Institute for Nature Conservation of Vojvodina Province, Serbia

Steppe Oak Woods and Pannonic Sand Steppes Conference

6-8 October 2011, Kecskemét, Hungary

Sand steppes and oak woodlands in Vojvodina (Serbia)

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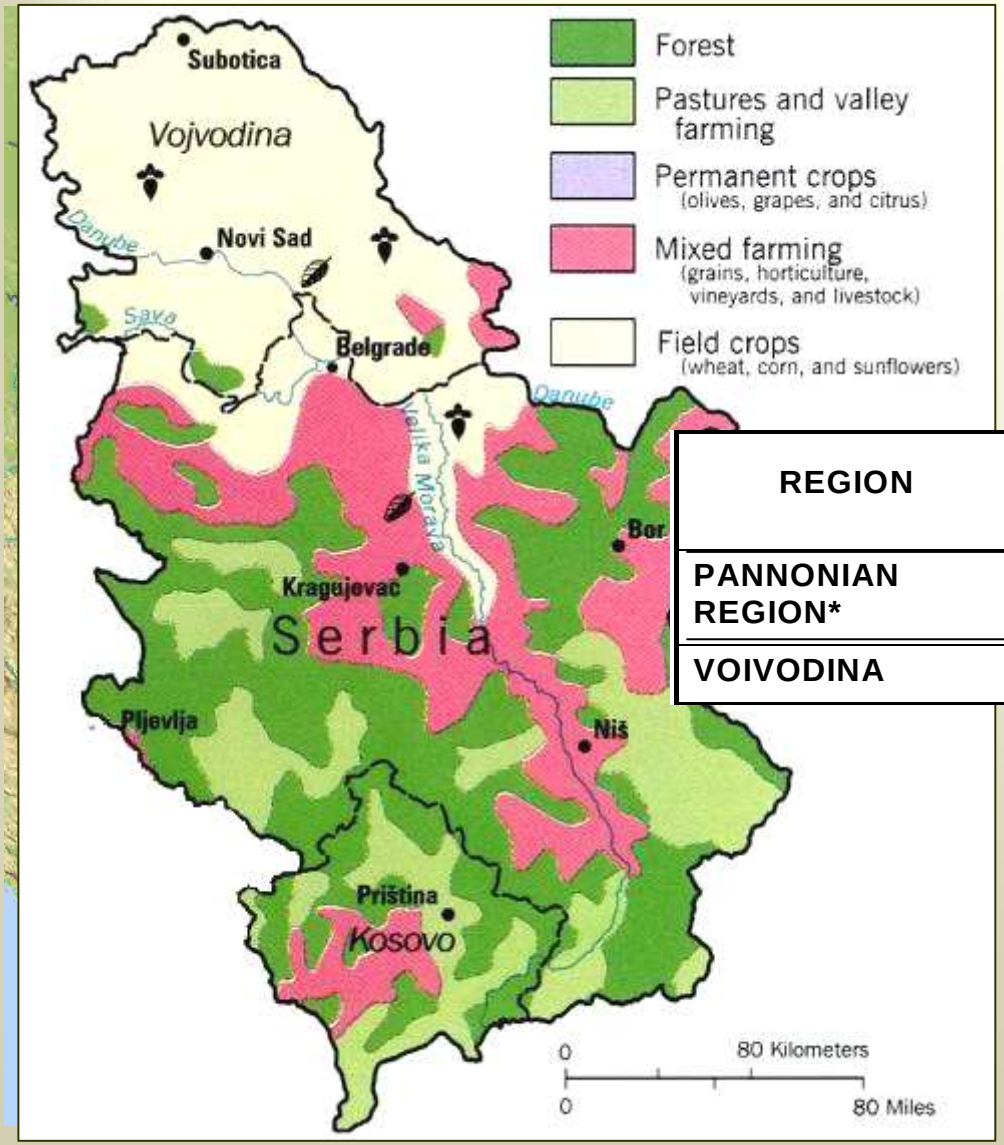
The main characteristics of the Vojvodina region – land use



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Vojvodina:

- **Agricultural region**
- **The protected areas are fragmented and embedded into cultural landscape**
- **Conservation planning in accordance with development activities**

REGION	LAND USE %		
	AGRICULTURAL	CULTIVATED	GRASSLANDS
PANNONIAN REGION*	75	67	8
VOIVODINA	82,8	74,5	6,8

Source: *EEA (2002)

Central and southern Serbia

- **Large pristine areas**
- **High number of endemic species**
- **Biodiversity hot-spots**
- **Conservation of wild areas**

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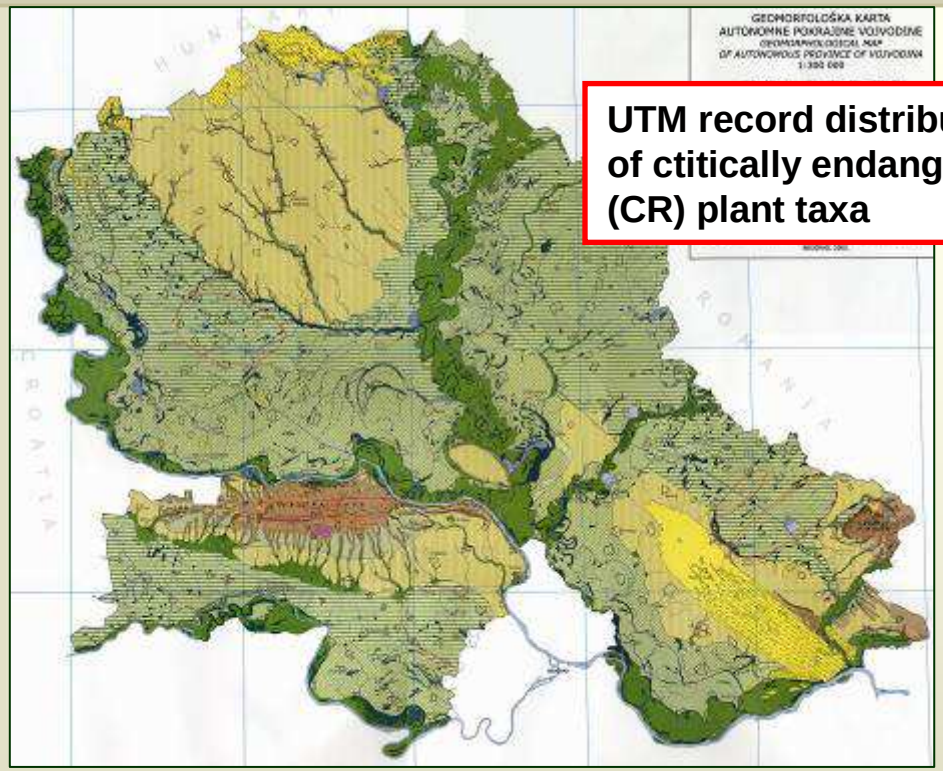
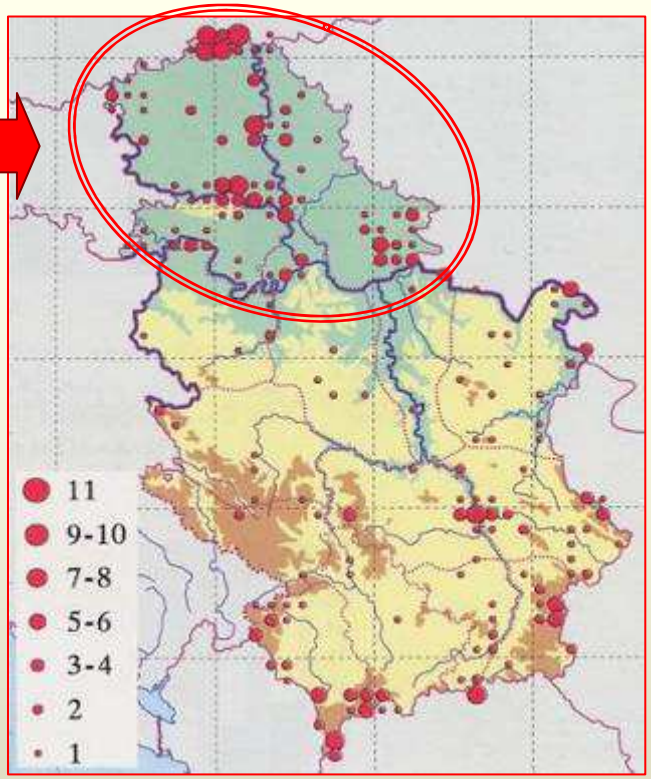
Biodiversity



UTM record distribution of ctitically endangered (CR) plant taxa



- complex geomorfology > remarkable habitat diversity
- High number of rare birds and small vertebrates (insufficient information about invertebrates)
- Annex I of Directive 92/43/EEC (Habitat Directive)
  - Pannonic loess steppic grasslands
  - Pannonic sand steppes
  - Pannonic inland dunes
  - Pannonic salt steppes and salt marshes

Landscape history

Large settlements could have been developed near rivers

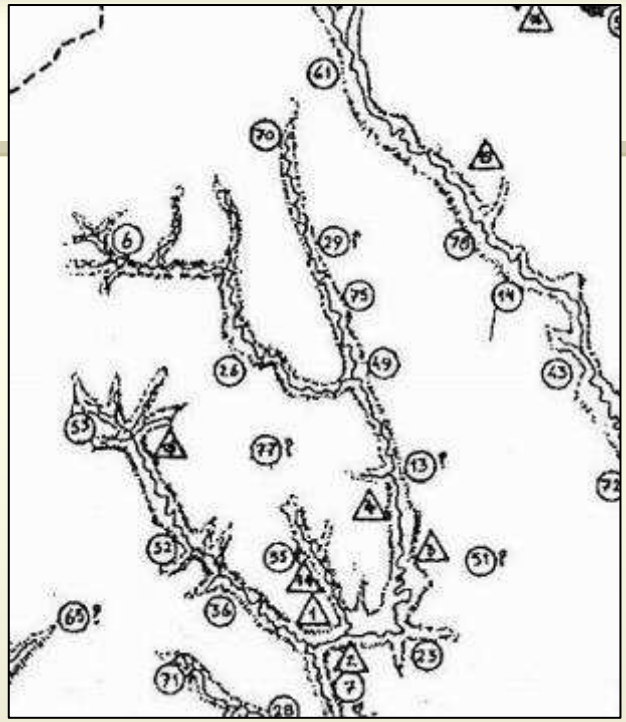
Transhumance, loss of dry forests and large mammals during the Iron age

