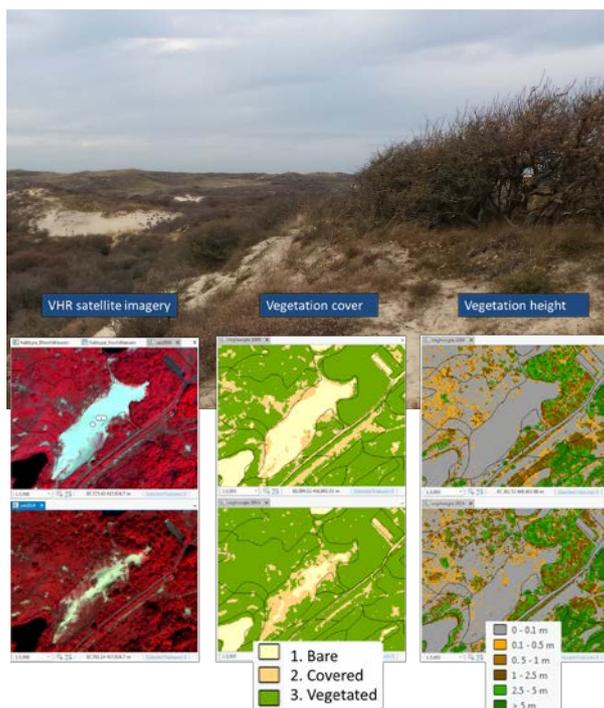


# Monitoring vegetation and habitats using remote sensing

- The urgency to stop biodiversity decline has never been so high as now.
- In Europe more than 115 million hectares need to be protected under the Birds and Habitats Directive
- Regular monitoring shows however that at the EU level only 16% of the protected habitats under the Habitats Directive have a favourable conservation status.
- Monitoring also shows that one third of all land habitats are currently under threat, causing a decline in habitat health and extent.
- Land-use change from intensive farming, urbanisation and associated infrastructure development as well as drainage, pollution and invasion of alien plant and animal species all pose major threats to land-based habitats.
- There is an urgent need to monitor habitats more frequently to facilitate their proper management and conservation.
- Remote sensing at very high resolutions supports a more cost-effective monitoring and management of existing habitats.



A pilot was carried out in cooperation with terrain managers from the coastal nature area Meijndel-Berkheide (Province Zuid-Holland, the Netherlands). In this pilot, we combined LiDAR-data from AHN2 (2008) and AHN3 (2014) with very high resolution satellite imagery from the similar time period in order to detect changes in vegetation structure at 1 meter spatial resolution. The existing habitat map was used to develop a protocol to find Grey Dunes (H2130) that showed significant changes in vegetation structure between 2008 and 2014. The Remote Sensing method can also be used for other vegetation structures - or habitat types but requires other specific decision rules in relation to vegetation height and/or vegetation cover which have to be agreed upon by the nature conservation community.

## MOTIVATION

The Dutch Natura 2000 site Meijndel-Berkheide is one of the sites that needs to be protected under the Birds and Habitat Directive. One of the major threats is the shrub and tree encroachment of the grey and white dunes. Monitoring this encroachment can be done effectively with easy accessible high spatial and temporal remote sensing data that provides valuable information on changes to the conservation managers. It enables the terrain managers to make reliable estimates of the most cost effective way to stop the encroachment. Traditional vegetation mapping, which are also used to derive habitat maps, are normally only updated once in the twelve years since it is labour intensive and therefore costly. Remote sensing, including drones, can be an effective tool to support traditional vegetation mapping with regular updates of changes in the vegetation structure.

## SOLUTION

In the Netherlands, high resolution satellite imagery are easy accessible through the national satellite portal, next to national coverage of LiDAR data every six years and freely available. A methodology has been developed that use these easy accessible remote sensing data sources to detect changes in the vegetation structure of targeted habitats, based on respectively vegetation height and vegetation cover.

## PROSPECT

The work demonstrates that the developed Remote Sensing monitoring method for vegetation structure can be exploited to enable national wide operational monitoring of changes in the vegetation structure of all habitat types which is essential information for the development of effective management and protection plans.

### RS Monitoring Method for Vegetation

