

area in Flanders and makes the river basin 5 times more secure against floods. The project area is a part of the Natura2000 network.

**LIFE+ Scalluvia** (2013-2017) will substantially and permanently improve the state of conservation of 80 ha of **alluvial forests** with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno padion*, *Alnion incanae*, *Salicion albae*) and 10 ha of **creeks** (natural eutrophic lakes with *Magnopotamion* or *Hydrocharitton*).

To improve the water quality and quantity for the forests and creeks, the wastewater from the town has been deviated for water treatment and adjustable dams will make the water level of the alluvial forests controllable. The construction of a **special five level fish passable flood control dam** will let fish migrate from and to the river Scheldt. The banks of the creeks will be reconstructed in an ecological manner and burrowing fish species will be removed. The forest itself will be cleared from invasive or exotic species and from former ponds and lodges. To improve the structure and the amount of dead wood, some big remaining poplars will be ring-barked and scrubs will be planted.

The habitat restoration will benefit the re-establishment of European bitterling, spined loach, blue throat, common kingfisher, little bittern, and purple heron. The Scalluvia area will acquire the protection status of Flemish nature and forest reserve.

The **benefits** of the *Polders van Kruike* **to society** are enormous. **Flood control** is the most important service. To build the flood control area, more than 600 ha have been expropriated and closed for public for more than 10 years. In 2014 the area was partly reopened for the public.

**Recreation** is since another important service to society and leads to acceptance. With Scalluvia, we invite people to (re)discover the area. After consulting the stakeholders, infrastructure for hikers, bikers and fishermen was built. Collective maintenance actions to experience nature, a smart phone game for animated walks, a play forest, field classes, training of guides, and guided walks constitute special topics.

To inform people about the area, time capsules are built. A time capsule is a place within the area where visitors can rest and receive information on the past, present or future of that place. Ample information is available through social and written media.

Furthermore, we experience with **site-specific art**, as nature often inspires and art can be the perfect way to invite people to visit and discover nature. We actually test the developed vision on the relationship between art and nature with two site-specific art works.

However, none of these measures may jeopardize the challenging nature goals or the functioning of the flood control area. In every action we **continuously balance nature goals, flood control and the demand for recreation**.

[www.scalluvia.eu](http://www.scalluvia.eu)

## WORKSHOP

### Vegetation succession in the Zwin estuary 2010-2014. Effects of natural processes and nature management

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#### Introduction

Since 1987 we observe a progressive silt accretion of the mud flats and salt marshes of the Zwin. This situation led to a dramatic decrease in area occupied, amongst others, by the habitat type 1310 - *Salicornia* and other annuals colonizing mud and sand, and habitat type 1330 Atlantic salt meadows. Meanwhile, a *Halimione portulacoides* salt marsh community became dominant in the lower areas, whereas *Elymus athericus* did in more elevated areas. That resulted in a dramatic loss of plant and bird biodiversity .

The Flemish regional nature and forest agency aims at restoring this rich biodiversity by carrying out the large-scale LIFE program ZTAR - Zwin Tidal Area Restoration This program includes amongst others:

- Sod cutting and removal of the dominant *Elymus athericus* in an 8 ha area (removing the upper 20 cm of soil) in order to rejuvenate the salt marsh.

- Re-introduction of cattle, i.e. cows and sheep, for seasonal low density grazing of the salt marsh.

However, there are many setbacks and problems associated with salt marsh restoration that require careful long-term monitoring. Information on all components of the salt marsh ecosystem should be understood and monitored, from sedimentation and tidal influences, to behaviour patterns and tolerances of both flora and fauna species. A better understanding of processes and patterns can help to suggest more sound and practical nature management and restoration efforts for this area. Therefore one of the interventions was to set up a vegetation survey.

#### Material and methods

In 2010 we started monitoring the vegetation succession along 14 transects with a total length of 332 m. We continuously sampled vegetation along these transects using 2 x 2 m relevés. Monitoring was carried out at T0 = sept. 2010, sept. 2013 & sept. 2014. Transects were set up under different management regimes: low-density cattle grazing (100 m, 4 transects), sheep grazing (38 m, 2 transects), sod cutting (62 m 2 transects), no management or under natural succession (132 m, 6 transects).

#### Results & discussion

Under natural conditions we observed a rapid and strong decline of pioneer habitat (Eu-1310) in favour of *Glauco-Puccinellietalia maritima* communities in the lower salt marsh. However also the latter showed a net loss of cover. Overall *Elymus athericus* became more dominant in the salt marsh. This may be the result of a still ongoing silt accretion and the corresponding increase of nitrogen in the topsoil.

Extensive, seasonal grazing is able to slow down this natural succession, thereby maintaining a higher plant diversity. Trampling creates small gaps that favour pioneer species whereas grazing alters light concurrence and litter accumulation. Sod cutting and topsoil removal is a drastic measure pushing back vegetation succession to the initial pioneer state. As diaspores of target species are well available we expect the development of the desired EU-habitats to be realistic.

### CONTRIBUTED LECTURE

#### **Realization of a cross-border Natura 2000 European protected area and the Dutch 'Nature Protection Act'**

*Ir E. Hoogendam and mr E.E.M.J. Haverkorn van Rijsewijk*

The extension of the Zwin reserve with 120 hectares, 10 of them being Dutch territory, is laid down in the 'Treaty Scheldt Estuary Development Outline 2010' between the Flemish Region and the State of the Netherlands. As part of the preparation one cross-border Environmental Impact Report with an appropriate assessment has been drawn up. The border between Flanders and the Netherlands runs right through the Zwin.

As a result of the work on the Zwin creek, during a first period after the construction, changes will take place in the mosaic of habitat types (H1310A, H1320, H1330A, H1330B). For some habitat types, this will lead to a temporary areal loss. During the next phase those habitats will return, although nature does not bother about the Flemish-Dutch border. Looking at the Zwin nature reserve as a whole, within a period of ten years the habitat types concerned will have increased with a surface larger than the initial loss in the Netherlands. As a matter of fact, in connection with the extension, 120 hectares of nature reserve will have been added. However, considering the picture from both national perspectives, as the legislation demands, gives rise to a complicated situation.

The workshop will take a closer look at the differences between the ecological line of approach and the legal point of view.