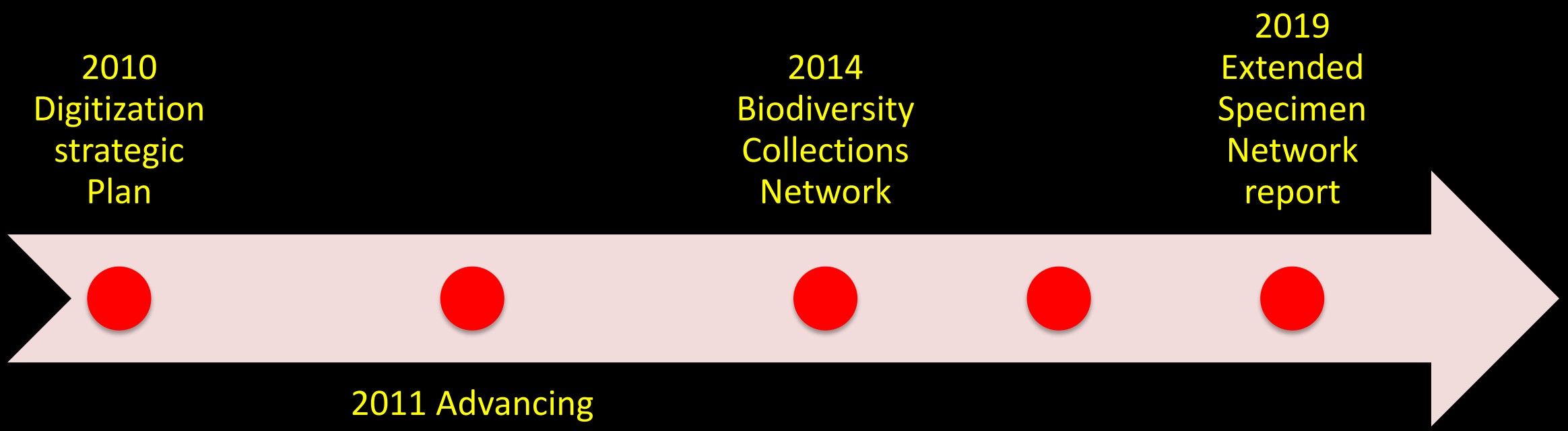
Parasite Tracker

Natural Science Collections Alliance

- Work to engage our network of collections-based member institutions to advocate for shared interests/needs.
- Partner on national collections-focused initiatives (e.g., BCoN)
- Ongoing efforts/collaborations with other groups to address issues,. e.g., the Negoya protocols and federal support for collections.
- Upcoming partner meetings: Digital Data Conference - iDigBio – Indiana University, 1-3 June 2020.

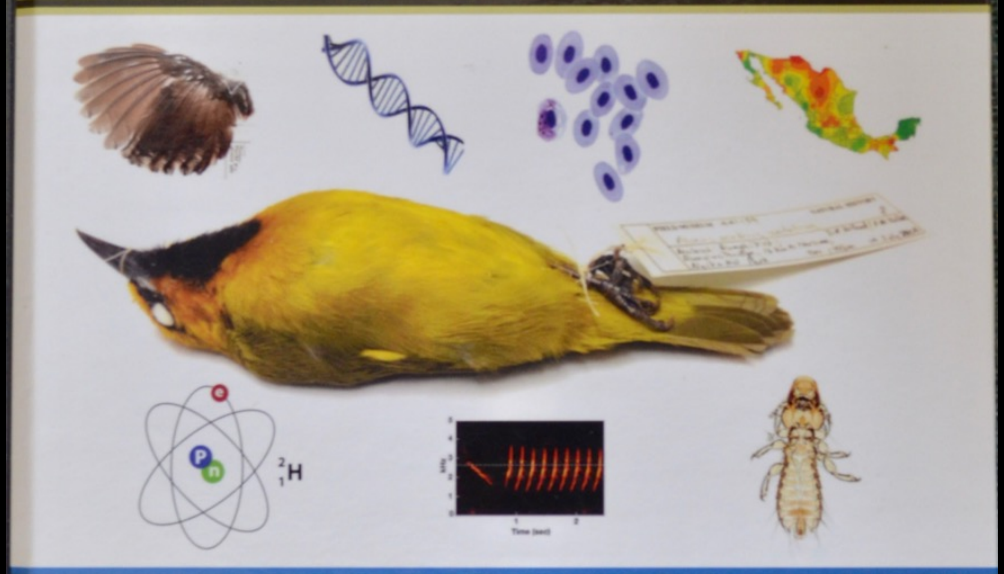
https://bcon.aibs.org/2019/01/16/community-input-requested-extending-u-s-biodiversity-collections-to-address-national-challenges/

