

Introduction to the Data Life Cycle, FAIR (**F**indable, **A**ccessible, **I**nteroperable, and **R**eusable) Data, and Data Citation

Presenter : Arctic Data Center, DataONE, Environmental Data Initiative, ESIP,
GBIF, iDigBio, NEON

Amber Budden, Kyle Copas, and Kristin Vanderbilt

#datahelpdesk

Ecological Society of America 2019 ESAUSSEE

Career Fair Center in the Exhibit Hall <https://esa.org/louisville/career-fair/>

Monday 12 August 330-430 PM



Why Manage Data?



Carrots

- Data are being recognized as 1st class products of research
 - Data citation
 - Data publication
- Increased collaboration
- More efficient research
- Supports the advancement of science

Sticks

- Funders
- Publishers
- Peers

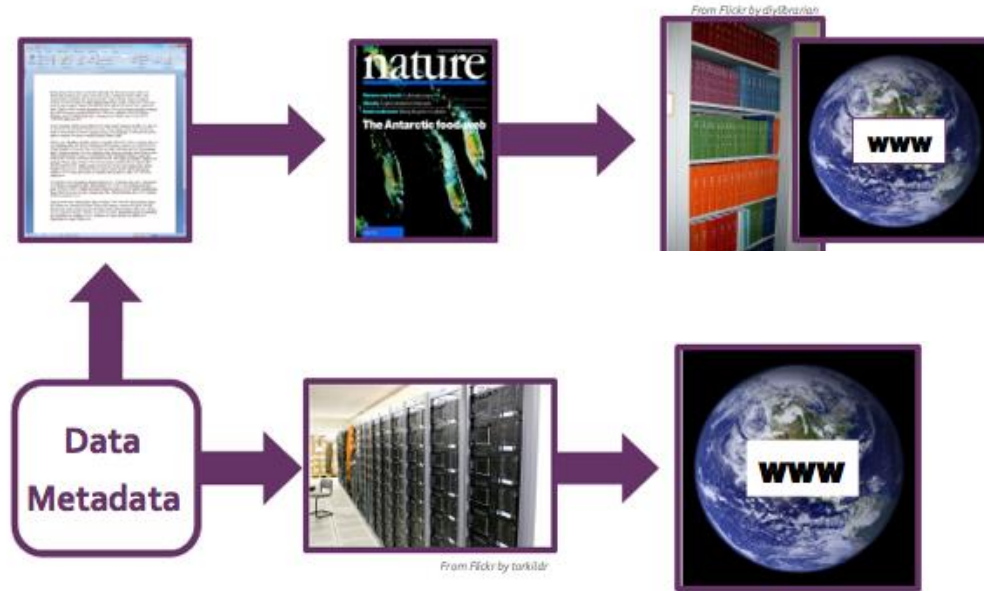


Data Life Span: Where majority of data ends up



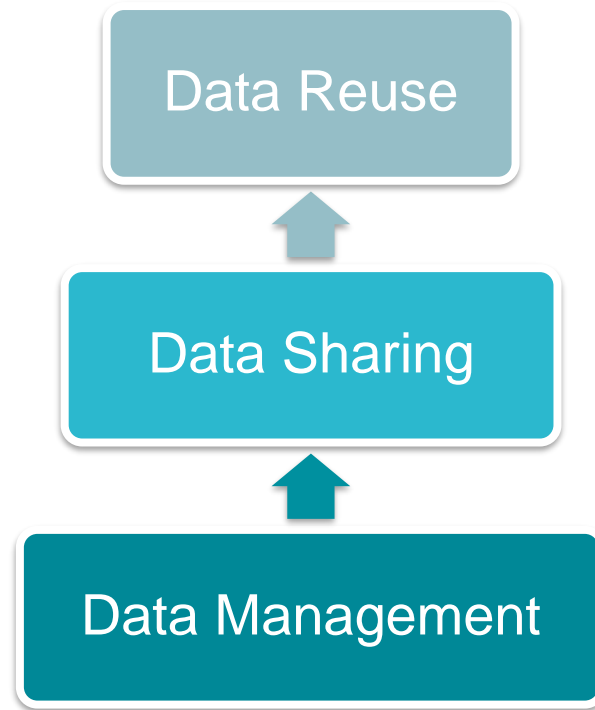
Recreated from Klump et al. 2006

An Alternative



Recreated from Klump et al. 2006

Good Data Management Facilitates Sharing & Reuse



Well-managed, shared, publicly accessible data is valuable

- Increases the impact and visibility of research
- Leads to new collaborations between data users and creators
- Supports open science
- Satisfies publishers and funders

Well-Managed, Shared Data Can Result in Re-use, Integration, and New Science

eBird




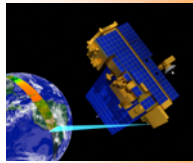
Land Cover



Meteorology




MODIS –
Remote
sensing data



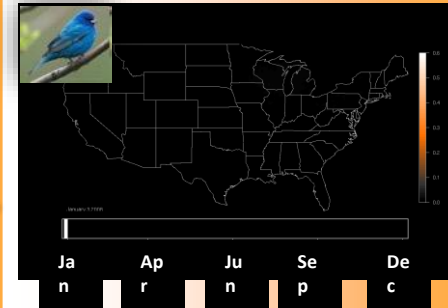
$$F(X, s, t) = \frac{1}{n(s, t)} \sum_{i=1}^n f_i(X, s, t) I(s, t \in \theta_i)$$

Spatio-Temporal Exploratory Models predict the probability of occurrence of bird species across the United States at a 35 km x 35 km grid.

Model

results

Occurrence of Indigo Bunting (2008)



Potential Uses-

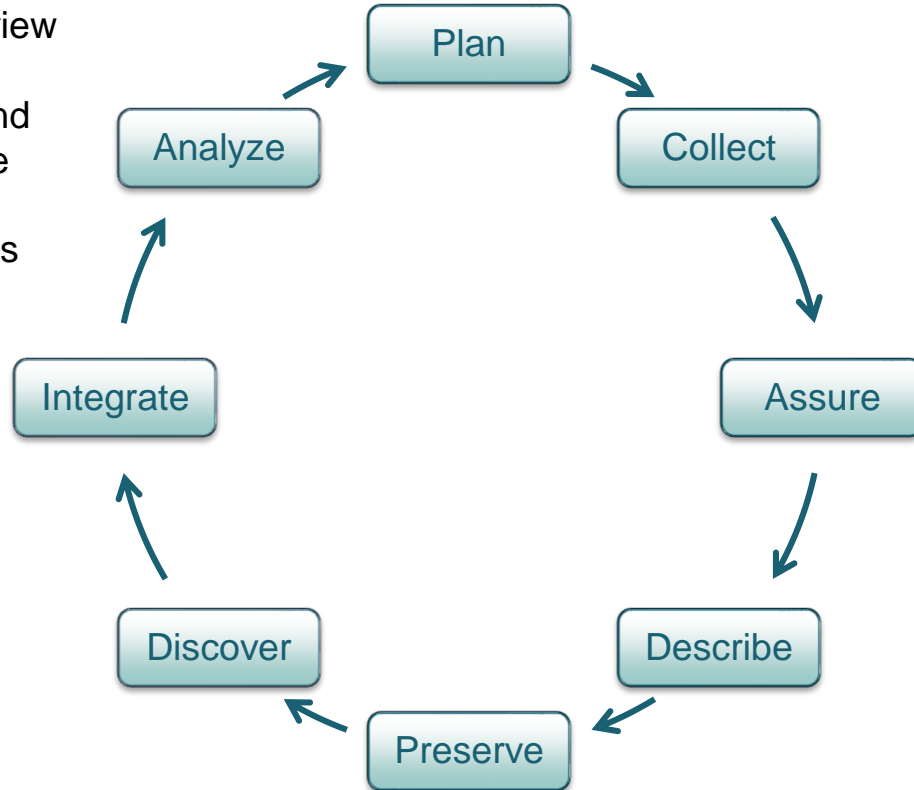
- Examine patterns of migration
- Infer impacts of climate change
- Measure patterns of habitat usage
- Measure population trends

Data Management

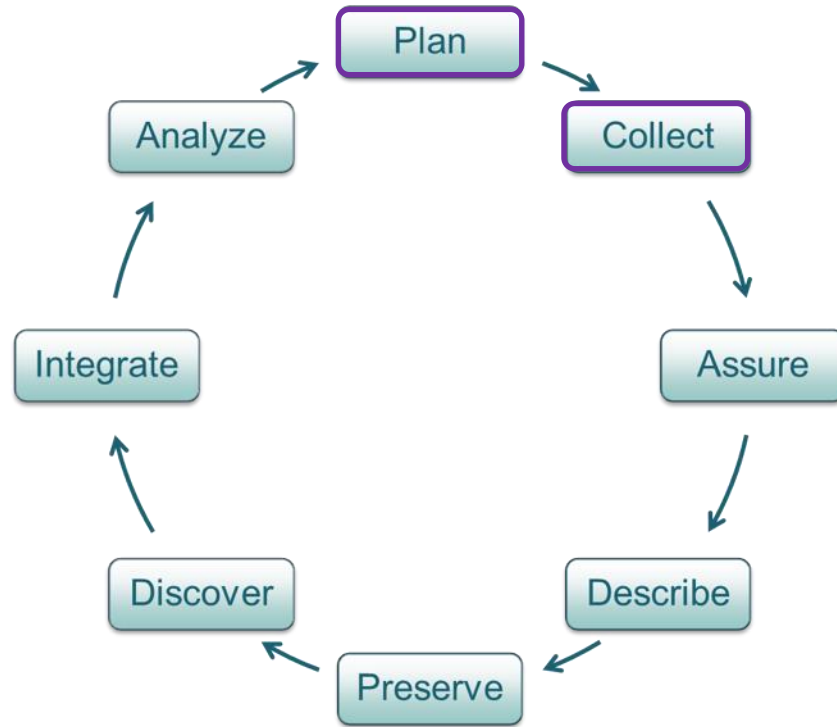
- Data Reuse <- Data Sharing <- Data Management
- A term that describes the organization, storage, documentation, and preservation of data collected and used in a research project
- Effective data management occurs throughout what we refer to as the *Data Life Cycle*.