<u>Medieval period</u>: network of small settlements

half-nomadic herds of cattle

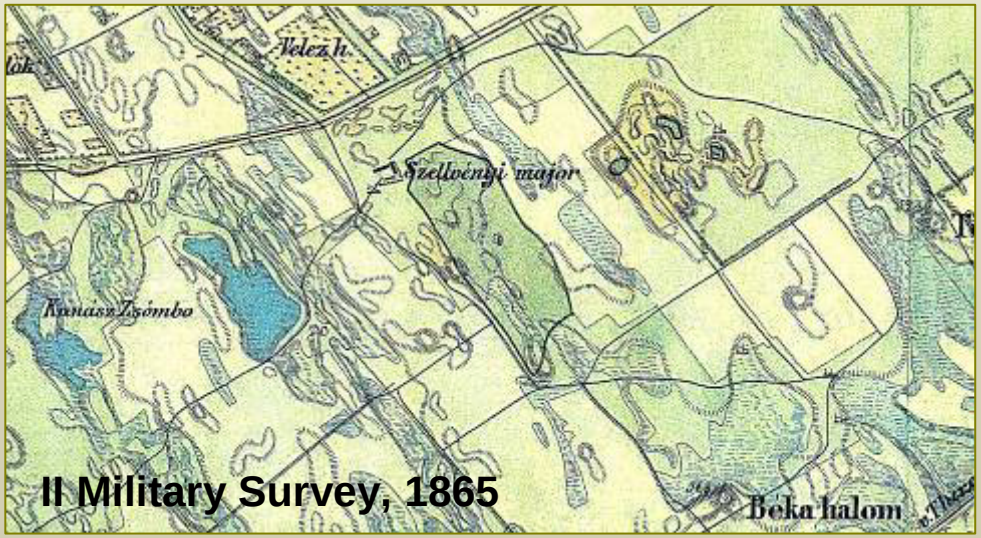
<u>Turkish empire</u>: cattle breeding was enhanced by tax system

depopulation > in XVII century the deserted area was used as pasture



- From 1760`s > organised recolonisation,
- Settlements + network of farmhouses (tanya)

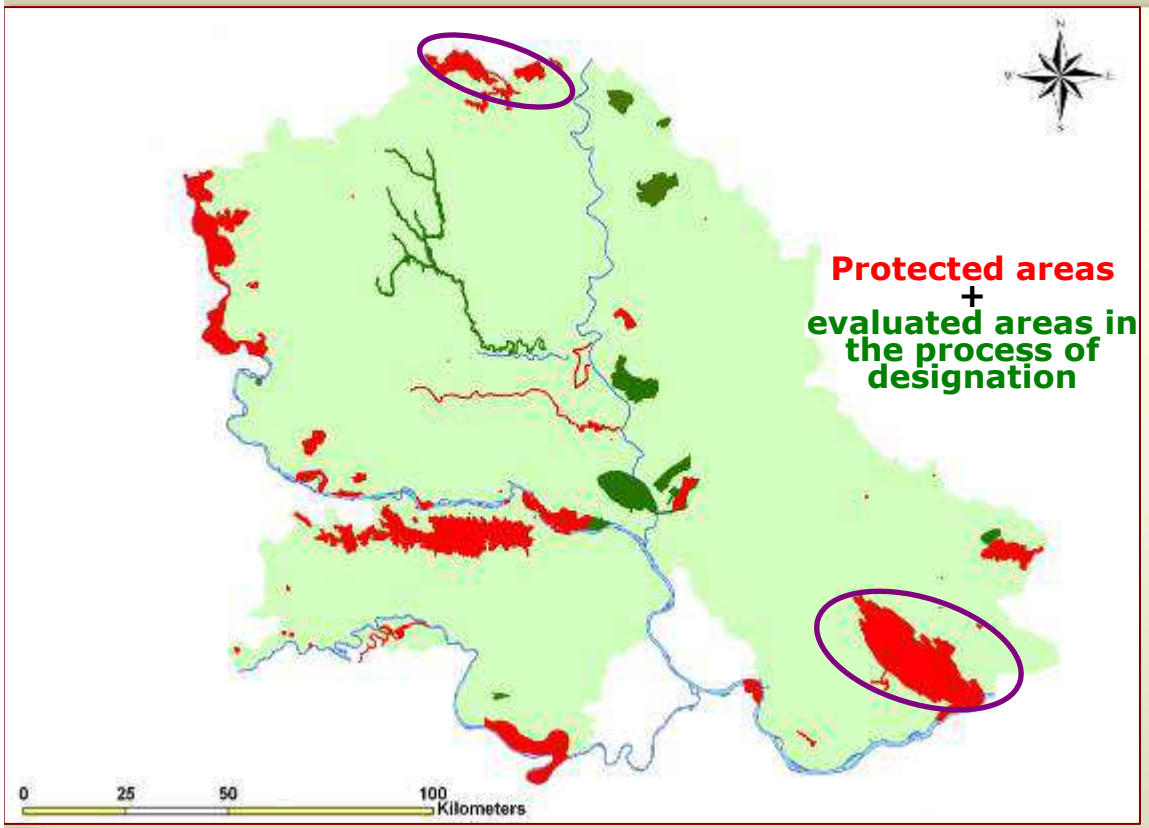
The dry pastures are converted into arable land between 1840 – 1880



II Military Survey, 1865

The scattered farms were self-supplying > high diversity of crops + hayfields and pastures

Nature protection



6-7 % of the region is protected

Protected areas are established on the state-owned land:

- **Forested areas of hills**
- **Riparian woodlands and wetlands + other wetlands**
- **Sand areas (habitat remains scattered within forest monocultures)**

<u>Insufficient protection of grasslands as dominant habitat types</u>

size of the protected area	number of areas in Vojvodina
> 10 000 ha	3
1 000 - 10 000 ha	10
100 - 1 000 ha	16
< 100 ha	4

Pannonic inland dunes (Open sand grasslands)-protected areas

Assessed total habitat size (natural plant communities containing floristic rarities)

Deliblato sand area = 150 ha

Subotica-Horgos sand area = 20 ha

Fragmentation (both areas) > number of habitat patches > 100

minimum area = 0.01 ha

median = 0.2 ha

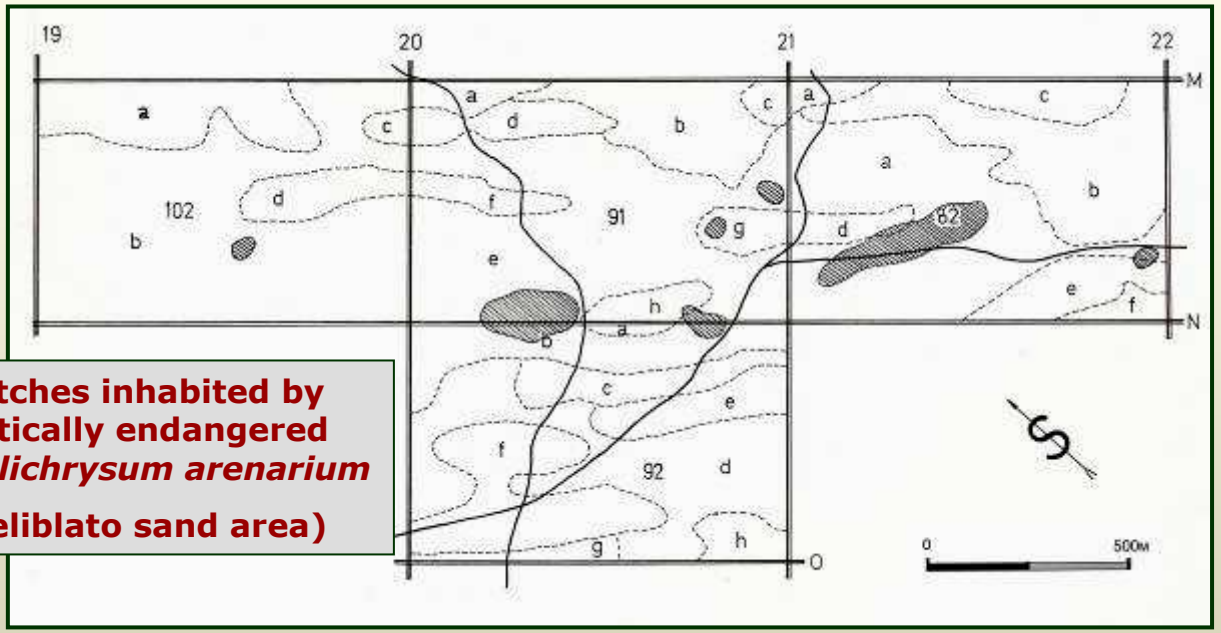
maximum area = 1 ha

Patch shapes:

- irregular

- narrow strips

along the roads within the forested area



patches inhabited by critically endangered *Helichrysum arenarium*

Deliblato sand area)

Land use

Both sand areas are covered by allochtonous forest plantations (black locust and pines), originated from XIX century. Part of the Subotica-Horgos sand area is transformed into agricultural landscape (orchards and vineyards).

