



# MONITORING LIFE+ ZTAR



## ZWIN TIDAL AREA RESTORATION

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15.09.2015

Nature & Landscape Unit

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WVI  
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# About WVI

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## ABOUT WVI

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- Service rendering public company:
  - Spatial planning, mobility and GIS;
  - Environmental issues, Climate change & Energy efficiency;
  - Nature management & landscaping projects;
  - Monitoring of nature management & restoration projects;
  - Ethno-ecological & historical-ecological studies





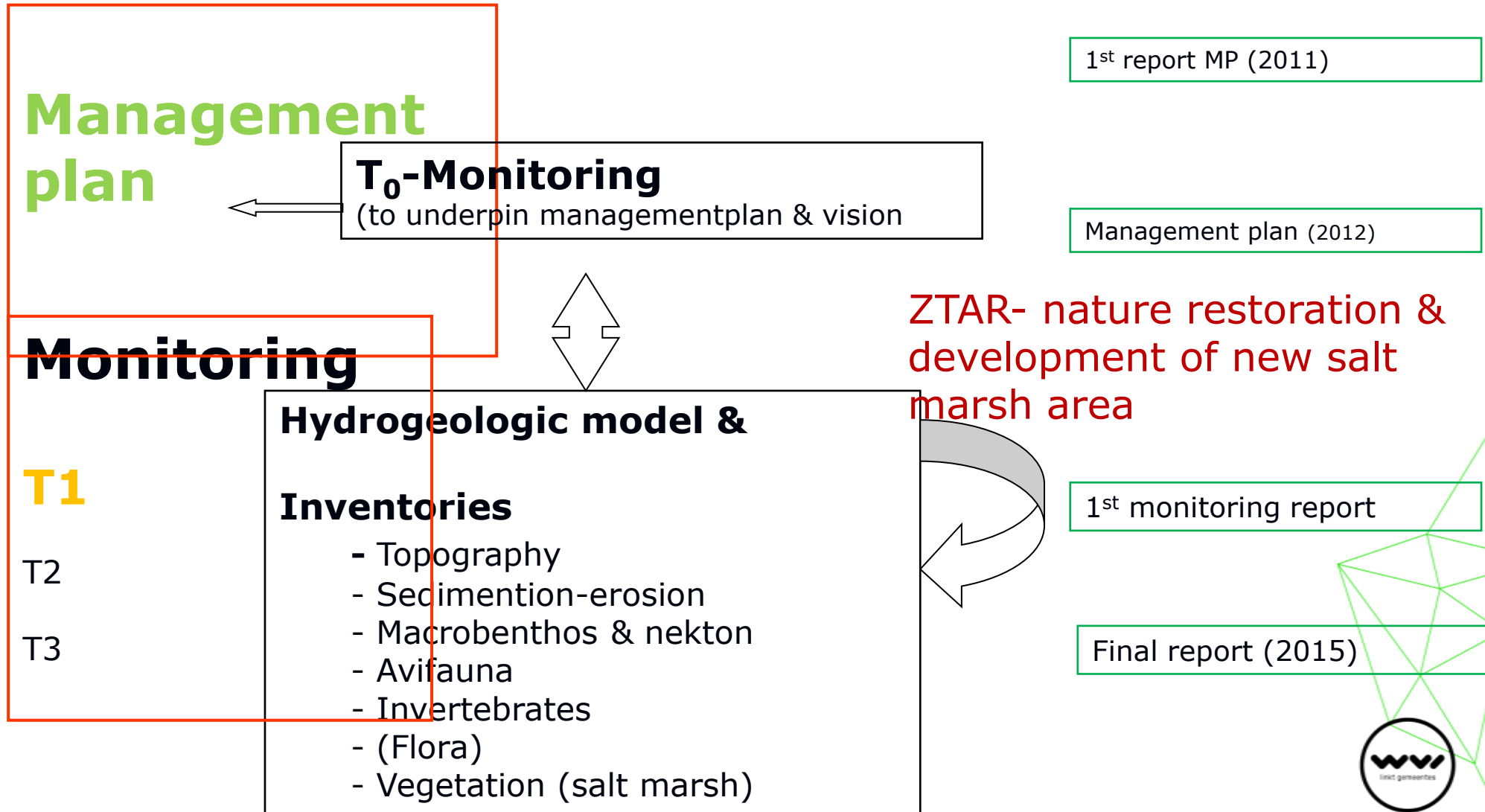
# MONITORING LIFE+ ZTAR

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# Zwin management & monitoring study (2009-2015)



