Monitoring

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Monitoring tools consist of both hardware and software that can be used for the monitoring process before, during or after the implementation of a BwN project.

Fibre-optic distributed temperature sensing for monitoring morphological changes

The use of fibre-optic Distributed Temperature Sensing (DTS) is a promising new technique to measure morphological changes. Fibre-optic distributed temperature sensing uses a single fibre-optical cable as a sensor, and allows measuring temperature with a resolution below 0.1C, spatial resolution of less than 1 meter and sub-minute temporal resolution (Hausner et al, 2011). It was originally developed by the oil and gas industries as a borehole logging tool (e.g. Kersey, 2010). Other applications include pipeline monitoring and fire detection and protection. For several years, the technology has been used increasingly to monitor environmental temperatures (Selker et al., 2006; Tyler et al., 2009; Vogt et al., 2010). Here, fibre-optic DTS is applied to monitor morphological changes.

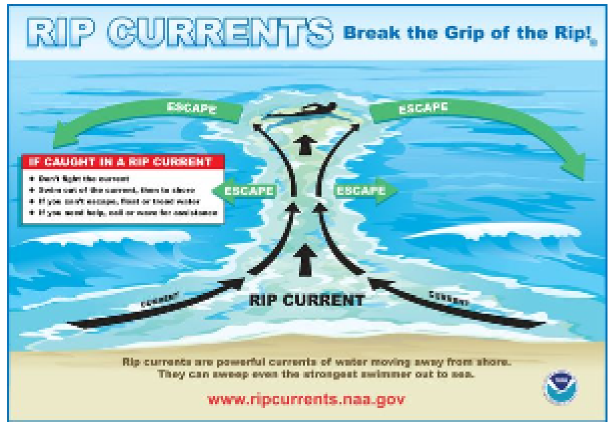
Monitoring of coastal morphodynamics using satellite imagery

This tool aims to use observed morphodynamical changes of any coastal system during the last 30 years to predict future morphological effects to coastal interventions. This is done by the analysis of LandSat satellite imagery using Google Earth Engine. This platform enables quick selection and analysis of satellite imagery, using Google storage space and processing capacity. Since the first useful LandSat imagery was recorded in the early 1980's, over 30 years of imagery is available for every place on earth. By first assessing past morphological changes along the coast where an intervention is planned, the morphodynamical system can be understood and predictions of future effects to interventions can be better predicted. These observed changes in the past also provide a valuable dataset to test the performance of models.

Monitoring swimmer safety

Please note that this website is currently not running, but the principle and method can be applied to monitor other locations.

In the Netherlands, on average five people per year drown in the surf zone and in most cases rip currents play a role in these accidents. Rip currents can form spontaneously and suddenly in the surf zone, but they usually occur when waves break over a sand bar, water “piles up” between the bar and the beach, and flows out through gaps (rip channels) in the sand bar. Offshore directed velocities of over 1 m/s can be reached, which makes a rip current difficult to counter, even for adult swimmers. The website www.muienradar.nl provides daily predictions of swimming conditions for the beach of Egmond. The predictions are based on model computations of nearshore tidal, wind- and wave-driven currents. The prediction system provides lifeguards and beach visitors with information about the swimming conditions, with special attention to the occurrence of rip currents.



Remote monitoring of bio -and morphological developments - ArgusBio

Monitoring the morphological and biological developments of intertidal areas is crucial to understand the functioning of the biogeomorphological system and effectively manage this system. This applies to both short- and long-term management (months to years vs. years to decades) to assess the direct impacts of interventions (eg. nourishments, structures), as well as to assess coastal safety and comply with regulations (eg. EU Bird/ and Habitats Directive) over time. The ArgusBio monitoring stations provide the possibility for remote and continuous monitoring in form of geo-referenced JPEG-images taken by different types of cameras. Traditionally, monitoring requires regular visits of project sites in order to assess e.g. changes in bed level, the number of birds, or the (re)colonisation by benthic animals and vegetation. Most tidal flats however, are difficult to access and therefore expensive to visit, especially in averse weather conditions. Consequently, the monitoring frequency may be too low to capture the relevant dynamics of the system. Additionally, field monitoring methods tend to focus on one system component at a time, i.e. birds are counted at a different time than benthos is sampled or the bathymetry is measured. This makes it more difficult to interpret the data in terms of relations between these components. As an alternative, remotely controlled and continuously operating monitoring systems can provide valuable, comprehensive and high-resolution information about the development of intertidal areas.