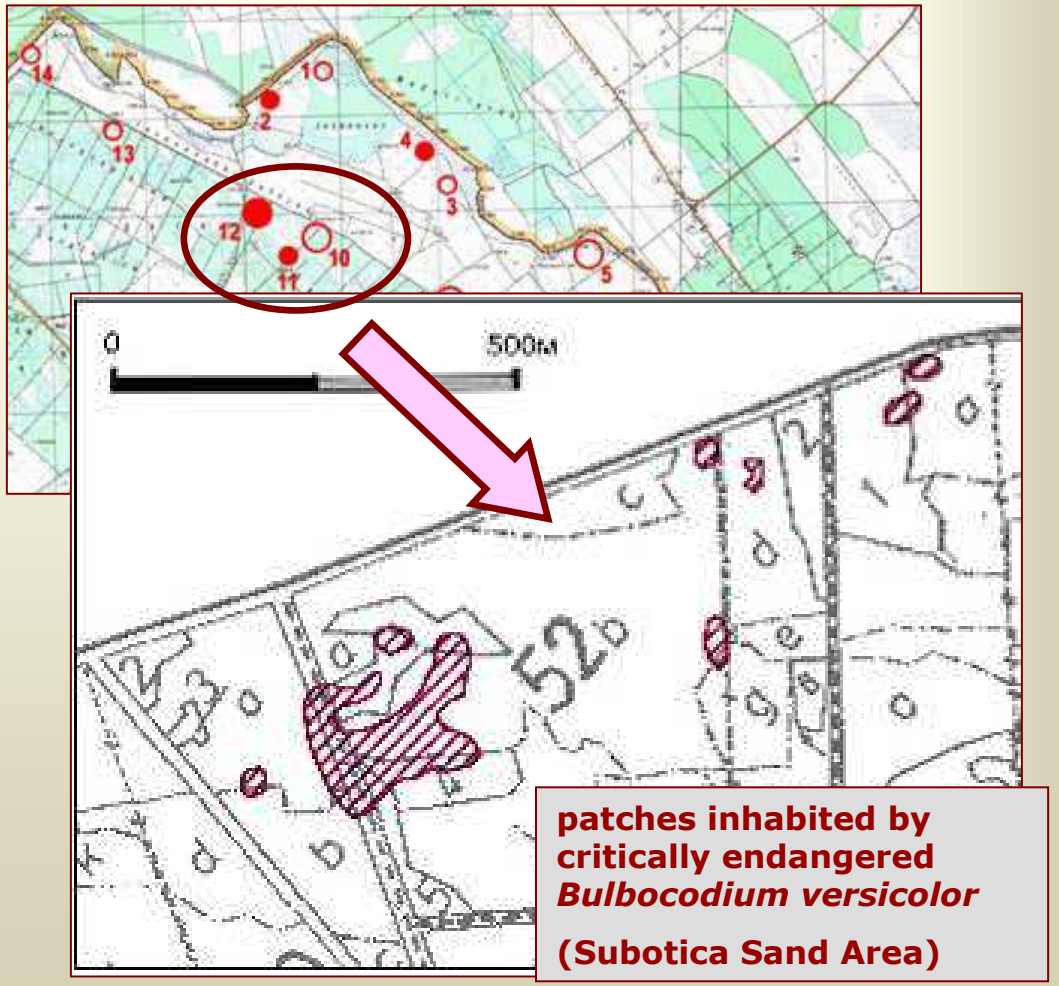
Clearings and road edges are proved to be refuges for rare native species.

Pannonic sand steppes – protected areas

Assessed total habitat size (natural plant communities containing floristic rarities)

Deliblato sand area = 1 500 ha

Subotica-Horgos sand area = 50 ha



patches inhabited by critically endangered *Bulbocodium versicolor*

(Subotica Sand Area)

Fragmentation (both areas)

number of habitat patches > 100

- **minimum area = 0.05 ha**
- **median = 0.5 ha**
- **maximum area = 5 ha**

The most common patch shapes:

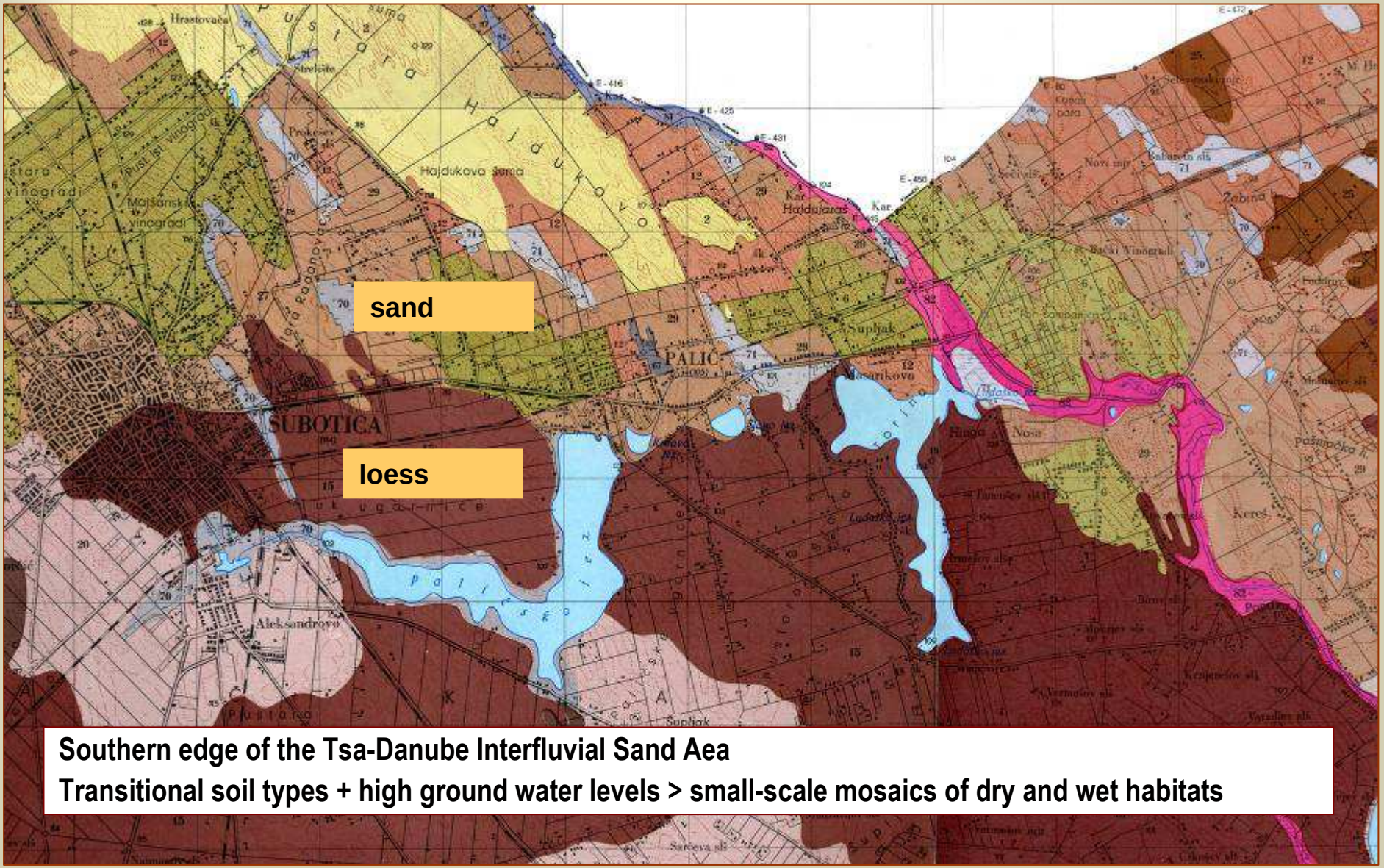
- **convoluted (irregular with lobes)**
- **elongated (narrow strips along the roads within the forest area)**
- **rounded (very small)**

Land use

Steppes are converted into arable land.

Steppe patches within wet meadows, field and road edges are refuges of rare species.

