Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Citizen Science Data for temporal species projection

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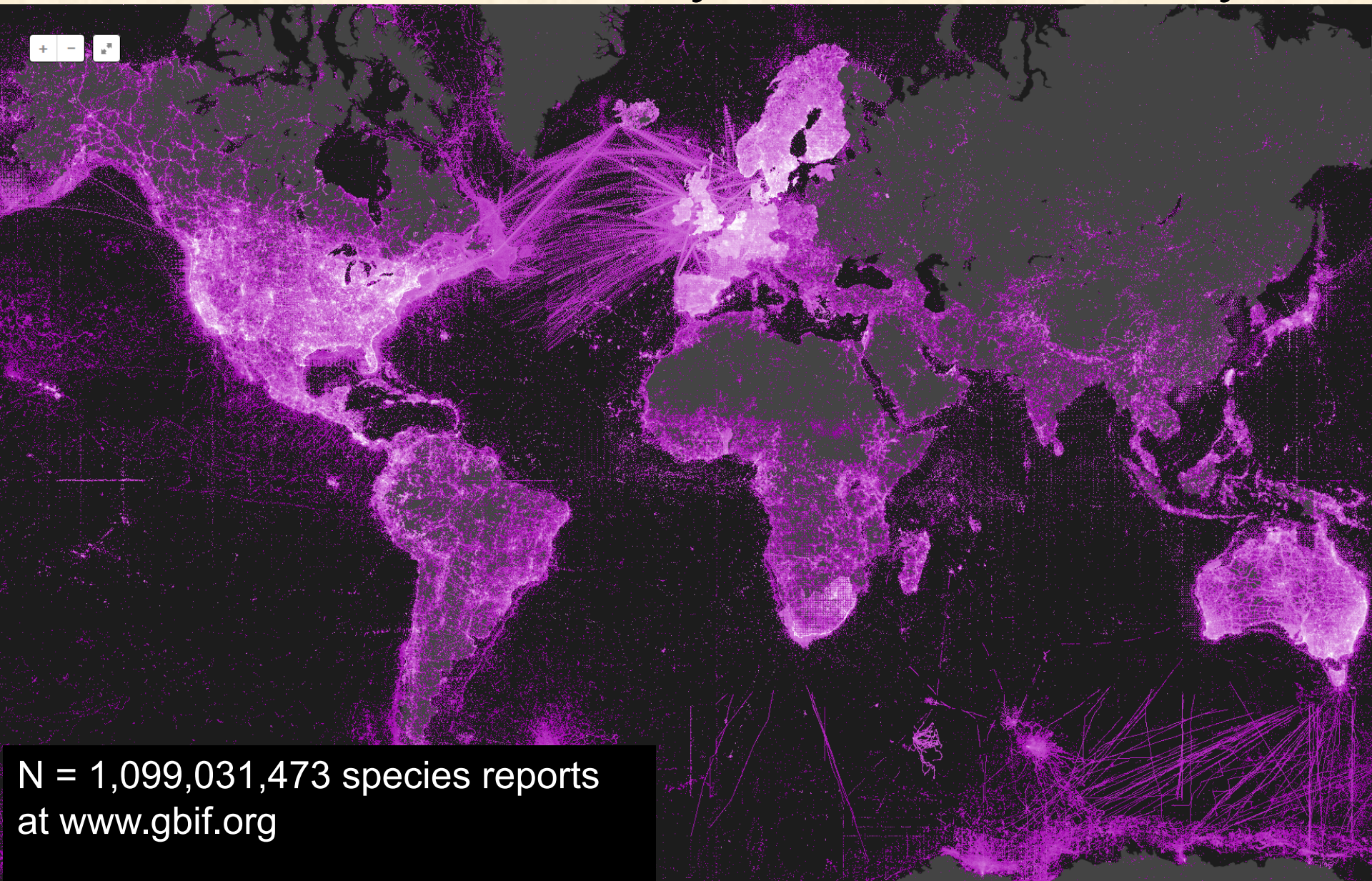
Helen Moor

Citizen Science Data at the Global Biodiversity Information Facility



General question & approach

Are CSD a reliable basis to

- project the future development or map the distribution of species given scenarios of land-use or climate change?

