

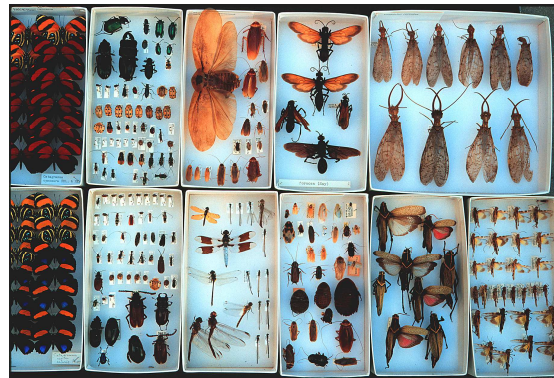


**iDigBio**  
Integrated Digitized Biocollections

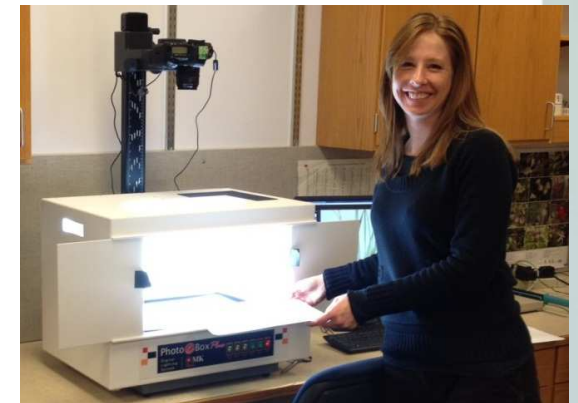
# Digitization in the Pacific



SCIENCEPHOTOLIBRARY



**Larry M. Page**  
PD, iDigBio  
Curator, FLMNH





## Advancing Digitization of Biodiversity Collections (ADBC)



**Coordinating center for the  
national effort to digitize  
natural history collections**

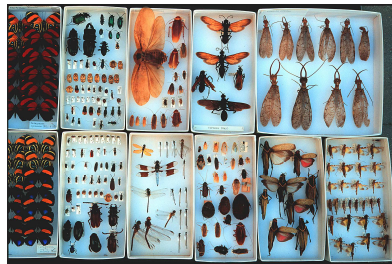


# **REVOLUTION!**

## **Biodiversity Collections**

# Biodiversity Collections

The single largest source of information on biological diversity



1 billion specimens in USA

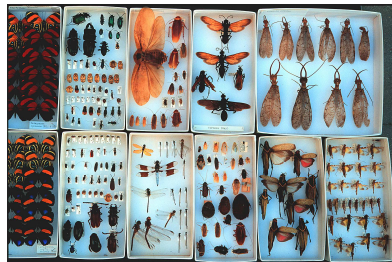


3 billion specimens globally

# Biodiversity Collections

The single largest source of information on biological diversity.