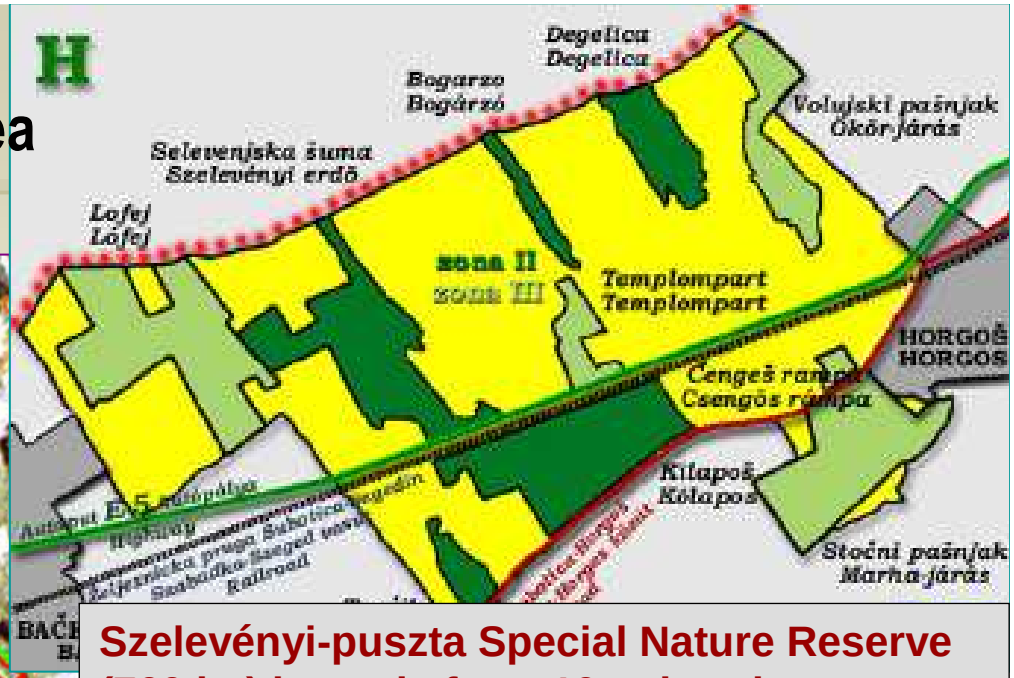
Subotica – Horgos Sand Area



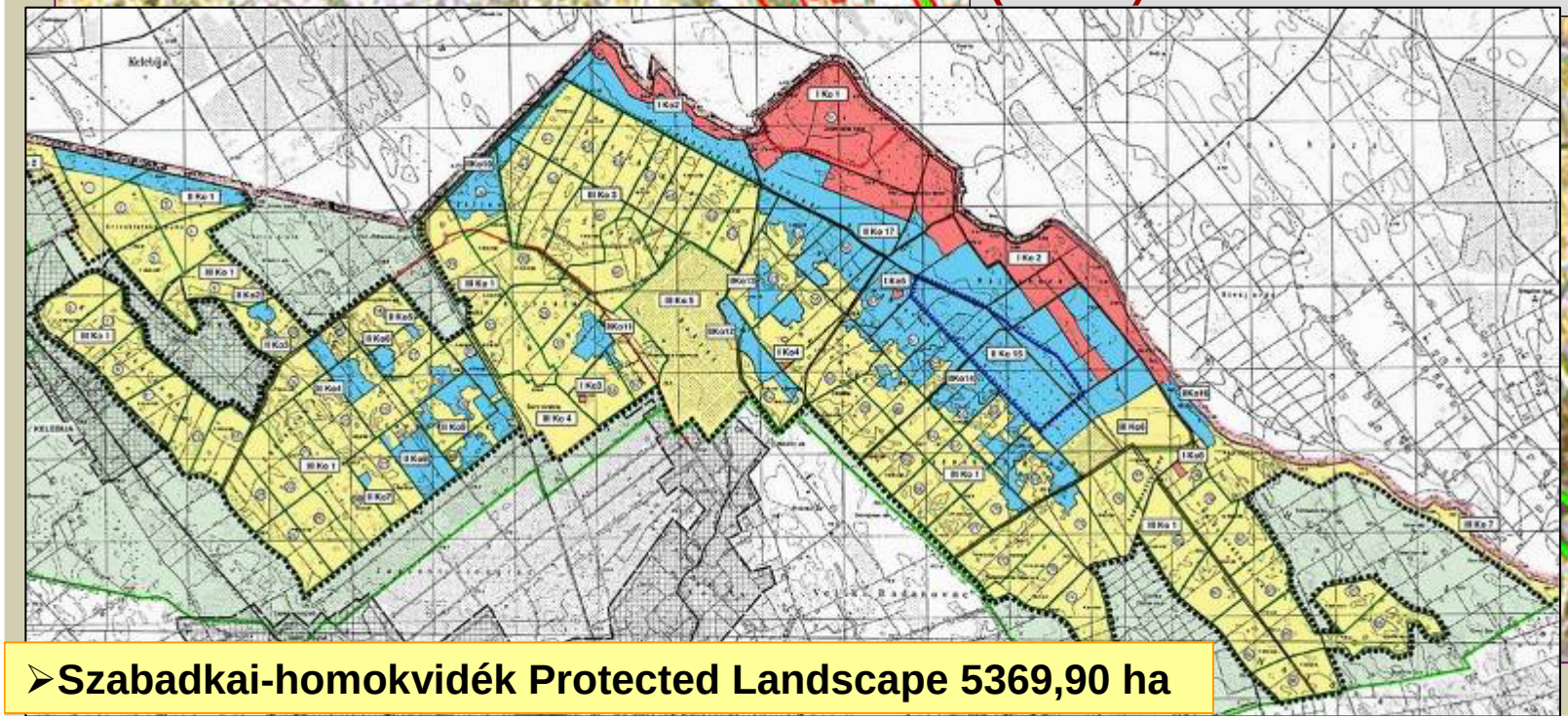
Southern edge of the Tsa-Danube Interfluvial Sand Aea

Transitional soil types + high ground water levels > small-scale mosaics of dry and wet habitats

