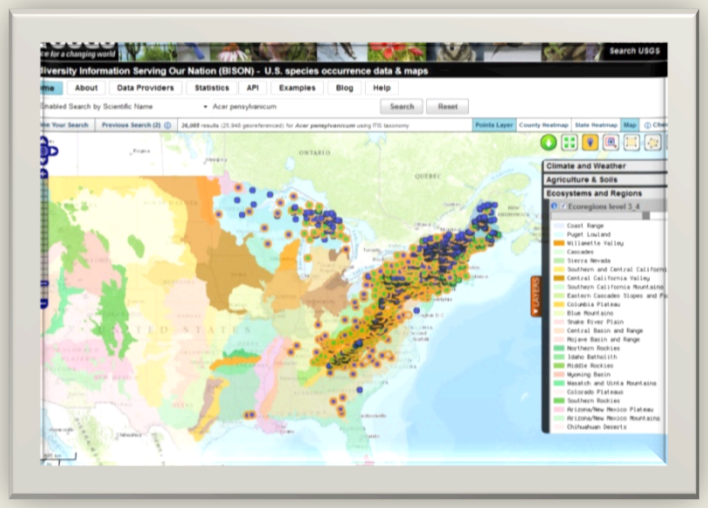
Core Science Analytics, Synthesis & Libraries

USGS

BISON

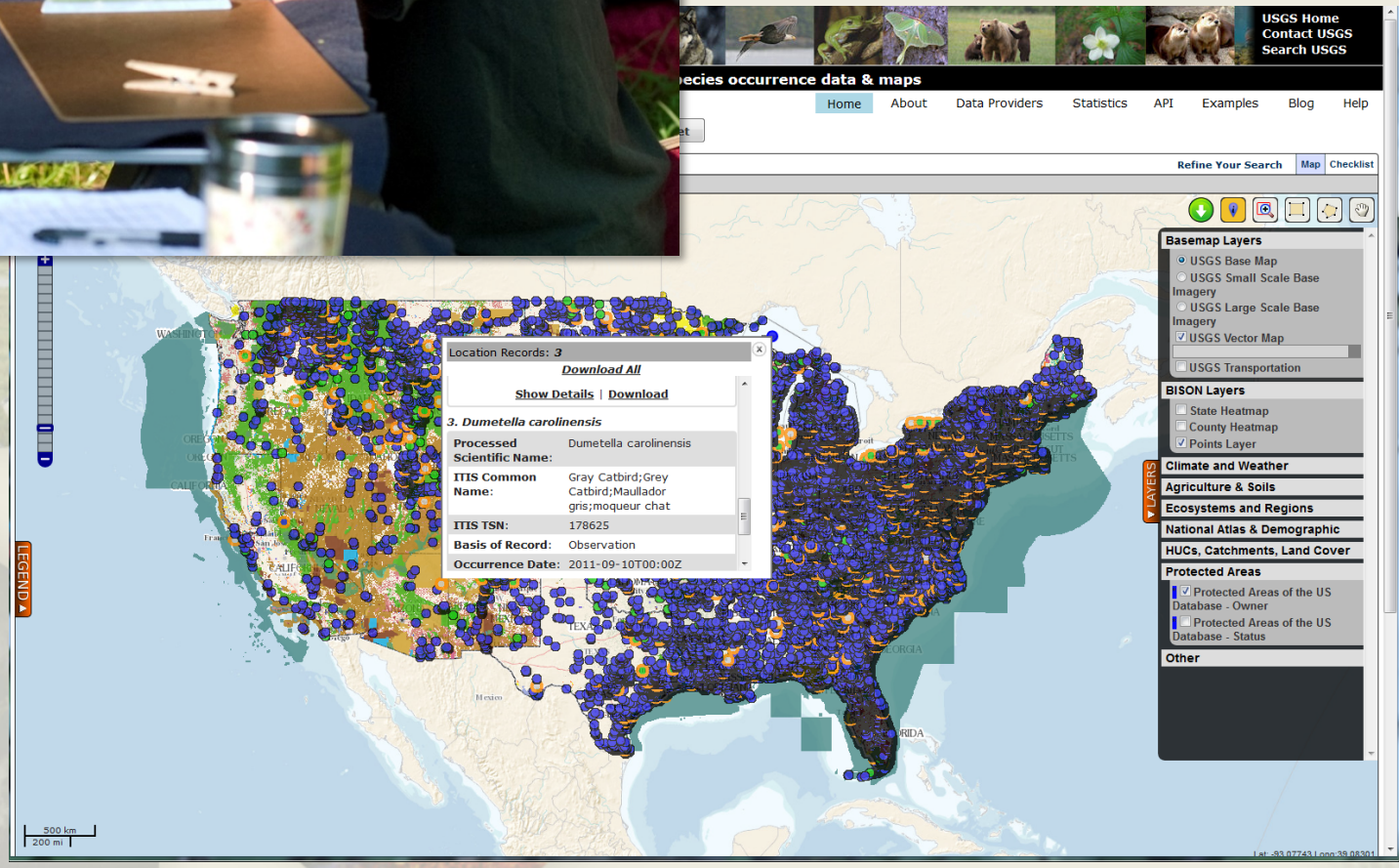


Biodiversity Information Serving Our Nation

Gerald "Stinger" Guala, Ph.D.
Branch Chief for Eco-Science Synthesis
Core Science Systems Mission Area
United States Geological Survey

U.S. Department of the Interior
U.S. Geological Survey

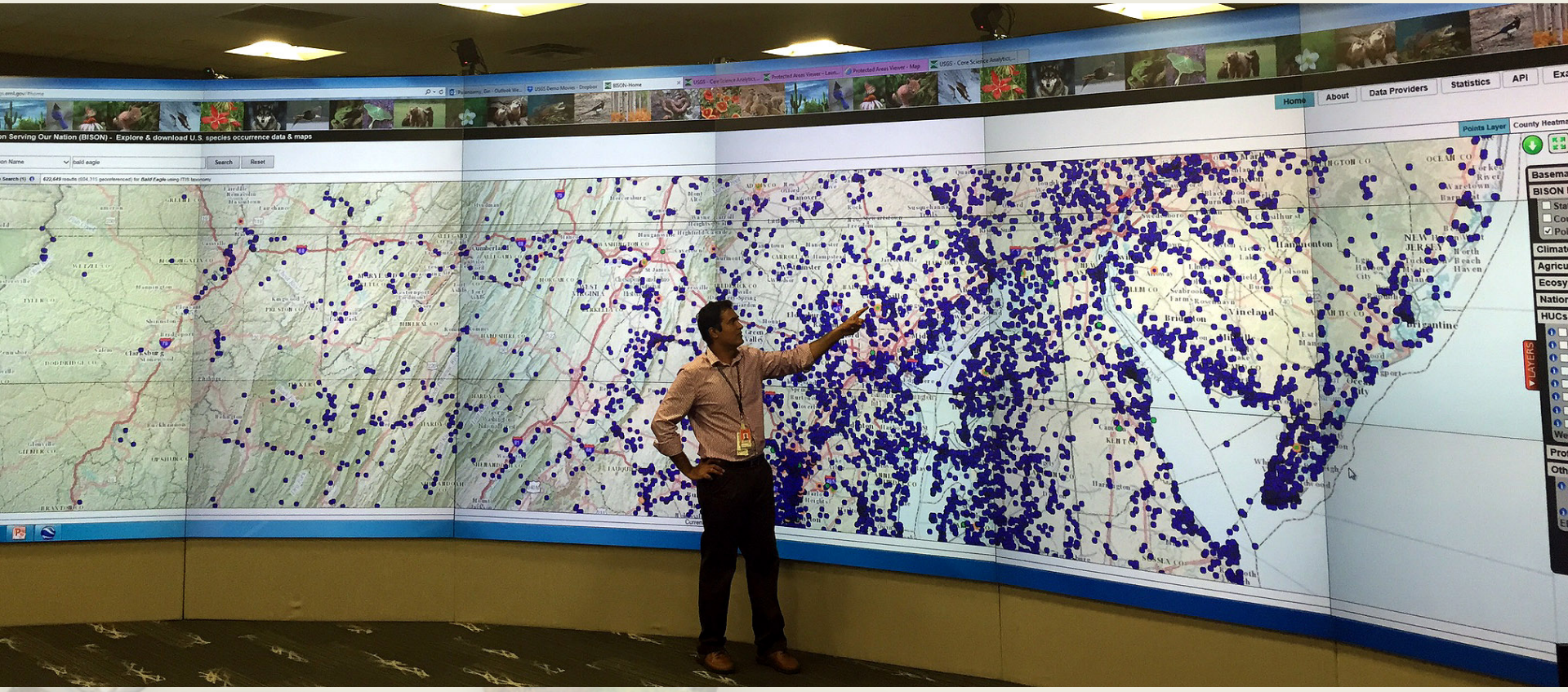
Everyone's data online helping to save our environment



More than a million professional and citizen scientists have gathered the data that is in BISON

USGS

Big Data



An open source framework to add spatial extent and geospatial visibility to Big Data
Proceedings - 2014 IEEE International Conference on Big Data, IEEE Big Data (2015)
DOI: 10.1109/BigData.2014.7004495

USGS

(BISON.USGS.GOV)

- National Clearinghouse for occurrence data
- US Node of GBIF
- Biodiversity Hub of EcoINFORMA
- 261+ million records & growing
- Nearly all species
- Taxonomic standardization
- Every state and county
- 55 environmental layers
- Who, what, when, where for every record (at a minimum)
- 1568 data sets from 380 global providers across Federal, State, and local Gov'ts, NGOs and Academia

"I have been spending a lot of weekends using BISON and the data have been extremely helpful in my analyses. I am very grateful to have this resource - thank you for all you've done to make this what it is."
September 14, 2016. Laura T. Bortolin, Harvard Medical School, Dept. of Genetics, Boston, MA

"...I am very impressed with BISON and am happy the USGS is making biodiversity data available as it is desperately needed. Keep up the good work! "
December 14, 2015. Robert Irwin, Resource Conservationist, Sacramento River Forum, Red Bluff, CA.

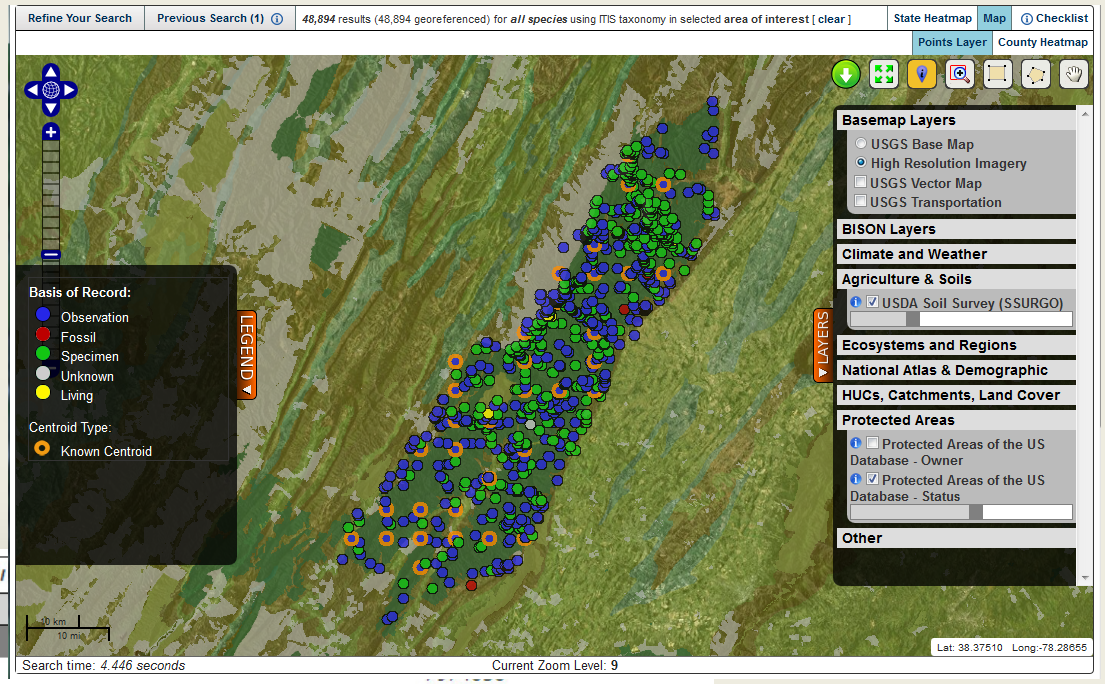
"...thanks a million for this application. It is really adding to the number of records I have been able to acquire for numerous amphibian and reptile species."
April 29, 2013. Bill Sutton, Ph.D., Postdoctoral Research Associate, Clemson University, School of Agricultural, Forest and Environmental Sciences.

"...we're really excited at its performance in producing and mapping extremely large search-result sets (I generated one with 1.8 million hits in a matter of seconds)."
April, 22, 2013. Scott L. Cross, Ph.D.. NOAA National Oceanographic Data Center/National Coastal Data Development Center, Charleston, SC.

