Proteus Partners Annual Meeting 2014

Hosted by BP at Jesus College, Cambridge 13th-14th May

The billion dollar leap of faith: do biodiversity offsets work?

Joe Bull

Director, Wild Business

UNEP WCMC

proteus

A billion dollar leap of faith: do biodiversity offsets work?

Joseph W Bull

Overview

- Introduction
- What are biodiversity offsets
- What people are saying
- What is happening on the ground
- Conclusions

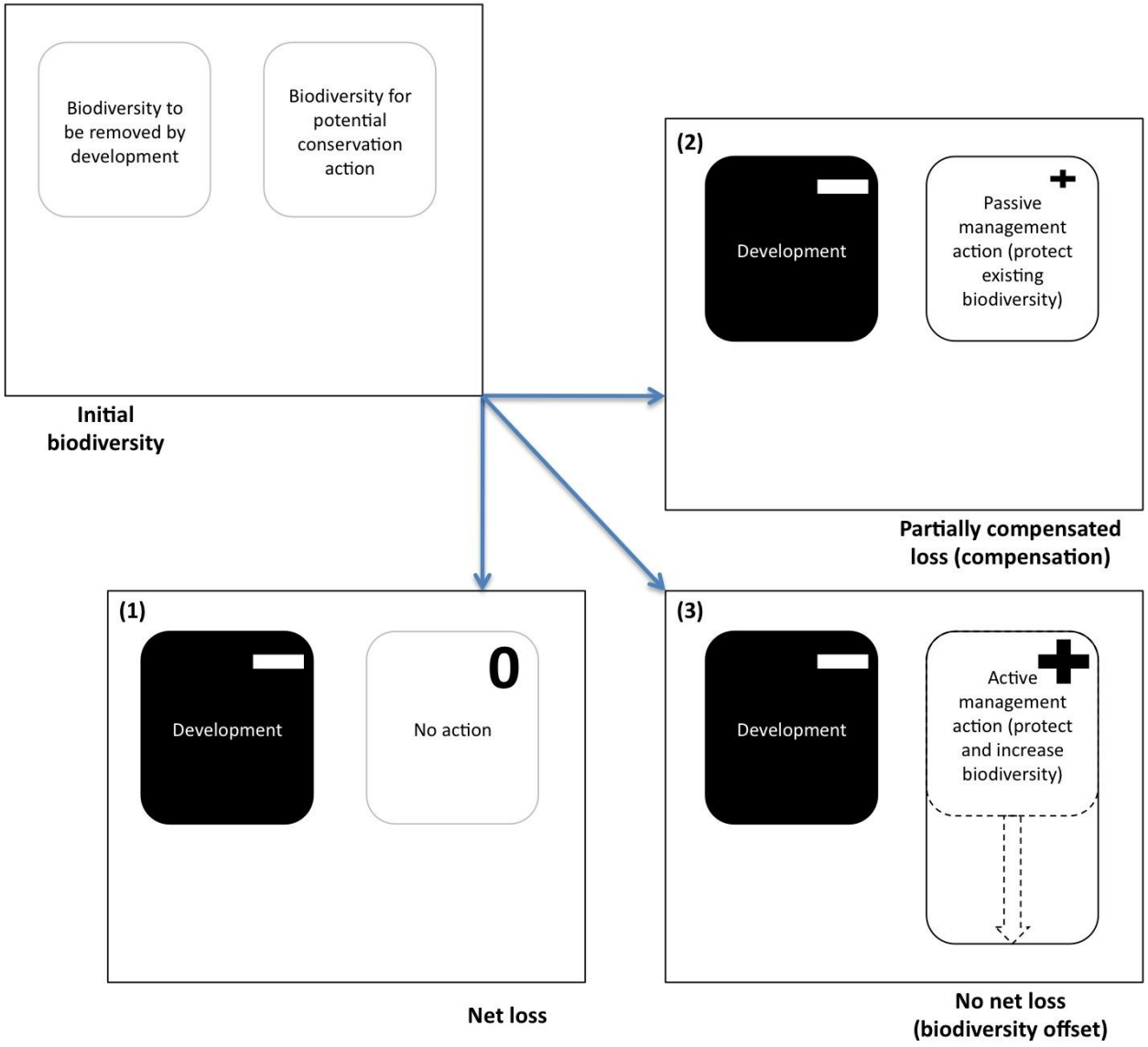
Introduction

- Compensatory biodiversity legislation in 45 places around the world, under development in an additional ~ 30
- Biodiversity markets worth >> $4bn per annum (Madsen *et al.*, 2011)
- Biodiversity offsets increasingly important in contemporary conservation

What are biodiversity offsets?

1. Provide **substitution** or **replacement** for **unavoidable** negative impacts of human activity on **biodiversity**
2. Involve **measurable**, **comparable** biodiversity **losses** and **gains**
3. **Demonstrably** achieve, as a minimum, **no net loss** of biodiversity

What are biodiversity offsets?



What the academics say

- *"We believe that offsetting has a role to play in achieving no net loss…"*
- *"Restoration offset policy leads to a net loss of biodiversity…"*
- *"…biodiversity offsets represent a necessary component…for achieving no net loss…"*
- *"…the use of biodiversity offsets is consistent with sustainable development practices".*

What the media say

- *"Biodiversity offsetting will unleash a new spirit of destruction on the land"*
- *"Why Biodiversity Offsetting will be a disaster for the environment"*
- *"Is biodiversity offsetting a 'license to trash' nature?"*
- *"Biodiversity offsetting: setting off on the wrong foot?"*

Public implementation record

Related to	Country	Mechanism	Proportion	Measure	Reference
Compliance, Uncertainty	US	Wetland banking	30 %	Offsets meet all project objectives	*Matthews & Endress (2008)*
	US	Wetland banking	50 %	Offsets fully implemented	*Mitsch & Wilson (1996)*
	US	Wetland banking	74 %	Offsets achieving no net loss	*Brown & Lant (1996)*
	Canada	Fish habitat compensation	12 - 13 %	Offsets implemented as required	*Quigly & Harper (2006a)*
Monitoring ecological outcomes	Australia	Native vegetation compensation	80 %	Reduction in approvals for vegetation clearance	*Gibbons (2010)*
	California, US	Wetland banking	0 %	Created wetlands which were functionally successful	*Ambrose (2000)*
	Canada	Fish habitat compensation	37 %	Offsets which didn't result in a loss of productivity	*Quigly & Harper (2006b)*