Data Life Cycle

- Provides a high level overview of the stages involved in successful management and preservation of data for use and reuse.
- Helps define responsibilities
- Helps determine needed resources for data management (people, software, hardware)



DataONE Data Life Cycle

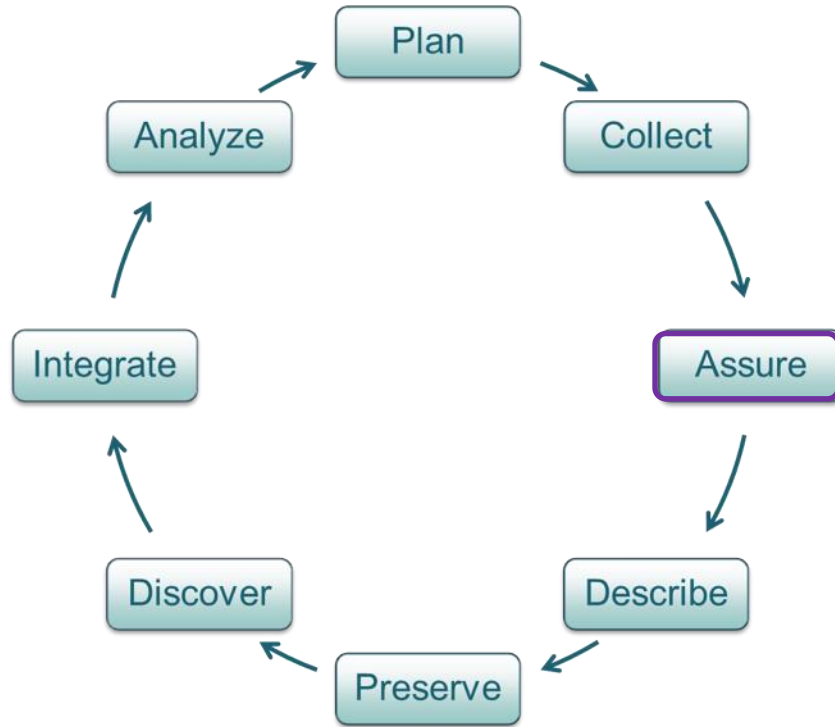


Plan: Write a Data Management Plan that describes the data to be acquired and how it will be documented, stored, quality assured, preserved and shared. DMP required for NSF proposals.

Collect: Data acquisition by hand or with sensors or other instruments.

- templates
- consistent file organization

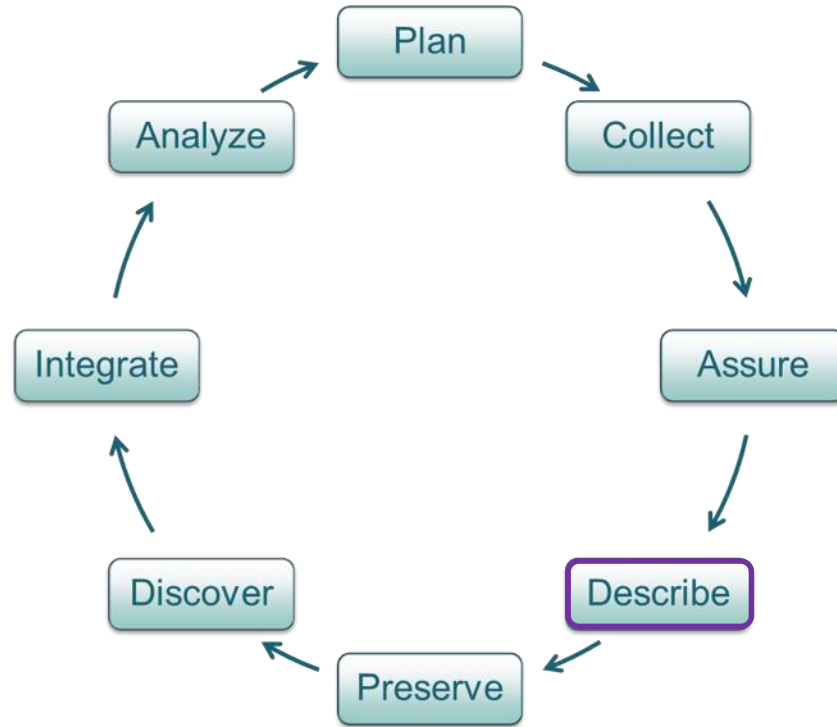
DataONE Data Life Cycle



Assure: Quality of data is assured through various checks and inspections.

- Perform statistical and graphical summaries
- Communicate quality

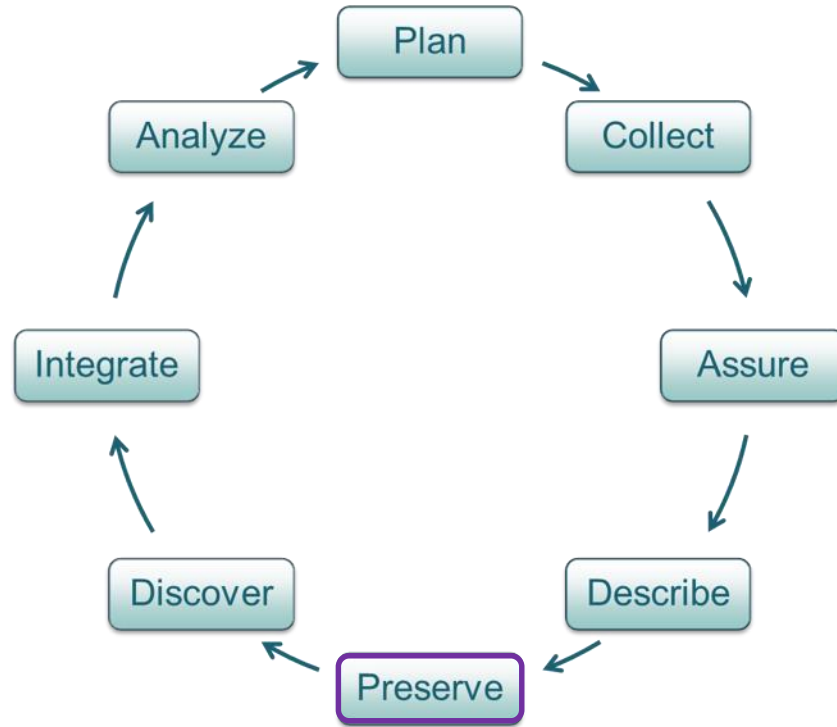
DataONE Data Life Cycle



Describe: Data are thoroughly documented using appropriate metadata standards. Key to understanding the data.

- Who? What? Where? When? Why?
- Structure
- Semantics
- License
- Standards: Ecological Metadata Language (EML); ISO19115; Darwin Core

DataONE Data Life Cycle



Preserve: Submit data to a data repository for long-term storage and to retain usability of data by someone other than the data creator.

