HUSZPO HRVATSKA UDRUGA STRUČNJAKA ZAŠTITE PRIRODE I OKOLIŠA

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USING SENSITIVITY MAPPING TO PRIORITISE FIELD RESEARCH

KORIŠTENJE KARTIRANJA OSJETLJIVOSTI U SVRHU PRIORITIZACIJE TERENSKOG ISTRAŽIVANJA

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Introduction

Uvod

PROBLEM:
How to comprehensively assess the environmental impact of large-scale infrastructure?

Photo source: Georg Slickers, Wikimedia commons

Introduction

Uvod

PROBLEM:
How to comprehensively assess the environmental impact of large-scale infrastructure?

POSSIBLE SOLUTION:
Random sampling - does not work well for extremely rare events (e.g. electrocution of a specific species)

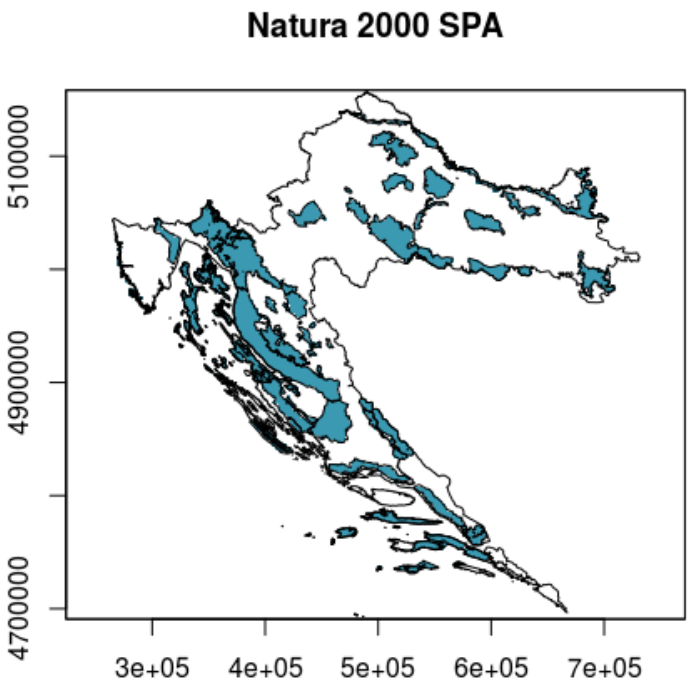
Case study

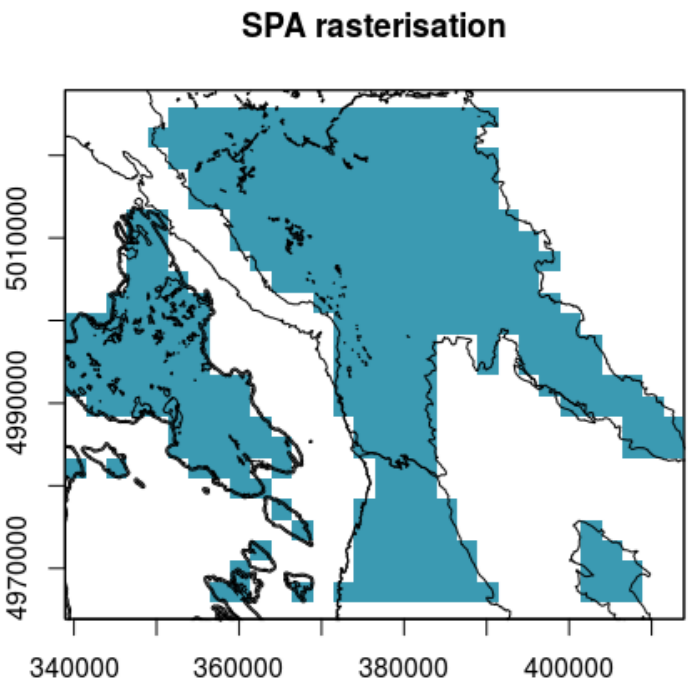
Studija slučaja

- HEP ODS d.o.o. - Electrical energy distribution system operator
- Medium voltage powerlines (10-35 kV)
- > 135,000 km of powerlines operated by HEP ODS
- Most significant natural impact: **Electrocution**
- Assignment: **Identify critical areas for bird electrocution**
- Geographic scope: Dalmatia, Kvarner, Primorje, Lika; Natura 2000 SPAs
- Target species: designated as at risk of electrocution (17 species total, 12 of which were included in the study)