Public implementation record

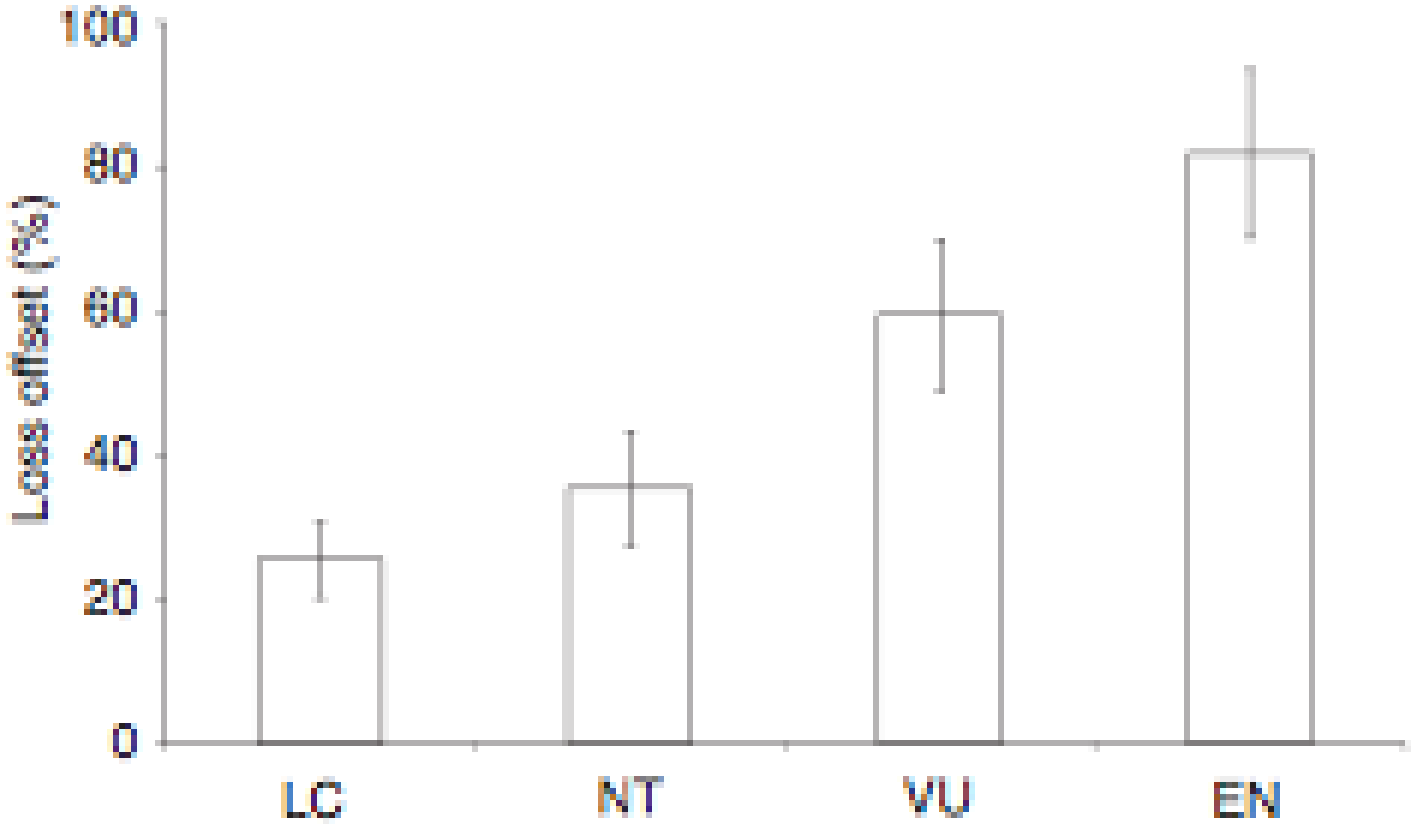
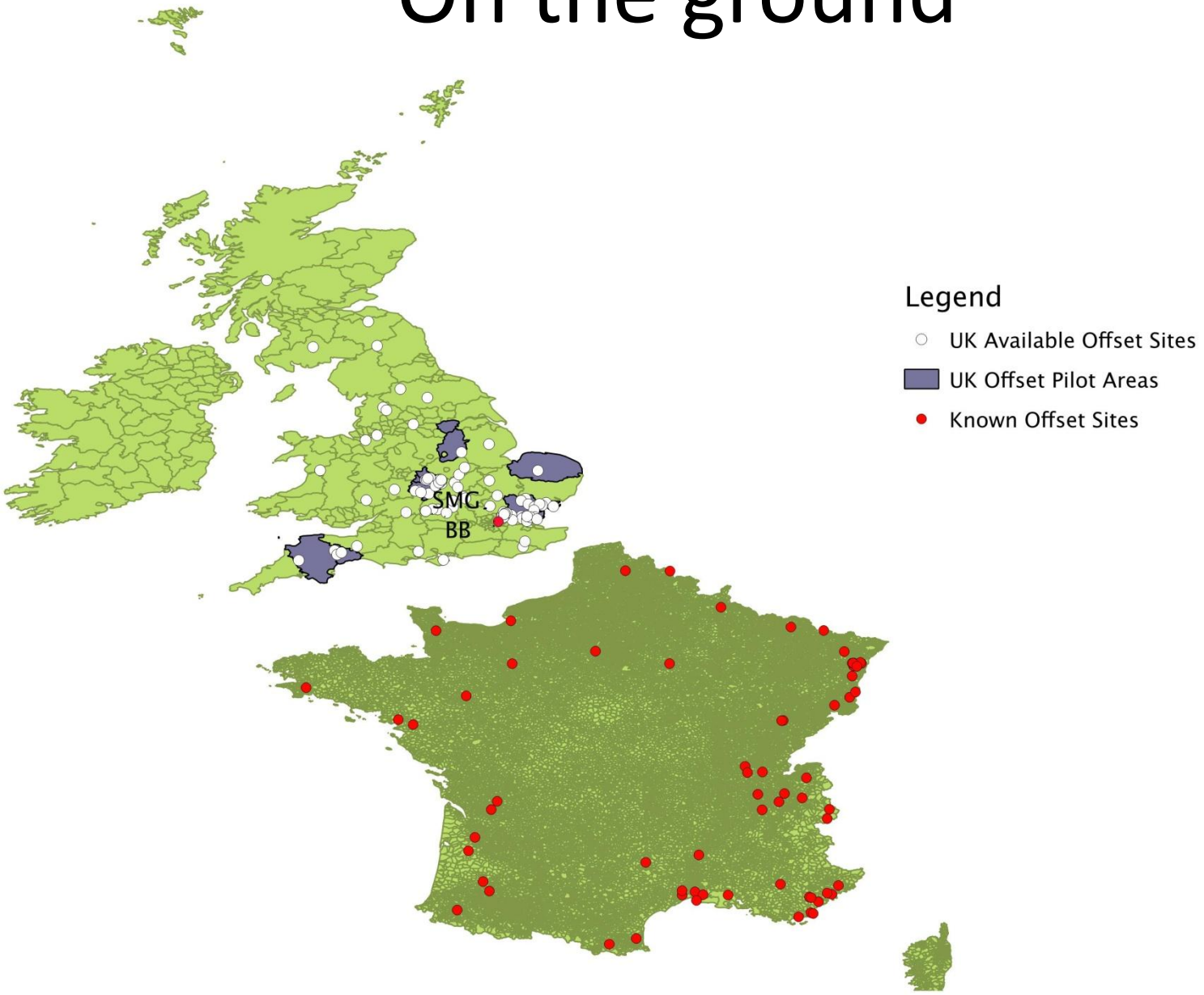


Figure 1. Species loss offset as a function of conservation status (French National Red List) (LC, least concern; NT, near threatened; VU, vulnerable; EN, endangered).

Private implementation record

On the ground



Conclusions

- Scientists, and policymakers, think offsets could work
- The public/media are skeptical
- Available data are limited, and do not reflect the state of play (esp. voluntary offsets)
- A need to collate information on offset projects and locations
- Until then, we are taking a leap of faith

Imperial College
Conservation Science

Thank you

Any questions?

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Theoretical challenges

Problem	Description	Relevant research
(a) Currency	Choosing metrics for measuring biodiversity	McKenneny & Kiesecker (2010); Temple *et al.*, (2010); Treweek *et al.* (2010); BBOP (2009a); Norton (2009); Walker *et al.* (2009); Burgin (2008); Chapman & LeJeune (2007); McCarthy et al., (2004); Godden & Vernon (2003); Salzman & Ruhl (2000); Humphries *et al.* (1995)
(b) No net loss	Defining requirements for demonstrating no net loss of biodiversity	Gordon *et al.* (2011); Bekessey *et al.* (2010); McKenneny & Kiesecker (2010); BBOP (2009a); Gorrod & Keith (2009); Gibbons & Lindenmayer (2007)
(c) Equivalence	Demonstrating equivalence between biodiversity losses and gains	Quetier & Lavorel (2011); Burrows *et al.* (2011); McKenneny & Kiesecker (2010); Bruggeman et al (2009, 2005); Norton (2009); Chapman & LeJeune (2007); Gibbons & Lindenmayer (2007); Godden & Vernon (2003)
(d) Longevity	Defining how long offset schemes should endure	McKenneny & Kiesecker (2010); BBOP (2009a); Gibbons & Lindenmayer (2007); Morris *et al.* (2006)
(e) Time lag	Deciding whether to allow a temporal gap between development and offset gains	Gordon *et al.* (2011); Bekessey *et al.* (2010); McKenneny & Kiesecker (2010); Moilanen *et al.* (2009); Norton (2009); Gibbons & Lindenmayer (2007); Morris *et al.* (2006)
(f) Uncertainty	Managing for uncertainties throughout the offset process	Treweek *et al.* (2010); Moilanen *et al.* (2009); Norton (2009)
(h) Reversibility	Defining how reversible development impacts must be	BBOP (2012); Godden & Vernon (2003)
(i) Thresholds	Defining threshold biodiversity values beyond which offsets are not acceptable	BBOP (2012); BBOP (2009a); Norton (2009); Gibbons & Lindenmayer (2007); Morris *et al.* (2006)

- Problems arising in design, potentially resolved through better science
- Require value judgments to be made
- Focus of today's workshop

Practical challenges

Root problem	Manifestation	Example
(1) Compliance	• Non-compliance with the mitigation hierarchy	Mühlenburger Loch, Germany
	• Insufficient compensation proposed	Mühlenburger Loch, Germany
	• Offsets not implemented, or only partially implemented	Wetland banking, US Fish habitat, Canada
	• Legislation changes during offset scheme	Forest Code, Brazil
(2) Measuring ecological outcomes	• Monitoring different things suggests different ecological outcomes	Wetland banking, US
	• Difference in opinion about ecological outcomes	Basslink project, Australia
	• Outcomes not measured for very long	Fish habitat, Canada
	• Outcomes not monitored at all	Conservation banking, US
	• No follow up by regulator	Conservation banking, US
(3) Uncertainty	• In measurement of biodiversity baseline	Native grassland, Australia
	• In magnitude and type of development impacts	Extractive sector, Uzbekistan
	• Offsets fail to establish or persist	Wetland banking, US
	• Development causes greater impacts than expected	Fish habitat, Canada

- Problems that arise in practice, cannot be resolved through improved science
- Would argue that these are more important than theoretical challenges!
- So – how successful have they been in practice?

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Sharing biodiversity data from the private sector