*1,500 natural history collections*



**1 billion specimens  
in USA**

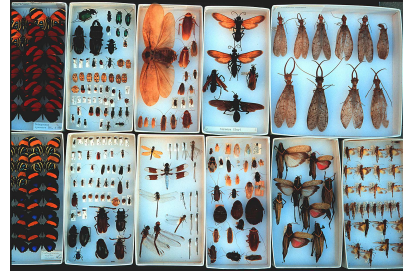


**3 billion specimens  
globally**

# Biodiversity



## Collections: Specimens, Images, DNA



billions of specimens

**Environmental Policy**  
Management, Use,  
Protection

**New Discoveries**

**Understanding**

**Appreciation**

**Research**

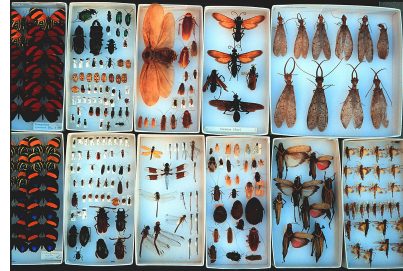
**Education**

**Outreach**

# Biodiversity



## Collections: Specimens, Images, DNA



billions of specimens

*Benefits*

**Environmental Policy**  
Management, Use,  
Protection

**New Discoveries**

**Understanding**

**Appreciation**

**Research**

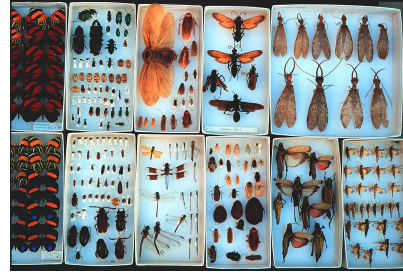
**Education**

**Outreach**

# Biodiversity



## Collections: Specimens, Images, DNA



*Benefits*

billions of specimens

*Benefits*

**Environmental Policy**  
Management, Use,  
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**New Discoveries**

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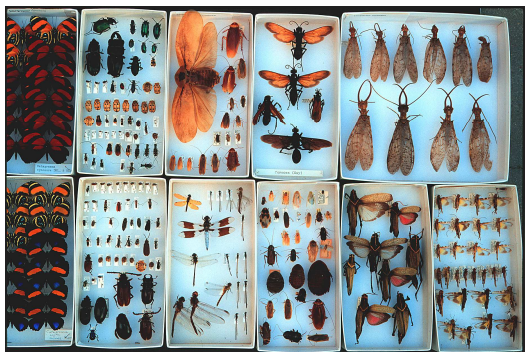




## PROBLEM:



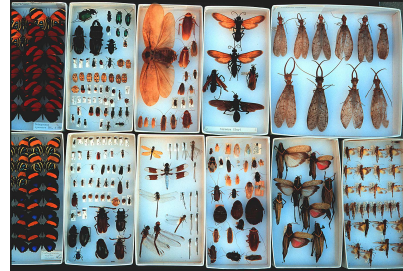
**The data in biodiversity collections are  
inaccessible to most potential users**



# Biodiversity



## Collections: Specimens, Images, DNA



**Environmental Policy**  
Management, Use,  
Protection

**New Discoveries**

**Understanding**

**Appreciation**

**Research**

**Education**

**Outreach**

## U.S. National Science Foundation

### Advancing Digitization of Biodiversity Collections Program (ADBC)

The goal of **ADBC** is to *remove this inaccessibility* through **digitization**: putting information online so that researchers, educators, students, natural resource managers, environmentalists, and policymakers have access.

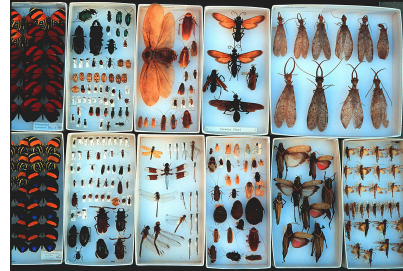
**\$100 million over 10 years to digitize specimen-based data in non-federal U.S. collections**



# Biodiversity

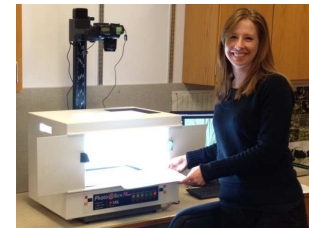


## Collections: Specimens, Images, DNA



## Digitization

Databases  
Georeferencing  
Imaging



Environmental Policy  
Management, Use,  
Appreciation, Protection

New Discoveries

Understanding

Appreciation

Research

Education

Outreach



## **Advancing Digitization of Biodiversity Collections**

### **Funds**

**‘Thematic Collections Networks’ or TCNs**  
– groups of institutions that digitize data  
organized around a research question  
**(climate change, invasive species,  
agricultural pests, etc.)**