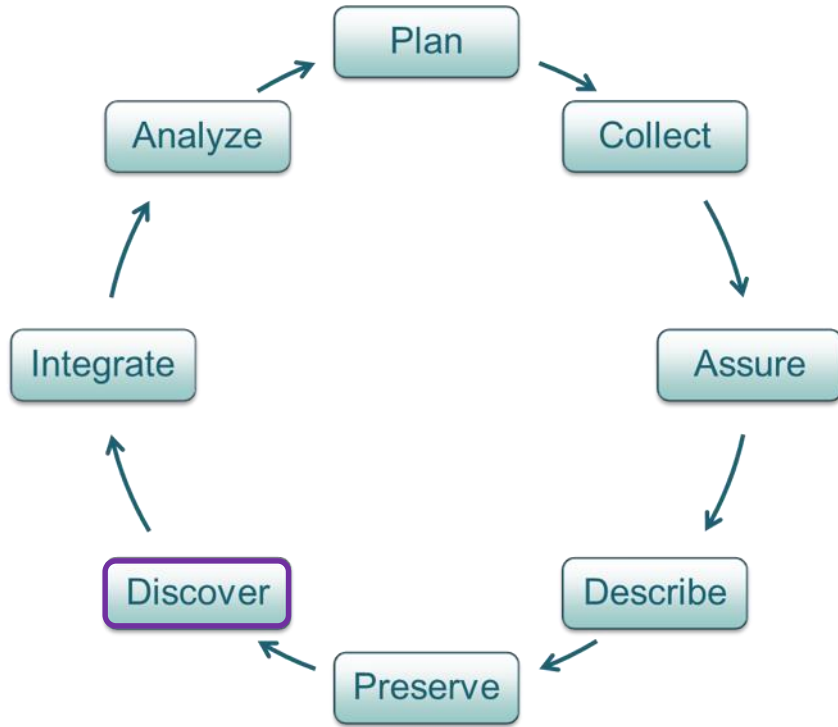
- Data Repositories implement systematic stewardship practices to ensure data availability, dissemination and access.
- Data repositories are operated by universities, government entities, grant-funded organizations
- General and discipline-specific

re3data.org
REGISTRY OF RESEARCH DATA REPOSITORIES

ecology

Search

DataONE Data Life Cycle



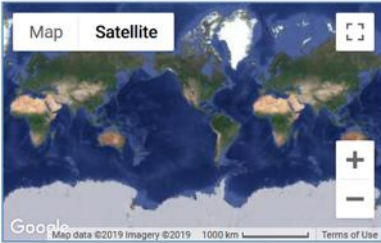
EDI Data Repository

Advanced Search

Spatial / Place Name Sites Subject Creator / Organization Temporal Taxonomic Project Identifier

Zoom in to the region you'd like to search:

Map Satellite



North:

West: East:

South:

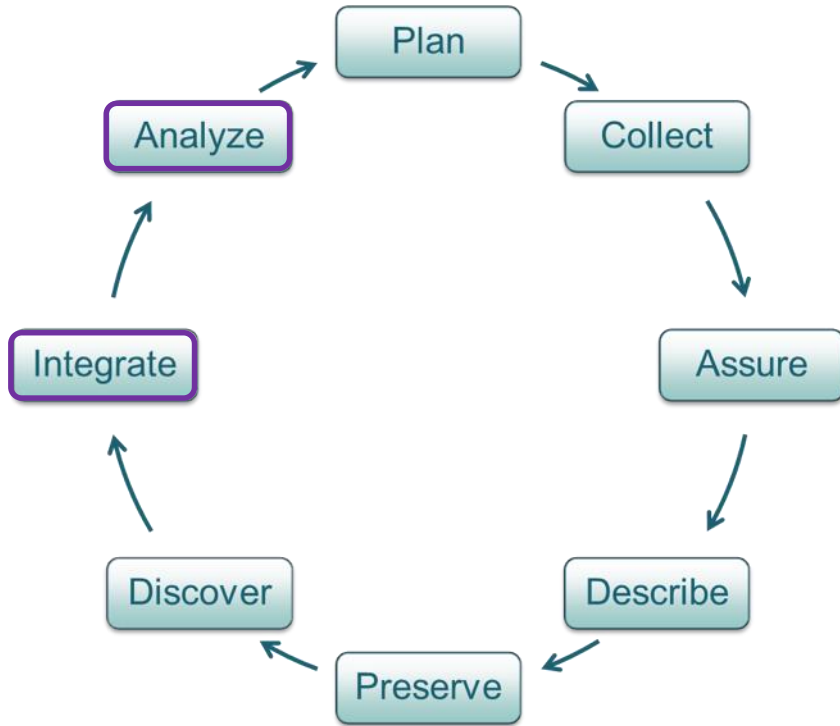
Dataset is Contained within Boundaries

Select

Geographic Place Name:

Submit Clear All

DataONE Data Life Cycle



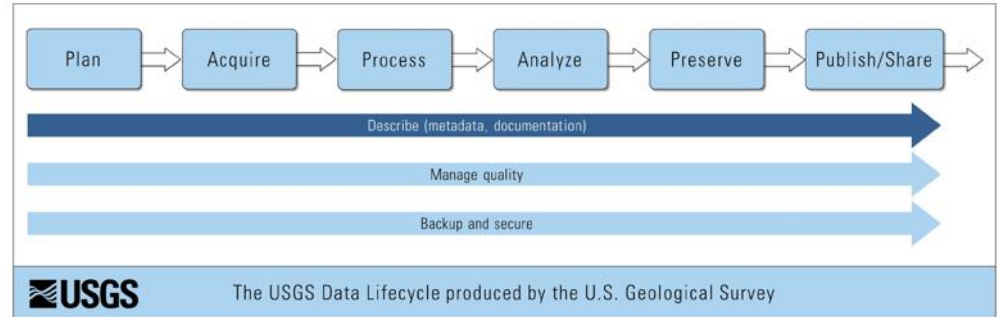
Integrate and Analyze: Data from disparate sources can be combined and analyzed. Papers are published and data are cited!

Other models of the Data Life Cycle



Data life cycle: Plan, Create, Process, Analyze, Preserve, Share, Reuse

<https://biblio.uottawa.ca/en/services/faculty/research-data-management/what-research-data-management>



usgs.gov

Best Practices and FAIR Data



Best Practices: Skillbuilding Hub

Data Management Skillbuilding Hub DataONE

Home Contribute FAQ GitHub

The Data Management Skillbuilding Hub contains resources for better data management and is open to community input and update. These resources are adaptable across a range of contexts and intended for use by researchers, teachers, librarians, or anyone who wants to learn better data management practices. Each tile below links to community contributed education materials, such as best practices and lesson plans

The resources presented on the Data Management Skillbuilding Hub can be updated by users to promote a current, well-maintained, and sustainable educational tool. Learn more about how you can [contribute](#).

Using This Resource

Click individual tiles to learn more and use each resource. You can limit resources by content type and [Data Life Cycle](#) stage. Comprehensive information is available in the [FAQ](#).

Filter by content type:

Filter by stage of the Data Life Cycle:

01.

Why Data Management

02.

Data Sharing

03.

Data Management Planning

04.

Data Entry and Manipulation

Best Practices Analyze

Best Practices Assure

Best Practices Collect

Best Practices Describe

Plan



DMPTool

 OPEN ACCESS

PERSPECTIVE


Ten Simple Rules for Creating a Good Data Management Plan

William K. Michener 

Published: October 22, 2015 • <https://doi.org/10.1371/journal.pcbi.1004525>

329 Save	10 Citation
30,690 View	323 Share

Article	Authors	Metrics	Comments	Related Content
⌵				

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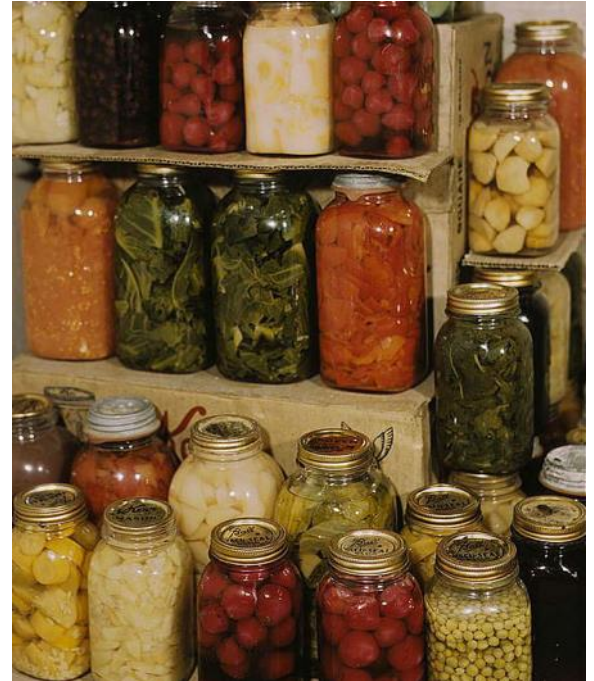
Collect

1	Site	Date	Plot	Species	Weight	Acult	Rodent Trapping 3/15/2010							
2	DeepWell	2/13/2010		1 DIPO	12.1	j	Site	Plot	Adult	RodentSp	Weight			
3	Deep Well	Feb-10		2 Pero	13.22	j	DW		1 y	Pero		12		
4	rioSalado	2/13/2010	1a	pero	16	N	RS		2 j	PERO	escaped <15			
5	riuSladu	"	1+	CleGap	18.92	gut away	RS		3 n	Clegap	91			
6				Mean1	15.06									
7														
8														
9														
10														
11														
12	Rodent Trapping		MJK & ALN	10-Apr-10										
13	Site	Plot	Adult	Species	grams	Comments								
14	deep well		1 y	woodrat	13									
15	riosalado		2 y	PERO	24.5									
16	riosalado		3 y	Clegap	91									
17														
18														
19														
20														

- Ensure column contents are consistent (don't mix data and text)
- Create descriptive column names (no spaces or special characters)
- Use a descriptive file name
- Store data in a consistent format that can be well in to the future

