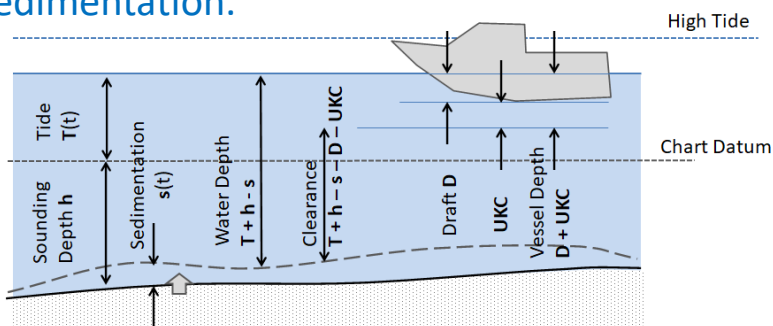


Dredged Navigation Channels

Safe navigation requires a depth that accounts for tidal variation, vessel motions and changes to the seabed. Dredging is often used when there is insufficient natural depth to provide safe transit for vessels, with maintenance dredging used to counterbalance the rate of infilling caused by sedimentation.

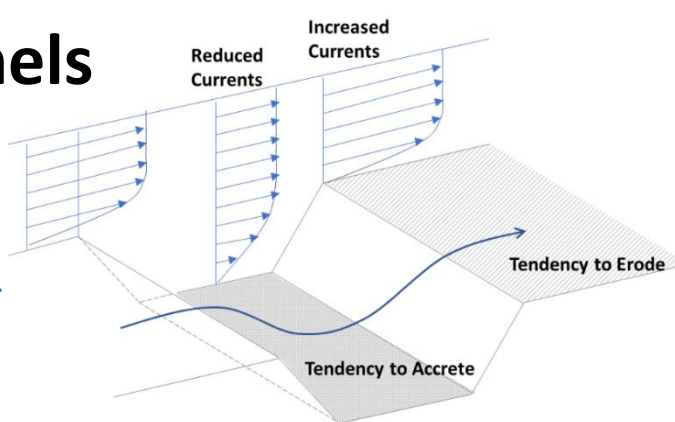


All elements determining vessel underkeel clearance are subject to spatial and temporal variations.

Water levels are highly seasonal, with low water levels only able to occur at certain times of year – and usually at particular times of day.

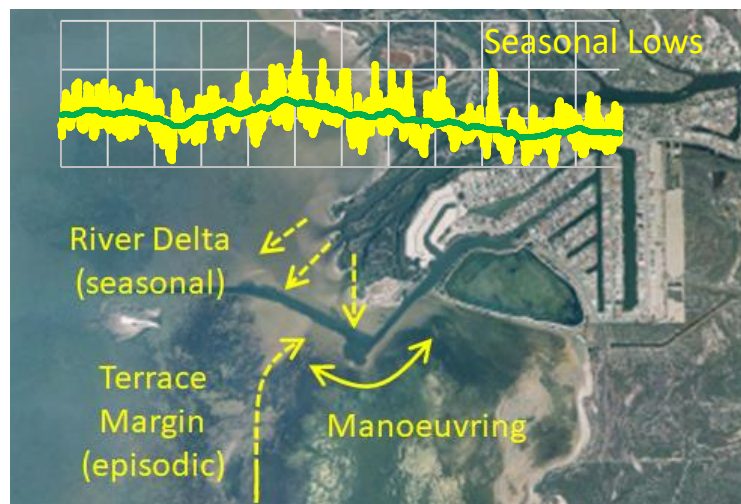
Vessel motions are affected by squat during manoeuvring, as well as wave-induced motions.

Seabed change is determined by sedimentation, balanced by maintenance dredging. In most instances, sedimentation rates are determined by observation over years after a facility has been

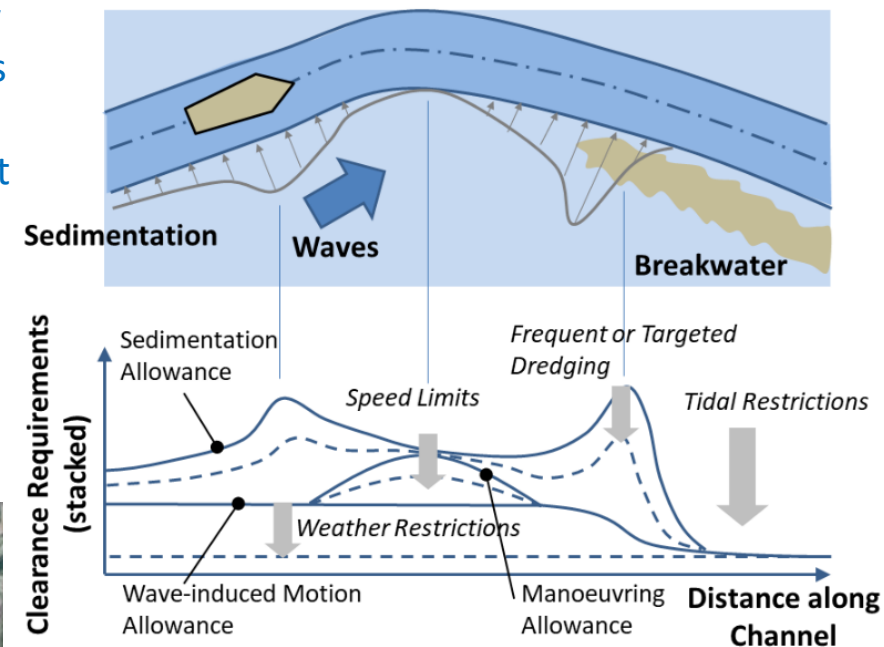


constructed. Dredge management is typically determined forensically, based on differences between expectations and outcomes. However, problems identified across different facilities define a body of practice relevant to the design of new facilities. Some causes of sedimentation are:

1. Deeper water slowing currents, reducing sediment carrying capacity



2. Modified hydrodynamics (e.g. flow into a basin) which may increase bed mobility
3. Proximity to resuspension sources, including wave reflection from marine structures
4. Interception of migratory or actively supplied sedimentary bed features
5. Channel batter slope influence on bed transport
6. Batter instability due to vessel wash



Comparison of the timing and location of factors affecting underkeel clearance can be drawn together to identify effective management tools. These can include speed limits, tide or weather restrictions, complementing dredging design.