Extended Specimen Network Concept Timeline



The Extended Specimen

Emerging Frontiers in Collections-Based Ornithological Research



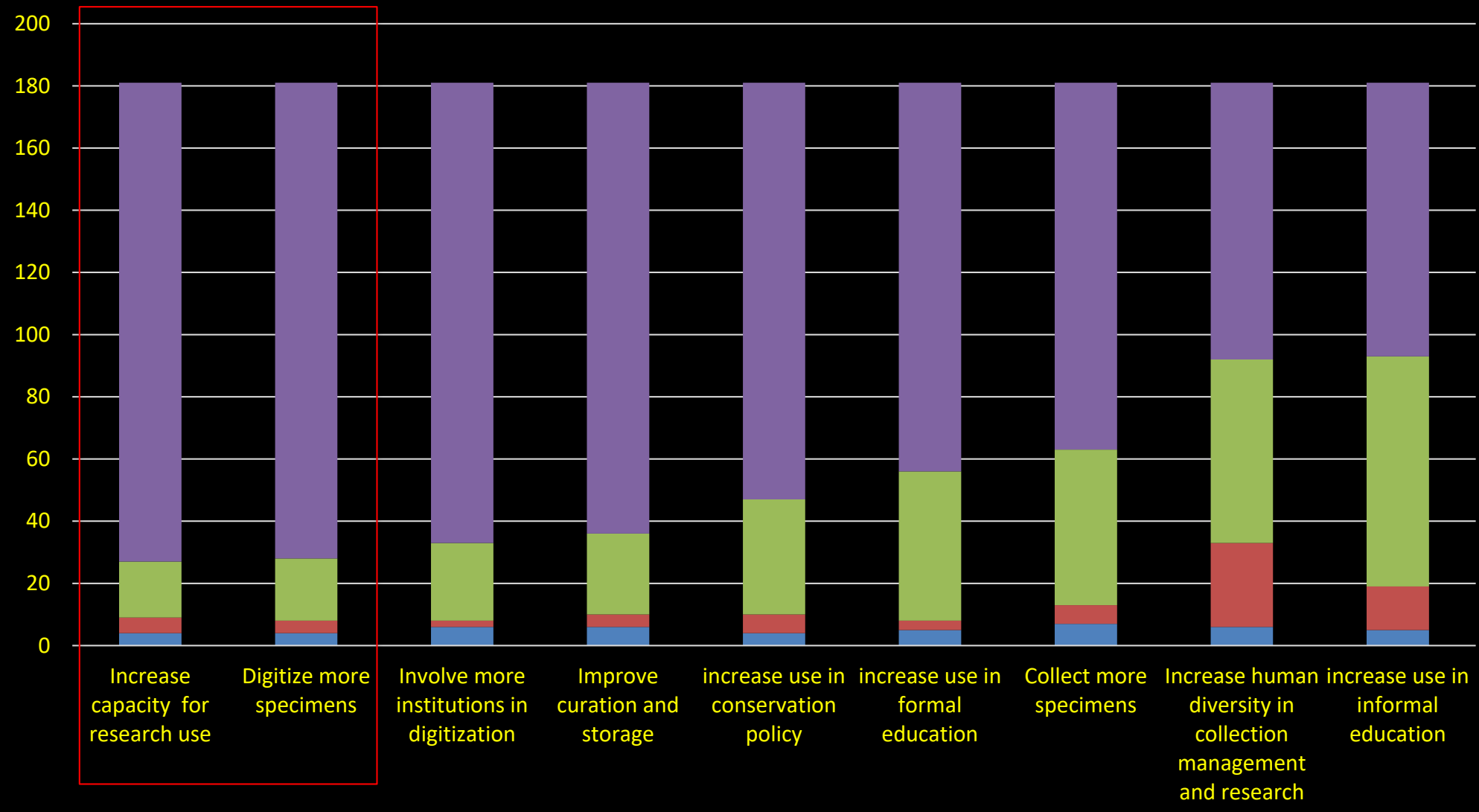
EDITED BY

Michael S. Webster

Studies in Avian Biology
American Ornithological Society

CRC Press
Taylor & Francis Group

Community Survey: What Should Come After ADBC?