Tim Hirsch
Deputy Director and Head of Participation, GBIF Secretariat

UNEP WCMC

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GBIF
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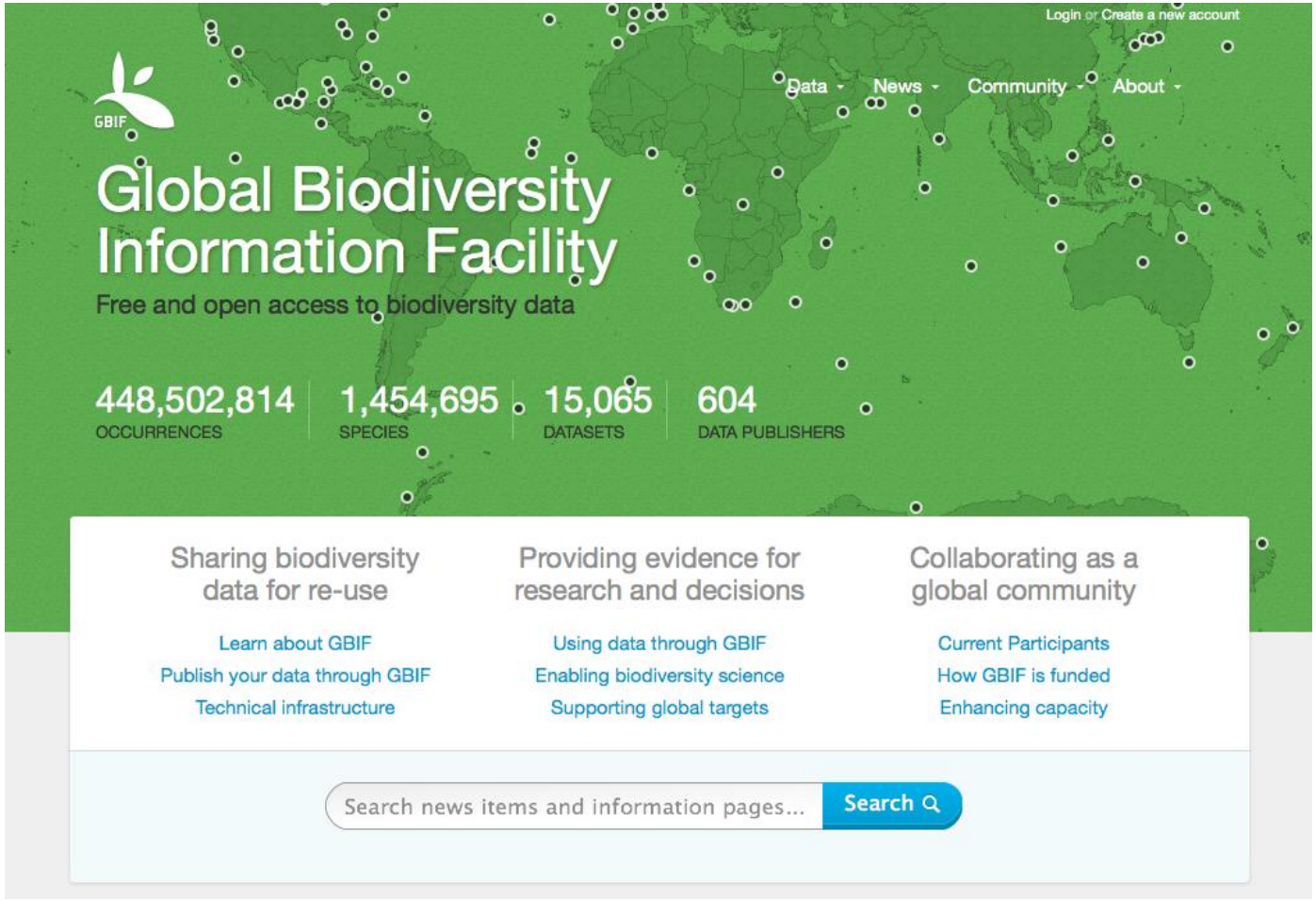
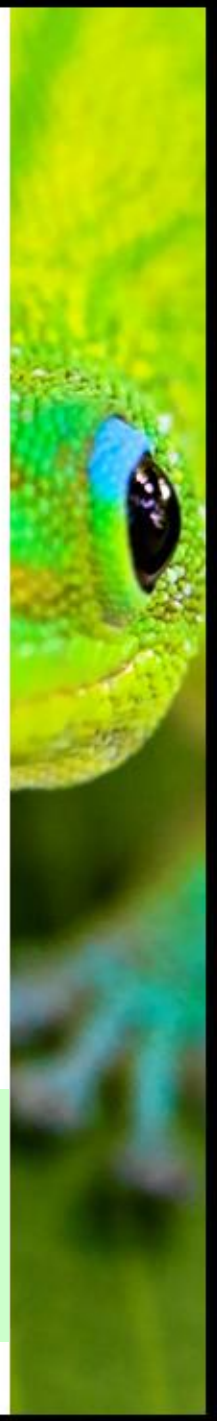
Sharing biodiversity data from the private sector

Tim Hirsch
Deputy Director
Global Biodiversity Information Facility (GBIF)

Proteus Annual Meeting
13 May 2014

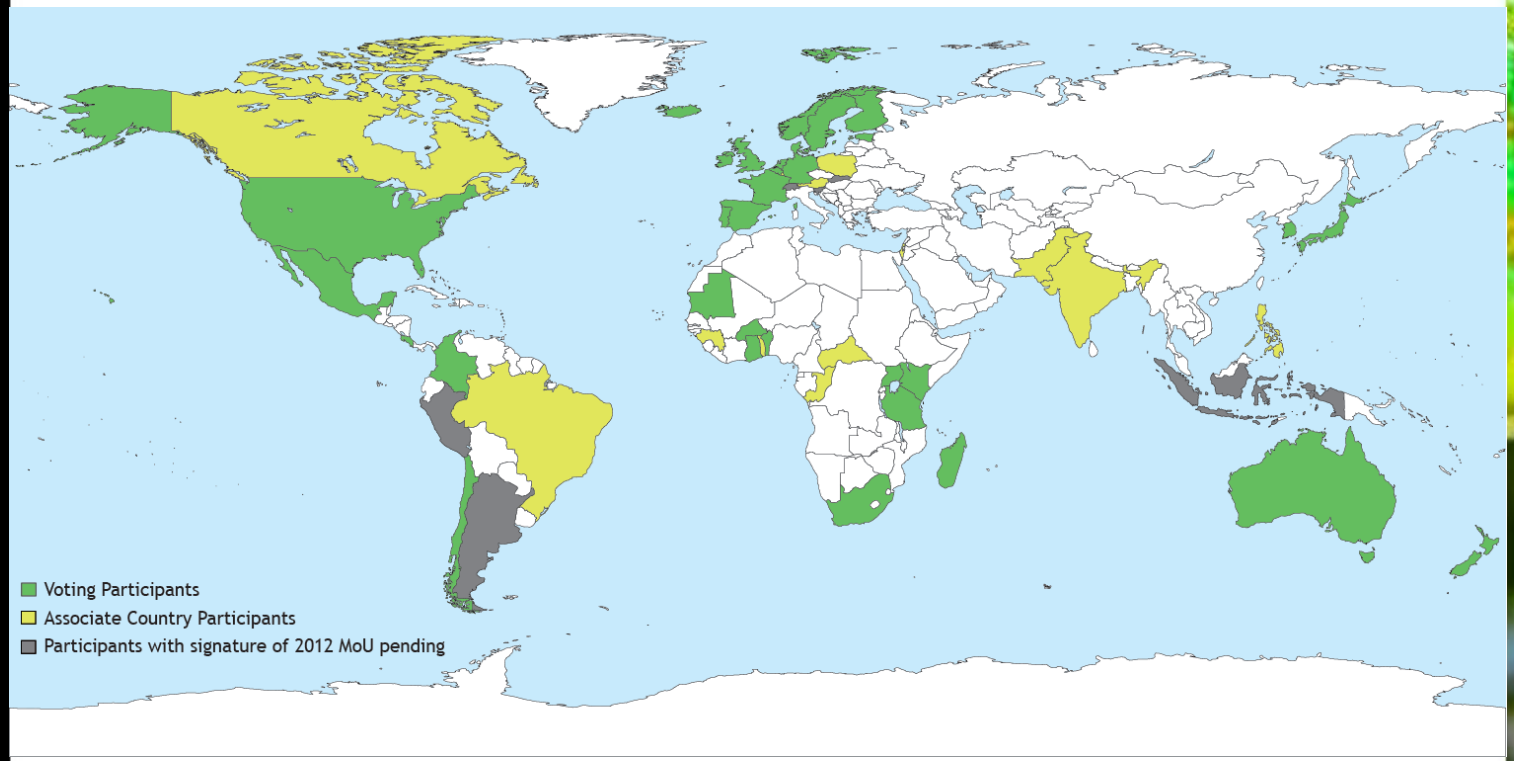




GBIF
www.gbif.org

- Founded 2001, intergovernmental collaboration
- Free and open access to biodiversity data for research and policy
- Promotes data publication through common standards, tools
- Single access point for specimens, observations

GBIF participants

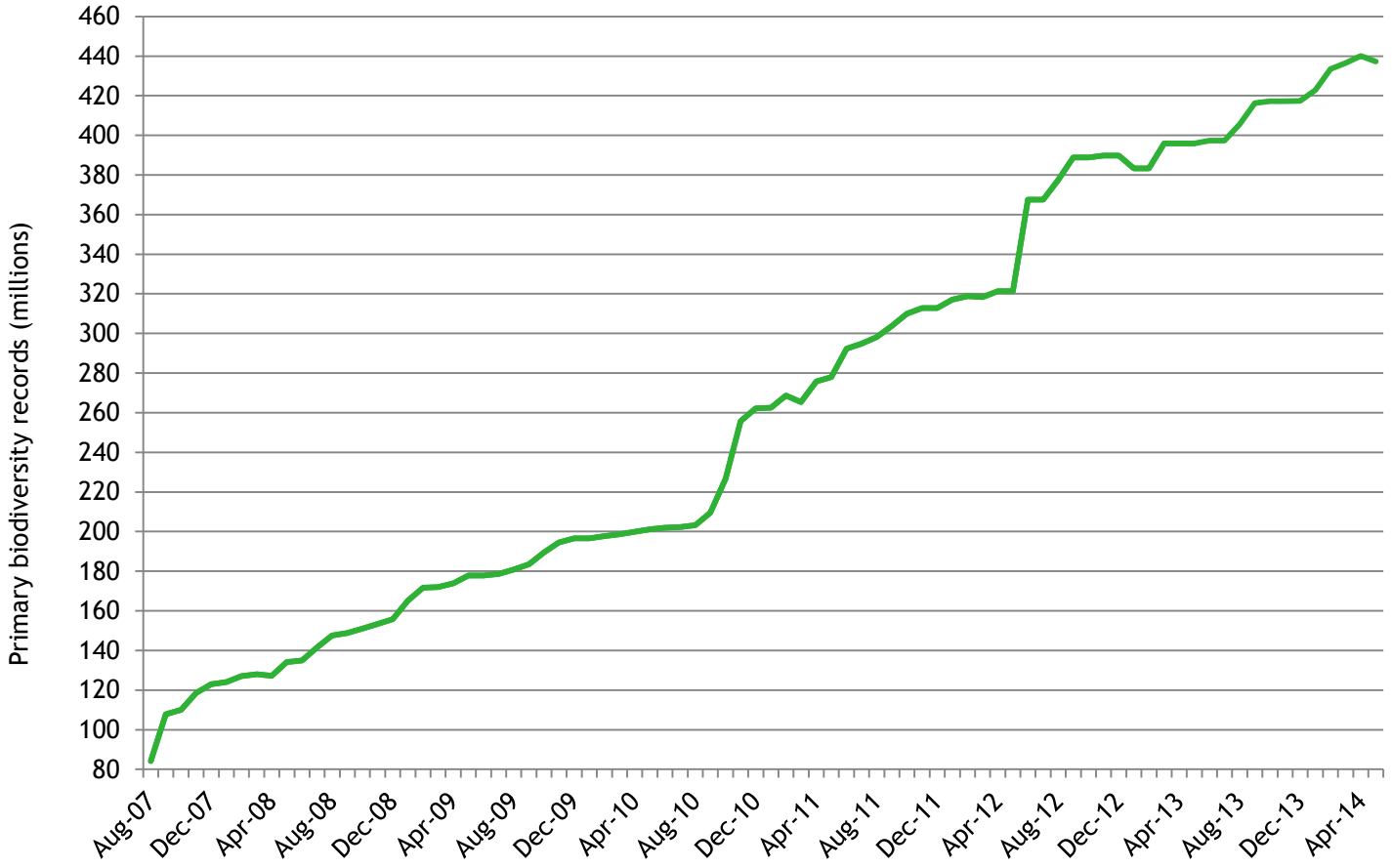


- 52 countries, collaborating through network of national nodes
- 38 international organizations
- 600 data publishing institutions

