

Harnessing Biodiversity Collections Data for Addressing National Challenges

Barbara M. Thiers & Anna K. Monfils

2nd Digital Data in Biodiversity Research Conference
U. C. Berkeley 4—6 June 2018

How We Got Here

U.S. Biodiversity Collections Digitization Infrastructure Development

2010:

- Initial focus group meeting;
- NIBA strategic plan developed and released
- First ADBC competition

2011:

- iDigBio established at University of Florida, Florida State University
- First TCNs funded

2013:

- Biodiversity Collections Network RCN funded
- NIBA Implementation plan published

2017:

NSF Program Officers ask for a reevaluation of Strategic/Implementation plan and for community input on the future of collections digitization

2018 (or early 2019): New strategic plan/white paper responding to NSF's 2017 request organized by BCoN

NIBA IMPLEMENTATION PLAN GOALS

Goal 1: Establish an organizational and governance structure

- **Goal 2:** Advance engineering of the US biodiversity collections cyberinfrastructure [create, maintain, share digital data]

- **Goal 3:** Enhance the training of existing collections staff and create the next generation of biodiversity information managers

- **Goal 4:** Increase participation in and support for NIBA from a broad spectrum of stakeholders, both nationally and internationally

- **Goal 5:** Establish an enduring and sustainable knowledge base [sustainability]

- **Goal 6:** Infuse specimen-based learning and exploration into formal and informal education

Progress toward NIBA Goals: Digitization

- The [Advancing the Digitization of Biological Collections \(ADBC\)](#)
 - 20+ Thematic Collection Networks (TCNs) funded
 - Specimens have been digitized from 561+ collections held in 336+ institutions.
- ADBC program has provided continual iDigBio as the organizing unit for the digitization effort.
 - iDigBio provides training in digitization and data mobilization to participating institutions
 - shares digitized data through its [iDigBio Portal](#) that has over 110 million specimen records and 24 million media records from 1600 record sets.

Research

- This Conference (Digital Data in Biodiversity Research)!
 - Systematics, biogeography, phenology, ecology etc.
- ICER (*Integrating Collections and Ecological Research Working Group*) – how to disseminate relevant research-ready data to ecologists, document uses of collections data serving ecological research and conservation
- Partnership with Data Carpentry (has the goal of building communities teaching universal data literacy)

Education and Outreach

- iDigBio Education and Outreach Working Group
- K-12 Lesson plans generated by TCNS, iDigBio
- Library of Life Collection Cards
- WeDigBio --public participation partner of iDigBio that has hosted three Worldwide Engagement for Digitization events. October 2017: citizen scientists from 20 countries and 33 US states contributed 16,000 online specimen data transcriptions over a three-day period

Related NSF-Funded Initiatives

- BLUE (Biodiversity Literacy in Undergraduate Education)
- BiotaPhy
- Kurator
- Morphosource
- Paleobiology Database Project
- Phylolink
- The Whole Tale

PROGRESS TOWARD NIBA GOALS—

Areas still requiring attention

- Development of a long-term organizational/governance structure devoted to implementing NIBA and sustaining the digitization effort beyond the current funding program (Goal 1,4)
- Efficient methods for data integration; robust link between specimen data source and research products based on these data (Goal 2)
- Formal and inclusive training programs for the next generation of biodiversity scientists and data managers (Goal 3)



