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Cover

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PD/PI Name:	Lawrence M Page, Principal Investigator Jose A Fortes, Co-Principal Investigator Bruce J MacFadden, Co-Principal Investigator Gregory A Riccardi, Co-Principal Investigator Pamela S Soltis, Co-Principal Investigator
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Submitting Official (if other than PD\PI):	Lawrence M Page Principal Investigator
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Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)	Lawrence M Page

Accomplishments

* What are the major goals of the project?

Integrated Digitized Biocollections (iDigBio) is the central resource for the Advancing Digitization of Biodiversity Collections (ADBC) program funded by the U.S. National Science Foundation (NSF). Through ADBC, data and images for millions of biological specimens are being made available in electronic format for the research community, government agencies, students, educators, and the general public.

The vision for ADBC is a permanent database of digitized information from all biological collections in the United States that leads

to new discoveries through research and a better understanding and appreciation of biodiversity through improved education and outreach, which then results in improved environmental and economic policies. Creation of the digitized database is occurring in four stages:

1. An initial stage in which the effort to digitize biological collections across the U.S. is catalyzed by funding from NSF and from effective iDigBio-driven activities that foster collaborations, identify priorities, and generate information on best practices related to standards, workflows, and data management for digitization of biological collections, as well as demonstrate the value of biodiversity and collections that document biodiversity.
2. An intermediate stage wherein digitization at [Thematic Collections Networks](#) (TCNs), Partners to Existing Networks (PENs), and other participating institutions and networks improves methods and strategies and demonstrates the scientific and societal benefits of validated and readily accessible data.
3. A third stage in which the vision for ADBC is realized through participation by all U.S. institutions with biological collections.
4. A fourth stage in which digitization is a routine and sustained practice in all institutions with biological collections, and the national database is easily accessible as an up-to-date source of information on biodiversity.

The mission of iDigBio is to develop a national infrastructure that supports the vision of ADBC by overseeing implementation of standards and best practices for digitization; building and deploying a customized cloud computing environment for collections; recruiting and training personnel, including underserved groups; engaging the research community, collections community, citizen scientists, and the public through education and outreach activities; and planning for long-term sustainability of the national digitization effort.

iDigBio is enabling digitization of data from all U.S. biological collections and is integrating those data to make them broadly available and useful with shared standards and formats. Ultimately, ADBC is furthering the discovery and understanding of biological diversity, and iDigBio is engaging the research, collections, and education communities in a spirit of collaboration in an effort to open biological research collections to new downstream user communities.

iDigBio involves the development of a permanent and powerful cloud computing infrastructure to link biological data from collections across the U.S. into a single unified web interface, overcoming the “data silos” that currently exist across the country. Search and analytical tools enable users to mine diverse data, such as taxonomy, geographic location, 2- and 3-dimensional images, vocalizations, and molecular resources tied to specimens in collections. These data promote integrative biological research on living and fossil species and provide an immense resource for agricultural science and land use management, human health, and assessing the impacts of climate change, invasive species, and other natural resource management issues.

Key partners in this effort are the TCNs, which form a national grid of institutions that are digitizing specimens and associated resources. Integration with the greater community of biocollections resources, tools and organizations is critical to accomplishing the grand challenge of digitizing and integrating data from all U.S. collections, large and small. For more details regarding the larger community that encapsulates ADBC, please refer to the Network Integrated Biocollections Alliance (NIBA) [strategic plan](#) and [implementation plan](#).

*** What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?**

Major Activities: **7/2014:** The Summer 2014 issue of the University of Florida's *Explore Research Magazine* featured iDigBio in an article entitled *Out of the Darkness—Bringing Biological Collections into the 21st Century* that detailed iDigBio's work and promoted the rationale behind digitization for natural history collections.

7/2014: iDigBio updated the Research page on the project Web site to emphasize TCN research and share community research tools.

8/2014: iDigBio engaged as a collaborator on four ABI proposals:

- “Collaborative Research: ABI Development: Forging New Connectivity in Arctos, a Growing Collaboratory for Museum Biodiversity Data” with Carla Cicero as the Principal Investigator
- “BioFinder: Harnessing the Power of Citizen Science” with Henry L. Bart Jr. as the Principal Investigator
- “Notes from Nature: Advancing a Next Generation Citizen Science Platform For Biocollection Transcription” with Rob Guralnick as Principal Investigator
- “Collaborative Research: ABI Innovation: Connecting resources to enable large-scale biodiversity analyses,” with Doug Soltis as PI and Pam Soltis, Jose Fortes, and Andrea Matsunaga of iDigBio as co-PIs, plus Jim Beach, Jorge Soberon, and Stephen Smith as additional co-PIs

8/18/2014: iDigBio affirmed its interest and desire to collaborate with Brazil's Virtual Herbarium, Centro de Referência em Informação Ambiental (CRIA), in a variety of activities related to digitization, including but not limited to the sharing of specimen data and media sets, training of human resources, software and infrastructure tools. In particular, iDigBio is looking forward to leveraging expertise and technology from the speciesLink (<http://splink.cria.org.br/>) network developed and maintained by CRIA, being able to access collections data from Brazil's Virtual Herbarium, and providing access to all data and media sets ingested by iDigBio.

8/20/2014: iDigBio is a partner on the project entitled "Organizing, Coordinating, and Sustaining a Network Integrated Biocollections Alliance", which is supported by a five-year grant from NSF to the American Institute of Biological Sciences (RCN Award #1441785). The project is an outgrowth of recent scientific meetings in which scientists have articulated a need to digitally capture biodiversity specimens and associated data held in natural science collections for use in research, education, and for the public interest.

8/2014: iDigBio issued a press release announcing the award of \$7.5 million dollars that established three new TCNs and three PENs for 2014. University of Florida News along with ten other online news entities published the announcement. In addition, 12 follow-up press releases were published by external sources highlighting the newly funded TCNs between September and December 2014.

10/2014: iDigBio released a new version of the Specimen Portal to the community. The new and updated features included: a taxonomic synonyms search feature, a redesign of individual specimen and media pages, and a point-clustering feature for the map to better visualize individual records when coordinates are very similar.

10/2014: iDigBio released a beta version of Biospex.org to the community. Biospex is a project management system for public participation in digitization of biodiversity specimens.

10/27/2014–10/28/2014: iDigBio held its fourth annual Summit in Gainesville, FL. The Summit was a meeting of representatives from TCNs, iDigBio, and other initiatives related to the Advancing Digitization of Biodiversity Collections (ADBC) program. The Summit focused on discussion of shared goals, challenges, opportunities, and collaboration. This two-day workshop facilitated participation of 84 on-site attendees and 9 remote attendees.

10/27/2014: iDigBio's External Advisory Board (EAB) members met with the iDigBio PIs and project staff during iDigBio Summit IV. The EAB report is included as an attachment.

11/2014: iDigBio engaged as a collaborator on one IMLS Museums for America proposal: "UCM Paleogene Mammal Project" with Jaelyn Eberle as the Principal Investigator.

12/11/2014: Pam Soltis (Principal Investigator), Jose Fortes, Larry Page, Andrea Matsunaga, Renato Figueiredo, and others submitted a pre-proposal to NSF for a Science and Technology Center in Biodiversity, in which iDigBio will play a major role.

3/2015: iDigBio published a comprehensive list of natural history collections in the United States of America (<https://www.idigbio.org/portal/collections>), which was created and curated by iDigBio postdoc François Michonneau.

4/13/2015–4/17/2015: Several iDigBio members (Page, Fortes, Riccardi, Soltis, Jennings, Nelson, & Mast) participated in the Digitization of Biological Collections: A Global Focus, hosted by Atlas of Living Australia (ALA). Principal items of interest for iDigBio were to (1) have access to additional specimen-based records from institutions and aggregators to facilitate research and outreach activities, and (2) have access to tools—or information about tools—that ALA, NHM (London), and NSII (China) have developed that will help us meet our research and outreach goals. Principal items of interest for ALA and other participants were to (1) gain a better understanding of the digitization workflows and community involvement strategies developed by iDigBio, and (2) have more information on the funding model for ADBC. This meeting was instrumental in furthering our

achievement of our objectives to “enable links with existing digitization projects and other national and international entities that promote biological research based in collections, collections standards, and training.”

Ongoing: Using the list of U.S. Collections created and curated by iDigBio postdoc François Michonneau, iDigBio staff members Joanna McCaffrey and Molly Phillips initiated an email writing campaign inviting all U.S. collections that are not already publishing data with iDigBio or a TCN to share their data with iDigBio. The campaign resulted in 562 emails being sent to collections across the country. The email campaign uncovered many incorrect and/or missing contact information for collections, which iDigBio is seeking to correct. All corrections and updates made to the iDigBio collections list are also being sent back to the original data providers (Index Herbariorum and GRBio).

5/2015: iDigBio conducted its annual Community Survey to seek input from internal staff as well as the broader collections community. Feedback helps iDigBio better understand areas in which we need to improve and provides guidance on priorities and next steps. The survey asked for feedback on the iDigBio portal and website, outreach, and potential intended/unintended impacts of the project. iDigBio staff were also asked about internal communication, work climate, and project leadership.

Specific Objectives:

8/24/2014–8/25/2014: Andréa Matsunaga participated in the BCO Biodiversity Hackathon in Eugene, OR. The goal of the hackathon was to mobilize biodiversity data by linking to ontologies (including BCO, PCO, and OBI). Datasets covered included VertNet and iDigBio occurrences, with discussion on additional future datasets. The hackathon generated competency questions to guide the scope of the ontology and mapped most of Darwin Core (DwC) and all AudubonCore (AC) terms into classes of Biological Collections Ontology (BCO). This effort created a path for iDigBio data to also be parsed by a semantic web/graph technology, enabling additional downstream use cases for the biodiversity data. Not only specimen data, but also media metadata has been mapped to BCO domains.

9/6/2014: iDigBio's Careers and Graduate Study in the Biological Sciences - A Workshop for Undergraduate Students: ([Chicago, IL](#)): One-day workshop for undergraduate students in the Chicago area focused on opportunities for careers and graduate study in the biodiversity sciences, with emphasis on environmental, conservation, and molecular biology as well as biodiversity science, ecology, evolution, and opportunities for scientific research. A primary goal of this event was to increase the participation of underrepresented minorities in the biodiversity sciences. This event was funded by an NSF workshop grant awarded to Florida State University (NSF award DBI-1358501, 9/14/2013). There were numerous iDigBio staff involved in this event: Gil Nelson, David Jennings, Kevin Love, Pam Soltis, Claudia Segovia, Joanna McCaffrey, & Cheryl McLaughlin.

10/16/2014: David Jennings presented a Webinar entitled “The Art and Science of Project Management”. This webinar provided an overview of the technical and artistic aspects of project management, including strategies and tactics for adapting to situations and driving things forward.

10/10/2014: [iDigBio's CyberInfrastructure Working Group \(CYWG\) \(WEBINAR\)](#): Alex Thompson, Dan Stoner, Matt Collins, Andréa Matsunaga, and Renato Figueiredo presented iDigBio cyberinfrastructure developments to the community on new features added to the portal and APIs, technical aspects of the data ingestion process, compute infrastructure, new research tools and integration with other projects, and new appliances made available.

10/14/2014: Joanna McCaffrey represented iDigBio at the 2014 North American EMu User Conference (Washington, DC). iDigBio is making efforts to keep communication channels open with Specify, Symbiota, and EMu users and software developers. Joanna and some key KE staff discussed the possibility of having a half-day digitization workshop next year in conjunction with the NHSIG meeting in Oct 2015.

10/24/2014: Greg Riccardi and Deb Paul participated in the Distributed Open-Source Development of Collection Management Systems (DINA Consortium) meeting at the Swedish Museum of Natural History. Representatives of digitization and data management projects attended from Sweden, Denmark, Finland, Germany, Estonia and Canada. This meeting included discussions of potential collaborations between the DINA consortium and iDigBio.

10/25/2014–10/26/2014: Greg Riccardi and Deb Paul participated in the Persistent Identifier Summit at the Swedish Museum of Natural History to foster the development of stakeholder-derived “community guidelines for the adoption of persistent identifiers relevant to biodiversity informatics.”

11/1/2014–11/2/2014: Larry Page met with the AIBS Council of Representatives to discuss funding issues for taxon-oriented and other biological societies.

11/1/2014–11/2/2014: Larry Page attended the AIBS-sponsored workshop on data publications and talked about iDigBio’s plans for data publication and attribution.

11/24/2014–11/25/2014: iDigBio, Digitarium, GBIF, and others were invited by SiBBR (Brazilian Biodiversity Information System or Sistema de Informação sobre a Biodiversidade Brasileira) to present a one-day workshop on Best Practices in managing and digitizing biodiversity collections. This event was held as part of the launch of the SiBBR project at CNPq, Brasília, DF, on November 24-25, 2014. iDigBio was represented by Greg Riccardi, Deb Paul, & Andréa Matsunaga. The agenda, presentations and further details are available at: https://www.idigbio.org/wiki/index.php/SiBBR_Launching_Event

2/12/2015 and ongoing: Shari Ellis went to the meeting conversation with David Schindel, Barbara Thiers, and Eileen Graham about a survey of botanists regarding potential migration from Index Herbariorum to GRBio. This collaboration sought to strengthen partnerships, and resulted in personnel exchanges (e.g., project staff and/or partner's staff use each other's facilities, work at each other's site).

3/1/2015-3/4/2015: Larry Page Participated in a review of UC Berkeley’s Initiative in Global Change Biology (BiGCB). This provided an opportunity to investigate ways in which BiGCB and iDigBio might integrate research activities.

3/2015-10/2016: Deb Paul met with GBIF Task Force on Accelerating the Discovery of Biocollections Data. The meeting sought to use biocollections metadata to discover biocollections data not-yet-digitized, and publish robust metadata about these datasets to facilitate data discovery. This collaboration promises to produce several benefits to iDigBio including:

- Supports NIBA goals that stipulate international collaboration, and in this particular case, collaboration with GBIF.
- Overlaps with our data discovery goals
- Identifying donor stakeholders who might fund digitization of particular datasets has been a topic in several workshops, as well as sustainability conversations.
- Supports collections discovery, and in doing so, helps those who manage these collections to illustrate the value to their own institutions.
- As a first step, publication of a metadata file, before digitization is done, is low-hanging fruit (after discovery of course).
- Emphasizes the importance and value of robust metadata.

Ongoing: iDigBio has been coordinating and conducting a series of Broadening Participation workshops and other events, led by Gil Nelson with contributions by Pam Soltis, Larry Page, Bruce MacFadden, David Jennings, Charlotte Germain-Aubrey, and Claudia Segovia. These outreach efforts have the goal of broadening the diversity of the biodiversity collections work force.

Ongoing: Pam Soltis is working with the TCNs to identify their needs for research tools and expertise. Following a survey of the TCNs, a virtual meeting/workshop will be held in June to explore the results.

Ongoing: The TCNs provide regular progress reports to iDigBio, which address the following areas: (1) progress in digitization efforts; (2) share and identify best practices and standards (including lessons learned); (3) identify gaps in digitization areas and technology; (4) share and identify opportunities to enhance training efforts; (5) share and identify collaborations with other TCNs, institutions, and organizations; (6) share and identify opportunities and strategies for sustainability; (7) share and identify Education and Outreach activities; and (8) other progress that doesn't fit into the above categories.

iDigBio maintains all previously submitted reports at

https://www.idigbio.org/wiki/index.php/Internal_Advisory_Committee#TCN_Progress_Reports_to_iDig

Significant Results:

6/29/2014–7/3/2014: Center for Pre-collegiate Education and Training/ Summer Science Institute Workshop for Advanced Topics in Evolution (Gainesville, FL): Pam Soltis, Bruce MacFadden, Charlotte Germain-Aubrey, and a group of graduate and undergraduate students gave presentations, research demonstrations, and collection tours to 10 middle school and high school teachers. Presenters discussed the increasing importance of storing museum specimens digitally and how to use digital collection materials as teaching aids.

7/11/2014: iDigBio cyberinfrastructure staff met with Tim Robertson to discuss technical issues regarding an established goal of mobilizing iDigBio data into GBIF (and BISON).

8/2014: iDigBio worked with NSF program officers to create a document entitled "Notes on Writing a Proposal for the ADBC Program at NSF" that provides guidance to community members interested in submitting ADBC proposals to NSF.

8/5/2014: iDigBio published a Systems Status page on the project Web site. The page offers performance information for iDigBio systems consistent with the Service Level Agreement.

8/7/2014: iDigBio's Data Management Interest Group held a kickoff webinar to discuss issues surrounding shared data and the help and information , the community needs in order to ensure , if possible, that the provider has the most up to date versions of their own datasets.

8/10/2014: iDigBio interacted with the ecological community and engaged them in ADBC endeavors at the [Ecological Society of America 2014 Conference](#) (Sacramento, CA). iDigBio shared its resources as well as those of TCNs and other groups involved in digitizing biodiversity specimens. iDigBio also received feedback from ecologists about their experiences with and needs for historical and museum data.

9/2014: iDigBio disseminated the report entitled "DNA Banking for the 21st Century: A White Paper of Recommendations from the U.S. Workshop on DNA Banking." The report identifies areas in need of growth/improvement with recommendations for DNA banks to make them more accessible and useful to researchers. The report covers three major topics: (a) infrastructure, methodology, and information; (b) networking and awareness; and (c) visions for the future.

9/12/2014: iDigBio created and published a Travel Policy document to clarify the procedures and process for travel and reimbursement associated with an iDigBio-funded workshop, symposium, or other event. This document is linked from iDigBio's workshop page and documentation page.

9/17/2014–9/23/2014: Maria Viteri's attendance at iDigBio's second Careers and Graduate Study in the Biological Sciences (Chicago, IL) workshop motivated her to pursue an internship in Ecuador (her parents' country) and to seek options for learning more about tropical biodiversity research. Maria contacted iDigBio graduate student Claudia Segovia-Salcedo to obtain information about internships/ volunteer opportunities in Tropical Ecology-Primatology in Ecuador.

11/2014: The Explore Research team at FLMNH produced two new videos for iDigBio, which were unveiled at iDigBio Summit IV. The first video introduces the task clusters

involved with digitization of biodiversity specimens. The second video explains the five-step process for imaging or digitizing fluid-preserved specimens.

2/26/2015, 3/3/2015-3/4/2015, ongoing: Deb Paul, Alex Thompson were able to help Philip Goldstein (CU Museum Informatics) after having met at two different TDWG meetings. This interaction showed that community sees us as an information source for how to get help / find expertise. It provided model-sharing opportunity, as Philip is also clearly looking for potential workflow methods to deal with this sticky issue and created another contact for Shari Elis regarding our "Sphere of Influence."

3/20/2015-3/22/2015: Andréa Matsunaga attended the PBDB Hackathon where her role was able to familiarize all participants with the upcoming PBDB API, provide feedback on improvements to the API and produce exciting applications that utilize the Paleobiology Database. This meeting allowed us to we keep in touch, interact and share ideas with individuals from PBDB.

3/23/2015-3/25/2015: Andréa Matsunaga, Blaine Marchant, Deb Paul, Shari Ellis collaborated with Tracy Teal, Mike Smorul, Mary Shelley, Jason Williams for the Data Carpentry Genomics Hackathon. The goals of this hackathon were to identify the fundamental data management and analysis skills needed to work with genomic data, determine a set of modules that would address these needs, determine learning objectives for each module, develop assessment to determine if the learning objectives are being met, identify a dataset to be used throughout the workshop, develop the teaching materials, and a clear set of issues for follow-up work on each module. The material produced in this hackathon is available via GitHub (<https://github.com/datacarpentry/genomics-hackathon/wiki>).

3/2015: iDigBio is now listed as a resource to locate specimen information on Florida biodiversity on the Linking Florida's Natural Heritage Page (<http://palmm.fcla.edu/lfnh/index.shtml>). This was a model program of cooperation between the Florida Museum of Natural History; the libraries of the University of Florida, Florida International University, and Florida Atlantic University; and the Florida Center for Library Automation. From the site, you can access a list of sites that offer specimen data related to Florida species and the Florida Environments Online (FEOL) database, which covers the literature related to Florida species and ecosystems.

Key outcomes or
Other achievements:

5/2014: Pam Soltis met with Chris Johnson, American Museum of Natural History (AMNH) and discussed the possibility of collaborating on a workshop addressing TNRS/Data Cleaning. This collaboration provided an opportunity to explore developing technology in Taxonomic Name Resolution Services in conjunction with Data Cleaning solutions.

7/3/2014: Larry Page, Reed Beaman, and Kevin Love had a discussion with Nico Franz of Arizona State University to explore potential for collaboration. Nico has developed a system that resolves synonyms and species concepts, which could potentially be deployed as a data service for taxonomic name resolution.

7/23/2014 & ongoing: Gil Nelson met with Peggy Fiedler and Erin Marnocha, director and program coordinator of the University of California's Natural Reserve System, which includes 39 biological field stations, a large number of which have collections of various types. This meeting and subsequent communication has allowed iDigBio to extend its digitization efforts to a largely unserved group of collections with important biodiversity data.

7/24/2014: Greg Riccardi and Deb Paul were contacted at Tallahassee's TalTECH meeting about potential for working with the MoLab project (<http://www.tallymolab.org/>). They talked with MoLab staff about a variety of projects with potential for collaboration.

9/13/2014: iDigBio's [User Engagement for Public Participation in Digitization Working Group](#) planned and hosted a 1-day iDig'dBio@ Imaging Blitz at Florida State University's Robert K. Godfrey Herbarium. The blitz engaged 22 volunteers, 2/3 of which had not visited the herbarium previously, in the imaging of 3,000 specimens over 8 hours and, the

transcription of those specimens on Zooniverse's Notes from Nature public engagement website, and increased public understanding of the importance of specimens. The event was co-sponsored with the SERNEC TCN.

12/1/2014–12/15/2014: Austin Mast and Libby Ellwood experimented with crowdfunding as a strategy for sustaining digitization activities at biocollections. The \$2,156 raised (108% of the goal) will fund incentives and food for participants during six 1-day citizen science digitization blitzes at the FSU herbarium in 2015. Mast and Ellwood will share their experience with crowdfunding and the events in iDigBio "blitz kits" for other biocollections to use.

Ongoing: iDigBio continues its partnership with the project entitled "Full-scale Development: FOSSIL--Fostering Opportunities for Synergistic STEM with Informal Learners" under the direction of Bruce MacFadden, Shari Ellis, Austin Hendy, Kent Crippen, and Betty Dunckel (AISL Award #1322725). The project is developing a cyberenabled Community of Inquiry in which U.S. fossil club members are networked with each other as well as with professional paleontologists to receive training and development, attend meetings and workshops, and have on-line access to digitized fossils in U.S. natural history museums.

Ongoing: Larry Page and Pam Soltis regularly meet with members of the FLMNH Planning Committee for SPNHC 2015, which was hosted by FLMNH in Gainesville, FL, with symposia and other events sponsored by iDigBio.

Ongoing: Deb Paul participated in a meeting with Sarah Phillips from the EU-funded Synthesys 3 Project. Sarah is leading the Synthesys 3 team responsible for gathering workflows, and her efforts parallel iDigBio's workflow efforts. Deb and Sarah discussed potential for collaboration in creating a "workflow resource" similar to a database or GitHub so that workflows can be stored in a public location, complete with versioning. Discussions are ongoing.

7/1/2014–12/10/2014: iDigBio has been cited as a resource (for specimen data and/or information) in eight peer-reviewed publications and seven conference papers (excluding publications from iDigBio staff mentioned below).

8/2014: Deb Paul and Libby Ellwood noted their observations on hosting a booth with the iDigBio tradeshow display. They wrote up their list of ideas in iDigBio's internal Redmine system so that other staff could benefit from their experience.

10/19/2014–10/20/2014: Bruce MacFadden represented iDigBio as an invited panelist for a session on natural history collections in science centers at the Association of Science and Technology Centers (ASTC) annual meeting (Raleigh, NC).

1/14/2015: Pam Soltis and Gil Nelson met with Jon Coddington from Global Genome Biodiversity Network (GGBN). Jon reached out to discuss possible ways to collaborate and to ensure that GGBN and iDigBio are not in conflict or duplication. Various avenues were discussed, including Jon or another GGBN collaborator attending one or more iDigBio workshops (notably, Vertebrate Digitization workshop at Cornell, which would include a GGBN presentation) and as a partner on a potential SPNHC symposium focused on genomic resources. Follow up meetings and communications were planned. From this collaboration, we will be able to enhance collaboration and provide methods for linking specimens to genomic records.

12/2014 & ongoing: Shari Ellis has worked and will continue to work with members from COLLABIT including ;Tracy Teal, Aleksandra Pawlik, Erika Mudrak, Mike Smorul, Karthik Ram, Hilmar Lapp, Mary Shelly, Jason Williams, including pre- and post-workshop assessments and planning for the upcoming Genomics Data Carpentry Hackathon. This collaboration helps to strengthen our partnership and relationships with NSF-funded BioCenters.

3/8/2015-3/9/2015 & ongoing: Pam Soltis, Andrea Matsunaga, and Charlotte Germain-

Aubrey participated in the inaugural meeting of FuturePhy to discuss areas of synergy and collaboration. iDigBio will continue to meet with this group.

3/30/2015-3/31/2015: Andréa Matsunaga attended the AIBS – Integrating Complex Data Workshop. The goal of the workshop was to identify technical barriers and problems with integrating large complex data sets (from genotypes to phenotypes to ecosystems and to macrosystems) that could address current challenges in science. This meeting allowed iDigBio to keep in touch, interact and share ideas with individuals from a wide community (ecologists, geneticists, biologists, geologists, computer engineer, policy maker, etc.).

4/17/2015-4/18/2015: iDigBio graduate student Randy Singer was an invited panelist for the UF CAIRES (Center for Adaptive Innovation, Resilience, Ethics, and Science) Sustainability and Social Media Conference held at the Levin School of Law. The goal of this interdisciplinary conference was to create an interactive stage for experts, faculty, students and practitioners to explore the opportunities and dangers of employing social media to further the pursuit of environmental caretaking, social justice and empowerment, and the development of sustainable business, technologies and communities.

4/28/2015: Joanna McCaffrey met with Dawn Roberts and Erica Krimmel at the Ravenswood location of the Chicago Academy of Sciences to help them find a database solution for their diverse collections. They discussed various approaches and strategies for rolling out a data migration project once they have chosen a collection management system. Joanna sent them the process she followed at FMNH, and they will call to continue communication. We were able to share our expertise with members of the biodiversity community as a result of several talks Joanna had given in selecting a collection management system and managing data migration in the past.

*** What opportunities for training and professional development has the project provided?**

iDigBio Workshops, Symposia, & Events (see attachment for more detail)

- Georeferencing Workshop at Botany 2014: 7/27/2014 (Boise, ID)
- Digitized Natural History Collections Digitization for International Collaboration Symposium at Botany 2014: 7/29/2014 (Boise, ID)
- Botanical DNA Banking and the Systematics Community Symposium at Botany 2014: 7/29/2014 (Boise, ID)
- North American Network of Small Herbaria (NANSH) Workshop at Botany 2014: 7/31/2014 (Boise, ID)
- Careers and Graduate Study in the Biological Sciences: A Workshop for Undergraduate Students: 9/6/2014 (Chicago, IL)
- iNaturalist Workshop: 9/26/2014 (Gainesville, FL)
- Data Carpentry Workshop: 9/29/2014-9/30/2014 (Gainesville, FL)
- Leveraging Digitization Processes Workshop: 10/6/2014-10/10/2014 (Santa Barbara, CA)
- Symposium at the Geological Society of America Annual Meeting: 10/19/2014-10/22/2014 (Vancouver, Canada)
- Symposium at TDWG 2014 - Access to Digitization Tools and Methods: 10/27/2014 (Jönköping, Sweden)
- Mobilizing Dark Data: Raising the Profiles of Small Natural History Collections: 11/15/2014 (Portland, OR)
- iDigBio's Summit IV: 10/27/2014-10/28/2014 (Gainesville, FL)
- CitStitch Hackathon: 12/3/2014-12/6/2014 (Gainesville, FL)
- Data Standards, Data Sharing, and Demystifying the Integrated Publishing Toolkit Workshop: 1/13/2015-1/14/2015 (Gainesville, FL & Ottawa, Canada)
- Developing Herbarium Workflows Workshop: 1/26/2015-1/30/2015 (Valdosta, GA)
- Basics of CT Data Acquisition, Visualization, and Analysis Workshop: 2/22/2015-2/26/2015 (Austin, TX)
- Field to Database Workshop: 3/9/2015-3/12/2015 (Gainesville, FL)
- WeDigBio Meeting/Workshop : 3/19/2015-3/20/2015 (Washington, DC)
- WISE Girlz Science Spring Camp: 3/23/2015-3/27/2015 (Gainesville, FL)
- ASB Conference 2015: 4/1/2015-4/4/2015 (Chattanooga, TN)
- International Digitization Summit: 4/13/2015-4/17/2015 (Canberra, Australia)
- Vertebrate Digitization Workshop: 5/4/2015-5/7/2015 (Ithaca, NY)
- TCN/iDigBio Reception at SPNHC 2015: 5/20/2015 (Gainesville, FL)
- Plenary Session at SPNHC 2015: 5/19/2015 (Gainesville, FL)
- Specimen Full Circle Symposium at SPNHC 2015: 5/20/2015 (Gainesville, FL)
- Small Collections Workshop Symposium at SPNHC 2015: 5/21/2015 (Gainesville, FL)
- DemoCamp at SPNHC 2015: 5/21/2015 (Gainesville, FL)

- Special Interest Group "TCN Coffee Klatch" at SPNHC 2015: 5/20/2015 (Gainesville, FL)
- Reproducible Research Workshop: 6/1/2015-6/2/2015 (Gainesville, FL)
- iDigBio's API Hackathon: 6/3/2015-6/5/2015 (Gainesville, FL)
- iDigBio/American Society of Mammalogists Collections Digitization and Imaging Workshop: 6/12/2015 (Jacksonville, FL)
- Digitization Technology for Educators and Citizen Scientists Workshop: 6/15/2015 (Gainesville, FL)

iDigBio Webinars (see attachment for more detail)

- Georeferencing Herbarium Specimens Using Geolocate: 7/7/2014, 7/21/2014
- Strategies for an OCR directed workflow: 8/25/2014
- Lichens, Bryophytes and Climate Change (LBCC) Online Training: 8/26/2014
- Symbiota Training - Introduction to Specimen Management: 8/27/2014
- Symbiota Training - Checklist and Voucher Management: 9/3/2014
- GigaMacro - High Quality Imaging of Biological Specimens: 9/16/2014
- High resolution scanning of insects on microscope slides: 10/15/2014
- Small Entomology Collections - How to Manage: 10/16/2014
- Data Management - Partnering with libraries for data management: 10/20/2014
- Small Fish in a Big Pond - Lessons Learned in Digitizing a Small Paleontology Collection: 11/13/2014
- The Value of the Symbiota Portal and Database for Small Collections: 12/15/2014
- Data quality, usage, and issue tracking using GitHub: 4/23/2015
- Bugs in my Checklist: 4/23/2015
- Bugs in my Taxonomic Trees: 4/23/2015
- Issues in Re-integrating Georeferenced Data, the FishNet2 Experience: 3/30/2015
- Towards user-definable, semi-automated workflows for curating biodiversity data: 5/28/2015
- Designing Interdisciplinary Collections Internships for College Students: 3/19/2015
- Citizen Science course WEBINAR SERIES: 3/8/2015-4/8/2015
- Interactive Handwritten Text Recognition and Indexing of Historical Documents: tranScriptorium and the Transkribus Platform: 5/26/2015

SCNet Webinar Series (see attachment for more detail): SCNet and iDigBio held a series of webinars centered on supporting small collections and establishing SCNet as a collaborative resource for small collections and the professionals who manage them.

- The Role of SPNHC in Supporting the Sustainability of Small Collections: 4/14/2014
- Building the Small Collections Network: A Model from ECN: 4/21/2014
- Documenting the Importance of Small Collections: 5/12/2014
- The Future of Funding for Small Collections: 5/19/2014
- Large Collections Supporting Small Collections: 6/2/2014
- AIM-UP!: Advancing Integration of Museums into Undergraduate Programs: 6/9/2014
- Small Entomology Collections: How to Manage: 10/16/2014
- Small Fish in a Big Pond: Lessons Learned in Digitizing a Small Paleontology Collection: 11/13/2014
- The Value of the Symbiota Portal and Database for Small Collections: 12/15/2014
- Increasing Capacity for Small Natural History Collections: Developing Protocol for Volunteer-Based Inventorying Programs: 1/15/2015
- Saving Orphaned Collections: 2/19/2015
- Designing Interdisciplinary Collections Internships for College Students: 3/19/2015
- Biological Field Stations as Repositories of Biodiversity Data: 4/30/2015

11/15/2014-11/16/2014: ECN and iDigBio partnered to host a 2-day Entomological Collections Network Conference (Portland, OR) with a collections management panel discussion and 25 presentations. The goals were to disseminate information and foster communications between collections managers around the world regarding best practices in entomological natural history collections.

11/18/2014: iDigBio presented a symposium at Entomology 2014 (Portland, OR): "Out of the field and into the lab: the state of the art in processing biodiversity to publication." The talks were focused on how to streamline the workflow for processing specimens, handling the data, and reaching publication. The topics included recruiting volunteers, specialized equipment, streamlining database entry with excel, managing multiple forms of data for individual specimens, processing specimens that require specialized preservation, prepping photos and plates, and advice/pitfalls.

3/20/2015-3/22/2015: Andrea Matsunaga attended the Paleobiology Database API Hackathon in Santa Cruz, CA. The goal of the hackathon was to create tools (web applications, R code, data analysis tools, data visualization tools, integration with other web databases, etc.) that use the Paleobiology Database API for research, education, and outreach.

4/28/2015: iDigBio hosted simultaneous iDig'dBio@ Transcription Blitzes in the computer labs at Valdosta State University and Florida State University. The 31 volunteers present for the 4-hour Blitz created 1,748 transcriptions. This was the second in a planned series of digitization blitzes coordinated by iDigBio, the SERNEC TCN, and FSU's Robert K. Godfrey Herbarium. The volunteers were educated on local herbarium and the importance of specimens to research and education. The event produced progress in digitization for the herbaria and built community support for the collections.