Preserve

- Create a clear backup policy and review frequently
- Minimize or remove reliance on users
- Don't assume backups are being performed
- Use non-proprietary, standard formats
- Check your backups manually
- Have multiple versions of backups on multiple formats in multiple places



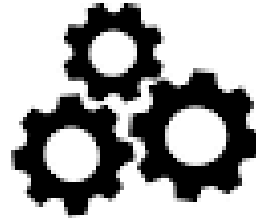
F
Findable



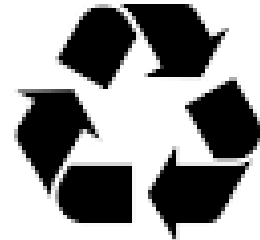
A
Accessible



I
Interoperable



R
Reusable



Finable Accessible

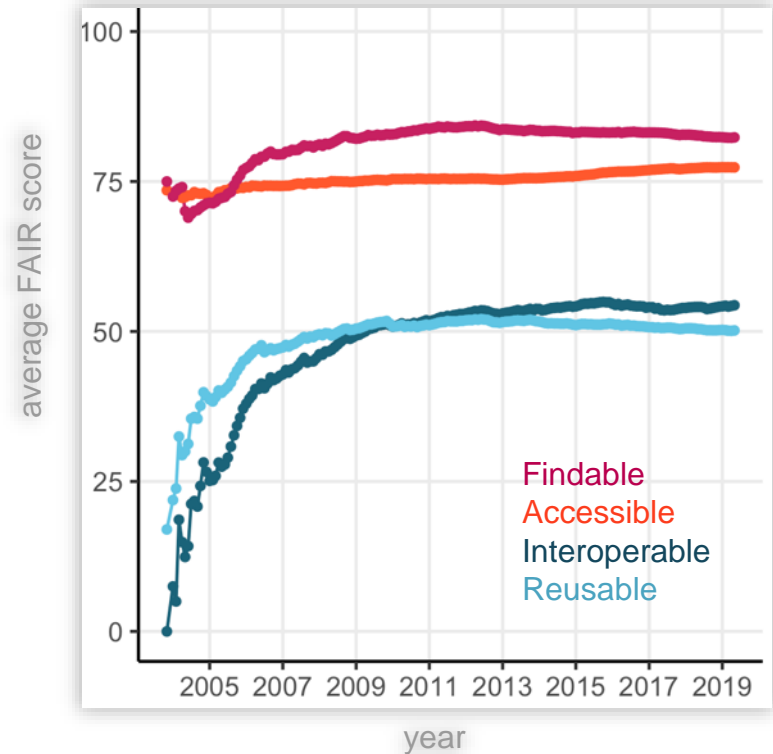
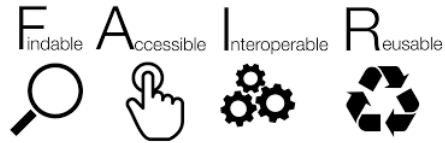
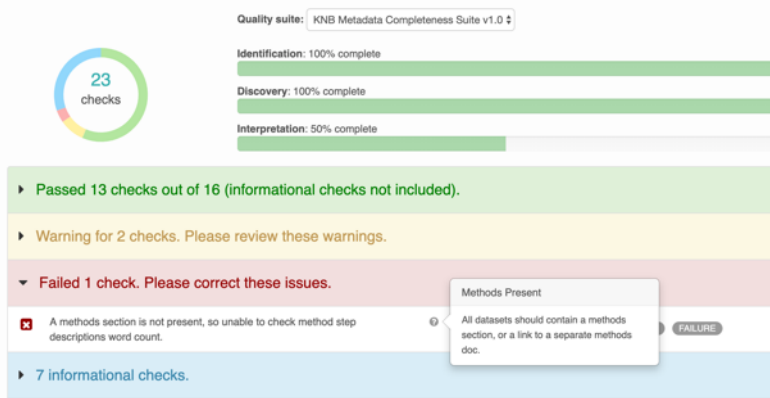
The screenshot shows the DataONE search results page. The search criteria are "Date Range: 2013-2018". The results are sorted by "Most recent". A table of search results is displayed, with columns for various data attributes. The table includes the following data:

822	2432	337	16	120	83	28	9	31	97	382	745
372	1327	1126	277	150	59	209	6	75	71	652	455
346	366	337	705	330	304	175	61	395	223	689	526
+	112	489	4526	1778	1457	5307	3808	3			
-	76	97	11915	5200	6697	1446	4905	16	1		
54	88	141	768	42825	12840	4437	5439	11			
51	94	247	294	6421	17728	1812	9191	33			
771	232	229	49	199	1286	994	9129	20			
2326	1096	107	51	66	385	479	892	9			
107	73	593	125	192	235	1199	636	7			
226	101	641	407	2200	2						
436	1902	385	349	799	576	4999	10				



Interoperable Reusable

- Use open, reproducible workflows



Getting Credit: Data Citation and Data Level Metrics

2 Citations 1 Downloads 2.5K Views 279

Hajo Eicken, Rolf Gradinger, Thomas Heinrichs, Mark Johnson, Amy Lovecraft, et al. 2011. Mooring Temperature/Conductivity & Temperature/Pressure data. Arctic Data Center. doi:10.18739/A2CZ3244X.

7 Parent dataset: The State of the Arctic Sea Ice Cover: Sustaining the Integrated seasonal ice zone observing network

Name	File type	Size	Downloads
Metadata: science_metadata.xml	EML v2.1.1	17 KB	62 Views
brw_sbe3528_2013-14_nearshore.asc	octet stream (application file)	1 MB	128 downloads
brw_sbe_metadata_2010-11.pdf	PDF	161 KB	271 downloads
brw_sbe37_774_2009-10_nearshore.csv	text/csv	2 MB	169 downloads

2 Citations 1 Downloads 2.5K Views 279

2.5K Downloads

754 Downloads from May 2010 to Apr 2017

These download counts are COUNTER compliant, meaning that downloads from some Internet robots and repeat downloads within a certain time window are excluded.

Monthly Downloads

Drag the slider to visualize a specific time window for the download events.



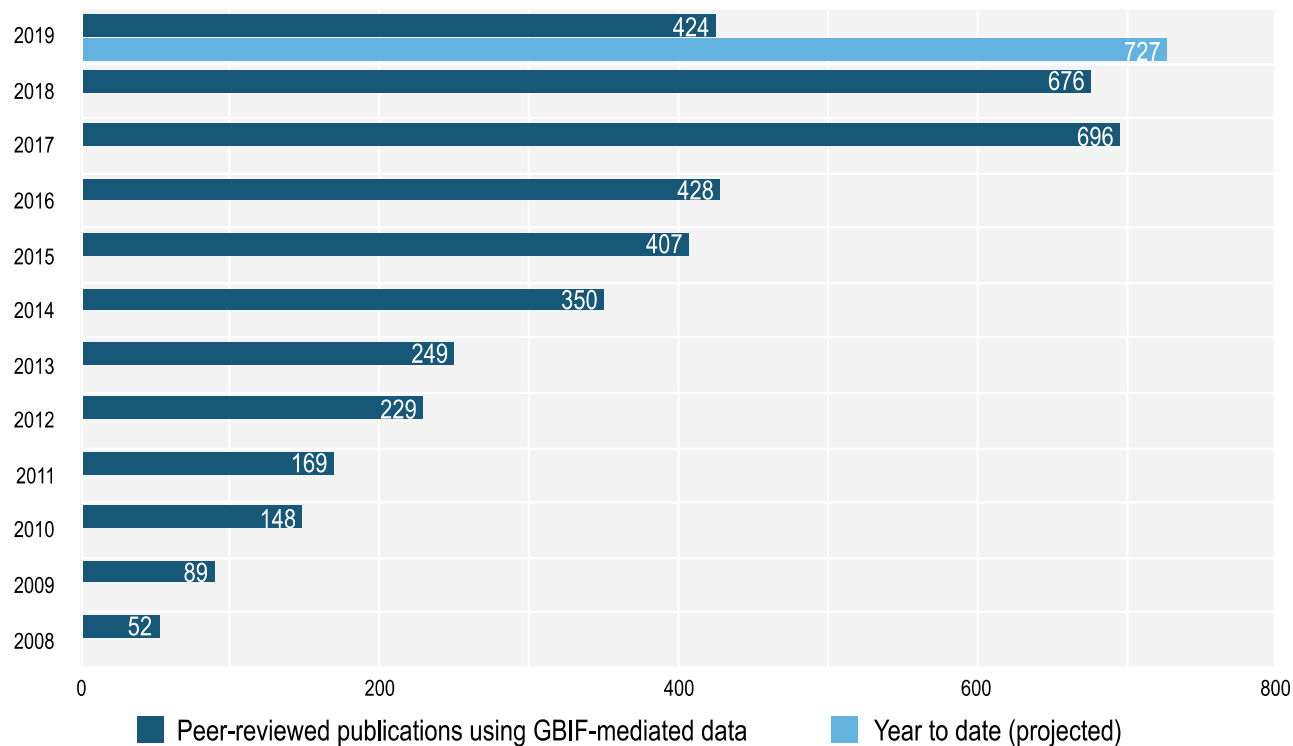
INTRO TO DATA CITATION

Kyle Copas | GBIF Secretariat

Dried's saddle (Polyporus squamosus). Photo 2019 Carolyn Waters via
[iNaturalist Research-grade Observations](#), licensed under CC-BY-NC 4.0.

