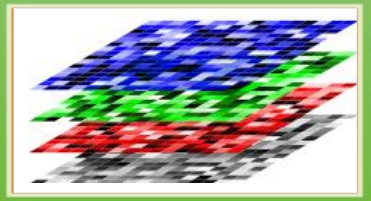
Federal Agency for Nature Conservation

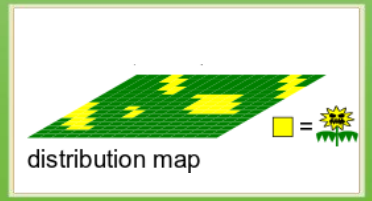
Monitoring the spread of invasive plant species in Germany

How many species can we possibly detect by remote sensing and what data do we need?

Sandra Skowronek

German Federal Agency for Nature Conservation



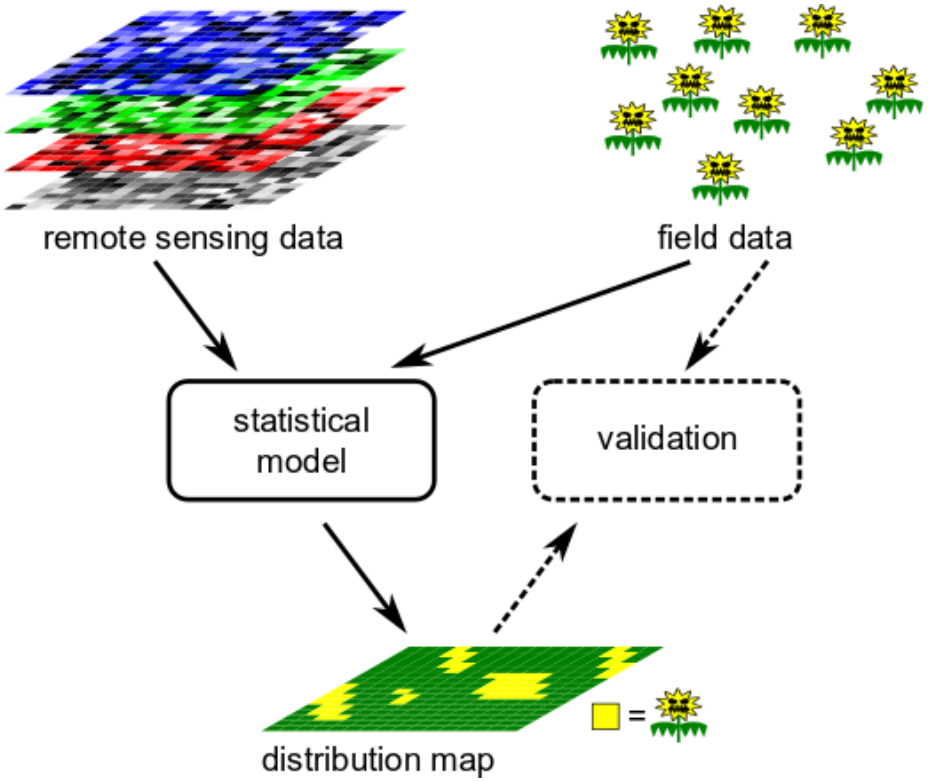


Motivation

Need for better knowledge of the distribution of invasive plants (as required by EU legislation)

- How many invasive plant species can we potentially map?
- Cost-efficiency of the data and methods?

Basics


remote sensing data
field data
statistical model
validation
=
distribution map

Methods

1. **Literature scan**
   - Previous studies
   - Success
   - Data used

2. **Evaluation of potential detectability**
   - Size
   - Characteristic properties
   - Below canopy / below water
   - Similar native species

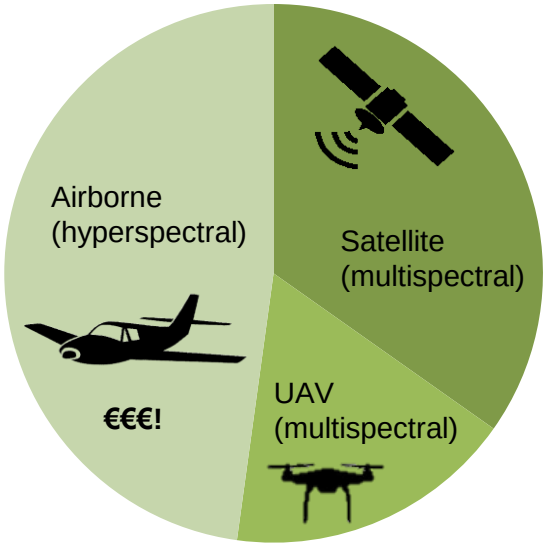
1. Literature scan

Invasive plants present in Germany:

17 out of 42 species mapped

Globally:

> 55 species mapped



2. Examples

Rosa rugosa

Lysichiton americanus

Federal Agency for Nature Conservation

Potentially not detectable

Populus x canadensis
Cynodon dactylon
Epilobium ciliatum
Galeobdolon argentatum
Lysichiton americanus
Phedimus spurius
Cabomba caroliniana
Crassula helmsii
Elodea canadensis
Elodea nuttallii
Hydrocotyle ranunculoides
Lagarosiphon major
Ludwigia x kentiana

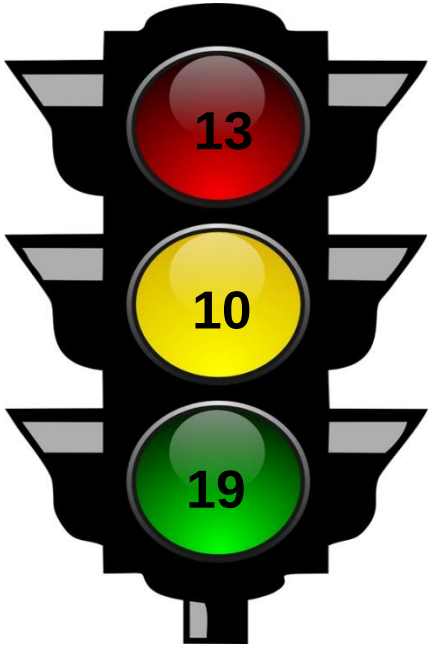
Maybe detectayble, maybe not

Fraxinus pennsylvanica
Rhododendron ponticum
Syringa vulgaris
Lupinus polyphyllus
Sarracenia purpurea
Symphyotrichum lanceolatum
Symphyotrichum novi-belgii
Ludwigia grandiflora
Myriophyllum aquaticum
Myriophyllum heterophyllum

Potentially detectable

Acer negundo
Ailanthus altissima
Asclepias syriaca
Pinus strobus
Prunus serotina
Quercus rubra
Robinia pseudoacacia
Rosa rugosa
Fallopia x bohemica,
F. japonica & F. sachalinensis
Heracleum mantegazzianum
Impatiens glandulifera
Solidago canadensis &
S. gigantea
Spartina anglica
Azolla filiculoides
Eichhornia crassipes

Evaluation of potential detectability



Most subcanopy and submerged species

Species smaller, less characteristic or somewhat similar to native species

Most trees and shrubs, half of the grasses and herbs

What did we learn?

Yes, we could potentially use remote sensing for mapping a good part of the relevant invasive plants in Germany

What is needed to regularly use remote sensing for monitoring invasive plants?

- more species-specific knowledge

- more user-friendly, efficient repeatable workflows and transferable models

- proof of feasibility of a large scale mapping using low cost data

Federal Agency for Nature Conservation

Co-authors:
Stefanie Stenzel & Hannes Feilhauer

Thanks for your attention!

Contact:

Sandra.Skowronek@BfN.de