Approach:
Conduct temporal projections or map distributions using models based on CSD vs. models based on systematically collected data

–> do they lead to different conclusions about future species abundance?

Citizen Science Data features

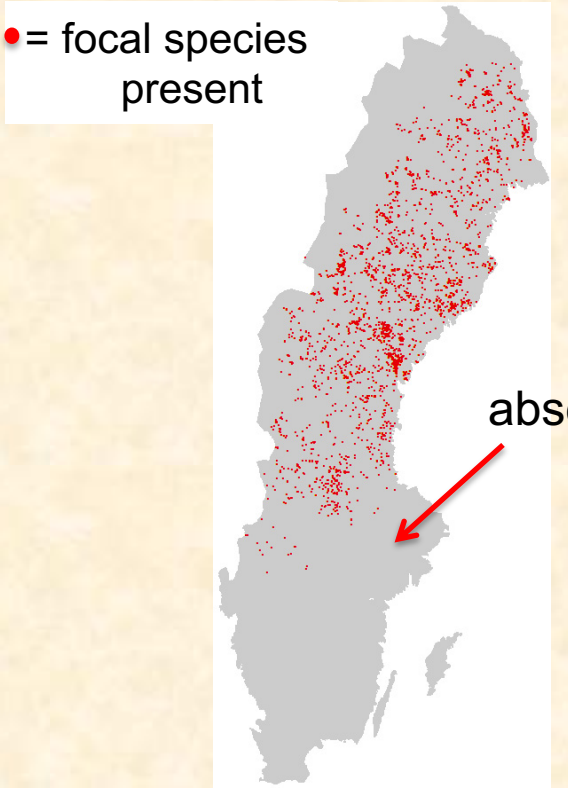
The reporting frequency varies non-randomly

- through time
- across space
- between habitats

Typically reports of species presences;

-> few reports of species absences

P. ferrugineufuscus

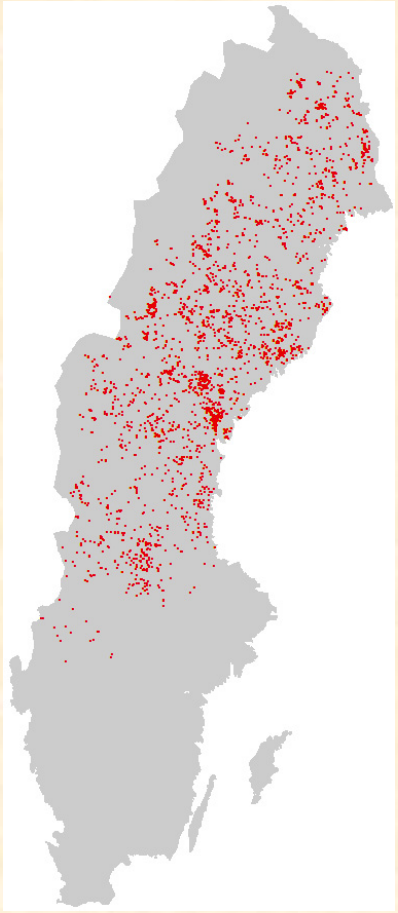


Yoccoz et al. (2001), Graham et al. (2004), Kery et al. (2010), Snäll et al. (2011, 2014)

