



INVASIVE PLANT SPECIES

Public Institution „Nature Park Medvednica”

Kristina Vugrek Petljak, M.Biol.

Marijan Ocvirek, Mr.sc.For.

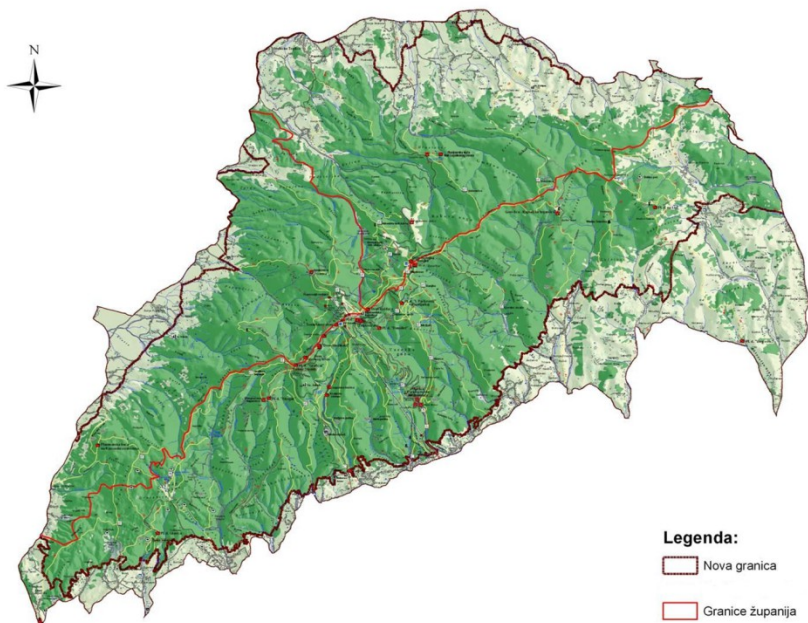
National Parks and Nature Parks in Croatia



8 National Parks

11 Nature Parks

Nature Park Medvednica



Medvednica Nature Park ID-current state

Surface of the Park	17.938 ha
Height above mean sea level:	120 - 1035 m a.s.l.
Highest point:	Sljeme
Direction:	Southwest-northeast in the length of 42 km
Territorial boundaries:	City of Zagreb, Krapina-Zagorje County, Zagreb County
Number of inhabitants in the Nature Park, 2001, estimate:	Approximately 7.400
Accessibility:	By foot, car, bicycle, public transportation - bus
Specific landscape macro-units:	
a) forests:	78% of Park's area
b) access area:	11% of Park's area

ABOUT THE PARK

Established: in 1981, by the Croatian Parliament

Basic phenomena: well preserved forests and forest communities

Area of special protection: 8 special forest reserves, 2 monuments of landscape architecture and 1 geomorphological natural monument

Park is exposed to many pressures, but despite this it represents very valuable area worth to protect



MANAGEMENT OF THE PARK

Management: Public institution “Nature Park Medvednica”

Headquarters: Zagreb, Bliznec 70

Established: in 1998, by the Government of the Republic of Croatia

Activities: *protection, maintenance, promotion* of protected area with an aim to protect and preserve nature's origin, ensure natural processes and sustainable use of natural resources, and supervision of nature protection measures and performance of permitted economic activities.

Financing: state budget, concessions, donations and sponsorships, projects, ticket and souvenir sale

Governing bodies: Governing Board and Director

Employees: currently 16 (15+1)



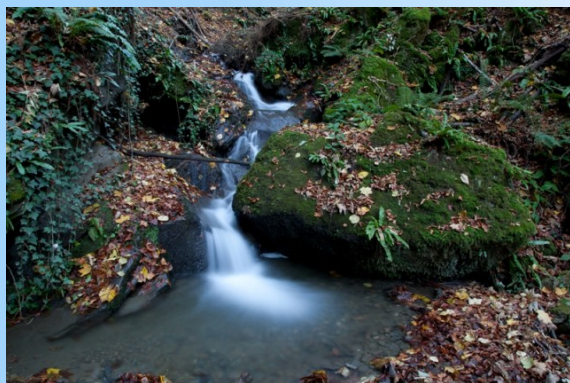
ACTIVITIES IN THE PARK

- **Forestry:** state forests (60%) are managed by Croatian forests l.t.d.; part of forests are private property (40%)
- **Agriculture, wine and fruit growing, hunting**
- **Quarries:** one active and 11 abandoned
- **Recreation and tourism:**
 - recreationists - excursionists,
 - recreationists - athletes,
 - mountaineers,
 - tourists,
 - children as users of educational programs
- **3 tourist localities:** cave Veternica, mine Zrinski and medieval fort Medvedgrad