Last updated: 2013-06-28

GBIF
www.gbif.org

Data published through GBIF



GBIF
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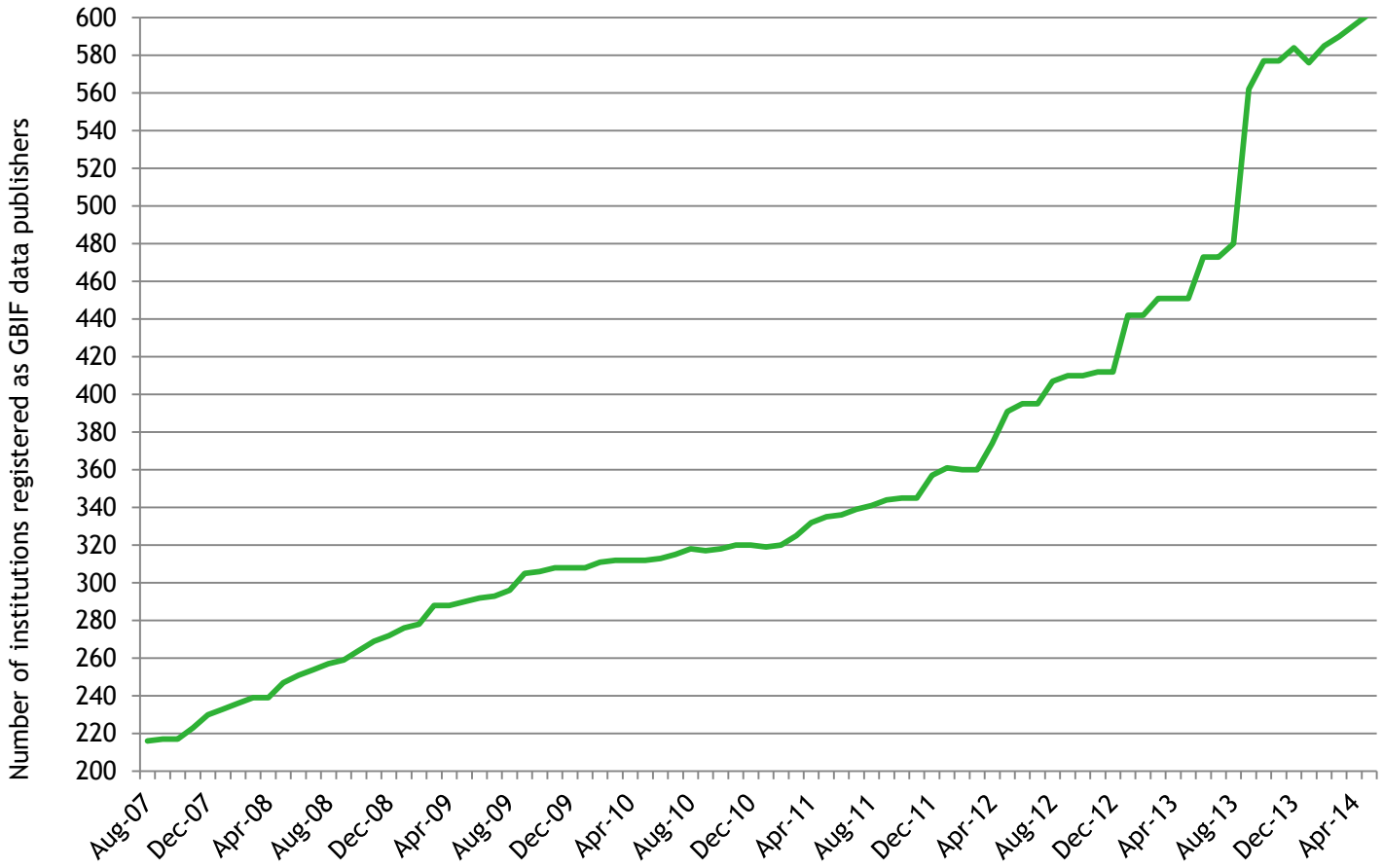
Last updated: 2014-05-07

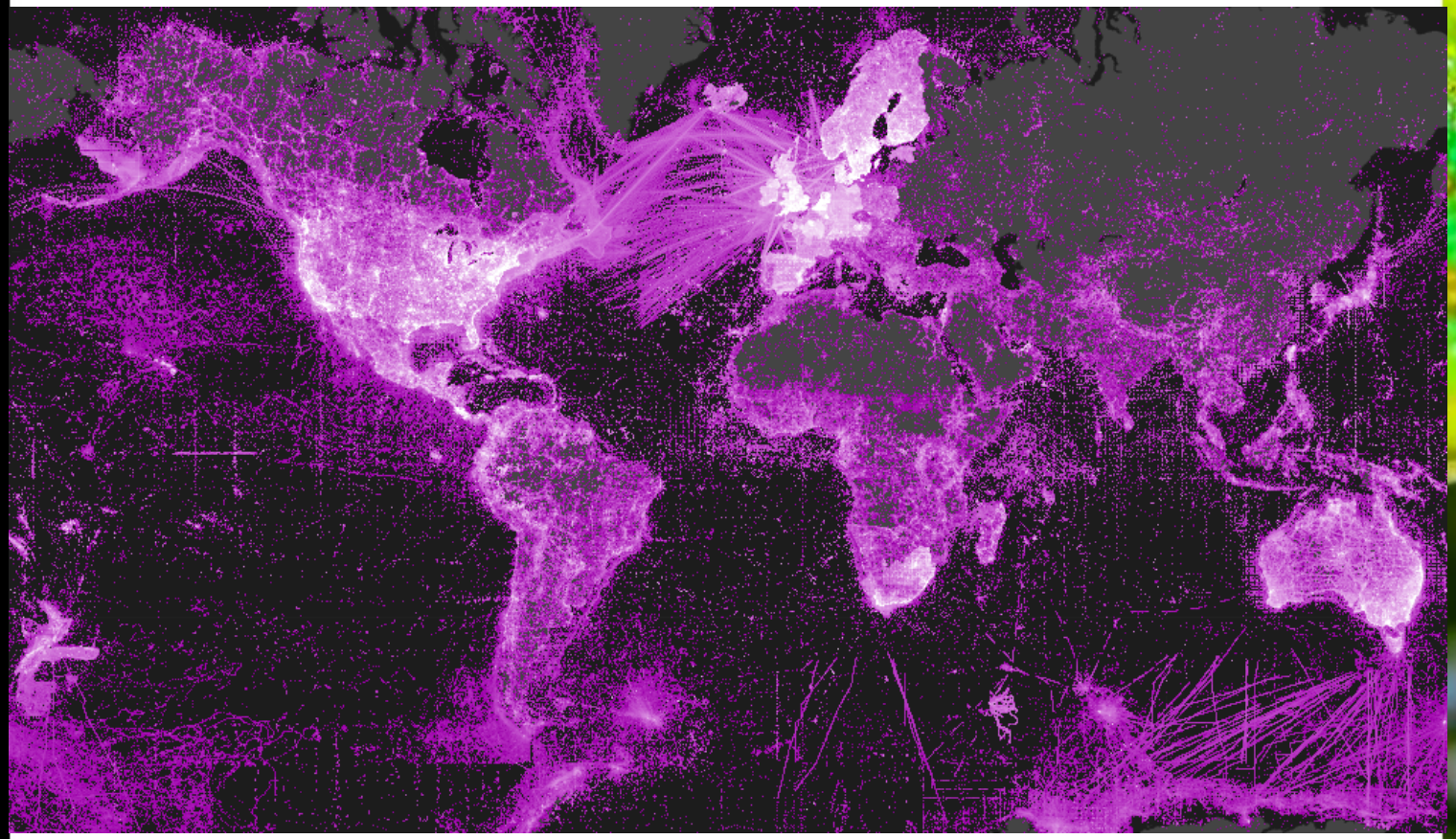
GBIF data publishers

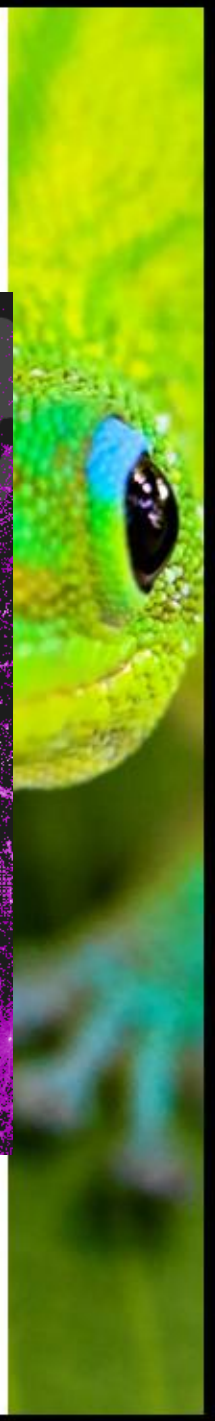


A sharp rise in the number of data publishers in September 2013 results from institutions choosing to register as separate entities rather than sharing datasets through a single publisher at their national node institution.