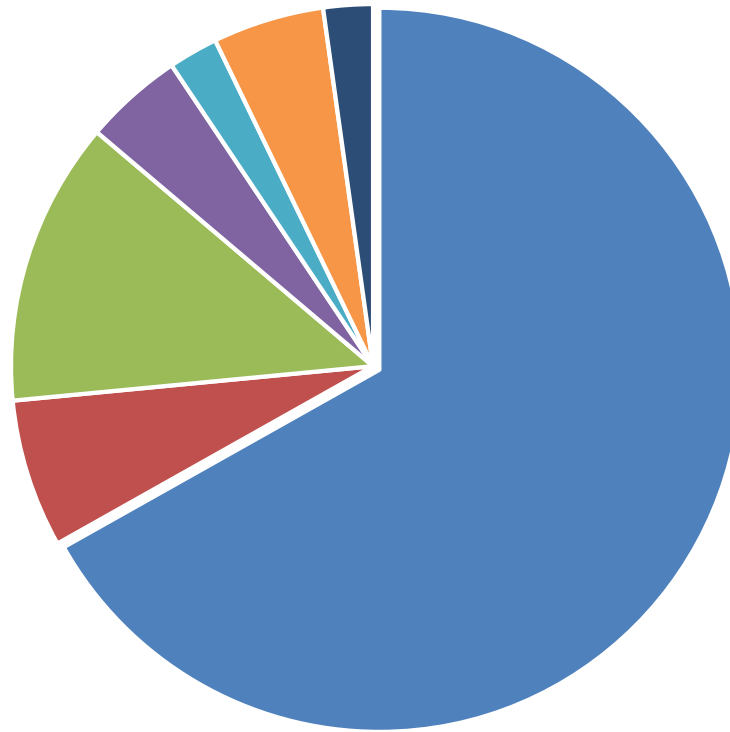
**BIODIVERSITY
COLLECTIONS NETWORK**

SURVEY: Harnessing Biodiversity Collections Data for Addressing National Challenges

February 7th, 2018

This survey is intended to elicit information for a stakeholder vision of how to maximize the value of biodiversity collections data for collections management, research and education in the future. BCoN is coordinating the development of this vision in response to requests from NSF and others to inform the development of a new funding program to succeed NSF's current ADBC program. The effort will culminate in a workshop in October 2018 where we will consolidate the feedback into a strategic plan for 2020-2030. The strategic plan, to be issued in early 2019, will be available for public comment and edited accordingly before it is finalized.

Participants (181)



■ Director, Curator or Manager - some digitized specimens 121

■ Director, Curator or Manager no digitized specimens 12

■ Scientist who uses biodiversity data in research 23

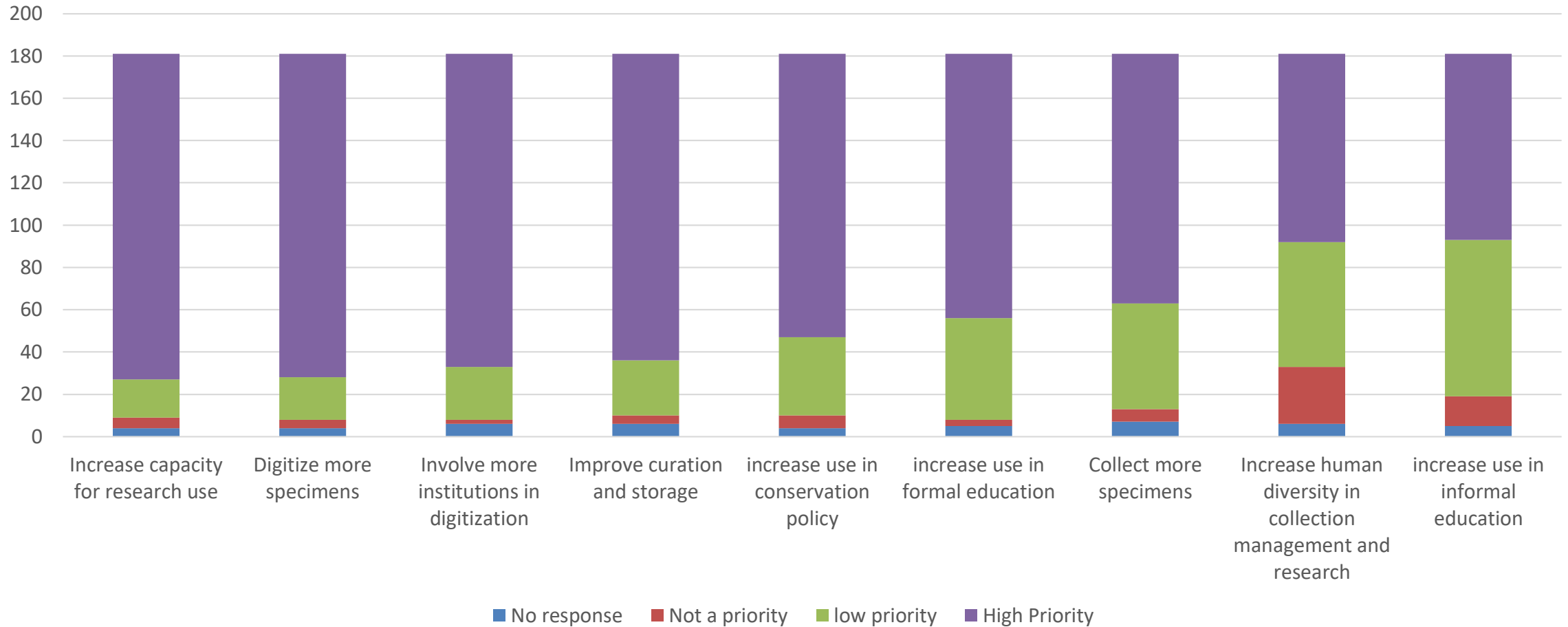
■ Scientist who uses biodiversity data in research and teaching 8