USGS

Custom Maps & Checklists

For Any Area Including User Polygons



Found **9,070,998** matches for *all*

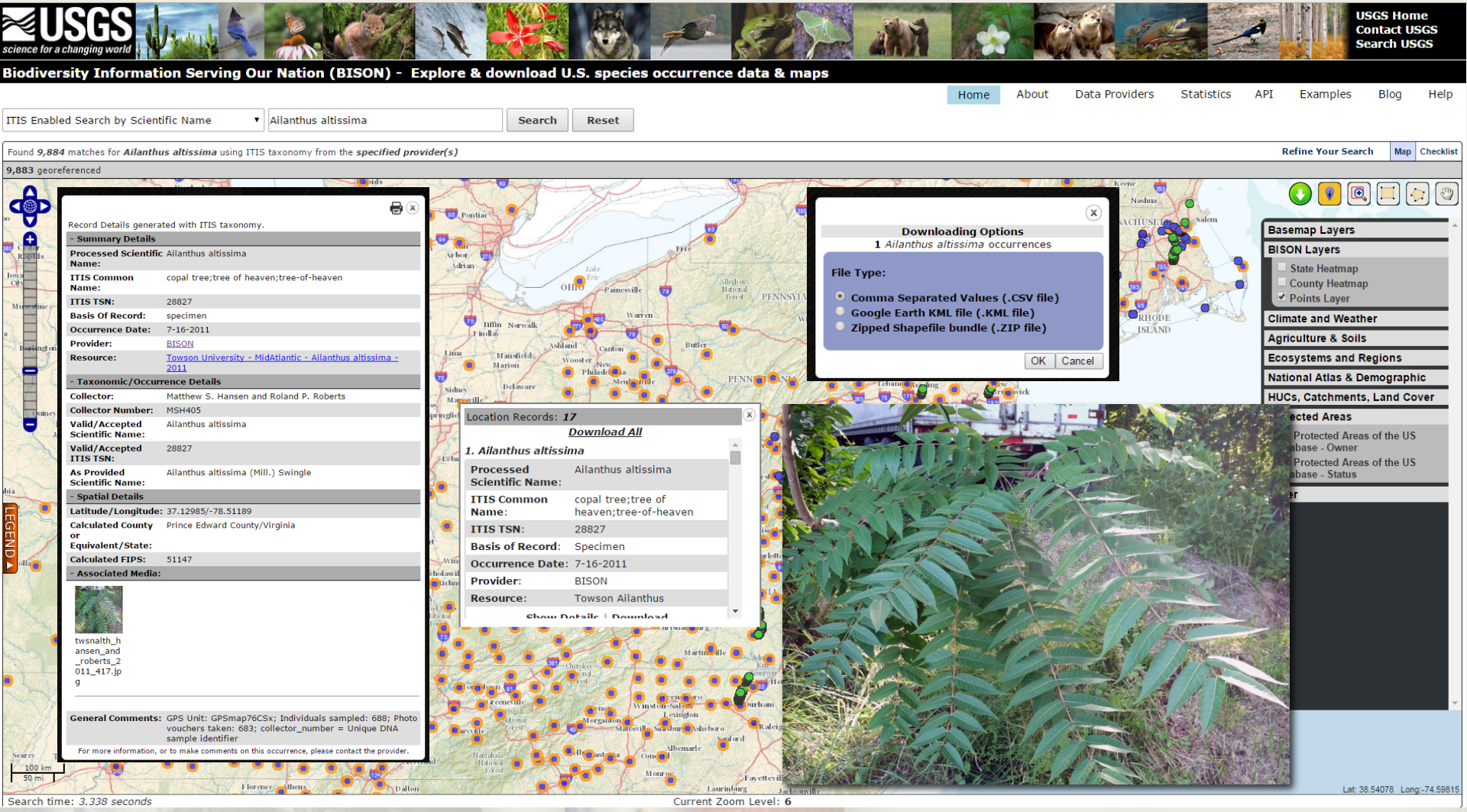
9,070,998 georeferenced

Kingdom	
Animalia	
Chromista	10808
Fungi	2651
Plantae	454729

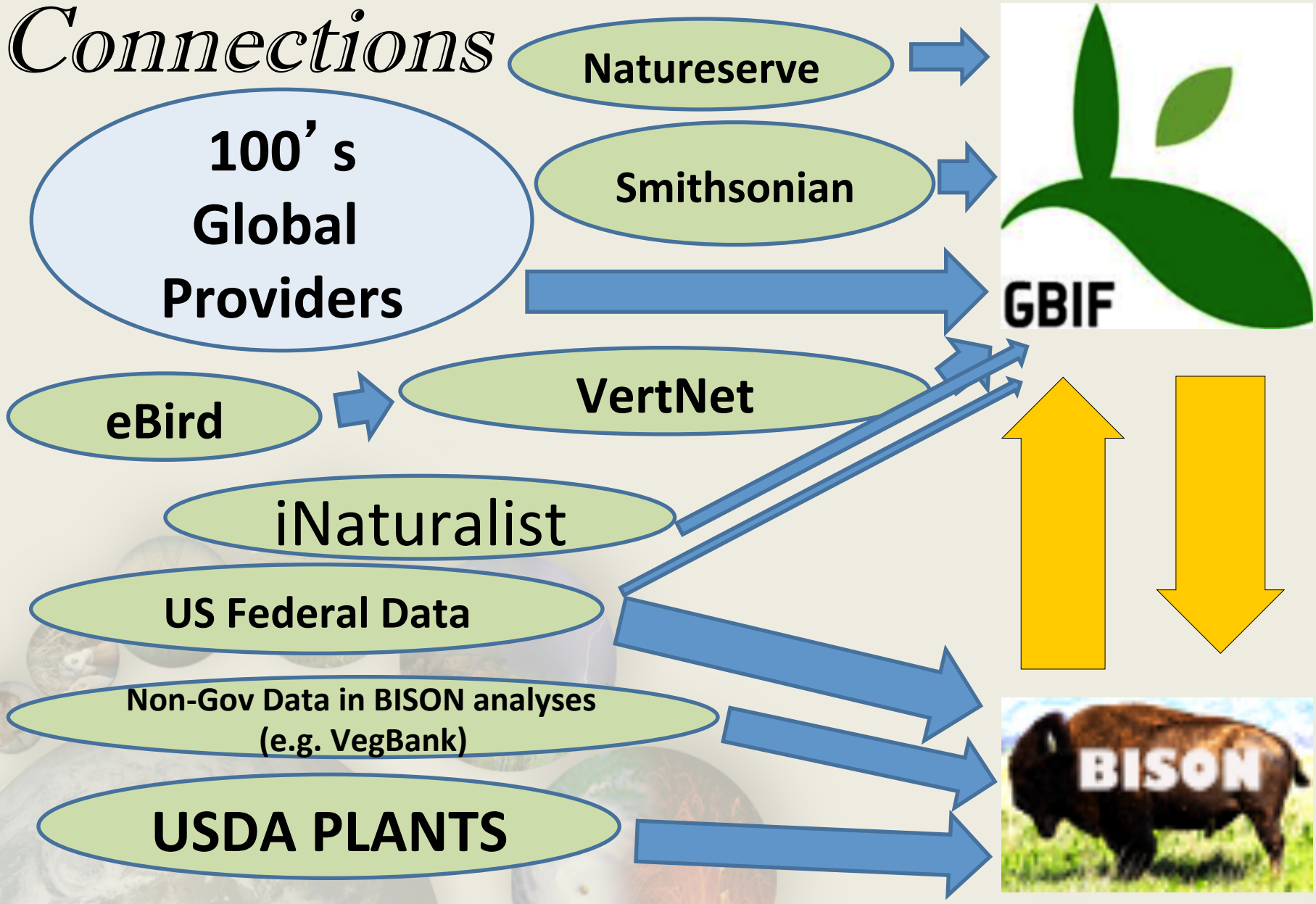
ITIS Scientific Name	Count
Abies balsamea	12807
Abies balsamea balsamea	28
Abies homolepis	2
Abies magnifica	1
Abies procera	1
Abietinella abietina	5
Abutilon theophrasti	39
Acacia baileyana	1
Acacia cultriformis	1
Acacia ligulata	1

USGS

Documentation with a Click & Download



Connections



Datasets from other Federal agencies:
BLM - Landscape Monitoring Framework - Plants - 2011-2013 (44,626)
BLM - National Invasive Species Information Management System - Plants - 2010-2014 (62,317)
EPA - National Lakes Assessment - Zooplankton - 2007 (17,539)
NPS - Inventory and Monitoring Program - NPSpecies Park Species Lists (256,073)
USDA - PLANTS Database (2,390,439)
USFS - Forest Inventory and Analysis - Tree Species (18,170,706)
USFS - New York City Tree Census - 1995 (516989)
USFWS - Big Rivers Network Native Bee Survey Project (FWS No. F11AC00869) - 2013 (6,071)
USFWS - Mourning Dove Call-Count Survey - 2001-2013 (9,270)
USFWS - Ruby Lake NWR - Vegetation Mapping Survey - 2012-2013 (577)

Numerous sets from USGS Science Centers: Alaska, FORT, Leetown, NWHC, PIERC, PWRC, SESC & WERC. Highlighting PWRC...
USGS PWRC - Bird Banding Lab - (61,605,303)
USGS PWRC - Bird Phenology Program (585,541)
USGS PWRC - Colonial Waterbirds - US (109,596)
USGS PWRC - Native Bee Inventory and Monitoring Lab - US-CA-MX - Bees (260,950)
USGS PWRC - North American Breeding Bird Atlas Explorer (2,726,852)
USGS PWRC - North American Breeding Bird Survey - 1966-2013 (2,288,254)

Other USGS Programs including:
USGS GAP - Alaska - Vertebrates - 1867-2009 (1,193,488)
USGS NAWQA - BioData - USA (1,154,963)

Non-Federal datasets of importance to the BISON mission:
International Biological Information System - US - Nonnative Species (299,222)
Multistate Aquatic Resources Information System - MARIS - Fish (961,352)
VegBank - Carolina Vegetation Survey (438,861)
VegBank - Vegetation Plot Database (1,029,948)

A selection of datasets hosted directly by BISON

Individual Statistics

USGS ASC - Changing Arctic Ecosystems - Birdlist - 2011-2013	156	3905	17095	85556
USGS ASC - Copper River Delta - Birds - 1997-2005	125	3844	16523	77453
USGS BISON Team - Species Recognizable in Images and Video	138	4411	23127	116840
USGS FORT - Mesa Verde NP - Bats - 2006-2007	14	3732	17036	78407
USGS FORT - Ouray NWR - Bats - 2010	14	3732	16640	76238
USGS FORT - Rocky Mountain Arsenal NWR - Bats - 1997-1998	14	3732	17062	77941
USGS GAP - Alaska - Vertebrates - 1867-2009	152	4346	20145	109212
USGS LSC - Northern Appalachian Research Lab - Delaware River Mussel Survey	14	3834	16420	78154
USGS NAWQA - BioData - USA	26	4565	23774	142561
USGS NRP - Submerged Aquatic Plants - 1966-2009	14	4254	18417	98865
USGS NWHC - Laboratory Information Management System - Eastern US - Avian Cholera and Pasteurella multocida	262	4173	17998	95224
USGS NWHC - Laboratory Information Management System - Texas - Avian Cholera	262	4005	16964	78635
USGS NWHC - Laboratory Information Management System - US - Avian Pox and Pox Viruses	277	4778	20946	114656
USGS PIERC - Hawaii Forest Bird Survey Database	22	4002	18040	85010
USGS PWRC - Bird Banding Lab - Canada - 1960-2010	46	607	3728	28560
USGS PWRC - Bird Banding Lab - US 10min Block - 1960-2010	38	4922	24580	157897
USGS PWRC - Bird Banding Lab - US State Centroid - 1960-2010	30	514	3142	25368
USGS PWRC - Bird Phenology Program	295	5296	25583	166191
USGS PWRC - Colonial Waterbirds - US	18	4468	21903	126522
USGS PWRC - Native Bee Inventory and Monitoring Lab - US-CA-MX - Bees	16	4806	21976	130903
USGS PWRC - North American Breeding Bird Atlas Explorer	290	4878	23165	143996
USGS PWRC - North American Breeding Bird Survey - 1966-2013	160	5163	25320	167564
USGS SESC - Big Cypress - Herpetofauna - 2002-2003	58	4045	17525	80259
USGS SESC - Biscayne - Herpetofauna - 2002-2003	58	3818	16624	78513
USGS SESC - Everglades - Herpetofauna - 2000-2002	58	4044	17517	80396
USGS SESC - Everglades - Herpetofauna - 2005	16	3961	16848	78479
USGS SESC - Virgin Islands - Herpetofauna - 2001-2002	14	3737	16262	75091
USGS WERC - SDFS Fisher Lab - Vertebrates - 1999-2009	20	4244	19006	95861

Name Reconciliation

This application will look at all scientific names in the data set of a specific provider and compare them to the ITIS accepted names for those organisms in BISON. Conflicts will be listed. You will need to enter the three digit BISON Provider ID number which is listed in brackets after the provider name HERE.