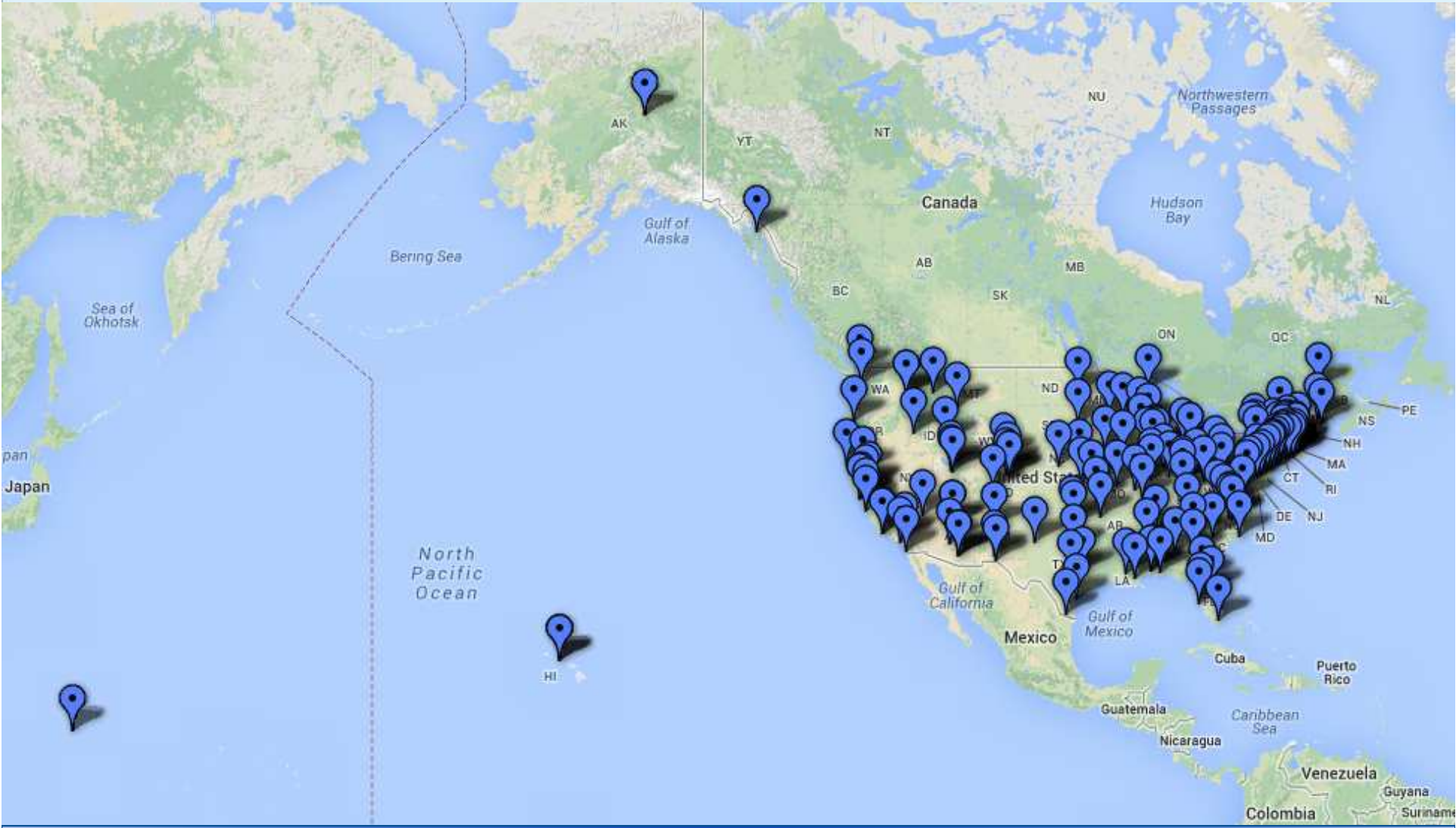
# Ten Thematic Collections Networks (TCNs)

- **InvertNet**: An Integrative Platform for Research on Environmental Change, Species Discovery and Identification (*Illinois Natural History Survey, University of Illinois*)
- **Plants, Herbivores, and Parasitoids**: A Model System for the Study of Tri-Trophic Associations (*American Museum of Natural History*)
- North American **Lichens and Bryophytes**: Sensitive Indicators of Environmental Quality and Change (*University of Wisconsin – Madison*)
- Digitizing **Fossils** to Enable New Syntheses in Biogeography-Creating a PALEONICHES-TCN (*University of Kansas*)
- The **Macrofungi** Collection Consortium: Unlocking a Biodiversity Resource for Understanding Biotic Interactions, Nutrient Cycling and Human Affairs (*New York Botanical Garden*)
- Mobilizing New England **Vascular Plant** Specimen Data to Track Environmental Change (*Yale University*)
- Southwest Collections of **Arthropods** Network (SCAN): A Model for Collections Digitization to Promote Taxonomic and Ecological Research (*Northern Arizona University*)
- The Macroalgal **Herbarium** Consortium: Accessing 150 Years of Specimen Data to Understand Changes in the Marine/Aquatic Environment (*University of New Hampshire*)
- Developing a Centralized Digital Archive of Vouchered Animal **Communication Signals** (*Cornell University*)
- **Fossil Insect** Collaborative: A Deep-Time Approach to Studying Diversification and Response to Environmental Change (*University of Colorado at Boulder*)