Subotica – Horgos Sand Area

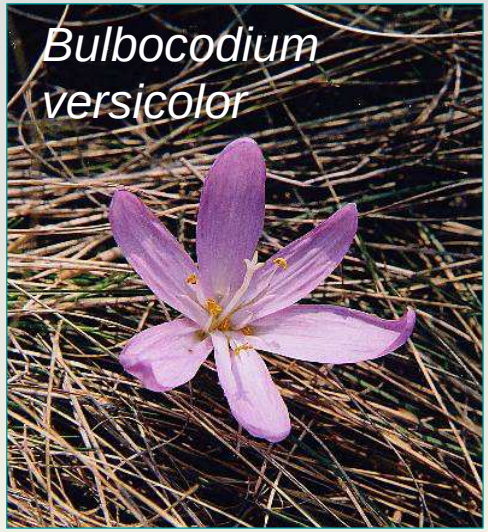


Szelevényi-puszta Special Nature Reserve (760 ha) is made from 10 sub-units



➢**Szabadkai-homokvidék Protected Landscape 5369,90 ha**

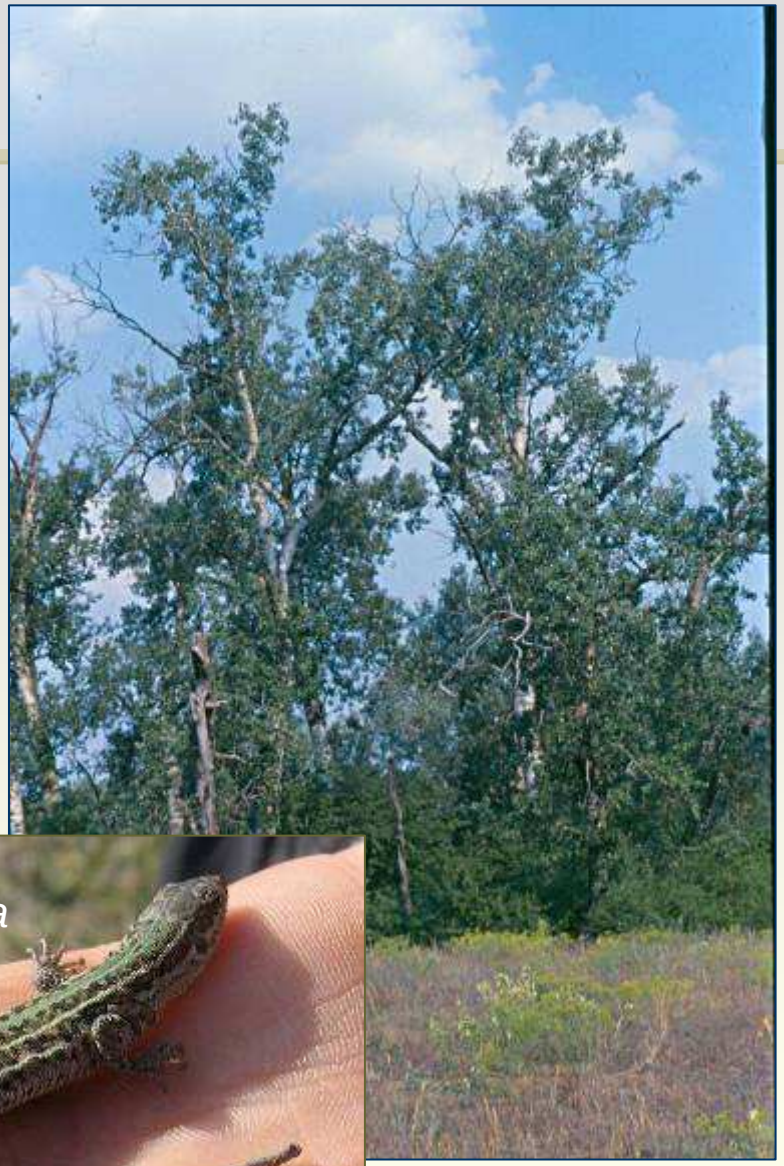
Subotica – Horgos Sand Area



Acrida hungarica

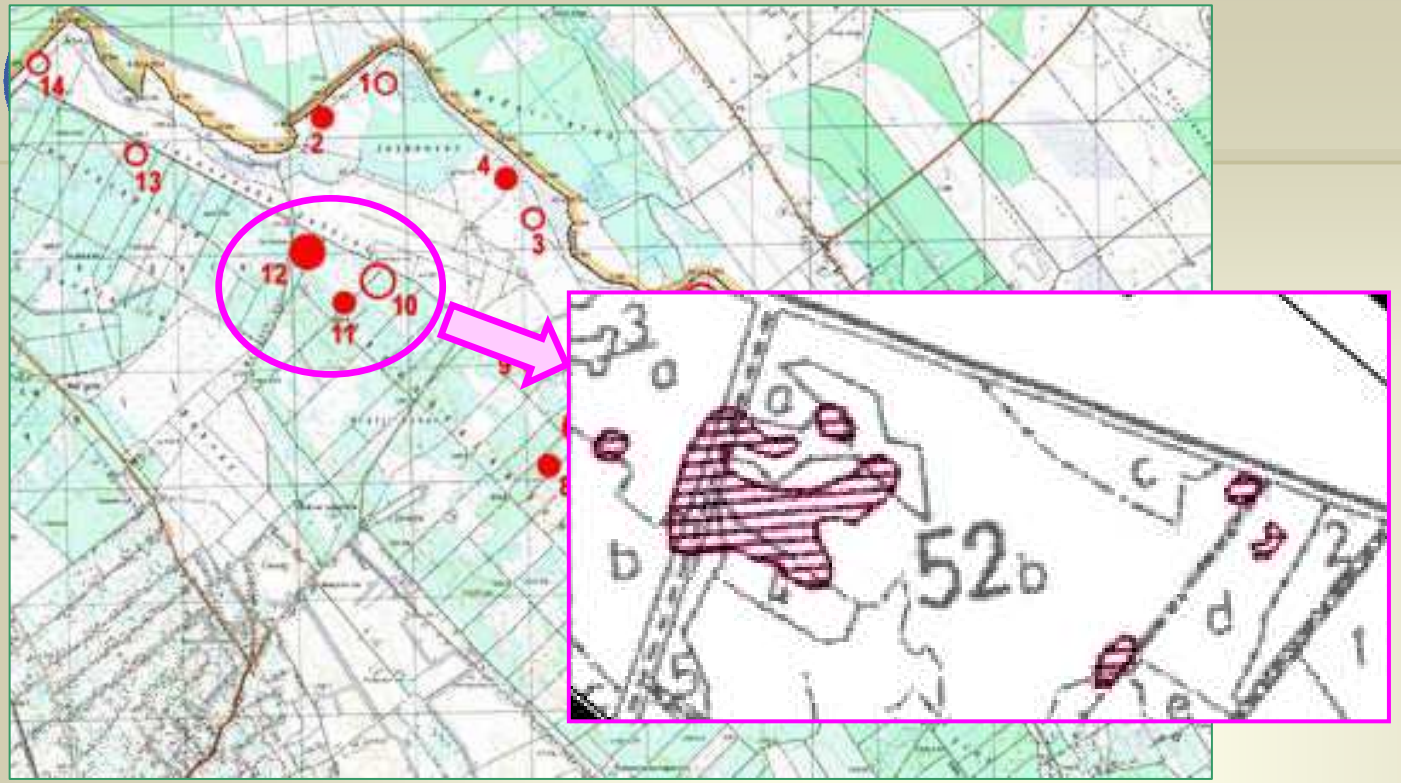
Subotica – Horgos Sand Area


Iris arenaria




Pelobates fuscus


Podarcis taurica



Bulbocodium versicolor

CR, Viable population

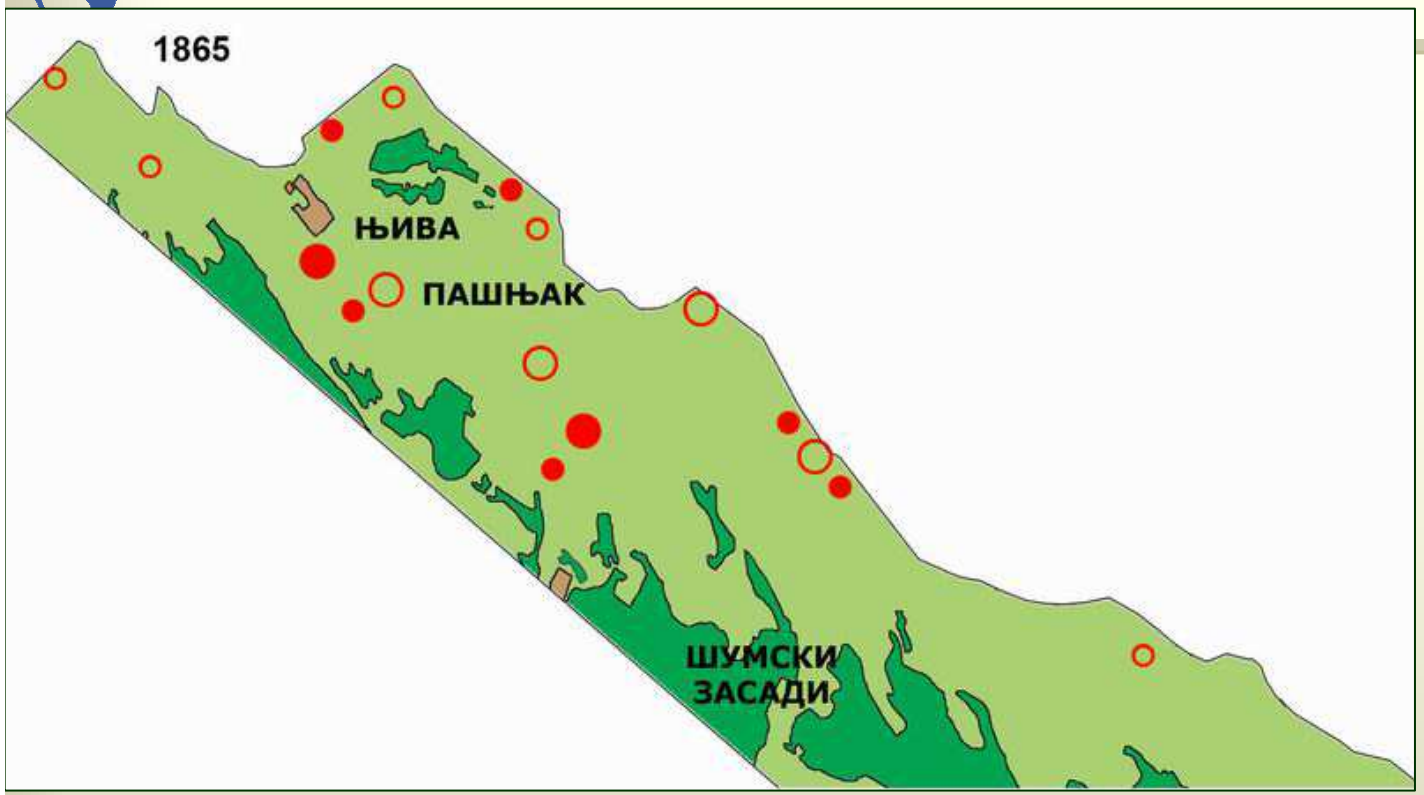
Small micro-habitats

22 habitat fragments

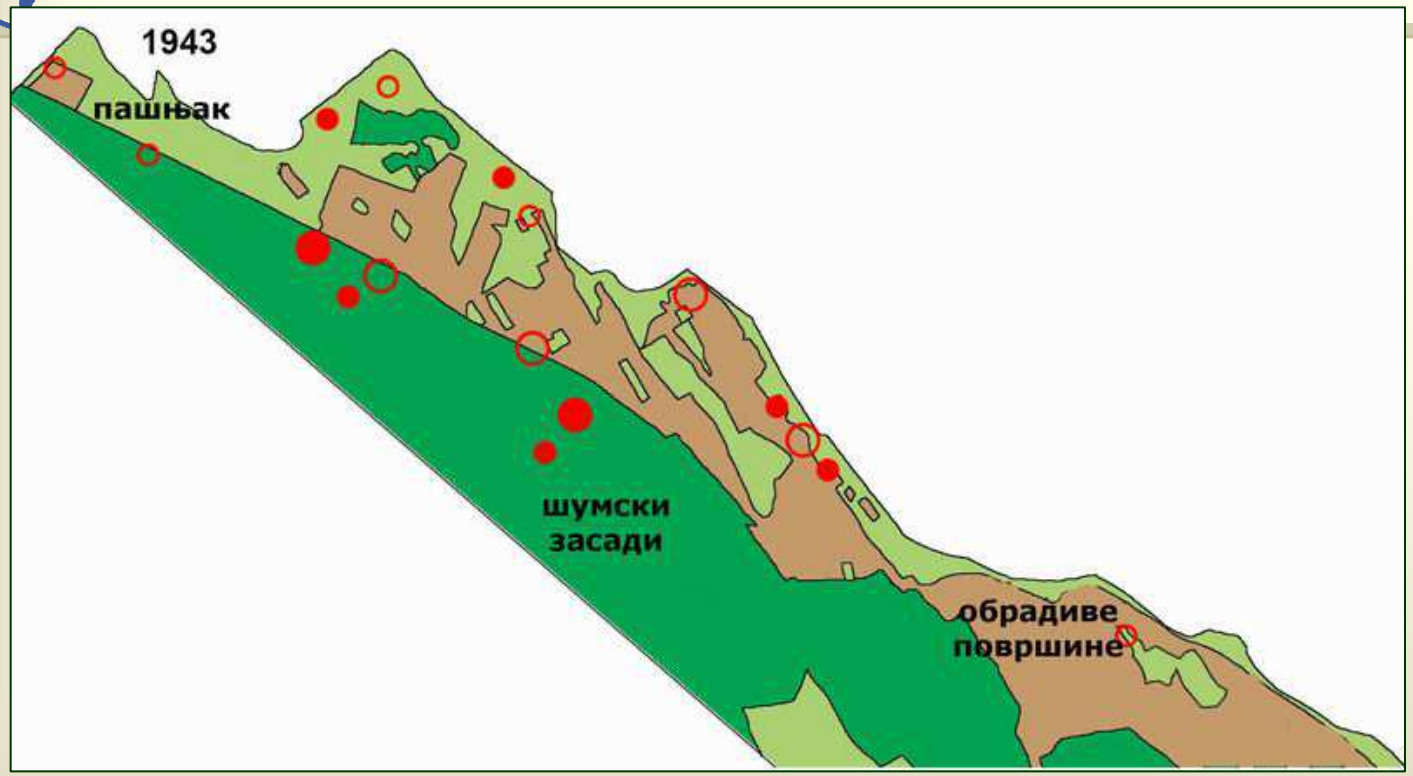
size from 0,1 to 1,5 ha

assessed habitat size in 1902 = 700 ha,

actual habitat size = 9 ha