Last updated: 2014-05-07

Data published through GBIF

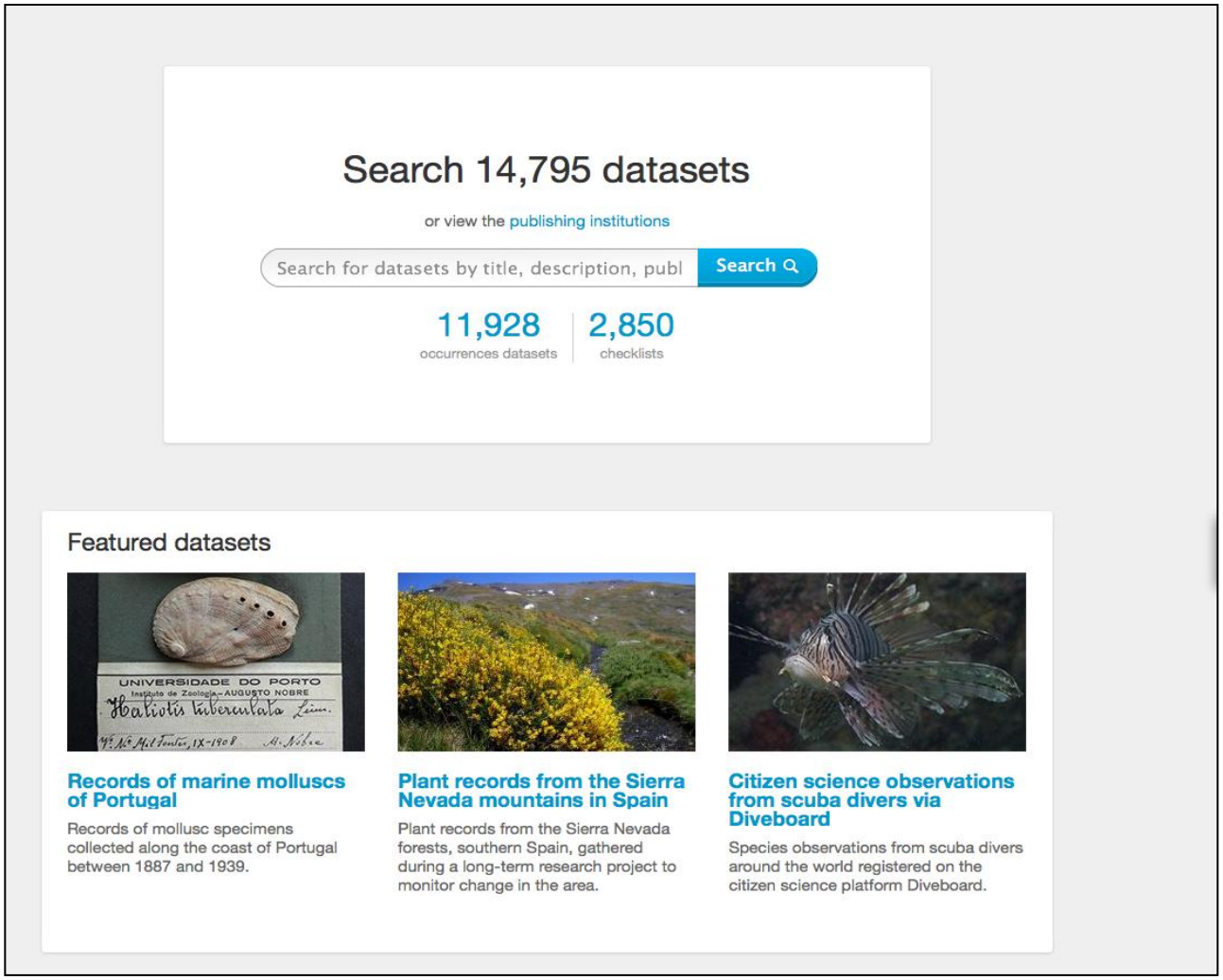




Each record represents evidence of species occurrence
What? Where? When? How? By whom?

Last updated: 2014-01-07

Data published through GBIF



Historic collections, survey data, citizen observations

GBIF
www.gbif.org

Data published through GBIF

Sinfonevada: Dataset of Floristic di…

Occurrence dataset published by Sierra Nevada Global Change Observatory. Andalusian Environmental Cent...

7,920
Occurrences
View occurrences

Information | Stats | Activity

Summary

7,920 Georeferenced data

VIEW RECORDS
All records | In viewable area

DESCRIPTION

FUNDING

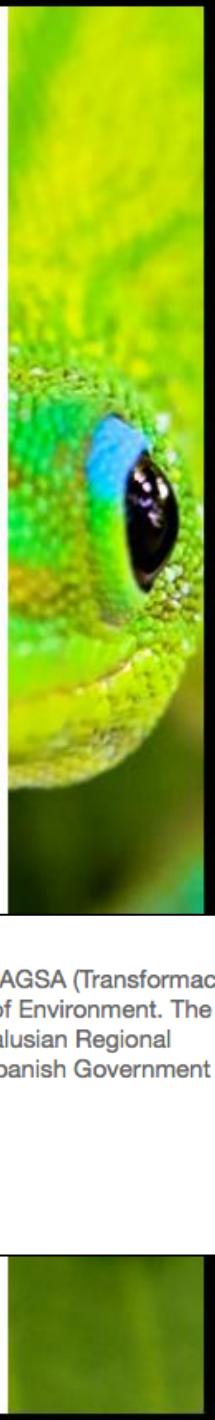
All the information contained in Sinfonevada was gathered by TRAGSA (Transformación Agraria S.A.), a public company funded by the Spanish Ministry of Environment. The Sierra Nevada Global Change Observatory is funded by the Andalusian Regional Government (via Environmental Protection Agency) and by the Spanish Government (via 'Fundación Biodiversidad', what is a Public Foundation).

PROJECT PERSONNEL

PRINCIPAL INVESTIGATOR
Regino Jesús Zamora Rodríguez

TEMPORAL COVERAGES
Date range: Jan 1, 2004 - Dec 1, 2005

Rich metadata: geographic/taxonomic scope, methods, attribution of collectors, dataset branding



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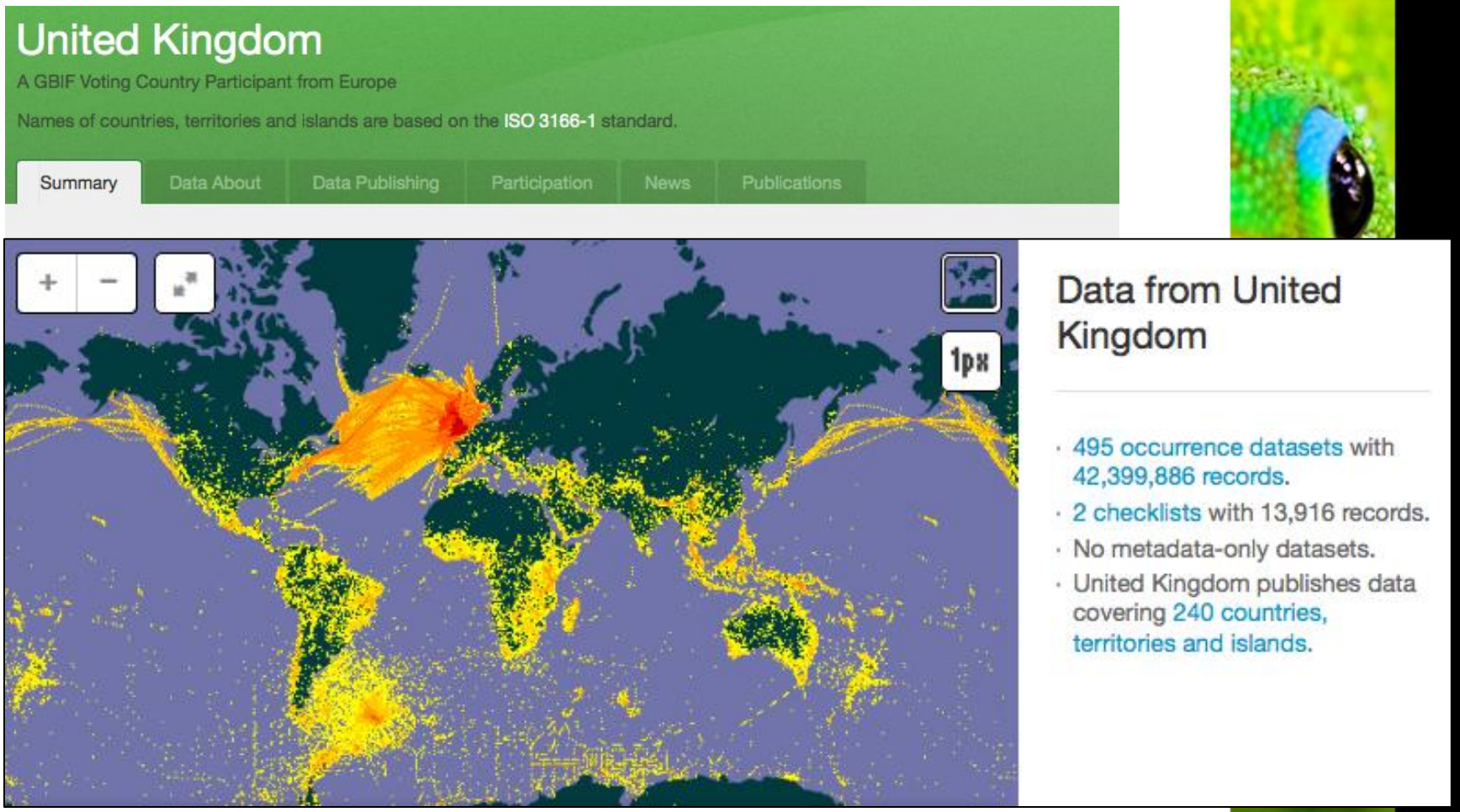
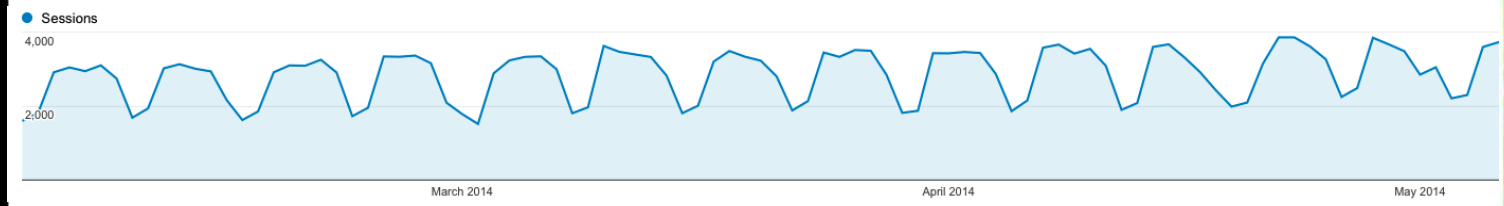
Data repatriation



Returns data to countries of origin through electronic access

Who uses GBIF?