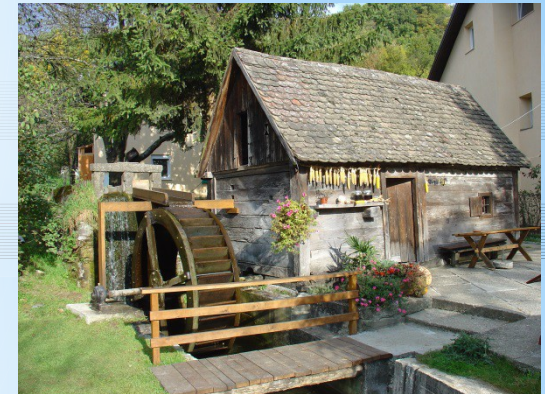
NATURAL VALUES

- High biodiversity value
- 1.205 floral species and 12 forest communities
- great variety of fauna from invertebrates to mammals (some endemic underground species)
- Natura 2000 site as a part of ecological network; 21 target species and 9 target habitat types according to Habitat Directive



CULTURAL VALUES

- A number of **registered cultural heritage sites** in the area of the Park!
- More than 20 archeological locations with heritage remains from prehistory to late Middle Ages
- Traditional rural architecture and small villages
- Numerous manors, castles and villas with parks
- Numerous traditional chapels and churches
- Mills, saw mills and water mills
- Intangible heritage: stories and legends



TOURISM IN THE PARK

The Park is of a great importance for the city of Zagreb (1.2 mil. inhabitants) from an ecological, aesthetic, recreational and tourist point of view

About 1 mil. visitors per year (majority are domestic visitors)

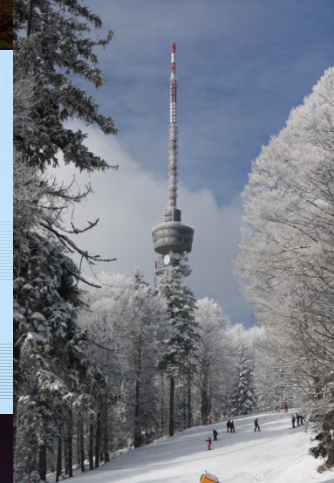
Visitors' system:

- 📖 3 main locations with professional guidance,
- 📖 a number of educational trails,
- 📖 9 bike trails,
- 📖 more than 70 mountain trails,
- 📖 educational and professional programs offered to a wide range of visitors, various events (Fantastic Zagreb Film Festival, Medvedgrad Music Nights, European Bat Night, Medieval days on Medvednica, eco cleaning actions, etc...)

Tourist infrastructure:

- 📖 11 mountain huts,
- 📖 2 hotels and 8 restaurants,
- 📖 a rough calculation of accommodation capacity is around 500 beds,
- 📖 ski slopes, cable car....

EUROPARC Charter for sustainable tourism awarded end 2014



Invasive species in NP Medvednica

- *invasive plant species were systematically researched until now
- *invasive animal species were sporadically recorded such as invasive fish *Carasius gibelio*, *Oncorhynchus mykiss*, turtle *Trachemys scripta elegans*,...
- *great number of mainly domestic visitors and vicinity to the city give larger possibility for introduction of invasive animal species (transport, fishery, tourism)
- *marginal villages with gardens of the Park give larger possibility for introduction of invasive floral species

Invasive plant species

☞ Alien species

+ Naturalized

+ Successful expansion in a short time to more areas

☞ Problems:

◦ Biodiversity

◦ Economy

◦ Human health

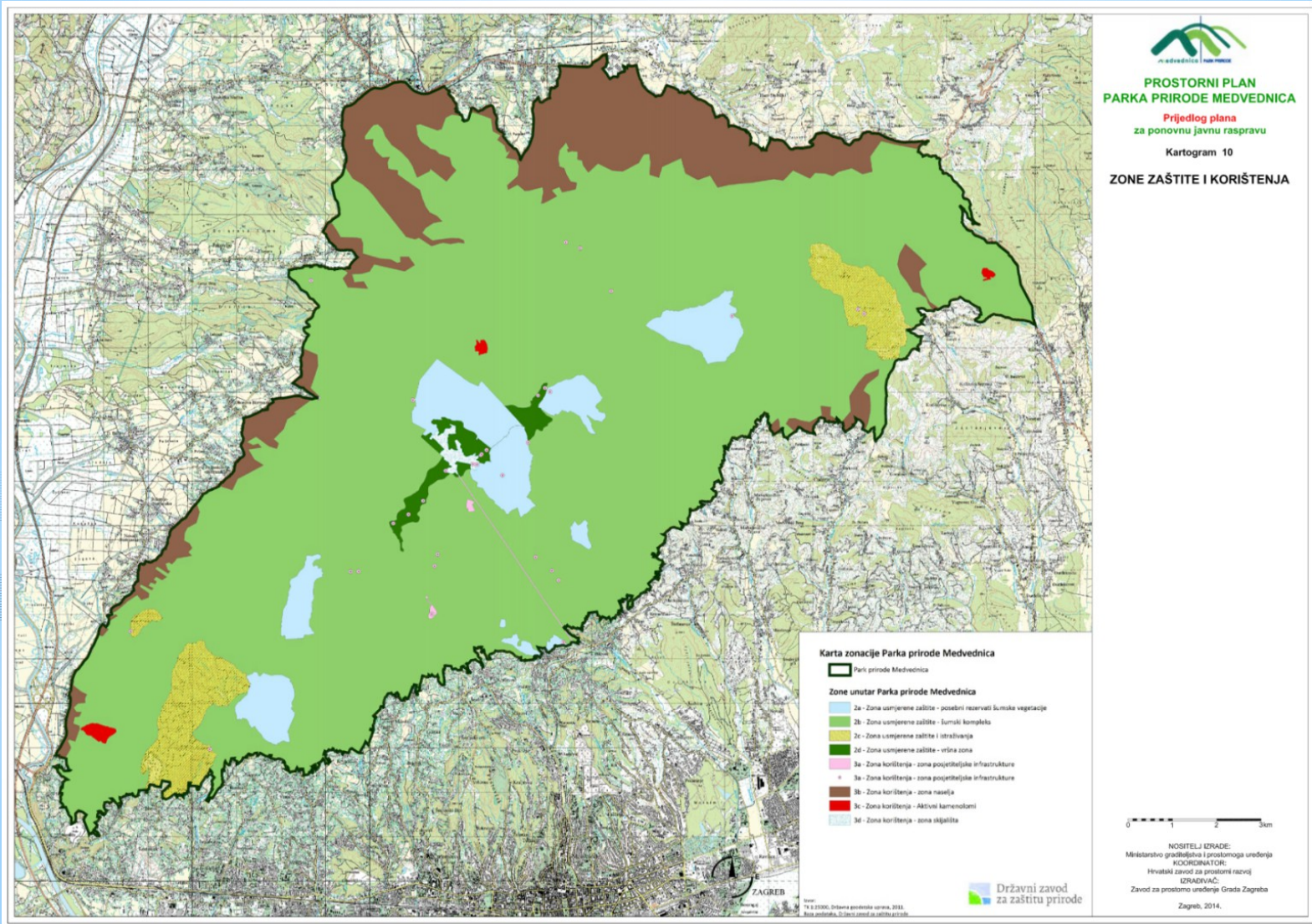
☞ Projects, programs, institutions, initiatives, measures of control, suppression, laws ...

☞ 1. research in NP Medvednica - analysis of invasive plants (Vuković et al, 2010)

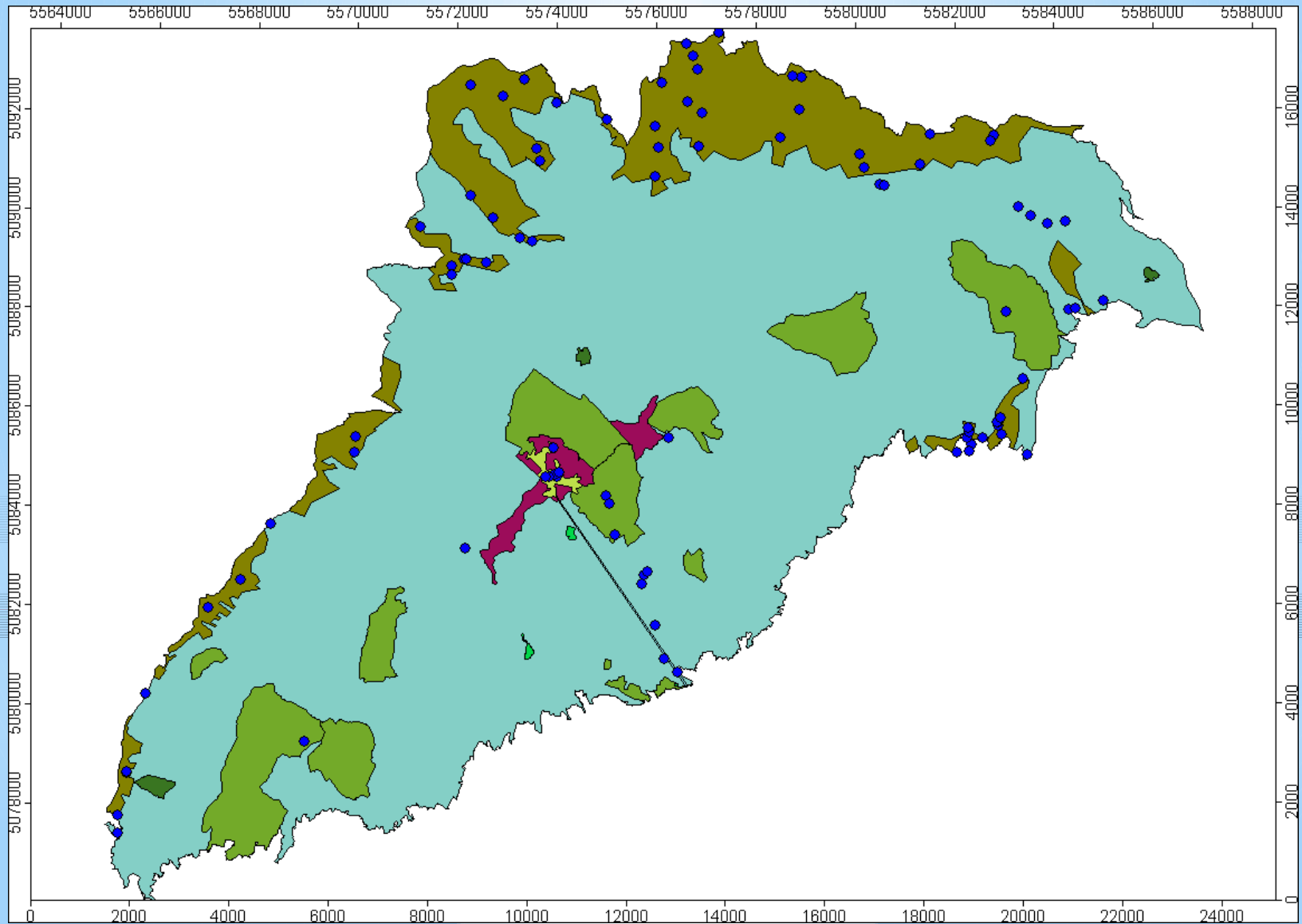
☞ 2. research in NP Medvednica - research of invasive plants in use zone (Allegro et al, 2015.) - villages, ski slopes, quarries and visitor infrastructure