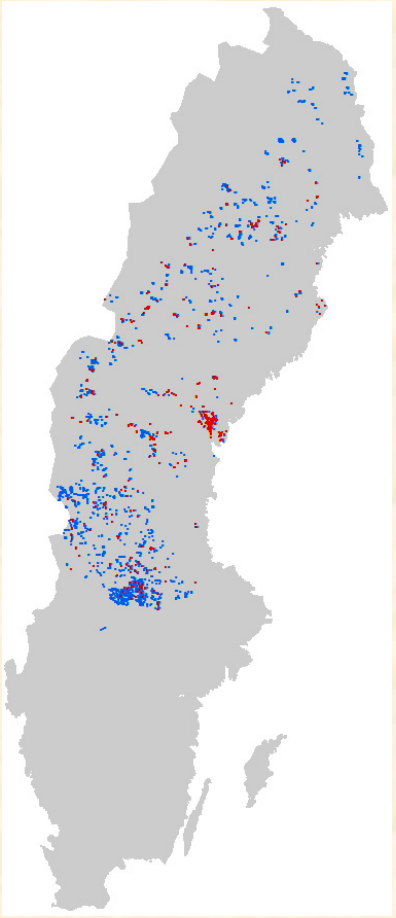
Four alternative CSD response variables

• = focal species present

Presence Only

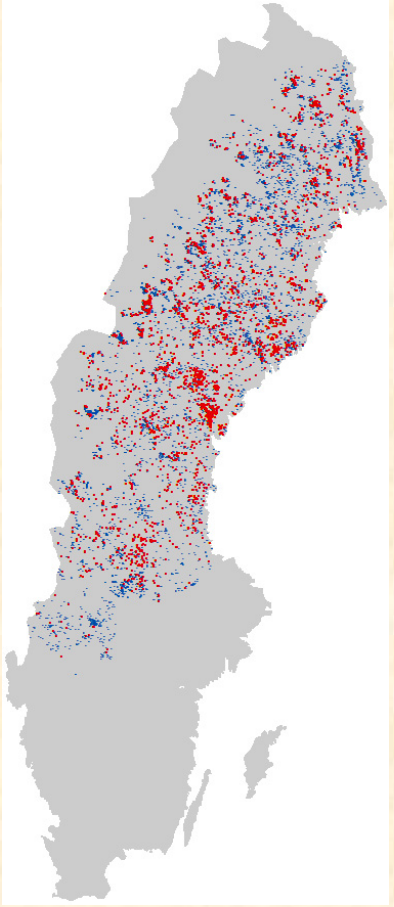


Presence/Absence



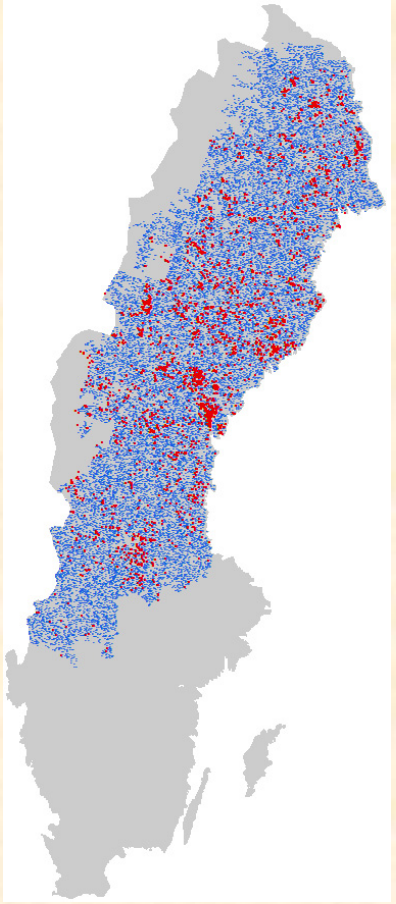
Elith et al. (2006)

Presence/ Spp Background



Phillips & Dudik (2008)

Presence/Random Backgr.

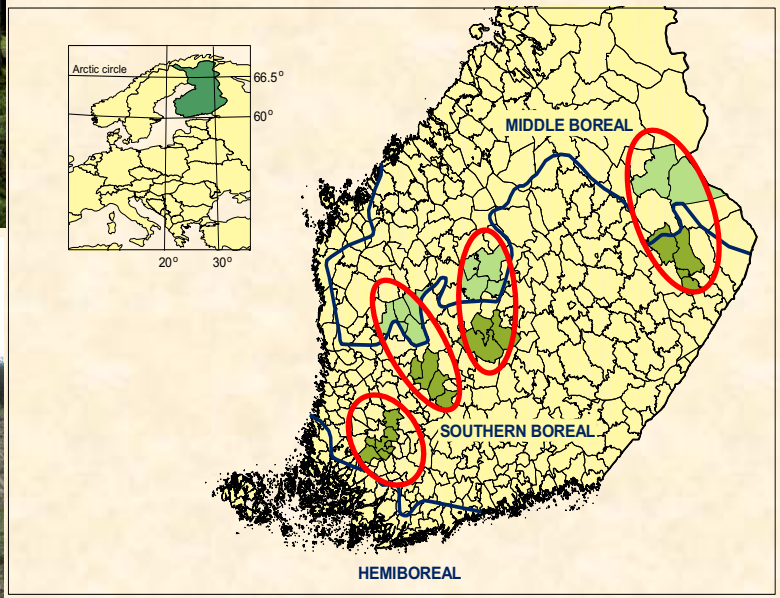


Phillips & Dudik (2008)