PEER-REVIEWED USES OF GBIF-MEDIATED DATA

through 31 July 2019



PRE-EXISTING (ENABLING) CONDITIONS



Data and supplementary materials have sufficiently rich metadata and a unique and persistent identifier.

FINDABLE



Metadata and data are understandable to humans and machines. Data is deposited in a trusted repository.

ACCESSIBLE



Metadata use a formal, accessible, shared, and broadly applicable language for knowledge representation.

INTEROPERABLE



Data and collections have a clear usage licenses and provide accurate information on provenance.

REUSABLE

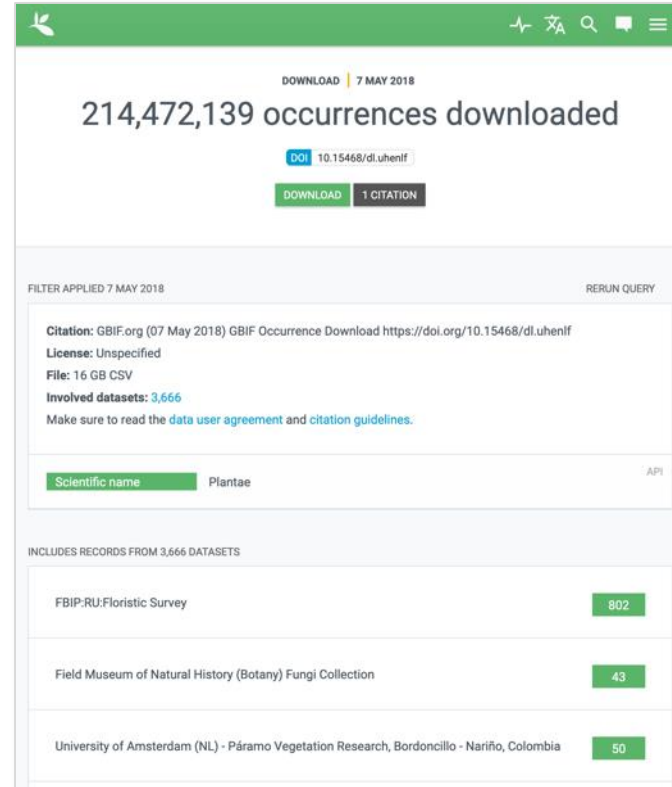
DOIs: DIGITAL OBJECT IDENTIFIERS

Four types of uses on GBIF.org

<i>Use type</i>	<i>Date of issue</i>	<i>Issued by</i>	<i>Function</i>
Mobilization	As close to publication event as possible	Data publisher, GBIF network host or GBIF.org	Institutional recognition of dataset through simple citation mechanism
Access	At time of user request for download from GBIF.org	GBIF	Simple citation, reproducibility, clarity of materials & methods
Bibliography	Publication date	Journal publisher	Stable identifier
Use	Data archiving before manuscript submission	Repository	Clarity of results, support reproducibility and discussion

DOWNLOAD DOIs

- GBIF stores each user download request and assigns a DOI resolving to a landing page that includes
 - Date and size of download
 - Terms/filters used in query
 - Links to download original file and to update query
 - Details of contributing datasets
 - Relationships modelled in metadata



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License: Unspecified
File: 16 GB CSV
Involved datasets: 3,666
Make sure to read the [data user agreement](#) and [citation guidelines](#).

Scientific name: Plantae API

INCLUDES RECORDS FROM 3,666 DATASETS

FBIP-RU:Floristic Survey	802
Field Museum of Natural History (Botany) Fungi Collection	43
University of Amsterdam (NL) - Páramo Vegetation Research, Bordoncillo - Nariño, Colombia	50

DATA AS A FIRST-CLASS RESEARCH OBJECT

‘It is in the hands of researchers, who use such data, to properly cite the datasets or the associated data papers if they exist. Failure to do so weakens the link between data and discovery and reduces the probability of the latter by jeopardizing the availability of the former.’

Journal List > Database (Oxford) > v.2018; 2018 > PMC5892138

Alerts | Author Instructions | Submit | About

DATABASE

The Journal of Biological Databases and Curation

Database (Oxford) | 2018; 2018: bay033. PMID: PMC5892138
Published online 2018 Apr 9. doi: [10.1093/database/bay033](https://doi.org/10.1093/database/bay033) PMID: 29688384

The tragedy of the biodiversity data commons: a data impediment creeping nigher?

Nora Escribano, David Galicia, and Arturo H Arriño

• Author information • Article notes • Copyright and License information [Disclaimer](#)

Associated Data

• Supplementary Materials

Abstract Go to:


Researchers are embracing the open access movement to facilitate unrestricted availability of scientific results. One sign of this willingness is the steady increase in data freely shared online, which has prompted a corresponding increase in the number of papers using such data. Publishing datasets is a time-consuming process that is often seen as a courtesy, rather than a necessary step in the research process. Making data accessible allows further research, provides basic information for decision-making and contributes to transparency in science. Nevertheless, the ease of access to heaps of data carries a perception of ‘free lunch for all’, and the work of data publishers is largely going unnoticed. Acknowledging such a significant effort involving the creation, management and publication of a dataset remains a flimsy, not well established practice in the scientific community. In a meta-analysis of published literature, we have observed various dataset citation practices, but mostly (92%) consisting of merely citing the data repository rather than the data publisher. Failing to recognize the work of data publishers might lead to a decrease in the number of quality datasets shared online, compromising potential research that is dependent on the availability of such data. We make an urgent appeal to raise awareness about this issue.

LITERATURE TRACKING

Article | Published: 05 November 2018

A global test of ecoregions

Jeffrey R. Smith , Andrew D. Letten, Po-Ju Ke, Christopher B. Anderson, J. Nicholas Hendershot, Manpreet K. Dhimi, Glade A. Dlott, Tess N. Grainger, Meghan E. Howard, Beth M. L. Morrison, Devin Routh, Priscilla A. San Juan, Harold A. Mooney, Erin A. Mordecai, Thomas W. Crowther & Gretchen C. Daily

Nature Ecology & Evolution **2**, 1889–1896 (2018) | [Download Citation](#) 

 An Author Correction to this article was published on 11 March 2019

 This article has been updated

Abstract

A foundational paradigm in biological and Earth sciences is that our planet is divided into distinct ecoregions and biomes demarking unique assemblages of species. This notion has profoundly influenced scientific research and environmental policy. Given recent advances in technology and data availability, however, we are now poised to ask whether ecoregions meaningfully delimit biological communities. Using

1 Citations | **176** Altmetric | [Article metrics >>](#)

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A global test of ecoregions

Jeffrey R. Smith , Andrew D. Letten, Po-Ju Ke, Christopher B. Anderson, J. Nicholas Hendershot, Manpreet K. Dhani, Glade A. Dlott, Tess N. Grainger, Meghan E. Howard, Beth M. L. Morrison, Devin Routh, Priscilla A. San Juan, Harold A. Mooney, Erin A. Mordecai, Thomas W. Crowther & Gretchen C. Daily

1

Citations

176

Altmetric

Article metrics >>


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Abstract

[Data availability](#)

 The original article was published on 05 November 2018

Correction to: *Nature Ecology & Evolution*

<https://doi.org/10.1038/s41559-018-0709-x>, published online 05 November 2018.

The original paper was published without unique DOIs for GBIF occurrence downloads. These have now been inserted as references 70–76, and the error has been corrected in the PDF and HTML versions of the article.



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Article | Published: 05 November 2018

A global test of ecoregions

1

Citations

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Jeffrey R. Smith
Manpreet K. Dhillon
Routh, Priscilla
Daily

