



Restoration of the water cycle and natural waterways of Pannonic sodic wetlands in Hungary

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AdaptToClimate, Nicosia, March 27-29, 2014



INTRODUCTION

- Pannonian salt steppes and salt marshes occur only in a few countries of the European Union, mainly in the Pannonian bio-geographical region.
- **99%** of this Natura 2000 habitat type (1530) occurs in Hungary.
- Böddi-szék is a Pannonian sodic lake with open water surface and is one of the most important of such wetland habitats in the Carpathian Basin located in the central part of Hungary.
- The extent of its area is significant, represents **18%** of the open water surface sodic lakes in Hungary.



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INTRODUCTION

- Wetlands of the Pannonian biogeographic region of Europe are sensitive ecosystems to climate change effects;
- Observed evidence exists and showing impact like increased average annual temperature and increased drought. (Bertzky et al, 2010)
- Warmer temperature may increase the risk of algal blooms and eutrophication, while inland waters are likely to have lower volume and increased salinisation .




- Healthy resilient ecosystems have a greater potential to mitigate and adapt to climate change.** (Nature's role in climate change. EU Report, 2009)
- In case the water regime of the sodic wetland is damaged, the effects of the climate change may be intensified.**

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NATURAL WATER CYCLE OF A SODIC LAKE

HSD

Month	Precipitation (mm)
Jan	25
Feb	28
March	30
Apr	35
May	28
June	15
July	5
Aug	2
Sept	2
Oct	15
Nov	25
Dec	25

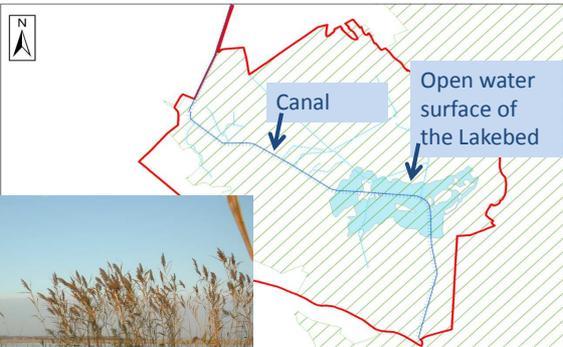



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THREATS AND PROBLEMS OF THE AREA - Unfavourable water dynamics

Sodic lakes are extremely sensitive for the anthropogenic threatening factors, like eutrophication and the decrease of the ground water due to water management.

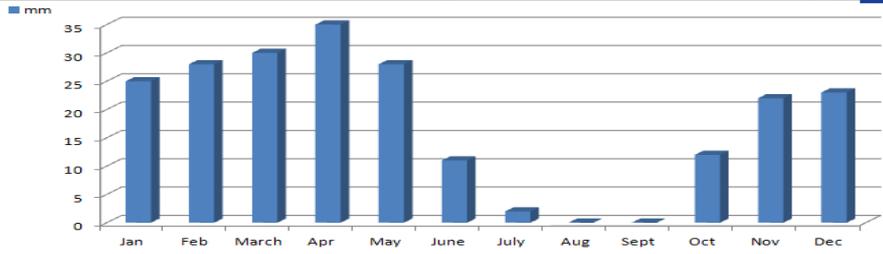



Lakebed →
Dam →
Canal →

Canal
Open water surface of the Lakebed

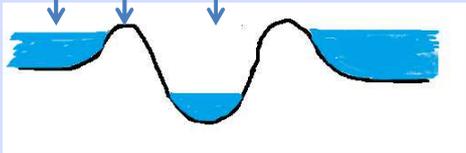
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THREATS AND PROBLEMS OF THE AREA - Unfavourable water dynamics



Month	Precipitation (mm)
Jan	26
Feb	29
March	31
Apr	36
May	29
June	12
July	3
Aug	1
Sept	1
Oct	13
Nov	23
Dec	24