Methods - Rasterisation of SPA polygons

Metode - Rasterizacija SPA poligona

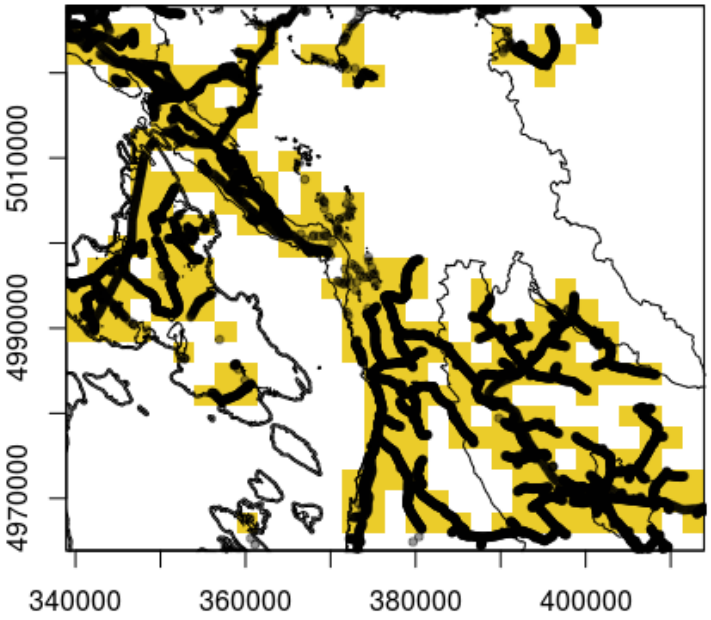




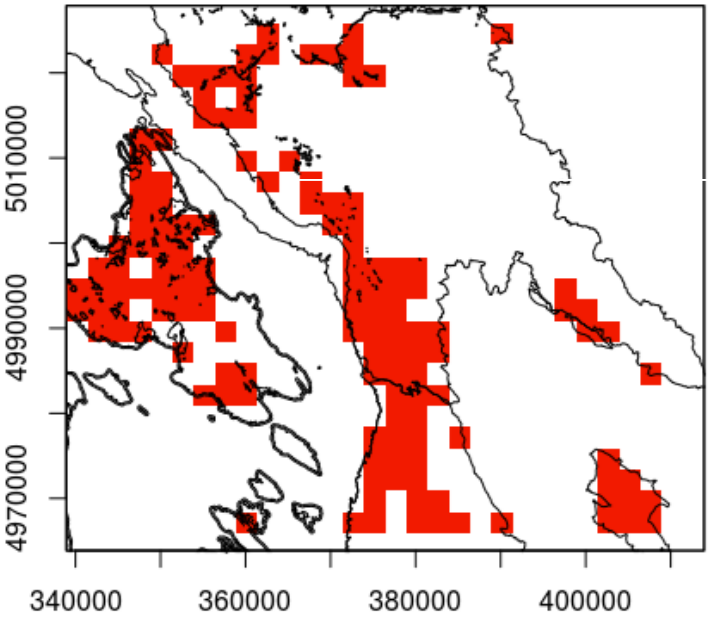
Methods - Rasterisation of infrastructure (Medium-voltage distribution network)

Metode - Rasterizacija podloge s infrastrukturom (SN distribucijska mreža)