Ongoing: iDigBio continues to train graduate and undergraduate students and post-docs in areas related to digitization of biodiversity collections, from IT development to digitization to research use cases to applications in education and outreach. This training involves formal courses, discussion groups, and mentored research, with opportunities for participation in national and international conferences and workshops on career development, including application to public policy.

*** How have the results been disseminated to communities of interest?**

iDigBio staff and graduate students hosted booths at various events throughout the year utilizing iDigBio's large tradeshow display:

- Botany 2014 (Boise, ID): 7/26/2014-7/30/2014
- ESA 2014 (Sacramento, CA): 8/10/2014-8/15/2014
- SPNHC 2015 (Gainesville, FL): 5/19/2015-5/21/2014

07/27/2014-07/30/2014 (Botany 2014): Austin Mast gave a presentation on Biospex, iDigBio's prototype system for managing public participation in digitization of biodiversity specimens, Libby Ellwood presented an overview of the field of public participation in the digitization of biodiversity specimens, and Pam Soltis gave a number of presentations related to iDigBio:

- iDigBio: Update for Herbarium Curators
- Digitized Data and Research Symposium organized with C. Gries
- Digital Resources for Biology Teaching using the Floridian Flora: From Field to Niche Modeling to Phylogeny and Beyond, coauthored by Doug Soltis
- DNA Banks, Specimen Records, and GenBank Numbers: Toward an Integrated Network of Genetic Resources, coauthored by G. Godden, Symposium organized by W. Applequist
- Variables Affecting DNA Preservation in Archival Plant Specimens, coauthor, presented by Kurt Neubig, Symposium organized by W. Applequist

8/13/2014-8/15/2014: Sarfaraz Soomro and José Fortes participated in the 2014 15th IEEE Information Reuse and Integration (IRI) Conference (San Francisco, CA), which focused on a wide range of topics related to information reuse, information integration, and reusable systems. Sarfaraz presented the paper entitled "Mapping Specifications for Ranked Hierarchical Trees in Data Integration Systems" authored by Sarfaraz Soomro, Andréa Matsunaga and José Fortes. The paper presented the research performed for the iDigBio project, focusing on solving the problem of integrating data from several sources and automating a recurring transformation pattern involving ranked hierarchical trees, such as taxonomies and locations data.

9/15/2014-9/19/2014: Andréa Matsunaga and François Michonneau participated in the Tree-for-all hackathon (Ann Arbor, MI), a hackathon to access OpenTree resources (Open Tree of Life, Arbor, HIP). The premise of OpenTree's project was to synthesize a Tree of Life and to make it available with source studies and a reference taxonomy. A closely related community (phylogeneticists) has been introduced to iDigBio and ADBC for the first time via interactions during the hackathon. This was also an opportunity foster awareness of the iDigBio APIs to allow developers to take advantage of the data available in iDigBio. During the hackathon, a number of clients of the iDigBio API were developed and demonstrated to show how to integrate with familiar tools (Python, Arbor, OpenRefine, Java, PhyloJIVE).

9/23/2014-9/26/2014: Austin Mast introduced iDigBio at the Global Plants Initiative meeting in Panama City, Panama. There are a number of shared challenges between the GPI and ADBC communities, including data cleaning, sustainability, and attribution for biocollections in research products.

10/4/2014: iDigBio staff promoted inquiry about biodiversity and the grand challenges of the digitization community while advancing a call to action for the conservation and preservation of backyard wildlife and habitats at the Florida Museum of Natural History's annual ButterflyFest.

10/20/2014-10/24/2014: e-Science is an annual international conference designed to bring together leading international and interdisciplinary research communities, developers, and users of e-Science applications and enabling IT technologies. The iDigBio paper entitled "Reaching Consensus in Crowdsourced Transcription of Biocollections Information", co-authored by Andréa Matsunaga, Austin Mast, and José Fortes, was presented by Andréa at the 2014 10th IEEE International Conference on e-Science (Guarujá, São Paulo, Brazil).

10/30/2014: Pamela Soltis presented a talk in a Symposium, Biodiversity data synthesis and discovery at a Tree of Life scale, at

TDWG in Jönköping, Sweden: "Linking Diverse Data in Studies of Plant Evolution: Case Studies in Progress"

11/17/2014: Pamela Soltis gave a presentation at a Florida Museum of Natural History Science Café: "Unlocking the Cabinets of Our Nation's Natural History Museums"

1/23/2015: Pamela Soltis gave a presentation in which iDigBio featured prominently at UF's Annual Women's Leadership Conference: "UF's New Biodiversity Initiative: Translating Science into Action"

2/11/2015: Pamela Soltis gave a presentation featuring iDigBio at UF's Oak Hammock Retirement Center as part of the Institute for Learning in Retirement: "Using Museum Specimens in Studies of Plant Diversity, Evolution, and Conservation." Plans were developed for a transcription session using Notes From Nature to be held in Summer 2015 as part of WeDigBio.

2/11/2015–2/12/2015: Austin Mast, Libby Ellwood, and Greg Riccardi attended the Citizen Science Association Conference (San Jose, CA) where Austin presented a talk, and Libby presented a poster. Public participation in science is in a phase of explosive growth, and we were able to show leadership with our innovations and community building in the area for the benefit of the ADBC community and in-scope iDigBio activities. The talks provided an overview of iDigBio's public participation management system, Biospex, and its interoperability with the widely used biodiversity data management systems and citizen science tools.

2/13/2015–2/16/2015: Austin Mast, Libby Ellwood and Bruce MacFadden presented posters at the AAAS Conference (San Jose, CA), and handed out draft Augmented Reality E&O cards for the SERNEC TCN. They were able to provide outreach to the community and the public.

3/17/2015: Charlotte Germain-Aubrey conducted an outreach program where she talked about "being a scientist" to the Academic Mentoring Program at the John Winthrop Elementary School. The presentation was drawn from the "Broadening Diversity in Biological Sciences" workshop organized by Gil Nelson, with a rich exchange between the students and Charlotte on what scientists do, what career prospects there are, etc. The students were receptive, and the feedback was positive. The majority of participants were from underrepresented groups.

3/18/2015: Charlotte Germain-Aubrey conducted a workshop for middle-school teachers in a science magnet program school. She promoted iDigBio as an educational resource for the classroom and the value of pushing sciences for girls in middle school. A journalist was present, which resulted in the following article:

<http://www.sacredheart.edu/aboutshu/news/newsstories/2015/april/shu-brings-esteemed-biologist-to-bridgeport-aquaculture-school-.html>

3/19/2015: Charlotte Germain-Aubrey gave a seminar to the Biology Department at the Sacred Heart University entitled: "Big Data for Big Questions: harnessing the power of museums to predict the impact of climate change in Florida."

4/14/2015: iDigBio attended the National Association for Research in Science Teaching ([NARST](#)) Annual Meeting, which is a worldwide organization of professionals committed to the improvement of science teaching and learning through research.

6/27/2015: Pamela Soltis will present a talk in a symposium on The Multiple Dimensions of Biodiversity Science to be held at the annual meeting of the Society for the Study of Evolution near Sao Paulo, Brazil. The talk will feature applications of specimen data and images to understand ecological function of plants distributed in eastern North America and eastern Asia and will provide an overview of the types of research that will be possible with facile integration of large-scale specimen data, phylogeny, and appropriate tools.

*** What do you plan to do during the next reporting period to accomplish the goals?**

iDigBio will continue its mission to develop a national infrastructure that supports the vision of ADBC by overseeing implementation of standards and best practices for digitization; building and deploying a customized cloud computing environment for collections; recruiting and training personnel, including underserved groups; engaging the research community, collections community, citizen scientists, and the public through education and outreach activities; and planning for long-term sustainability of the national digitization effort. iDigBio will continue to enable digitization of data from all U.S. biodiversity collections and integrate those data to make them broadly available and useful with shared standards and formats.

Ongoing activities:

- Joanna McCaffrey is managing the mobilization of data for ingestion into the iDigBio specimen data portal.
- Deb Paul is developing biodiversity informatics workshops to bridge the current informatics knowledge gap and to facilitate future data management, data-sharing, data quality and ethical data-use issues.
- iDigBio post-doc Charlotte Germain-Aubrey is continuing her work on integrating herbarium specimen data, climate models, ecological niche modeling, and molecular phylogenies to formulate research workflows to be enabled by the iDigBio

cyberinfrastructure.

- Deb Paul participates in the regular COLLABIT meetings, which are aimed at establishing collaboration and technical coordination among the nation's Biocenters.
- Shari Ellis is working with the COLLABIT group in an effort to standardize pre- and post-evaluation across workshops and other trainings. Shari is also responsible for conducting the evaluations.
- Gil Nelson coordinates iDigBio's internal digitization activities.
- Joanna McCaffrey and Gil Nelson co-chair the Biodiversity Informatics Management working group.
- Deb Paul co-chairs the Augmenting Optical Character Recognition Working Group (AOCR) and the Georeferencing Working Group (GWG).
- Andréa Matsunaga and Joanna McCaffrey co-chair the Cyberinfrastructure Working Group (CYWG).
- The core iDigBio project staff meet weekly to review progress and plan activities.
- The core iDigBio IT, digitization, and project staff meet weekly to review progress, plan activities, and coordinate decision-making on key issues.
- The iDigBio Steering Committee meets monthly to review project progress and to discuss upcoming strategic issues.
- The iDigBio Executive Committee meets in-between Steering Committee meetings to discuss and resolve key issues.
- iDigBio personnel and TCN personnel meet bi-monthly in a collaborative effort to discuss ongoing operations, gaps, needs, planned activities, procedural questions, and opportunities for improvement.
- Larry Page serves as President of the Natural Science Collections Alliance (NSCA) and regularly reports on the activities of iDigBio.
- Larry Page serves on the National Ecological Observatory Network (NEON) Collections Technical Working Group, which advises regarding scientific, technical and implementation issues related to the collections program.
- Austin Mast serves on the steering committee for Notes from Nature (www.notesfromnature.org), the crowdsourcing transcription site for biodiversity research specimens. The committee is working to build a robust tool that interoperates with the iDigBio cloud.
- Austin Mast and Libby Ellwood are planning six 1-day citizen science digitization events at the FSU Herbarium in 2015: two focused on imaging, two on transcription, and two on georeferencing.
- Austin Mast, Libby Ellwood, and Deb Paul will work with members of the biocollections community to plan and hold the first of what might be an annual global digitization blitz called WeDigBio.
- Austin Mast is co-leading, with Melody Basham and Nico Franz (ASU), the development of a set of Augmented Reality cards for the ADBC community—1 card per TCN, 1 for iDigBio, and 1 for ADBC.
- iDigBio will continue to support regular meetings of the iDigBio Working Groups.
- Pam Soltis, Larry Page, Greg Traub, Alex Thompson, and Dan Stoner meet regularly to discuss feature development for the iDigBio portal.
- iDigBio collects voluntary anonymous demographic data in its post-workshop surveys to track participation.
- iDigBio is actively recruiting an Education & Outreach Coordinator who will be responsible for coordinating and implementing the E&O activities of iDigBio. The E&O Coordinator will be responsible for communicating, coordinating, and networking across ADBC to promote, encourage, develop, and implement E&O activities that achieve broad reach and high impact.
- iDigBio is actively recruiting a Data Management Coordinator to facilitate the use of natural history collections data in addressing big-science questions by integrating tools and services into a computational environment for data integration, analysis, and visualization. The Data Management Coordinator will act as a liaison between museum researchers and IT developers; develop and document use cases for natural history collections data; prioritize requirements for iDigBio's cyberinfrastructure and data products; provide advice on cyberinfrastructure direction; and provide advice on cyberinfrastructure data standards and linked data.
- Pam Soltis is part of a planning team for an RCN proposal on extending biodiversity standards.
- Pam Soltis is part of a planning team for an RCN-UBE proposal on using collections (real and digital) in undergraduate education.
- Pam Soltis is part of a planning team for an IUSE proposal on using museum collections and data in STEM education.
- Pam Soltis and the UF iDigBio Research Uses Team is organizing an Ecological Niche Modeling workshop for Botany 2015 in Edmonton, Alberta, Canada.
- iDigBio RAs Blaine Marchant and Lauren Gonzalez are continuing their work with Pam Soltis on research applications using specimen data and images in studies of plant evolution.
- Former iDigBio RA Ryan Moraski is finalizing a teaching module with Pam Soltis et al. on georeferencing and ecological niche modeling for inclusion in the AIM-UP! RCN's set of teaching materials.
- iDigBio images of herbarium specimens are being explored as a source of data on ecological function in Pam Soltis et al.'s Dimensions of Biodiversity project.
- Pam Soltis, Jose Fortes, and Andrea Matsunaga have begun collaborative research with Doug Soltis, Jim Beach, Jorge Soberon, and Stephen Smith on their new ABI grant to connect iDigBio with the Open Tree of Life, Lifemapper, and Arbor tools.

The following is a preliminary list of workshops, symposia, and other events being planned for Fiscal Year 5:

- American Society of Ichthyologists and Herpetologists, (Reno, NV), 7/15/2015-7/19/2015
- Ecological Niche Modeling Training Workshop, Botany 2015 (Edmonton, Alberta, Canada), 7/26/2015
- U.S. Virtual Herbarium (Edmonton, Alberta, Canada), 7/30/2015
- American Ornithologists Union (Norman, OK), 7/28/2015-7/31/2015
- Ignite Session at EcoSA 2015: Enhancing Ecological Research with iDigBio Biological Specimen Data (Baltimore, MD), 8/9/2015-8/14/2015
- Managing NHC Data for Discoverability (Phoenix, AZ - ASU), 9/15/2015-9/17/2015
- Organization of Biological Field Stations (Crested Butte, CO), 9/17/2015-9/20/2015
- Biodiversity Information Standards (TDWG) Conference 2015 (Nairobi, Kenya), 9/28/2015
- Broadening Diversity (Raleigh, NC - NCMNS), 10/2/2015-10/3/2015
- Emu NHSIG (Philadelphia, PA), 10/7/2015
- Paleontological Society (TBD), 10/2015
- GSA 2015 (Baltimore, MD), 11/1/2015-11/4/2015
- iDigBio Summit V (Arlington, VA), 11/4/2015-11/6/2015
- ESA 2015 (Minneapolis, MN), 11/15/2015-11/18/2015
- Global Change and Biodiversity Data (TBD), Fall 2015
- Redacting and Concealing Sensitive Data (ASB 2016), 4/2016

Supporting Files

Filename	Description	Uploaded By	Uploaded On
Award_1115210_Y4_Annual_Workshops_Webinars.pdf	This file contains statistics, demographics, descriptions, and participants of iDigBio-sponsored workshops, symposia, and events. This file also contains statistics and descriptions of iDigBio-sponsored webinars.	Lawrence Page	05/29/2015
Award_1115210_Y4_Annual_Web_Presence.pdf	This file contains statistics for iDigBio's website usage, portal usage, newsletter, collaboration software, social media, and data ingestion.	Lawrence Page	05/29/2015
2015_iDigBio_Annual_Evaluation.pdf	This file contains the results of the 2015 iDigBio Annual Evaluation: (1) an evaluation of the anticipated and unanticipated impacts of the project, (2) an evaluation of internal communication and leadership, and (3) the results from the community survey.	Lawrence Page	05/29/2015

Products

Books

Book Chapters

Conference Papers and Presentations

Austin Hendy, Bruce MacFadden, Claudia Grant (2013). (Poster) *Fossils of Panama: Developing a Bilingual Online Hub for Education and Research Resources*. Geological Society of America Annual Meeting and Expo. Denver, Colorado. Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Deborah Paul, Austin Mast, Greg Riccardi, Gil Nelson (2013). (Poster) *iDigBio as a Resource for the Digitization of a Billion*

Biodiversity Research Specimens. TDWG 2013 Annual Conference. Florence, Italy. Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Austin Mast, Gil Nelson, Deborah Paul, Greg Riccardi (2013). (Poster) *iDigBio as a resource for the digitization of a billion biodiversity research specimens*. Evolution 2013. Snowbird, Utah. Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Ellwood, Elizabeth R., Dunckel Betty, Flemons Paul, Guralnick Robert, Nelson Gil, Newman Greg, Paul Deborah L., Riccardi Greg, Rios Nelson E., Seltmann Katja, and Mast Austin R. (2014). *Accelerating Digitization of Biodiversity Research Specimens through Online Public Participation..* Botany 2014. Boise, ID. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Mast Austin, and Ellwood, Libby (2014). *Accelerating Digitization of Biodiversity Research Specimens through Online Public Participation..* GSA 2014. Vancouver, BC, Canada. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

McLaughlin, C. A., MacFadden B. J., Reed, D., & Love, K. (2014). *Evolving Equids: Using Fossil Horses to Teach High School Science*. Society of Vertebrate Paleontology. Dallas, TX. Status = OTHER; Acknowledgement of Federal Support = Yes

McLaughlin, C. A., MacFadden B. J., Reed, D., & Love, K. (2014). *Facilitating Multi-institutional Collaboration in a Synchronous Cyber Learning Environment..* Southeastern Association for Science Teacher Education (SASTE) Annual Conference. Savannah, GA. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Sarfaraz Soomro, Andréa Matsunaga, and José Fortes. (2014). *Mapping Specifications for Ranked Hierarchical Trees in Data Integration Systems*. 15th IEEE Information Reuse and Integration (IRI) Conference. San Francisco, CA. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Matsunaga, Andréa, Mast Austin, and Fortes José A. B. (2014). *Reaching Consensus in Crowdsourced Transcription of Biocollections Information*. 10th IEEE International conference on e-Science. Guarujá, SP, Brazil. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Larry M. Page, José A. B. Fortes, Bruce MacFadden, Greg Riccardi, Pamela Soltis, Austin Mast (2015). *iDigBio, NSF's National Resource for Advancing Digitization of Biodiversity Collections*. AAAS Annual Meeting. San Jose, CA. Status = OTHER; Acknowledgement of Federal Support = Yes

Inventions

Journals

Cook, Joseph A., Edwards Scott, Lacey Eileen A., Guralnick Robert P., Soltis Pamela S., Soltis Douglas E., Welch Corey K., Bell Kayce C., Galbreath Kurt E., Himes Christopher, Allen Julie M., Heath Tracy A., Carnaval Ann C., Cooper Kimberly L., Liu Mark, Hanken James, and Ickert-Bond Stefanie (2014). Aiming Up: Natural History Collections as Emerging Resources for Innovative Undergraduate Education in Biology. *BioScience*. 64 (8), 725. Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI:

Deans AR, Lewis SE, Huala E, Anzaldo SS, Ashburner M, et al. (2015). Finding Our Way through Phenotypes.. *PLoS Biol*. 13 (1), . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI: doi:10.1371/journal.pbio.1002033

Elizabeth R. Ellwood, Betty Dunckel, Paul Flemons, Robert Guralnick, Gil Nelson, Greg Newman, Sarah Newman, Deborah Paul, Greg Riccardi, Nelson Rios, Katja C. Seltmann, Austin R. Mast (2014). Accelerating Digitization of Biodiversity Research Specimens through Online Public Participation. *BioScience*. . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI:

Enrique ARBELÁEZ-CORTÉS, María Fernanda TORRES, Diana LÓPEZ-ÁLVAREZ, Juan Diego PALACIO-MEJÍA, Ángela María MENDOZA, Claudia Alejandra MEDINA (2015). COLOMBIAN FROZEN BIODIVERSITY: 16 YEARS OF THE TISSUE COLLECTION OF THE HUMBOLDT INSTITUTE. *ACTA BIOLÓGICA COLOMBIANA*. 20 . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI: doi: http://dx.doi.org/10.15446/abc.v20n2.47102
ABSTRACT Collections of frozen tissue samples stand as keystone sources of molecular information to construct biodiversity knowledge, and are particularly challenged if they focus on megadiverse countries.

Everill, Peter H., Primack, Richard B., Ellwood, Elizabeth R. and Melaas, Eli K. (2014). Determining Past Leaf-Out Times of New England's Deciduous Forests From Herbarium Specimens. *American Journal of Botany*. 101 (8), 1293. Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI: 10.3732/ajb.1400045

Gezon, Z. J., Wyman, E. S., Ascher, J. S., Inouye, D. W., Irwin, R. E. (2015). The effect of repeated, lethal sampling on wild bee abundance and diversity. *Methods in Ecology and Evolution*. . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI: DOI: 10.1111/2041-210X.12375

J. A. Cook, S. V. Edwards, E. Lacey, R. P. Guralnick, P. S. Soltis, D.E. Soltis, C. Welch, K. C. Bell, K. E. Galbreath, C. Himes, J. Allen, T. A. Heath, A. C. Carnaval, K. L. Cooper, M. Liu, J. Hanken (2014). Aiming Up: Natural history collections as emerging resources for innovative undergraduate education in biology. *BioScience*. . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Khoo, Michael; Rosenberg, Gary (2015). Historical Considerations in Biodiversity Informatics. *iConference 2015 Preliminary Results Papers*. <http://hdl.handle.net/10111/2041-210X.12375>. Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI:

McLaughlin, C. A., Broo, J., MacFadden, B. J., & Moran, S. (2015). Not looking a gift horse in the mouth: Exploring the merits of a student-teacher-scientist partnership.. *Journal of Biological Education*. 1. Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI: 10.1080/00219266.2015.1028571

Nicole Cavender, Murphy Westwood, Catherine Bechtoldt, Gerard Donnelly, Sara Oldfield, Martin Gardner, David Rae and William McNamara (2015). Strengthening the conservation value of ex situ tree collections. *Oryx*. . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI: <http://dx.doi.org/10.1017/S0030605314000866>

Sarfraz Soomro, Andréa Matsunaga, José A. B. Fortes (2015). Simplifying Extract-Transform-Load for Ranked Hierarchical Trees via Mapping Specifications. *Formalisms for Reuse and Systems Integration*. 346 203. Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Licenses

Other Products

Audio or Video Products.

"Digitization Workflows Overview" offers an introduction into the digitization process, the rationale behind why museums are digitizing their collections, how iDigBio is facilitating the digitization movement, and what the current challenges are for museum digitization. <https://vimeo.com/120369455>

Audio or Video Products.

"Digitizing Herbarium Collections" offers an introduction to the six different types of plant samples that are commonly stored in herbaria, how researchers use herbaria data, and why the digitization of herbarium specimens is so important. The video then details the five-step process the University of Florida Herbarium uses for digitizing specimens: specimen staging, image capturing, specimen image processing, electronic data capture and georeferencing, and specimen curating. The video also features the Valdosta State Herbarium's image processing and data capture and georeferencing workflow. The video highlights specific information about what imaging equipment works best for digitizing the different types of herbarium specimens. <https://vimeo.com/120369768>

Audio or Video Products.

"Digitizing Wet Collections" summarizes why the digitization of fluid preserved collections is important and what types of specimen collections are considered wet collections. The video then details the five step process the Ichthyology Collection at the Florida Museum of Natural History uses to digitize their collection including: selecting specimens, image capturing, image processing, electronic data capture and georeferencing, and curating specimens. The video also gives specific tips for imaging wet collections including squeezebox use, what imaging equipment to use, and what views to capture for use in taxonomic identification. <https://vimeo.com/120369690>

Audio or Video Products.

Collection of videos from the Cyberinfrastructure Working Group covering topics such as the iDigBio Portal, iDigBio Research Tools, iDigBio Infrastructure, iDigBio Data Ingestion, iDigBio Architecture, and iDigBio Appliances: <https://vimeo.com/album/3391840>

Audio or Video Products.

Digitizing Biodiversity Collections – iDigBio Project Overview: More than 1,600 natural history collections across the United

States house over 1 billion biodiversity specimens ranging from fungi to fish to fossils. This video describes the iDigBio project. It explains why digitized information and ready access to it are important, provides an overview of the digitization process and highlights some of the challenges faced when working with different types of natural history collections.

<https://www.youtube.com/watch?v=WyRc6QtZQgo>

Audio or Video Products.

Digitizing Biological Collections – Imaging Fluid-Preserved Specimens: Florida Museum of Natural History Ichthyology collection manager Rob Robins explains the five-step process for imaging or digitizing fluid-preserved specimens. These fluid-preserved, or wet-collection, specimens are typically fishes, reptiles and amphibians, and aquatic invertebrates, and to a lesser degree, birds and mammals. The high-resolution images of specimens stored in alcohol increase access for researchers and the general public to the vast collections in natural history museums. https://www.youtube.com/watch?v=H_jy0EFWtHU

Audio or Video Products.

Digitizing Biological Collections - Task Process Overview: Scientists estimate natural history collections across the United States may contain more than 1 billion biological specimens. Frequently, the collections data are inaccessible to potential users. To make them available, members of the collections community called for the digitization of specimens and associated data, and the online dissemination of this information. Digitization is the process of creating an electronic representation of text, images, recordings or other specimen information. With funding from NSF, iDigBio, the coordinating center for the national digitization effort, shares best practices and workflows to improve efficiency and scalability of the digitization process.

<https://www.youtube.com/watch?v=-7sQm4mpm6M>

Audio or Video Products.

Digitizing Biological Collections - iDigBio Project Overview: More than 1,600 natural history collections across the United States house over 1 billion biological specimens ranging from fungi to fish to fossils. This video describes the iDigBio project. It explains why digitized information and ready access to it are important, provides an overview of the digitization process and highlights some of the challenges faced when working with different types of natural history collections. <https://www.youtube.com/watch?v=WyRc6QtZQgo>

Audio or Video Products.

Webinar recording that introduces the iDigBio API in preparation for the Hackathon in June 2015:

<https://vimeo.com/album/3391930>

Audio or Video Products.

iDigBio in a Nutshell at 2014 Entomological Collections Network Meeting (Portland, OR): Chances are you've heard the name iDigBio being used here and there, but what the heck is it? Well, Gil Nelson is here to tell you all about just that! For instance, iDigBio stands for Integrated Digitized Biocollections. The more you know! <https://www.youtube.com/watch?v=LM0nBkeBrWw>

Audio or Video Products.

iDigBio in a Nutshell at 2014 Entomological Collections Network Meeting in Portland, OR: Chances are you've heard the name iDigBio being used here and there, but what the heck is it? Well, Gil Nelson is here to tell you all about just that! For instance, iDigBio stands for Integrated Digitized Biocollections. The more you know! <https://www.youtube.com/watch?v=LM0nBkeBrWw>

Audio or Video Products.

iDigBio overview, research, and educational opportunities: <https://www.idigbio.org/content/idigbio-overview-research-and-educational-opportunities-0>

Audio or Video Products.

iDigBio overview, research, and educational opportunities: <https://www.idigbio.org/content/idigbio-overview-research-and-educational-opportunities-0>

Educational aids or Curricula.

Continual development and updating of workflow modules and task lists for digitizing biodiversity collections. The workflow modules consist of orderly, comprehensive task lists to serve as foundations from which institution-specific workflows can be created: <https://www.idigbio.org/content/workflow-modules-and-task-lists>

Educational aids or Curricula.

Glossary of biology terms to aid users of the iDigBio website and wiki: https://www.idigbio.org/wiki/index.php/Biology_FAQ

Educational aids or Curricula.

Glossary of digitization tools has been posted on the iDigBio Wiki, to be maintained and enhanced by iDigBio personnel and the community: https://www.idigbio.org/wiki/index.php/Glossary_of_Tools

Educational aids or Curricula.

Glossary of digitization/biological projects and organizations has been posted on the iDigBio Wiki, to be maintained and enhanced by iDigBio personnel and the community:

https://www.idigbio.org/wiki/index.php/Glossary_of_Projects_and_Organizations

Educational aids or Curricula.

Glossary of technology terms to aid users of the iDigBio website and wiki:

https://www.idigbio.org/wiki/index.php/Technology_FAQ

Educational aids or Curricula.

Information about ADBC: <https://www.idigbio.org/content/nsf-adbc-program-information>

Educational aids or Curricula.

Information and links on US DNA banks and genetic resource repositories: <https://www.idigbio.org/genetic-resources>

Educational aids or Curricula.

Links to all of the materials associated with iDigBio workshops: https://www.idigbio.org/wiki/index.php/IDigBio_Workshops

Educational aids or Curricula.

Online repository for sharing existing customized workflows from as many collection types and institutions as possible:

<https://www.idigbio.org/content/digitization-workflows>

Educational aids or Curricula.

Page designed to gather known effective OCR practices from the community and share examples of OCR use, OCR Output and Workflows utilizing OCR. It is designed to be a compilation of OCR resources, Technical Issues and Workflows for use by the community: https://www.idigbio.org/wiki/index.php/Augmenting_OCR

Educational aids or Curricula.

Page highlighting TCN research questions, iDigBio research tools, and iDigBio publications: <https://www.idigbio.org/research>

Educational aids or Curricula.

Page to gather and organize resources used for Georeferencing has been posted to the iDigBio Wiki, to be maintained by iDigBio personnel and the community: <https://www.idigbio.org/wiki/index.php/Georeferencing>

Educational aids or Curricula.

Page with a comprehensive list of all natural history collections in the United States of America:

<https://www.idigbio.org/portal/collections>

Educational aids or Curricula.

Project Management Resources: https://www.idigbio.org/wiki/index.php/Project_Management_Resources

Educational aids or Curricula.

Wiki for upcoming digitization workshops, including the creation of videos and documents to support workshop participants:

https://www.idigbio.org/wiki/index.php/Digitization_Training_Workshops

Instruments or Equipment.

Information about NIBA: <https://www.idigbio.org/content/network-integrated-biocollections-alliance-niba>

Protocols.

DNA Banking for the 21st Century – A White Paper of Recommendations from the U.S. Workshop on DNA Banking: https://www.idigbio.org/sites/default/files/internal-docs/Reports/DNA_Banking_for_the_21st_Century.pdf

Protocols.

Data Ingestion Guidance: https://www.idigbio.org/wiki/index.php/Data_Ingestion_Guidance

Protocols.

Identifier Guide for Data Providers: <https://www.idigbio.org/content/guid-guide-data-providers>

Protocols.

MISC Phase I report: https://www.idigbio.org/wiki/images/c/c9/Phase_I_Report.pdf

Protocols.

iDigBio Service Level Agreement: <https://www.idigbio.org/content/idigbio-service-level-agreement-sla>

Protocols.

iDigBio Terms of Use Policy: <https://www.idigbio.org/content/idigbio-terms-use-policy>

Other.

A Guide to Common Fossils of the Gatun Formation (Poster and Field Guide): <http://www.flmnh.ufl.edu/panama-pire/pcppireteach/download.htm>

Other.

Data ingestion dashboard: https://www.idigbio.org/wiki/index.php/Data_Ingestion_Report

Other.

FOSSIL Project website portal: <http://www.flmnh.ufl.edu/myfossil/>

Other.

Form for reporting of external collaborations, meetings, etc. by iDigBio staff: <https://www.idigbio.org/content/idigbio-external-collaboration-reporting>

Other.

Full-scale tradeshow display for use at conferences: https://www.idigbio.org/wiki/index.php/IDigBio_10%27_Display

Tabletop tradeshow display for use at conferences: https://www.idigbio.org/wiki/index.php/IDigBio_Table_Top_Display

Other Publications

Godden, G. T. and P. S. Soltis (2014). *A new iDigBio web feature links DNA banks and genetic resources repositories in the United States*. In W. L. Applequist and L. M. Campbell, DNA Banking for the 21st Century: Proceedings of the U.S. Workshop on DNA Banking. William L. Brown Center, Peru. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Bokor, J., Broo, J., Moran, S., McLaughlin, C.A., MacFadden, B.J. (2015). *Bringing Natural History Collections into the Science Classroom..* Presentation at the International Teacher-Scientist Partnership (ITSP) Conference, San Francisco CA.. Status = OTHER; Acknowledgement of Federal Support = Yes

Cindy Spence (2014). *Out of the Darkness - Bringing Biological Collections into the 21st Century*. Explore Research Magazine, University of Florida. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

L. Endara, J. A. Soto-Centeno, T. A. Lott, and P. S. Soltis (2014). *Preserving biodiversity for long-term research: The Genetic Resources Repository of the Florida Museum of Natural History*. In W. L. Applequist and L. M. Campbell, DNA Banking for the 21st Century: Proceedings of the U.S. Workshop on DNA Banking. William L. Brown Center, Peru. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

McLaughlin, C. A., Bokor, J., Broo, J., & Moran, S. (2015). *Promoting Student Inquiry through Strategic Teacher-Scientist Partnerships*. Symposium session presented to the International Teacher-Scientist Partnership (ITSP) Conference,. Status = OTHER; Acknowledgement of Federal Support = Yes

K. M. Neubig, W. M. Whitten, J. R. Abbott, S. Elliott, D. E. Soltis, P. S. Soltis (2014). *Variables affecting DNA preservation in archival plant specimens*. In W. L. Applequist and L. M. Campbell, DNA Banking for the 21st Century: Proceedings of the U.S. Workshop on DNA Banking. William L. Brown Center, Peru. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Patents

Technologies or Techniques

Thesis/Dissertations

Randy Singer. *Interdisciplinary Uses of Museum Data in Research, Education and Outreach*. (2019). University of Florida. Acknowledgement of Federal Support = Yes

Sarfaraz Soomro. *Mapping Specifications for Ranked Hierarchical Trees in Data Integration Systems*. (2015). University of Florida. Acknowledgement of Federal Support = Yes

Claudia Segovia-Salcedo. *New Insights Into The Evolutionary History Of The Complex Andean Genus Polylepis (Rosaceae: Sanguisorbeae) And Implications For Conservation And Management*. (2014). University of Florida. Acknowledgement of Federal Support = Yes

Grant T. Godden. *Out Of The Bushes And Into The Trees: Alternative Approaches For Resolving The Phylogeny Of Lamiaceae*. (2014). University of Florida. Acknowledgement of Federal Support = Yes

Websites

Biospex

<http://www.biospex.org/>

iDigBio is collaborating with crowdsourcing tools including Notes from Nature and Atlas of Living Australia's Biodiversity Volunteer Portal, to package digitization tasks into batches with compelling research or societal benefits. The emerging iDigBio management system that will create and advertise the projects and process the resulting data is called BIOSPEX for BIOdiversity Specimen Expeditions.