Fithian et al. (2015)

Research data from repeated surveys of (dead) wood and polypore species

Jenni Nordén & Juha Siitonen, around 2004:



Recorded variables for
- stand conditions,
- dead wood
- many fungal species

at almost 400 sites

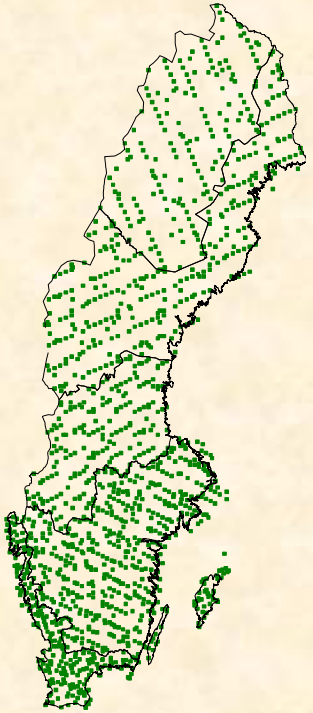
- we have re-surveyed 278 of the sites

Norden et al. JEcol 101: 701- (2013)

Swedish national Forestry Scenario Analysis (FSA)

- Conducted since the 1930'ies; currently every 5th-10th year
- The last one in 2015
- Swedish Forest Agency responsible; formulates scenarios
- SLU performs the projection work using heureka!

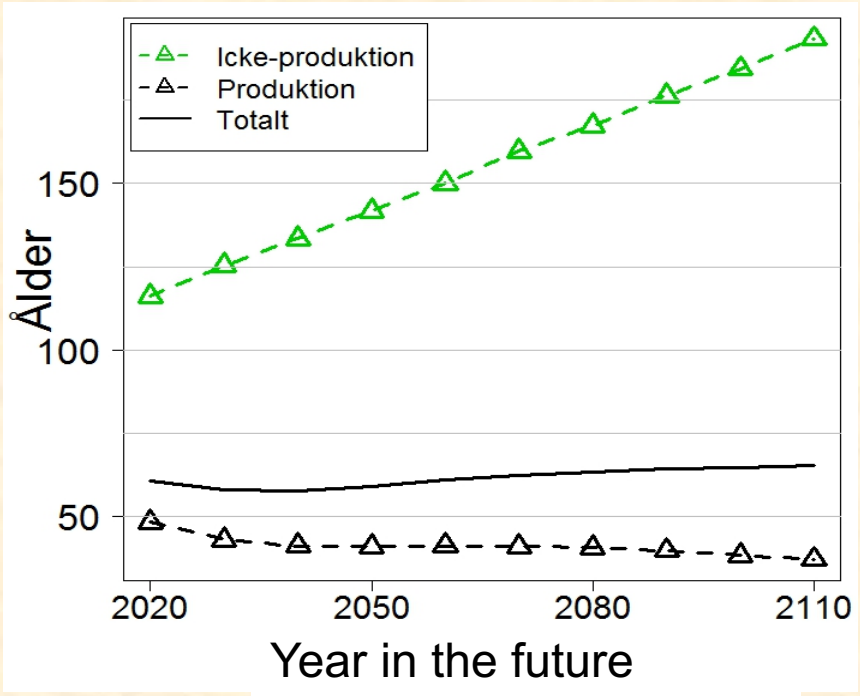
- FSA approach: project future forestry and forest dynamics on the national forest inventory (NFI) plots