■ Student who uses biodiversity data in research 4

■ Other 9

■ No response 4

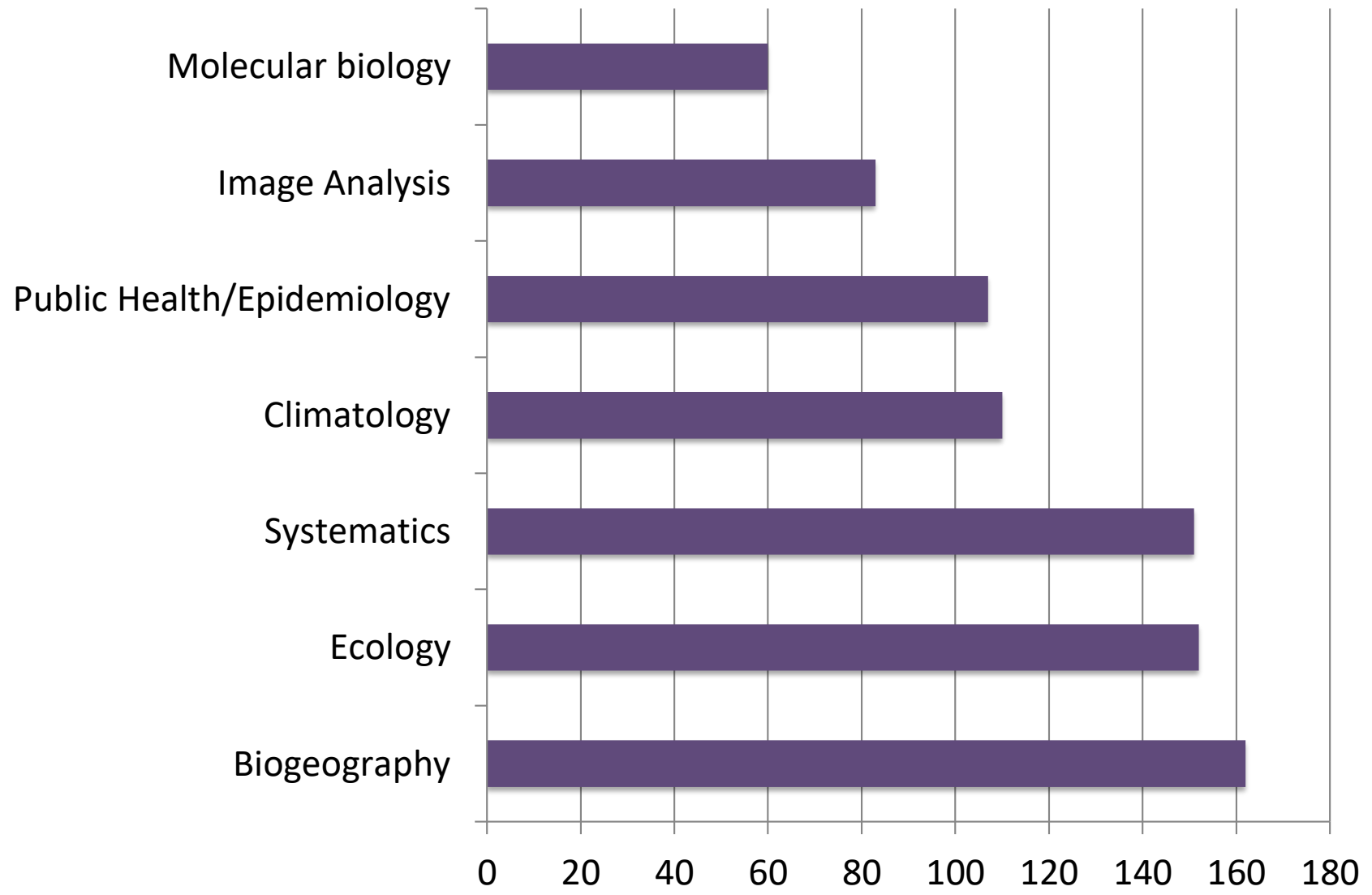
Priority Future Goals for Biodiversity Collections?