Medium-voltage network rasterisation



Final area selection

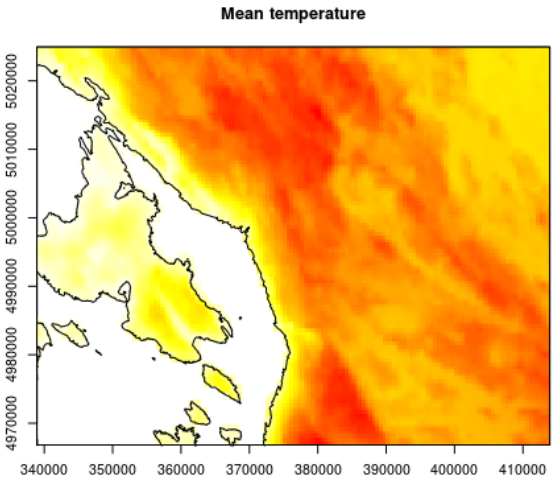


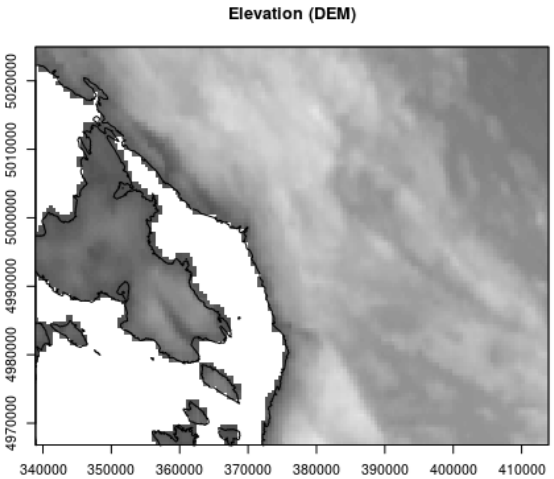
Methods - Species distribution modeling

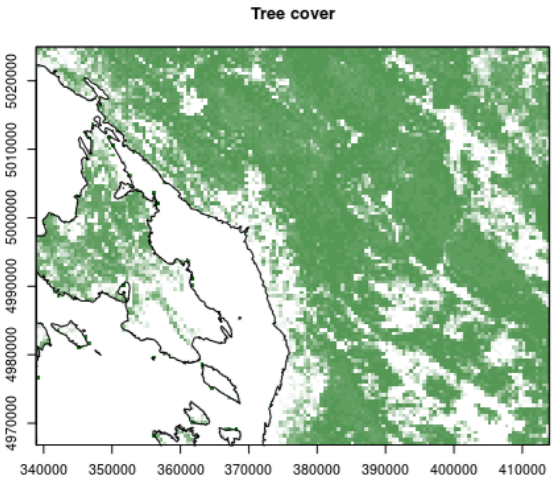
Metode - Modeliranje rasprostranjenosti vrsta

Input data:

- Point observations (BIOM archive, HAOP archive)
- Point locations for *Gyps fulvus* nesting sites (Sušić, 2013.)
- BIOCLIM climate variables (500 m rasters)
- Digital Elevation Model (500 m raster)
- Tree cover rasters (Tuanmu et al. 2014.)
- Wetland and freshwater rasters





