

# ROGGENPLAAT FACTSHEET

## BACKGROUND

In 1986, a storm surge barrier and compartmentalization dams were built in the **Eastern Scheldt tidal basin** (The Netherlands) as part of the Delta works. As a result, the dynamic morphological equilibrium of the basin has been disturbed. Intertidal flats are now confronted with the so called **'sand hunger' or sand starvation**: due to reduced tidal amplitude and flow, the building-up of tidal flats by tidal currents has reduced, which results in erosion of the flats. This has led to loss of intertidal habitats and increasing wave loads on the dikes. **The Eastern Scheldt intertidal areas** are especially important as **foraging grounds for birds**. Because of its nature value the Eastern Scheldt is a Natura2000 area and managed as a Natural Park. As a mitigation measure, **intertidal flats are nourished with sediment** to conserve foraging grounds for birds.<sup>4,5</sup>

## PROJECT CHARACTERISTICS

**Nourishment on the Roggenplaat, one of the biggest intertidal areas in the Eastern Scheldt. It exists of 6 smaller nourishments.**

**Date<sup>1</sup>:** 2019-2020 (forecasted)  
**Area<sup>1</sup>:** 231 ha (total of 6 nourishments together)  
**Expected lifetime<sup>1</sup>:** At least until 2035  
**Mean/max height:** Planned nourishment heights are shown on Figure 1 below.

## PURPOSE

Reduce the impact of sand starvation at the Roggenplaat to preserve the ecological functions (i.e. low-water foraging function of 14 bird species) in reference year 2010 for the following 25 years (until 2035) and at the same time prevent undesirable wave impact at the Southern coast of

## SEDIMENT CHARACTERISTICS

**Origin<sup>2</sup>:** Roompot  
**Grain size D<sub>50</sub><sup>2</sup>:** Roompot: layer of 285-400 µm on top of layer of 285-360 µm  
**Amount used<sup>1</sup>:** 1.32 million m<sup>3</sup>

## ROGGENPLAAT NOURISHMENT<sup>1,6</sup>

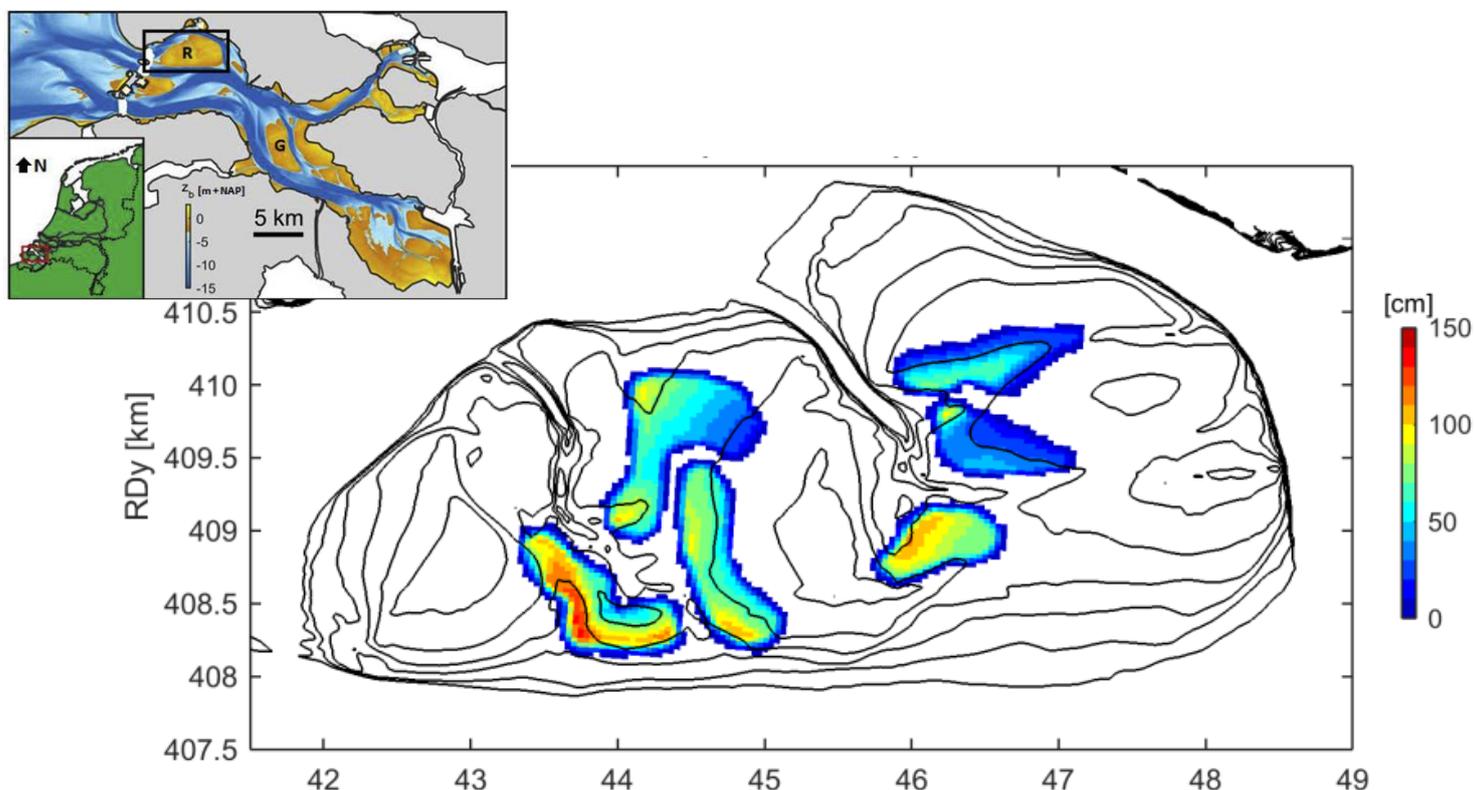


Figure 1: Location of the planned nourishments on the Roggenplaat and their nourishment height in cm. The top left figure shows the Eastern Scheldt tidal basin and the location of the Roggenplaat (black rectangle).

