

EBVs, Citizen Science and EU BON tools and modelling approaches

*Mark Chandler, Linda See, Kyle Copas, Astrid M.Z. Bonde,
Bernat Claramunt, Finn Danielsen, Jan Kristoffer
Legind, Siro Masinde, Abraham J. Miller-Rushing, Greg
Newman, Alyssa Rosemartin, Eren Turak*

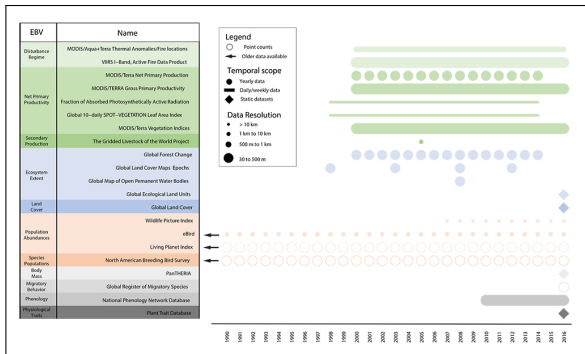
4th European Biodiversity Observation Network (EU BON)
Stakeholder Roundtable

Berlin, 17 November 2016



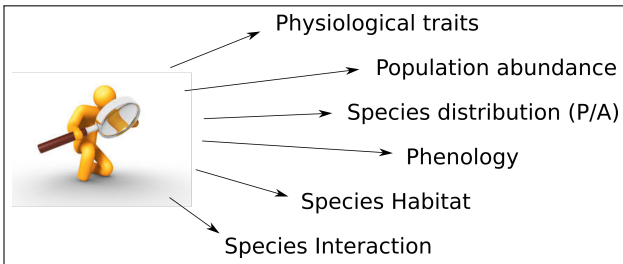
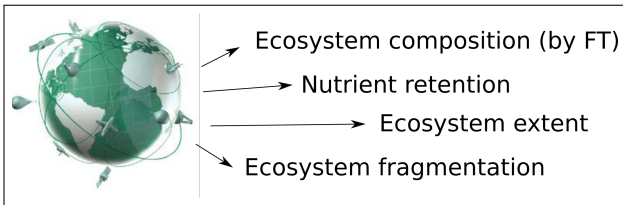
What are the Essential Biodiversity Variables?

EBV are the minimum set of measurements to capture major dimensions of biodiversity change

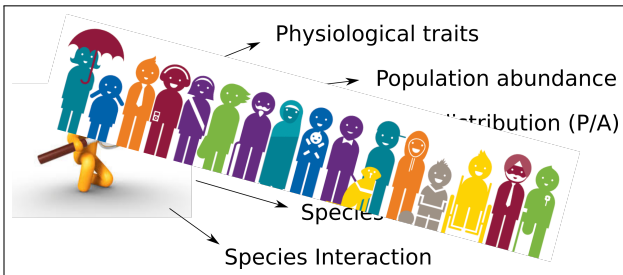
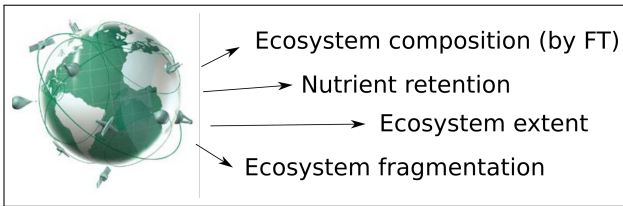


<http://data.geobon.org/>

Where to take data from?



Where to take data from?





Contents lists available at ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/bioc

Contribution of citizen science towards international biodiversity monitoring

Mark Chandler^{a,*}, Linda See^b, Kyle Copas^c, Astrid M.Z. Bonde^d, Bernat Claramunt López^{e,f}, Finn Danielsen^d, Jan Kristoffer Legind^c, Siro Masinde^c, Abraham J. Miller-Rushing^g, Greg Newman^h, Alyssa Rosemartinⁱ, Eren Turak^{j,k}

^a Earthwatch Institute, 114 Western Avenue, Boston, MA 02143, USA

^b International Institute for Applied Systems Analysis (IIASA), Schlossplatz 1, A-2361 Laxenburg, Austria

^c Global Biodiversity Information Facility (GBIF), Universitetsparken 15, 2100 Copenhagen Ø, Denmark

^d Nordic Foundation for Development and Ecology (NORDECO), Skindergade 23, 3rd floor, DK-1159 Copenhagen K, Denmark

^e CREAF, Universitat Autònoma de Barcelona, 08193, Bellaterra, Barcelona, Spain

^f Ecology Unit, Department of Animal Biology, Plant Biology and Ecology, Universitat Autònoma de Barcelona, 08193, Bellaterra, Barcelona, Spain