Nature Ecology & Evolution

An Author

This article

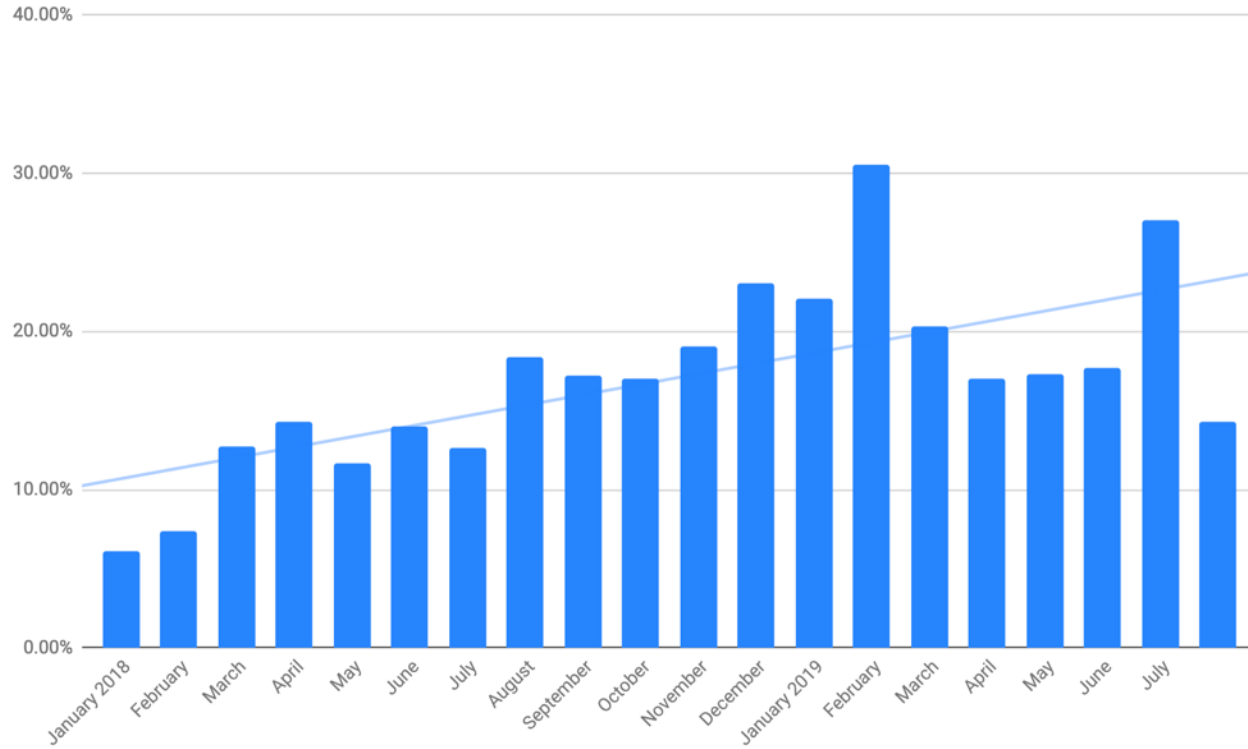
Abstract

A foundation
planet is
assemblage
research
technology
whether70. Plants: GBIF.org (GBIF, 2018); <https://doi.org/10.15468/dl.uhenlf>71. Arthropods: GBIF.org (GBIF, 2018);
<https://doi.org/10.15468/dl.uhumps>72. Reptiles: GBIF.org (GBIF, 2018);
<https://doi.org/10.15468/dl.pn1aw9>73. Amphibians: GBIF.org (GBIF, 2018);
<https://doi.org/10.15468/dl.as6uug>74. Mammals: GBIF.org (GBIF, 2018);
<https://doi.org/10.15468/dl.diqarx>75. Birds: GBIF.org (GBIF, 2018); <https://doi.org/10.15468/dl.61rqcy>76. Fungi: GBIF.org (GBIF, 2018); <https://doi.org/10.15468/dl.akftay>

Figures

References

DOI CITATION IN PERSPECTIVE



UNPACKING A DATA CITATION

Date: 7 May 2018

Filter: *Plantae*

DOI: doi:10.15648/dl.uhenlf

Datasets involved: 3,666

Records available now and at time of download

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License: Unspecified
File: 16 GB CSV
Involved datasets: 3,666
Make sure to read the [data user agreement](#) and [citation guidelines](#).

Scientific name Plantae API

NRW Regional Data: North Wales	5k
Field Museum of Natural History (Botany) Seed Plant Collection 10.15648/nxnqzf	116 116 records at time of download
Base de datos de plantas vasculares del País Vasco: ARAN-EH	1
	802
	43
Doncillo - Nariño, Colombia	50

CREDITING INSTITUTIONS & COLLECTIONS

PUBLISHER | SINCE MAY 3, 2010

Field Museum

ABOUT METRICS HOME PAGE

2,880,378 OCCURRENCES

14 DATASETS

266 CITATIONS

Description: <http://fieldmuseum.org/explore/our-collections>

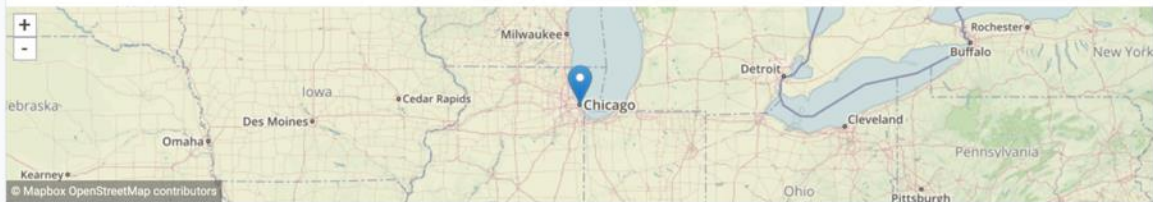
Endorsed by: U.S. Geological Survey

Installations: Field Museum of Natural History IPT

Technical contact: Sharon Grant

Country or area: United States of America

Hosting: 14 datasets (1 publisher • 1 country)




CONTACTS

Field Museum
Chicago, Illinois
United States of America
<http://www.fieldmuseum.org/>

Sharon Grant
Technical point of contact
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Rob Zschernitz
Technical point of contact
FMNH Systems Manager
rschernitz@fieldmuseum.org
312-665-7203

CITATION TRACKING

Get data Share Tools Inside GBIF Admin📍 🌐 🔍 🗨️kylecopas

Resources 1

SEARCH RESOURCES | 266 RESULTS

Search

ALL LITERATURE

Country or area of researcher

Search

<input type="checkbox"/> United States of America	84
<input type="checkbox"/> United Kingdom	31
<input type="checkbox"/> Australia	28
<input type="checkbox"/> Brazil	24
<input type="checkbox"/> Spain	24
<input type="checkbox"/> Germany	19
<input type="checkbox"/> China	18
<input type="checkbox"/> Canada	17
<input type="checkbox"/> South Africa	16
<input type="checkbox"/> Mexico	15
<input type="checkbox"/> Switzerland	13
<input type="checkbox"/> Colombia	13
<input type="checkbox"/> France	13
<input type="checkbox"/> Sweden	13
<input type="checkbox"/> Netherlands	12
<input type="checkbox"/> Denmark	11
<input type="checkbox"/> Portugal	11
<input type="checkbox"/> Argentina	10
<input type="checkbox"/> Italy	9
<input type="checkbox"/> New Zealand	6

Country or area of coverage

Literature type

Relevance

Read more about literature, how it's discovered and linked to GBIF-mediated data.

Phylogeography and species limits in the red-shouldered hawk (*Buteo lineatus*): Characterization of the Northern Florida Suture Zone in birds Literature

Barrowclough, G. Groth, J. Mauck, W. Blair, M. (2019) Ecology and Evolution
The North American red-shouldered hawk, *Buteo lineatus*, is comprised of two widely allopatric eastern and western populations with an additional well-marked subspecies in the Florida peninsula. The two eastern populations meet in northern Florida, the location of a well-known suture zone in many non...

Buteo lineatus • hybrid zones • niche modeling • phylogeography • red-shouldered hawk • suture

Journal article | Open access | Peer-reviewed

Data used in study [DOI 10.15468/dl.moaai](#)

Distribution of a habitat specialist: Mopane woodland structure determines occurrence of Near Threatened Lillian's Lovebird *Agapornis lillanae* Literature

MZUMARA, T. MARTIN, R. TRIPATHI, H. PHIRI, C. AMAR, A. (2019) Bird Conservation International
The near-threatened Lillian's Lovebird *Agapornis lillanae* is a small parrot endemic to the Zambezi basin in south-east Africa. The species has a fragmented distribution predominantly within mopane woodlands and is widely referred to as a mopane specialist. The harvesting of mopane trees for charcoal ...

Journal article | Peer-reviewed

Data used in study [DOI 10.15468/dl.ofqjeh](#)

The Economic Implications of *Robinia pseudoacacia* L. (black locust) on Agricultural Production in South Africa Literature

Humphrey, L. Fraser, G. Martin, G. (2019) Agrekon
Robinia pseudoacacia L. (black locust) is an invasive deciduous, broad-leaved tree that has the potential to be widely distributed across South Africa. It has invaded all nine South African provinces. The potential economic impact of *R. pseudoacacia* on agricultural production stems from the tree's a...