# Nature conservation policy and nature management

## GEBIEDSVISIE EN BEHEERPLAN VOOR HET UITGEBREIDE ZWIN

Kaart 5.1: Eénmalige inrichtings- en beheermaatregelen

ZTAR 2011-2015:

New salt marsh area  
 1. Depoldering 2016-2018  
 2. Monitoring 2019-2034

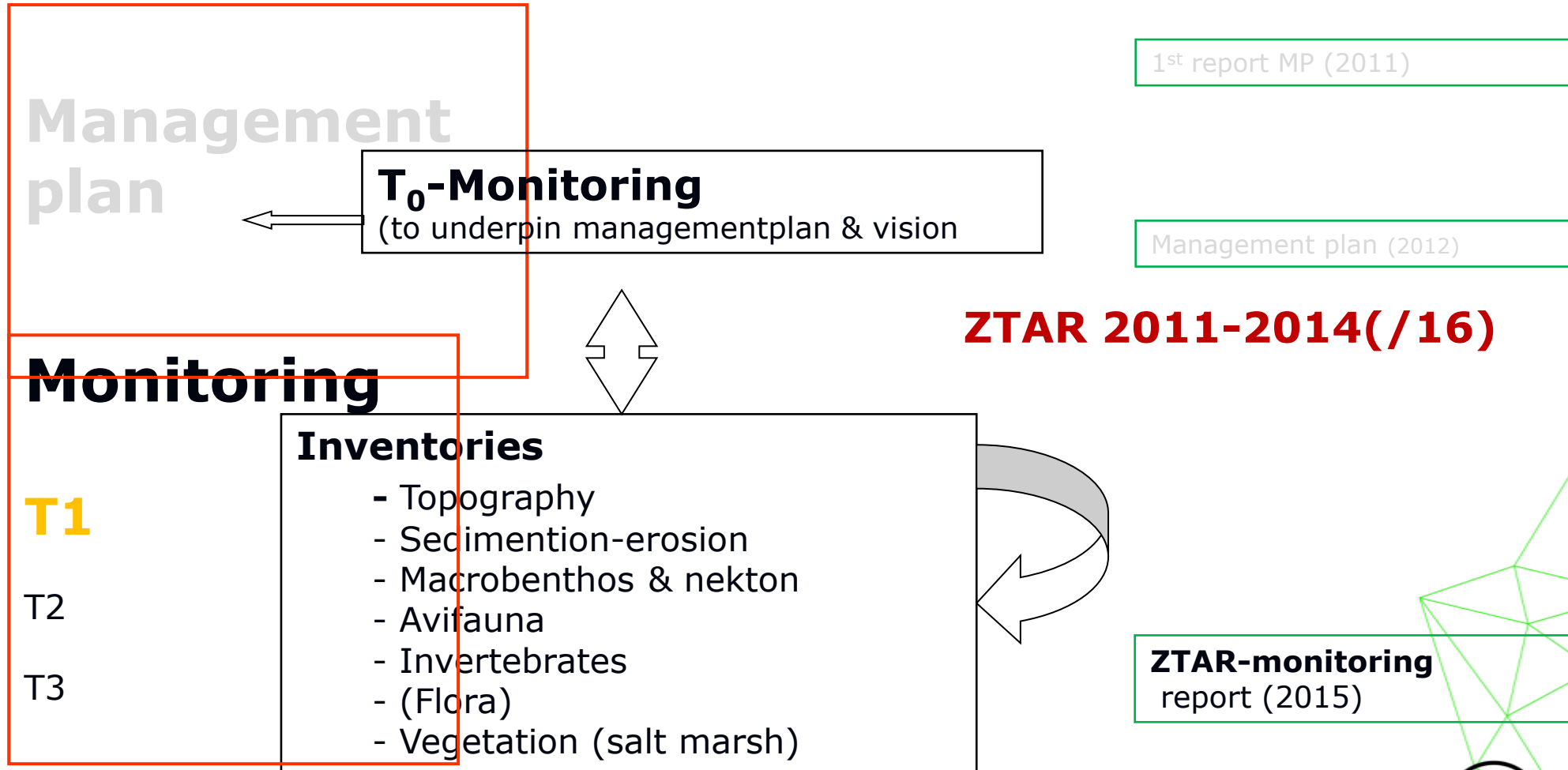
- aanleg nieuwe poelen
- aanlegplaats boot
- brug
- palenrij
- ruimen bestaande poelen
- schuilhok
- tijdelijke brug geul D
- veeroosters
- afsluiting runderblok
- afsluiting schapenblok
- afsluiting zwin
- binnendijkvoet
- buitendijkvoet
- dienstweg
- gracht
- eiland +5m
- hoog water 4m 25
- laag water 3m 10 - 3m30
- laag water 3m 10 - 3m30 eiland
- aanleg schelpenstrand
- strandhaak
- opgevuld geul B
- nieuwe betonweg naar stuw
- hollestelle
- geul uitbreiding
- Geul D hersteld
- uitgraven zwingeel 3mTAW
- geplagde zone zwin
- Begrenzing studiegebied