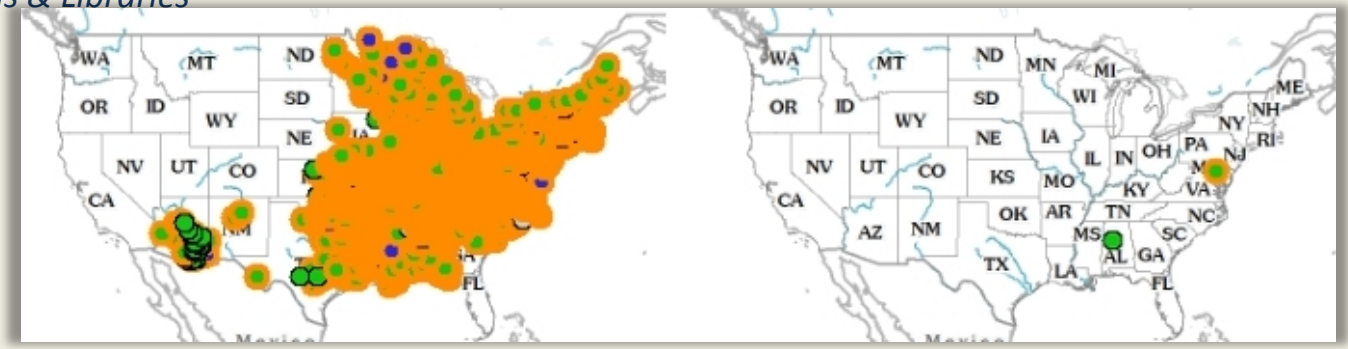
Enter a BISON Provider ID: 362 Submit Query

24 Conflicts Found

Provider 362 = Bosmina coregoni ***vs*** ITIS = Eubosmina coregoni
Provider 362 = Chinemys reevesii ***vs*** ITIS = Mauremys reevesii
Provider 362 = Cichlasoma nigrofasciatum ***vs*** ITIS = Archocentrus nigrofasciatus
Provider 362 = Cichlasoma spilurum ***vs*** ITIS = Archocentrus spilurus
Provider 362 = Cichlasoma urophthalmus ***vs*** ITIS = Cichlasoma urophthalma
Provider 362 = Gambusia holbrooki ***vs*** ITIS = Gambusia affinis
Provider 362 = Gasterosteus aculeatus williamsoni ***vs*** ITIS = Gasterosteus aculeatus
Provider 362 = Gila bicolor ***vs*** ITIS = Siphateles bicolor
Provider 362 = Gila bicolor mohavensis ***vs*** ITIS = Siphateles bicolor mohavensis
Provider 362 = Gila bicolor obesa ***vs*** ITIS = Siphateles bicolor obesus
Provider 362 = Gila bicolor snyderi ***vs*** ITIS = Siphateles bicolor snyderi
Provider 362 = Hypsopsetta guttulata ***vs*** ITIS = Pleuronichthys guttulatus
Provider 362 = Lampetra appendix ***vs*** ITIS = Lethenteron appendix
Provider 362 = Myleus rubripinnis ***vs*** ITIS = Myloplus rubripinnis
Provider 362 = Notropis dorsalis ***vs*** ITIS = Hybopsis dorsalis
Provider 362 = Oncorhynchus gilae apache ***vs*** ITIS = Oncorhynchus apache
Provider 362 = Oncorhynchus mykiss aguabonita ***vs*** ITIS = Oncorhynchus aguabonita
Provider 362 = Phoxinus neogaeus ***vs*** ITIS = Chrosomus neogaeus
Provider 362 = Phoxinus oreas ***vs*** ITIS = Chrosomus oreas

USGS

ITIS



Go to Print Version

***Rubus flagellaris* Willd.**

Taxonomic Serial No.: 24921

Download data (Download Help) ***Rubus flagellaris*** TSN 24921

Taxonomy and Nomenclature

Kingdom:	Plantae
Taxonomic Rank:	Species
Synonym(s):	Rubus scambens L.H. Bailey
	Rubus aboriginum Rydb.
	Rubus apogaeus L.H. Bailey
	Rubus aptatus L.H. Bailey
	Rubus arenicolus Blanch.
	Rubus arizonensis Focke
	Rubus arundelanus Blanch.
	Rubus ashei L.H. Bailey
	Rubus baileyanus Britton
	Rubus cacaponensis H.A. Davis & T. Davis
	Rubus celer L.H. Bailey
	Rubus centralis L.H. Bailey
	Rubus clarus L.H. Bailey
	Rubus curtipes L.H. Bailey
	Rubus deamii L.H. Bailey
	Rubus decor L.H. Bailey
	Rubus depavitus L.H. Bailey
	Rubus enslenii Tratt.
	Rubus exsularis L.H. Bailey
	Rubus fecundus L.H. Bailey
	Rubus felix L.H. Bailey
	Rubus grimesii L.H. Bailey
	Rubus hancinianus L.H. Bailey
	Rubus injunctus L.H. Bailey
	Rubus invisus (L.H. Bailey) Britton
	Rubus ithacanus L.H. Bailey
	Rubus kentuckiensis L.H. Bailey
	Rubus leviculus L.H. Bailey
	Rubus meracus L.H. Bailey
	Rubus michiganensis (Card ex L.H. Bailey) L.H. B
	Rubus multifer L.H. Bailey
	Rubus mundus L.H. Bailey
	Rubus nefrens L.H. Bailey
	Rubus obsessus L.H. Bailey
	Rubus particeps L.H. Bailey
	Rubus plicatifolius Blanch.
	Rubus profusiflorus L.H. Bailey
	Rubus pronus L.H. Bailey
	Rubus roribaccus (L.H. Bailey) Rydb.
	Rubus russeus L.H. Bailey
	Rubus sailori L.H. Bailey
	Rubus schoolcraftianus L.H. Bailey
	Rubus steelei L.H. Bailey
	Rubus temerarius L.H. Bailey
	Rubus uvidus L.H. Bailey
	Rubus vixalacer L.H. Bailey
	Rubus whartoniae L.H. Bailey
	Rubus arenicola Blanch.
	Rubus iniens L.H. Bailey
	Rubus obvius L.H. Bailey
	Rubus pernagaeus Fernald
	Rubus plexus Fernald
	Rubus sewardianus Fernald
	Rubus alacer L.H. Bailey
	Rubus alius L.H. Bailey
	Rubus almus (L.H. Bailey) L.H. Bailey
	Rubus armatus (Fernald) L.H. Bailey
	Rubus austrinus L.H. Bailey
	Rubus bollianus L.H. Bailey
	Rubus bonus L.H. Bailey
	Rubus botruosus L.H. Bailey
	Rubus bretonis L.H. Bailey
	Rubus camurus L.H. Bailey
	Rubus canaanensis H.A. Davis & T. Davis
	Rubus cathartium Fernald
	Rubus census L.H. Bailey
	Rubus clandestinus L.H. Bailey
	Rubus coloniatus L.H. Bailey
	Rubus complex L.H. Bailey
	Rubus conabilis L.H. Bailey
	Rubus connixus L.H. Bailey
	Rubus cordialis L.H. Bailey
	Rubus cordifrons (L.H. Bailey) L.H. Bailey
	Rubus currulis L.H. Bailey
	Rubus dives L.H. Bailey
	Rubus eflagellaris L.H. Bailey
	Rubus exemptus L.H. Bailey
	Rubus exutus L.H. Bailey
	Rubus fandus L.H. Bailey
	Rubus florenceae L.H. Bailey
	Rubus foliaceus L.H. Bailey
	Rubus folioflorus L.H. Bailey
	Rubus frustratus L.H. Bailey
	Rubus fuscus Weihe & Nees ex Bluff & Finge
	Rubus geophilus Blanch.
	Rubus gordonii L.H. Bailey ex Core
	Rubus housei L.H. Bailey
	Rubus ignarus L.H. Bailey
	Rubus imperiorum Fernald
	Rubus indianensis L.H. Bailey
	Rubus inobvius L.H. Bailey
	Rubus jactus L.H. Bailey
	Rubus jaysmithii L.H. Bailey
	Rubus lassus L.H. Bailey
	Rubus longipes Fernald
	Rubus lundelliorum L.H. Bailey
	Rubus macdanielsii L.H. Bailey
	Rubus mainensis L.H. Bailey
	Rubus maltei L.H. Bailey
	Rubus masseyi L.H. Bailey
	Rubus minnesotanus L.H. Bailey
	Rubus neonefrens L.H. Bailey
	Rubus occidualis (L.H. Bailey) L.H. Bailey
	Rubus occultus L.H. Bailey
	Rubus pauper L.H. Bailey
	Rubus peracer L.H. Bailey
	Rubus pityophilus S.J. Sm.
	Rubus pohlii L.H. Bailey
	Rubus polulus L.H. Bailey
	Rubus polybotrys L.H. Bailey
	Rubus prior L.H. Bailey
	Rubus problematicus L.H. Bailey
	Rubus redundans L.H. Bailey
	Rubus rhodinsulanus L.H. Bailey
	Rubus ricei L.H. Bailey
	Rubus rosagnetis L.H. Bailey
	Rubus sanfordii L.H. Bailey
	Rubus satis L.H. Bailey
	Rubus semierectus Blanch.
	Rubus serenus L.H. Bailey
	Rubus subinnoxius Fernald
	Rubus subuniflorus Rydb.
	Rubus tantulus L.H. Bailey
	Rubus tenuicaulis L.H. Bailey
	Rubus terraltanus L.H. Bailey
	Rubus tetricus L.H. Bailey
	Rubus tracyi L.H. Bailey
	Rubus uncus L.H. Bailey
	Rubus uniflorifer L.H. Bailey
	Rubus urbanianus L.H. Bailey
	Rubus usus L.H. Bailey
	Rubus arundelanus var. jeckylanus (Blanch.)
	Rubus flagellaris var. almus L.H. Bailey
	Rubus flagellaris var. humifusus (Torr. & A. G
	Rubus flagellaris var. occidualis L.H. Bailey
	Rubus jaysmithii var. angustior L.H. Bailey
	Rubus obsessus var. unilaris L.H. Bailey
	Rubus recurvicaulis var. armatus Fernald
	Rubus villosus Aiton
	Rubus procumbens Muhl.
	Rubus brevipedalis L.H. Bailey
	Rubus clairbrownii L.H. Bailey