Collaboration Report Webform

<https://www.idigbio.org/content/idigbio-external-collaboration-reporting>

Webform for reporting of collaborations, meetings, important discussions, etc. by iDigBio staff

Fossils of Panama

<http://www.flmnh.ufl.edu/panama-pire/fossils-of-Panama/default.htm>

Fossils of Panama is an initiative of the Florida Museum of Natural History Fossils in the Cloud Project - an effort to digitize the museum's paleontological collections. Fossils of Panama leverages the availability of digital images and online media to build a greater awareness and appreciation of Panama's past biodiversity, as well as provide a web resource for the scientific and education community in which common fossils of Panama can be simply and rapidly identified. This online resource builds on the extensive collections of Panamanian fossils in the Florida Museum of Natural History and a number of other U.S. natural history museums. This initiative is funded through the Florida Museum of Natural History, iDigBio [NSF# 1115210], and the Panama Canal Project-PIRE [NSF# 0966884]

Small Collections Network

<http://scnet.acis.ufl.edu/>

SCNet is a collaborative resource dedicated to supporting smaller natural history collections and the professionals who manage them, especially related to the processes of collections management and digitization. SCNet has also established a listserv and inaugurated a continuing webinar series using iDigBio's web conferencing infrastructure.

TCN Report Webform<https://www.idigbio.org/content/tcn-bi-monthly-progress-report-idigbio>

Webform for bi-monthly TCN progress reports to iDigBio

Temporary TCN Storage<https://storage.idigbio.org>

Temporary storage location provided to enable storage of images for TCNs requiring this resource.

WeDigBio<https://www.wedigbio.org/>

WeDigBio, Worldwide Engagement for Digitizing Biocollections, is an event that will engage participants in digitizing biodiversity research collections. Participants onsite at local collections, and around the world via online transcription platforms, will collaboratively and interactively transcribe specimen information. The thousands of label transcriptions from this four-day event will enhance the span of biodiversity research across time, taxa, and geographies.

iDigBio API<http://api.idigbio.org/>

This site provides access to the specimen and images stored in the iDigBio cloud infrastructure through API access.

iDigBio Beta Portal<http://beta-portal.idigbio.org/>

Beta version of the iDigBio portal for development and testing of new features to be integrated into the production version of the portal. This gives the community of users the opportunity to see, play, and review upcoming releases.

iDigBio Calendar<https://www.idigbio.org/calendar>

Communication and dissemination of iDigBio events, workshops, symposia, and meetings

iDigBio Facebook<https://www.facebook.com/iDigBio>

iDigBio will use social media outlets, including Facebook, to advance the project's objectives related to community building, education, outreach, and broader impacts. The goals are to build a community of students, teachers, scientists, and collection managers who are interested in digitization of biodiversity specimens and to keep them updated on learning opportunities. iDigBio's Facebook account will connect our diverse audiences with project information including webinar and workshop announcements and registration links, meetings with remote connection information, reports and photo galleries and other topics related to digitization, technology, biodiversity, education and public outreach. iDigBio's Facebook content will consist of original text, photos, and videos generated by project participants and/or partner institutions. Some links and embedded photos/videos may be derived from external sources. The images shared are related to biodiversity fieldwork, education, outreach, and other topics associated with the project.

iDigBio Specimen Data Portal<https://www.idigbio.org/portal/>

Portal demonstrating access to the specimen and image database, including search technology and geovisualization functions. A complete redesign of the portal was released in December 2013 to coincide with the redesigned website. New data discovery features are continually being added to the portal.

iDigBio Test Website<https://www-qa.idigbio.org/>

QA version of the iDigBio website for testing of new features to be integrated into the production version of the website. This gives the community of users the opportunity to see, play, and review upcoming releases.

iDigBio Twitter<https://twitter.com/idigbio>

iDigBio will use social media outlets, including Twitter, to advance the project's objectives related to community building, education, outreach, and broader impacts. The goals are to build a community of students, teachers, scientists, and collection managers who are interested in digitization of biodiversity specimens and to keep them updated on learning opportunities. iDigBio's Twitter account will connect our diverse audiences with project information including webinar and workshop announcements and registration links, meetings with remote connection information, reports and photo galleries and other topics related to digitization, technology, biodiversity, education and public outreach. iDigBio's Twitter content will consist of original text, photo links, and video links generated by project participants and/or partner institutions. Some links and embedded photos/videos may be derived from external sources. The images shared are related to biodiversity fieldwork, education, outreach, and other topics associated with the project.

iDigBio Vimeo

<http://vimeo.com/idigbio>

iDigBio will use social media outlets, including Vimeo, to advance the project's objectives related to community building, education, outreach, and broader impacts. The goals are to build a community of students, teachers, scientists, and collection managers who are interested in digitization of biodiversity specimens and to keep them updated on learning opportunities. iDigBio's Vimeo account will connect our diverse audiences with project information including webinar and workshop recordings and videos on other topics related to digitization, technology, biodiversity, education and public outreach. iDigBio's Vimeo content will consist of videos generated and contributed by project participants and/or partner institutions. Some links and embedded photos/videos may be derived from external sources. The images shared are related to biodiversity fieldwork, education, outreach, and other topics associated with the project.

iDigBio Website

<https://www.idigbio.org>

Primary website for collaboration, dissemination of information, and training. Currently includes forums, a primary website, and a Wiki. A complete redesign of the website was released in December 2013 that focused on making it easier to understand and to use. In addition, the site was improved to be more approachable to a lay visitor. With the latest release of the iDigBio specimen portal, there is also a new consistency in the visual language used, which will help users navigate the collection of technologies that make up the iDigBio website.

Participants/Organizations

What individuals have worked on the project?

Name	Most Senior Project Role	Nearest Person Month Worked
Page, Lawrence	PD/PI	4
Fortes, Jose	Co PD/PI	2
MacFadden, Bruce	Co PD/PI	2
Riccardi, Gregory	Co PD/PI	2
Soltis, Pamela	Co PD/PI	2
Dunckel, Betty	Faculty	1
Figueiredo, Renato	Faculty	2
Mardis, Marcia	Faculty	1
Mast, Austin	Faculty	2
Ellwood, Elizabeth	Postdoctoral (scholar, fellow or other postdoctoral position)	12

Germain-Aubrey, Charlotte Postdoctoral (scholar, fellow or other postdoctoral position) 12

Schmitt, Audrey, Charlotte	Postdoctoral (scholar, fellow or other postdoctoral position)	12
Hendy, Austin	Postdoctoral (scholar, fellow or other postdoctoral position)	1
McLaughlin, Cheryl	Postdoctoral (scholar, fellow or other postdoctoral position)	11
Bester, Cathy	Other Professional	12
Bruhn, Robert	Other Professional	6
Collins, Matthew	Other Professional	6
Jennings, David	Other Professional	12
King, Suzette	Other Professional	1
Love, Kevin	Other Professional	12
Mathis, Jason	Other Professional	3
McCaffrey, Joanna	Other Professional	6
Paul, Deborah	Other Professional	12
Phillips, Molly	Other Professional	11
Spinks, Jeremy	Other Professional	3
Stoner, Dan	Other Professional	12
Thompson, Alex	Other Professional	12
Traub, Greg	Other Professional	12
Flemming, Adania	Technician	6
Randall, Zachary	Technician	1
Beaman, Reed	Staff Scientist (doctoral level)	2
Ellis, Shari	Staff Scientist (doctoral level)	8
Matsunaga, Andrea	Staff Scientist (doctoral level)	9
Nelson, Gil	Staff Scientist (doctoral level)	12
Godden, Grant	Graduate Student (research assistant)	2
Gonzalez, Lauren	Graduate Student (research assistant)	5
Imminni, Shiva	Graduate Student (research assistant)	5
Jeong, Kyuho	Graduate Student (research assistant)	2

Liu, Yonggang	Graduate Student (research assistant)	2
Marchant, Blaine	Graduate Student (research assistant)	6
Michonneau, Francois	Graduate Student (research assistant)	9
Moraski, Ryan	Graduate Student (research assistant)	3
Rincon, Aldo	Graduate Student (research assistant)	2
Segovia, Claudia	Graduate Student (research assistant)	2
Singer, Randy	Graduate Student (research assistant)	5
Soomro, Sarfaraz	Graduate Student (research assistant)	1
Elliott, Savannah	Undergraduate Student	3
Molgo, Iwan	Undergraduate Student	1
Stouder, Deanna	Consultant	1
Neubig, Kurt	Other	6
Orleus, Lunide	Other	1

Full details of individuals who have worked on the project:

Lawrence M Page

Email: lpage1@ufl.edu

Most Senior Project Role: PD/PI

Nearest Person Month Worked: 4

Contribution to the Project: Director of iDigBio: responsible for overall project management, oversight of the national resource activities, and implementation of the strategic plan, including assurance that the digitization, research and educational missions of the national resource are integrated and accomplished.

Funding Support: University of Florida

International Collaboration: Yes, Australia, China

International Travel: Yes, Australia - 0 years, 0 months, 5 days

Jose A Fortes

Email: fortes@ufl.edu

Most Senior Project Role: Co PD/PI

Nearest Person Month Worked: 2

Contribution to the Project: Director, Advanced Computing and Information Systems (ACIS) Laboratory, Department of Electrical and Computer Engineering, University of Florida. iDigBio Director for Computational Activities: oversight of data integration, support for computational needs and assessment of new technologies and programs to facilitate digitization efforts including directing the development of "appliances" to facilitate digitization and the development of cloud storage capabilities.

Funding Support: University of Florida

International Collaboration: Yes, Australia, Brazil

International Travel: Yes, Australia - 0 years, 0 months, 5 days

Bruce J MacFadden

Email: bmacfadd@flmnh.ufl.edu

Most Senior Project Role: Co PD/PI

Nearest Person Month Worked: 2

Contribution to the Project: iDigBio Director for Education and Outreach: oversight of educational and outreach activities and their assessment at iDigBio, the TCNs and at other digitization projects involving biodiversity collections.

Funding Support: University of Florida Panama PIRE [NSF# 0966884] FOSSIL [NSF# 1377275]

International Collaboration: Yes, Panama

International Travel: Yes, Panama - 0 years, 0 months, 5 days

Gregory A Riccardi

Email: griccardi@fsu.edu

Most Senior Project Role: Co PD/PI

Nearest Person Month Worked: 2

Contribution to the Project: Director of Morphbank and Professor of the College of Communication and Information, Florida State University. iDigBio co-Director for Computational Activities: oversight of data integration, support for computational needs and assessment of new technologies and programs to facilitate digitization efforts related to imaging, collection integration, and georeferencing.

Funding Support: Florida State University

International Collaboration: Yes, Brazil, Germany, Sweden

International Travel: Yes, Germany - 0 years, 0 months, 2 days; Brazil - 0 years, 0 months, 2 days; Sweden - 0 years, 0 months, 5 days

Pamela S Soltis

Email: psoltis@flmnh.ufl.edu

Most Senior Project Role: Co PD/PI

Nearest Person Month Worked: 2

Contribution to the Project: Distinguished Professor, University of Florida, and Curator, Florida Museum of Natural History. iDigBio Director for Research Activities: liaison to the scientific community and coordination of scientific research activities and needs identified by the collections community with iDigBio and TCN activities.

Funding Support: University of Florida

International Collaboration: Yes, Australia, Sweden

International Travel: Yes, Australia - 0 years, 0 months, 5 days; Sweden - 0 years, 0 months, 1 days

Betty Dunckel

Email: bdunckel@flmnh.ufl.edu

Most Senior Project Role: Faculty

Nearest Person Month Worked: 1

Contribution to the Project: Betty Dunckel is on iDigBio Steering Committee. Betty has expertise in informal science education and outreach, and is a strong supporting resource for Bruce MacFadden's Education and Outreach planning activities. Betty is also a Co-PI on the FOSSIL project.

Funding Support: University of Florida FOSSIL [NSF# 1377275]

International Collaboration: No
International Travel: No

Renato Figueiredo
Email: renato@acis.ufl.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 2

Contribution to the Project: Renato Figueiredo is a member of the iDigBio Steering Committee and is a faculty member with the University of Florida's Advanced Computing and Information Systems (ACIS) Laboratory. Renato is responsible for iDigBio appliance architecture decisions and appliance development/maintenance.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Marcia Mardis
Email: marcia.mardis@cci.fsu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Marcia Mardis is working at FSU with the research and evaluation components of the project to study the social science factors of iDigBio and its interactions with the TCNs.

Funding Support: Florida State University

International Collaboration: No
International Travel: No

Austin Mast
Email: amast@bio.fsu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 2

Contribution to the Project: Austin Mast serves is a member of the iDigBio Steering Committee. Austin is contributing to the coordination of activities among FSU personnel, is leading the two Citizen Science Working Groups, and is developing crowdsourcing initiatives through iDigBio.

Funding Support: Florida State University

International Collaboration: Yes, Australia
International Travel: Yes, Australia - 0 years, 0 months, 5 days

Elizabeth Ellwood
Email: eellwood@bio.fsu.edu
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 12

Contribution to the Project: Libby Ellwood is a post-doctoral scholar working with Austin Mast at FSU. Libby is focusing on methods of establishing public participation as part of iDigBio.

Funding Support: Florida State University

International Collaboration: No
International Travel: No

Charlotte Germain-Aubrey**Email:** cgermain@ufl.edu**Most Senior Project Role:** Postdoctoral (scholar, fellow or other postdoctoral position)**Nearest Person Month Worked:** 12

Contribution to the Project: Charlotte Germain-Aubrey is a post-doctoral scholar working with PI Pamela Soltis. Charlotte is developing workflows to facilitate research that integrates molecular phylogenetics and ecological niche modeling with biodiversity collections data for ultimate integration into the iDigBio cyberinfrastructure. She is pioneering research workflows to integrate data across major clades from separate collections, and provides outreach through teaching and broader community activities (including K-12 outreach program)

Funding Support: University of Florida**International Collaboration:** No**International Travel:** No

Austin Hendy**Email:** ahendy@flmnh.ufl.edu**Most Senior Project Role:** Postdoctoral (scholar, fellow or other postdoctoral position)**Nearest Person Month Worked:** 1

Contribution to the Project: Austin Hendy was a post-doctoral scholar working with PI Bruce MacFadden. Austin was in charge of the Fossils of Panama initiative, which coordinates the digitization of fossils collected from Panama into the collections at the Florida Museum of Natural History, in addition to researching the use of digitized fossils in education and outreach. Austin was also a Co-PI on the FOSSIL project, which aims to increase the role of amateur paleontologists in the U.S. in digitization activities and improve awareness of and access to digitized natural history collections. Austin no longer works for iDigBio.

Funding Support: University of Florida FOSSIL [NSF# 1377275]**International Collaboration:** No**International Travel:** No

Cheryl McLaughlin**Email:** chermac72@ufl.edu**Most Senior Project Role:** Postdoctoral (scholar, fellow or other postdoctoral position)**Nearest Person Month Worked:** 11

Contribution to the Project: Cheryl McLaughlin is a post-doctoral researcher working with PI Bruce MacFadden. Cheryl is working on the evaluation of the Broader Impacts class at the University of Florida, and is working with Gil Nelson on broadening representation. Cheryl is also representing iDigBio at various meetings and has several papers in the works.

Funding Support: University of Florida**International Collaboration:** No**International Travel:** No

Cathy Bester**Email:** cbester@flmnh.ufl.edu**Most Senior Project Role:** Other Professional**Nearest Person Month Worked:** 12

Contribution to the Project: Cathy Bester is responsible for navigating FLMNH and UF processes/policies related to ongoing project and office operations. Cathy performs scheduling, coordination, and logistics for Participant activities, such as workshops, Working Groups, symposia., and other events. Cathy also maintains project records and ensures efficient day-to-day office operations.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Robert Bruhn

Email: bruhnnp@yahoo.com

Most Senior Project Role: Other Professional

Nearest Person Month Worked: 6

Contribution to the Project: Robert Bruhn is facilitating public participation in the digitization of biodiversity specimens. Robert is a programmer focused on producing interoperability between existing cyberinfrastructure used for digitization of biodiversity specimens and iDigBio, including tailoring the iDigBio portal interface to meet citizen science needs.

Funding Support: Florida State University

International Collaboration: No
International Travel: No

Matthew Collins

Email: mcollins@acis.ufl.edu

Most Senior Project Role: Other Professional

Nearest Person Month Worked: 6

Contribution to the Project: Matthew Collins is an IT Expert at the University of Florida's Advanced Computing and Information Systems (ACIS) Laboratory. Matthew is assisting with IT infrastructure design and implementation.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

David Jennings

Email: djennings@flmnh.ufl.edu

Most Senior Project Role: Other Professional

Nearest Person Month Worked: 12

Contribution to the Project: David Jennings is the Project Manager and is responsible for specific definition of project scope, control of scope creep, coordination of project activities, coordination of interaction with collaborators, identification and outreach to key stakeholders, budget tracking and management, planning/leading various weekly, monthly and annual meetings, managing day-to-day project activities, risk management, and project reporting.

Funding Support: University of Florida

International Collaboration: Yes, Australia
International Travel: Yes, Australia - 0 years, 0 months, 5 days

Suzette King

Email: sking@flmnh.ufl.edu

Most Senior Project Role: Other Professional

Nearest Person Month Worked: 1

Contribution to the Project: Suzette King was the Communications Coordinator for iDigBio. Suzette was overseeing the implementation and maintenance of a communications database and was responsible for technical writing/editing of web content. Suzette no longer works for iDigBio.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Kevin Love**Email:** klove@flmnh.ufl.edu**Most Senior Project Role:** Other Professional**Nearest Person Month Worked:** 12

Contribution to the Project: Kevin Love provides website development and maintenance, assistance with functional/technical requirement development, and provides user services support for technology questions, particularly with iDigBio's web presence, collaboration tools, and web conferencing tools. Kevin is also taking an increasing role in the development of aspects of the iDigBio Specimen Portal and technical writing (internal documentation, as well as end-user documentation). Kevin is also very interested in education and outreach, and is a frequent participant, for example, in local fairs that promote STEM via iDigBio.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Jason Mathis**Email:** jamathis@flmnh.ufl.edu**Most Senior Project Role:** Other Professional**Nearest Person Month Worked:** 3

Contribution to the Project: Jason Mathis was a videographer with the Florida Museum of Natural History's Explore Research exhibit, which showcases the University of Florida's most exciting discoveries. Jason was creating and editing videos from iDigBio materials for presentation to wide audiences. Jason has moved on with his career and no longer works for the Florida Museum of Natural History.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Joanna McCaffrey**Email:** jmccaffrey@flmnh.ufl.edu**Most Senior Project Role:** Other Professional**Nearest Person Month Worked:** 6

Contribution to the Project: Joanna McCaffrey is the Biodiversity Informatics Manager. Her work focuses on working closely with ACIS to further their understanding of museum collections and related bioinformatics issues, especially usability and product requirements. She has written various documents to support project clarity of message.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Deborah Paul**Email:** dpaul@fsu.edu**Most Senior Project Role:** Other Professional**Nearest Person Month Worked:** 12

Contribution to the Project: Deborah Paul Gil Nelson is a member of the iDigBio Steering Committee and is an informatics analyst at FSU. Deb is working closely with Gil Nelson to analyze and document digitization processes and tools. Deb is co-chair for the Augmenting Optical Character Recognition Working Group (AOCR) and the Georeferencing Working Group (GWG). Deb also plans and organizes various workshops through the year.

Funding Support: Florida State University

International Collaboration: No

International Travel: No

Molly Phillips

Email: mphillips@flmnh.ufl.edu

Most Senior Project Role: Other Professional

Nearest Person Month Worked: 11

Contribution to the Project: Molly Phillips is an Information Specialist with iDigBio. Molly supports the initial contact and collaboration with natural history museums to enable transfer of their digitized specimen-based data and media into the iDigBio repository. Molly also assists with the maintenance, organization, and content writing for iDigBio's website, wiki, social media, and other web presence. Molly facilitates IT aspects of iDigBio's conferences and workshops, including audio/visual setup and enabling remote participation via Adobe Connect.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Jeremy Spinks

Email: jspinks@fsu.edu

Most Senior Project Role: Other Professional

Nearest Person Month Worked: 3

Contribution to the Project: Jeremy Spinks is iDigBio's web designer. Jeremy provide design and usability consultation on web platforms created by iDigBio, provides design and programming for the main iDigBio website, and provides additional graphic design services as needed for posters and other communications.

Funding Support: Florida State University

International Collaboration: No

International Travel: No

Dan Stoner

Email: dstoner@acis.ufl.edu

Most Senior Project Role: Other Professional

Nearest Person Month Worked: 12

Contribution to the Project: Dan Stoner is an IT Expert at the University of Florida's Advanced Computing and Information Systems (ACIS) Laboratory. Dan is assisting with data/media ingestion and infrastructure.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Alex Thompson

Email: godfoder@acis.ufl.edu

Most Senior Project Role: Other Professional

Nearest Person Month Worked: 12

Contribution to the Project: Alex Thompson is an IT Expert at the University of Florida's Advanced Computing and Information Systems (ACIS) Laboratory. Alex is the iDigBio Infrastructure engineer and programmer, serving as the primary technical contact for the development and maintenance of all infrastructure services provided by ACIS to the iDigBio project.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Greg Traub

Email: gtraub@ufl.edu

Most Senior Project Role: Other Professional

Nearest Person Month Worked: 12

Contribution to the Project: Greg Traub is an IT Expert at the University of Florida's Advanced Computing and Information Systems (ACIS) Laboratory. Greg is assisting with IT infrastructure design and implementation.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Adania Flemming

Email: aflemming@flmnh.ufl.edu

Most Senior Project Role: Technician

Nearest Person Month Worked: 6

Contribution to the Project: Adania Flemming is an office assistant for iDigBio. Adania performs various tasks as requested by project leadership and administration, including entering workshop presentations and recordings into the iDigBio bibliography and compiling information for the semiannual and annual reports.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Zachary Randall

Email: zrandall@flmnh.ufl.edu

Most Senior Project Role: Technician

Nearest Person Month Worked: 1

Contribution to the Project: Assists with iDigBio workshops and other events.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Reed Beaman

Email: rbeaman@flmnh.ufl.edu

Most Senior Project Role: Staff Scientist (doctoral level)

Nearest Person Month Worked: 2

Contribution to the Project: Reed Beaman was the Product Manager where he was facilitating the use of collections data in addressing big-science questions by integrating tools and services into a computational environment for data integration, analysis and visualization. Reed also served as a member of the iDigBio Steering Committee. Reed no longer works for iDigBio.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Shari Ellis

Email: shellis@flmnh.ufl.edu

Most Senior Project Role: Staff Scientist (doctoral level)

Nearest Person Month Worked: 8

Contribution to the Project: Shari Ellis is the Project Evaluator. Shari works with the project to conduct robust evaluations and assessments, including those related to workshops, symposia, and summits. Shari is also a Co-PI on the FOSSIL project.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Andrea Matsunaga

Email: ammatun@acis.ufl.edu

Most Senior Project Role: Staff Scientist (doctoral level)

Nearest Person Month Worked: 9

Contribution to the Project: Andrea Matsunaga is a research scientist at the University of Florida's Advanced Computing and Information Systems (ACIS) Laboratory. Andrea is working on research aspects of the development of the cloud-based iDigBio cyberinfrastructure, obtaining data sets for testing and inclusion in a demonstrator website, and ensuring that the product is sufficiently scalable and capable of serving the needs of downstream users.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Gil Nelson

Email: gnelson@bio.fsu.edu

Most Senior Project Role: Staff Scientist (doctoral level)

Nearest Person Month Worked: 12

Contribution to the Project: Gil Nelson is a member of the iDigBio Steering Committee and is a digitization process and tool documentation/improvement specialist. He is researching, documenting and evaluating workflows at both mature and new digitization locations. Gil provides virtual and hands-on support to institutions that are implementing new digitization workflows, as well as to implement efficiency improvements in existing institutions. Gil coordinates, plans, and conducts preparation-specific digitization training workshops, chairs several workflow development working groups (Flat Sheets and packets, Pinned Things in Trays and Drawers, 3D Objects in Spirits in Jars, and 3D Objects in Trays and Drawers), the Biodiversity Informatics Managers working group as co-lead with Joanna McCaffrey, and the International Whole-drawer Digitization Interest Group, co-leading with Nicole Fisher of the Australian National Insect Collection.

Funding Support: Florida State University

International Collaboration: Yes, Australia

International Travel: Yes, Australia - 0 years, 0 months, 5 days

Grant Godden

Email: g0ddengr@ufl.edu

Most Senior Project Role: Graduate Student (research assistant)

Nearest Person Month Worked: 2

Contribution to the Project: Grant Godden was a graduate student in Biology working with PI Pamela Soltis. Grant was gathering information about genetic/tissue collections across the country and was helping to lead efforts to form a network of such collections. He was working with Visiting Scholar Anna Monfils to identify stakeholders for digitized biodiversity data and

to develop marketing strategies for supporting digitization and outreach activities long-term. He was also contributing to efforts to integrate data across major clades from separate collections. Grant has now graduated from the University of Florida.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Lauren Gonzalez

Email: laurenagonzalez@ufl.edu

Most Senior Project Role: Graduate Student (research assistant)

Nearest Person Month Worked: 5

Contribution to the Project: Lauren Gonzalez is a graduate student working with PI Pamela Soltis.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Shiva Imminni

Email: shivausum@gmail.com

Most Senior Project Role: Graduate Student (research assistant)

Nearest Person Month Worked: 5

Contribution to the Project: Imminni Shiva is a graduate student working with PI Greg Riccardi.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Kyuho Jeong

Email: kyuho.jeong@gmail.com

Most Senior Project Role: Graduate Student (research assistant)

Nearest Person Month Worked: 2

Contribution to the Project: Kyuho Jeong is a graduate student with the ACIS Laboratory, advised by Renato Figueiredo. Kyuho is currently working on the Specify thin client appliance.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Yonggang Liu

Email: myidpt@gmail.com

Most Senior Project Role: Graduate Student (research assistant)

Nearest Person Month Worked: 2

Contribution to the Project: Yonggang Liu was a graduate student with the Advanced Computing and Information Systems (ACIS) Laboratory, advised by Renato Figueiredo. Yonggang was assigned to help with the technology and standards development and was responsible for the design and development of a media ingestion tool that will reliably upload files from the provider's local data source to the iDigBio media storage system. Yonggang has now graduated from the University of Florida.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Blaine Marchant

Email: dbmarchant@ufl.edu

Most Senior Project Role: Graduate Student (research assistant)

Nearest Person Month Worked: 6

Contribution to the Project: Daniel (Blaine) Marchant is a graduate student working with PI Pamela Soltis. Blaine is using plant specimen records to test hypotheses about the distribution of polyploid species relative to their diploid parents.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Francois Michonneau

Email: francois.michonneau@gmail.com

Most Senior Project Role: Graduate Student (research assistant)

Nearest Person Month Worked: 9

Contribution to the Project: Francois Michonneau was awarded an iDigBio graduate research assistantship for 2013-2014. Francois is conducting research on digitized collections and/or digitizing a portion of the FLMNH collection and is assisting the iDigBio PIs in developing a list of US natural history collections.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Ryan Moraski

Email: rpm225@gmail.com

Most Senior Project Role: Graduate Student (research assistant)

Nearest Person Month Worked: 3

Contribution to the Project: Ryan Moraski is a graduate student in Biology working with PI Pamela Soltis. Ryan is focusing on ways to integrate georeferencing into research-oriented workflows and on applications of georeferenced data for research projects. He is also georeferencing collection data for collections at FLMNH and contributing to ecological niche modeling for fishes and Lepidoptera. He will also contribute to efforts to integrate data across major clades from separate collections.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Aldo Rincon

Email: arincon@ufl.edu

Most Senior Project Role: Graduate Student (research assistant)

Nearest Person Month Worked: 2

Contribution to the Project: Aldo Rincon is a graduate student working with PI Bruce MacFadden and Austin Hendy on the Fossils of Panama project, with an emphasis on pre-digitization curation.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Claudia Segovia**Email:** claudia@ufl.edu**Most Senior Project Role:** Graduate Student (research assistant)**Nearest Person Month Worked:** 2

Contribution to the Project: Claudia Segovia was a graduate student working with PI Pamela Soltis. She was working in the FLMNH's Genetic Resources Repository to gain curatorial experience. She participated in discussions about connecting similar collections across the country. Claudia has now graduated from the University of Florida

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Randy Singer**Email:** rsinger@flmnh.ufl.edu**Most Senior Project Role:** Graduate Student (research assistant)**Nearest Person Month Worked:** 5

Contribution to the Project: Randy Singer is a PhD student working with PI Larry Page to investigate innovative uses of the iDigBio data.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Sarfaraz Soomro**Email:** sarfarazsoomro@ufl.edu**Most Senior Project Role:** Graduate Student (research assistant)**Nearest Person Month Worked:** 1

Contribution to the Project: Sarfaraz Soomro was a master's student with the ACIS Laboratory, advised by PI José Fortes. Sarfaraz was assigned to perform research on information systems and to help with the development of data integration tools. Sarfaraz has now graduated from the University of Florida.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Savannah Elliott**Email:** savannahfelliott@ufl.edu**Most Senior Project Role:** Undergraduate Student**Nearest Person Month Worked:** 3

Contribution to the Project: Savannah Elliott was an undergraduate student working with PI Pamela Soltis.

Funding Support: University of Florida

International Collaboration: No

International Travel: No

Iwan Molgo**Email:** imolgo@ufl.edu

Most Senior Project Role: Undergraduate Student
Nearest Person Month Worked: 1

Contribution to the Project: Iwan Molgo was an undergraduate student working with PI Pamela Soltis.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Deanna Stouder

Email: deanna@execvisionvalue.com
Most Senior Project Role: Consultant
Nearest Person Month Worked: 1

Contribution to the Project: Deanna was a consultant working with iDigBio's Sustainability Working Group. Deanna brought a wealth of experience from the scientific, academic, non-governmental, and federal sectors. She has also been a professional, leadership, and executive coach since 2006 enabling individuals and their organizations to achieve their goals for themselves and their organizations. Deanna has moved on with her career and no longer works with iDigBio.

Funding Support: Deanna J. Stouder Coaching

International Collaboration: No
International Travel: No

Kurt Neubig

Email: kneubig@flmnh.ufl.edu
Most Senior Project Role: Other
Nearest Person Month Worked: 6

Contribution to the Project: Kurt Neubig was an assistant working with PI Pamela Soltis.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Lunide Orleus

Email: l.orleus1809@ufl.edu
Most Senior Project Role: Other
Nearest Person Month Worked: 1

Contribution to the Project: Lunide Orleus was working with PI Larry Page to investigate digitization workflow issues related to images of alcohol-stored specimens.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

What other organizations have been involved as partners?

Name	Type of Partner Organization	Location
ABBY	Industrial or Commercial Firms	Milpitas, CA
American Institute of Biological Sciences (AIBS)	Other Nonprofits	Reston, VA

CollectionsWeb	Other Nonprofits	USA
Consortium of California Herbaria (CCH)	Other Nonprofits	USA
Consortium of Pacific Northwest Herbaria (PNW)	Other Nonprofits	USA
Cornell University	Academic Institution	Ithaca, NY
Encyclopedia of Life (EOL)	Other Nonprofits	USA
Field Museum of Natural History	Other Nonprofits	Chicago, IL
Fishnet2 Project	Other Nonprofits	USA
Florida State University	Academic Institution	Tallahassee, FL
GEOLocate	Other Nonprofits	USA
Global Biodiversity Information Facility (GBIF)	Other Nonprofits	Denmark
American Museum of Natural History (AMNH)	Other Nonprofits	New York, NY
Global Environmental Facility (GEF)	Other Nonprofits	Brazil
Map of Life	Other Nonprofits	USA
Mississippi Herbaria Consortium	Other Nonprofits	Oxford, MS
Morphbank	Other Nonprofits	Tallahassee, FL
National Specimen Information Infrastructure (NSII)	Other Nonprofits	China
Natural Science Collections Alliance (NSCA)	Other Nonprofits	Washington, D.C.
New York Botanical Garden (NYBG)	Other Nonprofits	Bronx, NY
North Carolina State University (NCSU)	Academic Institution	Raleigh, NC
Notes from Nature	Other Nonprofits	USA
Society for the Preservation of Natural History Collections	Other Nonprofits	New York, NY
Appalachian State University	Academic Institution	Boone, NC
Specify	Other Nonprofits	USA
Symbiota	Other Nonprofits	USA
Texas Oklahoma Regional Consortia of Herbaria (TORCH)	Other Nonprofits	USA
The Global Registry of Biorepositories (GRBio)	Other Nonprofits	USA

University of Arizona (UA)	Academic Institution	Tucson, AZ
University of Colorado at Boulder (CU)	Academic Institution	Boulder, CO
University of Illinois at Urbana-Champaign (UI)	Academic Institution	Urbana ,IL
University of Kansas (KU)	Academic Institution	Lawrence, KS
University of New Hampshire (UNH)	Academic Institution	Durham, NH
University of Wisconsin-Madison (UW)	Academic Institution	Madison, WI
Arctos	Other Nonprofits	USA
VertNet	Other Nonprofits	USA
Yale University	Academic Institution	New Haven, CT
Atlas of Living Australia (ALA)	Other Nonprofits	Australia
Botanical Society of America (BSA)	Other Nonprofits	St. Louis, MO
Brazilian Biodiversity Information System or Sistema de Info	Other Nonprofits	Brazil
COLLABIT	Other Nonprofits	USA
Centro de Referência em Informação Ambiental (CRIA)	Other Nonprofits	Brazil

Full details of organizations that have been involved as partners:

ABBY

Organization Type: Industrial or Commercial Firms

Organization Location: Milpitas, CA

Partner's Contribution to the Project:

In-Kind Support

Collaborative Research

More Detail on Partner and Contribution: <http://www.abby.com/> Commercial Optical Character Recognition (OCR) software; member of OCR working group.

American Institute of Biological Sciences (AIBS)

Organization Type: Other Nonprofits

Organization Location: Reston, VA

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: Collaboration in various activities, including development of Implementation Plan for the Network Integrated Biocollections Alliance and symposium co-hosted by SPNHC on uses of natural history collections data.