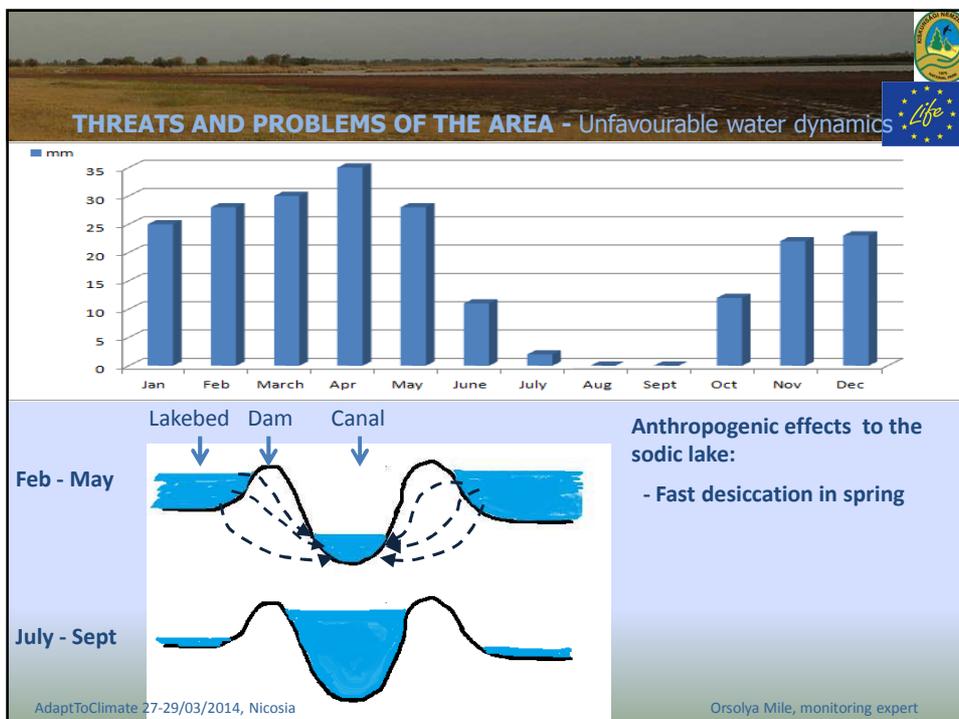
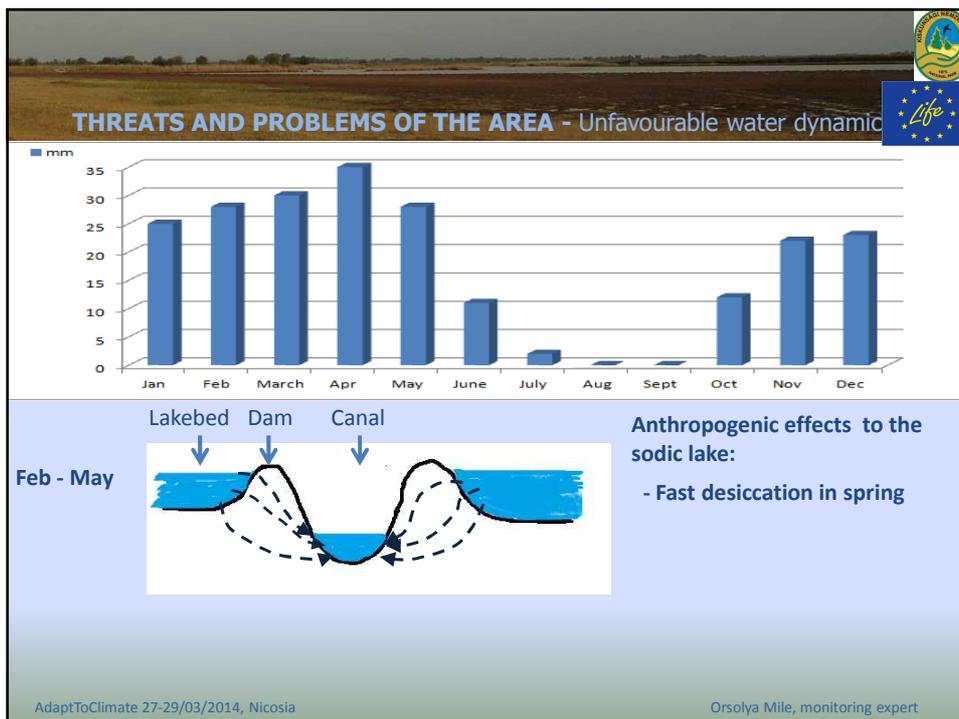
Feb - May