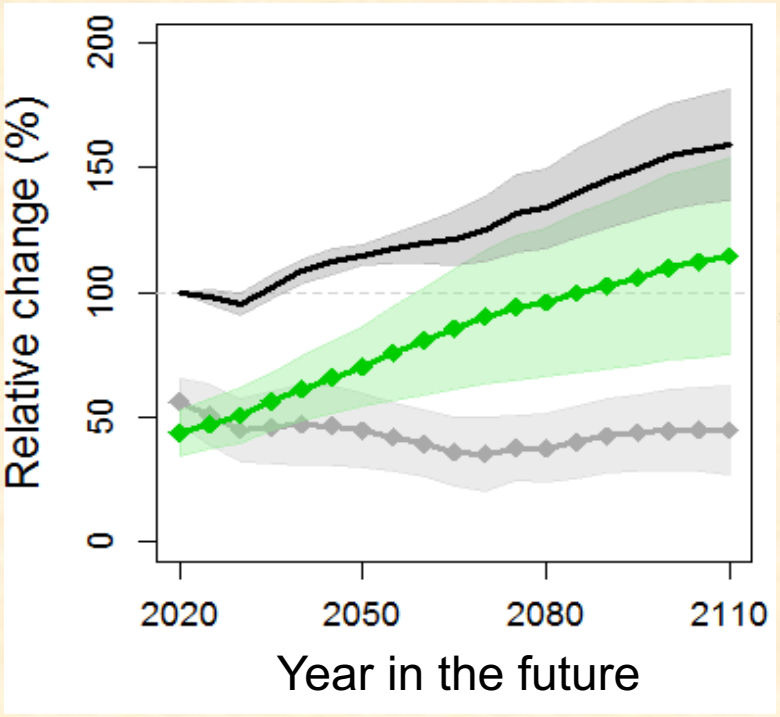
Location of 1/5 of the >30.000 NFI plots

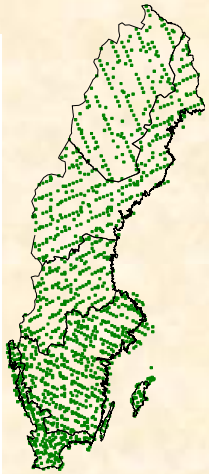
Forest and fungus projected

Forest age



Model based on CSD



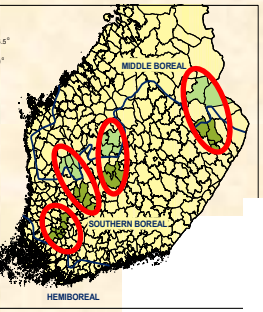


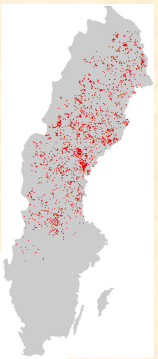
Non-production (voluntary set-asides, reserves)