Daily visits to GBIF portal, 1 Feb - 07 May 2014



Visitor numbers by country (top 10), 1 Feb – 07 May 2014

	Country / Territory	Sessions	% Sessions
1.	United States	48,380	17.64%
2.	Spain	12,960	4.73%
3.	Germany	12,577	4.59%
4.	United Kingdom	12,481	4.55%
5.	France	10,600	3.86%
6.	India	10,530	3.84%
7.	Mexico	9,904	3.61%
8.	Brazil	9,721	3.54%
9.	Italy	7,711	2.81%
10.	Colombia	7,583	2.76%

Last updated: 2014-05-08

Source: Google Analytics. Access to full data available on request to GBIF Secretariat. Email: saipanjiguly@gbif.org

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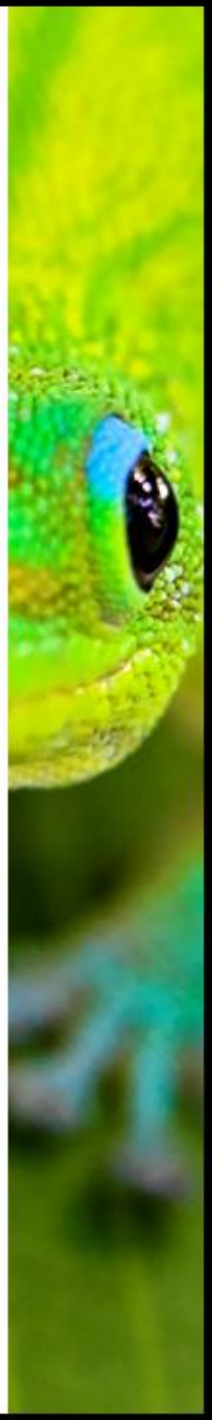
Who uses GBIF?

Country	Number of requests	Number of users
United States	15068	2789
Mexico	3579	760
Denmark	1370	748
Netherlands	1194	1746
Colombia	1136	241
Spain	1102	581
China	994	147
Australia	925	1850
Brazil	895	975
Canada	821	827

Data download requests Jan-May 2014 (top 10 countries)



GBIF
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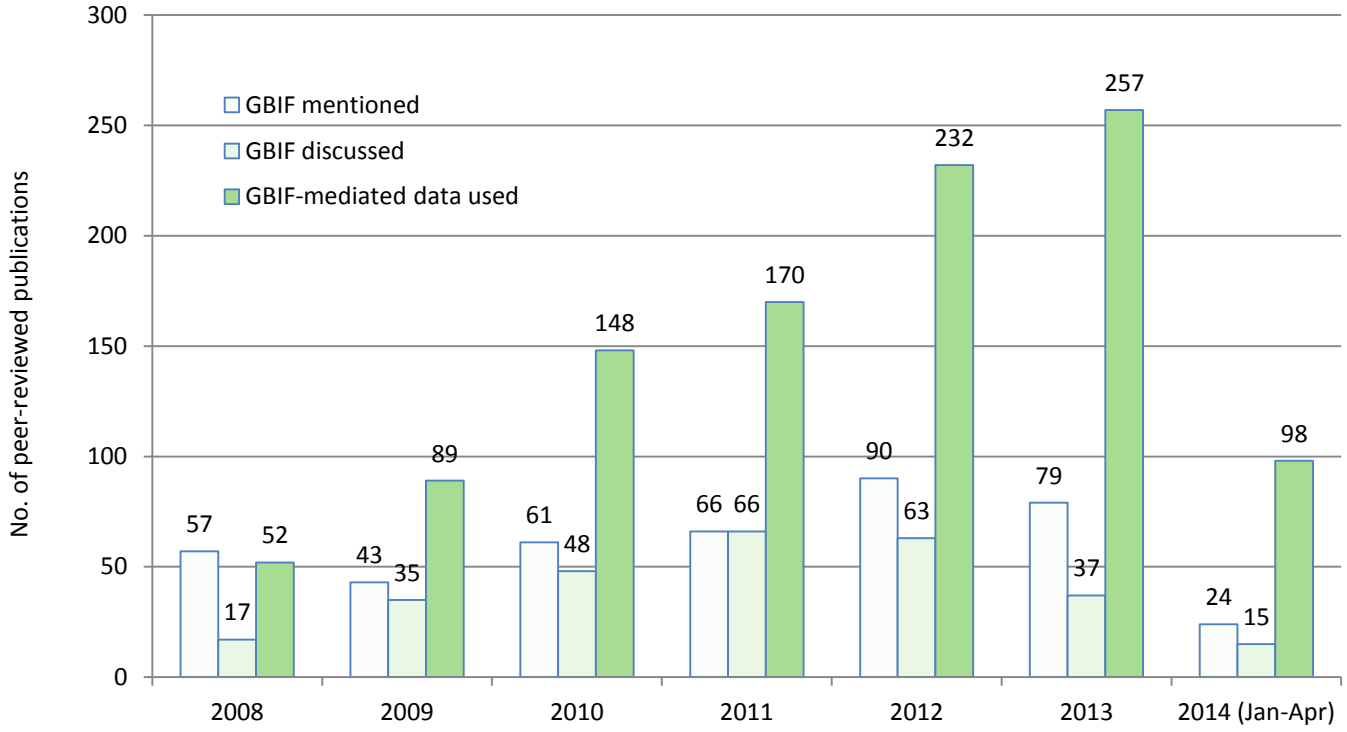
Who uses GBIF?



20+ peer-reviewed studies per month cite use of data from GBIF

GBIF
www.gbif.org

Last updated: 2014-05-02

GBIF citation in research

Using models to inform conservation policies

Two studies, based on data from GBIF and other sources, define the distribution of the bearded wood partridge, and help inform conservation policy.

41 records from sources including GBIF

Designing marine protected areas off Mexico

Researchers look at methods to determine the ideal spacing between protected areas in the Gulf of California, ensuring connectivity based on the distances covered by larvae of fish species identified through GBIF.

64 regional fish species identified

Shifting niches and invasive species control

Researchers use data available through GBIF to investigate how species can shift their ecological niches in alien environments – complicating the prediction of invasion risks.

2997 records of presence used

How important are rare species for ecosystems?

Research using records available through GBIF, in combination with other data, studies the role of rare and common species in the functioning of ecosystems.

Brazilian forest reserves in a changing climate

Study uses GBIF-mediated data to look into the effectiveness of current forest reserves in conserving 16 forest plant species under changing climate conditions.

Finding patterns in bee-plant relationships

Brazilian researchers use data published via GBIF to analyse the impact of climate on interactions between bees and the plants they pollinate.

GBIF
www.gbif.org

Last updated: 2014-01-07

nature International weekly journal of science

GBIF
www.gbif.org

Three keys to the radiation of angiosperms into freezing environments

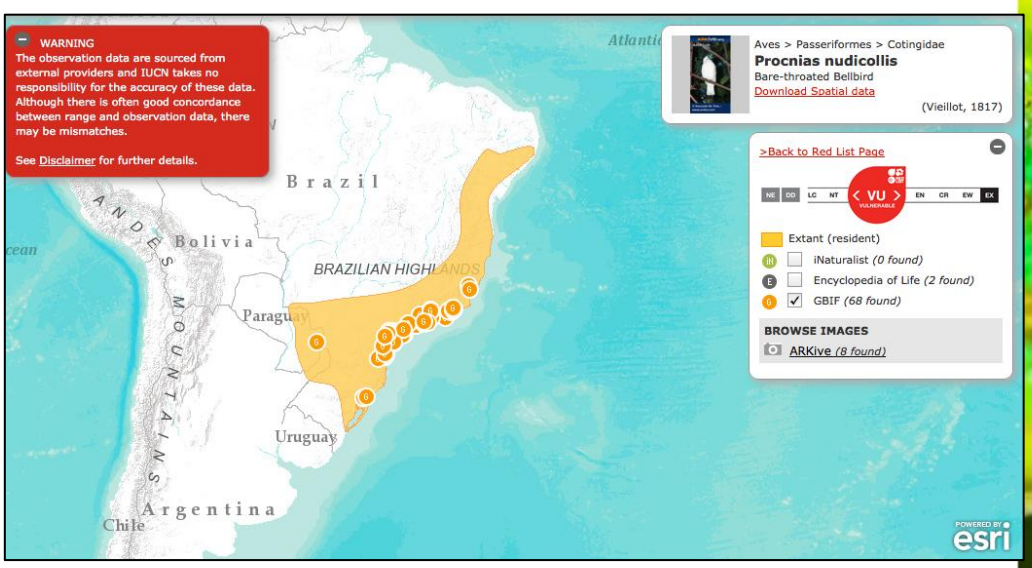
Amy E. Zanne, David C. Tank, William K. Cornwell, Jonathan M. Eastman, Stephen A. Smith, Richard G. FitzJohn, Daniel J. McGlinn, Brian C. O'Meara, Angela T. Moles, Peter B. Reich, Dana L. Royer, Douglas E. Soltis, Peter F. Stevens, Mark Westoby, Ian J. Wright, Lonnie Aarssen, Robert I. Bertin, Andre Calaminus, Rafaël Govaerts, Frank Hemmings, Michelle R. Leishman, Jacek Oleksyn, Pamela S. Soltis, Nathan G. Swenson, Laura Warman + *et al.*