Ent • Invasive alien plants • Max • economic impact • grazing capacity • livestock

Journal article | Peer-reviewed

Data used in study [DOI 10.15468/dl.2f6ca1](#)

TOP TEN PUBLISHERS BY DOI CITATION

<i>Rank</i>	<i>Publisher</i>	<i>Citations</i>
1	National Museum of Natural History, Smithsonian	350
2	iNaturalist.org	328
3	Naturalis Biodiversity Center	312
4	Museum national d'Histoire naturelle	291
5	Field Museum	285
6	Natural History Museum (London)	283
7	California Academy of Sciences	258
8	GBIF Sweden	256
9	naturgucker.de	243
9	Senckenberg Gesellschaft für Naturforschung	243

CREDITING INSTITUTIONS

DBG Chatfield Farms Riparian Restoration Ground Vegetation Monitoring

10.15468/scmp5u

613

613 records at time of download

SAMPLING EVENT | REGISTERED SEPTEMBER 29, 2017

DBG Chatfield Farms Riparian Restoration Ground Vegetation Monitoring

Published by Kathryn Kalmbach Herbarium (Denver Botanic Gardens)

by Rick Levy • Rebecca Hufft

613 OCCURRENCES 13 CITATIONS

DATASET PROJECT METRICS ACTIVITY DOWNLOAD HOME PAGE

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Data from vegetation surveys conducted along twelve 25 meter transects, in concurrence with riparian restoration project. Temporary Sod Plugs (TSP) installed in Deer Creek (to mimic beaver dams) in March 2016. Baseline data collected in 2016. Three vegetation monitoring transects established in each of the four following habitat types and with the indicated identifiers: 1.Upstream of TSPs on Jefferson County Open Space (Hildebrand Ranch) (JCOS1, JCOS2, JCOS3) 2.TSPs 1, 2 and 3 (TSP1, TSP2, TSP3... [More](#))

DENVER BOTANIC GARDENS
Project ID: 4597f9d5-a007-4958-bcd3-36656583ce3e
Metadata last modified: October 5, 2017
Data last changed: October 4, 2017
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[How to cite](#) [DOI](#) 10.15468/scmp5u

613 Occurrences	100% With taxon match
100% With coordinates	100% With year

613 GEOREFERENCED RECORDS

PUBLISHER | SINCE NOVEMBER 4, 2014

Kathryn Kalmbach Herbarium (Denver Botanic Gardens)

82,662 OCCURRENCE 5 DATASETS 97 CITATIONS

ABOUT METRICS HOME PAGE

Description: The Kathryn Kalmbach Herbarium (KHD), a collection of over 49,000 vascular plant specimens, is a regional herbarium located at the Denver Botanical Gardens.

Endorsed by: [U.S. Geological Survey](#)

Administrative contact: [Melissa Islam](#)

Technical contact: [David Bloom](#)

Country or area: [United States of America](#)

CONTACTS

Kathryn Kalmbach Herbarium (Denver Botanic Gardens) 1007 York Street Denver CO 80206 United States of America http://www.botanicgardens.org/science/plant-fungi/kathryn-kalmbach-herbarium	David Bloom Technical point of contact VertNet Programmer VertNet dbloom@vertnet.org +01 785 813-1496
--	---

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mhoeft
Morten Hoeft

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FIRST NAME Morten	LAST NAME Hoeft
EMAIL mhoeft@gbif.org	COUNTRY Denmark

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23.802 occurrences
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DATASETS

2 Datasets
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2 CREATED 12 PUBLISHED 19 HOSTED

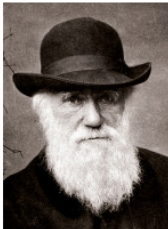


Year	Count
2008	7
2009	5
2010	1
2011	3
2012	0
2013	0
2014	1
2015	0
2016	0
2017	0

Title	Records	Citations	Comments	Last crawled
My short dataset title	14,254	7	0	October 17, 2017
My very long and not very informative dataset title with huge scientific names in it Streptopelia decaocto (Frivaldszky, 1838), Columbiformes ...	1,244,254	12	1	April 5, 2015
My very long and not very informative dataset title with huge scientific names in it Streptopelia decaocto (Frivaldszky, 1838), Columbiformes ...	1,244,254	12	1	April 5, 2015
My very long and not very informative dataset title with huge scientific names in it Streptopelia decaocto (Frivaldszky, 1838), Columbiformes ...	1,244,254	12	1	April 5, 2015
My very long and not very informative dataset title with huge scientific names in it Streptopelia decaocto (Frivaldszky, 1838), Columbiformes ...	1,244,254	12	1	April 5, 2015
My very long and not very informative dataset title with huge scientific names in it Streptopelia decaocto (Frivaldszky, 1838), Columbiformes ...	1,244,254	12	1	April 5, 2015
My very long and not very informative dataset title with huge scientific names in it Streptopelia decaocto (Frivaldszky, 1838), Columbiformes ...	1,244,254	12	1	April 5, 2015

CREDITING INDIVIDUALS: BLOODHOUND


[Home](#) [Profiles](#) [Trainers](#) [Organizations](#) [Countries](#) [Agents](#) [Help Others](#)  





Charles Darwin

Charles Robert Darwin; Charles R. Darwin; Darwin
(b. February 12, 1809 – d. April 19, 1882)

geologist, explorer, travel writer, ethologist, entomologist, botanist

 <https://www.wikidata.org/wiki/Q1035>


 United Kingdom of Great Britain and Ireland



 [Field notes](#)

[Overview](#) [Specialties](#) [Network](#) [Deposited At](#) [Science Enabled](#)

Specimens

Identified 77 specimens. Collected 1,076 specimens from at least 15 countries. Progress 97%



CREDITING INDIVIDUALS: BLOODHOUND

The screenshot shows the profile page for Sandra Knapp on the Bloodhound Tracker website. The page has a dark header with navigation links: Profiles, Trainers, Organizations, Countries, and Agents. A 'Help Others' button and a user profile icon are also present. The main content area features a profile picture of Sandra Knapp, her name, and her expertise in botany, biodiversity, taxonomy, nightshades, and Solanaceae. Her ORCID iD is listed as https://orcid.org/0000-0001-7698-3945, and her affiliation is the Natural History Museum, London, GB. There are 0 field notes listed. A 'Help Claim' button is visible. To the right, there are tabs for Overview, Specialties, Network, Deposited At, Science Enabled, and Specimens. A summary bar indicates that 33,984 specimens have been identified and 11,932 collected from at least 26 countries, with a progress bar at 98%. A world map shows collection locations in blue. At the bottom, there are sections for Resources (Integrations For Developers), About (Rationale, How it Works, Feedback), and a 'Give Support' button with a Twitter icon.

Profiles Trainers Organizations Countries Agents Help Others

Overview Specialties Network Deposited At Science Enabled Specimens

Identified 33,984 specimens. Collected 11,932 specimens from at least 26 countries. Progress 98%

Sandra Knapp
botany, biodiversity, taxonomy, nightshades, Solanaceae

<https://orcid.org/0000-0001-7698-3945>

Natural History Museum, London, London, GB

0 Field notes

Help Claim

Resources
Integrations
For Developers

About
Rationale
How it Works
Feedback

Give Support

CREDITING INDIVIDUALS: BLOODHOUND

The screenshot displays the Bloodhound Tracker web interface. At the top, there is a navigation bar with icons for Profiles, Trainers, Organizations, Countries, and Agents, along with a 'Help Others' button and a user profile dropdown. The main content area is divided into a left sidebar and a right main panel. The left sidebar features a profile picture of Sandra Knapp, her name, her expertise (botany, biodiversity, taxonomy, nightshades, Solanaceae), her ORCID ID (https://orcid.org/0000-0001-7698-3945), her affiliation (Natural History Museum, London, London, GB), and her field notes count (0). A 'Help Claim' button is also present. The right main panel has a tabbed interface with 'Overview', 'Specialties', 'Network', 'Deposited At', 'Science Enabled', and 'Specimens'. The 'Network' tab is active, showing a sub-tabbed view with 'Co-collectors', 'Identified For', and 'Identifications By'. A light blue banner indicates 'Has identified specimens collected by:'. Below this, a grid of individual profiles is shown, each with a small profile picture, name, birth and death dates, location, and the number of specimens claimed. The individuals listed are: Graham Charles George Argent (4,414 specimens), Isaac Bayley Balfour (1,277 specimens), Joseph Banks (2,607 specimens), Walter Berendsohn (5,277 specimens), Carl Ludwig Blume (1,778 specimens), Aimé Bonpland (4,198 specimens), Luc Brouillet, and Domingos Cardoso.

Profiles Trainers Organizations Countries Agents Help Others

Overview Specialties Network Deposited At Science Enabled Specimens

Co-collectors Identified For Identifications By

Has identified specimens collected by:

Sandra Knapp
botany, biodiversity, taxonomy, nightshades, Solanaceae
<https://orcid.org/0000-0001-7698-3945>
Natural History Museum, London, London, GB
0 Field notes
Help Claim

Argent, Graham Charles George
(b. May 15, 1941 – d. April 24, 2019)
United Kingdom
Identified Ericaceae and collected Ericaceae
4,414 specimens claimed

Balfour, Isaac Bayley
(b. March 31, 1853 – d. November 30, 1922)
United Kingdom of Great Britain and Ireland
Identified PRIMULACEAE and collected Rubiaceae
1,277 specimens claimed

Banks, Joseph
(b. February 24, 1743 – d. June 19, 1820)
United Kingdom of Great Britain and Ireland
Collected Poaceae
2,607 specimens claimed

Berendsohn, Walter
Germany
Identified Fabaceae and collected Fabaceae
5,277 specimens claimed

Blume, Carl Ludwig
(b. June 09, 1796 – d. February 03, 1862)
German Confederation; Netherlands
Identified Rubiaceae and collected Moraceae
1,778 specimens claimed

Bonpland, Aimé
(b. August 29, 1773 – d. May 04, 1858)
France
Identified Poaceae and collected Asteraceae
4,198 specimens claimed

Brouillet, Luc
Identified Asteraceae and collected Asteraceae

Cardoso, Domingos
Brazil

CREDITING INDIVIDUALS: BLOODHOUND

The screenshot shows the profile of Sandra Knapp on the Bloodhound Tracker website. The profile includes a photo, name, and a list of her specialties: botany, biodiversity, taxonomy, nightshades, and Solanaceae. It also displays her ORCID ID and affiliation with the Natural History Museum in London. The 'Identified For' section lists several individuals whose specimens she has identified, including Charles Baron, Eduardo Dalcin, Charles Darwin, Peter Hadland Davis, Per Karl Hjalmar Dusén, Heinrich Wawra Fernsee, Estrela Figueiredo, and George Forrest. The entry for Charles Darwin is circled in orange.