American Museum of Natural History (AMNH)

Organization Type: Other Nonprofits
Organization Location: New York, NY

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "Plants, Herbivores, and Parasitoids: A Model System for the Study of Tri-trophic Associations". Participated in iDigBio's Summit III.

Appalachian State University

Organization Type: Academic Institution
Organization Location: Boone, NC

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "The Key to the Cabinets: Building and Sustaining a Research Database for a Global Biodiversity Hotspot".

Arctos

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
In-Kind Support
Collaborative Research

More Detail on Partner and Contribution: <http://arctos.database.museum/> iDigBio and Arctos are working together to determine if users can submit their data to iDigBio directly, without necessarily going thru VertNet IPT. This provides an excellent opportunity for iDigBio to work with medium-sized collections.

Atlas of Living Australia (ALA)

Organization Type: Other Nonprofits
Organization Location: Australia

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: <http://www.ala.org.au/> iDigBio IT staff have discussed opportunities to leverage ALAs web services and interfaces. There are questions of scalability and compatibility that have caused iDigBio to delay the commitment of resources toward this activity.

Botanical Society of America (BSA)

Organization Type: Other Nonprofits
Organization Location: St. Louis, MO

Partner's Contribution to the Project:
In-Kind Support

More Detail on Partner and Contribution: The BSA included three iDigBio-funded symposia on digitization in its scientific program in the 2013 meeting in New Orleans.

Brazilian Biodiversity Information System or Sistema de Info

Organization Type: Other Nonprofits

Organization Location: Brazil

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: The Brazilian Biodiversity Information System, or Sistema de Informação sobre a Biodiversidade Brasileira (SiBBR), is an online platform developed to stimulate and facilitate the publication, integration, access and use of information about the Brazilian biodiversity, subsidizing research and supporting the creation of public policies and decision making associated with conservation and sustainable use.

COLLABIT

Organization Type: Other Nonprofits

Organization Location: USA

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: COLLABIT@LISTSERV.UTK.EDU Collaboration and technical coordination among the nation's biocenters.

Centro de Referência em Informação Ambiental (CRIA)

Organization Type: Other Nonprofits

Organization Location: Brazil

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: The aim of CRIA is the dissemination of electronic information as a tool for the organization of the scientific and technological community of Brazil. CRIA disseminates biodiversity information of environmental and industrial interest and, through this, hopes to contribute directly to the conservation and sustainable use of Brazil's biodiversity resources. CRIA has developed several tools over its 10+ years and it is part of SiBBR.

CollectionsWeb

Organization Type: Other Nonprofits

Organization Location: USA

Partner's Contribution to the Project:

In-Kind Support

More Detail on Partner and Contribution: <http://www.collectionsweb.org/> Deb Paul working with Alan Prather and James Woolley (CollectionsWeb planning committee) to facilitate iDigBio participation in upcoming workshop.

Consortium of California Herbaria (CCH)

Organization Type: Other Nonprofits

Organization Location: USA

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: <http://ucjeps.berkeley.edu/consortium/> Primary RDCN institution. Participated in iDigBio's Summit III.

Consortium of Pacific Northwest Herbaria (PNW)

Organization Type: Other Nonprofits

Organization Location: USA

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: Location <http://www.pnwherbaria.org/> Primary RDCN institution. Outreach for PNW workflow and OCR experiences feedback. Participated in iDigBio's Summit III.

Cornell University

Organization Type: Academic Institution

Organization Location: Ithaca, NY

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "Developing a Centralized Digital Archive of Vouchered Animal Communication Signals". Participated in iDigBio's Summit III.

Encyclopedia of Life (EOL)

Organization Type: Other Nonprofits

Organization Location: USA

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: <http://eol.org/> Bob Corrigan and iDigBio IT Staff have initiated communication to understand opportunities for collaboration with data exchange and utilization of EOL web services. Joanna McCaffrey and Reed Beaman have continued the conversation around how to share data, such as species lists.

Field Museum of Natural History

Organization Type: Other Nonprofits

Organization Location: Chicago, IL

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "InvertEBase: Reaching Back to See the Future: Species-rich Invertebrate Faunas Document Causes and Consequences of Biodiversity Shifts".

Fishnet2 Project

Organization Type: Other Nonprofits

Organization Location: USA

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: Fishnet2 Project

Florida State University

Organization Type: Academic Institution
Organization Location: Tallahassee, FL

Partner's Contribution to the Project:

Facilities
Collaborative Research
Personnel Exchanges

More Detail on Partner and Contribution: FSU is an integral partner with UF on the project. Participated in iDigBio's Summit III.

GEOLocate

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:

In-Kind Support

More Detail on Partner and Contribution: <http://www.museum.tulane.edu/geolocate/> Integral to the success of the Georeferencing WG efforts, meetings, and Train-the-Trainers workshops.

Global Biodiversity Information Facility (GBIF)

Organization Type: Other Nonprofits
Organization Location: Denmark

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: iDigBio informatics and IT staff have been interacting with GBIF staff on the enhancement of software tools for data exchange, on training materials for managing persistent identifiers, and on the development of data models for specimen collections. The <http://www.gbif.org/> Georeferencing Working Group (GWG) is participating with GBIF by testing the early versions of GBIF eLearning materials for non-facilitated (remote) georeferencing training materials. The GWG has also offered videos and presentations from the GWG Train the Trainers workshop to GBIF for their inclusion in the eLearning materials.

Global Environmental Facility (GEF)

Organization Type: Other Nonprofits
Organization Location: Brazil

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: Evaluate potential for collaboration with Brazilian Digitization Project: Global Environmental Facility (GEF)

Map of Life

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: Location <http://www.mappinglife.org/> Map of Life assembles and integrates different sources of data describing species distributions worldwide. These data include expert species range maps, species

occurrence points, ecoregions, and protected areas from providers like IUCN, WWF, GBIF, and more. All of Map of Life's data assets are stored, managed, backed up, and accessed using a hosted CartoDB instance in the cloud.

Mississippi Herbaria Consortium

Organization Type: Other Nonprofits

Organization Location: Oxford, MS

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: Primary RDCN institution. Participated in iDigBio's Summit III.

Morphbank

Organization Type: Other Nonprofits

Organization Location: Tallahassee, FL

Partner's Contribution to the Project:

In-Kind Support

Collaborative Research

More Detail on Partner and Contribution: <http://www.morphbank.net/> Finalizing plans for assuring only vouchered Morphbank specimen records go to iDigBio data portal.

National Specimen Information Infrastructure (NSII)

Organization Type: Other Nonprofits

Organization Location: China

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: Keping Ma from NSII (<http://www.nsii.org.cn/>) participated in iDigBio Summit IV. Keping gave a presentation on NSII and a demonstration of NSII's data portal. iDigBio is exploring potential for collaboration with NSII.

Natural Science Collections Alliance (NSCA)

Organization Type: Other Nonprofits

Organization Location: Washington, D.C.

Partner's Contribution to the Project:

In-Kind Support

More Detail on Partner and Contribution: Collaborating on various initiatives to publicize the value of digitized information from natural history collections. Joint sponsorship of symposium on uses of natural history collections data held at annual meeting in Rapid City, South Dakota on 20 June 2013.

New York Botanical Garden (NYBG)

Organization Type: Other Nonprofits

Organization Location: Bronx, NY

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: TCN institution for “Plants, Herbivores, and Parasitoids: A Model System for the Study of Tri-trophic Associations”. Participated in iDigBio’s Summit III.

North Carolina State University (NCSU)

Organization Type: Academic Institution

Organization Location: Raleigh, NC

Partner’s Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for “The Macrofungi Collection Consortium: Unlocking a Biodiversity for Understanding Biotec Interactions, Nutrient Cycling and Human Affairs”. Participated in iDigBio’s Summit III.

Notes from Nature

Organization Type: Other Nonprofits

Organization Location: USA

Partner’s Contribution to the Project:

In-Kind Support

Collaborative Research

More Detail on Partner and Contribution: <http://www.notesfromnature.org/> iDigBio is working with Notes from Nature to build robust crowdsourcing tools that interoperates with the iDigBio cloud infrastructure.

Society for the Preservation of Natural History Collections

Organization Type: Other Nonprofits

Organization Location: New York, NY

Partner’s Contribution to the Project:

In-Kind Support

Collaborative Research

More Detail on Partner and Contribution: Collaboration on symposium on uses of natural history collections data held at SPNHC annual meeting in Rapid City, South Dakota on 20 June 2013. Deb Paul is the first iDigBio representative on the SPNHC Council.

Specify

Organization Type: Other Nonprofits

Organization Location: USA

Partner’s Contribution to the Project:

In-Kind Support

Collaborative Research

More Detail on Partner and Contribution: <http://specifysoftware.org/> Specify is continuing to work closely with iDigBio by developing software support for iDigBio’s data requirements. By introducing a globally unique identifier and by creating an export feature specifically tailored to iDigBio, Specify users will have a streamlined path to data ingestion.

Symbiota

Organization Type: Other Nonprofits

Organization Location: USA

Partner's Contribution to the Project:

In-Kind Support
Collaborative Research

More Detail on Partner and Contribution: <http://symbiota.org/> Symbiota has made significant advances in support of iDigBio's needs as a result of the recent AOCR hackathon. The result is a more tightly coupled digitization workflow experience for Symbiota users when introducing character recognition of their label data. No longer is it a piecemeal effort to perform OCR and copy paste the results into the data collection system, instead the OCR algorithms of LABELX and SALIX are embedded in Symbiota, allowing for a reduction in time and effort.

Texas Oklahoma Regional Consortia of Herbaria (TORCH)

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: <http://www.torchherbaria.org/drupal/> Primary RDCN institution. Participated in iDigBio's Summit III.

The Global Registry of Biorepositories (GRBio)

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: <http://grbio.org/> GRBio is the first-ever consolidated, comprehensive clearinghouse of information about biological collections in natural history museums, herbaria, and other biorepositories. This online-registry is a source for authoritative information about collections as well as validated, standardized data such as addresses, contacts, and values for the Darwin Core identifiers for institutions (InstitutionID) and collections (CollectionID).

University of Arizona (UA)

Organization Type: Academic Institution
Organization Location: Tucson, AZ

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "Southwest Collections of Arthropods Network (SCAN): A Model for Collections Digitization to Promote Taxonomic and Ecological Research". Participated in iDigBio's Summit III.

University of Colorado at Boulder (CU)

Organization Type: Academic Institution
Organization Location: Boulder, CO

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "Fossil Insect Collaborative: A Deep-Time Approach to Studying Diversification and Response to Environmental Change". Participated in iDigBio's Summit III.

University of Illinois at Urbana-Champaign (UI)**Organization Type:** Academic Institution**Organization Location:** Urbana ,IL**Partner's Contribution to the Project:**

Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "InvertNet: An Integrative Platform for Research on Environmental Change, Species Discovery and Identification". Participated in iDigBio's Summit III.

University of Kansas (KU)**Organization Type:** Academic Institution**Organization Location:** Lawrence, KS**Partner's Contribution to the Project:**

Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "Digitizing Fossils to Enable New Syntheses in Biogeography- Creating a PALEONICHES". Also University of Kansas (KU) Biodiversity Institute collaborated on the recent Wet Collections Digitization Workshop in March 2013.

University of New Hampshire (UNH)**Organization Type:** Academic Institution**Organization Location:** Durham, NH**Partner's Contribution to the Project:**

Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "The Macroalgal Herbarium Consortium: Accessing 150 Years of Specimen Data to Understand Changes in the Marine/Aquatic Environment". Participated in iDigBio's Summit III.

University of Wisconsin-Madison (UW)**Organization Type:** Academic Institution**Organization Location:** Madison, WI**Partner's Contribution to the Project:**

Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "Plants, Herbivores, and Parasitoids: A Model System for the Study of Tri-trophic Associations". Participated in iDigBio's Summit III.

VertNet**Organization Type:** Other Nonprofits**Organization Location:** USA**Partner's Contribution to the Project:**

In-Kind Support

Collaborative Research

More Detail on Partner and Contribution: <http://vertnet.org/> Primary RDCN institution. Participation in workshops and working group discussions of software, hardware and OCR. Participated in iDigBio's Summit III.

Yale University**Organization Type:** Academic Institution**Organization Location:** New Haven, CT**Partner's Contribution to the Project:**

Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "Mobilizing New England Vascular Plant Data to Track Environmental Changes". Participated in iDigBio's Summit III.

What other collaborators or contacts have been involved?

- Institutions collaborating in TCNs and PENs (268): <https://www.idigbio.org/content/collaborating-institutions>
- Current iDigBio data contributors (35) publishing over 434 datasets: <https://www.idigbio.org/portal/publishers>
- Datasets in the process of being ingested by iDigBio: https://www.idigbio.org/wiki/index.php/Data_Ingestion_Report
 - Datasets ingested since 1/1/2015 (31)
 - Datasets at some stage of active mobilization (69)

Impacts**What is the impact on the development of the principal discipline(s) of the project?**

The Integrated Digitized Biocollections (iDigBio) project has made significant progress since the initiation of funding in 2011. iDigBio's innovations include both sociological and technological accomplishments with wide-ranging benefits to the collections community.

First and foremost, iDigBio has established successful **communication** between the Information Technology (IT) and biodiversity collections communities. Having bridged this "cultural" barrier, iDigBio personnel are working together to identify challenges and to design appropriate solutions. This communication extends beyond the personnel specifically working on iDigBio to other partners, such as the Thematic Collections Networks (TCNs), which allows for collaboration, synergy, and effective training throughout the community.

Perhaps the most successful innovation of iDigBio to date is the series of **training workshops** that have been organized and sponsored by iDigBio personnel. These workshops have delivered effective training on digitization-related methods and practices, as well as on other topics contributed by the workshop participants. These workshops and training materials, publically available at www.idigbio.org, have provided a wealth of new resources and have secured iDigBio's leadership role in **workforce development** within the collections community. During its first 4 years, iDigBio has facilitated the attendance of over 2,201 participants (over 1,245 of which are unique) from over 511 unique institutions to its 63 workshops, summits, symposia, and other events.

Finally, the forthcoming **availability of massive amounts of specimen data** has energized the collections community about the use of specimen data for a variety of big research questions that have been intractable to this point. This renewed energy within the community has fostered iDigBio to produce significant innovations in IT design and implementation, including: Creating the practice of introducing identifiers in the data stream to enable data linking; Development of emerging data models for ingestion and integration of data sets from diverse collections; Cloud architecture for data storage, retrieval, and management; an Open schema infrastructure to offer flexibility and agility in handling an evolving data model; and an Appliance framework to respond to the needs of biocollections informatics. iDigBio's specimen data portal (www.idigbio.org/portal) provides access to all of iDigBio's specimen and media records and currently includes over 434 collections, 28,525,695 specimen records, and 4,663,453 media records. Upgraded versions of the iDigBio portal are released semi-annually.

What is the impact on other disciplines?

Nothing to report.

What is the impact on the development of human resources?

The iDigBio program is currently supporting post-docs, graduate students, and undergraduate students, and is, therefore, participating in the development and training of the next generation of young scientists who will take the lead in digitized

collections in the future and sustain the activities related to iDigBio through their ongoing activities. Training has been provided in the following areas: digitization techniques by preparation type, georeferencing train-the-trainer, public participation, data carpentry, project management, collections management software, citizen science, optical character recognition, and education & outreach.

- Claudia Segovia-Salcedo was a graduate student working with PI Pamela Soltis. She was working in the FLMNH's Genetic Resources Repository to gain curatorial experience. She participated in discussions about connecting similar collections across the country.
 - Claudia was awarded the 2014 Association for Academic Women "Lockhart Dissertation Fellowship," which honors an outstanding female graduate student.
- Daniel (Blaine) Marchant is a graduate student working with PI Pamela Soltis. Blaine is using plant specimen records to test hypotheses about the distribution of polyploid species relative to their diploid parents.
- Ryan Moraski is a graduate student in Biology working with PI Pamela Soltis. Ryan is focusing on ways to integrate georeferencing into research-oriented workflows and on applications of georeferenced data for research projects. He is also georeferencing collection data for collections at FLMNH and contributing to ecological niche modeling for fishes and Lepidoptera. He will also contribute to efforts to integrate data across major clades from separate collections.
- Dr. Charlotte Germain-Aubrey is a post-doctoral scholar working with PI Pamela Soltis. Charlotte is developing workflows to facilitate research that integrates molecular phylogenetics and ecological niche modeling with biodiversity collections data for ultimate integration into the iDigBio cyberinfrastructure. She is pioneering research workflows to integrate data across major clades from separate collections.
- Lauren Gonzalez is a graduate student working with PI Pamela Soltis.
- Dr. Cheryl McLaughlin is a post-doctoral researcher working with PI Bruce MacFadden. Cheryl is working on the evaluation of the Broader Impacts class at the University of Florida, and is working with Gil Nelson on broadening representation. Cheryl is also representing iDigBio at various meetings and has several papers in progress:
 - Manuscript for Internet and Higher Education: "Investigating perspectives & experiences in a blended synchronous learning environment," co-authored with Bruce MacFadden, David Reed, & Kevin Love
 - Manuscript for NSTA Science & Children: "Fossil Detectives: Exploring Ancient Organisms in Modern Times," co-authored with Bruce MacFadden and Jaccobe Poole
- Dr. Elizabeth Ellwood is a post-doctoral scholar working with Austin Mast at FSU. Libby is focusing on methods of establishing public participation as part of iDigBio.
- François Michonneau was awarded an iDigBio graduate research assistantship for 2013-2014. François is conducting research on digitized collections and/or digitizing a portion of the FLMNH collection and is assisting the iDigBio PIs in developing a list of US natural history collections.
- Aldo Rincón is a graduate student working with PI Bruce MacFadden and Austin Hendy on the Fossils of Panama project, with an emphasis on pre-digitization curation.
- Sarfaraz Soomro was a master's student with the ACIS Laboratory, advised by PI José Fortes. Sarfaraz was assigned to perform research on information systems, and to help with the development of data integration tools.
- Yonggang Liu is a graduate student with the Advanced Computing and Information Systems (ACIS) Laboratory, advised by Renato Figueiredo. Yonggang is assigned to help with the technology and standards development. He is currently responsible for the design and development of a media ingestion tool that will reliably upload files from the provider's local data source to the iDigBio media storage system.
- Kyuho Jeong is a graduate student with the ACIS Laboratory, advised by Renato Figueiredo. Kyuho is currently working on the Specify thin client appliance.
- Austin Hendy was a post-doctoral scholar working with PI Bruce MacFadden. Austin was in charge of the Fossils of Panama initiative, which coordinates the digitization of fossils collected from Panama into the collections at the Florida Museum of Natural History, in addition to researching the use of digitized fossils in education and outreach. Austin was also a Co-PI on the FOSSIL project, which aims to increase the role of amateur paleontologists in the U.S. in digitization activities and improve awareness of and access to digitized natural history collections. Austin no longer works for iDigBio.
- Grant Gooden was a graduate student in Biology working with PI Pamela Soltis. Grant gathered information about genetic/tissue collections across the country and helped lead the effort to form a network of such collections. He was working with Visiting Scholar Anna Monfils to identify stakeholders for digitized biodiversity data and to develop marketing strategies for supporting digitization and outreach activities long-term. He also contributed to efforts to integrate data across major clades from separate collections.
- Iwan Molgo is an undergraduate working with Pamela Soltis.
- Savannah Elliott is an undergraduate working with Pamela Soltis.
- Randy Singer is a PhD student working with Larry Page to investigate innovative uses of the iDigBio data.
 - Presentation at Vertebrate Digitization Workshop: "Innovative Methods for Outreach using Museum Specimens"
 - Presentation at SPNHC 2015: "Unlocking the Hidden Potential: Using Museum Collections to Engage Children with

Autism”

- Presentation at ASIH/JMIH Annual Meeting: “Telepresence as an Underutilized, but Powerful Tool for the Modern Taxonomist”

Dr. Bruce MacFadden and Dr. David Reed of the Florida Museum of Natural History held a Graduate Course during the Fall 2014 semester entitled “Broader Impacts of Science on Society” (UF course: ZOO 6927 sec 2B56; BOT 6935 sec 2B57). The course addressed the increasing emphasis on the relevance of what scientists do and how they impact society in general. During the seminar-format course, students engaged in active participation, discussion, and dialog via blended learning. The course featured presentations by the instructors and invited/remote speakers as well as preparation for class projects. This course allowed participants to learn about the history, theory, relevance, and best practices of broader impacts and related activities through a participatory blended learning environment.

Dr. Austin Mast and Dr. Libby Ellwood of Florida State University held a graduate course during the Spring 2015 semester on the topic of Citizen Science. Citizen science involves the public in the generation of scientific knowledge. With a new professional society (<http://citizenscienceassociation.org/>) and an emerging journal, citizen science has reached a stage of explosive growth with new opportunities for citizen scientists appearing weekly. This course covered a wide variety of topics, including: project typologies, best practices, relevant resources, project evaluation, user motivations, broadening participant diversity, and data quality. Remote participation was offered from the iDigBio offices at the University of Florida, and via Adobe Connect (<http://idigbio.adobeconnect.com/citizenscience-fsu/>). University of Florida course number: Course ZOO 6927 sec 19EG.

What is the impact on physical resources that form infrastructure?

The iDigBio cyberinfrastructure team is following a formula that balances strategic planning with the agility to meet new challenges, short-term project needs, and enhanced/clarified specifications in order to meet the following objectives: (1) Implement a horizontally scalable cloud infrastructure for object (media) storage; (2) Implement a horizontally scalable cloud infrastructure for text (data/metadata) storage; (3) Implement infrastructure to enable hosting for the web services/websites of strategic partners; (4) Deploy iDigBio appliances and services via multiple channels (e.g., web services, locally-run virtual machines, Infrastructure-as-a-Service cloud implementations) to enhance, simplify and/or improve activities completed by data providers and data consumers; (5) Implement a Graphical User Interface (GUI) to enable end-users, including data contributors and data consumers, access to search/visualize/download text and media data from the cloud infrastructure; and (6) Implement a comprehensive authentication and access control system to enable data tracking and a cohesive user experience among the systems listed above, as well as the iDigBio collaboration and communication website (composed of Drupal, Redmine, and MediaWiki installations).

What is the impact on institutional resources that form infrastructure?

The iDigBio cyberinfrastructure team is following a formula that balances strategic planning with the agility to meet new challenges, short-term project needs, and enhanced/clarified specifications in order to meet the following objectives: (1) Implement a horizontally scalable cloud infrastructure for object (media) storage; (2) Implement a horizontally scalable cloud infrastructure for text (data/metadata) storage; (3) Implement infrastructure to enable hosting for the web services/websites of strategic partners; (4) Deploy iDigBio appliances and services via multiple channels (e.g., web services, locally-run virtual machines, Infrastructure-as-a-Service cloud implementations) to enhance, simplify and/or improve activities completed by data providers and data consumers; (5) Implement a Graphical User Interface (GUI) to enable end-users, including data contributors and data consumers, access to search/visualize/download text and media data from the cloud infrastructure; and (6) Implement a comprehensive authentication and access control system to enable data tracking and a cohesive user experience among the systems listed above, as well as the iDigBio collaboration and communication website (composed of Drupal, Redmine, and MediaWiki installations).

Some of the educational and outreach activities so far pertain in this category. For example, the Fossils in the Cloud initiative provides digital resources (poster of digitized specimens) to K12 schools in a pilot study in Santa Cruz County, California. The approximate impact of these activities includes about a dozen STEM teachers and about 1,500 students annually.

What is the impact on information resources that form infrastructure?

iDigBio digitization experts are pursuing a process of information gathering and documentation based upon both grounded theory and business process modeling/management, including reaching out beyond the natural history collections community for digitization expertise from other fields, to achieve the following objectives: (1) Engage the collections community to market and build interest in utilizing iDigBio services, including both data access services and collaboration tools; (2) Obtain preliminary data sets for ingestion, storage, testing and exposure via the iDigBio specimen portal; (3) Establish Minimum Information Standards and data fitness for use parameters; (4) Optimize digitization workflows; (5) Conduct digitization training and produce online training materials; (6) Enhance and broaden exposure to digitization tools and resources such as Georeferencing, Augmenting

Optical Character Recognition (AOCR), Natural Language Processing (NLP), Authority Files, optimized digitization workflows, and crowdsourcing; (7) Evaluate, document and publish analysis related to digitization hardware and software tools; (8) Identify significant technological gaps in digitization capabilities that require additional resource investment in order to ensure the success of Advancing Digitization of Biodiversity Collections (ADBC); (9) Conduct activities as required to improve Thematic Collections Network (TCN) efficiencies, resolve TCN problems, remove roadblocks; and (10) Provide user services related to digitization questions from the community.

What is the impact on technology transfer?

iDigBio Education and Outreach activities are focused on general digitization curricula development, stakeholder identification, and public speaking engagements to achieve the following objectives: (1) Identify target audiences, including university students, downstream user groups and other stakeholders, and assess their needs; (2) Engage the general public through informational resources, compelling deliverables, and opportunities to participate that highlight the importance of biodiversity collections and digitization; (3) Develop educational resources for K-12 students related to digitization and biodiversity; (4) Foster project awareness within the professional community; and (5) Measure the geographic distribution of impact and success of intended learning outcomes.

Existing relationships between iDigBio and the collections/research community provide an informal mechanism for iDigBio to achieve the following objectives: (1) Engage the research community to market and build interest in using iDigBio services, including both data access services and collaboration tools; (2) Seek opportunities for integration of iDigBio specimen data and data access services with key data and research services from other projects and organizations; and (3) Produce detailed Use Cases for research applications of specimen data, and provide these Use Cases to the cyberinfrastructure team.

What is the impact on society beyond science and technology?

Integrated Digitized Biocollections (iDigBio) is the national resource for digitized information about existing, vouchered natural history collections within the context established by the community strategic plan for the Network Integrated Biocollections Alliance (NIBA) and is supported through funds from the NSF program Advancing Digitization of Biodiversity Collections (ADBC). As such, iDigBio serves as the administrative home for the national digitization effort; fosters partnerships and innovations; facilitates the determination and dissemination of digitization practices and workflows; establishes integration and interconnectivity among the data generated by collection digitization projects; and promotes the uses of biodiversity collections data by the scientific community and stakeholders including government agencies, educational institutions, non-governmental organizations (NGOs), and other national and international entities to benefit science and society through enhanced research, educational, and outreach activities. iDigBio provides these services to all stakeholders with clarity, simplicity, transparency, intuitive methodology, and intuitive design.

Changes/Problems

Changes in approach and reason for change

Nothing to report.

Actual or Anticipated problems or delays and actions or plans to resolve them

Nothing to report.

Changes that have a significant impact on expenditures

Nothing to report.

Significant changes in use or care of human subjects

Nothing to report.

Significant changes in use or care of vertebrate animals

Nothing to report.

Significant changes in use or care of biohazards

Nothing to report.

Special Requirements

Responses to any special reporting requirements specified in the award terms and conditions, as well as any

award specific reporting requirements.

The TCNs provide regular progress reports to iDigBio, which address the following areas: (1) progress in digitization efforts; (2) share and identify best practices and standards (including lessons learned); (3) identify gaps in digitization areas and technology; (4) share and identify opportunities to enhance training efforts; (5) share and identify collaborations with other TCNs, institutions, and organizations; (6) share and identify opportunities and strategies for sustainability; (7) share and identify Education and Outreach activities; and (8) other progress that doesn't fit into the above categories. iDigBio maintains all previously submitted reports at https://www.idigbio.org/wiki/index.php/Internal_Advisory_Committee#TCN_Progress_Reports_to_iDigBio

iDigBio's External Advisory Board (EAB)—whose membership will be subject to the approval of NSF's cognizant program official—meets at least once a year to provide written and verbal advice to iDigBio on its activities, including progress and integration of digitization projects, research, education and outreach activities among all funded institutions and to advise iDigBio's leadership on strategic directions and management policies. iDigBio's EAB members most recently met with the iDigBio PIs and project staff during iDigBio Summit IV on 27 Oct 2014. The reports from all EAB meetings are maintained at: https://www.idigbio.org/wiki/index.php/IDigBio_External_Advisory_Board

Supporting Files

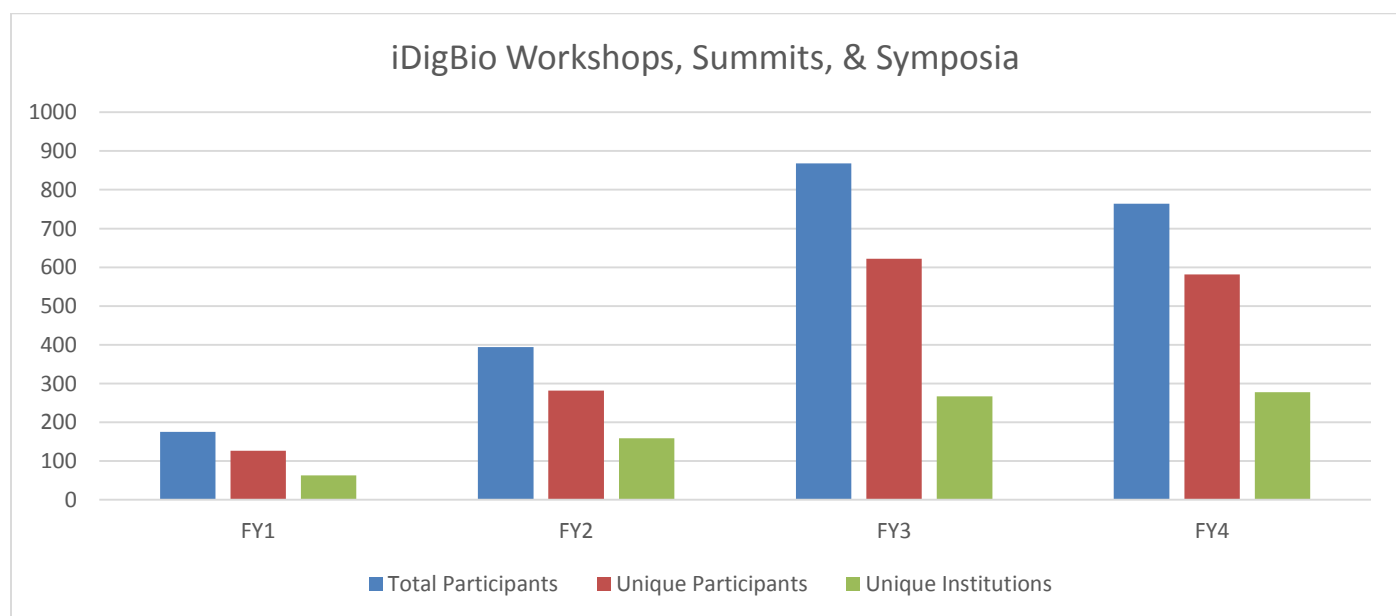
Filename	Description	Uploaded By	Uploaded On
TCN_Reports_to_iDigBio_FY4.pdf	This file contains a compilation of the bi-monthly reports provided to iDigBio from the Thematic Collection Networks (TCNs).	Lawrence Page	05/29/2015
2014_Report_of_the_iDigBio_External_Advisory_Board.pdf	This file contains the report of iDigBio's External Advisory Board (EAB) members from their meeting with the iDigBio PIs and project staff during iDigBio Summit IV.	Lawrence Page	05/29/2015

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iDIGBIO WORKSHOP STATISTICS (7/1/2011 THRU 6/30/2015)

Timeframe	Total Number of Workshops, Summits, and Symposia	Total Number of Participants	Number of Unique Participants	Number of Unique Institutions Represented
Fiscal Year 1 (7/1/2011 – 6/30/2012)	5	175	127	63
Fiscal Year 2 (7/1/2012 – 6/30/2013)	12	394	282	159
Fiscal Year 3 (7/1/2013 – 6/30/2014)	22	868	622	267
Fiscal Year 4 (7/1/2014 – 6/30/2015)	24	764	582	278
OVERALL (7/1/2011 – 6/30/2015)	63	2,201	1,245	511

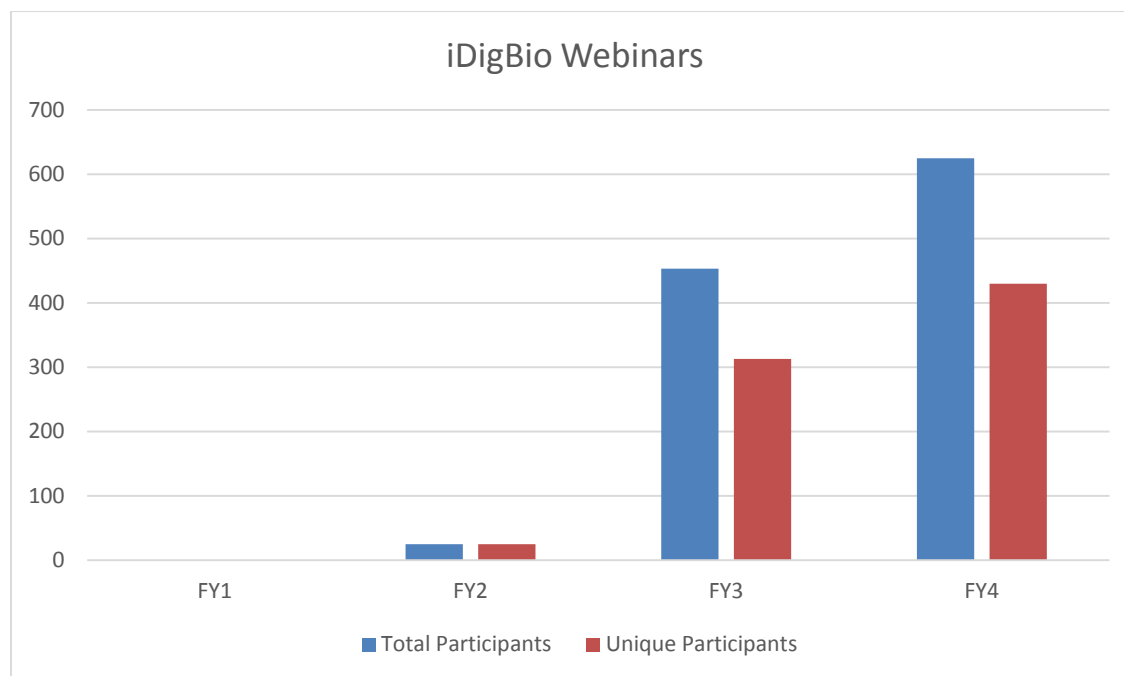


iDIGBIO WORKSHOP DEMOGRAPHICS (7/1/2014 THRU 6/3/2015)



iDIGBIO WEBINAR STATISTICS (7/1/2011 THRU 6/30/2015)

Timeframe	Total Number of Webinars	Total Number of Participants	Number of Unique Participants
Fiscal Year 1 (7/1/2011 – 6/30/2012)	0	0	0
Fiscal Year 2 (7/1/2012 – 6/30/2013)	1	25	25
Fiscal Year 3 (7/1/2013 – 6/30/2014)	10	453	313
Fiscal Year 4 (7/1/2014 – 6/30/2015)	20	625	430
OVERALL (7/1/2011 – 6/30/2015)	31	1,103	677



iDIGBIO WORKSHOPS, SYMPOSIA, & EVENTS (7/1/2014 THRU 6/30/2015)

Georeferencing Workshop at Botany 2014: 7/27/2014 (Boise, ID)

Pam Soltis organized and led an iDigBio-sponsored Botany 2014 Workshop entitled "Georeferencing Natural History Collections" in Boise, ID. This one-day workshop introduced its participants through a combination of lectures and hands-on exercises to the fundamental background, techniques, and best practices of georeferencing of biological specimens. Georeferencing – the assignment of geographic coordinates to locality data – allows collection events to be displayed on digital maps and used in applications to visualize the spatial and temporal intensity of scientific collecting activity, examine species distributions, develop ecological niche models, and address a range of scientific and societal needs such as conservation, ecological restoration, and preparation for global change.