## MONITORING<sup>3</sup>

Parameter	Method	Frequency (period)
<b>MORPHODYNAMIC MONITORING (by Rijkswaterstaat):</b>		
<b>Sedimentation &amp; erosion</b>	LIDAR (Light Detection And Ranging) measurements	Yearly ('17 – '23)
	Drone (Unmanned Aerial Vehicles) measurements via photographs or LIDAR	1-2 times a year ('17 – '23)
	RTK-GPS measurements to validate LIDAR	Every 3-6 months ('17 – '24)
	Multibeam measurements of the two main drainage channels	Yearly ('17 – '23)
	Continuous measurements with SED (Surface Elevation Dynamics) sensors at 35 locations	Continuously ('18 – '24)
<b>Net sediment transport</b>	Mini-nourishments (Paree, 2012)	7 times (Mar'14 – May'15)
<b>ECOLOGICAL MONITORING (By Rijkswaterstaat; WOT sampling by IMARES):</b>		
<b>Grain size distribution</b>	Sediment samples	Yearly (Sep or Oct '?)
<b>Macrobenthos species richness, diversity, density &amp; biomass on the Roggenplaat</b>	Macrobenthos sampling at 115 locations using the MWTL method: Sorting & identifying benthic macrofauna, determination wet weight & ash free dry weight	yearly ('15 and 1, 3 & 5 years after construction)
<b>Cockle population on the Roggenplaat</b>	WOT sampling campaigns of Wageningen Marine Research at 72 locations on the Roggenplaat using a 'cockle scoop'	Yearly ('17 – '23)
<b>Macrobenthos species richness, diversity, density &amp; biomass on the nourishments</b>	Macrobenthos sampling at 3 random locations on each of the 6 nourishments using the MWTL method. 2 nourishments undergo more detailed monitoring (20 locations).	Yearly in Sep or Oct ('18 – '22)
<b>Macrobenthos distribution</b>	RWS-CIV method: Area-wide mapping of different benthic parameters using field observations	Yearly in Sep or Oct ('18 – '22)
<b>Birds</b>	Bird counts around low tide: species, activity, residence time	8 times per year ('18 – '24)
<b>Seal population and behaviour</b>	Seal counts & observation	during construction
<b>HYDRODYNAMIC MONITORING (by Rijkswaterstaat):</b>		
<b>Wave dynamics</b>	Wave measurements at 11 locations	Continuously ('18 – '19)
<b>Flow dynamics</b>	ADCP flow measurements at 11 locations on the Roggenplaat and 1 in the Pijpen drainage channel during a spring-neap tide cycle	Yearly ('18 – '19)
<b>Sediment transport</b>	Combination of velocity measurements and suspended solid concentrations at 6 locations	3 periods of 4 weeks before & after construction
<b>MONITORING NATURAL JAPANESE OYSTER REEFS (by IMARES):</b>		
<b>Oyster population</b>	WOT sampling campaigns of Wageningen Marine Research	Yearly ('17 – '23)

## EVALUATION<sup>3</sup>

Evaluation questions as defined in the monitoring proposal:

- **Morphology:**
  - a) What is the effect on exposure time and how does it change over time?
  - b) What is the erosion trend (in space and time) of the Roggenplaat sand nourishment?
  - c) How fast and where does the nourishment spread/move?
  - d) Does the nourishment influence the non-nourished areas (intertidal areas or channels)?
  - e) How do the 6 individual nourishments evolve over time?
- **Ecology:**
  - a) How does benthic macrofauna develop over time after the construction of the nourishment?
  - b) How does benthic macrofauna develop on the 6 individual nourishments?
  - c) How do the oyster reefs on the Roggenplaat develop over time?
  - d) How do the 14 selected bird species use the nourished and not nourished areas of the Roggenplaat?
- **Biophysical interaction:**
  - a) What is the contribution of the oyster reefs on retaining the sediment?

<sup>1</sup> van der Werf, J., Boersema, M., Bouma, T., Schrijvershof, R., Stronkhorst, J., de Vet, L. & Ysebaert, T. (2016). *Definitief ontwerp Roggenplaat suppletie*. Vlissingen: CoE-DT.

<sup>2</sup> van der Werf, J., Boersema, M., Bouma, T., Schrijvershof, R., Stronkhorst, J., de Vet, L. & Ysebaert, T. (2016). *Variantenstudie Roggenplaat suppletie*. Vlissingen: CoE-DT.

<sup>3</sup> Ysebaert, T., van der Werf, J., de Vet, L., & Bouma, T. (2017). *Monitoringsplan Roggenplaat suppletie*. Vlissingen: CoE-DT.

<sup>4</sup> Boersema, M.P., et al. (2018). *Oesterdam sand nourishment – ecological and morphological development of a local sand nourishment* (Research Report). Vlissingen: CoE-DT.

<sup>5</sup> van der Werf, J., Reinders, J., van Rooijen, A., Holzhauer, H., & Ysebaert, T. (2015). Evaluation of a tidal flat sediment nourishment as estuarine management measure. *Ocean & Coastal Management*, 114, 77-87.

<sup>6</sup> van der Werf, J. et al. (2019). An integral approach to design the Roggenplaat intertidal shoal Nourishment. *Ocean & Coastal Management*, 172, 30-40.