Other Priorities Noted

- Train more systematists, collections professionals
- Identify other (e.g., non- NSF sources of funding for collections digitization)
- Improve data quality, especially specimen identifications
- Develop new digitization technologies
- Broaden the user community for digitized specimen data
- Focus future digitization on: historical collections; international collections; small collections; acoustic collections

Which Research Areas Would Benefit from Greater Integration and Collaboration with Digitized Collection Data?



What other fields could benefit from greater integration and collaboration with digitized collections?

Agriculture

Anatomical and Health Sciences

Architecture

Art

Conservation Biology

Ecology

Economics

Education

Ethology

Evolutionary Biology

Fisheries Science

Geology

History

Human Evolution

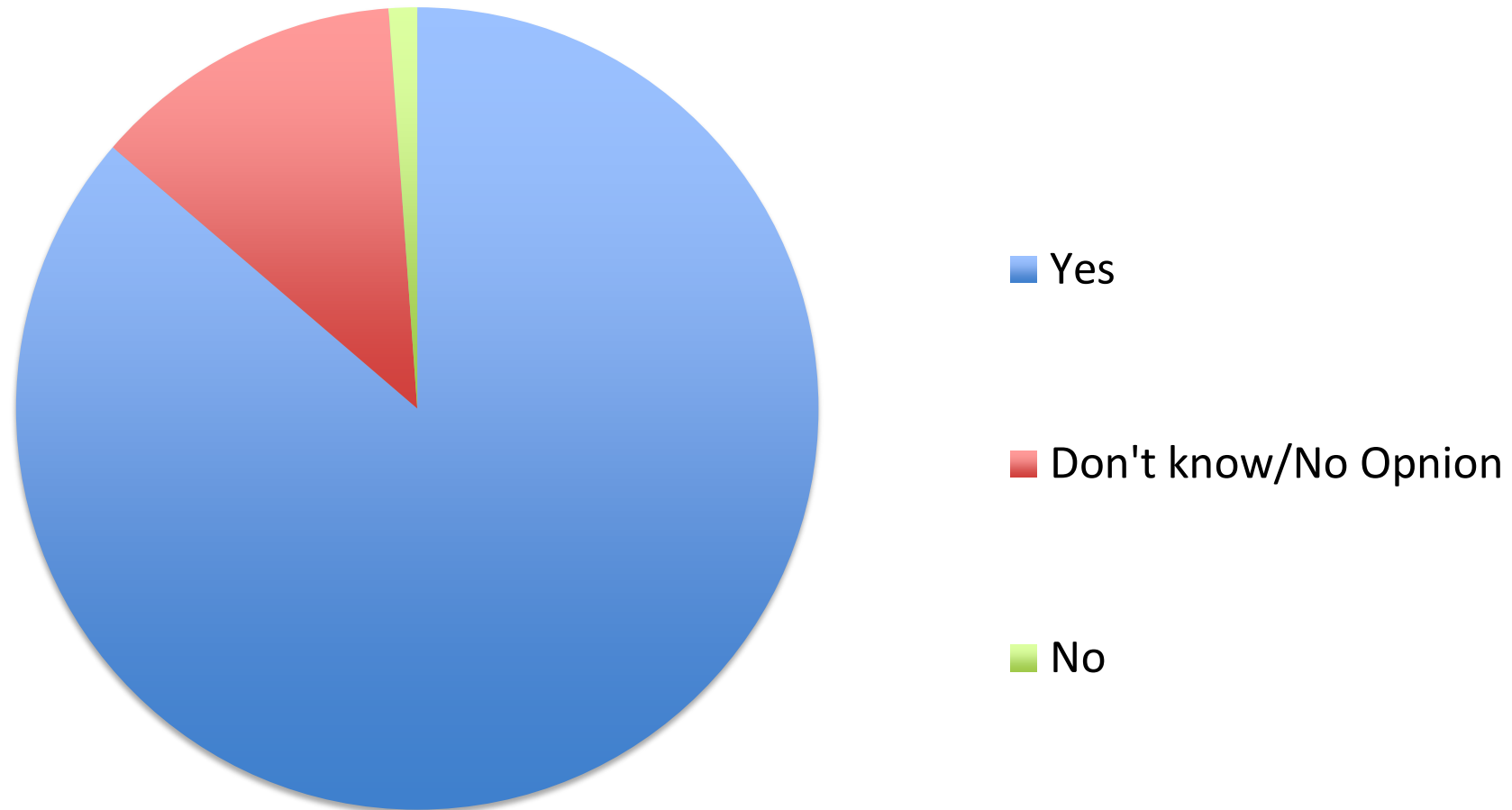
Invasive species control

Paleoecology