Facilitators

Blaine Marchant (University of Florida, Florida Museum of Natural History, iDigBio)
Grant Godden (University of Florida)
Iwan Molgo (University of Florida)

Pamela Soltis (University of Florida, Florida Museum of Natural History, iDigBio)
Shawn Abrahams (University of Florida)

Participants

Lakshmi Attigala (Iowa State University)
Davis Blasini (Northeastern Illinois University)
Samuel Brockington (University of Cambridge)
Matt Chansler (Michigan State University)
Mary Ann Feist (University of Wisconsin)
Ndubuisi Kanu (University of Lagos, Nigeria)
Gary Larson (South Dakota State University)
Lila Leatherman (no institution)
Shih-Hui Liu (St. Louis University)
Qing Ma (North Carolina State University)
Susan Mazer (University of California - Santa Barbara)
Caroline Morris (Idaho Native Plant Society)
Thomas Mulroy (Leidos, Inc.)
Ann Pinzl (no institution)
Mangaiyarkarasi Ravirajan (Kandaswami naidu College for Women, Thiruvalluvar University)

Jennifer Richards (Florida International University)
Klara Scharnagl (Michigan State University)
Yanxia Sun (North Carolina State University)
Debra Trock (California Academy of Sciences)
Andi Wolfe (Ohio State University)
Jenny Xiang (North Carolina State University)
Yunpeng Zhao (Zhejiang University)
Peter Hoch (Missouri Botanical Garden)
Jacob Edwards (University of Tennessee, Knoxville)
Monica Proulx (Brigham Young University)
Mark Ellis (Utah State University)
Andrew Simpson
Andrea Ravelo (University of Missouri)
Marty Wojciechowski (Arizona State University)

Digitized Natural History Collections Digitization for International Collaboration Symposium at Botany 2014: 7/29/2014 (Boise, ID)

Supported by the NSF ADBC program, natural history collections are currently being digitized at a rapid rate and digitally available records are reaching a critical mass to impact advanced research applications. Corinna Gries (North American Lichens and Bryophytes TCN) and Pam Soltis (iDigBio) presented a 1-day symposium that focused on exploring how this growing resource of digital biodiversity data has been used by the community. The symposium included presentations on: how this resource improves traditional research, new research question that can be addressed, impacts on community building and research collaborations, what is still missing, and how do other existing or emerging digital resources (e.g. DataONE, NEON, EOL and tools like the PhyloJIVE) interact, support, and enhance this research.

Facilitators

Corinna Gries (University of Wisconsin-Madison)

Pamela Soltis (University of Florida, Florida Museum of Natural History, iDigBio)

Presenters

Katja Schulz (Smithsonian)
Michael Denslow (NEON)
Dave Viegals (DataONE)

Matt von Konrat (Field Museum)
Barry Kaminsky (University of Florida)
Joe Miller (National Science Foundation)

Botanical DNA Banking and the Systematics Community Symposium at Botany 2014: 7/29/2014 (Boise, ID)

This symposium represented a follow-up to the NSF-funded U.S. Workshop on DNA Banking, held in St. Louis in January 2013. That meeting included representatives of institutions dealing with all major groups of multicellular taxa. This symposium had three goals: (1) introduce the major conclusions of the workshop to the broader botanical community; (2) engage in more detailed and public discussion of the specific interests of the botanical community, including presentation of the results of new methodological research inspired by the workshop; and (3) build community support for major recommendations of the white paper resulting from the workshop, including collecting and networking initiatives.

Facilitators

Wendy Applequist (Missouri Botanical Garden)
Pamela Soltis (University of Florida, Florida Museum of
Natural History, iDigBio)

Doug Soltis (University of Florida, Florida Museum of
Natural History)
Kurt Neubig (University of Florida, Florida Museum of
Natural History)

North American Network of Small Herbaria (NANSH) Workshop at Botany 2014: 7/31/2014 (Boise, ID)

iDigBio, the North American Network of Small Herbaria (NANSH), and SCNet collaborated on a 1-day workshop focused on digitizing small herbaria. The targeted audience for the workshop included directors, curators, and collections managers at small herbaria that had 1) yet to begin digitization, 2) started digitizing but would like to share ideas and discover new strategies, 3) captured data from some or all specimens but have yet to begin imaging, and/or 4) captured data in an electronic format (spreadsheets, documents, database, etc.) but would like to have a place to serve the data (and/or images) on the web. The workshop was attended by twenty-three participants representing 22 herbaria. The primary goal of the workshop was to provide the tools necessary for initiating or enhancing digitization in smaller collections, including strategies for transcribing label data, imaging specimens, and establishing a free account on the NANSH (nansh.org) or other Symbiota portal for publishing data and images. Alexa DiNicola of Boise State set up an Ortery lightbox for demonstration purposes and teamed up with Kim Watson to demonstrate light box imaging and associated imaging software. The workshop will be followed by two webinar series, one on techniques for using Symbiota, the other on techniques for digitally imaging herbarium specimens.

Facilitators

Alexandra Christine DiNicola (Boise State University)
Anna Monfils (Central Michigan University)
Ashley Morris (Middle Tennessee State University)
Ed Gilbert (Arizona State University)
Emily Gillespie (Marshall University)
Erica Krimmel (Sagehen Creek Field Station)

Gil Nelson (Florida State University, iDigBio)
Kari Harris (Arkansas State University)
Kim Watson (New York Botanical Garden)
Pam Soltis (University of Florida/iDigBio)
Travis Marsico (Arkansas State University)

Participants

Ann Pinzl (Nevada State Museum)
Austin Mast (Florida State University, iDigBio)
Benjamin Montgomery (University of South Carolina
Upstate)
Brad Ruhfel (Eastern Kentucky University)
C. Matt Guillems (Santa Barbara Botanic Garden)
Craig Whippo (Dickinson State University)
Donna Ford-Werntz (West Virginia University)

Elizabeth Johnson (Garrett Herbarium - Natural History
Museum of Utah - University of Utah)
Eric Tepe (University of Cincinnati)
Gary Larson (South Dakota State University)
Geraldine Allen (University of Victoria)
Gregory Gust (Eastern Nevada Landscape Coalition)
Heather Root (Weber State)
Julissa Roncal (Memorial University of Newfoundland)

Libby Ellwood (Florida State University, iDigBio)
 Lisa Castle (Southwestern Oklahoma State University)
 Mark Mayfield (Kansas State University)
 Michael Dunn (Cameron University)
 Rosario R. Rubite (University of the Philippines Manila)

Sarah Melissa Witiak (Virginia State University)
 Stephen Stern (Colorado Mesa University)
 Sue Harley (Weber State)
 Travis Almquist (Benedictine College)

Careers and Graduate Study in the Biological Sciences: A Workshop for Undergraduate Students: 9/6/2014 (Chicago IL)

The Field Museum of Natural History, National Science Foundation, and iDigBio co-sponsored a free 1-day workshop for undergraduate students in the Chicago area focusing on opportunities for careers and graduate study in the biological sciences. A primary goal of the event was to increase the participation of underrepresented minorities in the biological sciences, including African/Black Americans, American Indians, Native Alaskans and Hawaiians, and Hispanics/Chicanos/Latinos. About 50 undergraduates and recent graduates attended the workshop and with about 30 professional scientists on hand, students had plenty of opportunity to ask questions and discuss interests with working biologists and collections professionals. This event was funded by an NSF workshop grant awarded to Florida State University (NSF award DBI-1358501, 9/14/2013).

Facilitators

David Jennings (University of Florida, Florida Museum of Natural History, iDigBio)
 Kevin Love (University of Florida, Florida Museum of Natural History, iDigBio)
 Joanna McCaffrey (University of Florida, Florida Museum of Natural History, iDigBio)
 Cheryl McLaughlin (University of Florida, Florida Museum of Natural History, iDigBio)
 Kasey Mennie (Field Museum of Natural History)
 Robert Lücking (Field Museum of Natural History)
 Alan Resetar (Field Museum of Natural History)
 Paul Mayer (Field Museum of Natural History)
 Corrie Moreau (Field Museum of Natural History)

JP Brown (Field Museum of Natural History)
 Lu Yao (Field Museum of Natural History)
 Max Winston (Field Museum of Natural History)
 John Bates (Field Museum of Natural History)
 Jon Mitchell (Field Museum of Natural History)
 Anna Goldman (Field Museum of Natural History)
 Kevin Feldheim (Field Museum of Natural History)
 Susumu Tomiya (Field Museum of Natural History)
 Adrienne Stroup (Field Museum of Natural History)
 Noe De La Sancha (Field Museum of Natural History)
 Christine Niezgoda (Field Museum of Natural History)
 Joyce Havstad (Field Museum of Natural History)
 Kevin Swagel (Field Museum of Natural History)

Speakers

Gil Nelson (Florida State University, iDigBio)
 Shane Campbell-Staton (Harvard University)
 Hank Bart (Tulane University)
 Gabriela Hogue (North Carolina Museum of Natural Sciences)
 Dena Smith (University of Colorado, Boulder)

Claudia Segovia-Salcedo (University of Florida, Florida Museum of Natural History, iDigBio)
 Roland Roberts (National Science Foundation)
 Pam Soltis (University of Florida, Florida Museum of Natural History, iDigBio)

Participants

Abriel Miller
 Adriana Roman
 Aleksandra Deren
 Andrea Thompson
 Anna Wood
 Anna Zimnoch
 Autumn Morgan-Jones
 Aye Aye Myint
 Belkis Gaviria

Brittni Walker
 Cameron Rathjen
 Claire Short
 Dayani Pieri
 Elizabeth Clausing
 Erin O'Connell
 Gabriel Trujillo
 Janae J Eaton
 Jazmin Rios

Jennifer Kawaguchi
Jessica Wadleigh
Karolina Puchalski
Kate Hillard
Kyle Reid
Lauren Gromala
Madeleine Brewster
Magaly Franco
Maha Longi
Maria Viteri
Marisela Rodriguez
Marlin Amy Halder
Mary Toranzo
Miguel Garcia
Moomal Khan
Naznina Chand

Omar Roldan
Peri Stangas
Rachel Torrez
Romina Maldonado
Ryan Orda
Sally Whitaker
Sana Hira
Sandra Meesala
Sarah Whidden
Sharon de Vera
Tania Sosa
Tarek El Ali
Taylor Mitchell
Travis Buckley
Yosef N Raya
Zach Evans

iNaturalist Workshop: 9/26/2014 (Gainesville, FL)

The Florida Museum of Natural History and iDigBio hosted a half-day workshop where Ken-ichi Ueda, co-founder and director of iNaturalist, provided a short introduction followed by a practical exploration of the iNaturalist application in the field. The workshop concluded with a demonstration and hands-on practice with uploading field observations and other tasks in iNaturalist. The field observations were taken during a short field trip to the University of Florida's Natural Area Teaching Laboratory.

Presenters

Ken-ichi Ueda (iNaturalist)

Participants

Amanda Harvey (University of Florida)
Larry Page (University of Florida)
Bernadette Holthuis (University of Florida)
Pamela Soltis (University of Florida)
Gustav Paulay (University of Florida)
Rob Robins (University of Florida)
Jose Nunez (University of Florida)
Tina Choe (University of Florida)
Gil Nelson (Florida State University)
Lisa Lundgren (University of Florida)

Kent Crippen (University of Florida)
Patrick Norby (University of Florida)
Iliya Smithka (University of Florida)
Gayle Evans (University of Florida)
Kent Vliet (University of Florida)
David Jennings (University of Florida)
Kevin Love (University of Florida)
Adania Flemming (University of Florida)
Betty Dunckel (University of Florida)
Molly Phillips (University of Florida)

Data Carpentry Workshop: 9/29/2014 - 9/30/2014 (Gainesville, FL)

iDigBio and the American Museum of Natural History (AMNH) co-hosted a Data Carpentry Workshop. Seniors, graduate students, post-docs, and current researchers, were invited to apply for the two-day Data Carpentry Workshop. The workshop offered participant's hands-on training in managing the life-cycle of their data and code with a focus on using open source tools, including [R](#). For two intensive, information-filled days of hands-on learning *designed for beginners*, 31 students tackled improving their spreadsheet skills, learned about the power of [Open Refine](#) to clean data and reveal data patterns via facets and clustering algorithms, discovered the power of the shell, found out just how simple it can be, to get a dataset from a spreadsheet into a database to make use of structured query language (SQL), and got an [introduction to R](#) for data analysis and visualization.

Presenters

Bernardo Santos (American Museum of Natural History) - remote
Dan Stoner (University of Florida, iDigBio)
Deb Paul (Florida State University, iDigBio)
Derek Masaki (US Geological Survey) - remote
François Michonneau (University of Florida, Florida Museum of Natural History, iDigBio)

Jonathan Foux (American Museum of Natural History) - remote
Juliet Pulliam (University of Florida, Biology)
Katja Seltmann (American Museum of Natural History) - remote
Matthew Collins (University of Florida, iDigBio)
Ming Tang (University of Florida, iDigBio)
Tracy Teal (Michigan State University)

Participants

Carl Pearson (University of Florida, Epidemiology)
Cody Howard (University of Florida, Biology)
Elena Ortiz-Acevedo (University of Florida, Entomology)
Elizabeth Martin (University of Florida, School of Natural Resources)
Eric Stubbs (University of Florida, Ag Education)
Gustav Paulay (University of Florida, Biology)
James Heaney (University of Florida, Botany)
Jennifer Wood (Florida State University, Information Studies)
Jessica Rowland (University of Florida, Environmental and Global Health)
Juan Gomez (University of Florida, Biology)
Judit Ungvari-Martin (University of Florida, Biology)

Kevin Love (University of Florida, iDigBio)- facilitator
Laura Clark (Florida State University, Information Studies)
Libby Ellwood (Florida State University, Ecology)
Maria Claudia Segovia-Salcedo (University of Florida, Biology)
Nicole Alemanne (Florida State University, Information Studies)
Richard Hodel (University of Florida, Biology)
Song Shuang (University of Florida, Civil Engineering)
Stephanie Cinkovich (University of Florida, Biology)
Tania Chavarria Pizarro (University of Florida, Biology)
Victor Perez (University of Florida, Geology)
William Triplett (University of Florida, Physical Therapy)

Remote Participants (New York-based)

Angelo Soto-Centeno (American Museum of Natural History)
Ashley Yang (American Museum of Natural History)
Chantal-Marie Wright (American Museum of Natural History)
Jack Tseng (American Museum of Natural History)
Melina Giakoumis (American Museum of Natural History)
Nicole Mihnovets (American Museum of Natural History, Columbia University)

Noah Burg (City College of New York, American Museum of Natural History)
Nora Daisy Tainton (American Museum of Natural History)
Sara Oppenheim (American Museum of Natural History)
Signe Valentinsson (American Museum of Natural History)
Stephen Gaughran (American Museum of Natural History)
Susan Tsang (City College of New York)

Leveraging Digitization Processes Workshop: 10/6/2014 - 10/10/2014 (Santa Barbara, CA)

iDigBio held a workshop entitled Leveraging Digitization Practices Across Multiple Domains at The University of California Santa Barbara (UCSB). The workshop was co-sponsored by UCSB's Cheadle Center for Biodiversity and Ecological Restoration (CCBER), the Santa Barbara Museum of Natural History (SBMNH), and the Western Foundation of Vertebrate Zoology (WVZ). This event was part of a continuing series of iDigBio-sponsored workshops focused on organizing, launching, maintaining, and enhancing biological collections digitization programs. Fifty participants attended, representing more than 30 institutions that ranged from small and large natural history museums and academic institutions to biological field stations. The workshop planning team succeeded in its goal to attract scientists and collections professionals from all major prep types and disciplines, with a participant list that included representatives from wet and dry prep types in botany, entomology, vertebrate zoology, and paleontology, as well as biodiversity informatics.

Facilitators

Gil Nelson (Florida State University, iDigBio)

Greg Riccardi (Florida State University, iDigBio)

Jennifer Thorsch (University of California, Santa Barbara)
 Joanna McCaffrey (University of Florida, iDigBio)
 Kevin Love (University of Florida, iDigBio)
 Laurie Hannah (University of California, Santa Barbara)

Libby Ellwood (Florida State University, iDigBio) - Remote
 Mireia Beas-Moix (University of California, Santa Barbara)
 Pam Soltis (University of Florida, iDigBio)

Participants

Brandi Coyner (Sam Noble Oklahoma Museum of Natural History)
 Catherine Riddle (Duke Div. of Fossil Primates)
 Chris Tyrrell (Milwaukee Public Museum)
 Colleen Evans (Georgia Southern University)
 Dan Young (University of Wisconsin)
 Dawn Roberts (Chicago Academy of Sciences/Peggy Notebaert Nature Museum)
 Debra Miller ((Milwaukee Public Museum))
 Dmitry Dmitriev (Illinois Natural History Survey)
 Erica Clites (University of California Museum of Paleontology)
 Erin Marnocha (University of California Natural Reserve System)
 Faerthen Felix (Sagehen Creek Field Station)
 Janet Bala (Idaho Museum of Natural History, Idaho State University)
 Jeff Brown (Sagehen Creek Field Station)
 Jenessa Wall ((Natural History Museum of LA County))
 Jenn Yost (California Polytechnic State University)
 Jennifer Thomas (University of Kansas)
 Joselyn Fenstermacher (Sul Ross State University)
 Kevin Browne (University of California Riverside)
 Krista Fahy (Santa Barbara Museum of Natural History)
 Larry Jon Friesen (Santa Barbara City College)
 Larry Schmidt (University of Wyoming)
 Laura Abraczinskas (Michigan State University Museum)

Laura Brenskelle (The University of Texas at Austin)
 Lena Hernandez (Museum of Science & History of Jacksonville)
 Linnea Hall (Western Foundation of Vertebrate Zoology)
 Margaret Landis (Sam Noble Oklahoma Museum of Natural History)
 Mark Allen Wetter (Wisconsin State Herbarium)
 Mary Beth Prondzinski (Fairbanks Museum & Planetarium)
 Monica Proulx (Brigham Young University)
 N. Dean Pentcheff (Natural History Museum of LA County)
 Paul Mayer (Field Museum of Natural History)
 Paul Valentich-Scott (Santa Barbara Museum of Natural History)
 Peter Oboyski (University of California, Berkeley) - remote
 Rene Corado (Western Foundation of Vertebrate Zoology)
 Robert Gropp (American Institute of Biological Sciences)
 Roger Burkhalter (Sam Noble Oklahoma Museum of Natural History)
 Ronald C. Eng (Burke Museum of Natural History and Culture)
 Sohath Yusseff-Vanegas (University of Vermont)
 Steve Dilliplane (Academy of Natural Sciences of Drexel University)

Symposium at the Geological Society of America Annual Meeting: 10/19/2014 - 10/22/2014 (Vancouver, Canada)

iDigBio, in collaboration with the Society for the Preservation of Natural History Collections, the Paleontological Society, GSA Geoinformatics, University of Colorado Museum of Natural History, and Yale Peabody Museum of Natural History, sponsored a symposium entitled “Advancing the Digitization of Paleontology and Geoscience Collections: Projects, Programs, and Practices”. New developments in digitization and data discovery were presented at the symposium.

Facilitators

Gil Nelson (Florida State University, iDigBio)
 Talia Karim (University of Colorado at Boulder)
 Jim Beach (University of Kansas)

Nelson Rios (Tulane University)
 Tim White (Yale University)

Symposium at TDWG 2014 - Access to Digitization Tools and Methods: 10/27/2014 (Jönköping, Sweden)

This 1-day workshop covered the developments that are occurring in digitisation but had a strong emphasis on the accessibility of tools and protocols. Some of the topics discussed included: tools for data/metadata capture and enrichment

such as Optical Character Recognition (OCR), text mining, Natural Handwriting Recognition (NHR), Natural Language Processing (NLP), their availability, and how they are being adopted and adapted.

Facilitators

Elspeth Haston (The Royal Botanic Garden Edinburgh)
Deborah Paul (iDigBio and iDigInfo)

Vince Smith (Natural History Museum London)

Mobilizing Dark Data: Raising the Profiles of Small Natural History Collections: 11/15/2014 (Portland, OR)

Gil Nelson and Christy Bills, representing iDigBio's Small Collections Network (SCNet), presented a session at the annual ECN meeting where they discussed the issues of "dark data" and how to define "small" across collection types.

Facilitators

Gil Nelson (Florida State University, iDigBio)

Christy Bills (Natural History Museum of Utah)

iDigBio's Summit IV: 10/27/2014 - 10/28/2014 (Gainesville, FL)

iDigBio held the fourth annual Summit in Gainesville, Florida, at the [Hilton University of Florida Conference Center](#). Eighty-four on-site attendees and nine remote attendees from TCNs, iDigBio, NSF, and other biodiversity informatics initiatives convened to discuss their shared accomplishments, goals, challenges, opportunities, and collaborations.

Onsite Participants

Adania Flemming (University of Florida, Florida Museum of Natural History, iDigBio)
Alex Thompson (University of Florida, iDigBio)
Andrea Matsunaga (University of Florida, iDigBio)
Andrew Simons (University of Minnesota)
Andy Deans (Penn State)
Anna Monfils (Central Michigan University)
Austin Mast (Florida State University, iDigBio)
Barbara Thiers (New York Botanical Garden)
Ben Legler (University of Washington)
Betty Duncel (University of Florida, Florida Museum of Natural History, iDigBio)
Blaine Marchant (University of Florida, Florida Museum of Natural History, iDigBio)
Bruce MacFadden (University of Florida, Florida Museum of Natural History, iDigBio)
Bryan Heidorn (University of Arizona)
Cathy Bester (University of Florida, Florida Museum of Natural History, iDigBio)
Charlotte Germain-Aubrey (University of Florida, Florida Museum of Natural History, iDigBio)
Cheryl McLaughlin (University of Florida, Florida Museum of Natural History, iDigBio)
Chris Dick (University of Michigan)
Christopher Marshall (Oregon State University)
Christopher Neefus (University of New Hampshire)
Christopher Norris (Yale University)
Christopher Dietrich (Illinois Natural History Survey)
Christy Bills (Natural History Museum of Utah)

Dan Stoner (University of Florida, iDigBio)
David Jennings (University of Florida, Florida Museum of Natural History, iDigBio)
David Lowery (Filtered Push)
David Bloom (University of California, Berkeley)
Donald Hobern (GBIF)
Edward Gilbert (Arizona State University)
Dorothy Allard (University of Vermont)
Elizabeth Martin (US Geological Survey)
François Michonneau (University of Florida, Florida Museum of Natural History, iDigBio)
Gary Alpert (Harvard University)
Gavin Svenson (Cleveland Museum of Natural History)
Gil Nelson (Florida State University, iDigBio)
Herrick Brown (University of South Carolina)
James Hanken (Harvard University) - unsupported
Jenny Kluse (Louisiana State University)
Joanna McCaffrey (University of Florida, Florida Museum of Natural History, iDigBio)
Joe Leigh (Illinois Natural History Survey)
Joe McKenna (Appalachian State University) - unsupported
Joey Shaw (University of Tennessee at Chattanooga)
John La Salle (Atlas of Living Australia)
Jose Fortes (University of Florida, iDigBio)
Judy Skog (National Science Foundation)
Katja Seltmann (American Museum of Natural History)
Ken Cameron (University of Wisconsin, Madison)
Keping Ma (Chinese Academy of Science)

Kevin Love (University of Florida, Florida Museum of Natural History, iDigBio)
 Kyuho Jeong (University of Florida, iDigBio)
 Larry Page (University of Florida, Florida Museum of Natural History, iDigBio)
 Lauren Gonzalez (University of Florida, iDigBio)
 Linda Ford (Harvard University)
 Liz Shea (Delaware Museum of Natural History)
 (Margaret) Ann Molineux (University of Texas)
 Mare Nazare (Rancho Santa Ana Botanic Garden)
 Mary Klein (NatureServe)
 Matt Collins (University of Florida, iDigBio)
 Matthew Medler (Cornell University)
 Melissa Islam (Denver Botanic Gardens)
 Melody Basham (Arizona State University)
 Molly Phillips (University of Florida, Florida Museum of Natural History, iDigBio)
 Monica Proulx (Brigham Young University)
 Neil Cobb (Northern Arizona University)
 Nicole Fisher (CSIRO)
 Pam Soltis (University of Florida, Florida Museum of Natural History, iDigBio)
 Patrick Sweeney (Yale University)

Remote Participants

David Baxter (University of California Berkeley)
 Reed Beaman (National Science Foundation)
 Laura Brenskelle (University of Texas Austin)
 Herrick Brown (University of South Carolina)
 Anne Maglia (National Science Foundation)

Paul Kimberly (National Museum of Natural History)
 Paul Johnson (South Dakota State University)
 Petra Sierwald (Field Museum of Natural History) - unsupported
 Rafe Brown (University of Kansas)
 Rich Rabeler (University of Michigan)
 Robert Gropp (American Institute of Biological Sciences)
 Robert Naczi (New York Botanical Garden)
 Robin Abraham (University of Kansas)
 Roland Roberts (National Science Foundation)
 Rüdiger Bieler (Field Museum of Natural History) - unsupported
 Sam Heads (University of Illinois, Urbana-Champaign)
 Sandy Brantley (University of New Mexico)
 Shari Ellis (University of Florida, Florida Museum of Natural History, iDigBio)
 Taehwan Lee (University of Michigan) - unsupported
 Talia Karim (University of Colorado Boulder)
 Thomas Nash (Arizona State University)
 Una Farrell (University of Kansas)
 Yonggang Liu (University of Florida, iDigBio)
 Zack Murrell (Appalachian State University)

Gary Motz (University of Cincinnati)
 Deb Paul (Florida State University)
 Nathan Ruser
 Jodi Shippee (Vermont Natural Heritage Inventory)

CitStitch Hackathon: 12/3/2014 - 12/6/2014 (Gainesville, FL)

The goal of the event was to build interoperability among projects that enable public participation in the digitization of biodiversity research specimens in useful and exciting ways. The hackathon was organized by Austin Mast (Florida State University) and Rob Guralnick (University of Colorado–Boulder), with input from an organizing committee additionally composed of Ben Brumfield, Libby Ellwood, Paul Flemons, Ed Gilbert, Greg Newman, and Nelson Rios. The hackathon was co-sponsored by iDigBio and Zooniverse's Notes from Nature Project.

Participants

Alex Thompson (University of Florida, iDigBio)
 Andrea Matsunaga (University of Florida, iDigBio)
 Andrew Hill (Vizzuality/CartoDB)
 Austin Mast (Florida State University, iDigBio)
 Ben Brumfield (FromThePage)
 Chris Snyder (Zooniverse)
 Daryl Lafferty (Arizona State University)
 Deborah Paul (Florida State University, iDigBio)
 Dmitry Mozzherin (Encyclopedia of Life)
 Edward Gilbert (Arizona State University)
 Greg Newman (Colorado State University) - maybe

Greg Riccardi (Florida State University, iDigBio)
 Jeremy Spinks (Florida State University, iDigBio)
 John Wiczorek (University of California, Berkeley)
 Julia Allen (Illinois Natural History Survey)
 Libby Ellwood (Florida State University, iDigBio)
 Nelson Rios (Tulane University)
 Paul Flemons (Australian Museum of Natural History)
 Paul Kimberly (Smithsonian)
 Renato Figueiredo (University of Florida, iDigBio)
 Robert Bruhn (Florida State University, iDigBio)
 Robert Guralnick (University of Colorado, Boulder)

Sophia Liu (USGS)
Stuart Lynn (Zooniverse)

Charlotte Germain-Aubrey (iDigBio)

Data Standards, Data Sharing, and Demystifying the Integrated Publishing Toolkit Workshop: 1/13/2015 - 1/14/2015 (Gainesville, FL & Ottawa, Canada)

iDigBio, Global Biodiversity Information Facility (GBIF), Canadensys, VertNet, Agriculture and Agri-food Canada, Canadian Biodiversity Information Facility (CBIF, a GBIF node) and USGS-BISON, collaborated on this workshop that was held simultaneously at the University of Florida at iDigBio and at the Canadian Biodiversity Information Facility (CBIF). This workshop was the second in a series of biodiversity informatics workshops planned in for 2014-2015. The workshop was attended by 74 participants who learned more about best practices for how to develop and share robust natural history collection specimen data.

Facilitators

Gainesville

Deb Paul (iDigBio/Florida State University)
Greg Riccardi (iDigBio/Florida State University)
Kevin Love (iDigBio/University of Florida)
Matthew Collins (iDigBio/University of Florida)

Andrea Matsunaga (iDigBio/University of Florida)
Joanna McCaffrey (iDigBio/University of Florida)
Dan Stoner (iDigBio/University of Florida)
Molly Phillips (iDigBio/University of Florida)

Ottawa

Bénédicte Rivière (University of Montreal Biodiversity Center)

James Macklin (Canada)
David Shorthouse (University of Montreal)

Participants

Gainesville:

Mac Alford (University of Southern Mississippi)
Philip Anders (Illinois Natural History Survey)
David Baxter (University of California Berkeley)
Holly Bolick (Bishop Museum)
Christina Byrd (Virginia Museum of Natural History)
Dmitry Dmitriev (Illinois Natural History Survey)
Ronald Eng (Burke Museum, University of Washington)
Robert Faucett (Burke Museum, University of Washington)
Jacek Giermakowski (University of New Mexico)
Charles Horn (Newberry College)
Steven King (Sam Noble Oklahoma Museum of Natural History)
Jennie Kluse (Louisiana State University)
Margaret Landis (Sam Noble Oklahoma Museum of Natural History)

Richard Levy (Denver Botanic Gardens)
Holly Little (Smithsonian Institution)
Katherine Maslenikov (Burke Museum, University of Washington)
Paul Mayer (The Field Museum)
Heather Stimmel (Missouri Botanical Garden)
Michael Thomas (University of Hawaii at Monoa)
Shelley James (Bishop Museum)
Patricia Burke (Milwaukee Public Museum)
Peter Oboyski (Essig Museum of Entomology)
Gustav Paulay (Florida Museum of Natural History)
Derek Masaki (US Geological Survey)
Laura Russell (VertNet)
Alberto González-Talaván (GBIF)

Ottawa (remote):

Allan Jones (Agriculture and Agri-Food Canada)
Amanda Ward (Agriculture and Agri-Food Canada)
Anissa Lybaert (Agriculture and Agri-Food Canada)
Bénédicte Rivière (University of Montreal Biodiversity Center)
Bryan Brunet (University of Alberta)
Carolyn Babcock (Agriculture and Agri-Food Canada)

Christian Gendreau (Canadensys)
Cobus Visagie (Agriculture and Agri-Food Canada)
David Shorthouse (Canadensys)
Diana Sawatzky (University of Manitoba)
Dicky Yu (Agriculture and Agri-Food Canada)
Donald Moses (University of Prince Edward Island)
Gisele Mitrow (Agriculture and Agri-Food Canada)

Glen Newton (Agriculture and Agri-Food Canada)
 Heather Cole (Agriculture and Agri-Food Canada)
 Iyad Kandalaft (Agriculture and Agri-Food Canada)
 James Macklin (Agriculture and Agri-Food Canada)
 James Smith (Royal British Columbia Museum)
 Jenn McPhee (Royal Botanical Gardens, Burlington)
 Jennifer Wilkinson (Agriculture and Agri-Food Canada)
 Jenny Chiu (Fisheries and Oceans Canada)
 Kelly Sendall (Royal British Columbia Museum)
 Kyle Martins (McGill University)

Mark St. John (Mark St. John Research and Consulting)
 Mathieu Ouellet (Fisheries and Oceans Canada)
 Nadia Cavallin (Royal Botanical Gardens, Burlington)
 Satpal Bilkhu (Agriculture and Agri-Food Canada)
 Shannon Asencio (Canadian Museum of Nature)
 Stephen Darbyshire (Agriculture and Agri-Food Canada)
 Tammy Elliot (McGill University)
 Tyler Smith (Agriculture and Agri-Food Canada)
 Valerie Tait (Canadian Museum of Nature)
 Wen Chen (Agriculture and Agri-Food Canada)

Developing Herbarium Workflows Workshop: 1/26/2015 - 1/30/2015 (Valdosta, GA)

iDigBio and the Southeast Regional Network of Expertise and Collections (SERNEC) co-funded this workshop with the assistance of a small NSF-funded project. The workshop was hosted by Richard Carter, member of the CSBR-funded Georgia herbarium consortium, at Valdosta State University. This workshop brought together 25 experts in herbarium digitization for the purpose of developing and publishing a community-based set of herbarium digitization workflows that reflect the combined efforts of CSBR, TCN, and other collaboratives over the years of NSF's ADBC program.