1865
ЊИВА
ПАШЊАК
ШУМСКИ
ЗАСАДИ


1883
ЊИВА
ПАШЊАК
ШУМСКИ
ЗАСАДИ


1943
пашњак
шумски
засади
обрадиве
површине


шума
ливада, пашњак
парлог
њива
број јединки
> 1000
100 - 1000
50 - 100
< 50
1
2
3
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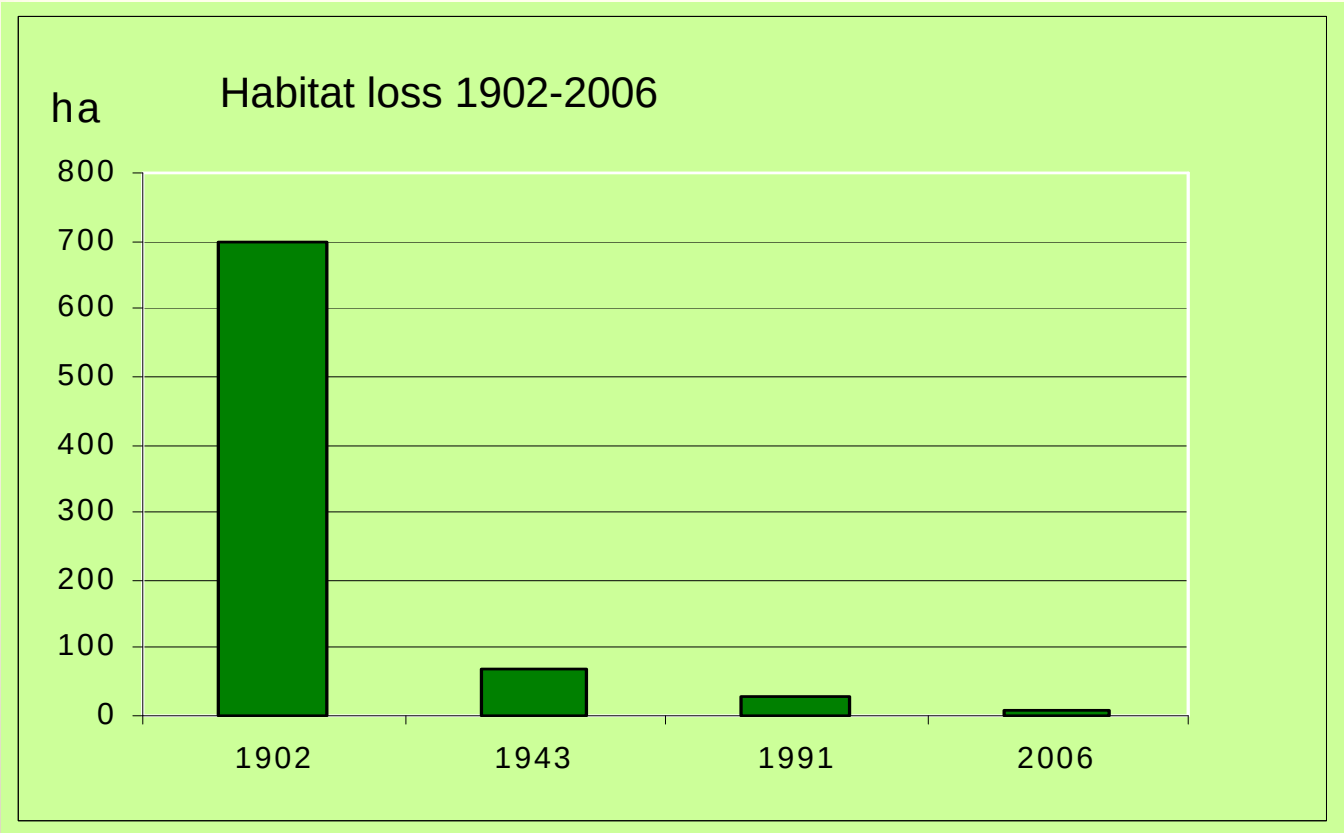
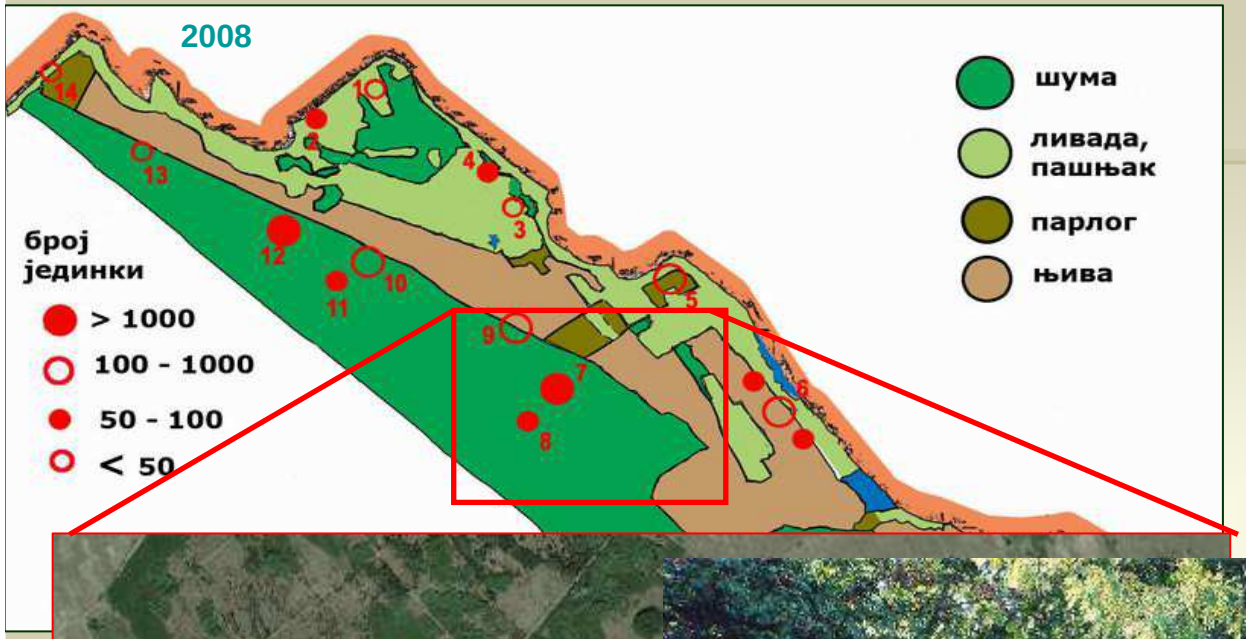
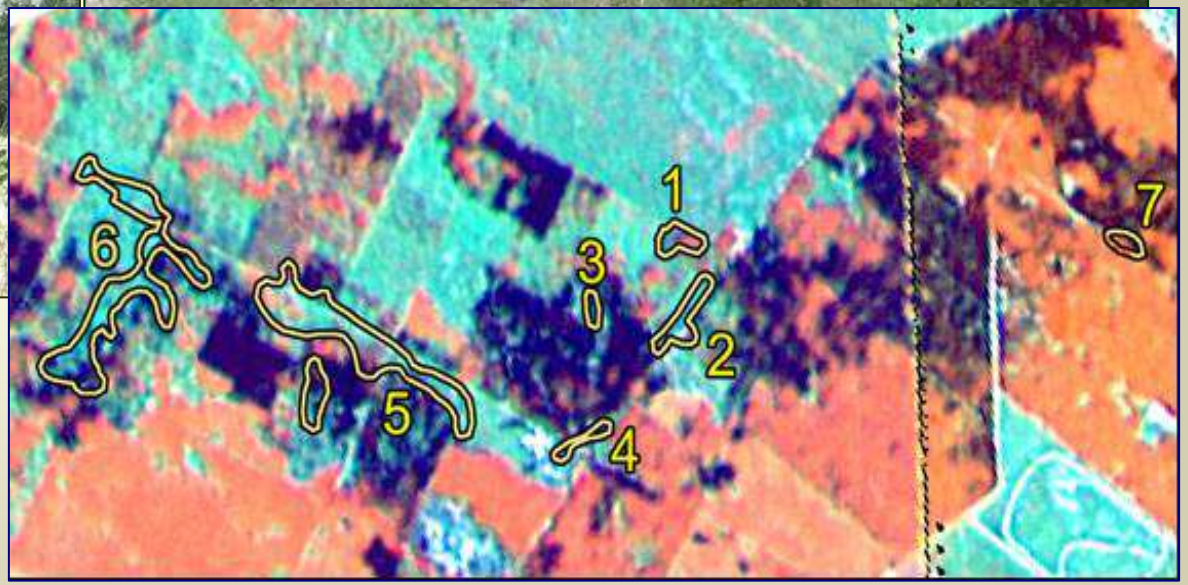
15


Habitat loss 1902-2006
ha
800
700
600
500
400
300
200
100
0
1902
1943
1991
2006



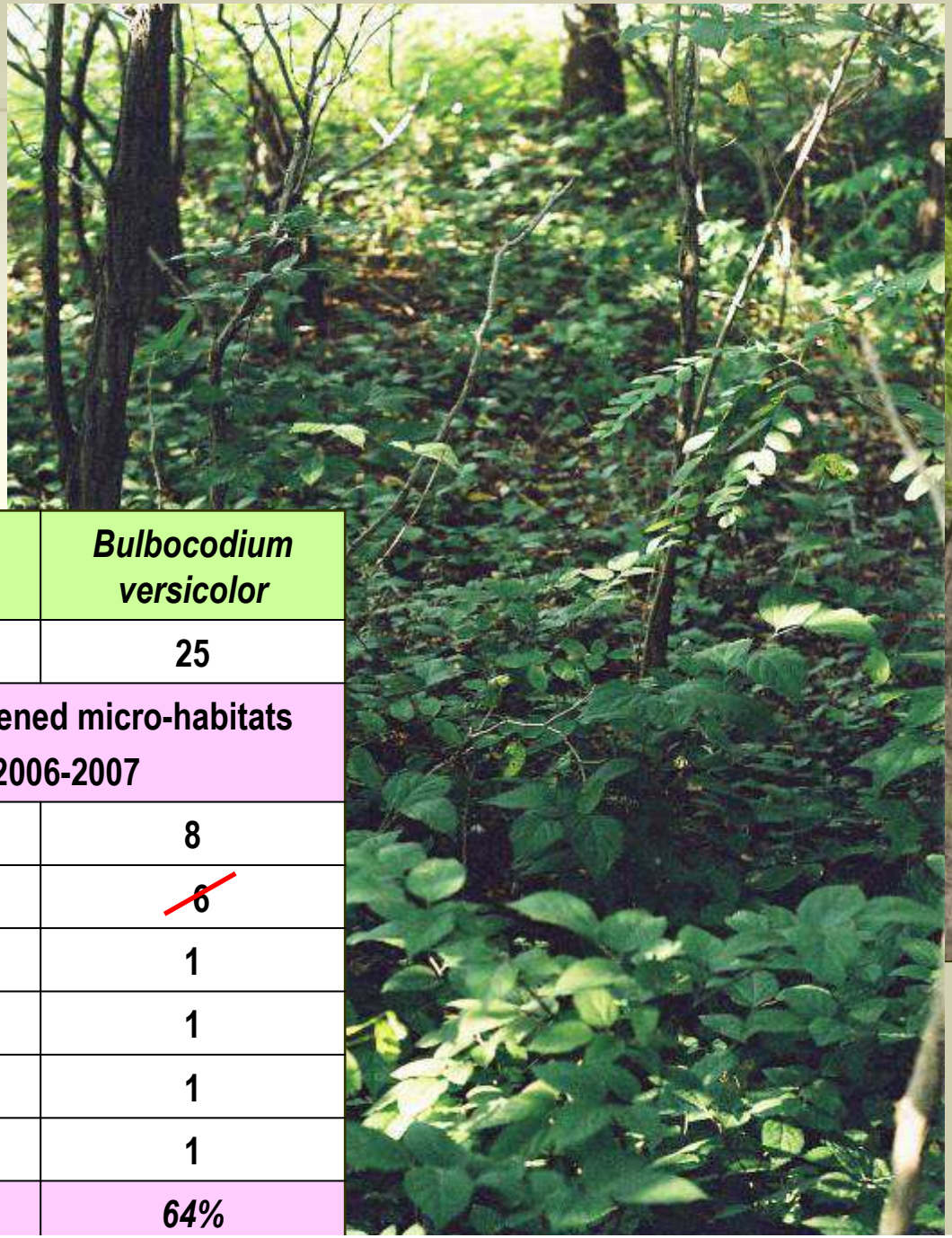
arable land	%
8. class	9.6%
7. class	53.6%
6. class	27.2%
6-8 class	90.4%

Dianthus serotinus



- **2300 individuals**
- **48 micro-habitats (7 sites)**
- **Occupied area= 2.64 ha.**