NP Medvednica

Zone of use



Localities in research





Fotodocumentation

Results

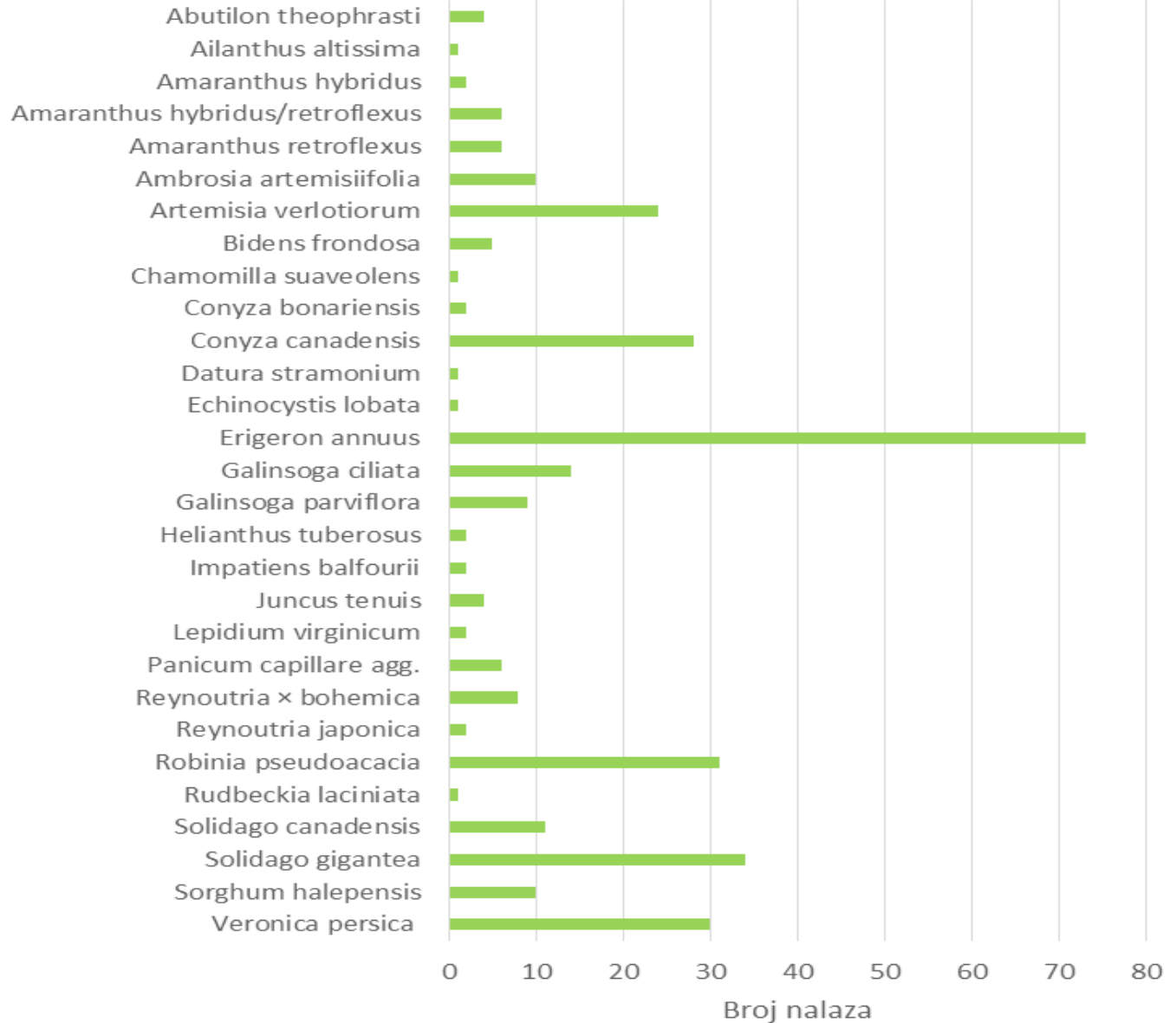
29 invasive plant species !