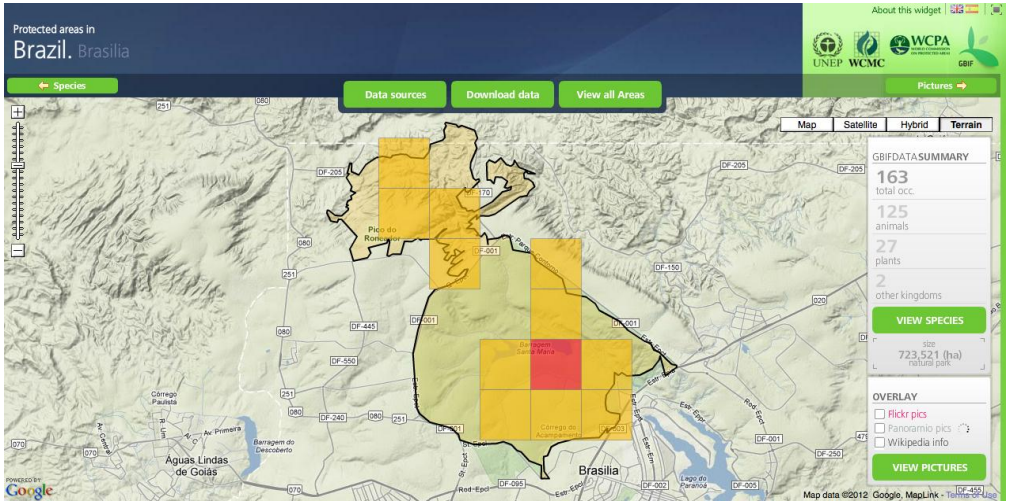
Affiliations | Contributions | Corresponding author

- Used GBIF to access >47m occurrence records of >27,000 plant species
- Extracted minimum temperatures from Worldclim database to flag which species exposed to freezing across their ranges

doi:10.1038/nature12872

Integration through web services





Protected Planet

To be updated!!

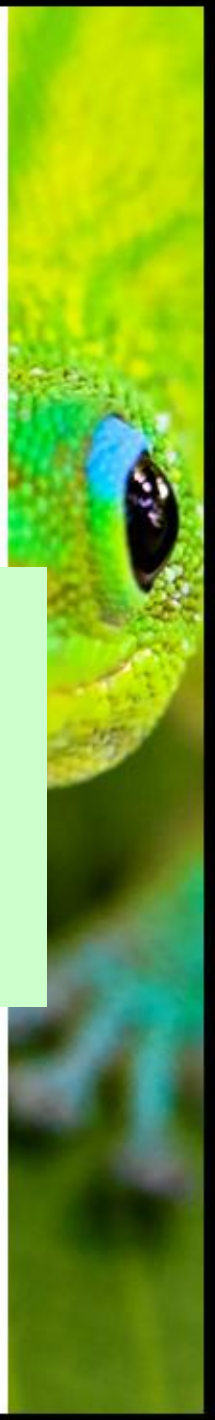
Local Ecological Footprinting Tool

- Provides reports on relative ecological values within landscape to help siting decisions
- Biodiversity layer derived from occurrence records published through GBIF

http://www.biodiversity.ox.ac.uk/left

Private sector data sharing – why?

- Potential for filling data gaps
- Preserving data for future re-use
- Recognition for data publication effort



GBIF
www.gbif.org

Private sector data sharing – how?

- Register as GBIF data publisher
- Use standard data formats and protocols
- Download guides and manuals
- Partner with GBIF national nodes

GBIF
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Private sector data sharing

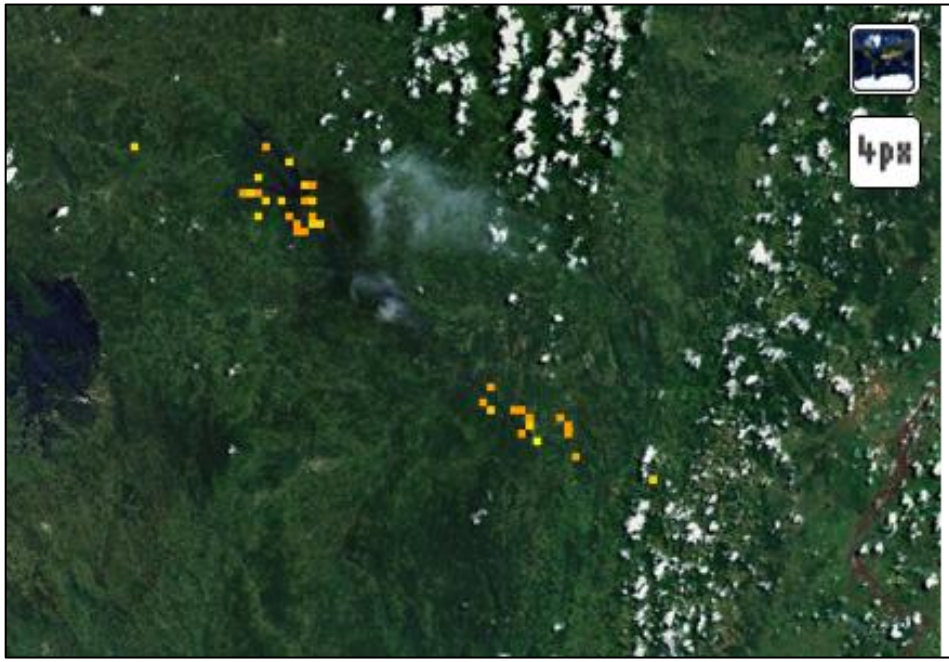
Registros biológicos de especies de …

Occurrence dataset published by **Isagen**

4,290
Occurrences
View occurrences

Information | Stats | Activity

Summary



4,258 Georeferenced data

VIEW RECORDS

All records | In viewable area

DESCRIPTION

Central Hidroeléctrica Jaguas Ubicada al Oriente del departamento de Antioquia, sobre las hoyas de los ríos Nare y Guatapé a 117 Km de Medellín. El embalse San Lorenzo se localiza en jurisdicción de l… more

Private sector data sharing

GBIF 727772914

Unknown evidence of Carollia perspicillata (Linnaeus, 1758) recorded on Feb 28, 2009

from Registros biológicos de especies de fauna vertebrada terrestre en las centrales de San Carlos y Jaguas - 2009 dataset

Information

Occurrence details

RECORDED

Feb 28, 2009 12:00:00 AM

SAMPLING PROTOCOL

Red niebla

REMARKS

Carollia perspicillata

época seca

DATASET CITATION PROVIDED BY PUBLISHER

ISAGEN S.A. (2009). Registros biológicos de especies de fauna vertebrada terrestre en las centrales de San Carlos y Jaguas - 2009. 4290 Registros, aportados por Pérez C. (Publicador, Creador del Recurso, Proveedor de los Metadatos), Muñoz-Escobar E (Proveedor de Contenido), Gallo SM (Proveedor de Contenido), Peña AF (Proveedor de Contenido), Palacio-V JA (Proveedor de Contenido), Duque VM (Editor), En linea, http://ipt.sibcolombia.net/sib/resource.do?r=isagen-2008-46-2978, publicado el 07/12/2012.

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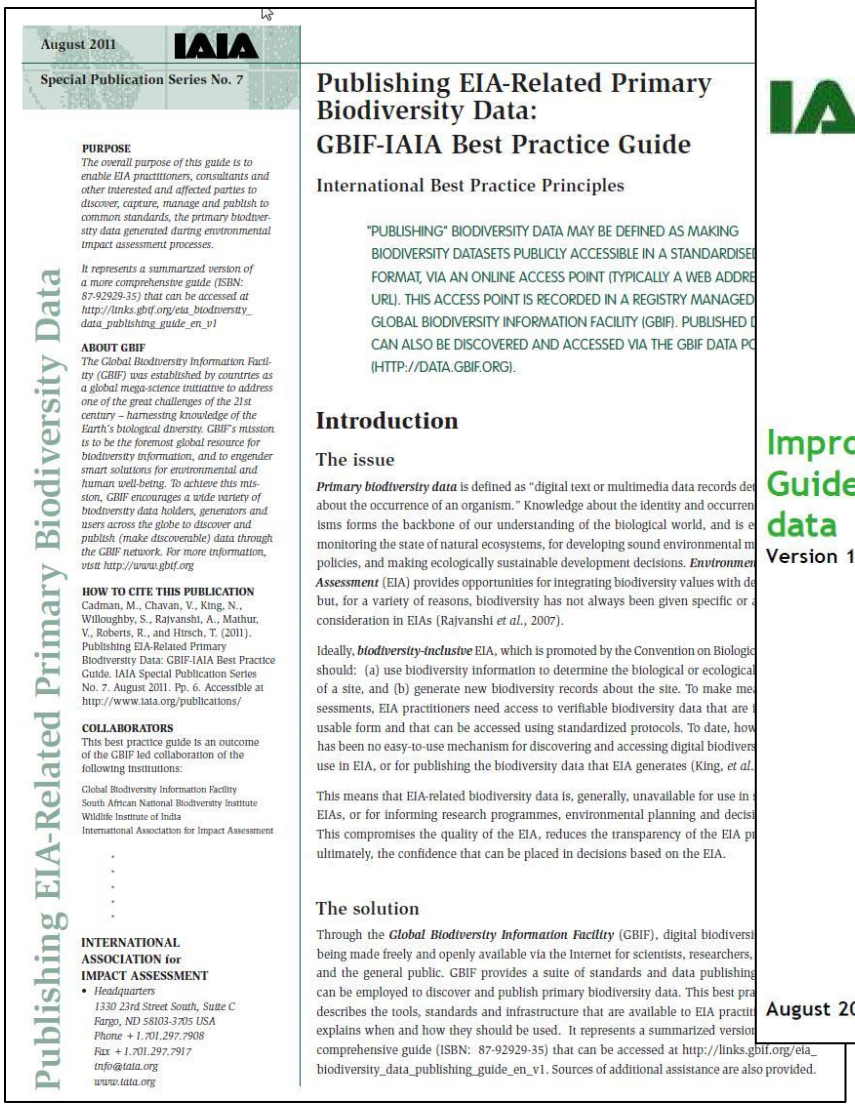
Private sector data sharing

Integrated view with all published records of the species

GBIF
www.gbif.org

Publishing data from EIAs


August 2011 IAIA

Special Publication Series No. 7

Publishing EIA-Related Primary Biodiversity Data

PURPOSE

The overall purpose of this guide is to enable EIA practitioners, consultants and other interested and affected parties to discover, capture, manage and publish to common standards, the primary biodiversity data generated during environmental impact assessment processes.