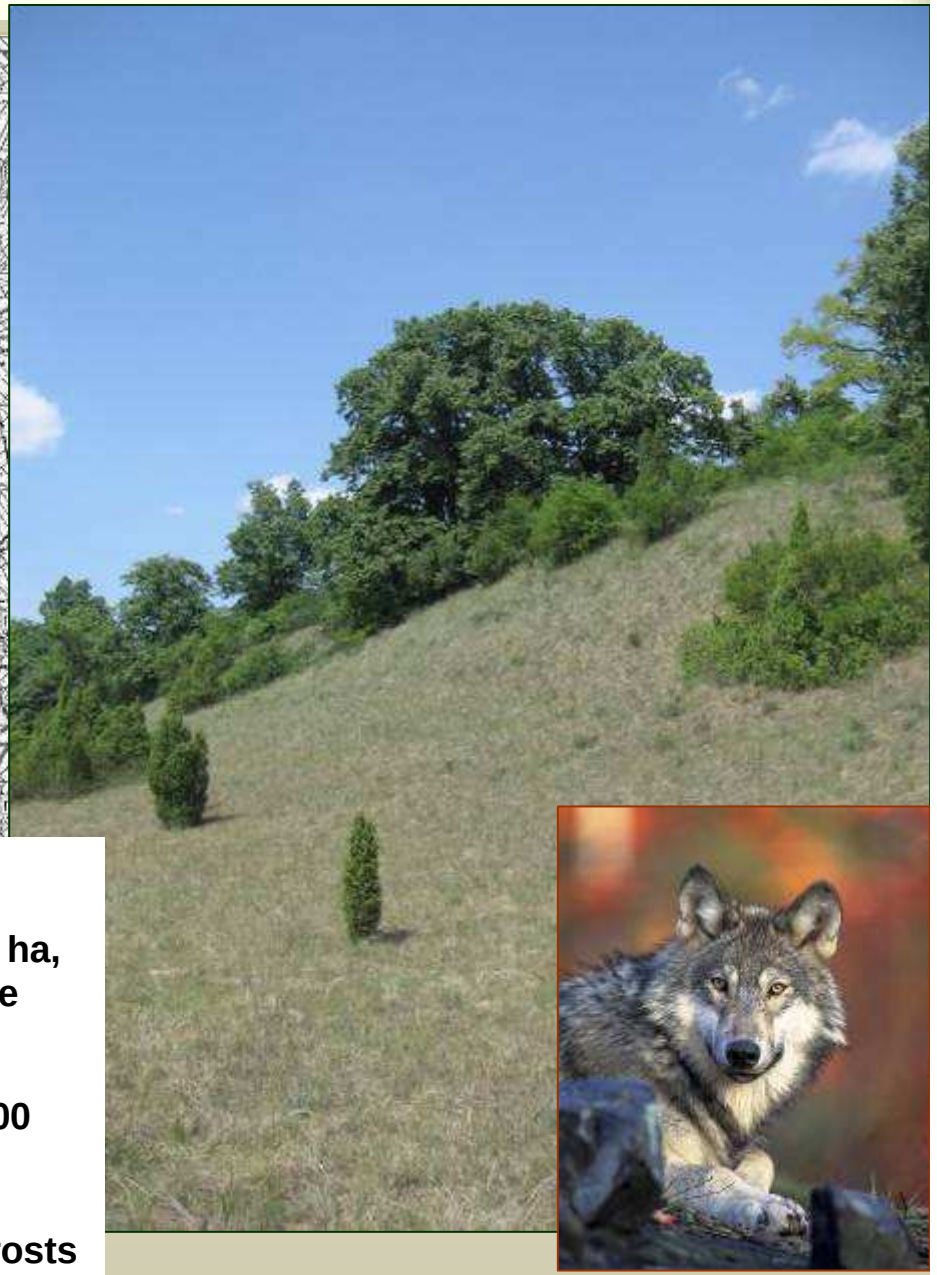
Plant invasions



- Management activities are focused on the plant invasions
- Forest monocultures are the most important sources of invasive species
- The number of micro habitats invaded by *Celtis occidentalis* is doubled in the last 5 years

species	*Dianthus serotinus*	*Bulbocodium versicolor*
N of micro-habitats	48	25
invasive species	N of threatened micro-habitats 2006-2007	
Robinia pseudoacacia	21	8
Celtis occidentalis	8	~~6~~
Ailanthus glandulosa	5	1
Asclepias syriaca	9	1
Oenothera sp.	3	1
Acer negundo	0	1
threatened micro-habitats %	*73%*	*64%*

Deliblat Sand Area

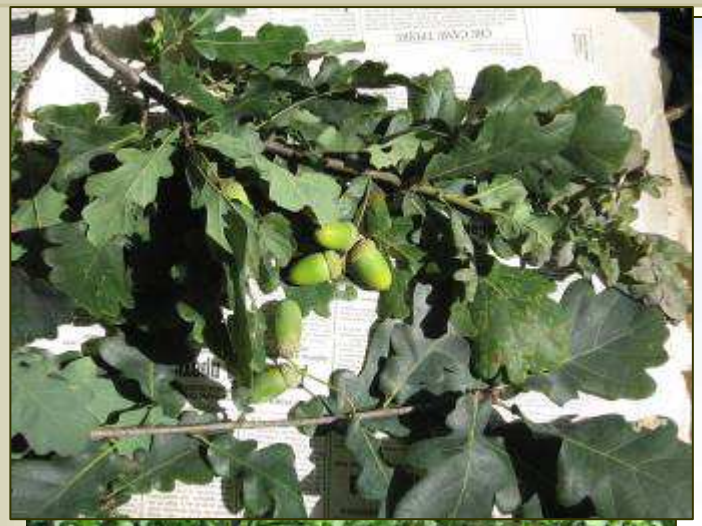


➢**25 km wide and 60 km long sand area**

➢ **Deliblatska peščara Special Nature Reserve, 34,829 ha, the manager of protected area is the Forest Enterprize Vojvodinasume**

➢**very low ground water level, but the precipitation (700 mm) accumulated in the dunes enable the forest development on the northern slopes, development of forest in the interdune depressions is limited by the frosts**

Deliblatska peščara Special Nature Reserve

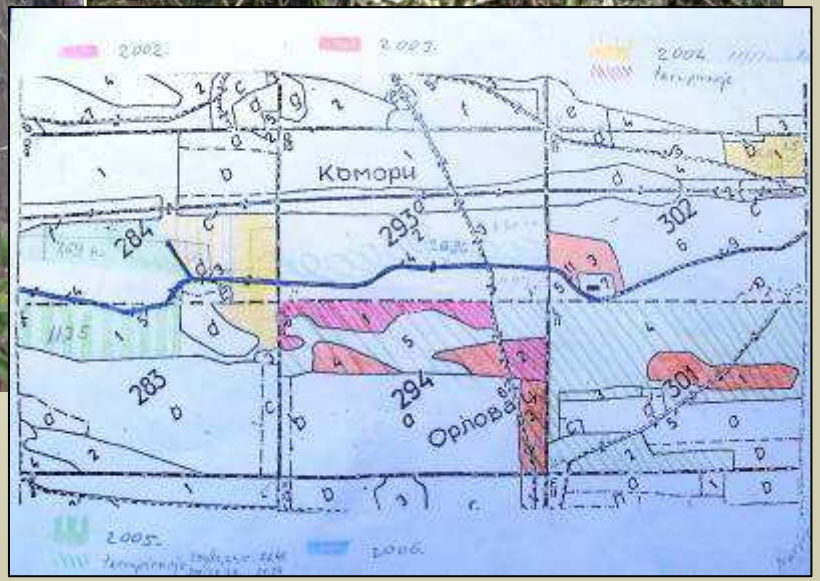


Deliblatska peščara Special Nature Reserve

Festucetum vaginatae deliblaticum

Deliblatska peščara Special Nature Reserve - fire

- Pine plantations are prone to fires
- 1973,1990,
- 1996 : 3815 ha (including 488 ha grassland)
- monitoring



Deliblatska peščara Special Nature Reserve - pastures

Deliblatska peščara Special Nature Reserve –Restoration of pastures

- On pastures of complex Korn
- Provincial Secretariat for Environmental protection and sustainable development financed project since season 2002/03
- Manager each year conducted activities on clearing of hawthorn (*Crataegus monogyna*) bushes. Until now, almost 100 ha of steppe on sands is revitalized.

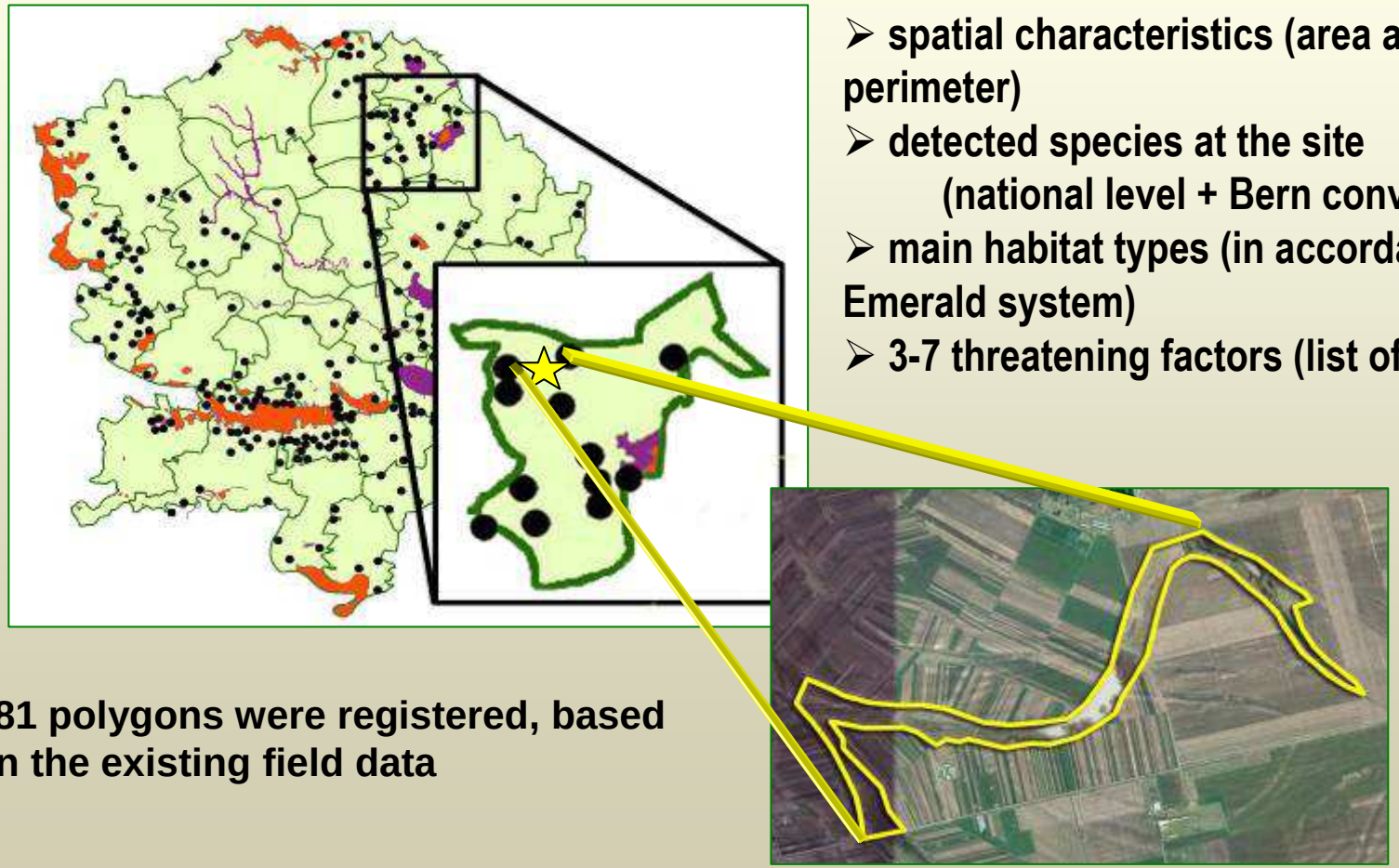
- Since year 2007, there are also regular pasturing, by approximately 650 sheep (200-1000) followed by 10% of goats. Grey cattle is present on nearby contry house, and they are pasturing inside electrical fence.