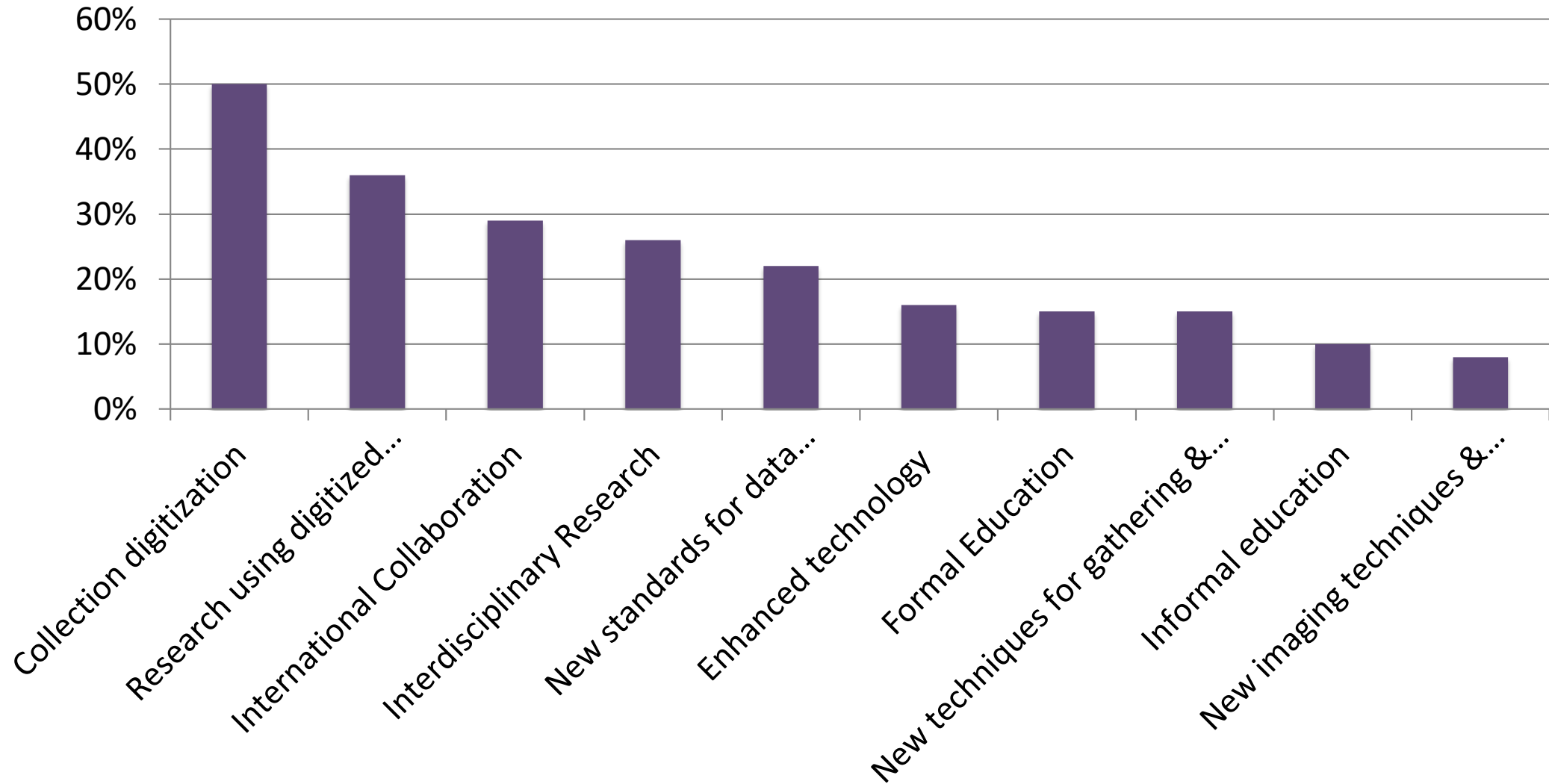
Paleontology

Stratigraphy

Do you think another NSF funding program is necessary for the digitized biodiversity data to reach its full potential for research, education and conservation objectives?



Highest Priority Focus for a New Funding Program



Summary

- As ADBC draws near its end, now is the time to update the current strategic plan, or develop a new one that might guide development of a new NSF funding program the way the NIBA plan did.
- Impressive progress has been made, but we have not met all of the NIBA goals outlined in the Implementation plan
- Respondents to the survey are strongly in favor of continued digitization and the facilitation of research that uses these data
- Respondents believe there is a much wider audience for collections data that is not yet making full use of this resource



**BIODIVERSITY
COLLECTIONS NETWORK**



Discussion

- What more can be done to make data derived from collections more widely available/known to potential users outside of systematics and ecology?
- NSF has left the door open to considering a new initiative that would consider physical as well as digital collections. What are the pros and cons of effectively combining the Collections in Support of Biodiversity Research (CSBR) and ADBC programs?
- What are some specific activities that were not included in the NIBA plan or the ADBC program that should be included in a new plan/funding program?
- For the NIBA Goals that have not yet been fully attained (i.e., governance structure, data robust link between data source and research product, sustainability, training programs), which are most important to address in a new plan?
- What different goals should a new program have?
- Should the collection of new specimens be part of a new plan?

To record your answers electronically, go to: <https://tinyurl.com/yc8aazre>