Production forestry

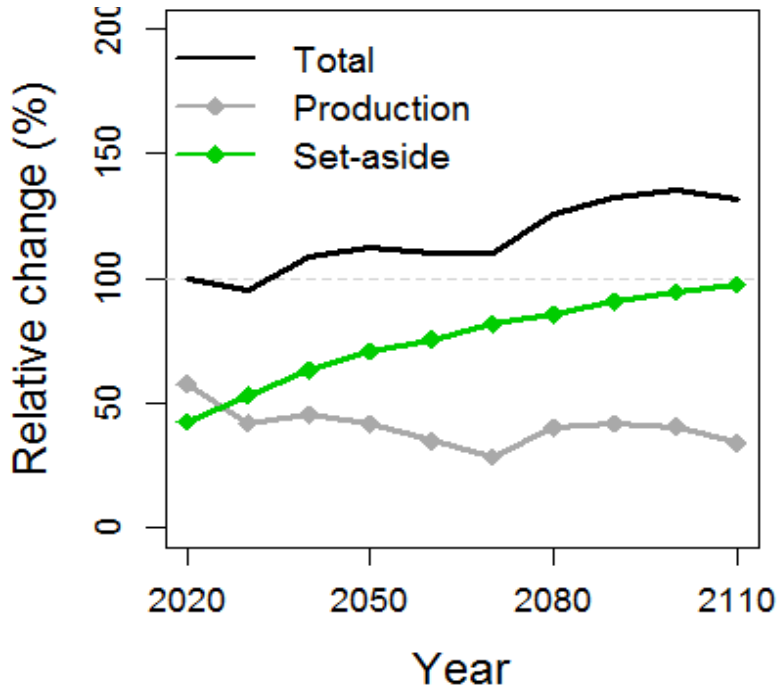
Totally

Projections, systematic data vs. CSD

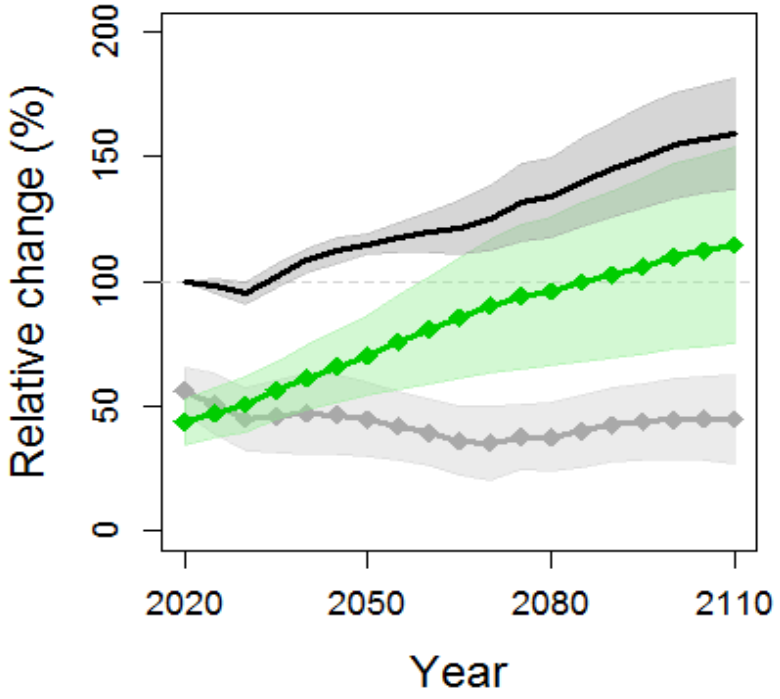




Model based on data from Finnish permanent plots

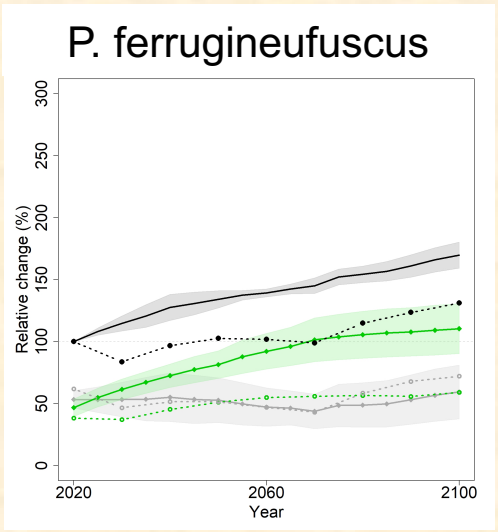