^g National Park Service, Acadia National Park, Bar Harbor, ME 04609, USA

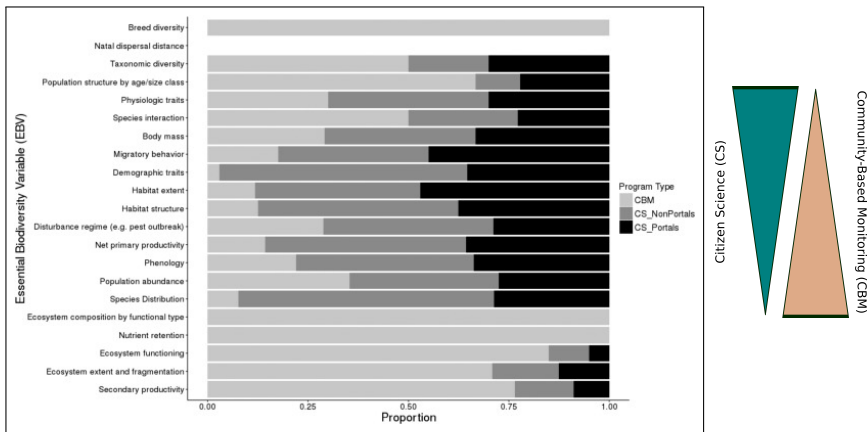
^h Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO 80523-1499, USA

ⁱ USA National Phenology Network, National Coordinating Office, Tucson AZ, School of Natural Resources and the Environment, University of Arizona, Tucson, AZ, USA

^j NSW Office of Environment and Heritage, PO Box A290, Sydney South, NSW 1232, Australia

^k Australian Museum, 6 College St Sydney, NSW 2000, Australia

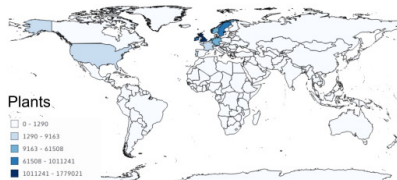
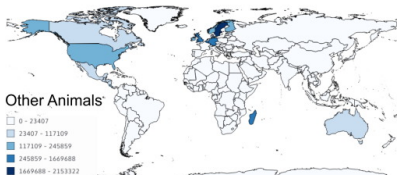
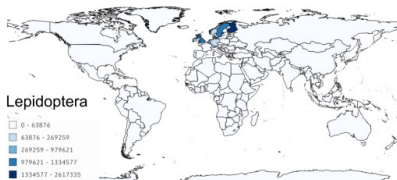
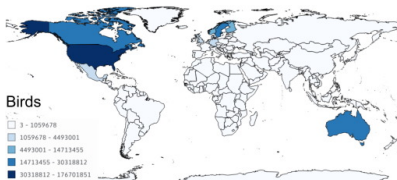
Citizen Science and Community-Based Monitoring



Distribution of citizen science (CS) and community-based monitoring (CBM) programs by Essential Biodiversity Variable.

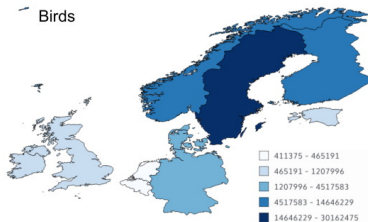
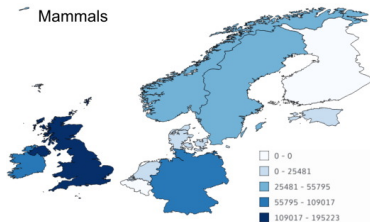
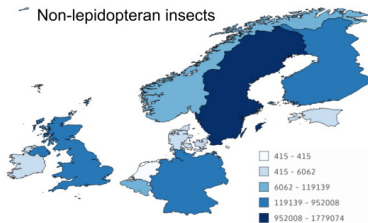
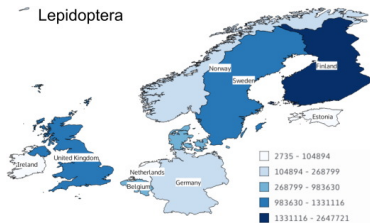
Spatial and taxonomic heterogeneity