* not confirmed from 2010.:

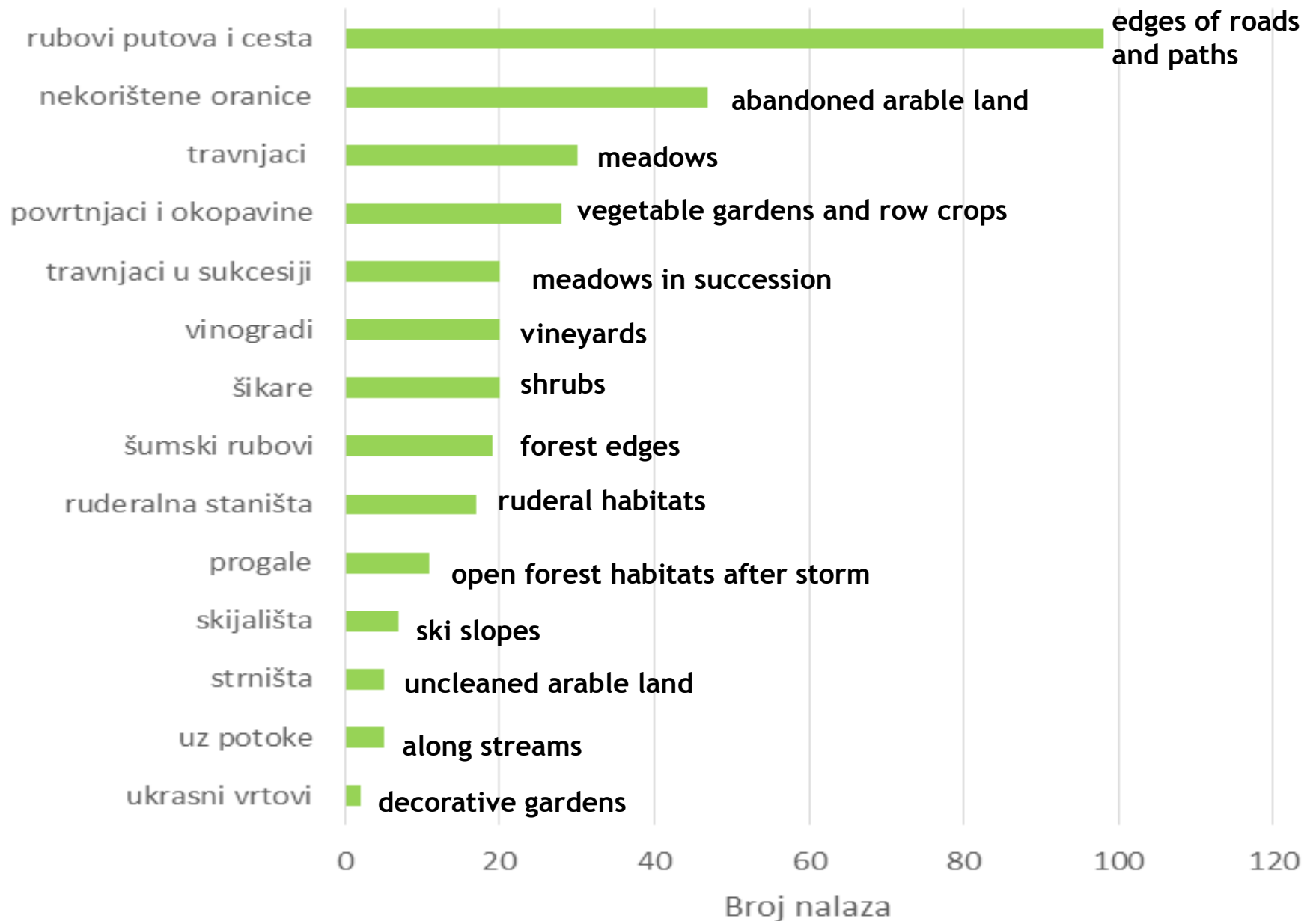
- * *Angelica archangelica*
- * *Asclepias syriaca*
- * *Datura innoxia*
- * *Impatiens glandulifera*
- * *Impatiens parviflora*
- * *Phytolacca americana*

* new ones:

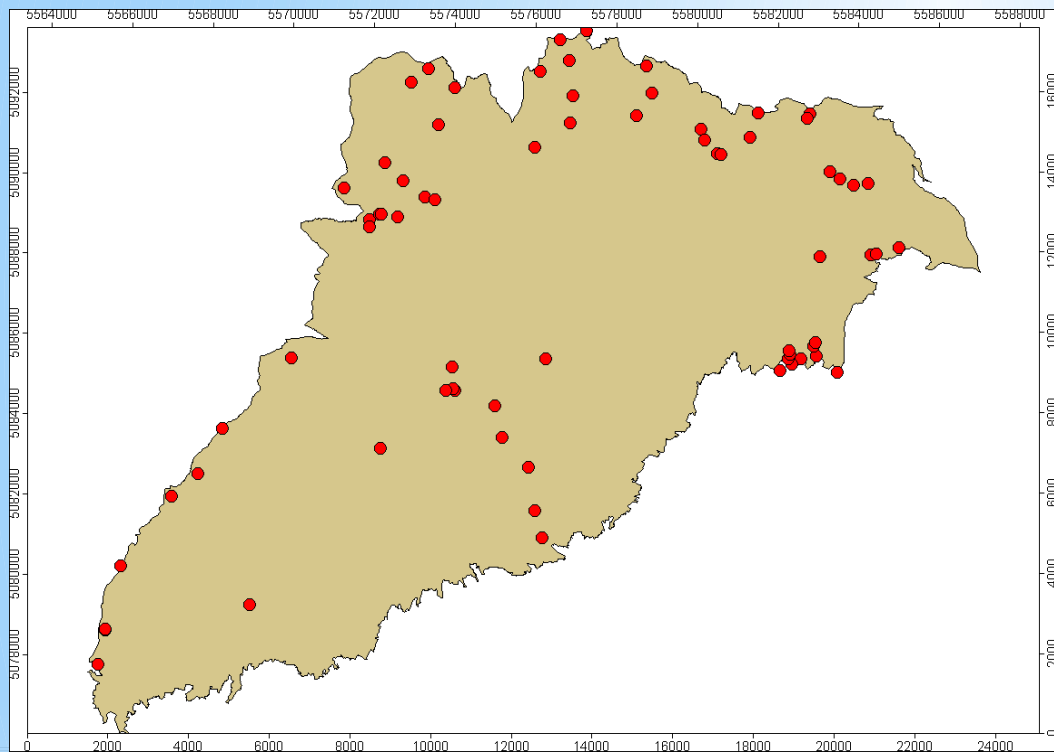
- * *Abutilon theophrasti*
- * *Amaranthus hybridus*
- * *Bidens frondosa*
- * *Conyza bonariensis*
- * *Lepidium virginicum*
- * *Reynoutria x bohémica*
- * *Rudbeckia laciniata*



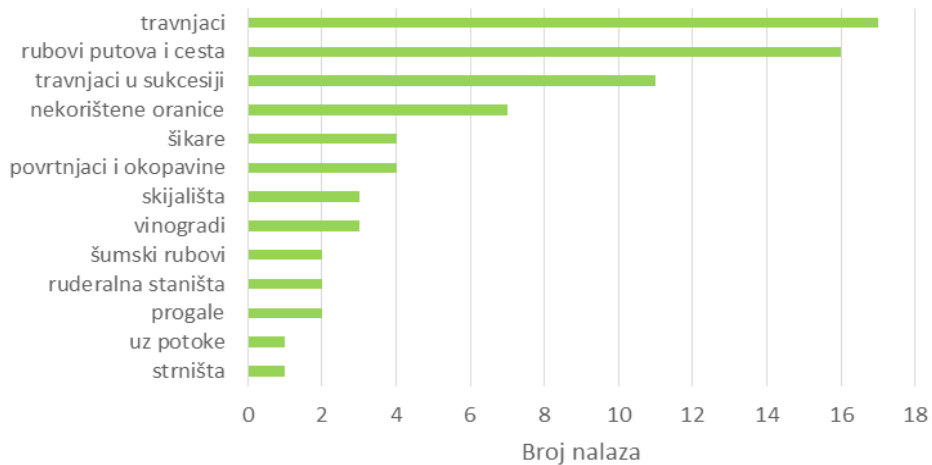
Invasive plant species according to habitat type



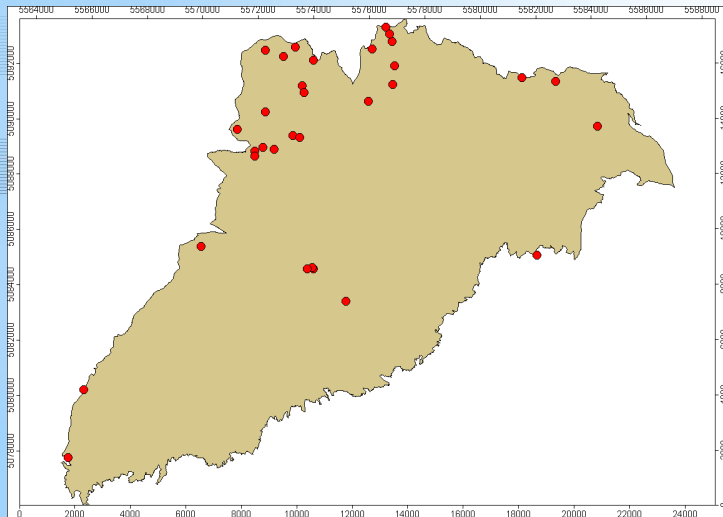
Erigeron annuus (L.) Pers. (Asteraceae)