98% of records in BISON are covered by ITIS

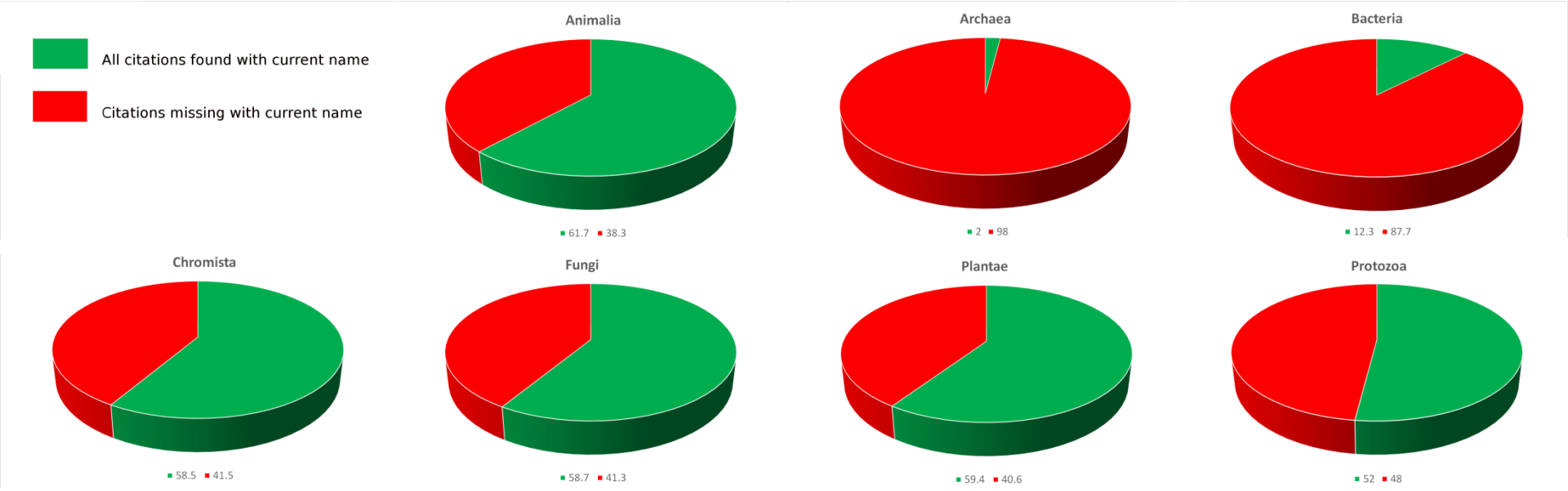
USGS

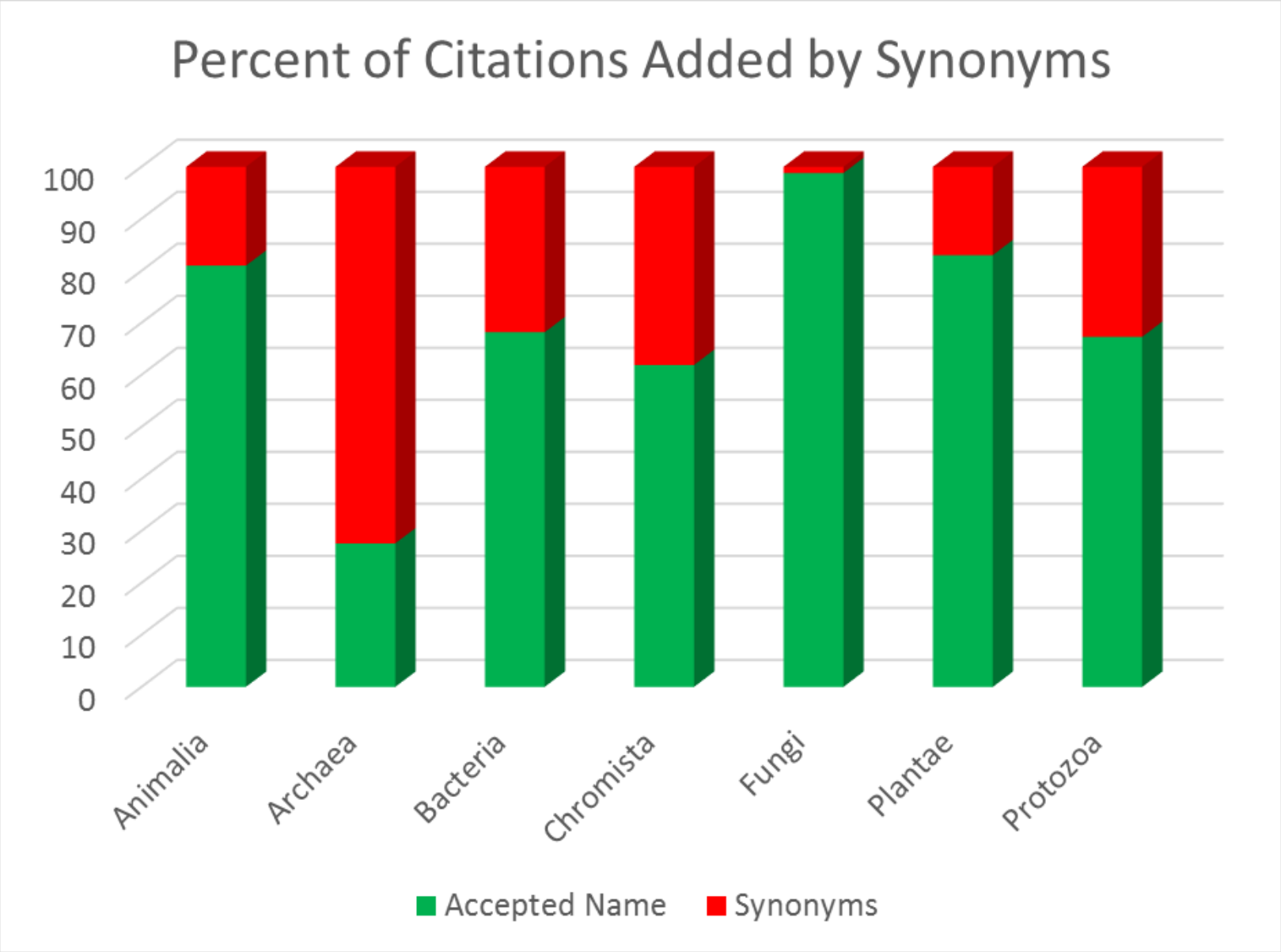
PLOS | ONE

RESEARCH ARTICLE

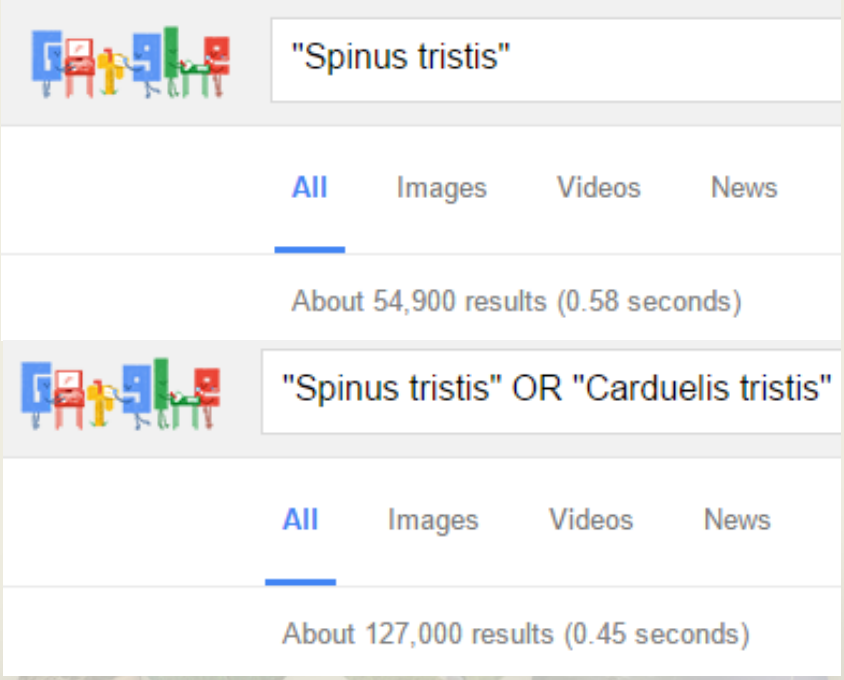
The Importance of Species Name Synonyms in Literature Searches

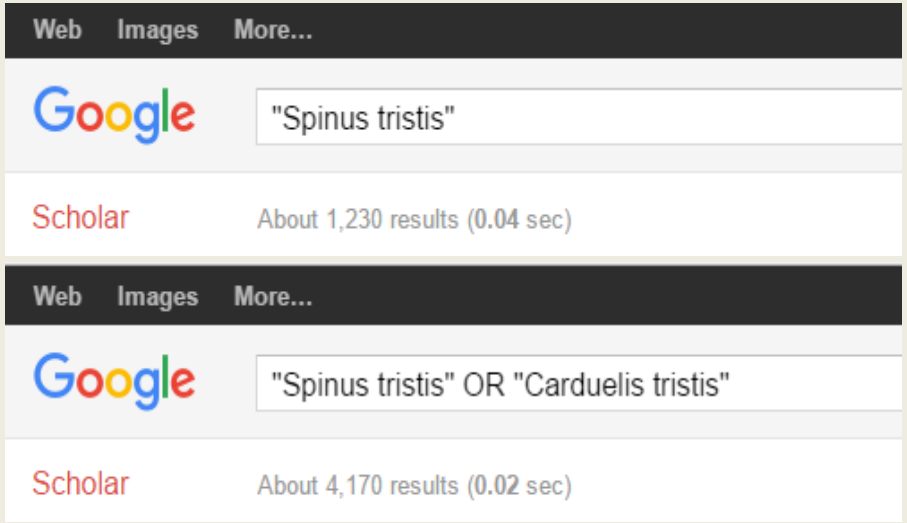
Gerald F. Guala*

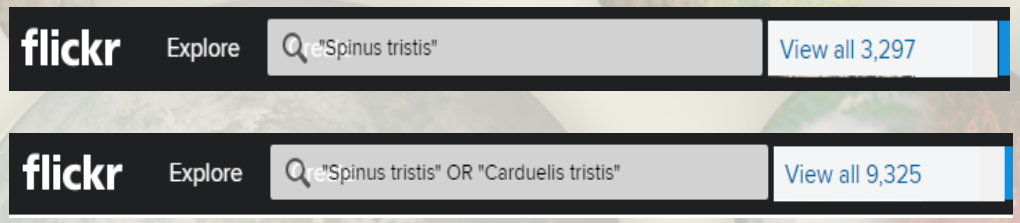


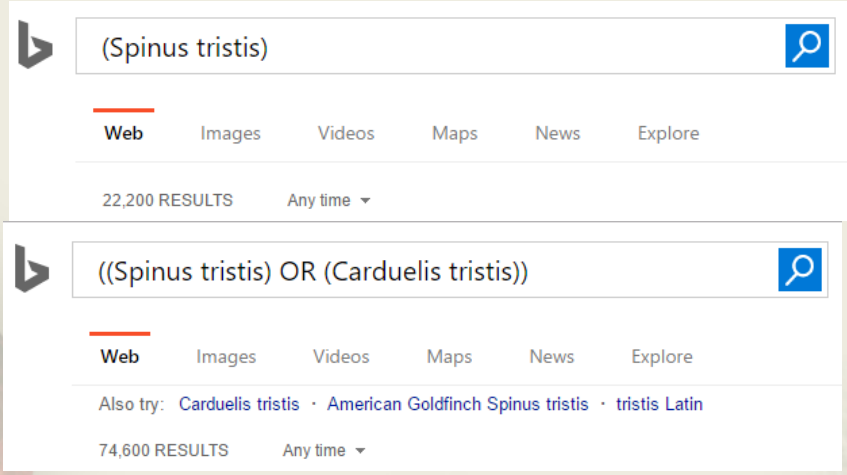

Percent of Citations Added by Synonyms
100
90
80
70
60
50
40
30
20
10
0
Animalia
Archaea
Bacteria
Chromista
Fungi
Plantae
Protozoa
Accepted Name
Synonyms

http://www.itis.gov/solr_examples.html



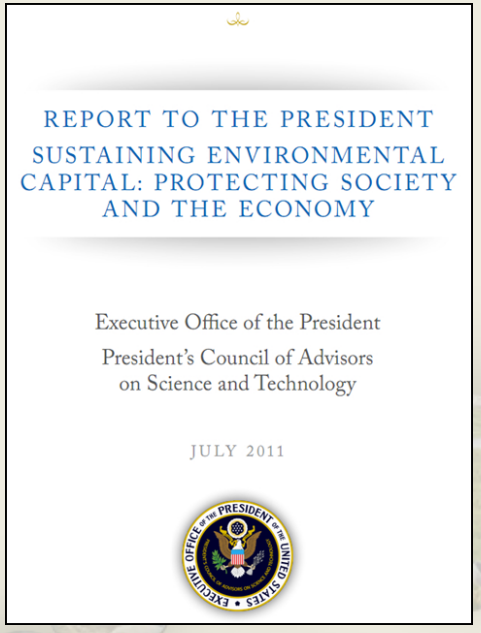






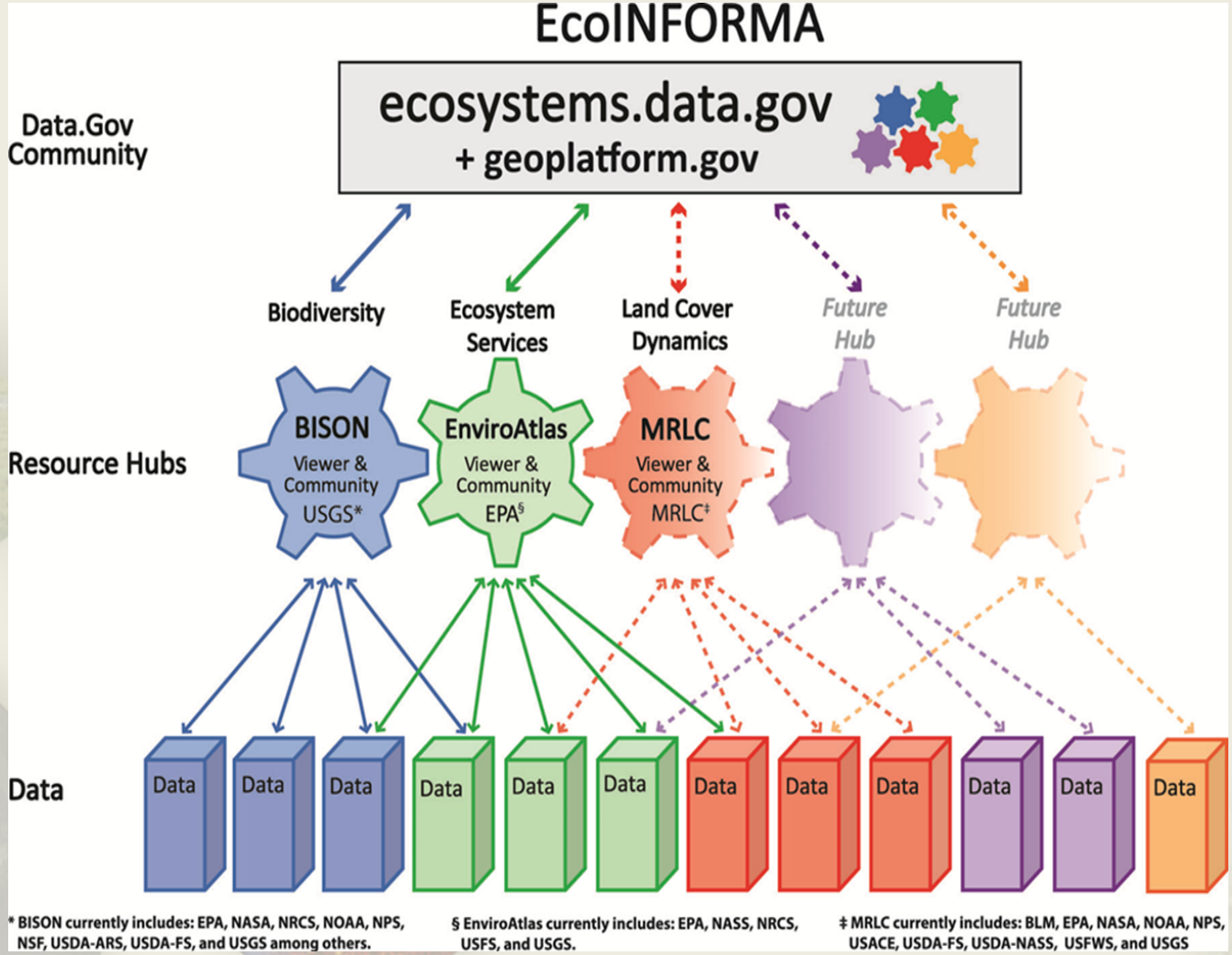
EcoINFORMA

Ecoinformatics-based Open Resources and Machine Accessibility
(EcoINFORMA)


REPORT TO THE PRESIDENT
SUSTAINING ENVIRONMENTAL CAPITAL: PROTECTING SOCIETY AND THE ECONOMY

Executive Office of the President
President's Council of Advisors on Science and Technology

JULY 2011



USGS

DATA.GOV

DATA TOPICS IMPACT APPLICATIONS DEVELOPERS CONTACT

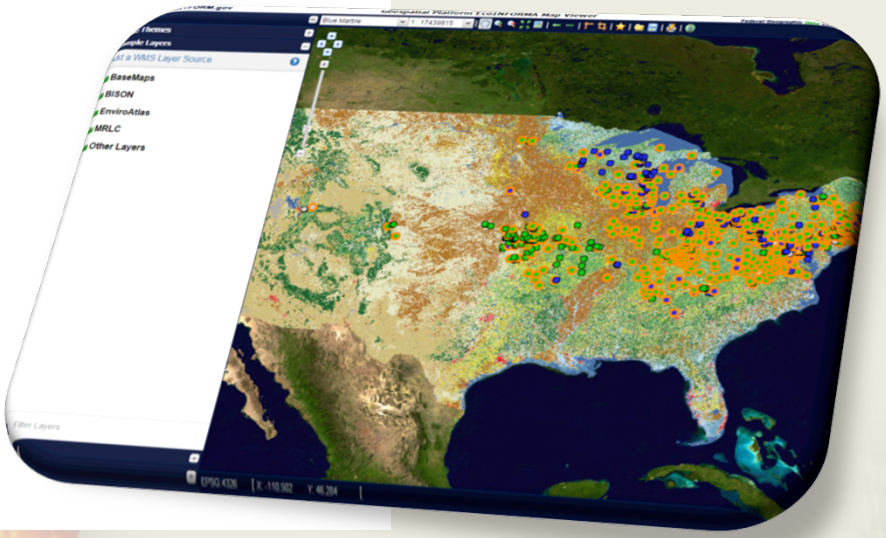
ECOSYSTEMS

EcoINFORMA Data Hubs Data Catalog Map Viewer Related Topics Contact Ecosystems

GeoPlatform Web Map Viewer

View maps and overlays of spatial data from the EcoINFORMA resource hubs (BISON, EnviroAtlas, and MRLC) and other national environmental data assets related to ecosystems, their living (biotic) and non-living (abiotic) components, and factors that impact ecosystems and biodiversity.