...in the world

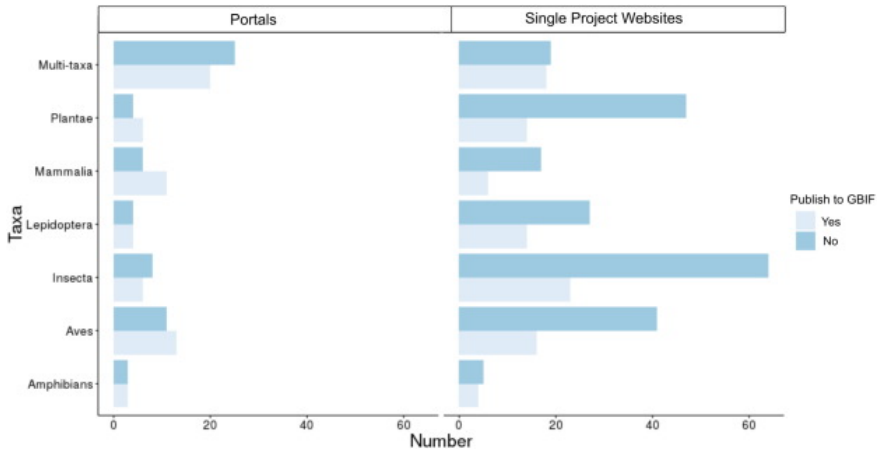


Spatial and taxonomic heterogeneity

...and in Europe



Data availability, the 2nd problem

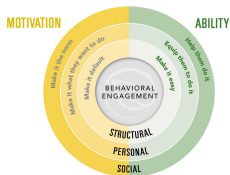
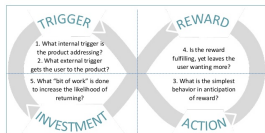


Solutions

Solution 1. Learning from successful experiences

1. Expand data fields of already successful platforms
2. Provide tools for non experts (specially for communities without resources or infrastructure)
3. Invest in CBM programs (species interactions, secondary production, population structure...)
4. Use strategies for community engagement

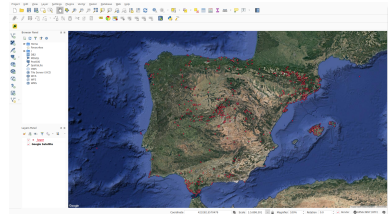
The HOOK Canvas



Solutions

Solution 2. Making more of existing strenghts in data coverage

1. Work on building networked portals, connect databases, make common taxonomies...
2. Include the development of tools and networks to build capacity both for individuals and institutions



Remote Sensing and EBV

Coverage of EBVs by citizen science/CBM

	Well covered	Some examples at scale	Few examples that share significant amounts of data at scale
High adequacy of RS			Ecosystem composition by functional type, Nutrient retention Ecosystem extent and fragmentation
Medium adequacy of RS	Phenology, Species distribution, Species Abundance	Disturbance regime (e.g. pest outbreak), Net primary and secondary productivity	Habitat structure
No RS products		Demographic traits, Migratory behavior, Species interaction Taxonomic diversity	Physiologic traits, Population structure by age/size class (e.g. trees) Natal dispersal distance, Body mass, Genetic variation

from *O'Connor et al 2015 Remote Sensing in Ecology and Conservation*

EUBON WP3 Modelling Tools

EBV: Habitat and land-cover

HieRanFor

EBV: Species Distribution

LST

downscale

VirtualEcologist

Create-Your-Own-Map

rAquaMaps

Hybrid SDMs

Improved freshwater SDMs

EBV: Taxonomic Diversity

UpScaling

Diversity calculator

Data mining tool

EBV: Habitat extent and fragmentation

Fourier transforms

http://eubon.eu/show/project_10234

Still a lot to do...

Genetic composition

- Co-ancestry
- Allelic diversity
- Population genetic differentiation
- Breed and variety diversity

Community composition

- Taxonomic diversity
- ▶ Species interactions

Ecosystem structure

- ▶ ● Habitat structure
- ● Ecosystem extent and fragmentation
- Ecosystem composition (by FT)

Ecosystem function

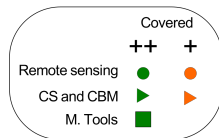
- Net primary productivity
- Secondary productivity
- Nutrient retention
- Disturbance regime

Species populations

- ▶ ● Species distribution (P/A)
- ▶ ● Population abundance
- Population structure by age/size class

Species traits

- ▶ ● Phenology
- Body mass
- Natal dispersal distance
- Migratory behavior
- Demographic traits
- ▶ Physiological traits



EBVs, Citizen Science and EU BON tools and modelling approaches

*Mark Chandler, Linda See, Kyle Copas, Astrid M.Z. Bonde,
Bernat Claramunt, Finn Danielsen, Jan Kristoffer
Legind, Siro Masinde, Abraham J. Miller-Rushing, Greg
Newman, Alyssa Rosemartin, Eren Turak*

4th European Biodiversity Observation Network (EU BON)
Stakeholder Roundtable

Berlin, 17 November 2016