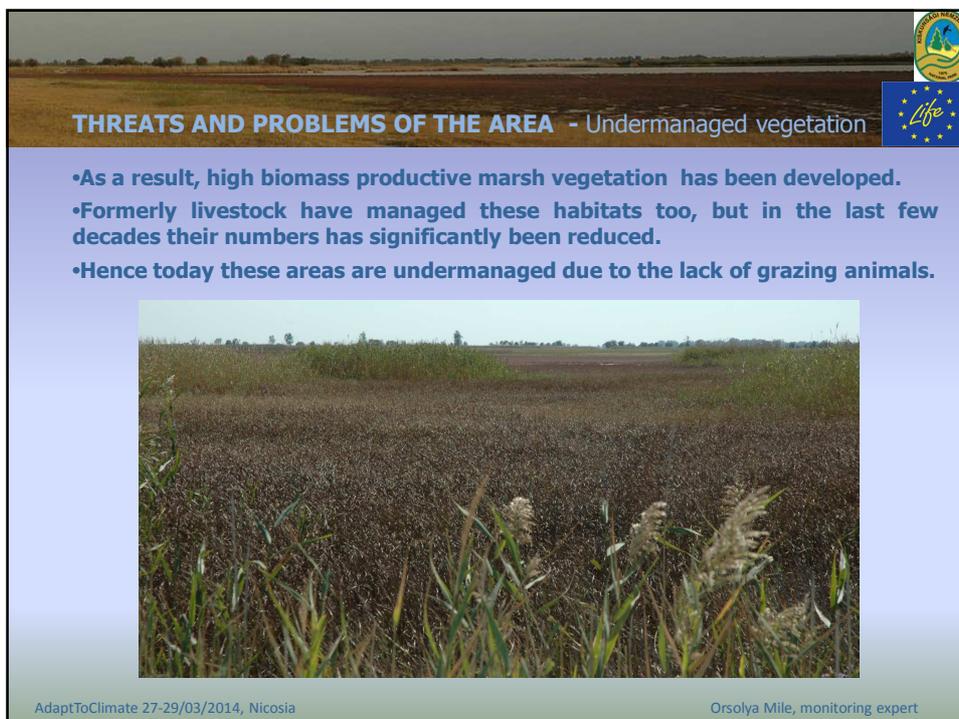
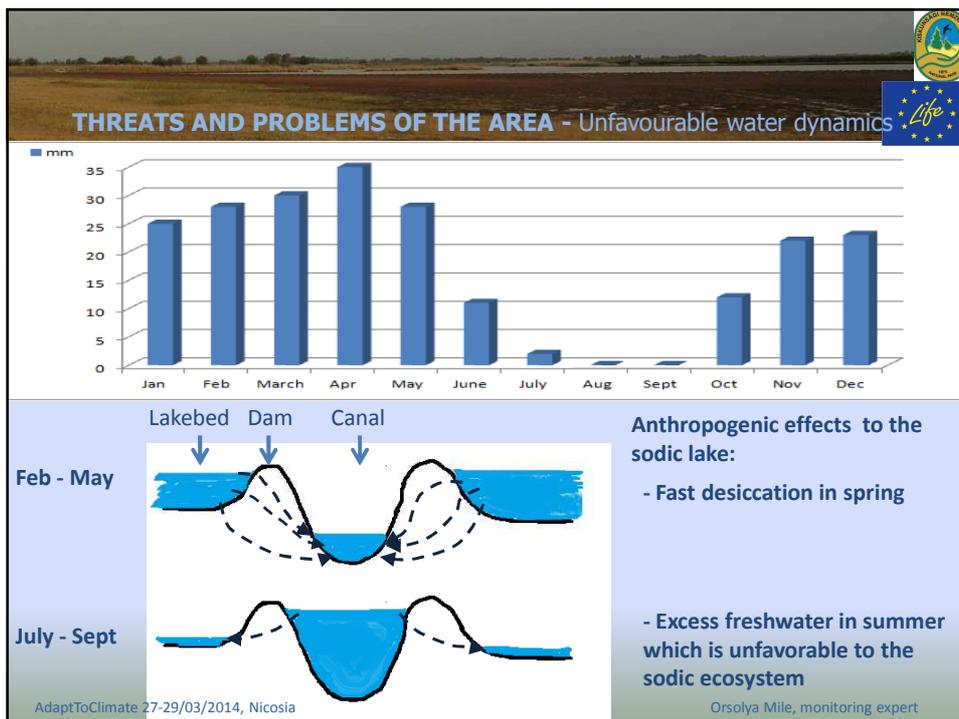


