Restoring oak forest steppe - sand grassland mosaic in Hungary, the LEGO project

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MTA ÖKOLÓGIAI KUTATÓKÖZPONT

deep forest

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Outline

1. Tasks, state of the area
2. Selection of target communities
3. Restoration methods
4. Monitoring plan
5. Preliminary results

Tasks

New LEGO factory at Nyíregyháza „the greenest factory”

Environmental issues (water, waste etc.)

+ harmonizing investment and nature:

„ECO-project” = Planting native species – self-sustaining community

Green surface must be guaranteed!

26,5 hectares of industrial area

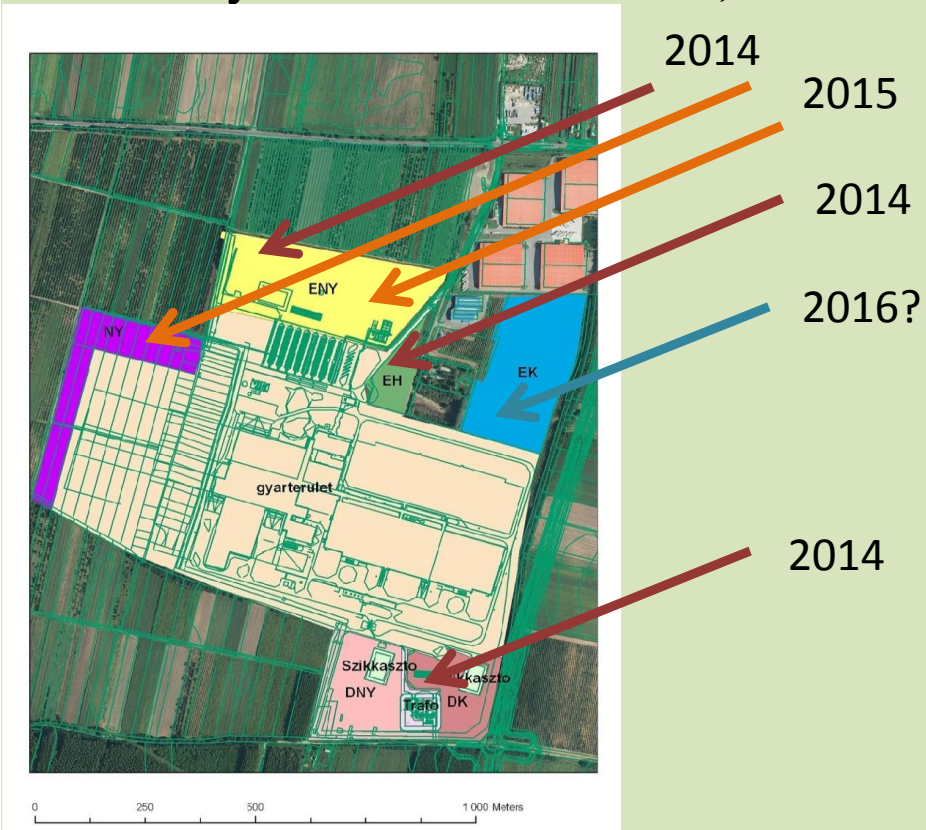
to be revegetated in 2 years

Contractors:

1. MTA ÖK Centre for Ecological Research
2. Deep Forest Kft.

Tasks, state of the area

- Mainly apple orchard before construction, fragmented properties
- No traces of natural vegetation remained in the surrounding
- Compacted, sandy soil, moderately acidic (pH 6-7 at 0-10 cm; 3,7-6,6 at 20-40 cm)
- Very low humus content, bad water holding capacity