The GeoPlatform Web Map Viewer allows users to discover a wide range of spatial layers, create map overlays using remote map services and the user's own content, and share maps openly for use by other applications and websites. Visit the GeoPlatform to access additional geospatial data, services and applications.



Go to the GeoPlatform Web Map Viewer

Data.gov 6 New Edit Page SEO Howdy, Elizabeth Martin

DATA.GOV

DATA TOPICS IMPACT APPLICATIONS DEVELOPERS CONTACT

ECOSYSTEMS

EcoINFORMA Data Hubs Data Catalog Map Viewer Related Communities

Data Hubs

EcoINFORMA's Resource Hubs are data hubs that serve as primary entry points for access and visualization of data around common ecosystem-related themes and their corresponding communities of practice. Established resource hubs of EcoINFORMA can be accessed below.

Biodiversity Resource Hub

Biodiversity Information Serving Our Nation

Biodiversity Information Serving Our Nation (BISON) is a web-based information system allowing users to find, explore, and download biological occurrence data for species (e.g. plants, animals, fungi) that occur at a particular location and time in the United States (U.S.) and Territories. BISON, a product of the U.S. Geological Survey (USGS), offers over 168 million species occurrence records from a large collection of datasets provided by participating institutions.

Learn More

Ecosystem Services Resource Hub

EnviroAtlas

EnviroAtlas is a web-based decision-support tool consisting of maps, graphs, analysis tools, and interpretive information about ecosystem services and their role in maintaining sustainable and healthy communities of the contiguous United States (lower 48 states). EnviroAtlas is a collaborative project developed by the U.S. Environmental Protection Agency (EPA) in cooperation with the U.S. Geological Survey (USGS), the Natural Resources Conservation Service (NRCS), the U.S. Forest Service, and LandScope America.

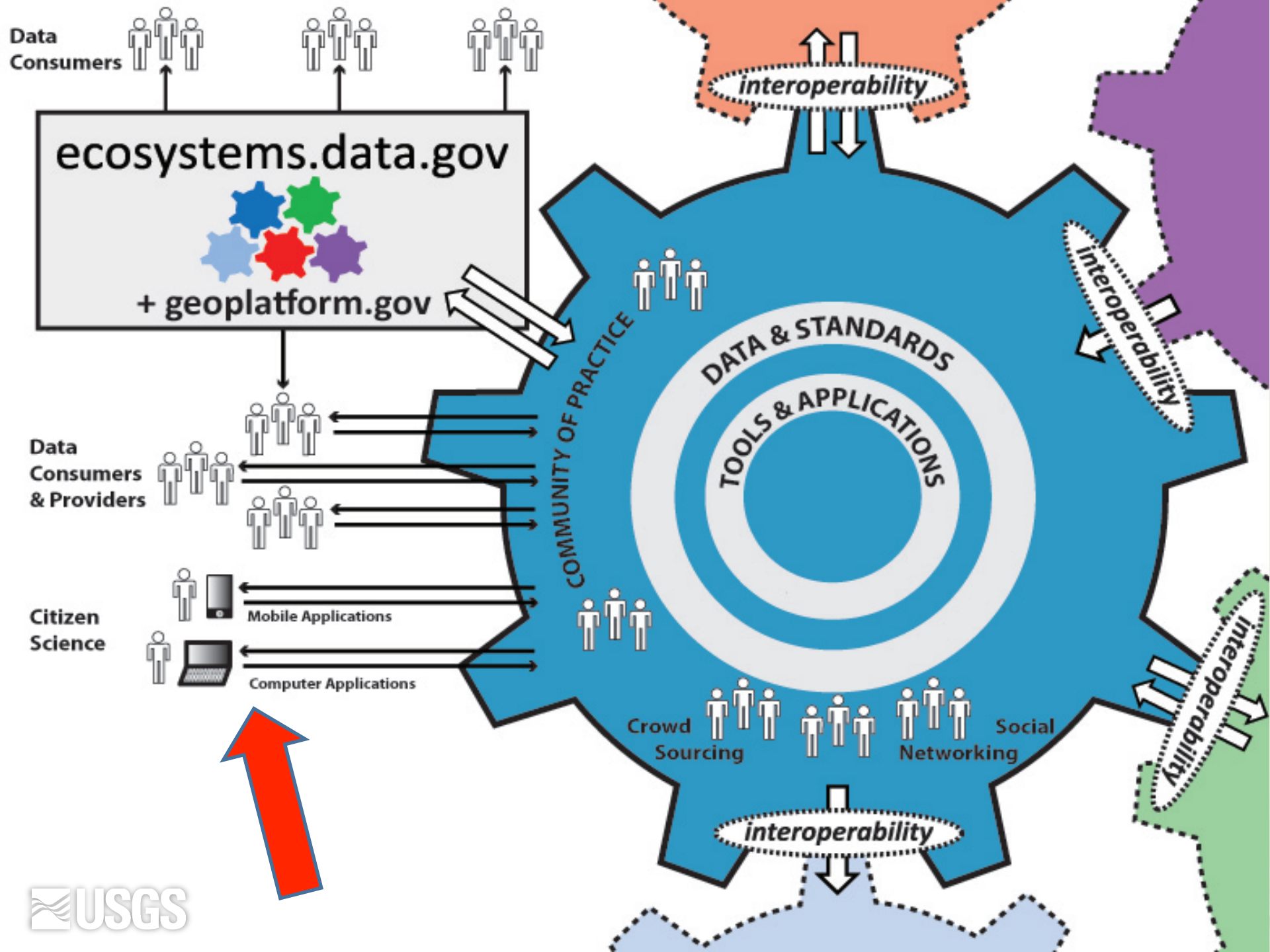
Learn More

Land Cover Dynamics Resource Hub

Multi-Resolution Land Characteristics Consortium

The Multi-Resolution Land Characteristics Consortium (MRLC) provides land cover and land cover dynamics information at the national scale for a wide variety of environmental, land management, and modeling applications. MRLC is composed of a group of federal agencies that coordinate and generate nationally complete, current and consistent land cover information products.

Learn More

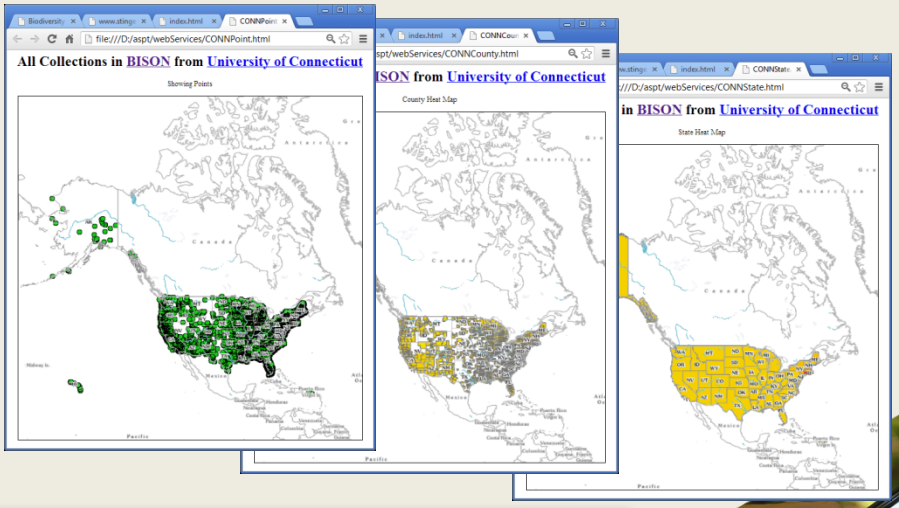

Data Consumers
ecosystems.data.gov
+ geoplatform.gov
Data Consumers & Providers
Citizen Science
Mobile Applications
Computer Applications
interoperability
COMMUNITY OF PRACTICE
DATA & STANDARDS
TOOLS & APPLICATIONS
interoperability
Crowd Sourcing
Social Networking
interoperability
interoperability
USGS

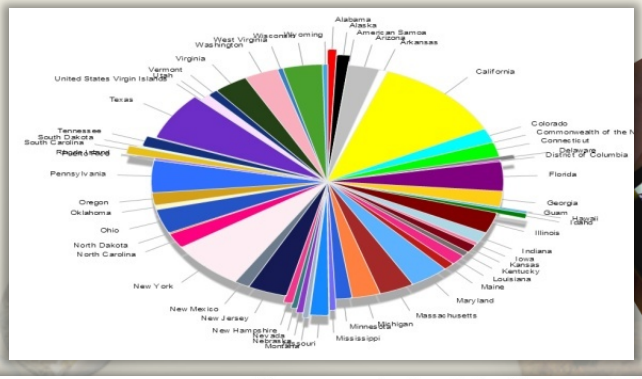
Many ways to use BISON's extensive services

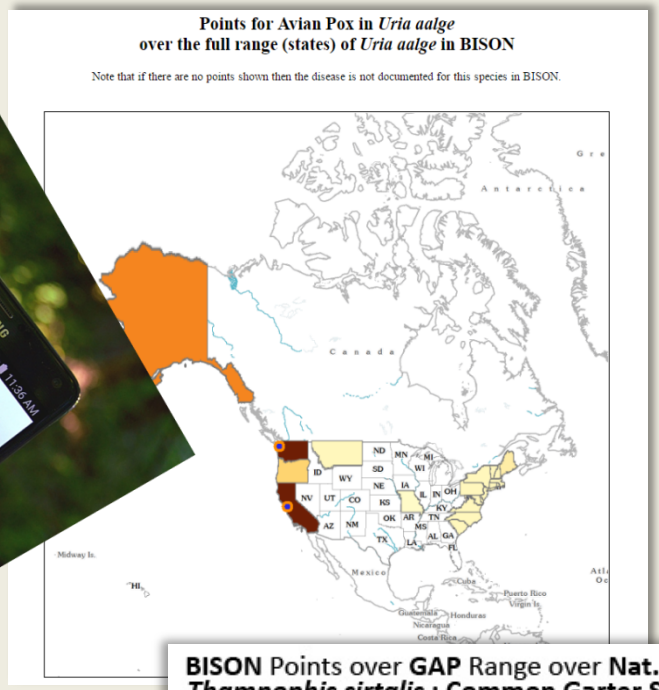
Output Formats
(Direct Solr & API)