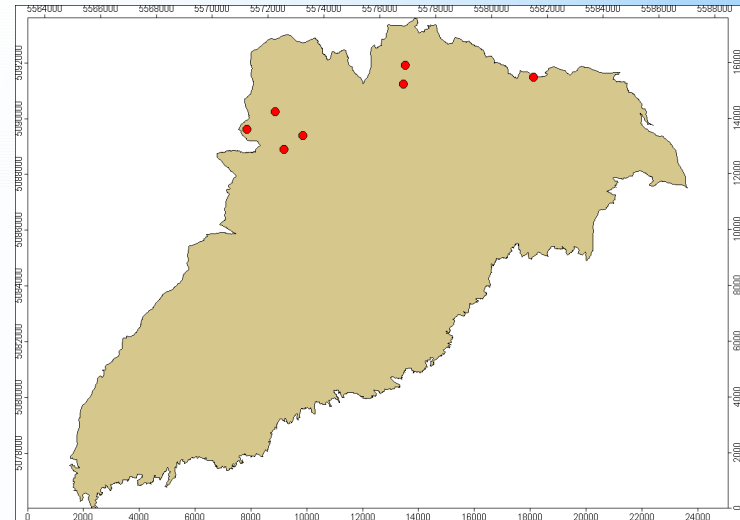
Erigeron annuus



Solidago gigantea Aiton (Asteraceae)



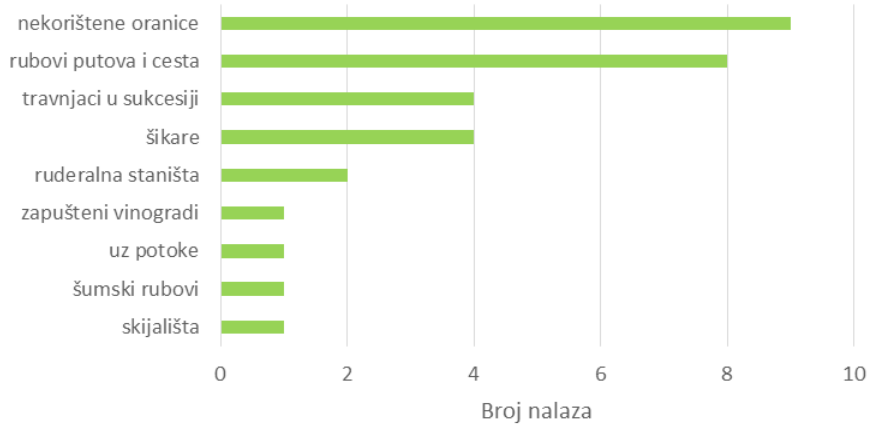
Solidago canadensis L. (Asteraceae)



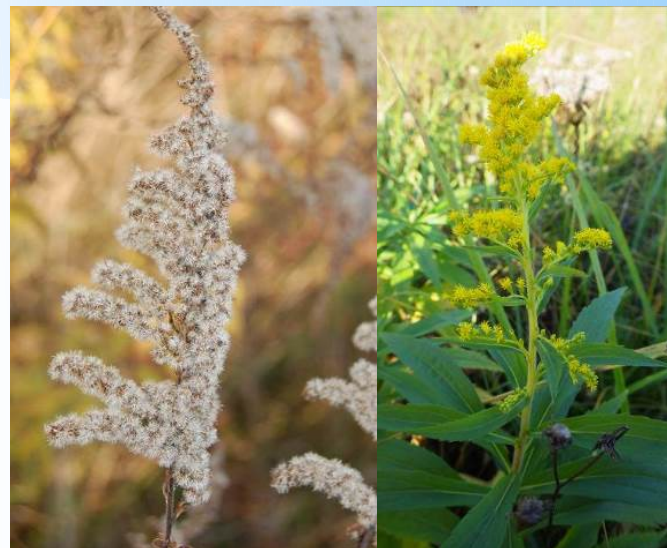
Solidago gigantea Aiton (Asteraceae)



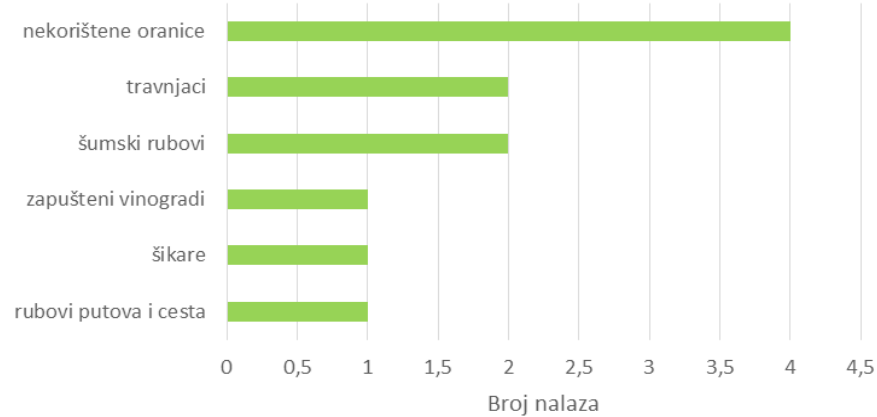
Solidago gigantea



Solidago canadensis L. (Asteraceae)