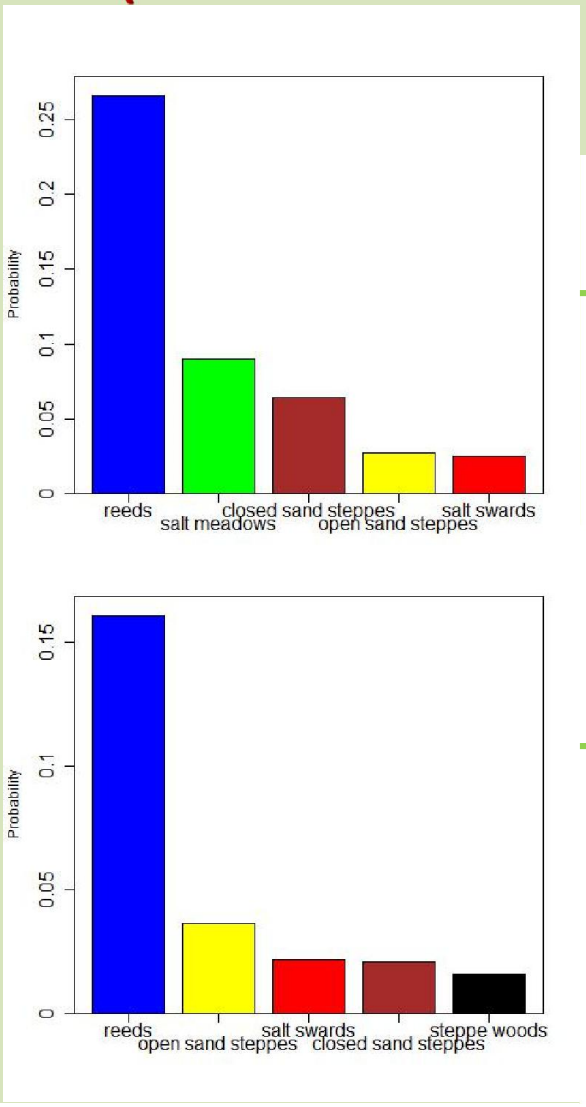
Selection of target comunities

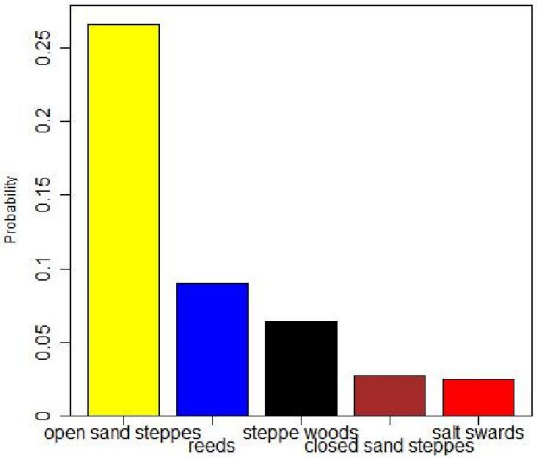
Concept:

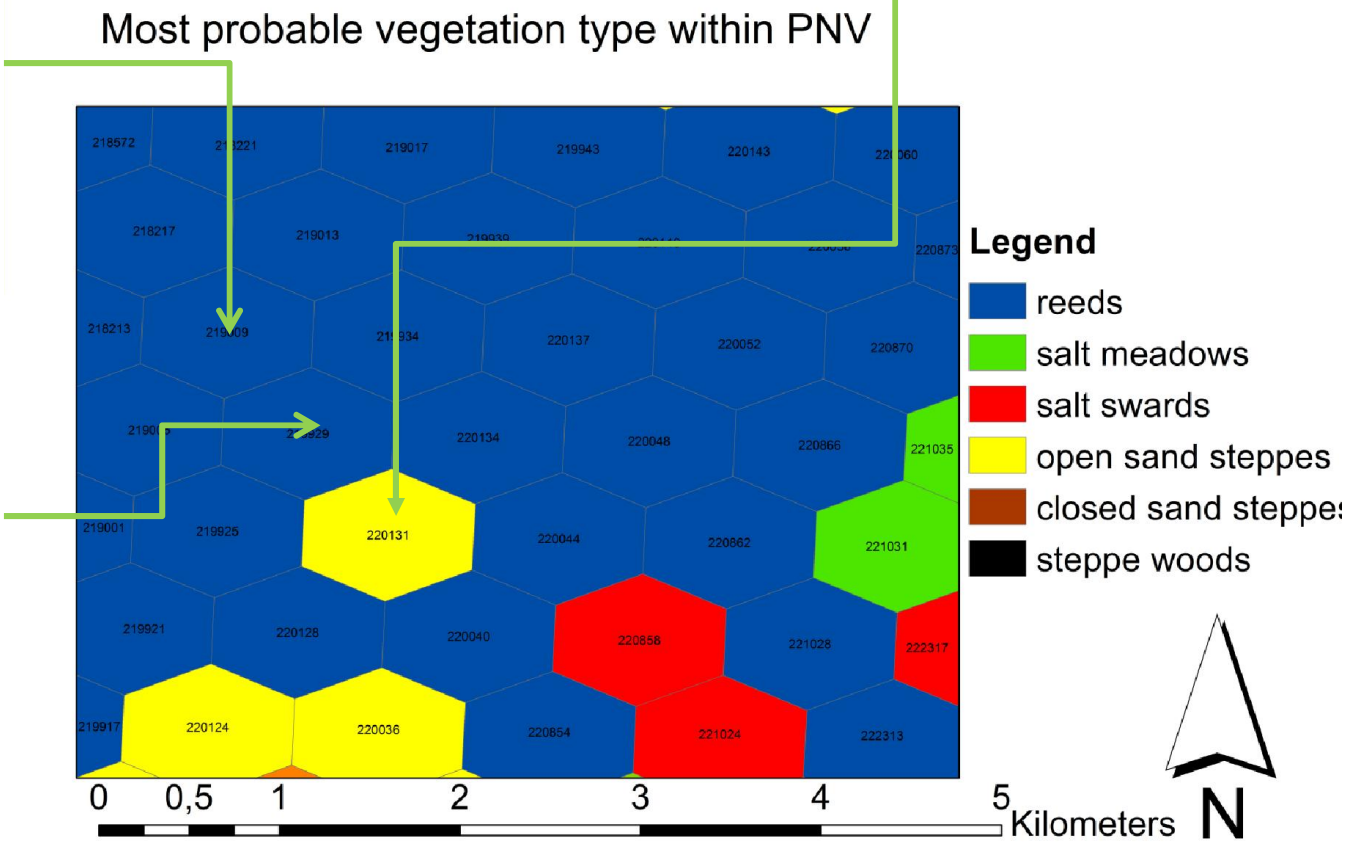
- archive maps
- literature
- Potential Natural Vegetation Modell (PNV – NOT pre-human)

- PNV works with current site data
- the vegetation that ‘would persist under the current conditions if it was already there.’
- Multiple probabilistic assessment: not a single outcome

Results – a distribution of vegetation types per hexagon (Based on the MÉTA database)