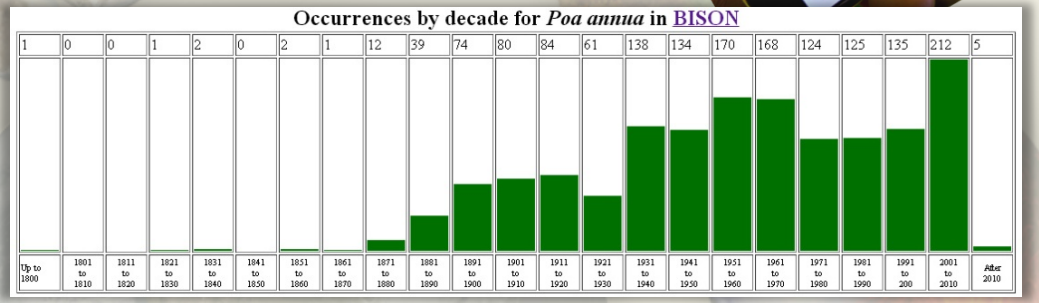
JSON, JSONP, XML, SHP, CSV

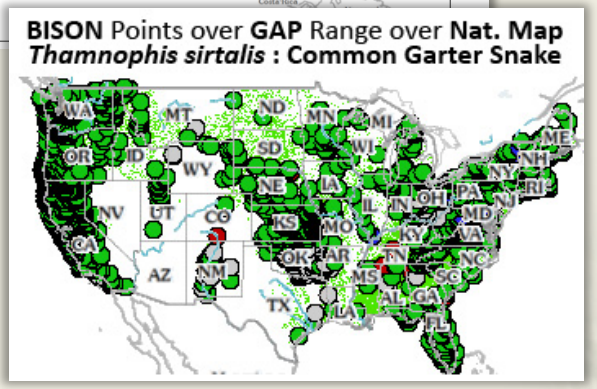
+ WMS services





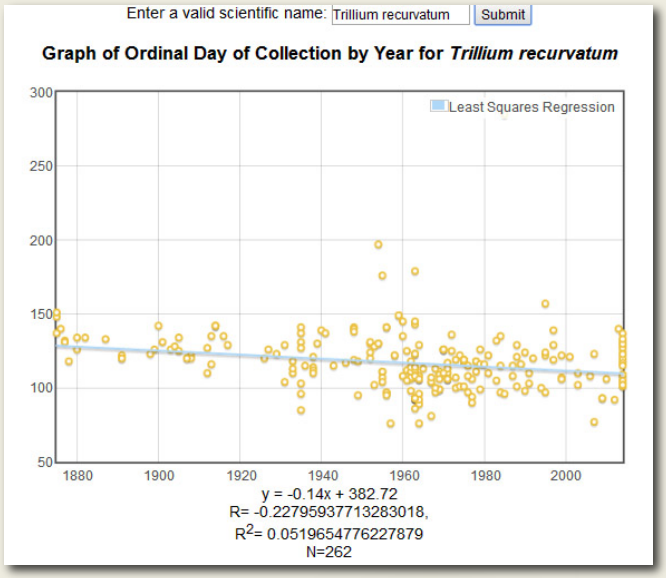


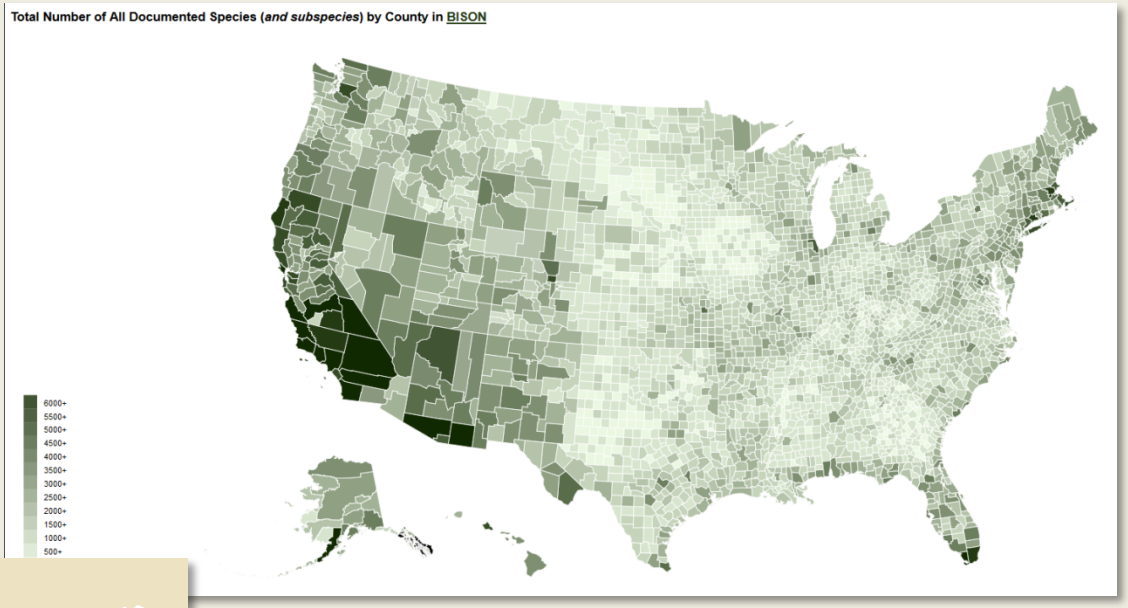


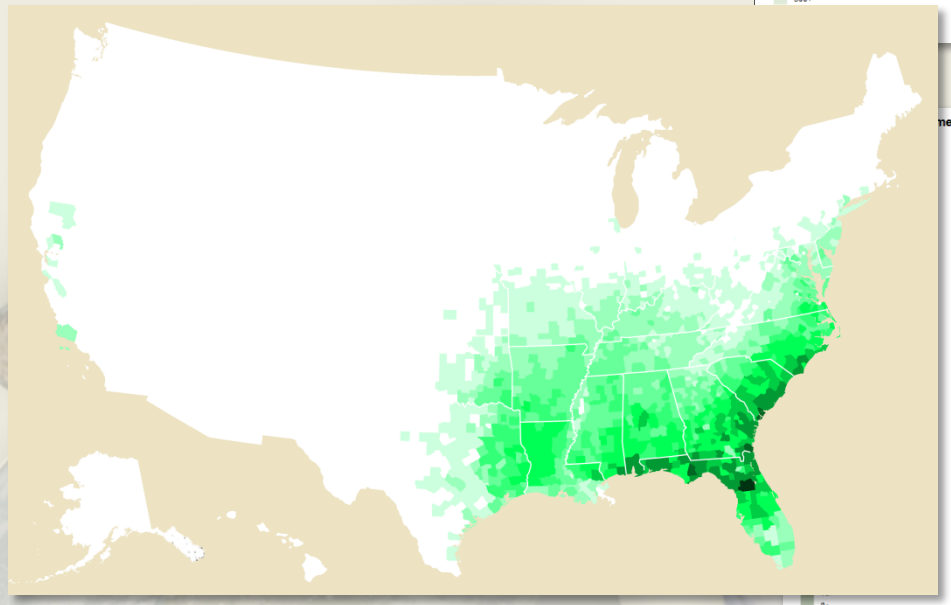


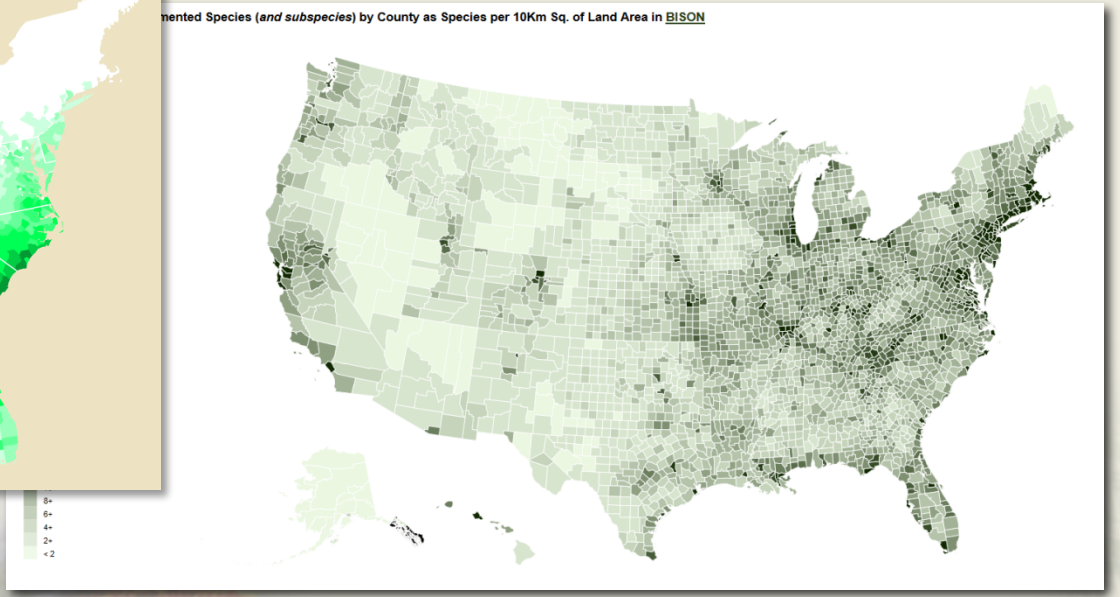
USGS

More ways to use BISON's extensive services



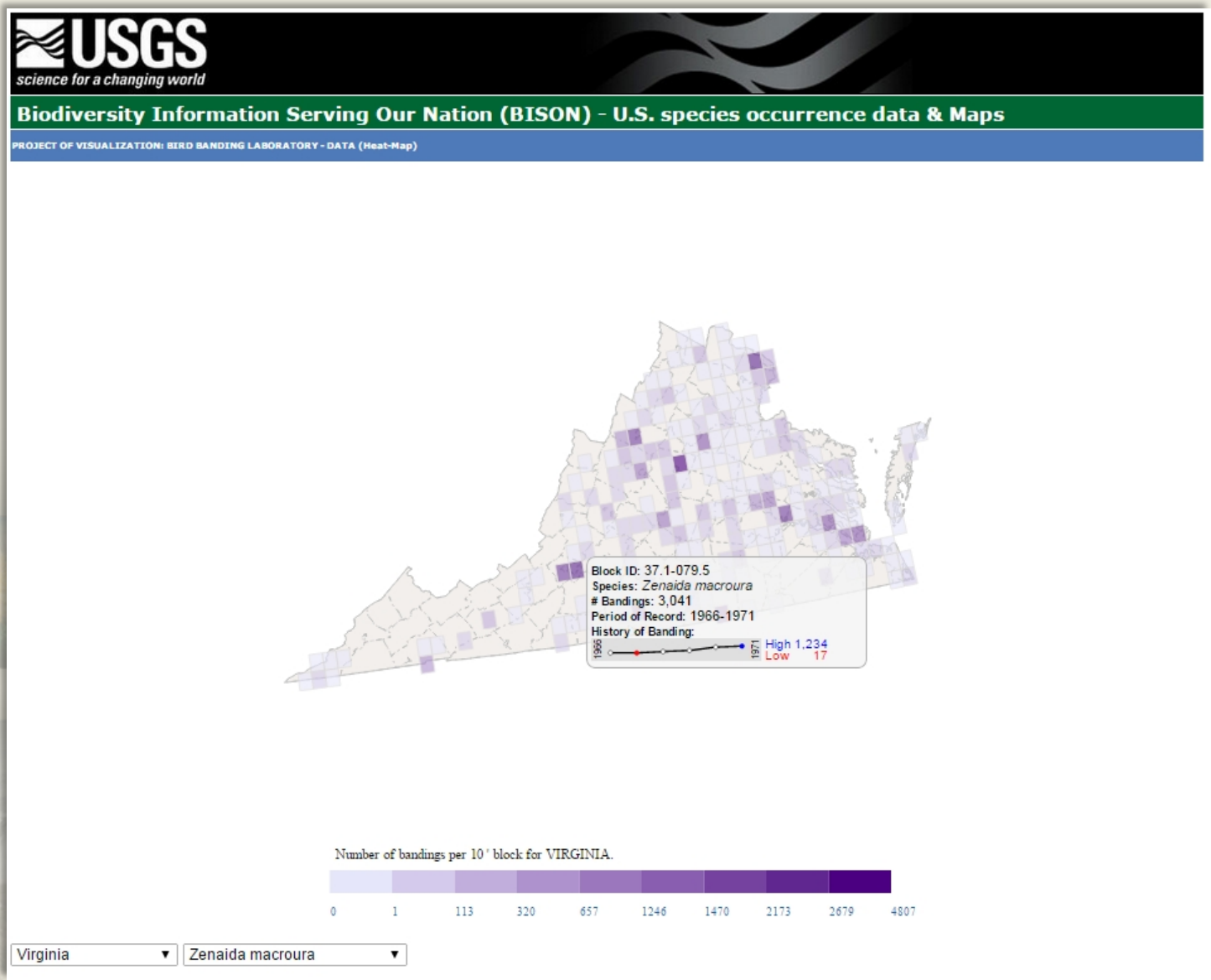




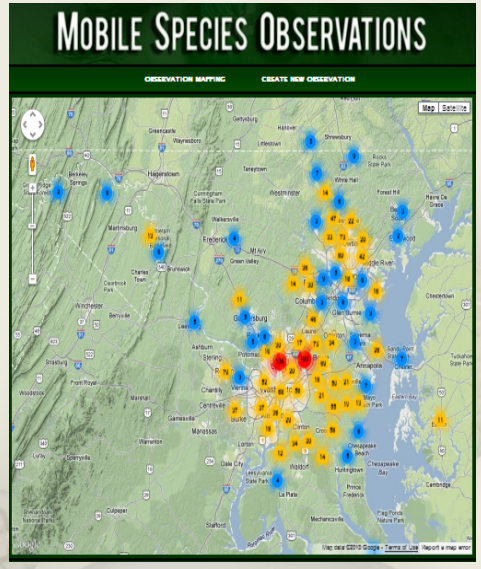


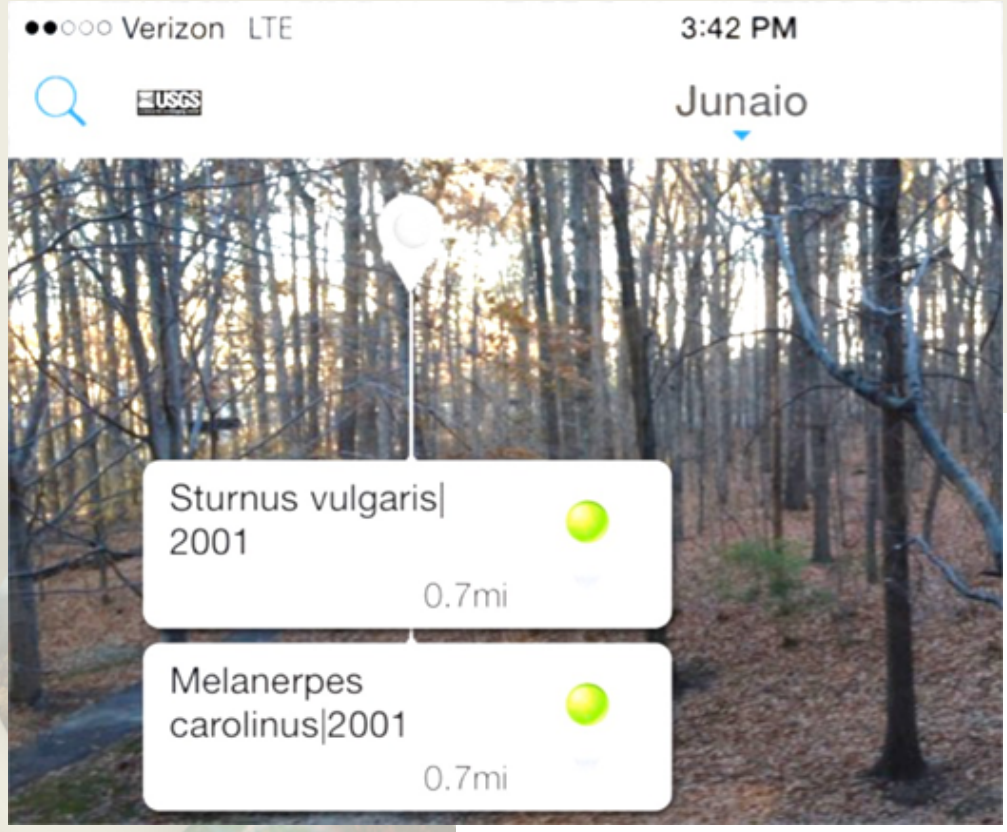
Patuxent Wildlife Research Center Bird Banding Lab Data Viewer.