It represents a summarized version of a more comprehensive guide (ISBN: 87-92929-35) that can be accessed at http://links.gbif.org/eia_biodiversity_data_publishing_guide_en_v1

ABOUT GBIF

The Global Biodiversity Information Facility (GBIF) was established by countries as a global mega-science initiative to address one of the great challenges of the 21st century – harnessing knowledge of the Earth's biological diversity. GBIF's mission is to be the foremost global resource for biodiversity information, and to engender smart solutions for environmental and human well-being. To achieve this mission, GBIF encourages a wide variety of biodiversity data holders, generators and users across the globe to discover and publish (make discoverable) data through the GBIF network. For more information, visit http://www.gbif.org

HOW TO CITE THIS PUBLICATION

Cadman, M., Chavan, V., King, N., Willoughby, S., Rajvanshi, A., Mathur, V., Roberts, R., and Hirsch, T. (2011). Publishing EIA-Related Primary Biodiversity Data: GBIF-IAIA Best Practice Guide. IAIA Special Publication Series No. 7. August 2011. Pp. 6. Accessible at http://www.tata.org/publications/

COLLABORATORS

This best practice guide is an outcome of the GBIF led collaboration of the following institutions:

Global Biodiversity Information Facility
South African National Biodiversity Institute
Wildlife Institute of India
International Association for Impact Assessment

INTERNATIONAL ASSOCIATION for IMPACT ASSESSMENT

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  tnfo@tata.org
  www.tata.org

Publishing EIA-Related Primary Biodiversity Data: GBIF-IAIA Best Practice Guide

International Best Practice Principles

"PUBLISHING" BIODIVERSITY DATA MAY BE DEFINED AS MAKING BIODIVERSITY DATASETS PUBLICLY ACCESSIBLE IN A STANDARDISE FORMAT, VIA AN ONLINE ACCESS POINT (TYPICALLY A WEB ADDRE URL). THIS ACCESS POINT IS RECORDED IN A REGISTRY MANAGED GLOBAL BIODIVERSITY INFORMATION FACILITY (GBIF). PUBLISHED D CAN ALSO BE DISCOVERED AND ACCESSED VIA THE GBIF DATA PO (HTTP://DATA.GBIF.ORG).

Introduction

The issue

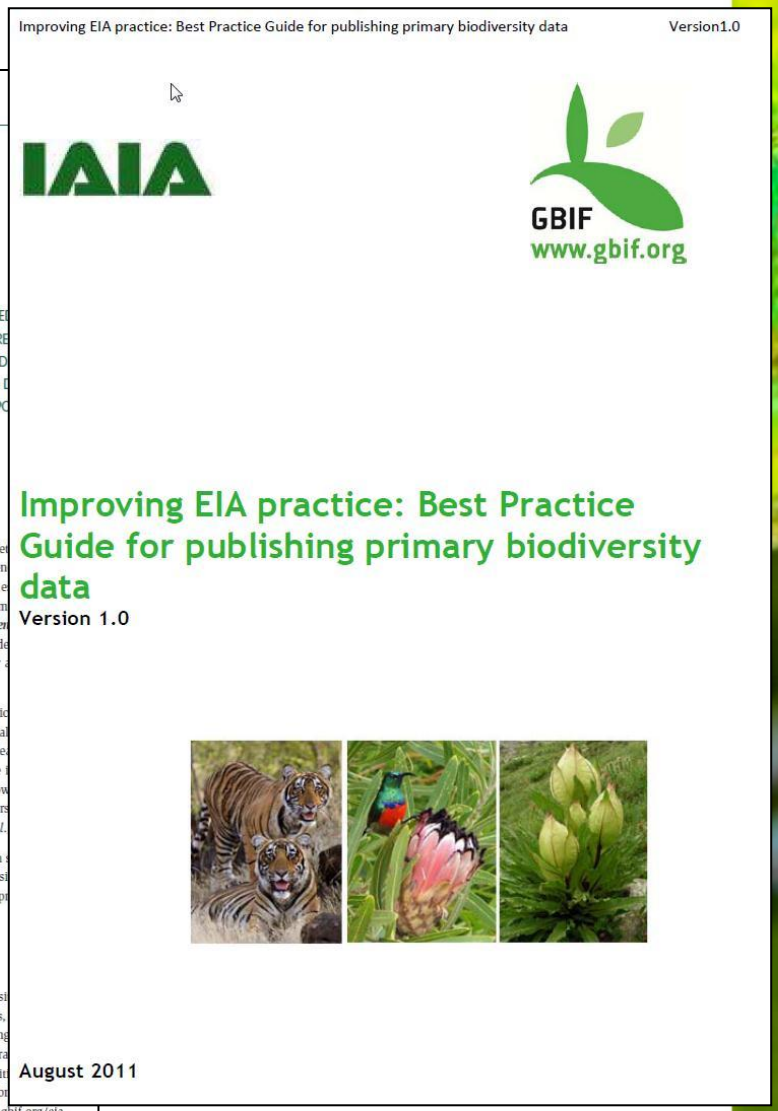
Primary biodiversity data is defined as "digital text or multimedia data records de about the occurrence of an organism." Knowledge about the identity and occurren isms forms the backbone of our understanding of the biological world, and is e monitoring the state of natural ecosystems, for developing sound environmental m policies, and making ecologically sustainable development decisions. ***Environmen Assessment*** (EIA) provides opportunities for integrating biodiversity values with de but, for a variety of reasons, biodiversity has not always been given specific or consideration in EIAs (Rajvanshi *et al.*, 2007).

Ideally, ***biodiversity-inclusive*** EIA, which is promoted by the Convention on Biologic should: (a) use biodiversity information to determine the biological or ecological of a site, and (b) generate new biodiversity records about the site. To make me sessments, EIA practitioners need access to verifiable biodiversity data that are usable form and that can be accessed using standardized protocols. To date, how has been no easy-to-use mechanism for discovering and accessing digital biodivers use in EIA, or for publishing the biodiversity data that EIA generates (King, *et al.*

This means that EIA-related biodiversity data is, generally, unavailable for use in EIAs, or for informing research programmes, environmental planning and decisi This compromises the quality of the EIA, reduces the transparency of the EIA p ultimately, the confidence that can be placed in decisions based on the EIA.

The solution

Through the ***Global Biodiversity Information Facility*** (GBIF), digital biodiversi being made freely and openly available via the Internet for scientists, researchers, and the general public. GBIF provides a suite of standards and data publishing can be employed to discover and publish primary biodiversity data. This best pra describes the tools, standards and infrastructure that are available to EIA practit explains when and how they should be used. It represents a summarized versio comprehensive guide (ISBN: 87-92929-35) that can be accessed at http://links.gbif.org/eia_biodiversity_data_publishing_guide_en_v1. Sources of additional assistance are also provided.


Improving EIA practice: Best Practice Guide for publishing primary biodiversity data Version1.0

IAIA

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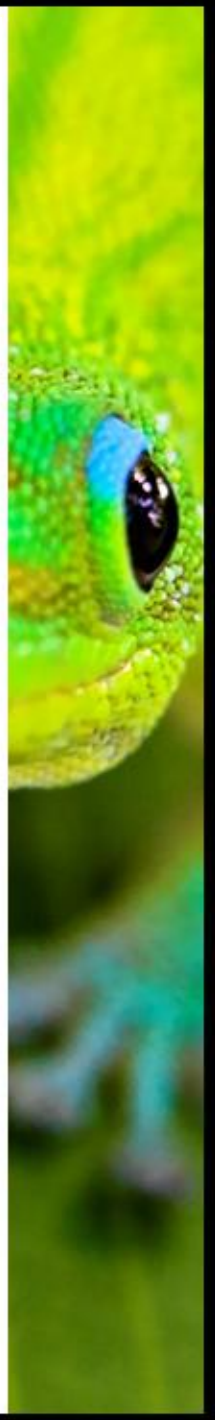
Improving EIA practice: Best Practice Guide for publishing primary biodiversity data

Version 1.0

August 2011

http://www.gbif.org/resources/2516

Unlocking Biodiversity Data from Environmental Impact Assessments (EIAs)



- EIA data publishing/hosting facility for Arabian Gulf region
- Stakeholder meeting for West Asia
- ‘Train the trainer’ workshop for EIA practitioners
- Update manual on EIA biodiversity data publishing and translate to UN languages

Thanks!

thirsch@gbif.org

Summary, Review and Close of Meeting

Jon Hutton
Director, UNEP-WCMC

UNEP WCMC

proteus

Proteus Partners Annual Meeting 2014

Hosted by BP at Jesus College, Cambridge 13th-14th May