Oak Springs Workshop

30 Oct – 1 Nov 2018

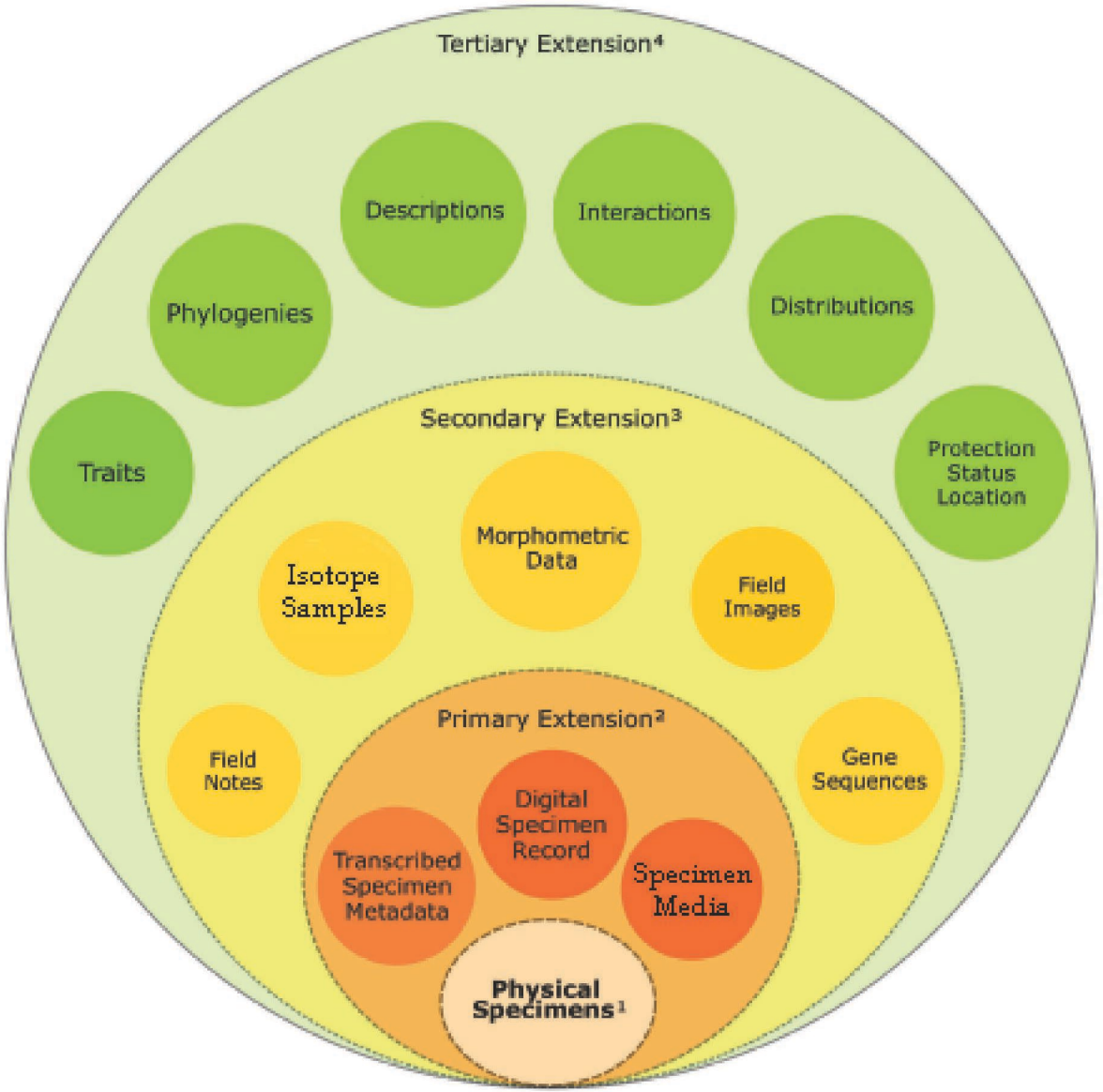
Considerations for a New Initiative

- We have not yet digitized a representative set of the biodiversity held in U.S. collections
- Not all digitized data are “research ready”
- NSF will not create a new funding project that is just like ADBC
- New program must provide critical data to users outside of our primary stakeholder group
- Must advance STEM Educational objectives
- New initiative must align with NSF’s 10 Big Ideas

Extended Specimen Vision

*Transform our wealth of physical specimens and related digital data into an **extended specimen network** that will enhance the biodiversity held in U.S. biodiversity collections*