Inventory of habitat patches

Natural or semi-natural habitat patches where one or more protected species were detected during the last decade > identifyed as a polygon (maps or Google Earth image)

Inventory data:

- code (county and number)
- site name
- spatial characteristics (area and perimeter)
- detected species at the site (national level + Bern convention)
- main habitat types (in accordance with Emerald system)
- 3-7 threatening factors (list of 49 factors)



481 polygons were registered, based on the existing field data

Data analysis: habitat types

27 habitat types:

- **natural,**
- **semi-natural (hayfields, pastures)**
- **antropogenic**

in the 481 polygons 1030 habitat patches were registered

the high frequency of salt and steppic habitats indicate insufficient conservation status

16 valuable sand steppe habitats are registered, covering the area of 1887 ha

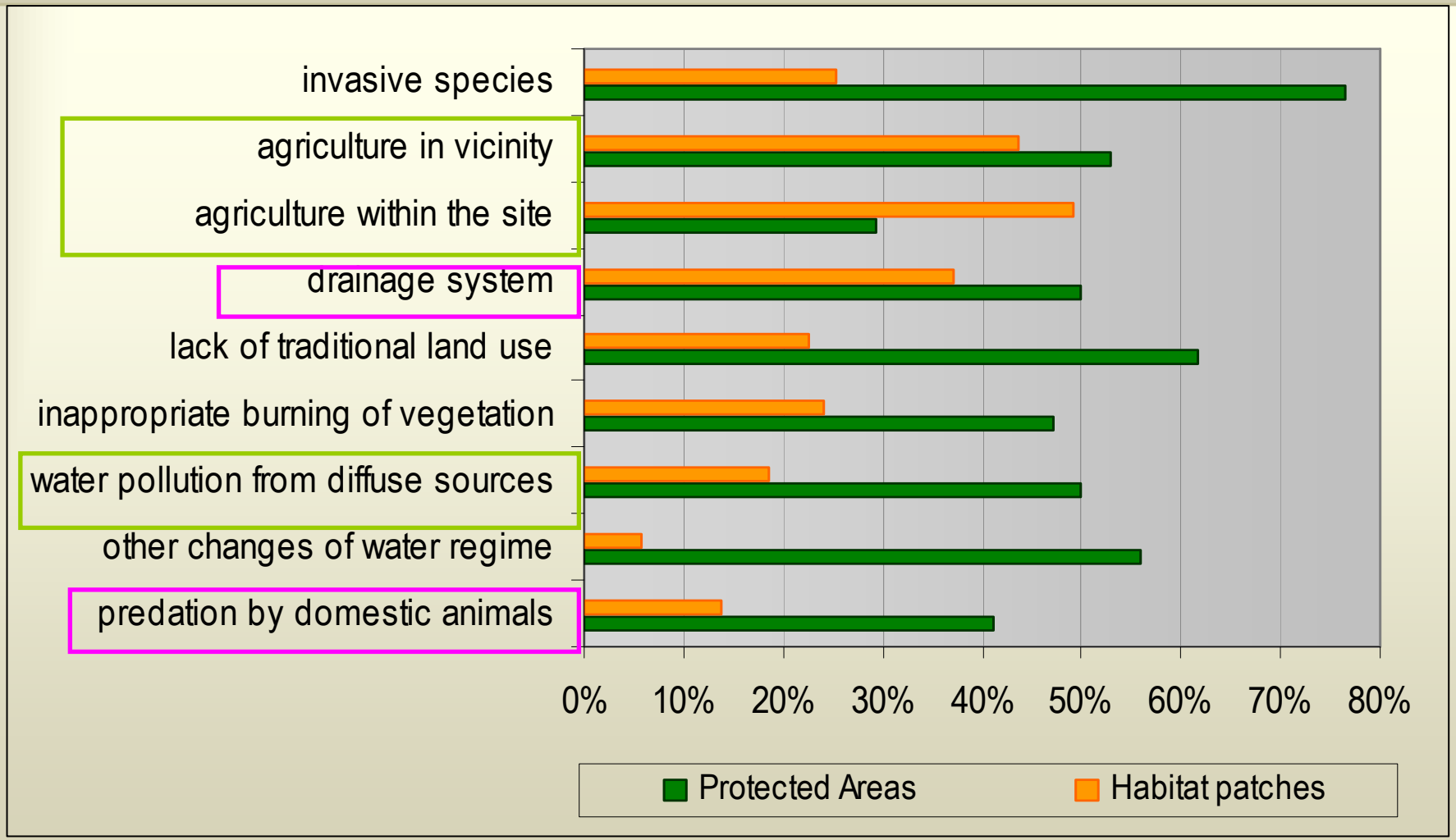
Habitat types	frequency (%)
Salt steppes and salt marshes	34,72%
Loess steppic grasslands	19,13%
Rural mosaics	16,42%
Humid meadows	15,59%
Tall tree plantations	15,59%
Temperate riverine and swamp forests and brush	14,97%
Marshes	13,93%
Water-fringe vegetation	13,93%
Broad-leaved deciduous forests	12,27%
Extensive cultivation	11,43%
Ditches and small canals	8,94%
Fish ponds	5,82%
Small woodlots	5,82%
Rivers and streams	5,41%
Sand, clay and kaolin quarries	3,53%
Reservoirs	3,33%
sand steppes	2,49%
Permanent freshwater ponds and lakes	2,49%
Industrial lagoons and ornamental ponds	1,87%
Pannonic wooded steppes	1,87%
Navigable canals	1,66%
Lowland blanket bogs	1,04%

Inventory - Steppe nad forest steppe habitats

Mali Pesak, 859 ha

	N	F	sumA(ha)	min(ha)	max(ha)	AVG(ha)	M(ha)
pannonic forest-steppe	38	0,072519084	1723,576	0,9315	404,768	45,35726316	19,13625
loess steppe	99	0,188931298	3284,6607	0,41	235,784	33,17839091	19,24
sand steppe	16	0,030534351	1886,9694	0,925	859,068	117,9355875	10,1455

Threatening factors – analisys of all habitat types



Effects that could be reduced by well-designed buffer zone

Effects that need a very wide buffer or regulation by transition zone

Special types of corridors

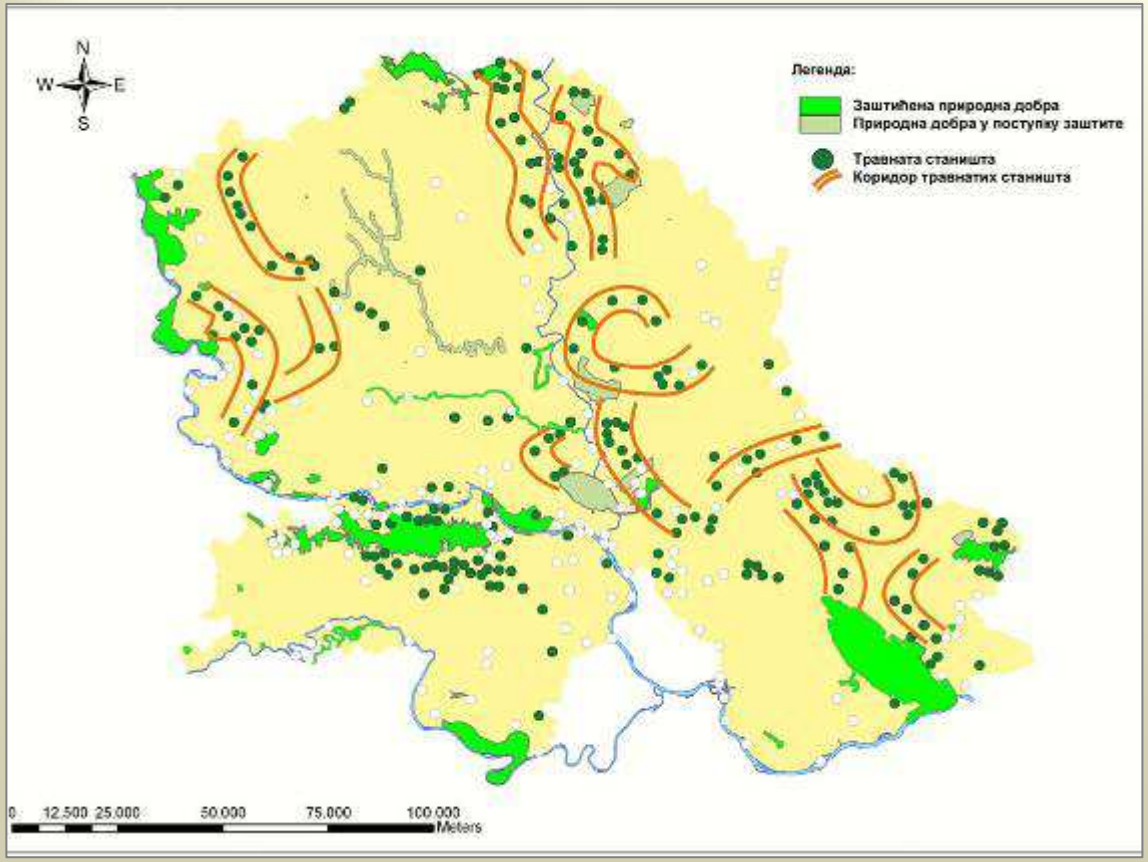
The priority types of grassland habitats needs special corridors.

Salt steppes &marshes > own fragmented remains

more or less degraded pastures

Isolated steppe habitats > creation of steppe strips

by habitat restoration

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