National Resource for Advancing  
Digitization of Biological Collections

# NATIONAL HUB, THEMATIC COLLECTION NETWORKS, AND COLLABORATORS



**Ten TCNS and collaborating institutions: 152 institutions in 50 states**

# Advancing Digitization of Biodiversity Collections

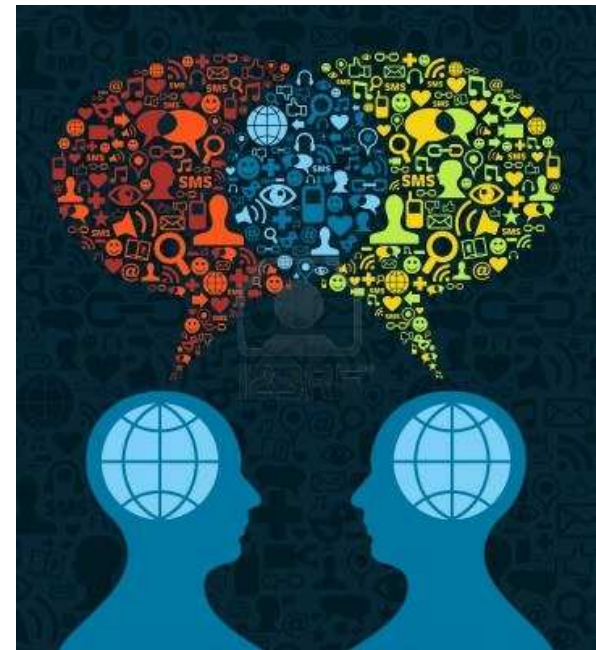
- Facilitate use of biodiversity data to address environmental and economic challenges
  - Researchers
  - Educators
  - General public, citizen scientists
  - Policy-makers
- Identify efficient and effective digitization standards and workflows
- Respond to cyberinfrastructure needs
- Develop research, education and outreach collaborations
- Plan for long-term sustainability of the national digitization effort





## iDigBio: Workshops and Working Groups, Establishing Connections, and Cyberinfrastructure

- 26 workshops and symposia (about 1/month)
  - >510 (unique) participants from 260 institutions
- Representation at other events
- Established relations with other collections organizations and biodiversity initiatives
  - CollectionsWeb
  - iPlant
  - NESCent
  - NEON
  - AIBS
  - SPNHC
  - NSC Alliance
  - GBIF: USGS/BISON
  - EOL
  - ---nets



### Search Records

Full Text Search



only records with images [Hide Advanced Search](#)

### Current Results

Query: Scientific Name = (percina nigrofasciata)

Records: 4

CSV download: [Coming Soon!](#)

**12,695,363 specimen records**  
**1,473,172 media records**  
**200 record sets**

### Advanced Search

<p><b>Family</b></p> <input type="text"/> <p><input type="checkbox"/> Present <input type="checkbox"/> Missing</p>	<p><b>Scientific Name</b></p> <p>percina nigrofasciata</p> <p><input type="checkbox"/> Present <input type="checkbox"/> Missing</p>	<p><b>Genus</b></p> <input type="text"/> <p><input type="checkbox"/> Present <input type="checkbox"/> Missing</p>	<p><b>Country</b></p> <input type="text"/> <p><input type="checkbox"/> Present <input type="checkbox"/> Missing</p>	<p><b>State/Province</b></p> <p>florida</p> <p><input type="checkbox"/> Present <input type="checkbox"/> Missing</p>
<p><b>Recordset</b></p> <input type="text"/> <p><input type="checkbox"/> Present <input type="checkbox"/> Missing</p>				
<p><b>Add a field</b></p> <p>please select</p>	<p><b>Sort by</b></p> <p>Scientific Name</p>	<p><b>Direction</b></p> <p>Ascending</p>	<input type="button" value="Search"/> <input type="button" value="Reset"/> <p><a href="#">Tips &amp; Hints</a></p>	

[Table view](#) [Label view](#)