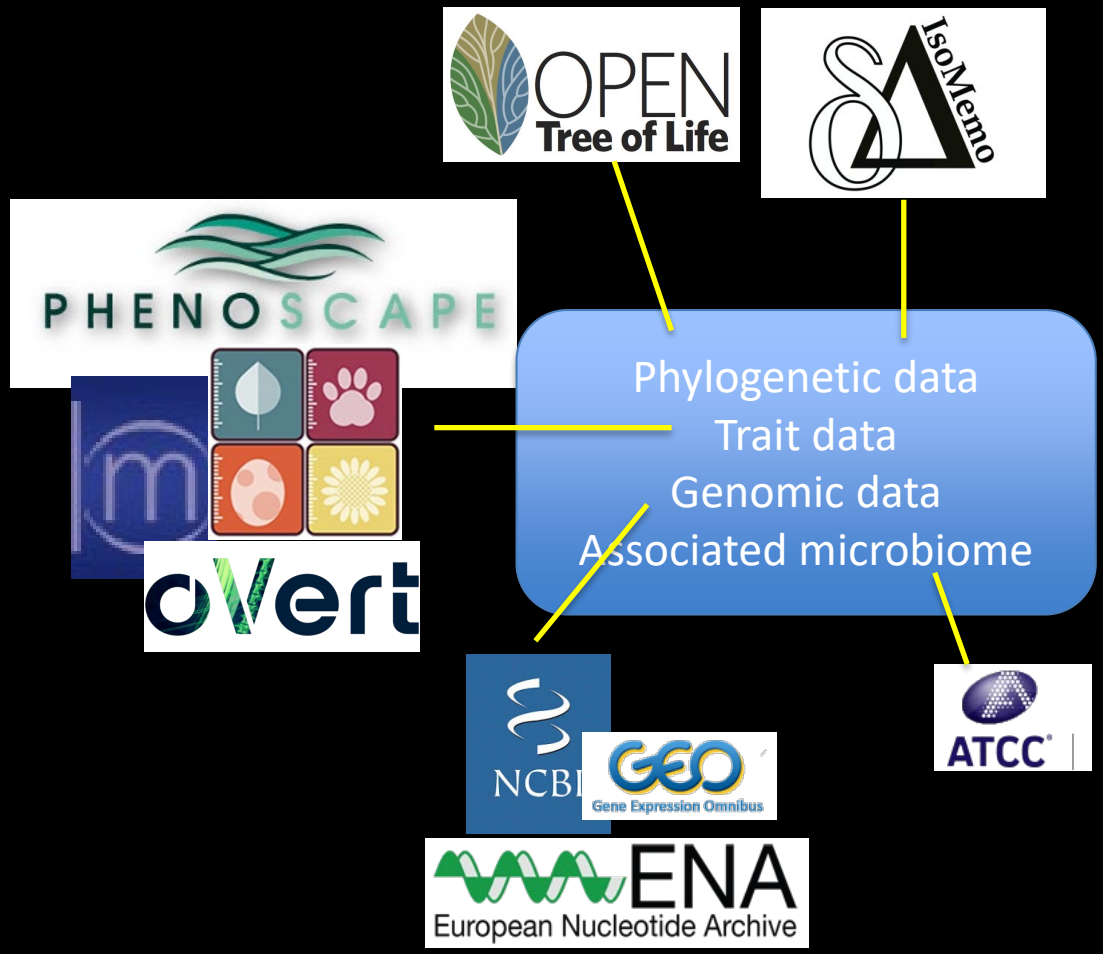
The Extended Specimen



Benefit: Research Enabled by the Extended Specimen Network

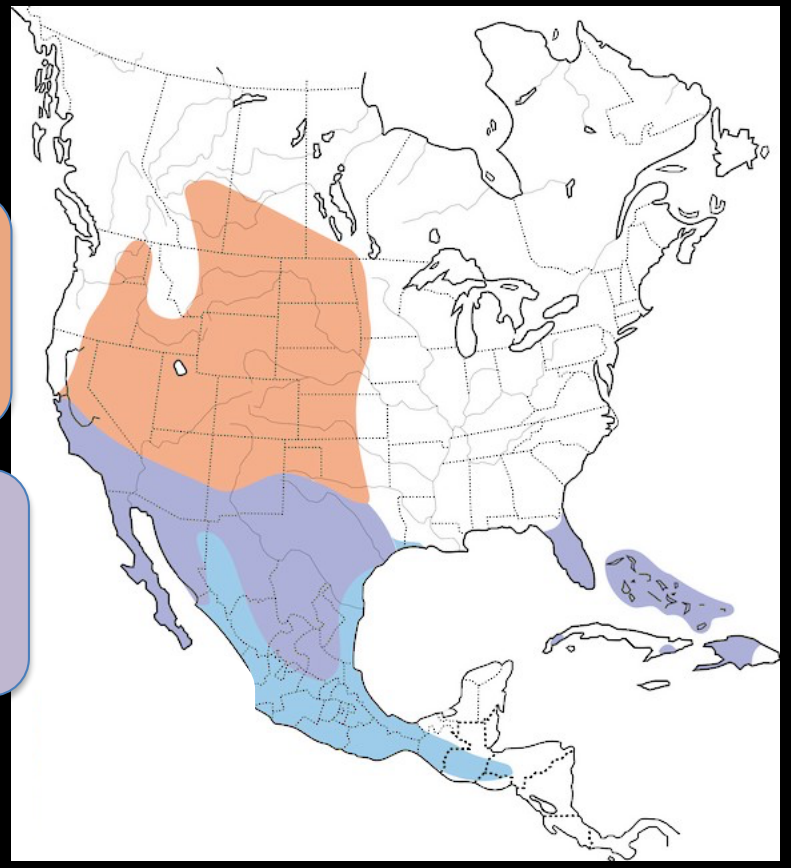
- Discover, characterize biodiversity
- Track habitat change over time
- Explore trait evolution, distribution
- Document effects of environmental change
- Understand species interactions
- Detection of genetically modified organisms in natural environments

Research question: What factors might explain the distributions of these taxa?