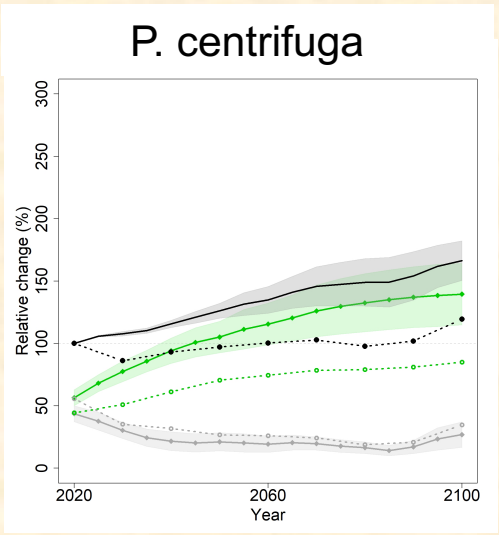
Model based on CSD

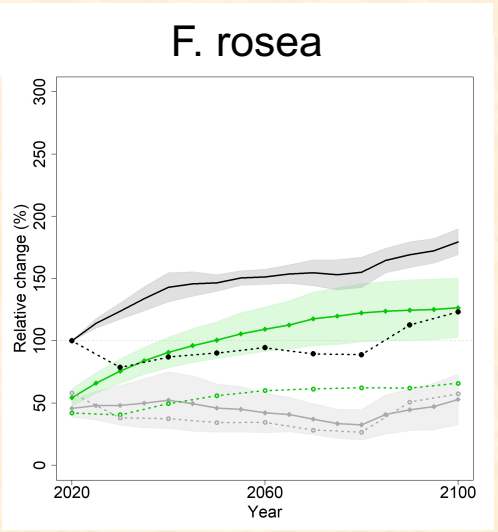


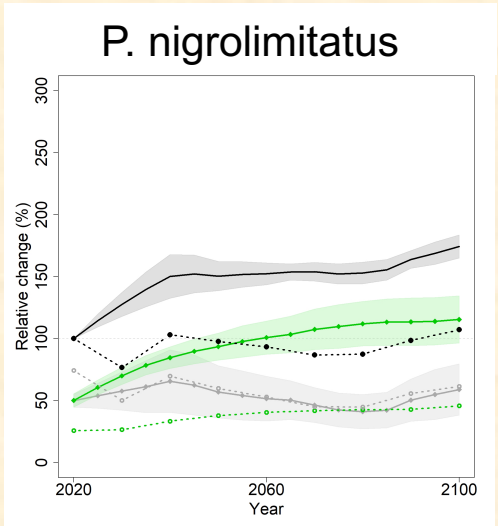
Mair et al., Ecol & Evol, 2017

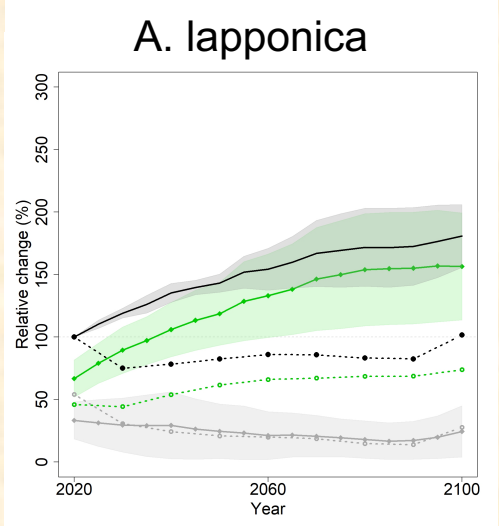
Additional comparisons, CSD vs. systematic