Sandra Knapp
botany, biodiversity, taxonomy, nightshades, Solanaceae

<https://orcid.org/0000-0001-7698-3945>
Natural History Museum, London, London, GB
0 Field notes

[Help Claim](#)



Overview Specialities Network Deposited At Science Enabled Specimens


Co-collectors Identified For Identifications By

Has identified specimens collected by:




- Clarke, Charles Baron**
(b. June 17, 1832 – d. August 26, 1906)
United Kingdom of Great Britain and Ireland
Identified Cyperaceae and collected Cyperaceae
1,883 specimens claimed
- Dalcin, Eduardo**
Brazil
Collected Bromeliaceae
60 specimens claimed
- Darwin, Charles**
(b. February 12, 1809 – d. April 19, 1882)
United Kingdom of Great Britain and Ireland
Identified Milleporidae and collected COMPOSITAE
1,123 specimens claimed
- Davis, Peter Hadland**
(b. June 18, 1918 – d. March 05, 1992)
United Kingdom
Identified Lamiaceae and collected Compositae
18,728 specimens claimed
- Dusén, Per Karl Hjalmar**
(b. August 04, 1855 – d. January 22, 1926)
Sweden
Identified Asteraceae and collected Asteraceae
10,622 specimens claimed
- Fernsee, Heinrich Wawra**
(b. February 02, 1831 – d. May 25, 1887)
Austria
Identified Lamiaceae and collected Rubiaceae
816 specimens claimed
- Figueiredo, Estrela**
Identified Acanthaceae and collected Solanaceae
- Forrest, George**
(b. March 13, 1873 – d. January 05, 1932)
United Kingdom


CREDITING INDIVIDUALS: BLOODHOUND

Profiles Trainers Organizations Countries Agents Help Others 



Sandra Knapp
botany, biodiversity, taxonomy, nightshades, Solanaceae

 <https://orcid.org/0000-0001-7698-3945>
 Natural History Museum, London, London, GB
 0 Field notes

 [Help Claim](#)


[Overview](#) [Specialties](#) [Network](#) [Deposited At](#) [Science Enabled](#) [Specimens](#)

35 publications used specimen data from the Global Biodiversity Information Facility (GBIF).

Science Enabled by Specimen Data


Grattarola, F., Botto, G., da Rosa, I., Gobel, N., González, E., González, J., ... Pincheira-Donoso, D. (2019). Biodiversidata: An Open-Access Biodiversity Database for Uruguay. *Biodiversity Data Journal*, 7. doi:10.3897/bdj.7.e36226 <https://doi.org/10.3897/bdj.7.e36226>

The continental and marine territories of Uruguay are characterised by a rich convergence of multiple biogeographic ecoregions of the Neotropics, making this country a peculiar biodiversity spot. However, despite the biological significance of Uruguay for the South American subcontinent, the distrib...

 29 specimens


Schubert, M., Marcussen, T., Meseguer, A. S., & Fjellheim, S. (2019). The grass subfamily Pooideae: Cretaceous–Palaeocene origin and climate-driven Cenozoic diversification. *Global Ecology and Biogeography*. doi:10.1111/geb.12923 <https://doi.org/10.1111/geb.12923>

Aim: Frost is among the most dramatic stresses a plant can experience, and complex physiological adaptations are needed to endure long periods of sub-zero temperatures. Owing to the need to evolve these complex adaptations, transitioning from tropical to temperate climates is regarded as difficult. ...

 7 specimens

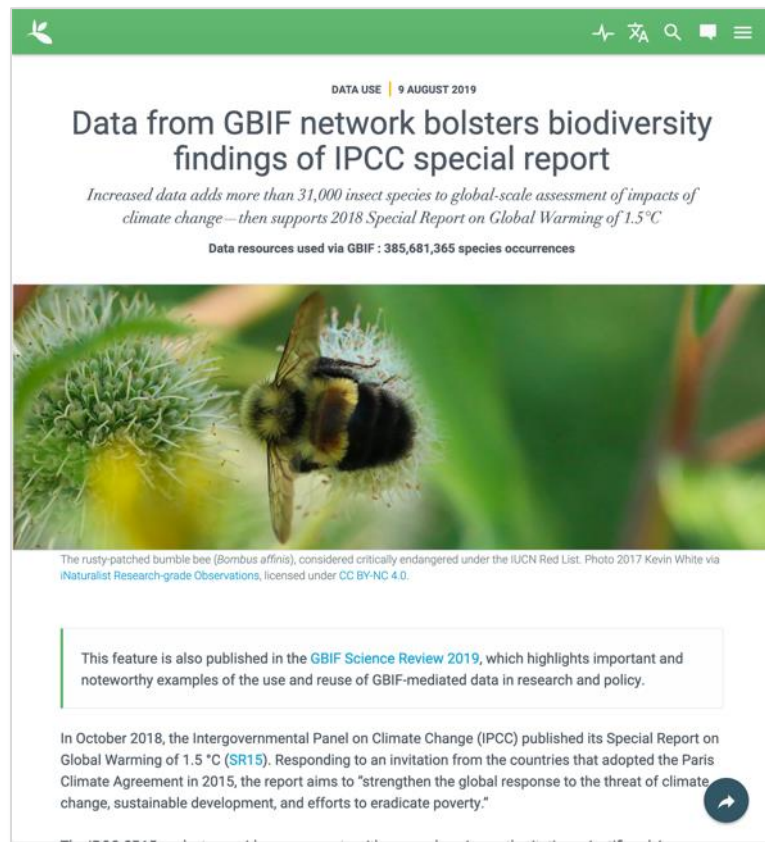
Folk, R. A., Stubbs, R. L., Mort, M. E., Cellinese, N., Allen, J. M., Soltis, P. S., ... Guralnick, R. P. (2019). Rates of niche and phenotype evolution lag behind diversification in a temperate radiation. *Proceedings of the National Academy of Sciences*, 116(22), 10874–10882. doi:10.1073/pnas.1817999116 <https://doi.org/10.1073/pnas.1817999116>

Environmental change can create opportunities for increased rates of lineage diversification, but continued species accumulation has been hypothesized to lead to slowdowns via competitive exclusion and niche partitioning. Such density-dependent models imply tight linkages between diversification and...

 3 specimens

POLICY-RELEVANT SCIENCE

‘...when asked why they share their data, GBIF publishers of any of the 5,432 datasets cited in the download can unequivocally state: to **contribute to critical policy-relevant science like the first global-scale assessment of climate change impacts on insects and the IPCC’s Special Report on Global Warming of 1.5 °C.**’



The screenshot shows a news article from GBIF. At the top, it says 'DATA USE | 9 AUGUST 2019'. The main headline is 'Data from GBIF network bolsters biodiversity findings of IPCC special report'. Below the headline is a sub-headline: 'Increased data adds more than 31,000 insect species to global-scale assessment of impacts of climate change—then supports 2018 Special Report on Global Warming of 1.5°C'. A line of text below that states: 'Data resources used via GBIF : 385,681,365 species occurrences'. The article features a photograph of a rusty-patched bumble bee on a flower. Below the photo is a caption: 'The rusty-patched bumble bee (*Bombus affinis*), considered critically endangered under the IUCN Red List. Photo 2017 Kevin White via iNaturalist Research-grade Observations, licensed under CC BY-NC 4.0.' A text box contains the following text: 'This feature is also published in the [GBIF Science Review 2019](#), which highlights important and noteworthy examples of the use and reuse of GBIF-mediated data in research and policy.' At the bottom of the article, there is a paragraph: 'In October 2018, the Intergovernmental Panel on Climate Change (IPCC) published its Special Report on Global Warming of 1.5 °C ([SR15](#)). Responding to an invitation from the countries that adopted the Paris Climate Agreement in 2015, the report aims to "strengthen the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty."' A blue circular arrow icon is in the bottom right corner of the article content area.

Introduction to the Data Life Cycle, FAIR (Findable, Accessible, Interoperable, and Reusable) Data, and Data Citation

Presenter : Arctic Data Center, DataONE, Environmental Data Initiative, ESIP, GBIF, iDigBio, NEON

Amber Budden, Kyle Copas, and Kristin Vanderbilt

#datahelpdesk

Ecological Society of America 2019 ESAUSSEE

Career Fair Center in the Exhibit Hall <https://esa.org/louisville/career-fair/>

Monday 12 August 330-430 PM

