 2017 - 2022

- Breached in March 2017
- Highly Dynamic entrance 2017 - 18
- Spit has reformed and grown Southward ~100m / yr 2018 - 2022



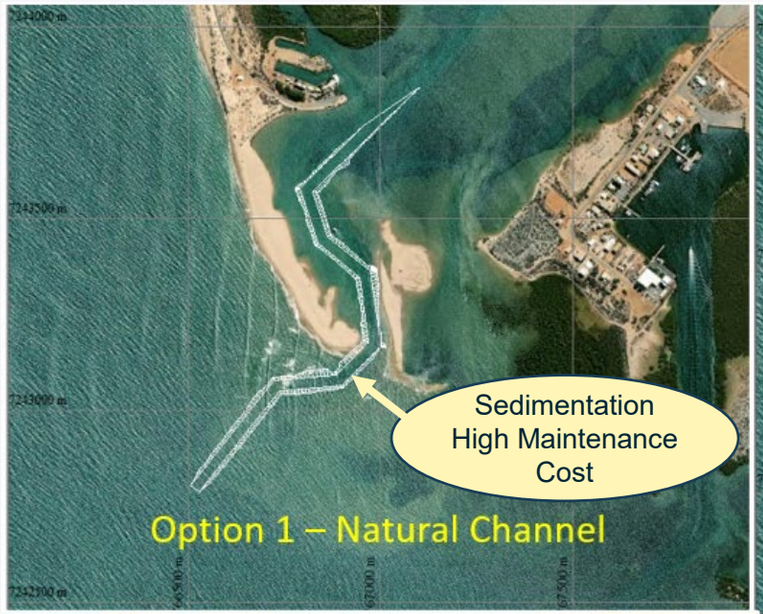
Realignment of Spit

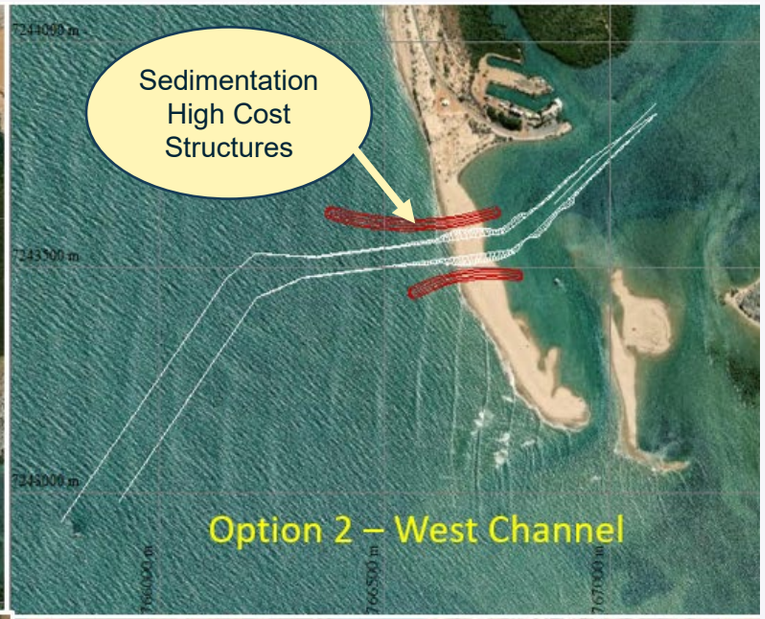
- The spit has re-established to the east of the original spit alignment
- Over the 2018 – 2022 period the spit has grown southward by ~ 100m annually
- Most active growth noted in the winter period due to influence of swell waves (littoral transport) and lighter winds
- By mid-2023 the spit is projected to reach the location of the Fascine entrance prior to the breach (Refer Navigation Chart)

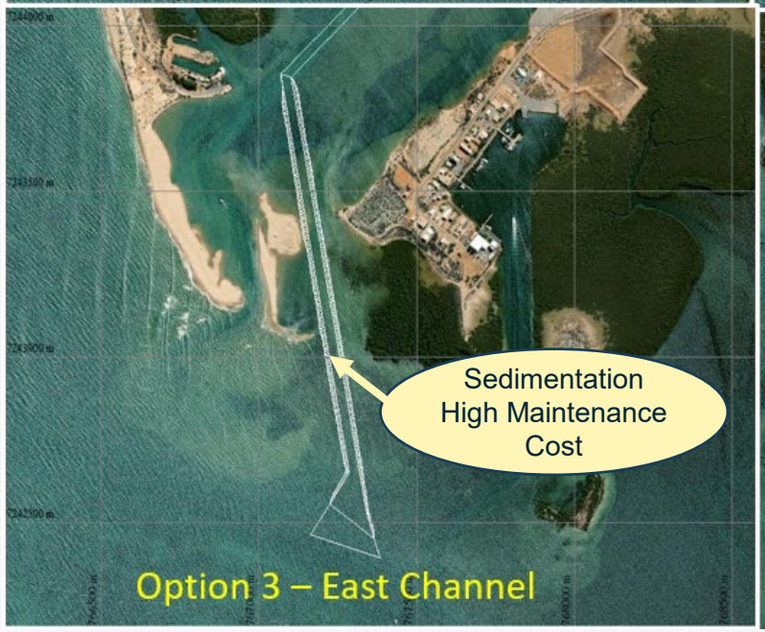


Options assessment

- There were four options assessed to re-open the Fascine entrance
  - Natural Channel
  - West Channel
  - East Channel
  - Inland Channel
- Each of the assessed options presented challenges as a long-term solution.







Assessment Option – Fascine Channel

- Currently examining dredging the Fascine channel in the lee of the spit
- Connection to Teggs Channel would be in the general location of the previous Teggs connection pre-breach (the ‘Bell Mouth’)
- This option being assessed under the assumption the spit will continue to extend southwards over 2022-2023
- The new dredged channel would be have a sedimentation risk from:
  - Littoral processes (transport under wave action)
  - Sand from the top of the spit carried in the wind (aeolian)
  - Overtopping of the spit - sediment pushed into the lee

Assessment Option – Stabilising the Spit

- Stabilisation of the spit will be undertaken with key objectives to:
  1. Build the dune level to prevent overtopping and safeguard against future breaching
  2. Reduce the wind blown sand from entering the navigation channel
- The stabilisation will examine opportunities to apply nature based options including:
  - re-use of dredge material to build the height of the spit.
  - use of Geotextiles (eg sand filled bags) to provide resilience under extreme cyclone events
  - revegetation and sand fences to establish the dune system