species 1

species 2



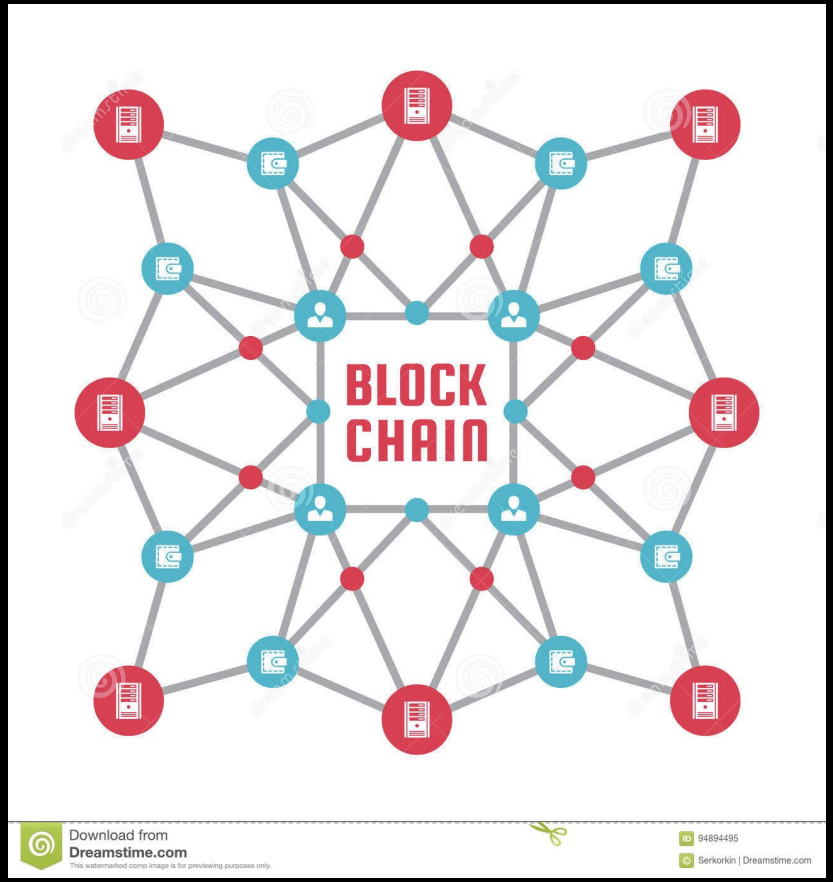
Benefit: A Tool for Education

- **Formal Education**
  - Classroom use for exploring relationships among organisms, between organisms and geography
  - Data literacy skills

- **Informal Education**
  - Interactive exhibits
  - Citizen science engagement
    - Building the extended specimen network though observations, collections, etc.
    - Using the network for their own research projects