Search Matched 4 Records

## Collections: Specimens, Images, DNA



**Digitization**  
**Databasing**  
**Georeferencing**  
**Imaging**





## Databasing

**What, when, where → taxonomic, spatial and temporal data**

**Recent species are extinct: How do we know?**

**Specimens in collections**

**Non-native species are established: How do we know?**

**Specimens in collections**

**Ecosystems are changing: How do we know?**

**Specimens in collections document community structure**

## Collections: Specimens, Images, DNA

**Georeferencing → mapping**

**Maps contain massive amounts of information**

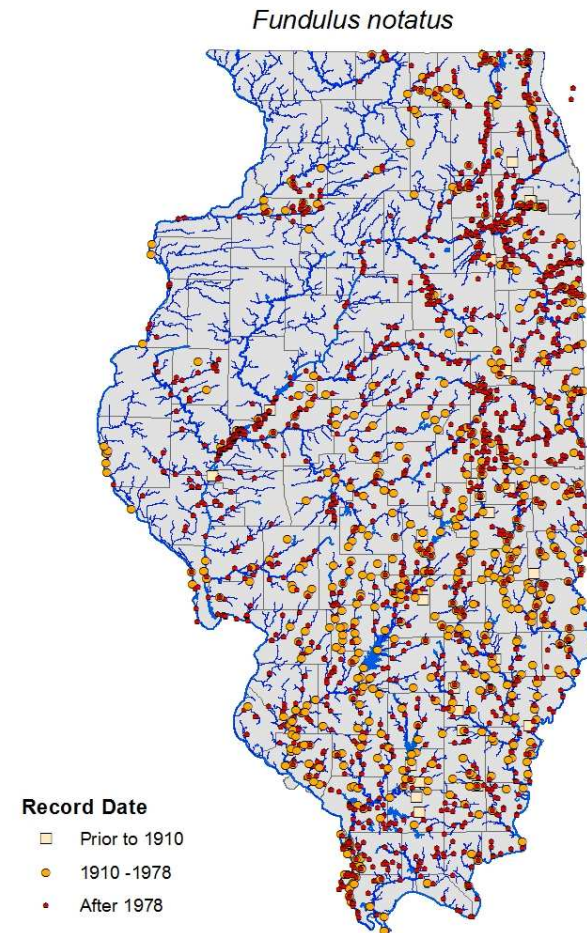
***Allow collections to:***

**Correct localities**

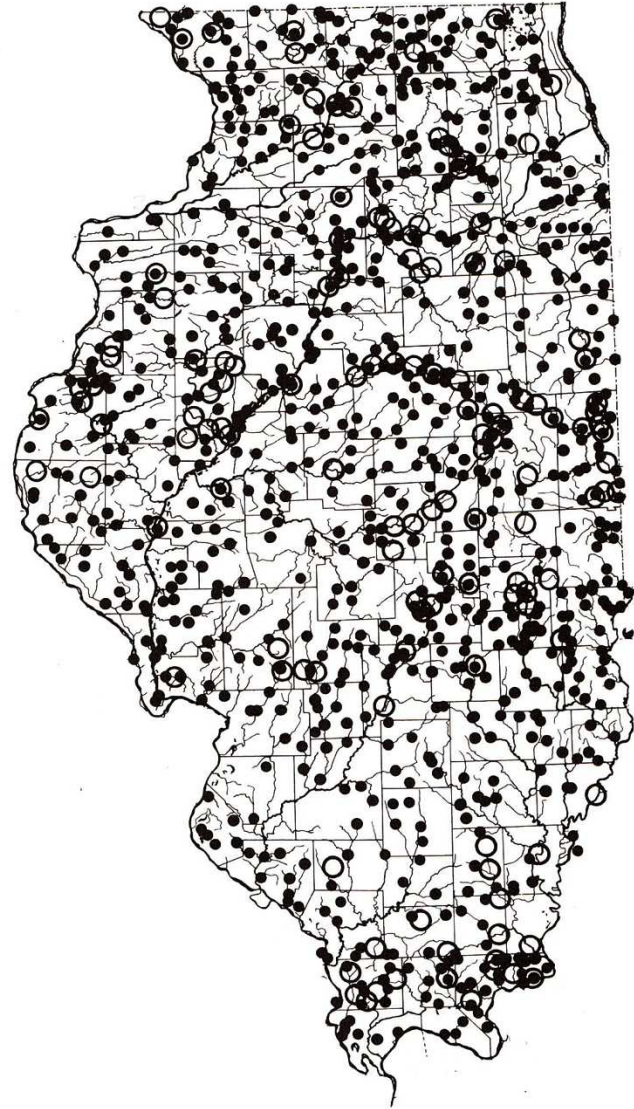
**Correct identifications**

**Track museum activities**

**Plan future activities**

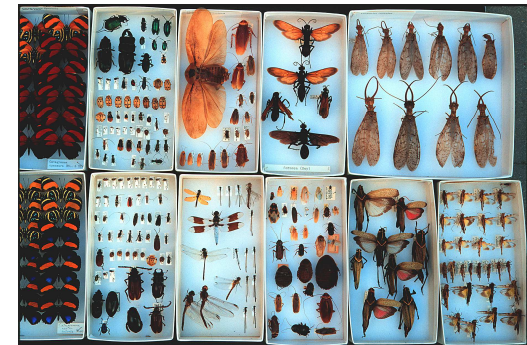
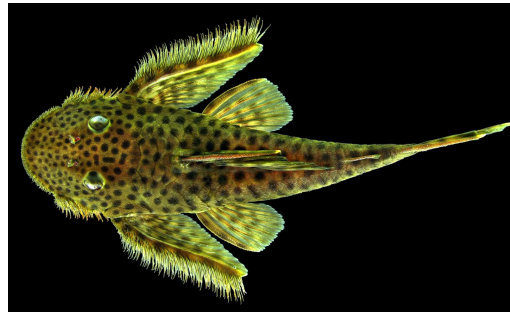


## Mapping



## Collections: Specimens, Images, DNA

Images → research,  
education, outreach