Lakebed Dam Canal

Anthropogenic effects to the sodic lake:

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THREATS AND PROBLEMS OF THE AREA - Undermanaged vegetation

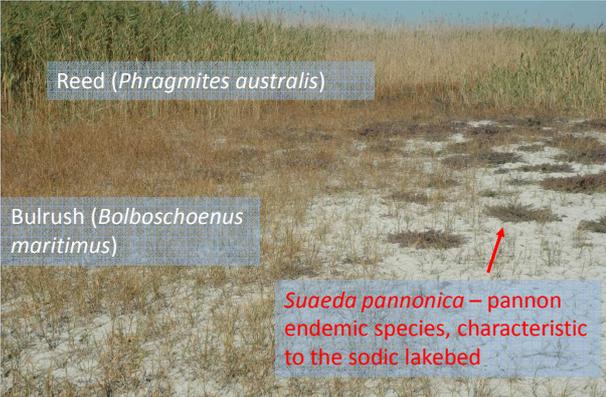
- As a result, high biomass productive marsh vegetation has been developed.
- Formerly livestock have managed these habitats too, but in the last few decades their numbers has significantly been reduced.
- Hence today these areas are undermanaged due to the lack of grazing animals.

Spreading of the marsh vegetation, most importantly dominated by reed (*Phragmites australis* (Cav.) Steud.) and bulrush (*Bolboschoenus maritimus* (L.) Palla) at the expense of endemic halophyte species.

Reed (*Phragmites australis*)

Bulrush (*Bolboschoenus maritimus*)

Suaeda pannonica – pannon endemic species, characteristic to the sodic lakebed



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THREATS AND PROBLEMS OF THE AREA - Degradation of catchment area

- Arable farming on the catchment area of the sodic lake causes fragmentation of natural habitat types, and hinders the complex high level grazing management of the catchment area.

- Intensive cultivation using fertilizers and pesticides;
- Causes eutrophication;
- Contributes to the loss of biodiversity and degrading of the priority habitat types 6260* and 1530*



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THREATS AND PROBLEMS OF THE AREA - Degradation of catchment area

•Non-indigenous and invasive species

- They occupy mainly valuable priority steppe habitat (6250), and they are continuously spreading.
- Mainly *Elaeagnus angustifolia* (L.), *Robinia pseudoacacia* L. and the herbaceous plant *Asclepias syriaca* L. occurs.

Black locust (*Robinia pseudoacacia*)

Closed stands of Russian olive (*Elaeagnus angustifolia*)

Milkweed (*Asclepias syriaca*)

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IMPROVE ECOLOGICAL CONDITIONS - Translocation of the canal

A LIFE-Nature project was granted in year 2013 (LIFE12 NAT/HU/001188) with the aim to restore the original water dynamics and natural habitats.