Major cost savings, and speed: powered by BISON



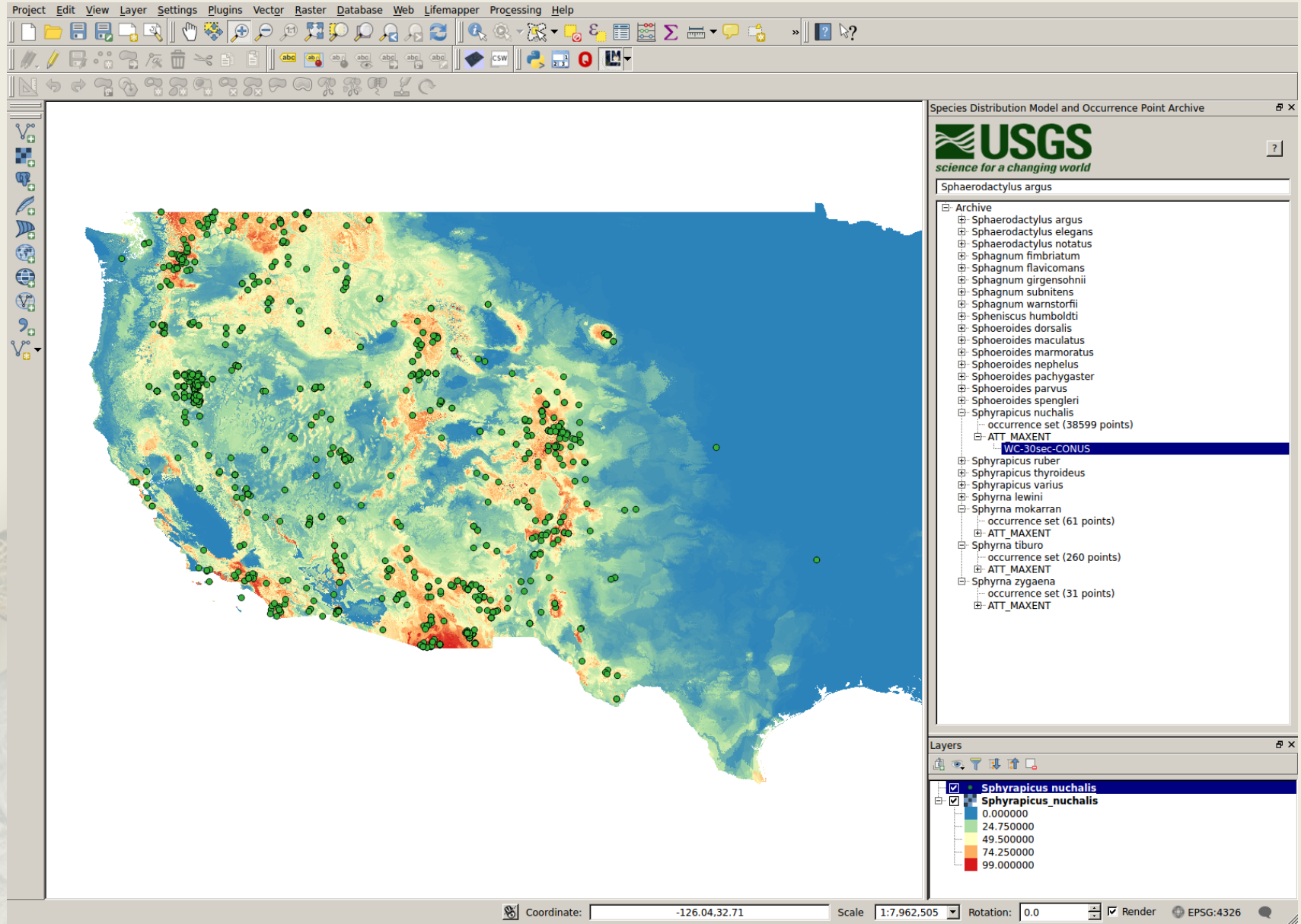
Walk through the woods with cyber-enabled vision and see exactly where species are in a heads up display – as well as on a map on your handset…





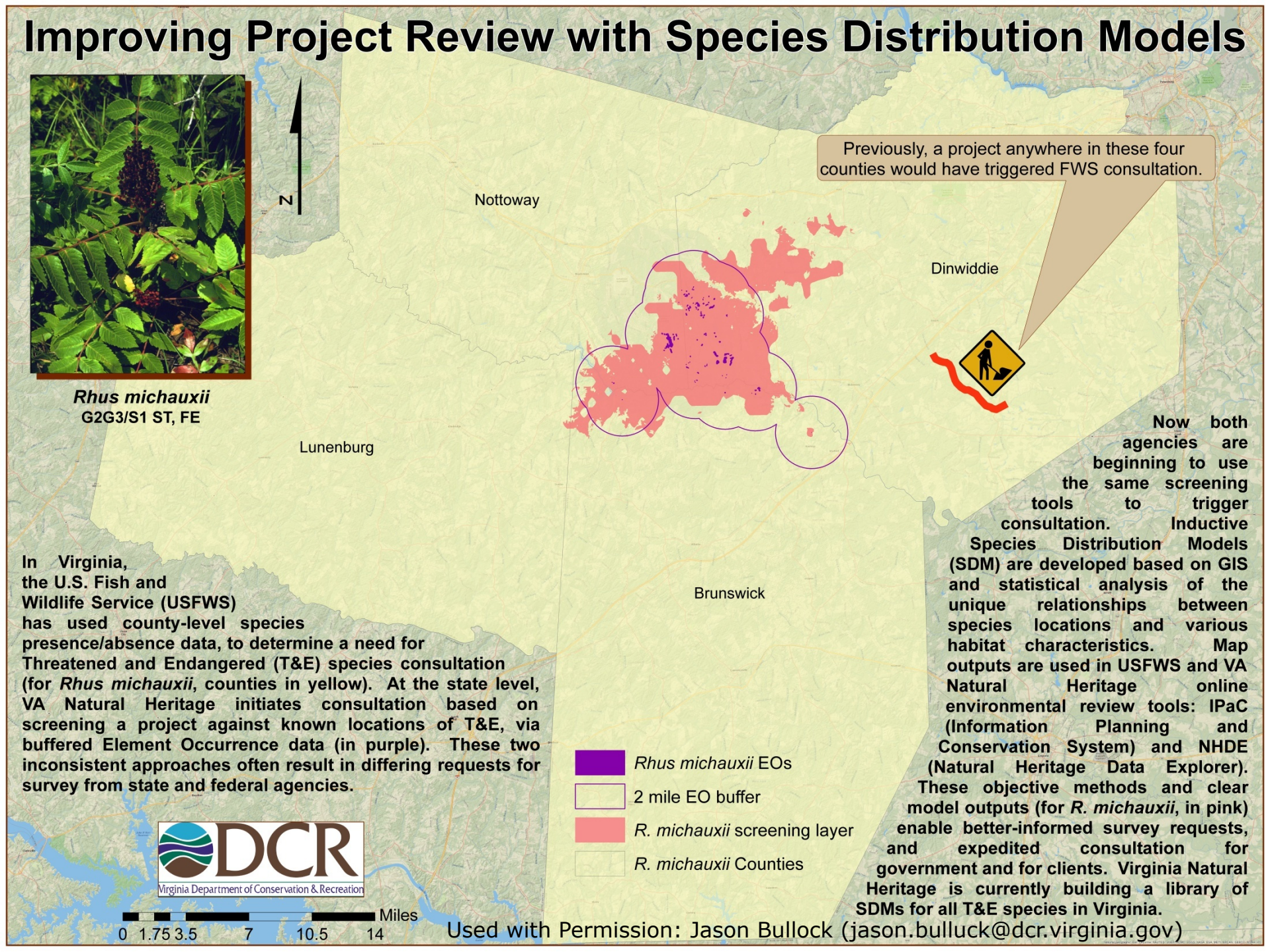
GIS Plugin

for advanced species and guild modeling



Improving Project Review with Species Distribution Models

Rhus michauxii
G2G3/S1 ST, FE



In Virginia, the U.S. Fish and Wildlife Service (USFWS) has used county-level species presence/absence data, to determine a need for Threatened and Endangered (T&E) species consultation (for *Rhus michauxii*, counties in yellow). At the state level, VA Natural Heritage initiates consultation based on screening a project against known locations of T&E, via buffered Element Occurrence data (in purple). These two inconsistent approaches often result in differing requests for survey from state and federal agencies.

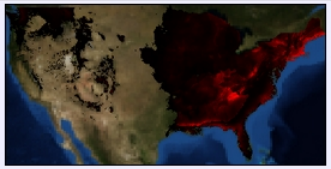
Now both agencies are beginning to use the same screening tools to trigger consultation. Inductive Species Distribution Models (SDM) are developed based on GIS and statistical analysis of the unique relationships between species locations and various habitat characteristics. Map outputs are used in USFWS and VA Natural Heritage online environmental review tools: IPaC (Information Planning and Conservation System) and NHDE (Natural Heritage Data Explorer). These objective methods and clear model outputs (for *R. michauxii*, in pink) enable better-informed survey requests, and expedited consultation for government and for clients. Virginia Natural Heritage is currently building a library of SDMs for all T&E species in Virginia.

DCR
Virginia Department of Conservation & Recreation

Used with Permission: Jason Bullock (jason.bulluck@dcr.virginia.gov)

Climate Sensitive Geoservices and Checklists in BISON

http://sporks.nhm.ku.edu/services/sdm/projections/95836
Scenario Code: A1B-MIROC3.2-Med-4069-CONUS



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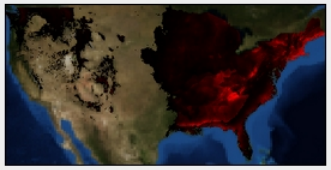

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http://sporks.nhm.ku.edu/services/sdm/projections/95838
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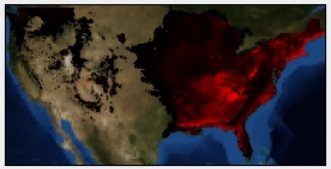

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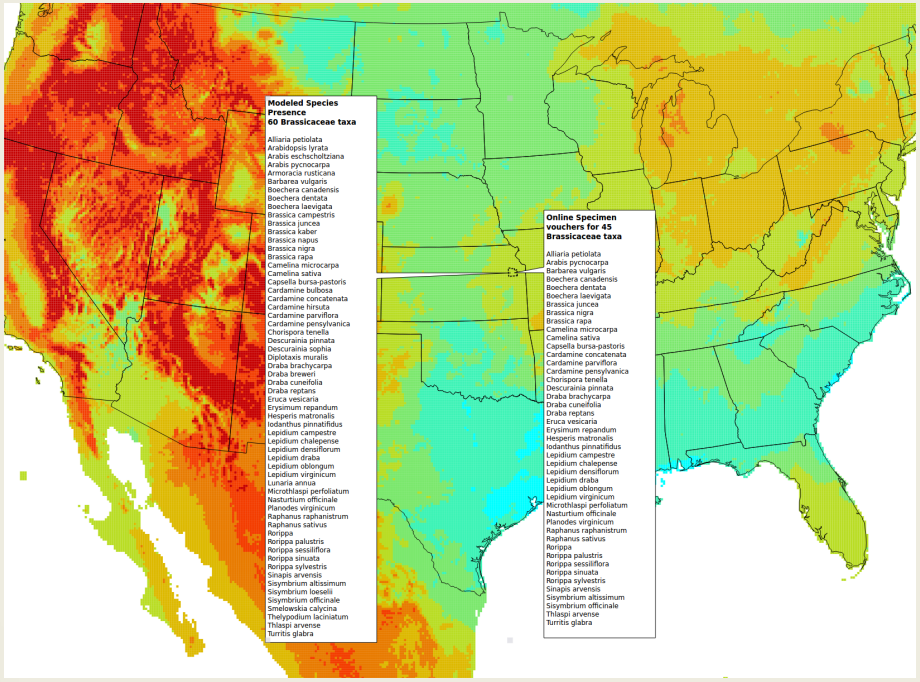
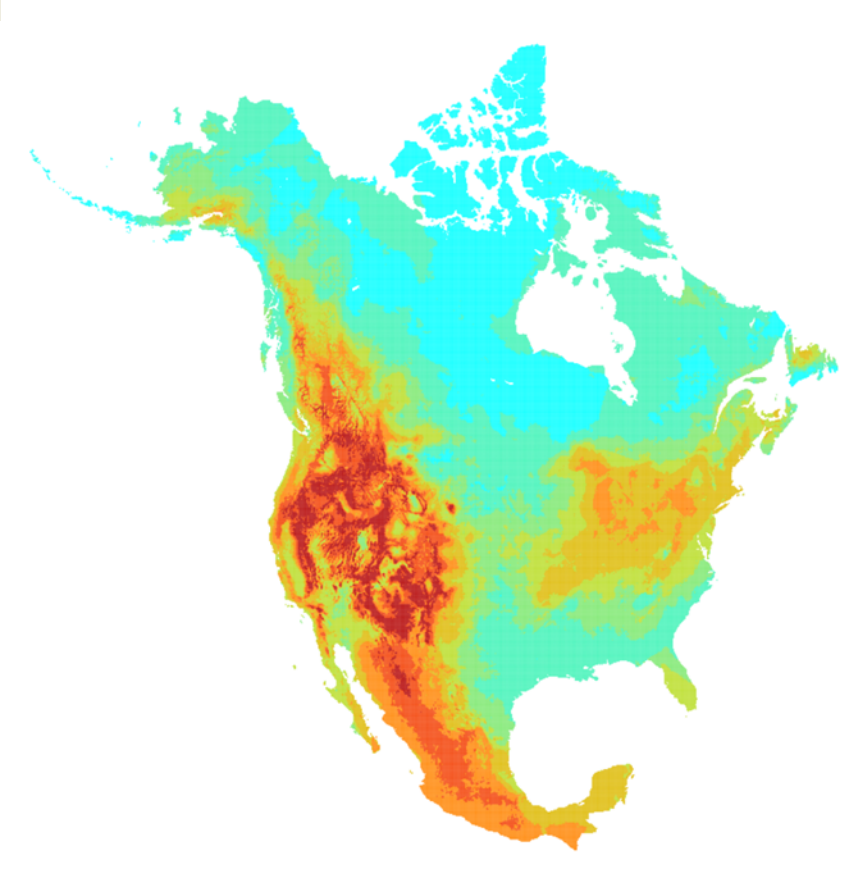
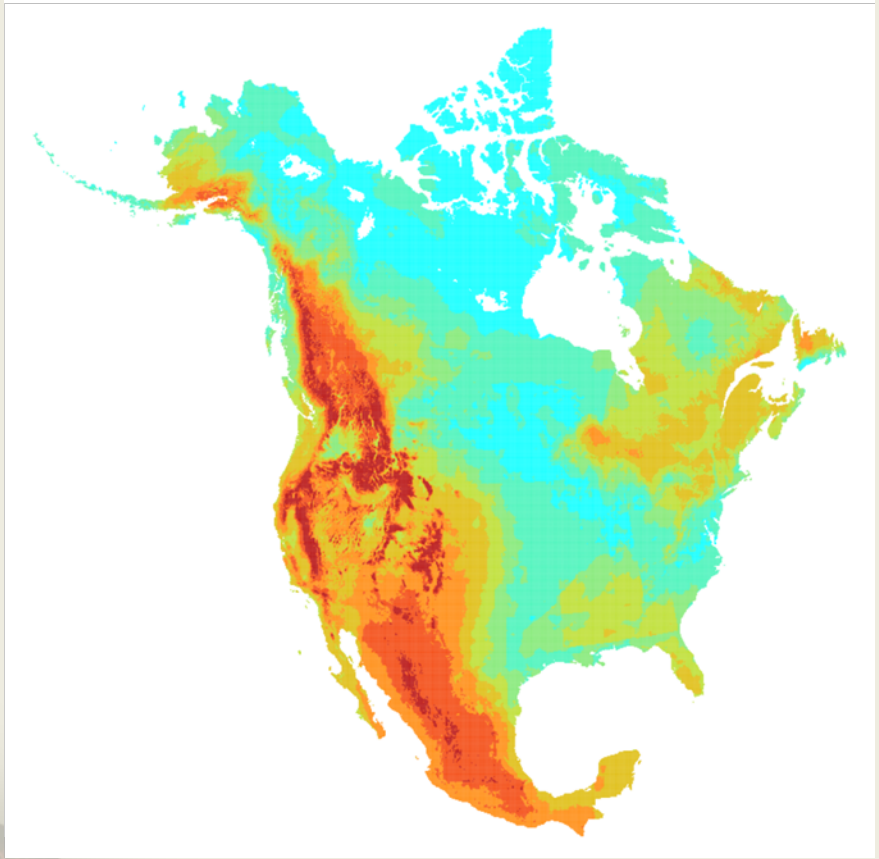