## Images of type specimens

**Scientists can examine types and  
other specimens online without  
borrowing them or visiting institutions**

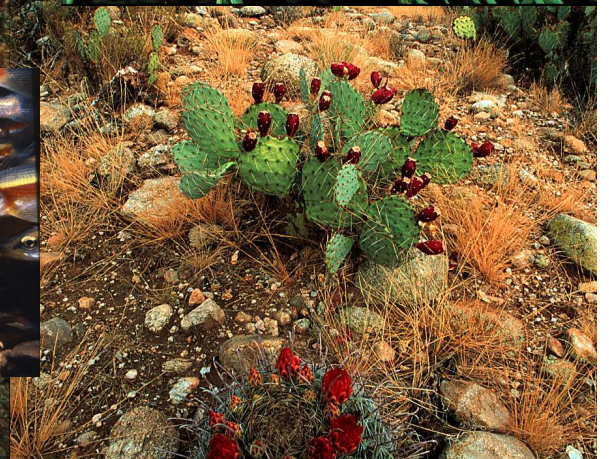




# BIODIVERSITY



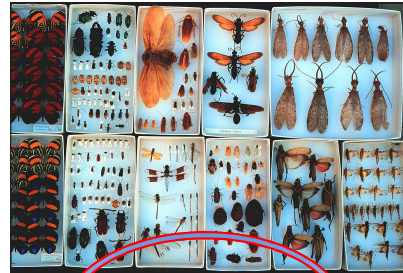
Photos: M. Jeffords  
& G. Paulay



# Biodiversity



## Collections: Specimens, Images, DNA



*Benefits*

billions of specimens

*Benefits*

**Environmental Policy**  
Management, Use,  
Protection

**New Discoveries**

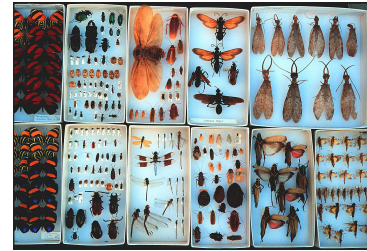
**Understanding**

**Appreciation**

**Research**

**Education**

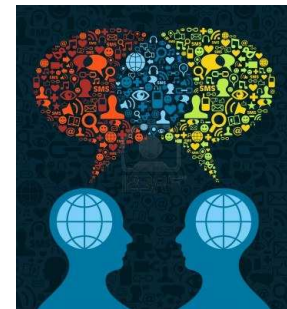
**Outreach**



# REVOLUTION!

## Biodiversity Collections

It will take all of us to keep it going!





NATURAL SCIENCE COLLECTIONS ALLIANCE



JOIN!



SPNHC

ADVANCING COLLECTIONS CARE

The Society For The  
Preservation of Natural  
History Collections

Taxon-oriented societies



# Thank you!



**Specimens are the  
scientific documentation  
of the Earth's biological  
diversity**



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