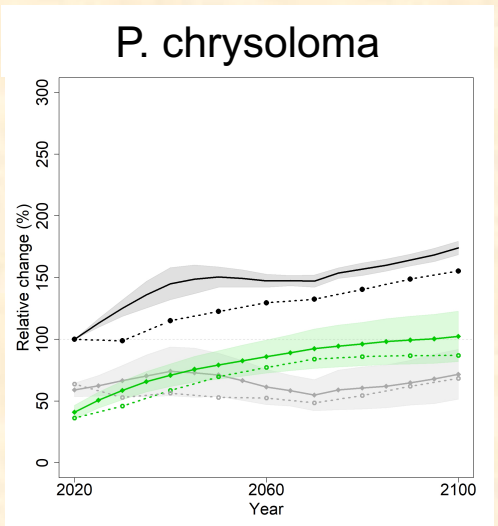


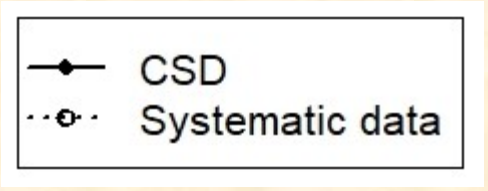


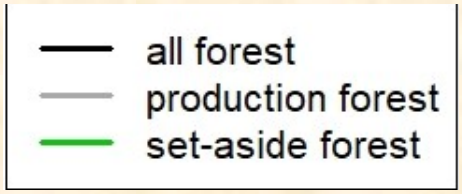




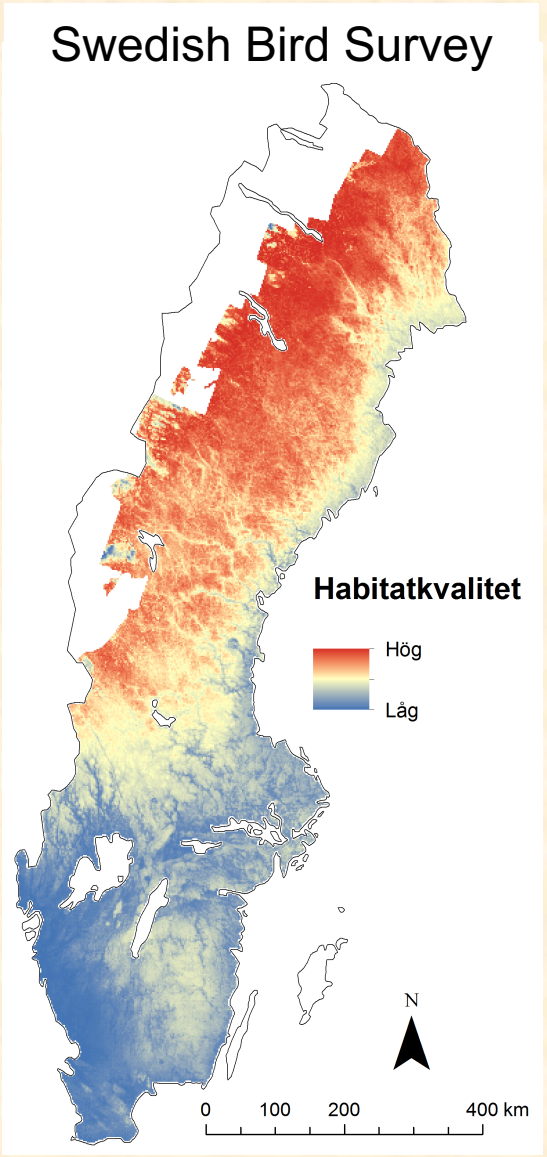








Predicted distribution, Siberian jay



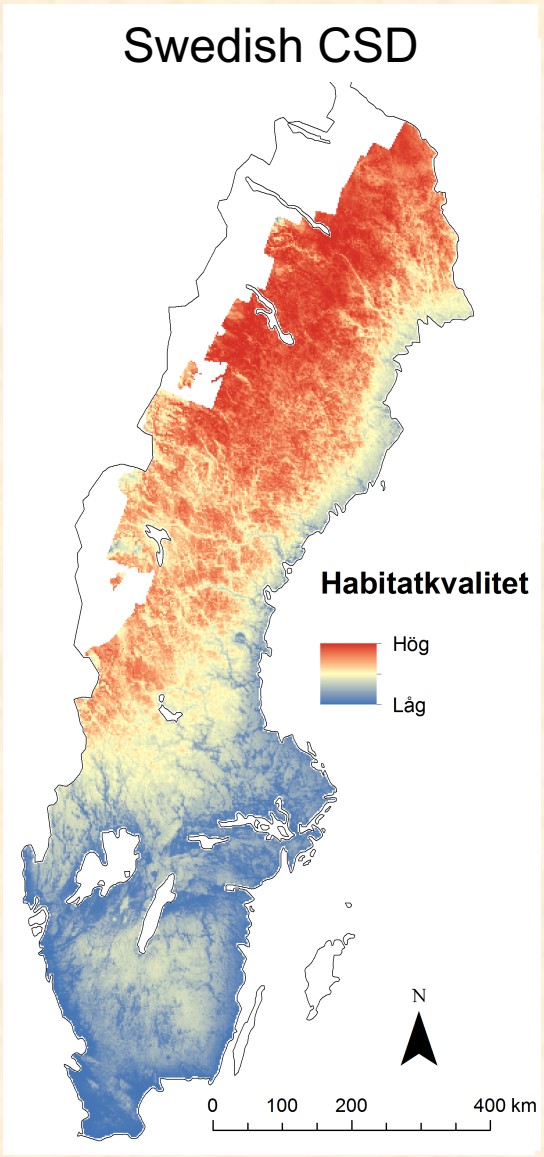


Foto: T. Jågas

Correlation between the maps: 0.95

Ute Bradter

Bradter et al., MEE, 2018

Conclusions

- Large Citizen Science Datasets on species occurrence exist

- CSD do not represent a random sample in time, space or among habitats

- Early work suggested small difference in future species abundance between using
  models based on Swedish CSD and
  models based on Finnish colonization-extinction data

- Current understading is that models based on CSD overestimate future species abundance in high-quality habitat such as reserves

- CSD seems a suitable sourse of data for mapping species distribution

- We should continue evaluating CSD for answering basic and applied questions for different organism groups

Thanks for key contributions

Photo: Michael Krikorev

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Louise Mair

Helen Moor

Jenni Nordén

Phil Harrison

Ute Bradter

J. Siitonen

Mari Jönsson

Anders Lundström

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Thanks for your attention