- 5,9 km section of the main canal crossing the lakebed with its drainage ditches will be eliminated and filled in to the surface level of the surroundings.
- The canal will be translocated to the periphery of the Natura 2000 site

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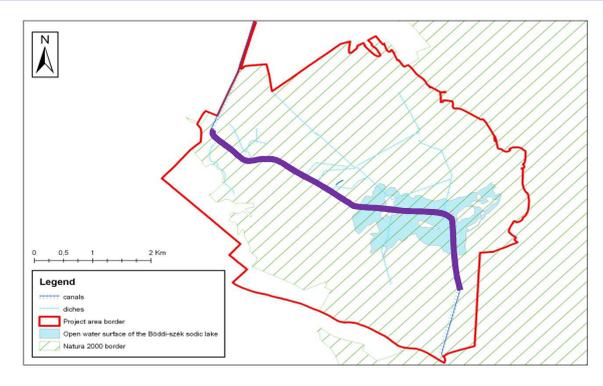
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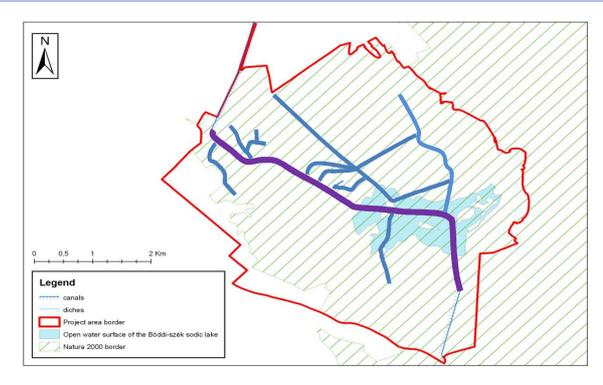
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IMPROVE ECOLOGICAL CONDITIONS - Translocation of the canal

By the translocation of the bisecting canal:

- The open water surface of the sodic lake will increase.
- The divided open water surfaces will be united.
- The natural turbulence will be operational again on the whole surface which helps the resuspension of the deposit from the lakebed.
- The resuspension hinders algal blooms which can become frequent with raising temperatures, since photosynthesis is reduced in the opalescent water.
- The large open water surface helps in retaining and evaporating precipitation which will reduce drought on the micro climatic level.

Boros 2003, 2007; Boros and Vörös 2010; V-Balogh et al.,2010)

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IMPROVE ECOLOGICAL CONDITIONS – Sustainable grazing

The sustainable model of grazing:

- Aims to hinder the spreading of marsh and reed vegetation and to extend open surfaces thus facilitating the re-establishment of the natural water-cycle.
- Grazing with a single type of livestock is inappropriate management of all vegetation types: from the ecological point of view the most adequate option is to graze native livestock, **Hungarian gray cattle** in the depressions, and **sheep, horses, donkeys** mainly on the higher reliefs.
- Varied microhabitats will be created, and in the meanwhile the previously neglected biomass will be converted to bioproduct.




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IMPROVE ECOLOGICAL CONDITIONS – Resoration of catchment area

Grassland habitats will be restored and improved:

- Reduces human disturbance caused by intensive agriculture in the most sensitive breeding season.
- Native grass seeds and drought tolerant local cultivars will be sown.
- Invasive species will be eliminated from the grasslands.
- The increased extension of the semi-natural habitats and the improved habitat structure allows the introduction of high level grazing regimes for nature conservational purposes. As a result, biodiversity is expected to be restored and enhanced.



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CONCLUSIONS

- The negative effects of the human activities and the changes of environmental conditions increase the loss of biodiversity. Conservation actions are going to be implemented to diminish these negative effects and improve habitat conditions.
- To halt the further loss of biodiversity was one of the main reason for the national level protection of Böddi-szék sodic lake obtained as late as in 1997.
- The EU's Natura 2000 conservation network is crucial in providing the ambience for natural species need to adapt to environmental change.

Healthy resilient ecosystems have a greater potential to mitigate and adapt to climate change.



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Thank You for the attention!

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