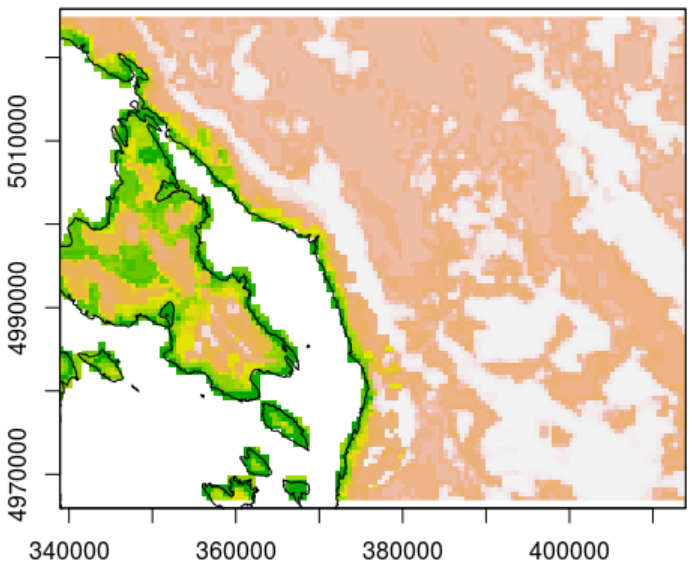


Methods - Species distribution modeling

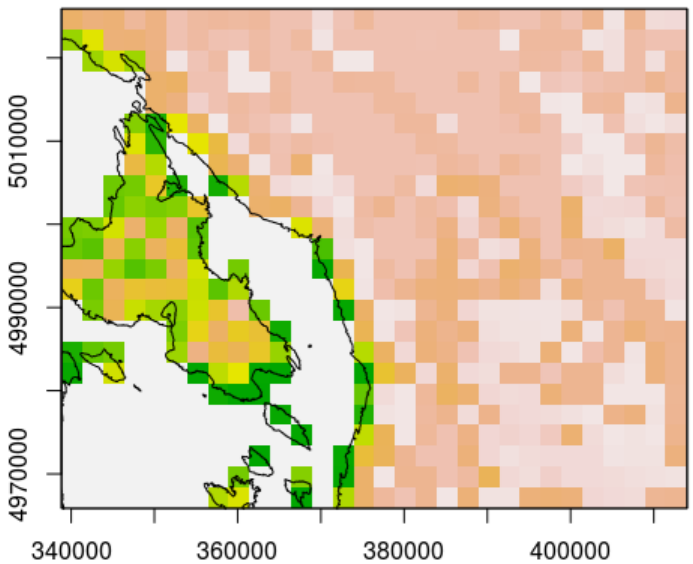
Metode - Modeliranje rasprostranjenosti vrsta

Pseudoabsence generation: MaxEnt
Method: Random Forest - tradeoff between predictive and interpretive power
Model output: habitat use prediction: *Gyps fulvus*

500 m resolution



2500 m resolution



Methods - Sensitivity mapping

Metode - Kartiranje osjetljivosti

$$\sum_{i=1}^{12} \left(\rho_i \times R_i \times Csi_i \right)$$

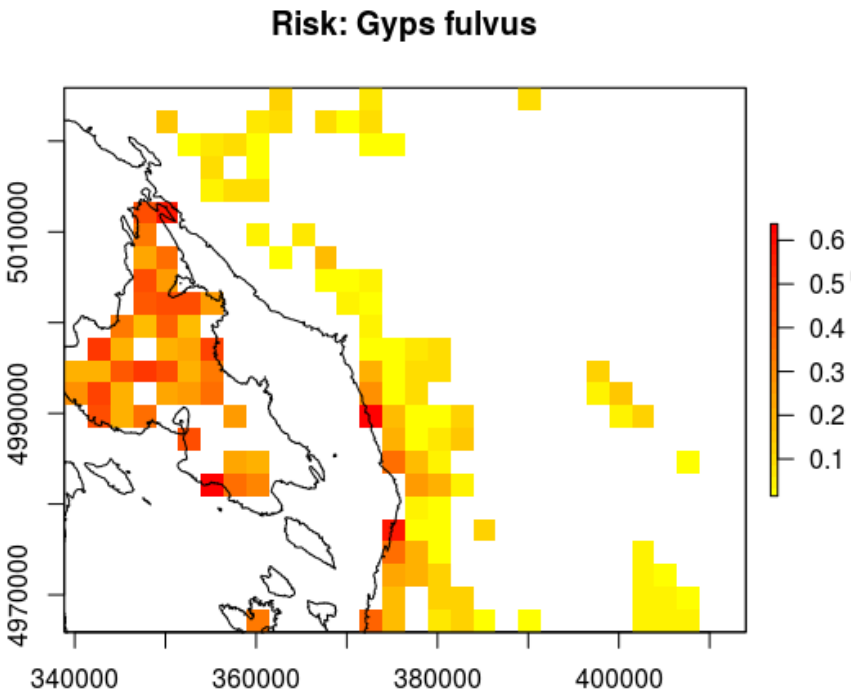
ρ_i → Habitat use prediction (model output) for a given species (*i*)