Facilitators

Austin Mast (iDigBio/Florida State University)
 Pamela Soltis (iDigBio/University of Florida)
 Gil Nelson (iDigBio/Florida State University)
 Blaine Marchant (iDigBio/University of Florida)

(James) Richard Carter (Valdosta State University)
 Zack Murrell (Appalachian State University)
 Kevin Love (iDigBio/University of Florida)

Participants

Shanna Oberreiter (University of North Carolina)
 Andrea Weeks (George Mason University)
 Ben Legler (University of Washington)
 Bradley Ruhfel (Eastern Kentucky University)
 Carol McCormick (University of North Carolina)
 Christopher Neefus (University of New Hampshire)
 Edward Gilbert (Arizona State University)
 Emily Gillespie (Marshall University)
 Herrick Brown (South Carolina Dept of Natural Resources)
 Joey Shaw (University of Tennessee Chattanooga)

Julianne Smith (University of Wisconsin)
 Kimberly Watson (New York Botanical Garden)
 Les Goertzen (Auburn University)
 Lisa Wallace (Mississippi State University)
 Mare Nazaire (Rancho Santa Ana Botanic Garden)
 Patrick Sweeney (Yale University)
 Richard Rabeler (University of Michigan)
 Thomas Sasek (University of Louisiana at Monroe)
 Travis Marsico (Arkansas State University)
 Michael Denslow (Appalachian State University)

Basics of CT Data Acquisition, Visualization, and Analysis Workshop: 2/22/2015 - 2/26/2015 (Austin, TX)

iDigBio cosponsored this workshop at the High Resolution X-ray CT Facility at the Jackson School of Geosciences, University of Texas, Austin. This 3-day short course covered the fundamentals of acquiring and working with CT data of biological and paleontological samples. Content included an overview of what CT data represent, how these data are acquired, and guidelines for specimen selection/preparation.

Facilitators

Gil Nelson (iDigBio/Florida State University)

Participants

Lisa Herzog (North Carolina State University)

Rosie Oakes (Penn State University)

Gregory Smith (Penn State University)
Agnese Lanzetti (San Diego State University)
Jeffrey Thompson (University of Southern California)
Paul Morse (University of Florida)

Cheyanna (Chip) Austin (University of Illinois at Urbana-Champaign)
Jeff J. Shi (University of Michigan)
Keegan Michael Melstrom (University of Utah)
Brian Davis (University of Louisville)

Field to Database Workshop: 3/9/2015 - 3/12/2015 (Gainesville, FL)

iDigBio hosted this 4-day workshop, which was a hands-on course for graduate students, postdocs, and researchers exploring data tools, current trends and best practices for collecting and managing field data, identifiers, trait data, and environmental variables. The course started with data collection in the field and ended with how best to get quality, standardized data into a format suitable for upload into a database to support long-term reproducible research workflows, data sharing, and data publication.

Facilitators

Justin Woods (Woods Media)
Andrew Short (University of Kansas)
Michael Webster (Cornell University)
Derek Masaki (US Geological Survey)
Grant Godden (Rancho Santa-Ana Botanic Garden)
Todd Vision (Data Dryad/University of North Carolina) – remote
Katja Selmann (American Museum of Natural History)
Charlotte Germain-Aubrey (iDigBio/University of Florida)

Emilio Bruna (University of Florida)
Francois Michonneau (iDigBio/University of Florida)
Matt Cannister (US Geological Survey)
Pam Soltis (iDigBio/University of Florida)
Kevin Love (iDigBio/University of Florida)
Matt Collins (iDigBio/University of Florida)
Deb Paul (iDigBio/Florida State University)
Gil Nelson (Florida State University, iDigBio)

Participants

Lina Freire-Fierro (Academy of Natural Sciences)
Richard Levy (Denver Botanic Gardens)
Shichao Chen (University of Florida)
Edgardo Rivera (New York Botanical Garden)
Roseann Healy (Harvard University)
Georgia Titcomb (UC Santa Barbara)
Elizabeth Forbes (UC Santa Barbara)
Ghita Heidt (Florida State University)

Mike Huben (Boston Latin School)
Kenneth Polzin (unaffiliated)
Thomas McElrath (University of Georgia)
Penny Carroll (Middle Tennessee State University)
Rayne Leonard (Middle Tennessee State University)
Lars Erik Johannssen (University of Oslo)
Jesse Breinholt (University of Florida)

WeDigBio Meeting/Workshop : 3/19/2015 - 3/20/2015 (Washington, DC)

iDigBio attended and helped organize a meeting entitled “Planning the Worldwide Engagement for Digitizing Biocollections (WeDigBio) Event”. The event had the dual goals of increasing the rate of specimen digitization—typically thought of as digital imaging, label transcription, and georeferencing—and public understanding of biocollections and their role in research, natural resource management, education, policy decisions, etc. A group representing online transcription platforms, biocollections, museum informal education and media departments, [National Geographic](#), were present at the [Smithsonian Institution's National Museum of Natural History](#) in Washington, D.C., and planned an annual event focused on global public participation in digitization of biocollections.

Participants

Tom Humphrey (Herbaria@Home)
Melissa Tulig (New York Botanical Garden)
Michael Denslow (SERNEC)
Kevin Love (iDigBio/Florida Museum of Natural History)
Shari Ellis (iDigBio/Florida Museum of Natural History)
Betty Duncel (iDigBio/Florida Museum of Natural History)

Austin Mast (iDigBio/Florida State University)
Libby Ellwood (iDigBio/Florida State University)
Deb Paul (iDigBio/Florida State University)
Edward Gilbert (Arizona State University)
Zack Murrell (SERNEC/Appalachian State University)

WISE Girlz Science Spring Camp: 3/23/2015 - 3/27/2015 (Gainesville, FL)

iDigBio Postdoc Charlotte Germain-Aubrey organized and led a science camp for middle school girls, which was financially accessible to all through sponsorship by iDigBio (food and venue). Eleven girls participated in the 5 day-camp that took place during the Alachua County School Board spring break. The girls were exposed to different fields of science each day: Biology/Museum Collections, Engineering, Chemistry, Computer Science, and Astronomy/Geology. This camp promoted science in general and biology/museum collections to middle school girls. The girls will present what they learned through talks, articles in local school papers or a video thereby, helping to spread the message of “Careers in Science” to public middle-schools in Alachua, and their teachers.

Facilitators

Charlotte Germain-Aubrey (iDigBio/Florida Museum of Natural History)
Sarah Graves (University of Florida)
Alison Trachet (University of Florida)

Stephanie Zick (University of Florida)
Savanna Barry (University of Florida)
Irina Velsko (University of Florida)

Participants

Njeri Carthy
Talia Becker
Anja Julian
Emma Harder
Isabella Robles
Navya Tripathi

Charlotte Trabbic
Emily Farrar
Sydney Crosby
Madison Cordero
Nima Jaiwal

ASB Conference 2015: 4/1/2015 - 4/4/2015 (Chattanooga, TN)

iDigBio’s Gil Nelson and representatives from the [North American Network of Small Herbaria](#) (NANSH) Working Group gave presentations at the [Association of Southeastern Biologists Conference](#).

Speakers

Gil Nelson (iDigBio/Florida State University)

International Digitization Summit: 4/13/2015 - 4/17/2015 (Canberra, Australia)

ALA, CSIRO, iDigBio, Smithsonian, BMNH, Naturalis, and NSII met at CSIRO’s Black Mountain Laboratories in Canberra, Australia, to discuss potential for collaborations among all of the projects. Of principal interest to iDigBio were access to additional specimen-based records to facilitate research and outreach, and access to or information about existing or emerging tools from international partners to help iDigBio meet its research and outreach goals. Principal objectives for ALA and other participants were to gain a better understanding of the digitization workflows, working groups, and community building strategies developed by iDigBio and to gain better understanding of the ADBC funding model for potential replication.

Participants

Larry Page (iDigBio/University of Florida)
Pam Soltis (iDigBio/University of Florida)
David Jennings (iDigBio/University of Florida)
Gil Nelson (iDigBio/Florida State University)
Jose Fortes (iDigBio/University of Florida)
Greg Riccardi (iDigBio/Florida State University)
Austin Mast (iDigBio/Florida State University)
Andrew Young (CSIRO)
Beth Mantle (CSIRO)
Dan Gledhill (CSIRO)

Changming Sun (CSIRO)
John LaSalle (ALA)
Nicole Fisher (ALA)
Keping Ma (National Specimen Information Infrastructure of China)
Peter Doherty (ALA)
Paul Flemons (Australian Museum)
Alexis Tindall (South Australian Museum)
Alison Vaughan (Royal Botanic Gardens in Melbourne)
Paul Kimberly (Smithsonian)

Dan Gledhill (Tasmania Biodiversity Hub)
Vince Smith (NHM UK)

Stuart Anderson (CSIRO)

Vertebrate Digitization Workshop: 5/4/2015 - 5/7/2015 (Ithaca, NY)

iDigBio held a 3 day workshop on Vertebrate Digitization at the University of California Santa Barbara (UCSB). The workshop was co-sponsored by the Cornell Laboratory of Ornithology, Bishop Museum, and University of Michigan Museum of Zoology. The workshop focused on the digitization of vertebrate collections, including the value of live audio and video phenotypic recordings, media metadata standards, media recording techniques (including equipment setup, configuration, and use), methods for linking media to physical specimens, media metadata standards, the value of specimen still images, issues in launching a digitization program, digitization workflows, and digital asset management and archiving.

Facilitators

Cody Thompson (University of Michigan)
Molly Hagemann (Bishop Museum)
Mike Webster (Cornell Lab of Ornithology)
Gil Nelson (iDigBio, Florida State University)

Kevin Love (iDigBio, University of Florida)
Molly Phillips (iDigBio, University of Florida)
Larry Page (iDigBio, University of Florida)
Greg Riccardi (iDigBio, Florida State University)

Participants

Stuart Gage (Michigan State University)
Douglas Nelson (Ohio State University)
Andrew M Simons (University of Minnesota)
Chris Feldman (University of Nevada, Reno)
Paul Velazco (American Museum of Natural History)
Brook Fluker (Arkansas State University)
Jeff Bradley (Burke Museum, University of Washington)
Jeremiah Trimble (Harvard University Museum of Comparative Zoology)
Andrew Williston (Harvard University Museum of Comparative Zoology)
Meredith Mahoney (Illinois State Museum)
Gary Motz (Indiana University Center for Biological Research Collections)
Holly Cochran (California State University Chico)
Paul Barnhart (Dickinson State University)
Jennifer Frey (New Mexico State University)
Stephen Kolomyjec (Ohio Northern University)
Robert K. McAfee (Ohio Northern University)
Luis A. Ruedas (Portland State University)
Matthew Wagner (South Dakota State University)
Kirsten R Brophy (Stamford Museum & Nature Center)
Emily Braker (University of Colorado Museum of Natural History)
Laura Vietti (University of Wyoming)
Rob Faucett (Burke Museum, University of Washington)
John Demboski (Denver Museum of Nature & Science)
Ben Marks (Field Museum of Natural History)
Anna E. Goldman (Field Museum of Natural History)
Caleb McMahan (Field Museum of Natural History)
Norma Salcedo (Grice Marine Laboratory)
Andrew Bentley (University of Kansas)

Laura Abraczinskas (Michigan State University Museum)
Cindy Opitz (Museum of Natural History, University of Iowa)
Carla Cicero (Museum of Vertebrate Zoology, University of California Berkeley)
John McCormack (Occidental College)
James Maley (Occidental College)
Tara Chestnut (Oregon State University)
Steve Kimble (Purdue University)
Gabrielle Maltaverne (South Dakota State University)
Curtis Schmidt (Sternberg Museum of Natural History, Fort Hays State University)
Heather Prestridge (Texas A&M University)
Andres Lopez (University of Alaska Fairbanks)
Aren Gunderson (University of Alaska Museum)
Sue Hochgraf (University of Connecticut)
Beth Wommack (University of Wyoming)
Arthur Porto (Washington University in St Louis)
Krista Fahy (Santa Barbara Museum of Natural History)
Jack Dumbacher (California Academy of Natural Sciences)
Rafe Brown (University of Kansas)
Robin Kuirian Abraham (University of Kansas)
Carl Hutter (University of Kansas)
Travis LaDuc (University of Texas)
Nate Rice (Academy of Natural Sciences, Drexel University)
Andres Cuervo (Tulane University)
Verity Mathis (Florida Museum of Natural History)
Randy Singer (Florida Museum of Natural History)
Melissa Cragin (National Science Foundation)
Roland Roberts (National Science Foundation)
Aaron Rice (Cornell Lab of Ornithology)

Holger Klinck (Cornell Lab of Ornithology)
Scott Edwards (National Science Foundation)
Jonathan Coddington (Smithsonian)
Graham Bird (GIGAmacro)
Gene Cooper (GIGAmacro)
Ed Scholes (Cornell Lab of Ornithology)

David Winkler (Cornell Lab of Ornithology)
Greg Budney (Cornell Lab of Ornithology)
Matt Medler (Cornell Lab of Ornithology)
Vanya Rohwer (Cornell Lab of Ornithology)
Susan Parks (Syracuse University)

TCN/iDigBio Reception at SPNHC 2015: 5/20/2015 (Gainesville FL)

Representatives of TCNs attending SPNHC were invited to a reception hosted by iDigBio (food and venue). The reception was semi-structured and was focused on providing mentoring opportunities among the TCNs. Attendees were encouraged to think about their project's strengths and areas in need of growth before the event, so they were prepared for meaningful conversations with their colleagues.

Facilitators

David Jennings (University of Florida)
Kevin Love (University of Florida)
Molly Phillips (University of Florida)
Joanna McCaffrey (University of Florida)

Gil Nelson (Florida State University)
Cathy Bester (University of Florida)
Shari Ellis (University of Florida)
Deborah Paul (Florida State University)

Participants

Dorothy Allard (Pringle Herbarium, University of Vermont)
Nasreen Aziz (Delaware Museum of Natural History)
Andy Bentley (University of Kansas)
Christina Byrd (Virginia Museum of Natural History)
Erica Clites (University of California, Berkeley)
Joe Cook (University of New Mexico)
Michael Denslow (Appalachian State University)
Sarah Dutton (New York Botanical Garden)
Donna Ford-Werntz (West Virginia University Herbarium)
Nico Franz (Arizona State University)
Edward Gilbert (Symbiota, Arizona State University)
Emily Gillespie (Marshall University)
Robert Groppe (Natural Sciences Collections Alliance and AIBS)
Pat Holroyd (University of California, Berkeley)
Shelley James (University of Hawaii)
Christine Johnson (American Museum of Natural History)
Talia Karim (University of Colorado)
Elizabeth Kiernan (New York Botanical Garden)
Bruce MacFadden (University of Florida)
Anne Maglia (NSF) – not supported

Travis Marsico (Arkansas State University)
Ann Molineux (University of Texas at Austin)
Anna Monfils (Central Michigan University)
Zack Murrell (Appalachian State University)
Chris Neefus (University of New Hampshire)
Christine Niezgoda (Field Museum)
Chris Norris (Yale University)
Cindy Opitz (Univ. of Iowa Museum of Natural History)
Larry Page (Florida Museum of Natural History)
Kent Perkins (University of Florida Herbarium)
Rich Rabeler (University of Michigan)
Brad Ruhfel (Eastern Kentucky University)
Mark Sabaj Pérez (The Academy of Natural Sciences)
Claudia Segovia (La Universidad de las Fuerzas Armadas)
Randal Singer (University of Florida)
Pam Soltis (University of Florida)
Barbara Thiers (New York Botanical Garden)
Jonathan Toll (New York Botanical Garden)
Melissa Tulig (New York Botanical Garden)
Norris Williams (FLMNH)
Charles Zimmerman (New York Botanical Garden)
Jose Fortes (University of Florida)

Plenary Session at SPNHC 2015: 5/19/2015 (Gainesville FL)

iDigBio, the National Science Collections Alliance (NSCA), and the Network Integrated Biocollections Alliance (NIBA) Research Coordination Network (RCN) co-sponsored the Plenary Session at the 2015 annual meeting of the Society for the Preservation of Natural History Collections (SPNHC). The program included six speakers who kicked off the meeting by presenting thought on the topic of Collections for the 21st Century.

Speakers

Larry Page (iDigBio/Florida Museum of Natural History)
Susan Middleton (California Academy of Sciences)
Erin Tripp (University of Colorado Museum of Natural History)

Austin Mast (iDigBio/Florida State University)
Quentin Wheeler (State University of New York College of Environmental Science and Forestry)
Robert Gropp (AIBS and NSC Alliance)

Specimen Full Circle Symposium at SPNHC 2015: 5/20/2015 (Gainesville FL)

iDigBio hosted a symposium at SPNHC 2015 that highlighted how novel field-collecting methods provide richer specimen data, mature transcription, and imaging techniques, and how updated end-user interfaces are resulting in greater access to and use of specimen data for a variety of purposes. These have led to increasing use of museum specimen data for analysis and the development of visualization tools that facilitate research and support educational needs and outreach opportunities. Talks focused on collecting practices that result in faster access to high quality data, sharing improved digitization methods, and finding out how the specimen data are being used in current research.

Facilitators

Deborah Paul (iDigBio/Florida State University)
Vladimir Blagoderov (Natural History Museum London)
Dena Smith (University of Colorado)

Speakers

Heather Dame (Central Michigan University)
Derek Woller (Texas A&M University)
Lindsay Walker (University of Colorado Boulder)
Evan Anderson (University of Colorado Boulder)

Small Collections Workshop Symposium at SPNHC 2015: 5/21/2015 (Gainesville FL)

iDigBio and the Small Collections Network (SCNet) jointly sponsored a symposium. Talks fall into three tracks: Small collections - the key to educating future generations of scientists, Digitization practices and challenges in small collections and museums, and Reaching out to small collections.

Facilitators

Anna Monfils (Central Michigan University)

Gil Nelson (iDigBio/Florida State University)

Participants

Supported by iDigBio

Erica Krimmel (Chicago Academy of Sciences)
Emily Meineke (North Carolina State University)
Emily Smith (Randolph College)
Hilary Swain (Archbold Biological Station)
Lena Hernandez (Museum of Science and Industry)
Laura Vietti (University of Wyoming)

Laurie Hannah (Cheadle Center for Biodiversity and Ecological Restoration)
Pam Soltis (iDigBio/Florida Museum of Natural History)
François Michonneau (iDigBio/Florida Museum of Natural History)

Not supported by iDigBio

Janaki Krishna (Natural History Museum of Utah)
Andrea Weeks (George Mason University)
Mary Beth Prondzinski (Fairbanks Museum and Planetarium)
Laura Abraczinskas (Michigan State University Museum)
Melissa Islam (Denver Botanical Garden)
Zack Murrell (Appalachian State University)

Barbara Thiers (New York Botanical Garden)
Rob Gropp (American Institute of Biological Sciences)
Ed Gilbert (Arizona State University)
Roland Roberts (National Science Foundation)
Kurt Galbreath (Northern Michigan University)
Travis Marsico (Arkansas State University)

DemoCamp at SPNHC 2015: 5/21/2015 (Gainesville FL)

DemoCamp provided a venue for promotion of technological solutions to advance the field of museum curation and specimen digitization, with broad applications for biology, ecology, and biodiversity informatics. DemoCamp was sponsored again by iDigBio, the national coordinating center for NSF's Advancing Digitization of Biodiversity Collections (ADBC). Live demonstrations were welcomed in any technologies relevant to biologists, collections managers, or biodiversity information managers, as well as technologies that enable the broader use of data, or enable citizen scientist participation.

Facilitators

Rusty Russell (Smithsonian Institution)

Special Interest Group "TCN Coffee Klatch" at SPNHC 2015: 5/20/2015 (Gainesville FL)

iDigBio co-sponsored the Special Interest Group "TCN Coffee Klatch" at SPNHC 2015. Current TCN participants and a representative from NSF were available to answer questions about the ADBC program for non-TCN SPNHC participants. There was an informal mentoring/networking session for collections outside of the existing ADBC network. We gave everyone the opportunity to ask questions about the proposal process, and the experience of being a part of a TCN from someone who has had personal experience with the program.

Facilitators

Dena Smith (University of Colorado)
Chris Neefus (University of New Hampshire)
Barbara Thiers (New York Botanical Garden)
Zack Murrell (Appalachian State University)
Gil Nelson (iDigBio/Florida State University)

Roland Roberts (NSF) – not supported
Deborah Paul (iDigBio/Florida State University)
Claudia Segovia (La Universidad de las Fuerzas Armadas)
Molly Phillips (University of Florida)

Reproducible Research Workshop: 6/1/2015 to 6/2/2015 (Gainesville, FL)

Making science more reproducible has the potential to advance scientific research and make researchers' work more effective and productive. For computational and data-intensive research, which is increasingly pervasive across the sciences, this is particularly true, and yet is often seen as difficult to achieve. In this 2-day bootcamp-style hands-on workshop, iDigBio taught a number of tools, resources, and practices that can be employed today to make one's computational science more reproducible. The content of this course was the result of the [Reproducible Science Curriculum Hackathon](#) that was held December 8-11, 2014, at the National Evolutionary Synthesis Center (NESCent) in Durham. Instructors were from the Duke's Center for Genomic and Computational Biology (GCB), the University of California Davis and the University of Florida.

Instructors (supported)

Hilmar Lapp (Duke University)
Ciera Martinez (University of California Davis)

François Michonneau (iDigBio/Florida Museum of Natural History)

Facilitators (not supported)

Judit Ungvári-Martin (Florida Museum of Natural History)
Deb Paul (iDigBio/Florida State University)

Kevin Love (iDigBio/Florida Museum of Natural History)

Participants (not supported)

Charlotte Germain-Aubrey (iDigBio/Florida Museum of Natural History)
Gabriella Blohm (University of Florida)
Matt Gitzendanner (University of Florida)
Wenbin Mei (University of Florida)
Heather Kates (University of Florida)

Jessica Burnett (University of Florida)
Miao Sun (University of Florida)
Nadia Zahra (University of Florida)
Sarah Carey (University of Florida)
Leslie Kollar (University of Florida)
Natya Hans (University of Florida)

Cody Howard (University of Florida)
 Claudia Ganser (University of Florida)
 Daniel Barrera (University of Florida)
 Jianan Wang (University of Florida)
 Jennie DeMarco (University of Florida)

Natasha Vitek (University of Florida)
 Kin Han (University of Florida)
 Sean Thackurdeen (New York Botanical Garden) - remote
 Gunes Yucel (Duke University) - remote

iDigBio's API Hackathon: 6/3/2015 – 6/5/2015 (Gainesville FL)

iDigBio hosted a 3-day hackathon to engage the community in developing applications that can facilitate biodiversity scientific workflows and information that use data, ingestion, and search APIs. iDigBio has ingested more than 25 million specimens and 4 million media objects from biodiversity collections with world-wide range. This great resource of biodiversity information has been made accessible not only through the iDigBio portal, but also through Application Programming Interfaces (APIs) that applications written in any programming language can consume to (a) access specimens, media, media metadata, datasets and publishers information, (b) perform searches, and (c) ingest media and its metadata. The goals of this hackathon were to: lower the entrance barrier to potential direct uses of the API by disseminating more broadly its capabilities and generating a body of use-case examples that can be reused by others, identify new opportunities for integration with other cyberinfrastructures, and develop collaborative pilot experiments that build on existing interoperability of other cyberinfrastructures.

Facilitators

Andrea Matsunaga (University of Florida, iDigBio)
 Jose Fortes (University of Florida, iDigBio)

Renato Figueiredo (University of Florida, iDigBio)
 Alex Thompson (University of Florida, iDigBio)

Participants

Brian Franzone (Harvard University)
 Chris Neefus (University of New Hampshire)
 Caitlin Chapman (Northern Arizona University)
 Edward Gilbert (Arizona State University)
 Nelson Rios (Tulane University)
 Joel Ramirez (New York Botanical Garden)
 Dmitry Mozzherin (Marine Biological Laboratory)
 Richard Pyle (Bishop Museum)
 Jonathan Lauters (Contract Developer)
 Benjamin Brandt (Arizona State University)
 Mike Trizna (Smithsonian)
 Tianhong Song (University of California Davis)
 Aimee Stewart (University of Kansas)
 Beh Anhalt (University of Kansas)

Francois Michonneau (iDigBio/Florida Museum of Natural History)
 Charlotte Germain-Aubrey (iDigBio/Florida Museum of Natural History)
 Ronny Leder (iDigBio/Florida Museum of Natural History)
 Kenneth Polzin (unaffiliated)
 Scott Chamberlain (University of California Berkeley)
 Shaun Mahmood (American Museum of Natural History)
 Scott Bates (University of Minnesota)
 Robert Bruhn (Florida State University)
 Derek Masaki (US Geological Survey)
 Matthew Clapham (University of California Santa Cruz) – remote
 Jordan Biserkov (unaffiliated) – remote

iDigBio/American Society of Mammalogists Collections Digitization and Imaging Workshop: 6/12/2015 (Jacksonville FL)

iDigBio's sponsorship of the 2015 Meeting of the American Society of Mammalogist Meeting consisted of two symposia, two plenary sessions, and three workshops. The symposia covered topics of Collections-Based Mammalogy and Caribbean Mammals. The two plenary sessions featured student Honoraria and Fellowship recipients and the 2014 recipients of the ASM Grinnell, Merriam, and Leopold Awards—Dr. Troy Best, Dr. Denise Dearing, and Dr. Lawrence Heaney. In addition, 2013 Grinnell Award winner, Dr. Ricardo Ojeda, presented.

Facilitators

Sean Moran (Florida Museum of Natural History)
 Arianna Harrington (Florida Museum of Natural History)

Molly Phillips (iDigBio/Florida Museum of Natural History)
 Kevin Love (iDigBio/Florida Museum of Natural History)

Gil Nelson (iDigBio/Florida State University)
Deb Paul (iDigBio/Florida State University)
Nelson Rios (Tulane University)

Cathy Bester (iDigBio/Florida Museum of Natural History)
Larry Page (iDigBio/Florida Museum of Natural History)

Digitization Technology for Educators and Citizen Scientists Workshop: 6/15/2015 **(Gainesville, FL)**

The 3D Digitization of Fossils for Educators & Citizen Scientists Workshop brought together scientists, collection professionals, and K-12 educators to discuss using 3D imaging and citizen science in the classroom. The workshop consisted of presentations, breakout discussion sessions, collection tours, and a field trip to Thomas Farm.

Participants

Adam Wade (Santa Cruz Office of Education, CA)
Utahna Denetclaw (University of New Mexico)
Chris Carlson (Harbor High School, CA)
Liza Manley (Pajaro Valley Unified School District, CA)
Jessica Bender (Rolling Hills Middle School, CA)
Karen Schmidt (Rolling Hills Middle School, CA)
Laura Beach (Soquel High School, CA)
Gail Alaimo (Soquel High School, CA)
Jason Tovani (Delta High School, CA)
Rob Hoffman (Pajaro Unified School District, CA)
Todd Kramer (Santa Cruz City Schools IT Dept, CA)
Laura Taylor (Soquel High School, CA)
Gretchen Miller (Aptos High School, CA)
Craig Miller (Aptos High School, CA)
Gary Bloom (Santa Cruz City Schools, CA)
Doug Boyer (Duke University)
Holly Little (Smithsonian Institute)
Shauna Fultz Smith (Texas State University)
Carlos Paez-Paez (Navajo Technical University)

Jessie Maisano (University of Texas Austin)
Dena Smith (University of Colorado Boulder)
Christina Byrd (Virginia Museum of Natural History)
Amy Bolton (unaffiliated)
Matt Tucker (Academy of the Holy Names, FL)
Andrew Farke (Raymond M. Alf Museum of Paleontology)
Megan Higbee Hendrickson (unaffiliated)
Aaron Currier (North America Research Group, Paleo)
Suzanne Galligher (Paleontological Society of Austin)
Lee Cone (Special Friends of the Aurora Fossil Museum, NC)
David Deyo (Fossil Club of Lee County, FL)
Zachary Henry Deyo (Fossil Club of Lee County, FL)
Dava Butler (Waco Mammoth Site, TX)
Tynessa Morgan-Craft (Dallas Paleontology Society)
Gil Nelson (iDigBio/Florida State University)
Alex Hastings (Virginia Museum of Natural History)

Local Participants

Lewis Webber (Kanapaha Middle School)
Adam Fournier (Kanapaha Middle School)
Tracey Hickox (PK Yonge Developmental Research School)
Logan Hickox (PK Yonge Developmental Research School)
Natasha Vitek (Florida Museum of Natural History)
Julie Henderson (PK Yonge Developmental Research School)
Myra Cordero (PK Yonge Developmental Research School)
Eleanor Gardner (Florida Museum of Natural History)
Justy Alicea (Florida Museum of Natural History)
Andrea De Renzis (Florida Museum of Natural History)

Sean Moran (Florida Museum of Natural History)
Catalina Pimiento (Florida Museum of Natural History)
Lisa Lundgren (Florida Museum of Natural History)
Victor Perez (Florida Museum of Natural History)
Claudia Grant (Florida Museum of Natural History)
Bruce MacFadden (iDigBio/Florida Museum of Natural History)
Denise Beaubien (University of Florida Science Library)
Sara Gonzalez (University of Florida Science Library)
Chris Baker (Majorie Kinnan Rawlings Elementary School, Gainesville FL)
Jeff Gage (Florida Museum of Natural History)

iDIGBIO WEBINARS (7/1/2014 THRU 6/30/2015)

Georeferencing Herbarium Specimens Using Geolocate: 7/7/2014 & 7/21/2014

Two-part webinar series hosted by Nelson Rios on the topic of Georeferencing Herbarium Specimens Using Geolocate.

Strategies for an OCR directed workflow: 8/25/2014

Through a presentation by Stephen Gottschalk, member of iDigBio's Augmenting OCR Working Group (aOCR), participants discovered new ways to use OCR output to speed up digitization. The webinar included a live demo and discussion of methods and other potential ways to use OCR output to improve the data transcription/validation/discovery process.

Lichens, Bryophytes and Climate Change (LBCC) Online Training: 8/26/2014

This webinar offered online training to members of the LBCC TCN. The general introduction and data entry topics included: permission management, field review, making use of label images, duplicate harvesting, exsiccati linking, determination history, images, common mishaps, and LBCC/Symbiota help pages.

Symbiota Training - Introduction to Specimen Management: 8/27/2014

Participants learned more about the option of managing specimen data within a Symbiota portal. This online training session provided an introduction to specimen management within a Symbiota portal, including: Collection Control Panel, quick overview of features in the menu, managing permissions, download backup, access to data entry and specimen editor, tracking specimen edits, processing toolbox, etc.

Symbiota Training - Checklist and Voucher Management: 9/3/2014

Participants learned how to create and manage species checklists within a Symbiota portal. This online training session covered step-by-step instructions on how to create new species lists for any given area, linking specimen vouchers as proof of occurrence, and how to make use of the voucher management toolbox to manage the list over time.

GigaMacro - High Quality Imaging of Biological Specimens: 9/16/2014

iDigBio's Fluid-preserved Arthropod and Microscopic Slide Imaging Interest Group highlighted imaging possibilities from GigaMacro, currently in use at the Frost Insect Museum at Pennsylvania State University.

High resolution scanning of insects on microscope slides: 10/15/2014

Follow up to a previous session featuring the Nanozoomer scanner by Hamamatsu. New developments in high resolution, rapid throughout microscopic slide imaging and helpful tweaks made to Nanozoomer scanner were discussed.

Small Entomology Collections - How to Manage: 10/16/2014

Christy Bills discussed obstacles small entomology collections face, how being small can be an asset, resources for digitization questions, funding resources, the importance and how-to of advocacy, partnerships, and collaboration.

Data Management - Partnering with libraries for data management: 10/20/2014

Brian Westra discussed the questions and challenges he encounters as a data services librarian supporting researcher's biodiversity and ecological datasets, which include: supporting small collections, migrating data into more supportive systems, and facilitating management and preservation of image data.

Small Fish in a Big Pond - Lessons Learned in Digitizing a Small Paleontology Collection: 11/13/2014

Julie Rousseau discussed challenges specific to the digitization of small paleontology collections and presented data mobilization and self-promotion strategies to increase your collection's visibility and use.

The Value of the Symbiota Portal and Database for Small Collections: 12/15/2014

Ed Gilbert, developer of Symbiota, presented an introduction to Symbiota, including how curators and collections managers can take advantage of existing Symbiota networks.

Data quality, usage, and issue tracking using GitHub: 4/23/2015

The iDigBio data Management Interest and Cyberstructure Working Groups in collaboration with VertNet hosted a webinar entitled "Data quality, usage, and issue tracking using GitHub" Part of VertNet's mission is to help data publishers in every way they can. One way to help is to set up, demonstrate, and use a common centralized reporting mechanism that makes it easy for data publishers to receive and manage feedback about their published data. GitHub provides all of the necessary infrastructure to do this for free, including version control for files, issue tracking, email integration, and an Application Programming Interface (API). This webinar discussed and demonstrated how VertNet uses each of these aspects of GitHub to capture and manage user feedback, usage statistics, and bulk data quality reports.

Bugs in my Checklist: 4/23/2015

iDigBio hosted a webinar entitled "Bugs in my Checklist". The webinar began with an initial run-through and explanation of the features available in the SCAN checklists. Next, there was a demonstration of how to create a checklist from scratch, in order to illustrate how the process works. Then, using an already established checklist, David reviewed the tools used to curate a checklist.

Bugs in my Taxonomic Trees: 4/23/2015

Ed Gilbert hosted a webinar entitled "Bugs in my Taxonomic Trees," introducing taxonomic tree functions using Symbiota in the SCAN portal.