Voor alle details verwijzen we naar de plannen bij het bestek voor de uitbreiding van het Zwin

# ZTAR NATURE RESTORATION – SITUATION 2014



# Monitoring Life+ ZTAR

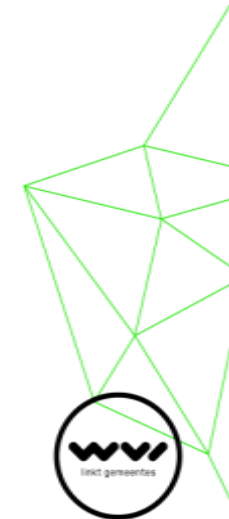
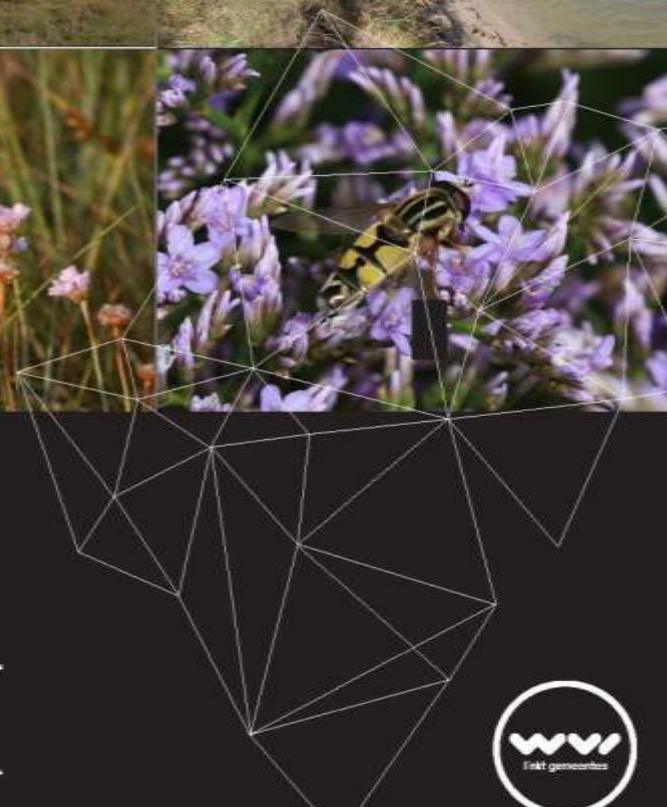






# MONITORING ZTAR LIFE+ NATUURHERSTEL IN HET ZWIN 2011-2015

SEPTEMBER 2015



INSTITUUT  
NATUUR- EN BOSONDERZOEK



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# Monitoring Life+ ZTAR

## → Multidisciplinary approach

Sedimentation-erosion / microtopography	INBO
Floristic survey + detailed mapping of rare species	INBO
Vegetation survey (t1 + t2 – 2013 -2014)	Wvi
Macrobenthos & Nekton (t1)	UG-Marbiol
Breeding birds (t1)	Natuurpuntstudie
Amphibians (Tree frog & Natterjack toad)	Natuurpuntstudie
Invertebrates (ground dwelling beetles, arachnidae, ants, dragonflies, butterflies, ... (t1 – pit fall)	Natuurpuntstudie
Other biota: Woodlice, Diptera, Moths, ...	Volunteers



natuurpunt

STUDIE



Marine Biology  
Ghent University

INSTITUUT  
NATUUR- EN BOSONDERZOEK



Vlaanderen  
is wetenschap





# ZTAR-MONITORING VEGETATION SURVEY

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# ZTAR-MONITORING – VEGETATION SURVEY

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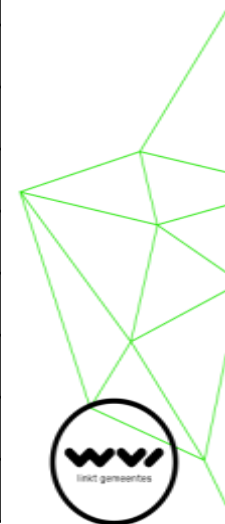
- 23 transects (salt marsh area, stratified random design, gradients)
  - T0 - 2010
  - T1 - 2013 surveys
  - T2 - 2014
- Effects of natural processes and nature management?"