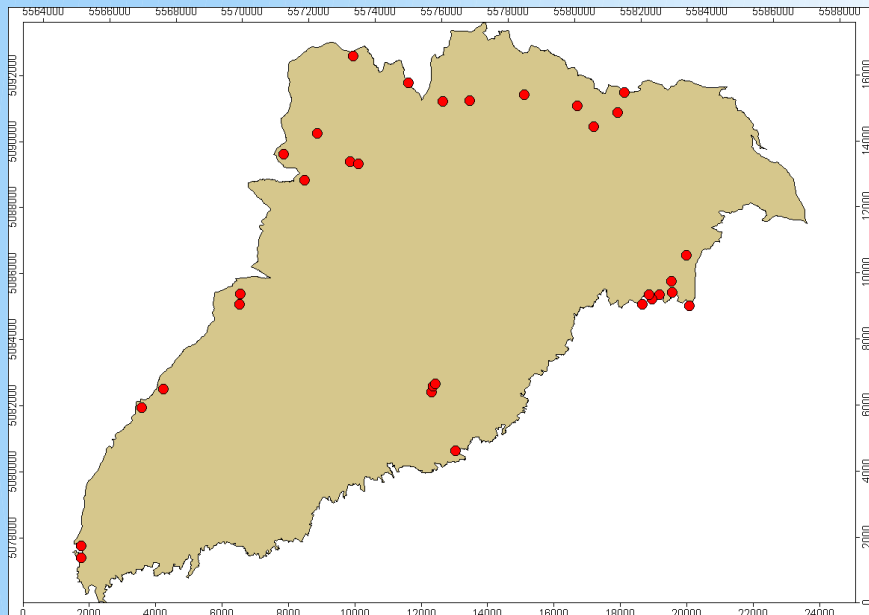


Solidago canadensis

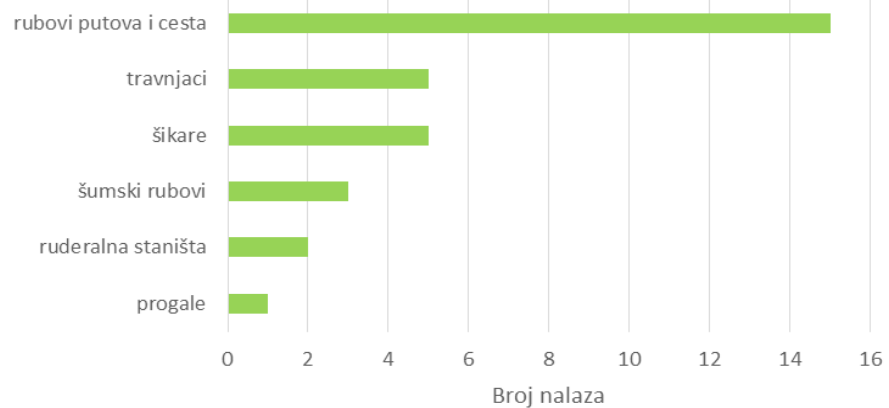




Robinia pseudoacacia L. (Fabaceae)



Robinia pseudoacacia



Every cutting gives opportunity for expansion of invasive plant species





Species *Robinia pseudoacacia* and *Ailanthus altissima*:

- after regular cutting or after wind storm devastation these species expand very fast
- species of light and fast growth



Both species have extra fast growth during their first few years





Main forestry measure:

📄 several cutting of young plants during 3-5 years

Conclusions

- * In the study area Nature Park Medvednica invasive plants (so far) are not a serious threat
- * The need for management of some types still exist, especially at the sites in succession:
 - * abandoned arable land
 - * meadows in succession
- * Recommendation:
 - * restore the culture of abandoned arable land and to mow meadows
 - * maintain the edges of roads and paths

What have we done until now ?

- 📁 monitoring of invasive plants during regular field supervision
- 📁 communication with forest experts from Croatian forests l.t.d.
- 📁 planing activities for management of agresive invasive plants
- 📁 learning more about ecology and the best measures for removal of invasive plants (workshops, seminars)
- 📁 education for visitors, local people and stakeholders about these issue and problems
- 📁 educational material on invasive plant species in NP Medvednica:
 - broshure for visitors out in May 2016 (main target group children)
 - internal manual for determination of invasive plants in NPM



Thank you for Your attention!

Public Institution "Nature Park
Medvednica"

Bliznec 70, Zagreb

Tel: 01 4586 317

Fax: 01 4586 318

info@pp-medvednica.hr

www.pp-medvednica.hr