Issues in Re-integrating Georeferenced Data, the FishNet2 Experience: 3/30/2015

The iDigBio Data Management Interest Group hosted a webinar entitled "Issues in Re-integrating Georeferenced Data, the FishNet2 Experience". The webinar focused on how to get improved data back into local collection databases after it has been enhanced outside the collection. FishNet2 used a collaborative georeferencing model and software to georeference over 282,199 distinct localities in 1.5 years. They addressed the following questions via a presentation and discussion:

- What are / were the challenges? What was simple?
- For those planning such projects, what does FishNet2 recommend, from the beginning of such a project, to make this re-integration step as seamless as possible.
- Are there specific tools / software that need better integration to make this type of workflow easier in the future?

Towards user-definable, semi-automated workflows for curating biodiversity data: 5/28/2015

The iDigBio Data Management Interest Group and the iDigBio Cyberinfrastructure Working Group hosted a webinar entitled "Towards user-definable, semi-automated workflows for curating biodiversity data". The webinar demonstrated the

existing set of Kurator tools for quality control of biodiversity data, assisted participants in setting up the software to run on their own data sets, examined the data quality reports that the tools produced, and discussed the next steps in the Kurator project.

Designing Interdisciplinary Collections Internships for College Students: 3/19/2015

iDigBio hosted a webinar entitled ‘Designing Interdisciplinary Collections Internships for College Students’, presented by Emily Patton Smith, Collections Manager, Randolph College Natural History Collections Project. This webinar examined ways to design internships that attract students in a multitude of major fields, such as history, studio art, business / marketing / economics, sociology, creative writing, journalism, forensics, photojournalism / filmmaking, web design, and much more. Using the example of the Natural History Collections Project (NHCP) at Randolph College, we looked at ways to better utilize the full potential of small collections as resources for hands-on experience and creative inspiration at the undergraduate level.

Citizen Science course WEBINAR SERIES: 3/8/2015 - 4/8/2015

iDigBio hosted several webinar series entitled “Zooniverse 2.0, What the Future Holds for Large-Scale Online Citizen”, “Practitioner tools and resources for evaluating learning outcome in citizen science”, “Filtering out the noise: Data validation challenges and strategies in citizen science”, “Supporting field-based citizen science: The CitSci.org cyberinfrastructure” for the joint FSU/UF Citizen Science course. Experts in the field presented on the topics of cyberinfrastructure for field-based citizen science, data validation, the popular Zooniverse citizen science platform, and evaluation of learning outcomes.

Interactive Handwritten Text Recognition and Indexing of Historical Documents: tranScriptorium and the Transkribus Platform: 5/26/2015

This iDigBio hosted a webinar entitled “Interactive Handwritten Text Recognition and Indexing of Historical Documents: tranScriptorium and the Transkribus Platform” which introduced automatic and computer-assisted solutions for the indexing, search and full transcription of handwritten document images, developed in the tranScriptorium project. The webinar also introduced the Transkribus platform, which integrates some of these solutions and provides flexible support for common image processing tasks entailed by both individual and collaborative management of handwritten image collections.

SCNET WEBINARS (2014-2015)

SCNet (<http://scnet.acis.ufl.edu/>) and iDigBio held a series of webinars centered on supporting small collections and establishing SCNet as a collaborative resource for small collections and the professionals who manage them. Meetings were virtual and accessible online at <https://idigbio.adobeconnect.com/scnet>. Each seminar is structured to allow a 20-30-minute introduction followed by participant questions and discussion.

The Role of SPNHC in Supporting the Sustainability of Small Collections: 4/14/2014

The Society for the Preservation of Natural History Collections (SPNHC) is the premier organization supporting natural history collections of all types. SPNHC has expressed interest in supporting small collections and has welcomed a collaboration with SCNet, to include hosting a symposium at SPNHC 2014 (22-27 June in Cardiff, Wales, UK). Andy Bentley, President-elect of SPNHC and Biodiversity Informatics Manager, University of Kansas Biodiversity Institute, focused on ways in which SPNHC can and does provide support to small natural history collections in museums and academic institutions.

Building the Small Collections Network: A Model from ECN: 4/21/2014

The Entomology Collections Network (ECN) is an excellent example of combining community interest, need, and collaboration to create an important resource for collections professionals. Founded to support the mutual needs of those who manage and digitize entomology collections, its history and success provide an excellent model for connecting small collections of all types and for growing SCNet into a communitywide resource. Katja Seltmann, American Museum of Natural History, Immediate Past President of Entomology Collections Network and Pam Horsley, American Museum of Natural History and lead organizer of the annual Entomological Collections Network meeting, outlined the development and organization of ECN, followed by discussion on how SCNet might benefit from the ECN model.

Documenting the Importance of Small Collections: 5/12/2014

Anna Monfils, Associate Professor and Director of the CMC Herbarium, Central Michigan University, is leading a team from the North American Network of Small Herbaria (NANSH) Working Group in a research project to provide empirical, quantifiable evidence for the value and importance of small herbaria. Anecdotal and some published evidence suggest that specimen data from small collections can significantly augment existing datasets from larger collections. Anna outlined the current research focused on small herbaria and discuss how the research might be expanded to other disciplines.

The Future of Funding for Small Collections: 5/19/2014

Financial support can be a major obstacle in the digitization and management of small natural history collections. As NSF's program director for Collections in Support of Biological Research (CSBR), Roland Roberts has a unique perspective on the need for documenting impacts of small collections and how this documentation might be used to secure greater funding opportunities. Roland discussed NSF's CSBR, ADBC, and other grant programs.

Large Collections Supporting Small Collections: 6/2/2014

Through leadership in several NSF-funded Thematic Collections Networks, NYBG has incorporated and coordinated numerous small collections in the digitization of vascular plants, bryophytes, fungi, and algae, all under the guidance of Barbara Thiers, Director William and Lynda Steer Herbarium and Vice President for Scientific Research, New York Botanical Garden. Barbara discussed the important role that larger institutions can play in ensuring the success and sustainability of smaller collections, especially in the dual roles of collections digitization and biodiversity data distribution. Barbara also highlighted potential involvement of small collections within the National Science Foundation's Advancing Digitization of Biodiversity Collections (ADBC) program.

AIM-UP!: Advancing Integration of Museums into Undergraduate Programs: 6/9/2014

AIM-UP! is an NSF-funded Research Coordination Network exploring the use of natural history collections in undergraduate education. Josh Whorley, Biology Faculty, Seattle Central Community College, and a participating member in AIM-UP!, discussed how natural history collections form a crucial physical basis for understanding the diversity and history of life. He introduced some educational modules in development and discussed ongoing educational initiatives. Josh also talked about opportunities for professionals who would like to participate in this integrated network of educators working on specimen-based questions.

Small Entomology Collections: How to Manage: 10/16/2014

Small insect collections have unique challenges and strategic advantages. In this webinar, Christy Bills, Invertebrates Collection Manager, Natural History Museum of Utah, discussed obstacles small entomology collections face, how being small can be an asset, resources for digitization questions, funding resources, the importance and how-to of advocacy, partnerships, and collaboration.

Small Fish in a Big Pond: Lessons Learned in Digitizing a Small Paleontology Collection: 11/13/2014

Julie Rousseau, Collection Manager, University of Alaska Museum, discussed challenges specific to the digitization of small paleontology collection, and presented data mobilization and self-promotion strategies to increase your collection's visibility and use.

The Value of the Symbiota Portal and Database for Small Collections: 12/15/2014

Managing and maintaining collections databases in the face of little IT support or cyber infrastructure is a significant challenge for small collections. Symbiota portal software and its underlying database has proven a useful tool for surmounting these hurdles, especially for herbaria and entomological collections. Wholly online, with no local software to install, Symbiota supports online entry or batch uploads of data, image storage and display, and tools that allow collections managers to control access by data technicians. This webinar presented an introduction to Symbiota, including how curators and collections managers can take advantage of existing Symbiota networks.

Increasing Capacity for Small Natural History Collections: Developing Protocol for Volunteer-Based Inventorying Programs: 1/15/2015

EcoTarium staff, Shana Hawrylchak, Manager of Exhibits and Collections, Kaleigh Pare, Collections Specialist, and Emma Westling, Collections Consultant, discussed their work preparing for the submission of a two-part IMLS grant to (a) conduct a collections survey of small natural history collections in New England, and (b) develop protocol for a volunteer-based inventorying system for small collections. They discussed successes and lessons learned as they developed materials for this submission.

Saving Orphaned Collections: 2/19/2015

Small collection managers are frequently asked to rescue "orphan collections" that will be discarded without their intervention. Each orphan collection has unique characteristics and must be assessed to determine if it fits into the institutional mission and will accentuate departmental strengths. Orphan collections seldom come with funding and can heavily impact limited small collection resources. This webinar used actual examples of orphan collection assimilation and rejection in the small collection environment. It provided methods to effectively determine the most important criteria for deciding to accept or reject an orphan collection.

Designing Interdisciplinary Collections Internships for College Students: 3/19/2015

Internships in managing natural history collections offer students the opportunity to expand on classroom learning and develop marketable skills in nearly every academic discipline. Extending the range of internship focus beyond "museum studies" or "biology" not only shapes new advocates for natural history collections among young professionals in many career fields, but also results in an innovative and dynamic team of interns. Collaborations with other academic disciplines can also expand possibilities for collections management funding. This webinar examined ways to design internships that attract students in a multitude of major fields, such as history, studio art, business / marketing / economics, sociology, creative writing, journalism, forensics, photojournalism / filmmaking, web design, and much more. Using the example of the Natural History Collections Project (NHCP) at Randolph College, this webinar looked at ways to better utilize the full potential of small collections as resources for hands-on experience and creative inspiration at the undergraduate level.

Biological Field Stations as Repositories of Biodiversity Data: 4/30/2015

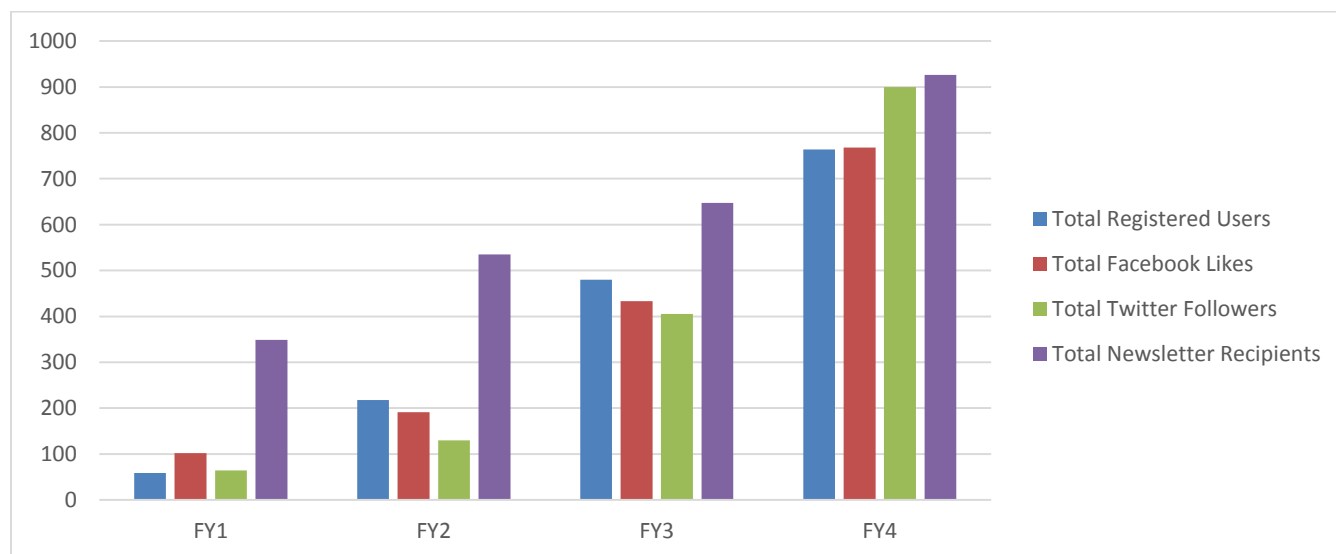
Field stations throughout North America, linked by the Organization of Biological Field Stations (OBFS), provide a network of people, natural observatories, and collection data. In a recent survey, 86% of 48 respondents supported on-site collections. This webinar presented a case study of one of the largest such collections, at Archbold Biological Station (ABS), a renowned not-for-profit in Florida. ABS has a broad scientific research, education and conservation mission but is not formally affiliated with any university or museum. As a component of its long-term research, ABS curates a diverse, multi-taxon, specimen-based, research Collection used by staff scientists and other investigators. The Collection is a unique, irreplaceable record of regional biodiversity, with an emphasis on the Florida scrub habitat including threatened and endangered species, and non-natives. After 75 years of growth, the Collection includes ~270,000 specimens identified to species including arthropods (95%) plants, bryophytes, mammals, birds, fish, and herptiles, representing ~10,392 species. In the last five years, the Collection has contributed to numerous research projects, descriptions of 12 new species, made hundreds of loans, been accessed on-site by 110 investigators, and resulted in 58 publications. ABS has made available on-line ~10,000 specimens of plants and arthropods, and has databased the vertebrates, plants, and bryophytes. Remaining specimen data are not yet accessible online via www-based portals. Archbold is partnering with iDigBio, seeking support to database, image and migrate specimen data to the internet. This webinar described how such projects at field stations could advance biological research, promote benefits to conservation, and increase educational outreach.

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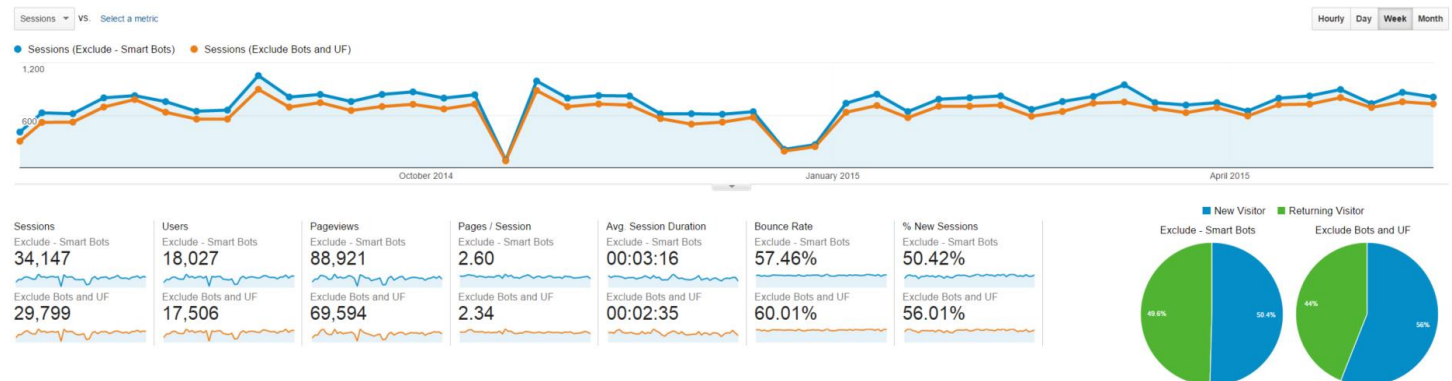
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IDIGBIO WEB PRESENCE (7/1/2011 THRU 5/22/2015)

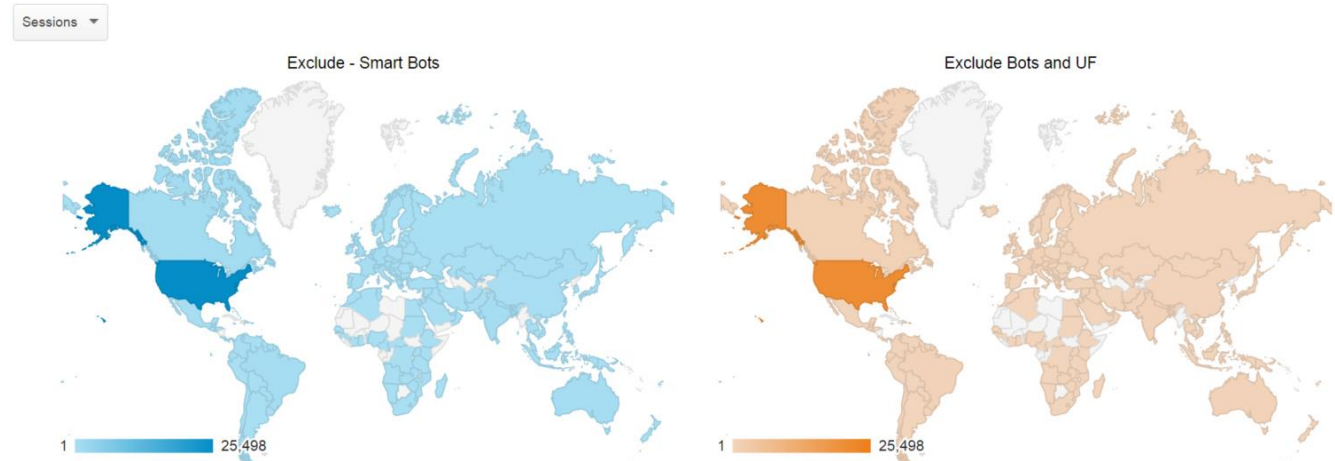
Timeframe	Total Registered Users	Total Facebook Likes	Total Twitter Followers	Total Newsletter Recipients
Fiscal Year 1 (7/1/2011 – 6/30/2012)	59	102	64	349
Fiscal Year 2 (7/1/2012 – 6/30/2013)	218	191	130	535
Fiscal Year 3 (7/1/2013 – 6/30/2014)	480	433	405	647
Fiscal Year 4 (7/1/2014 – 5/22/2015)	764	768	900	926



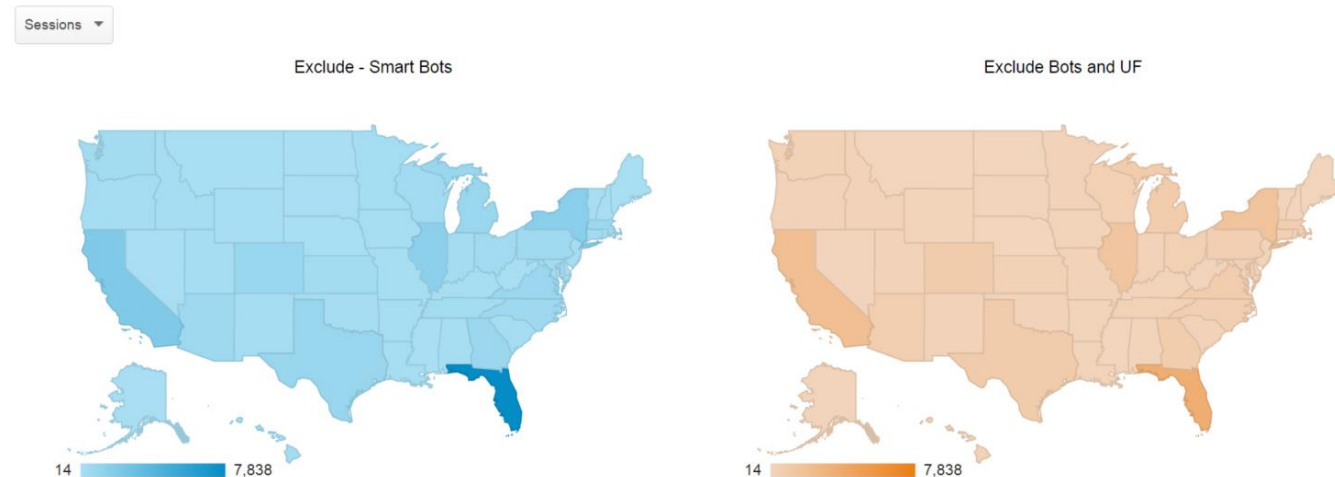
WEBSITE USAGE STATISTICS (7/1/2014 THRU 5/22/2015)



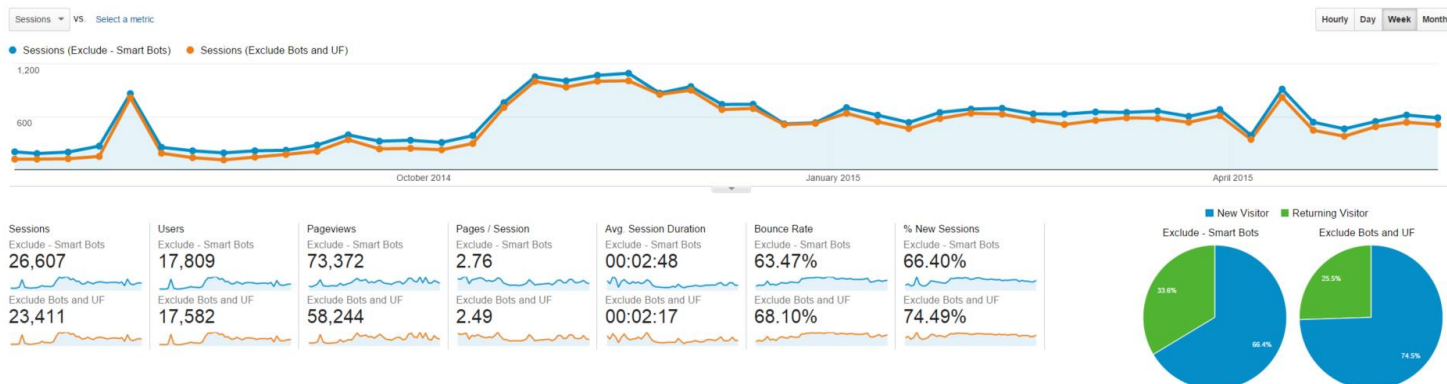
Total Website Visits by Country



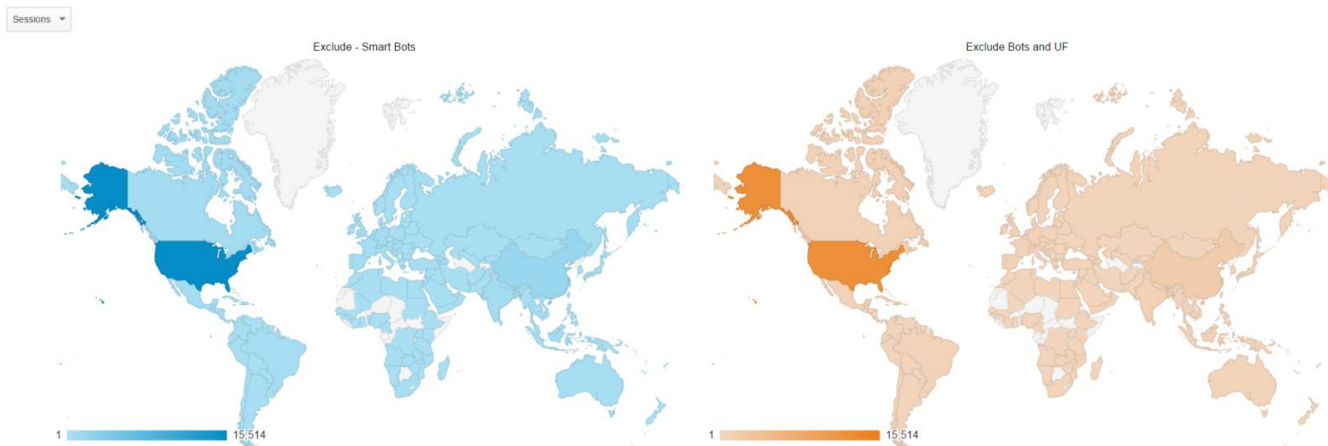
Total Website Visits by State



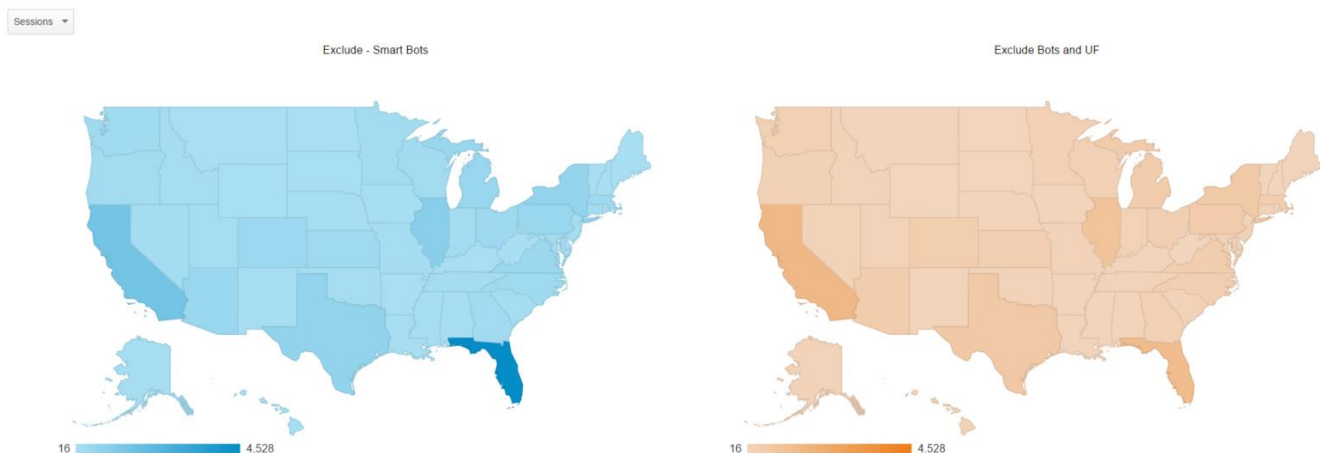
PORTAL USAGE STATISTICS (7/1/2014 THRU 5/22/2015)



Total Portal Visits by Country



Total Portal Visits by State

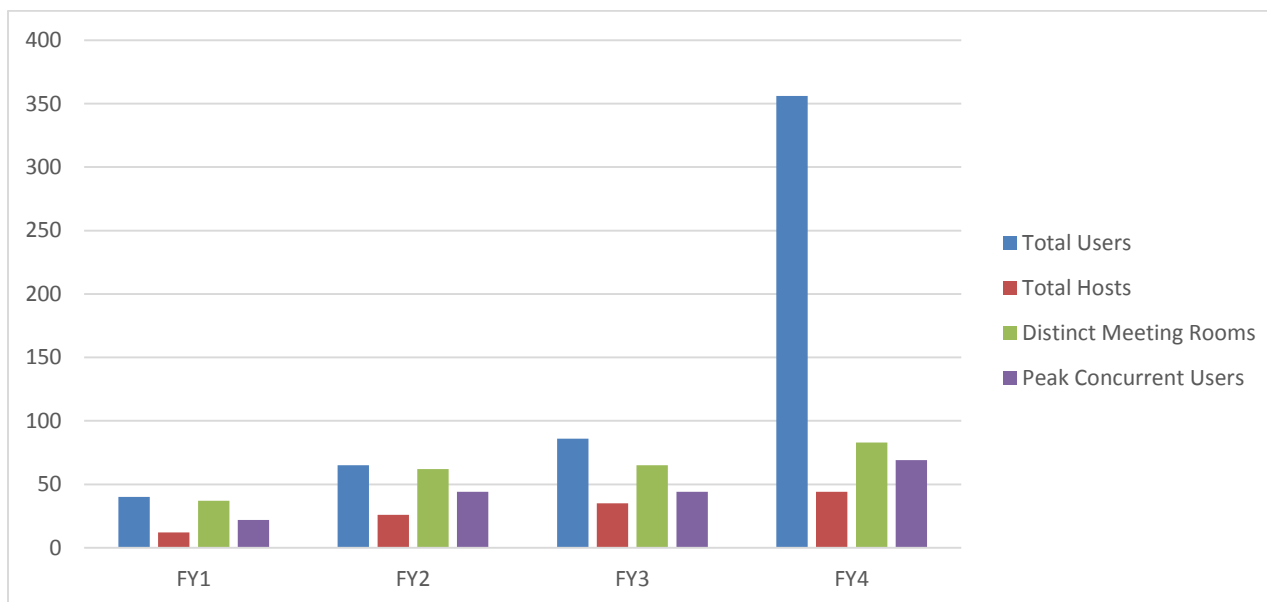


NEWSLETTER STATISTICS (7/1/2014 THRU 5/22/2015)

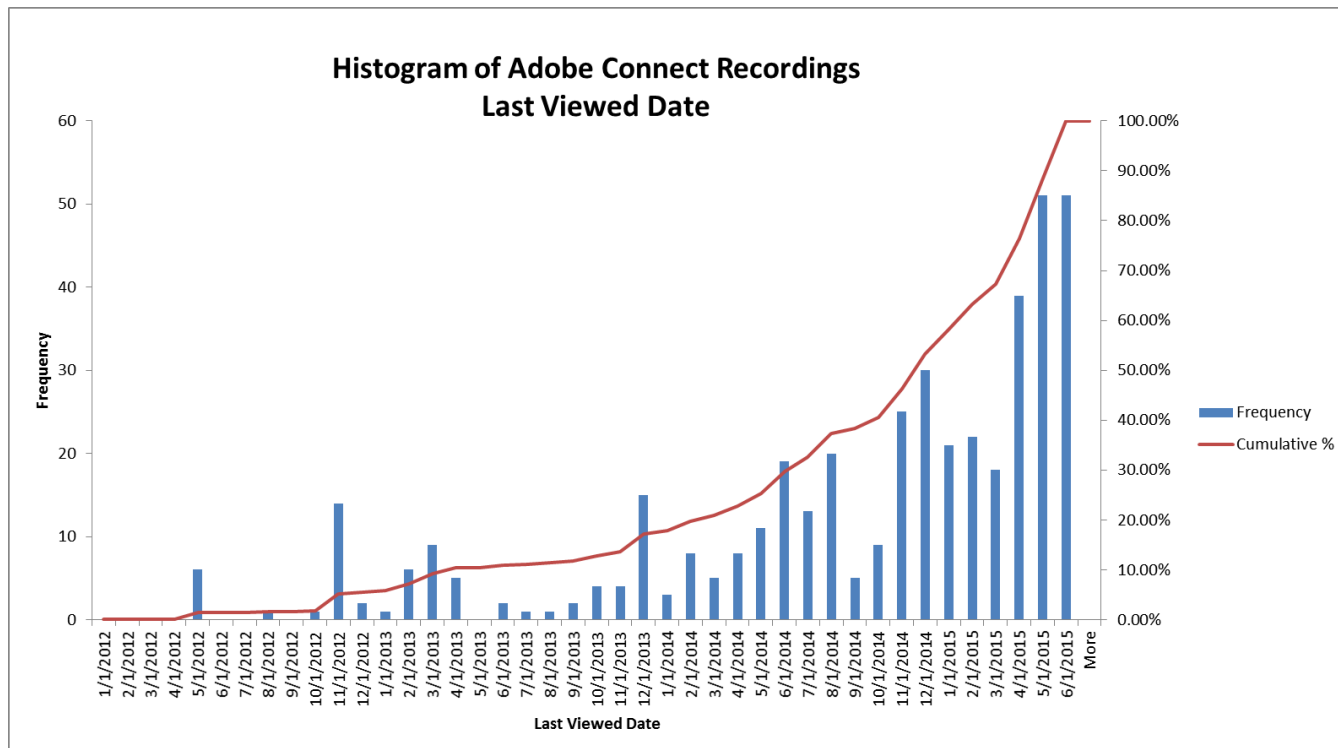
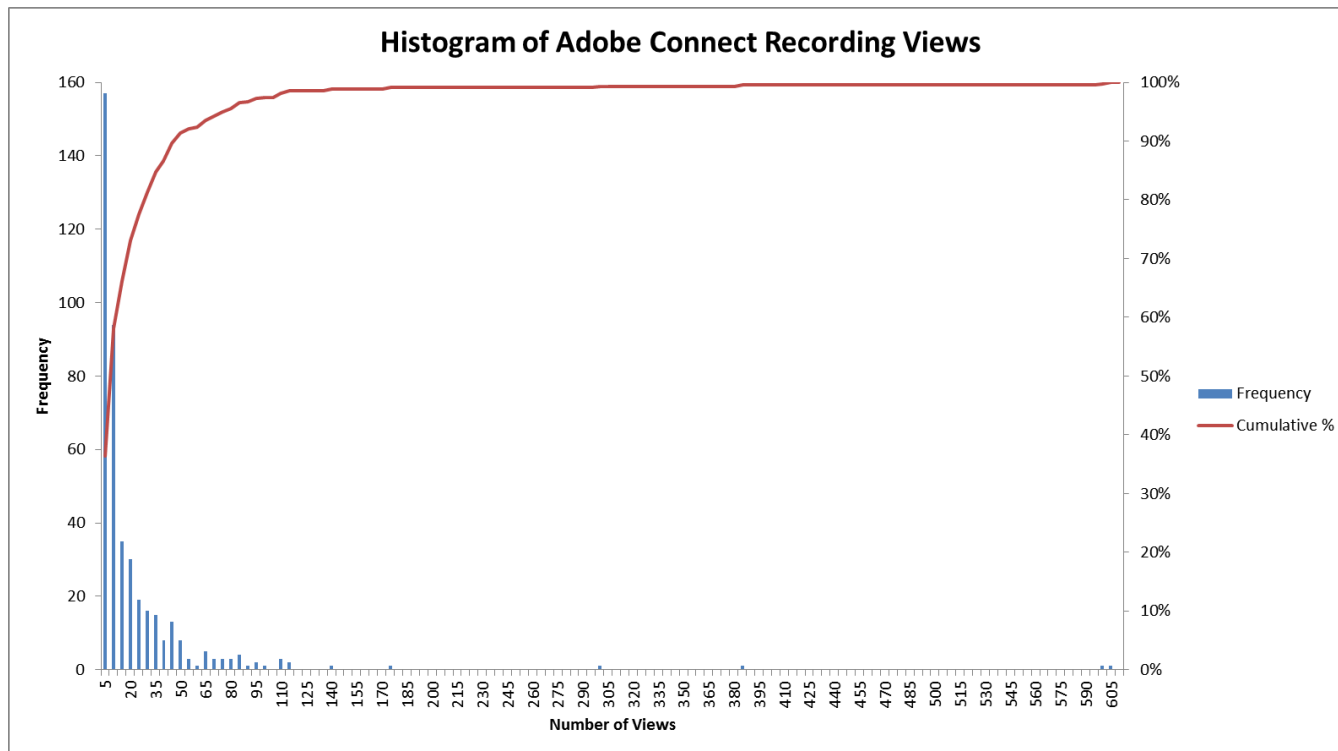
Title	Send Date	Total Recipients	Successful Deliveries	Total Bounces	Times Forwarded	Unique Opens	Open Rate (%)	Total Opens	Unique Clicks	Click Rate (%)	Total Clicks	Unsubscribes
iDigBio e-newsletter July 2014	7/1/2014	711	700	11	0	202	28.9	626	70	10.0	208	1
iDigBio e-newsletter September 2014	9/1/2014	943	926	17	0	373	40.3	1,240	124	13.4	288	0
iDigBio e-newsletter October 2014	10/15/2014	934	924	10	0	286	31.0	1,118	104	11.3	233	1
iDigBio e-newsletter November 2014	11/19/2014	937	926	11	1	286	30.9	615	91	9.8	157	2
iDigBio e-newsletter December 2014	12/15/2014	932	924	8	0	259	35.1	596	91	9.8	151	1
iDigBio e-newsletter January 2015	1/16/2015	931	922	9	2	279	30.3	774	90	9.8	137	0
iDigBio e-newsletter February 2015	2/12/2015	931	922	9	0	262	28.4	623	96	10.4	150	2
iDigBio e-newsletter March 2015	3/13/2015	926	922	4	0	248	26.9	496	93	10.1	188	1
iDigBio e-newsletter April 2015	4/20/2015	926	922	4	0	256	27.8	683	91	9.9	179	0
iDigBio e-newsletter May 2015	5/15/2015	923	921	2	0	221	24.0	485	61	6.6	95	1

ADOBE CONNECT USAGE STATISTICS (7/1/2011 THRU 5/22/2015)

Metric	FY1	FY2	FY3	FY4
Total Users	40	65	86	356
Total Hosts	12	26	35	44
Distinct Meeting Rooms	37	62	65	83
Total Meeting Hours	768	4429	5932	8273
Total Host Hours	304	2182	2268	2711
Peak Concurrent Users	22	44	44	69
System Storage Consumption (GB)	0.8	2.6	5.2	52.6
Meeting Storage Consumption (GB)	6.8	8.1	484.3	27.8



ADOBE CONNECT RECORDING STATISTICS (1/1/2012 THRU 5/22/2015)



SOCIAL MEDIA STATISTICS (7/1/2014 THRU 5/22/2015)

Facebook

Total Page Likes as of Today: 777



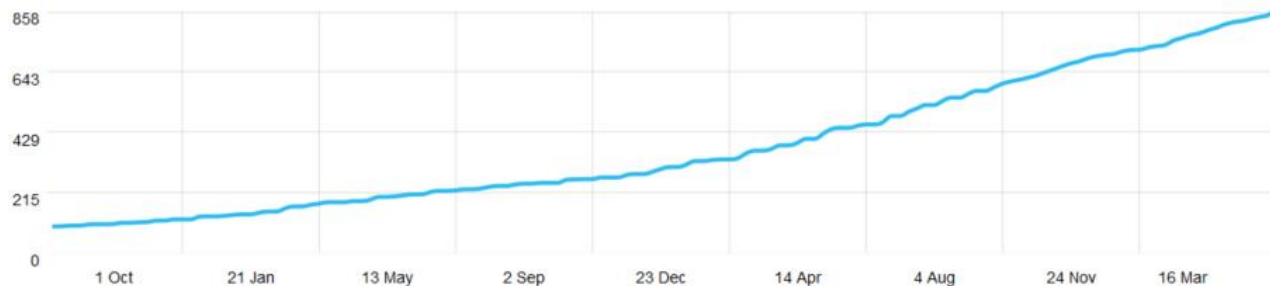
Post Reach

The number of people your post was served to.