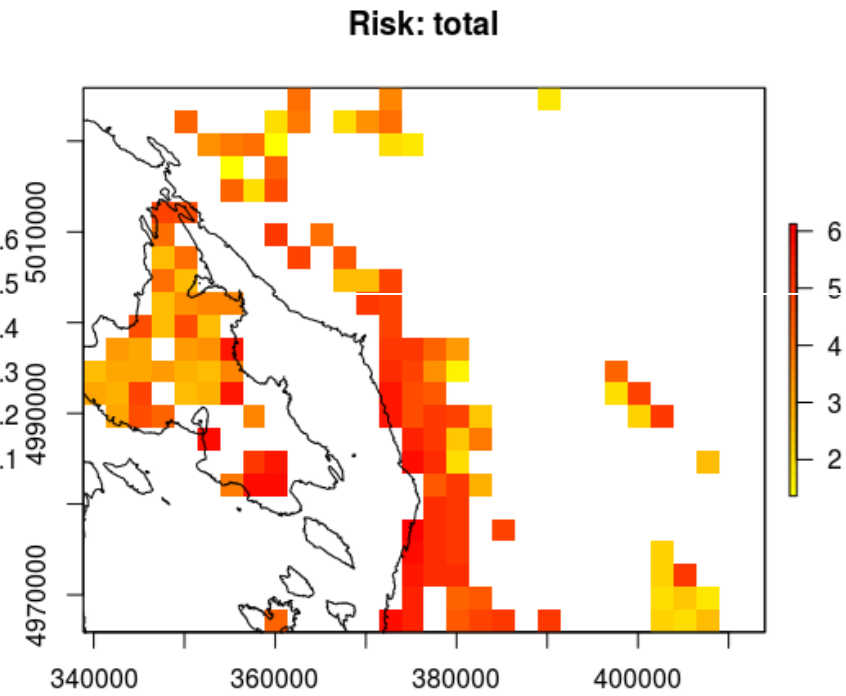
R_i → Relative risk factor for a given species (*i*)

Csi_i → Regional IUCN status for a given species (*i*)

Results - Spatial risk estimate

Rezultati - Prostorna procjena rizika





$$\rho_i \times R_i \times Csi_i$$

$$\sum_{i=1}^{12} (\rho_i \times R_i \times Csi_i)$$

Results - Priority grid cell selection

Rezultati - Odabir prioritetnih područja

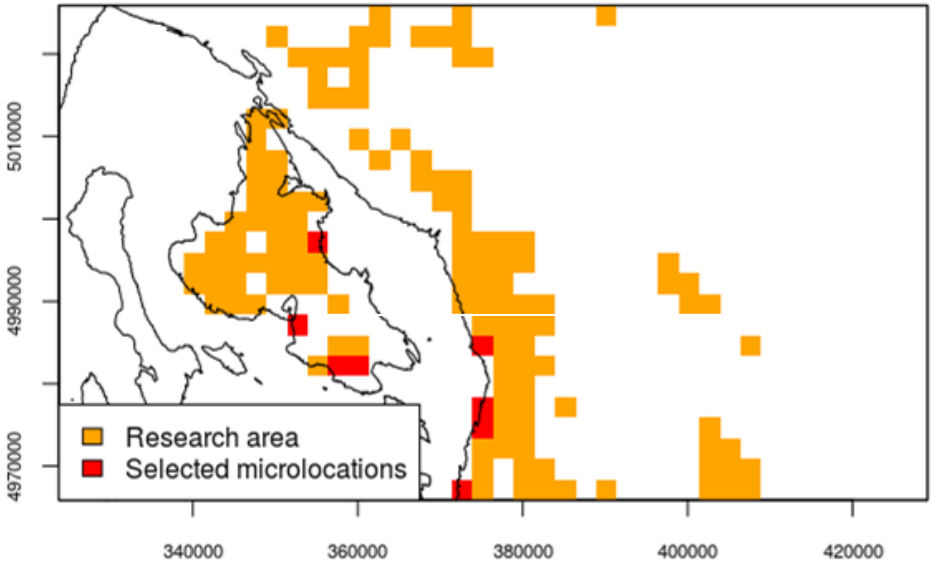
Conclusions:

PRO:

- Computationally simple and easy to interpret
- Results are objective, transparent and replicable
- Scale can be adjusted according to needs of specific study
- Software is completely free to use (even for commercial purposes)

CON:

- Moderately data-intensive (depending on study question)



Thank you for your attention!

Hvala na pažnji!