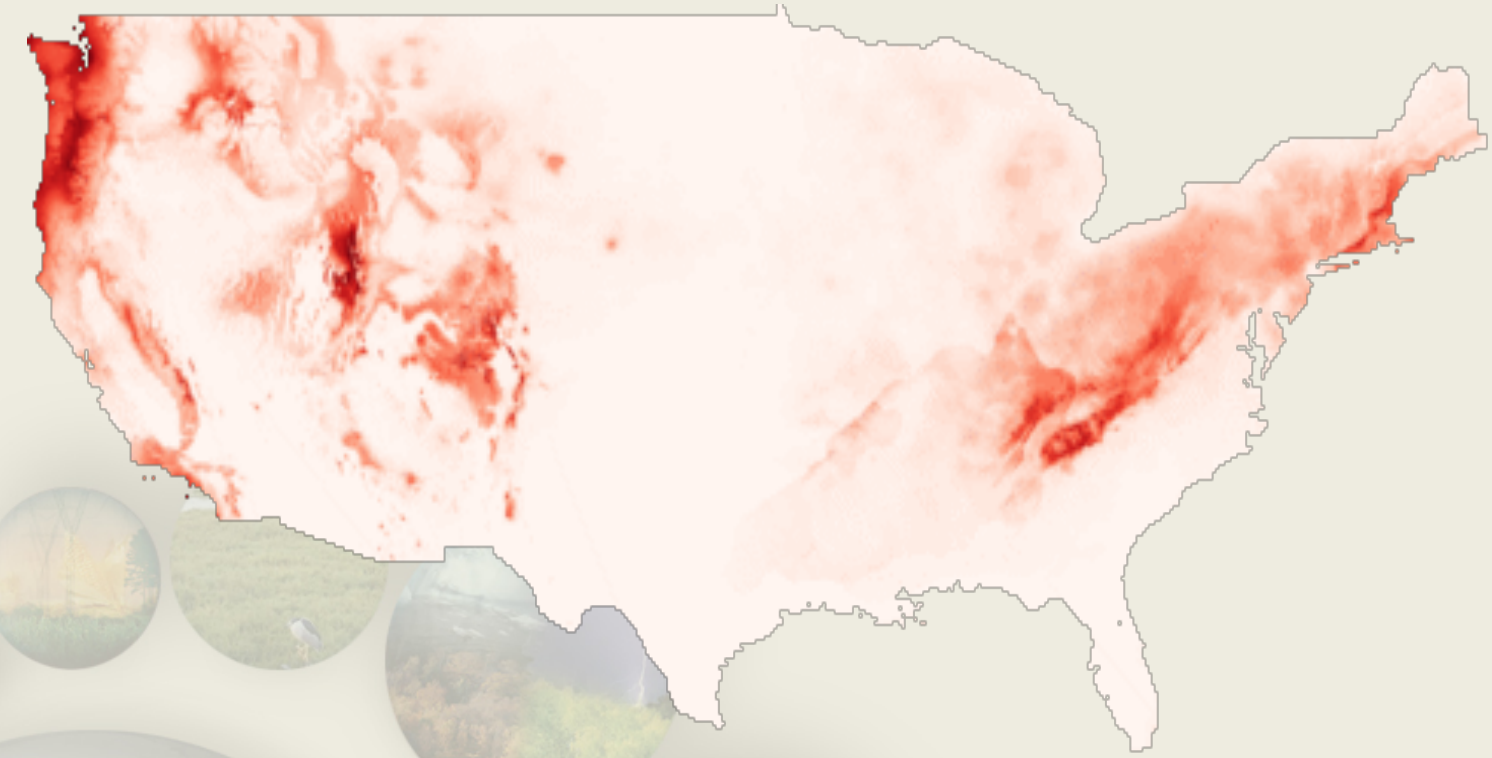
Pilot: 34,500 species modelled for their current and future distribution under climate change

Subtropical Invasive Mustards Expanding into the Southeast



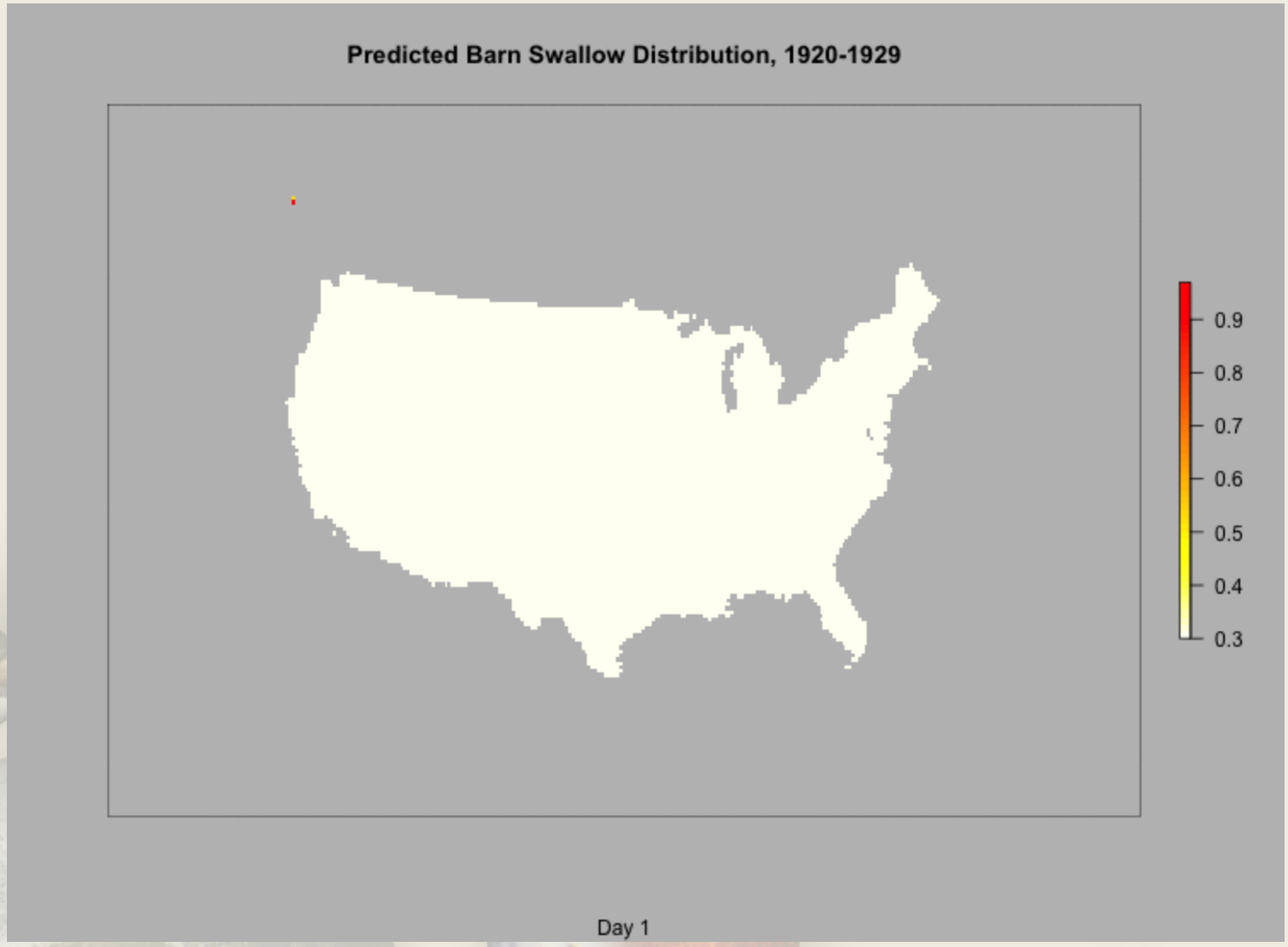


Potential effects of climate change on a species at the click of a button…

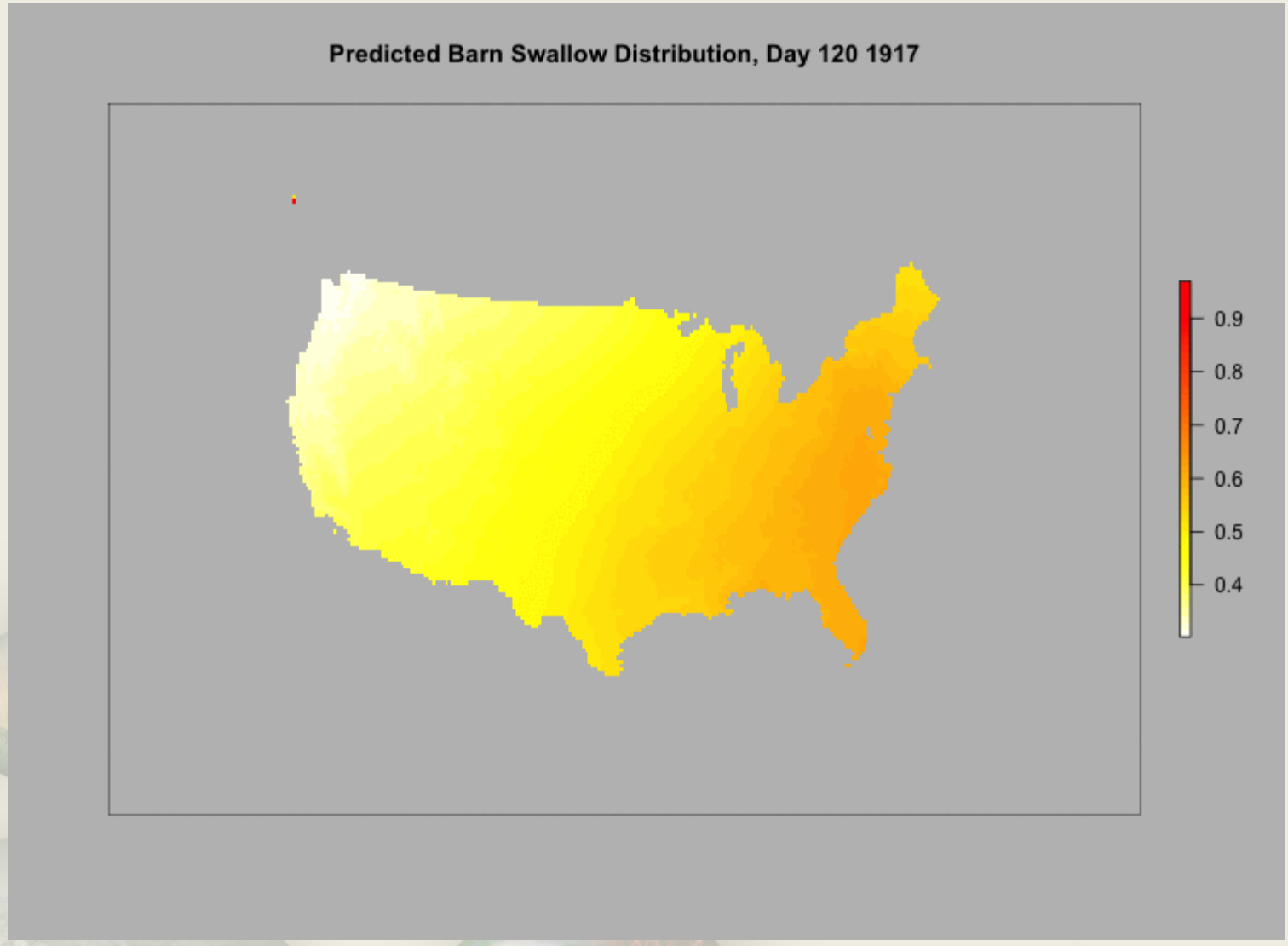


***Taenionema atlanticum* (Winter Stonefly)** as its habitat suitability shifts using the A2 scenario for three future timesteps.
The A2 storyline and scenario family: a very heterogeneous world with continuously increasing global population and regionally oriented economic growth that is more fragmented and slower than in other storylines.
Layers are CURRENT & A2 scenario, 2039, 2069, and 2099.

USGS



Distribution of Barn Swallow (*Hirundo rustica*)
Probability by ordinal day of the year for the 1920's



Probability of seeing a Barn Swallow (*Hirundo rustica*)
on April 30th for every year from 1917-1949

TIME
for
QUESTIONS

(Thank you)