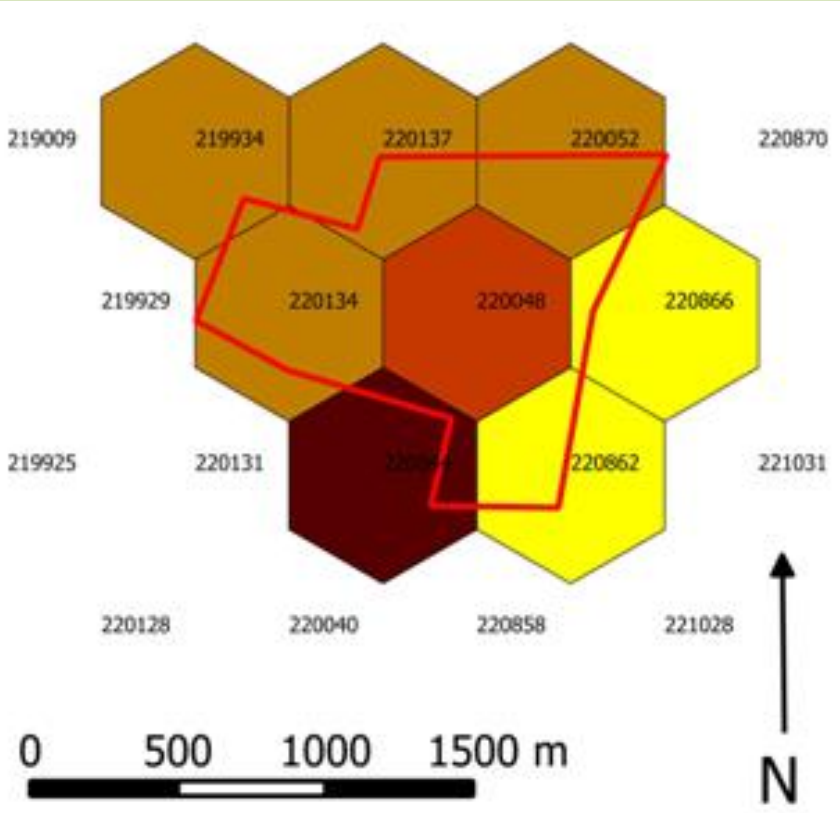






Target comunities

- Open sand steppes (G1)
- **Open sand steppe oak woodlands (M4)**
- Closed sand steppes (H5b)



G1 – Open sand steppes
M4 – Open sand steppe oak woodlands
H5b - Closed sand steppes
L5 - Closed lowland steppe oak woodlands

Treatments
Restoration of grassland

1. Seeding nurse plants:
- To accelerate green surface and avoid invasive sp.
- To vanish naturally
- rye, alfalfa, vetch

2. Hay transfer:
- Donor sites scarce
- Hand distribution
- grass and dicot dominant in different period
- amount: donor / target = 2:1




3. Seeding of target spp.

Origin of seeds:

- Commercial + HNP seeds
- Collection by the team

Seeding:

- Grass seeds and dicots by hand
- Rare sp: by hand in patches
- cover by hay

Seeded sp.	Amount
Festuca rupicola	60 kg/ha
Festuca pseudovina	30 kg/ha
dicot mix (Báics)	15 kg/ha
collecting	360 g/ha
Szarvas +collecting	6,8 kg/ha

4. Post-management

- re-seeding if necessary
- planned: mowing 2 times / y

Yellow: hay; Blue: hay + commercial seeds; Red: self collected seeding
Orange: 2015 (nurse + commercial seeding) 2016 seeding

Planting of trees and shrubs

Trees and shrubs:

- 2 years old forestry saplings
- 500 db tree, 1000 db shrub / hectar
-30% forest, 70% grassland
- native sp. specific to the target communities

Planting:

- in november by hand according to planned design
- heterogeneous patches, 2m-s apart
- shrubs mainly around the tree patches
- *Quercus robur* + accompanying spp.
- Mycorrhizae treatment

Monitoring

Vegetation composition

Sampling:

- Donor site vegetation composition
- 5 stratified random plots of 2m x 2m per parcel and treatment
- Species cover estimate in June
- tree and shrub survival estimate by species (late summer) in treated (mycorrhizae) and control parcels

Germination experiments

- Hay samples to test species composition
- Soil seed bank before treatments
- Germination % of seeded sp.

Problems to be solved

- Scarce availability of donor sites (Gávavencsellő, Napkor, Tiszakerecseny)
- Timing of mowing (short time slot)
- Storage of hay – or immediate transfer
- Seed availability: only 2 growers to provide seeds – no target sp. on the market (Festuca rupicola)
- National Park uses the seeds produced
- Difficulties in supervising implementation
- Rabbit damage on trees
- Permanent green cover to be guaranteed from May

Preliminary results

Nurse plants:

- Provided green cover
- lowered invasive sp. dominance (*Ambrosia artemissifolia*)

Seeded species:

- Grass seedlings (*Festuca speudovina* & *F. rupicola*)
- dicot emergence

Hay transfer: scarse seedlings, mainly weeds by now

seeded

late 2014

Seeded parcel (*Festuca rupicola*)

March 2015

Seeded parcel (*Dianthus pontederae*)

Rabbit damage

Festuca vaginata propagation site (20 m2)

Forest patch with marker stakes

Thanks for your attention