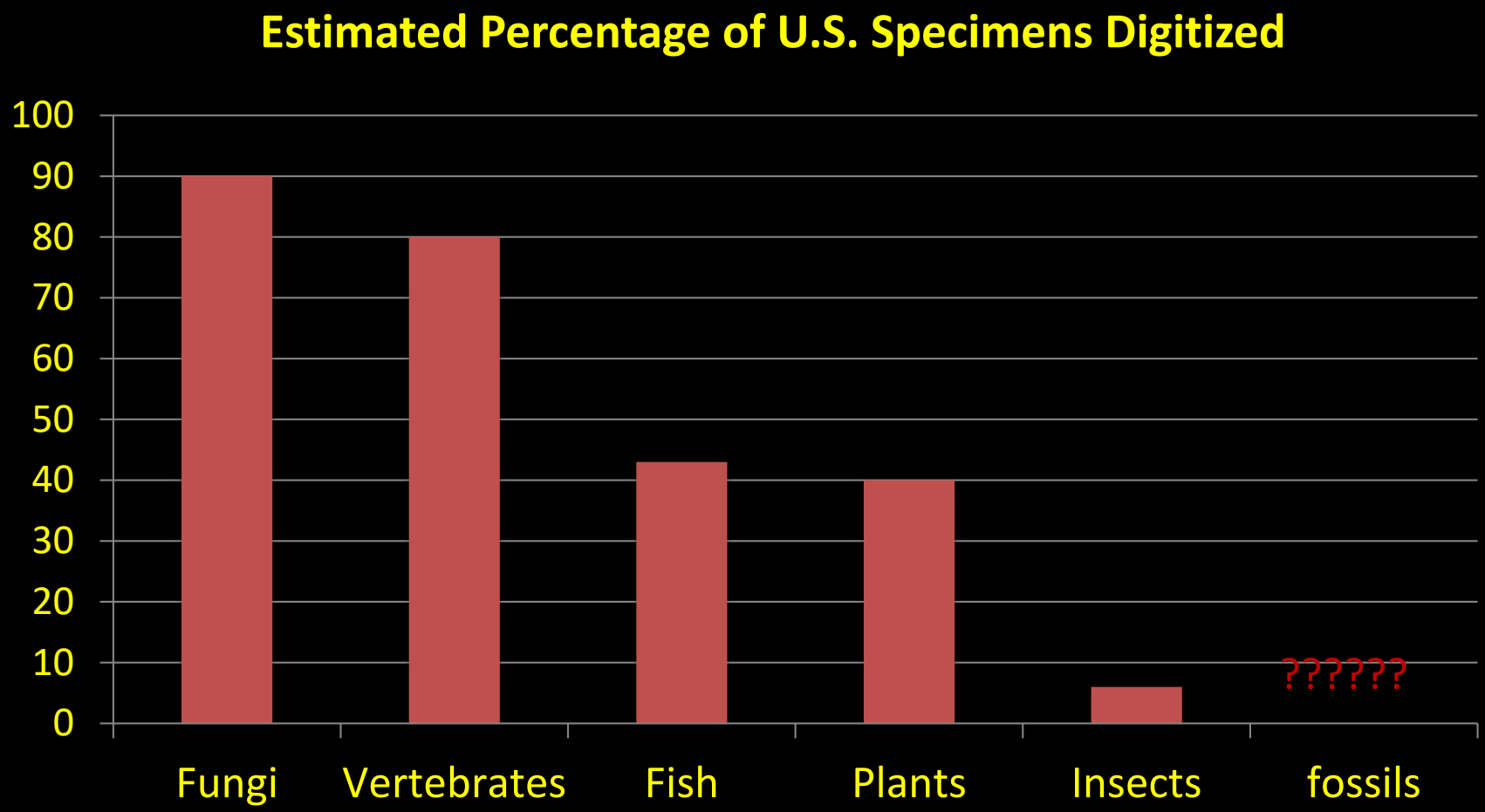
Benefit: Better Specimen Tracking

- Attribution of research use, publications citing specimens
- Compliance with legal requirements regarding collections use, e.g., Nagoya
- Improved management of extended data elements, e.g., gene sequences, tissues, symbionts, parasites, etc.



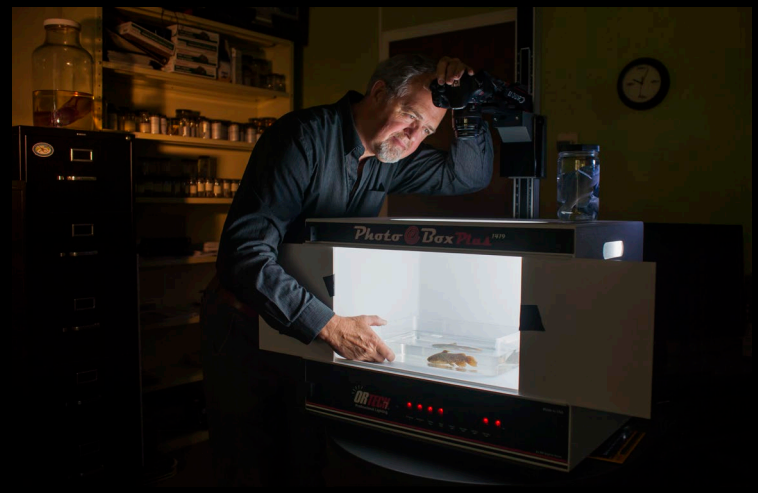
Benefits: A thriving network of U. S. Biodiversity Collections

Needed: More Digitization



Needed: Completion and Standardization of Existing Digital Records

- **Record Completion**
  - Complete transcription of skeletal records
  - Georeference specimen localities
  - Image specimen
  - Digitize ancillary images
- **Data Standardization**
  - Specimen identifiers
  - Taxonomic names
  - Collector names
  - Gazetteers for collection location



Needed: New Collection Protocols

The stage is now set for a new generation of collecting, preserving, analyzing, and integrating biological samples—a generation devoted to interdisciplinary research into complex biological interactions and processes. Next-generation collections may be essential for breakthrough research on the spread of infectious diseases, feeding Earth's growing population, adapting to climate change, and other grand research challenges.

Schindel & Cook, 2018

Needed: New User Interfaces

Types of questions we will want to ask:

- What species are dependent upon one another?
- How and why do certain species become invasive?
- Which species are most diverse genetically?
- What features determine species survival under environmental change?

Needed: A Biodiversity Data Center

- Manage database, extensions to other databases
- Provide training and ongoing support
- Coordinate activities with other initiatives
- Long-term support

NCBI

NIH 2018 Budget: 37.3 billion dollars
NSF 2018 Budget: 7.8 billion dollars

Partnerships – Other Biodiversity Organizations

- Commons for Biodiversity
- Alliance for biodiversity knowledge
- Global framework for integrating technologies, processes, standards, etc.
- One World Collection
- Global references

http://www.nscalliance.org/

https://spnhc.org/