# ZTAR-MONITORING – VEGETATION SURVEY – RESULTS

## (14 TRANSECTS)

Plant species (2010-2014)	Cattle grazing	Sod cutting (2013-14)	Natural proces
<i>Agrostis stolonifera</i>	++		Status Quo
<i>Aster tripolium</i> (EU-H 1330)	--		SQ/-
<i>Carex distans</i>	++		
<i>Elymus athericus</i>	SQ		++
<i>Festuca rubra</i>	--		--
<i>Galium verum</i>	++		SQ
<i>Glaux maritima</i>	SQ		--
<i>Halimione portulacoides</i> (EU-H 1330)	SQ		--
<i>Juncus gerardii</i>	SQ		SQ
<i>Juncus maritimus</i>	SQ		
<i>Limonium vulgare</i> (EU-H 1330)	++		SQ/--
<i>Lotus corniculatus</i>	++		SQ/--
<i>Poa pratensis</i>	SQ		--
<i>Puccinellia maritima</i> (EU-H 1330)	++		-/+
<i>Salicornia species</i> (Eu-H 1310)	++	++	--
<i>Suaeda maritima</i> (Eu-H 1310)	++	++	--



# ZTAR-MONITORING – VEGETATION SURVEY - CONCLUSIONS

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- Effects of nature management
- **Sod cutting & soil removal**

Obvious results

- **Set back of succession (*Elymus athericus* removed)**
- ***Salt Pioneers established***



# ZTAR-MONITORING – VEGETATION SURVEY - CONCLUSIONS

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- Effects of nature management
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Obvious results

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## But how sustainable?

- Follow up nature management e.g. extensive cattle grazing will be necessary to slow down succession & increase biodiversity (already done by now)
- Hydrodynamics are very important and will affect the outcome of vegetation succession
- Hydrodynamics themselves are altered by external activities (e.g. dredging, sand suppletion, harbour activities, depoldering activity...)



# ZTAR-MONITORING – VEGETATION SURVEY - CONCLUSIONS

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- Effects of nature management
- Cattle grazing (2010-2014)
- → Succession slowed down
  - After 4 years: **Elymus athericus** still dominant species, but its biomass decreased
  - But,  
Without grazing: Elymus would have spread much more
    - i.e. botanical diversity would have decreased
  - After 4 years: characteristic **pioneer and early salt marsh** succession species are still present under grazing;
  - moreover some spp show higher cover and spread along the transect
  - >< without grazing these species tend to disappear & their cover decreased.



## GENERAL CONCLUSIONS

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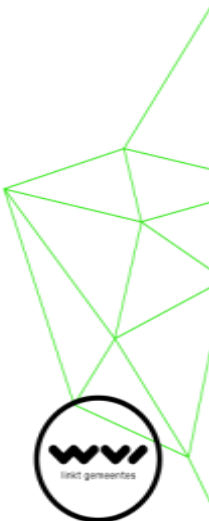
### **Without nature management**

We observed a rapid and strong decline of pioneer habitat (Eu-1310) in favour of *Glauco-Puccinellietalia maritimae* 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.

**Grazing** is able to slow down this natural succession,

**Sod cutting (& soil removal)** set back natural succession

- 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 the preferred EU-habitats established almost immediately



## GENERAL CONCLUSIONS

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**BUT !!**

**Overall observed vegetation shift (observed within transects and over the whole saltmarsh)**

**Means** decline of pioneer and low salt marsh communities (Eu-1310) in favour of communities of fresh and +/- dry conditions (Lolio potentillion, Elymus stands, dune grasslands)

Not as a result of increased sedimentation rates

but rather of significant (rapid?) changes in hydrodynamics in the salt marsh i.e. inundation frequency & duration.

- → Maybe the result of sand deposition in the Zwin estuary → decreasing watervolumes in tidal creeks



**Hydrodynamics are of main importance to understand vegetation succession in the Zwin tidal area (more than sedimentation/erosion is)**

**Future monitoring programs should also focus on this factor**