Twitter

854 followers as of 5/11/2015 (days shown in Pacific time)



Interests

Most unique interests ?

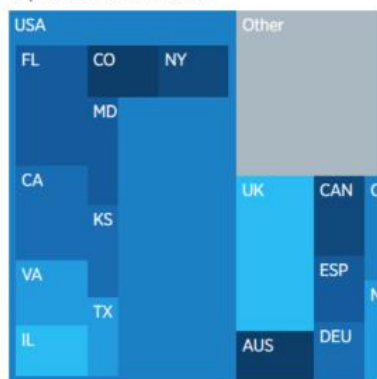
- 82% Biology
- 33% Biotech and biomedical
- 30% Geology
- 25% Geography
- 12% Birdwatching

Top interests ?

- 88% Science news
- 82% Biology
- 49% Tech news
- 43% Physics
- 38% Books news and general info
- 33% Politics and current events
- 33% Biotech and biomedical
- 32% Space and astronomy
- 31% Business and news
- 30% Geology

Location

Top countries and states



Top cities

- 7% Washington, D.C., US
- 5% Gainesville, US
- 4% San Francisco, US
- 3% New York City, US
- 3% Denver, US

Gender



Your followers also follow

- 46%  smithsonian - [Profile](#)
- 41%  NHM_London - [Profile](#)
- 38%  NMNH - [Profile](#)
- 37%  AMNH - [Profile](#)
- 33%  GBIF - [Profile](#)
- 32%  BioDivLibrary - [Profile](#)
- 23%  rdmpage - [Profile](#)
- 23%  opentreeoflife - [Profile](#)
- 22%  inaturalist - [Profile](#)

Vimeo

This year at a glance

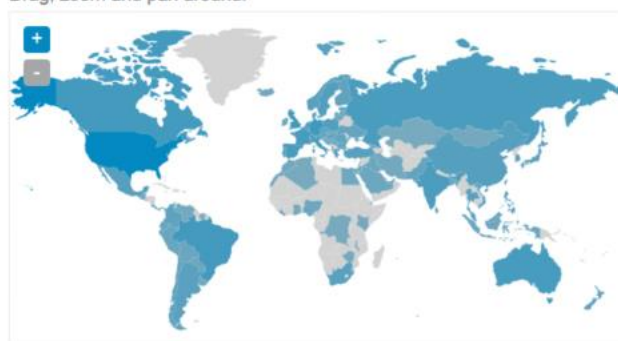


Yearly Overview

Date	Plays	Loads	Likes	Comments
May 2015	203	1,849	1	0
Apr 2015	241	2,591	0	0
Mar 2015	261	2,074	0	0
Feb 2015	255	1,578	0	0
Jan 2015	234	1,958	0	0
Dec 2014	184	1,523	0	0
Nov 2014	246	1,854	1	0
Oct 2014	233	1,438	0	0
Sep 2014	419	2,416	0	0
Aug 2014	164	694	0	0
Jul 2014	196	730	0	0
Jun 2014	192	660	0	0
May 2014	29	86	0	0
Totals	2,857	19.5K	2	0

Geographical Locations

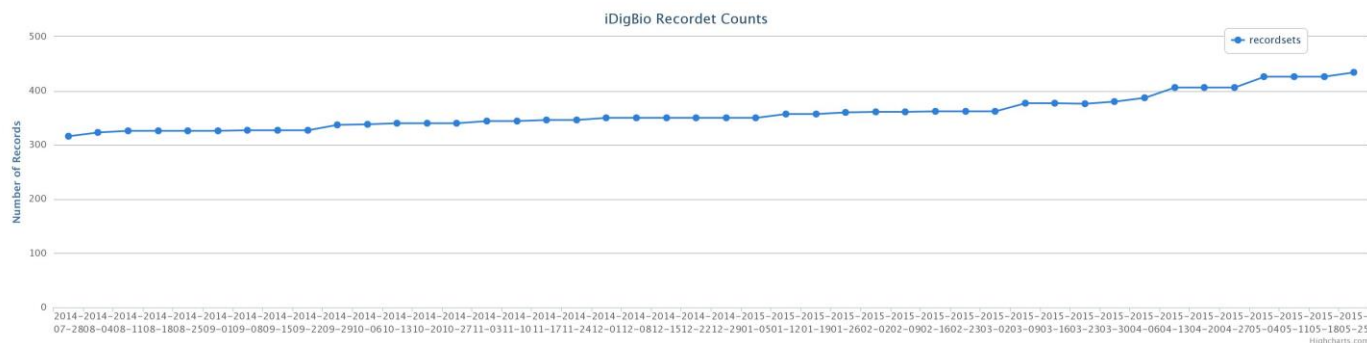
Drag, zoom and pan around.



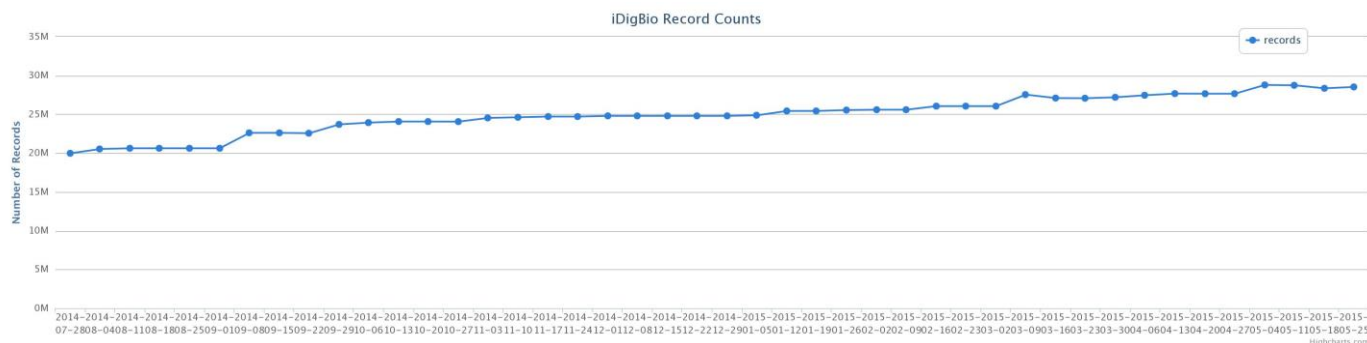
+ View your full geo stats

DATA INGESTION STATISTICS (7/1/2014 THRU 5/25/2015)

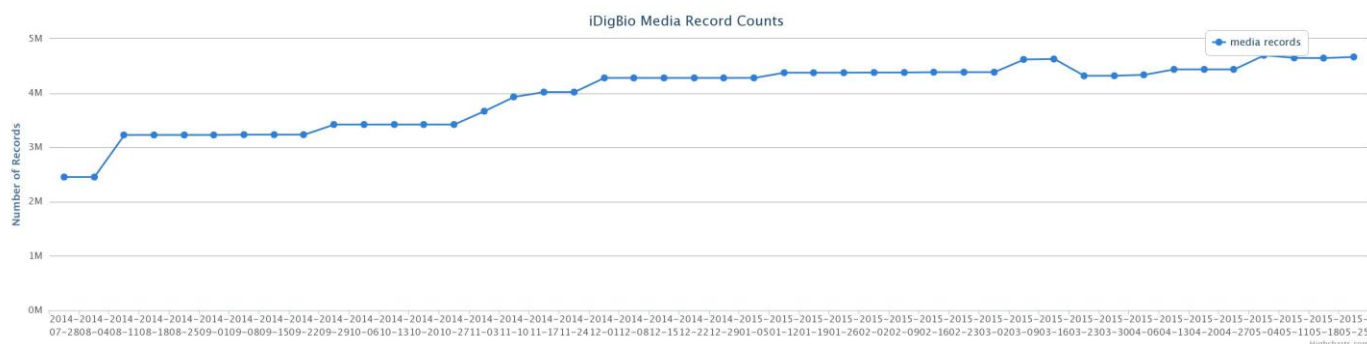
434 Recordsets



28,525,695 Specimen Records



4,663,453 Media Records



2015 iDigBio Annual Evaluation: Year 4 Impact Evaluation

iDigBio is funded by a grant from the National Science Foundation's Advancing Digitization of Biodiversity Collections Program (Cooperative Agreement EF-1115210). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.



2015 iDigBio Annual Evaluation Year 4 Impact Evaluation

Summary

The Year 4 evaluation focused on the impacts of the two areas of greatest activity during the first years of the project—digitization and workforce training and cyberinfrastructure. While adequate progress has also been made in the areas of education and outreach and research uses of data, these areas depend on a robust specimen data portal to be impactful. To date, work in these areas has largely focused on raising awareness of the existence and potential of the national digitization effort. While over 90% of the community gives iDigBio high marks for raising awareness, it is premature to measure impacts in these areas.

Digitization and workforce training have directly impacted more than 1200 individuals and 500 institutions with an undetermined number of additional individuals indirectly impacted (e.g., via train-the-trainer activities). Post-training evaluations consistently reveal increases in awareness, skill, or knowledge of workshop topics often among 100% of respondents. The vast majority of those who have expressed an opinion believe that the workshops and webinars have moved the digitization forward beyond what would be expected without them, contributed to community building, increased access to expertise, led to new collaborations, and improved the digitization of collections.

With over 17,000 users, the iDigBio website is increasingly viewed as the place to go for digitization resources and to learn about upcoming events and developments related to digitization in the collections community. Two-thirds of those who responded to a community survey report they visit the website three to four times a year, most often to access information about workshops, other digitization resources, and to learn about upcoming events. Further evidence of the website's impact is that over 400 Adobe Connect recordings of workshops and meetings have been viewed nearly 6500 times in total. The community views the website as a valuable resource, noting that much of the information available on the site simply does not exist elsewhere.

As of late May 2015, the iDigBio search portal has ingested 448 recordsets containing a total of 28 million records for 84 million specimens and 5 million images. More than three quarters (78%) of respondents on the 2015 Community Survey reported visiting the iDigBio specimen portal, and the number of survey respondents who have contributed data to the portal has doubled in the past year. (This does not necessarily include those who submit their data through another initiative).

The impact of iDigBio can also be measured via “anticipated” and “unanticipated” outcomes. The most commonly experienced “anticipated outcomes” reported by respondents were (1) increased digitization of collections, (2) increased ability to share data, and (3) increased collaboration among collections. The three most commonly experienced “unanticipated outcomes” were (1) improved collection management, (2) increased quality of specimen data, and (3) increased involvement and numbers of undergraduates working in collections.

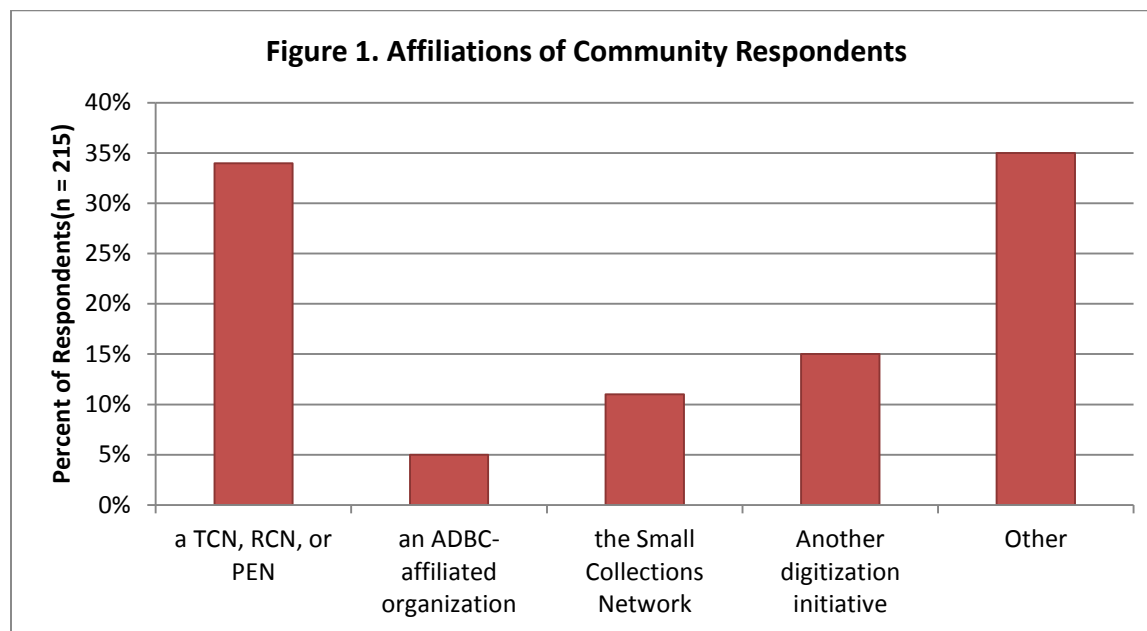
Approach

The goal of the Year 4 Impact Evaluation was to document the impact of iDigBio via a multi-method approach including participant observation, surveys, interviews, and analysis of project records. This evaluation targets the areas of greatest impact to date, those in which the Project Evaluator has been most closely involved, and areas for which impact measures are currently available.

Invitations to participate in the 2015 Annual Community Survey were emailed to over 1300 individuals who have attended iDigBio events, subscribe to the newsletter, are affiliated with a TCN, or are collaborating/partnering with iDigBio in some way. To encourage broad representation, anonymous links to the survey were also provided via the newsletter, Facebook, and Twitter. Nearly 250 individuals responded (including iDigBio team members).

One-third (34%) of respondents (excluding members of iDigBio) identified themselves as current members of a TCN, RCN, or PEN. Respondents who identified themselves as “other” included representatives of NSF Bio Centers, SPNHC, Specify, Vertnet, Symbiota/SEINet, Paleobiology Database, National Park Service, wildlife agencies, and

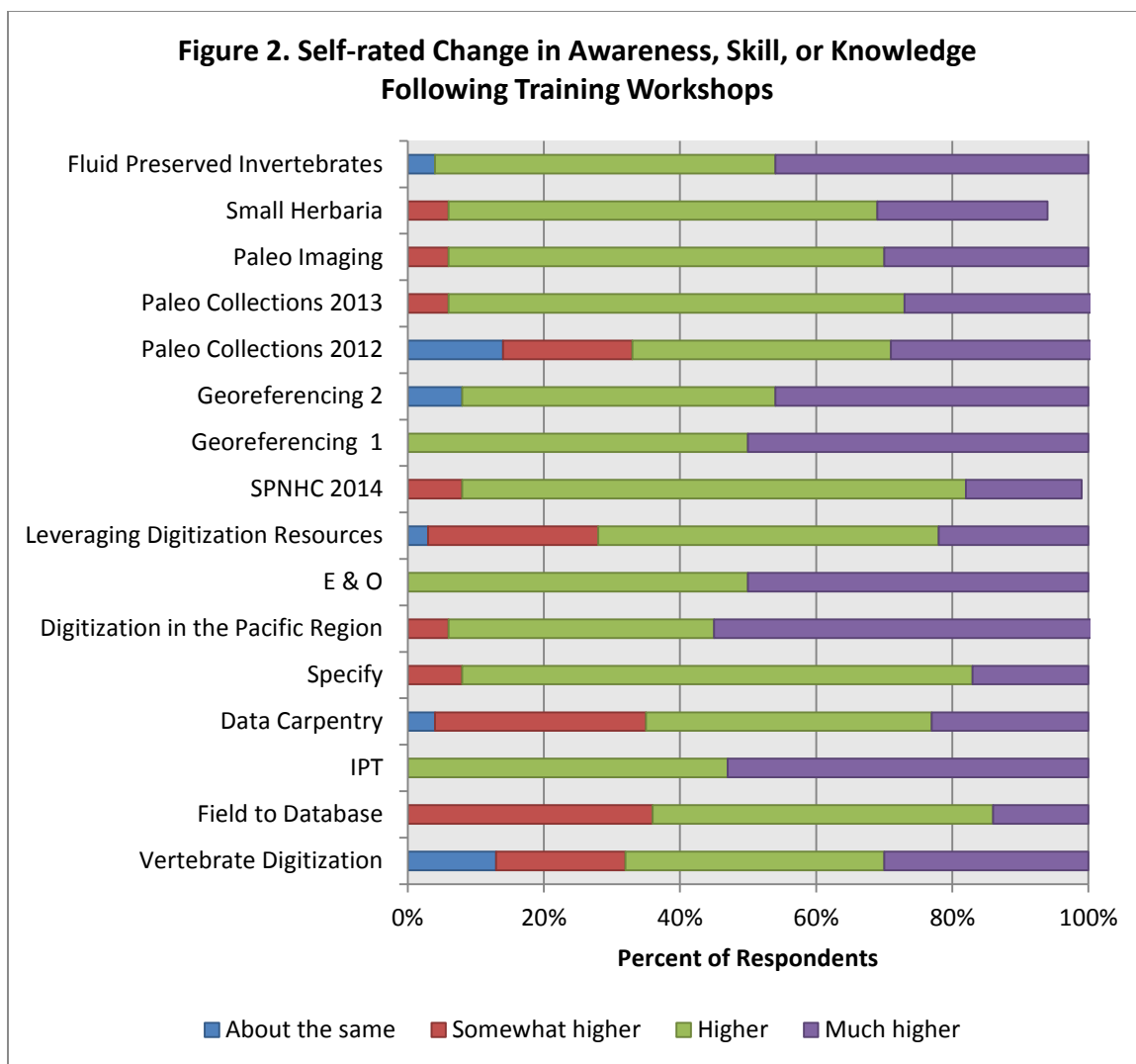
unaffiliated museums and herbaria including several outside of the U.S., as well as university scientists, a high school AP Biology teacher, and members of former TCNs.



Digitization and Workforce Training (Inreach)

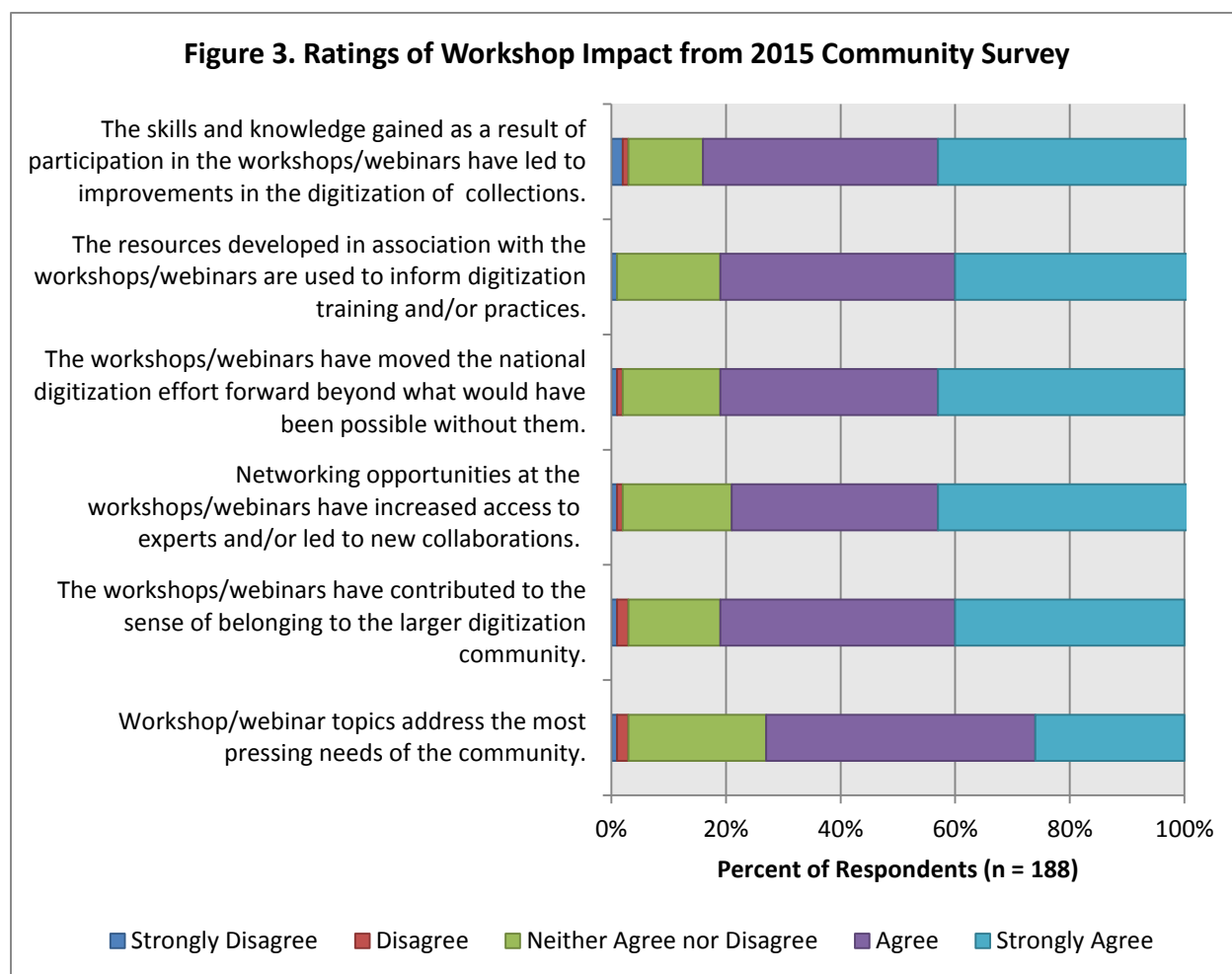
Since its inception, iDigBio has conducted over 60 workshops, symposia, and meetings involving more than 1200 individuals and over 500 institutions. (iDigBio refers to educational efforts involving the collections community “inreach.”) The purposes of these events varied: Some were designed primarily to raise awareness about the national collections digitization effort, others involved working groups focused on developing a product (e.g., policies and standards, publications or workshops), some were hackathons, while others provided training for the collections community. It is the last category that is the focus of attention here because (1) post-workshop surveys provide tangible evidence of impact and (2) results of annual surveys indicate that the community (broadly defined) rates the training and outreach efforts of iDigBio as one of its primary strengths and a major contribution to the digitization effort.

Figure 2 shows the responses to one “impact” question asked on the post-event survey following 16 training workshops. (Sample questions: *How does your knowledge of imaging techniques for paleo specimens now compare to that prior to the workshop? Please rate your level of knowledge on how to launch and maintain a collections digitization program following the workshop.*). As shown in Figure 1, the vast majority of participants in iDigBio training workshops report an increase in awareness, skill, or knowledge post-workshop.

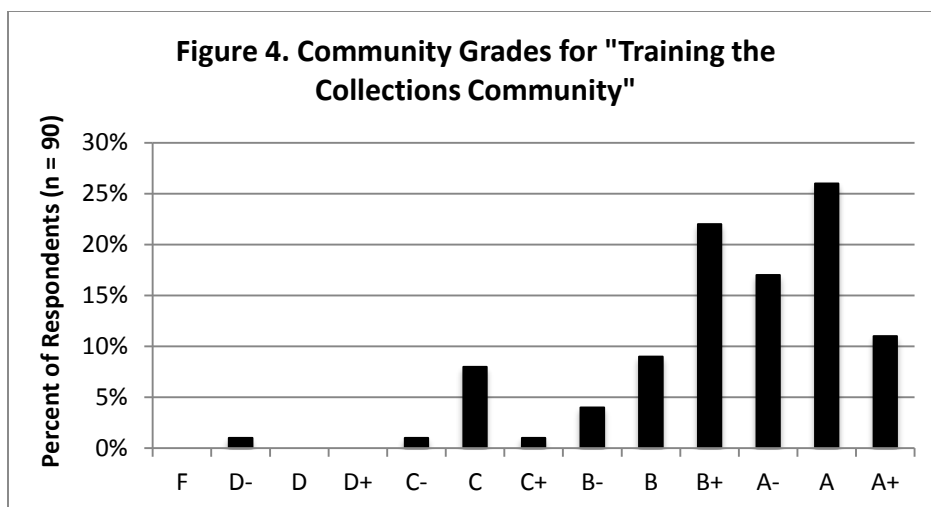


There is not comparable data for every workshop because the post-workshop evaluations of the earliest workshops were primarily focused on assessing needs—that is, topics to be addressed in future workshops—and soliciting feedback on ways to improve the workshop organization, format, delivery, and materials. The results of those surveys (in conjunction with informal feedback) did shape future workshop planning as broadly focused workshops were followed by a series targeting specific collection types, remote access to workshops was instituted, and increasing attention (and time) was devoted to facilitating collaboration and networking, among other changes.

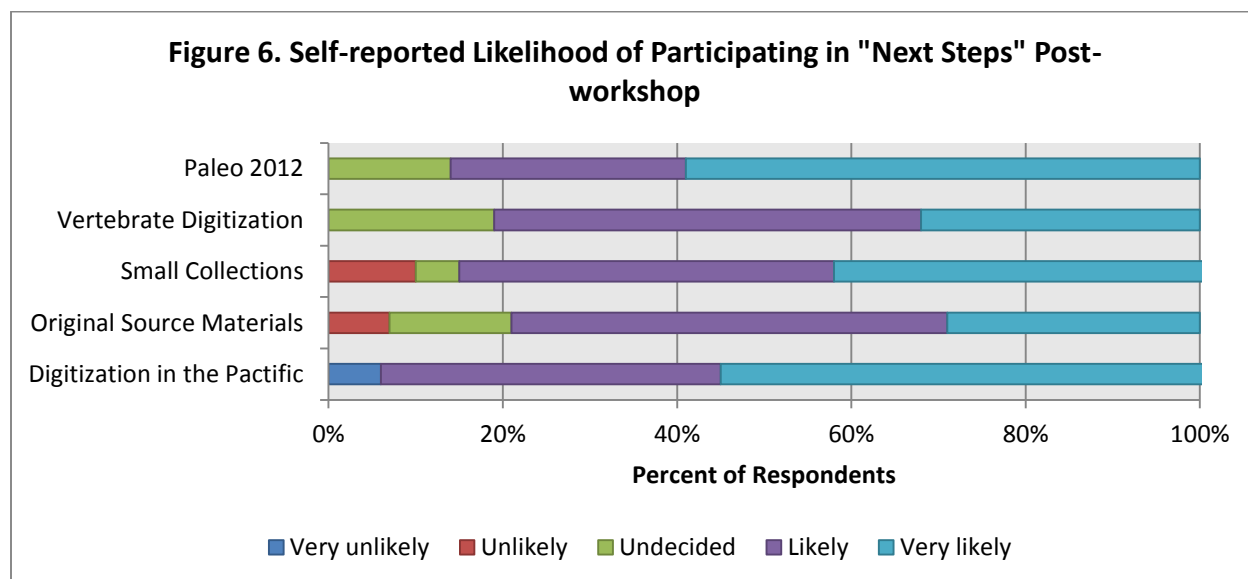
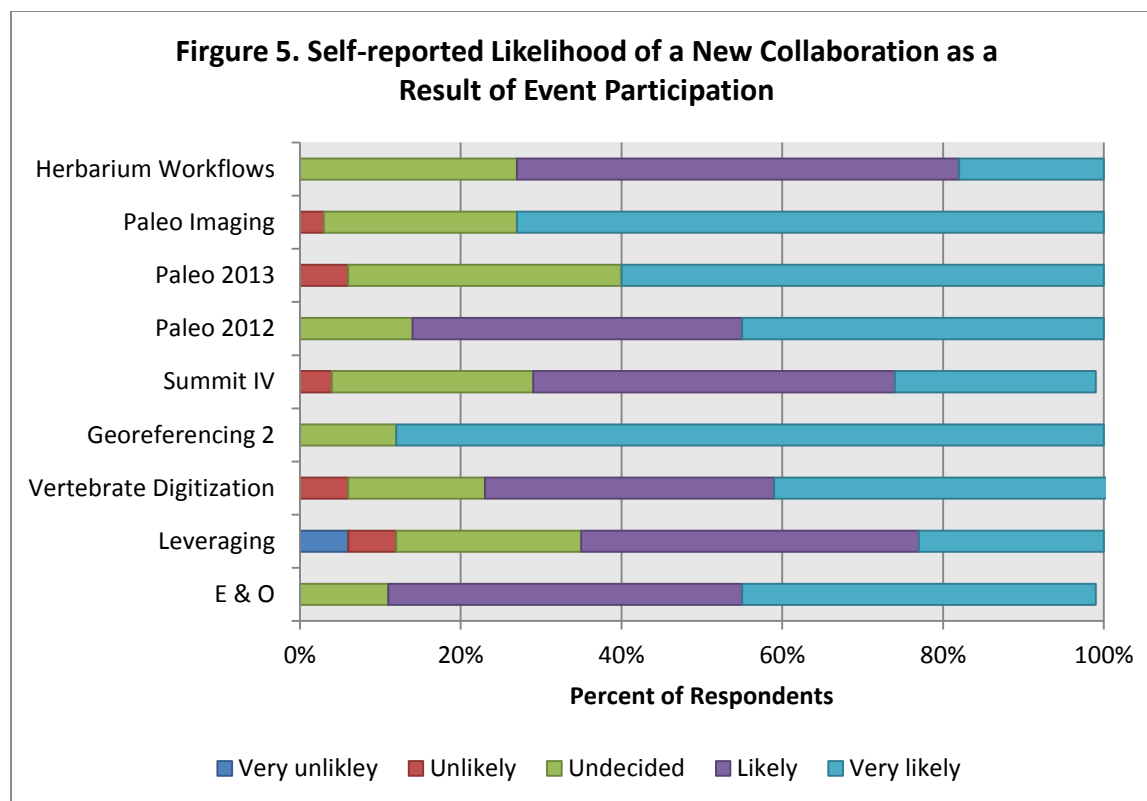
The purpose of providing digitization training for the collections community is, of course, to increase the digitization of collections. Nearly three-quarters of 2015 Community Survey respondents have “personally experienced or observed” an increase in the digitization of collections, while 80% “agree” or “strongly agree” that the workshops and webinars have moved the national digitization effort forward beyond what would have been possible without them (see Figure 3). As one respondent observed, *“I fully support what you have done so far, and appreciate the training that has been made available (staff from my institution have attended a number of workshops and share the info). I think the effort is driving my institution to digitize the collections at a faster rate than would have been done without the federal support. That being said, we are still a couple of years behind in being ready to upload our collections data (e.g. still cleaning up and converting old databases to KE, still digitizing specimen data especially for invertebrate collections, etc.)”*



When asked to grade iDigBio's effort at training the collections community, 53% of respondents awarded a grade in the "A" range, and 36% in the "B" range. Some of the lower grades may be artifacts of the question structure as several respondents who gave grades lower than "B" indicated that they had "no basis to judge" so simply awarded an average grade of "C" rather than skipping the question (see Figure 4).



A second perhaps unanticipated outcome of the workshops as well as other iDigBio-sponsored events (e.g., hackathons, Summits) was the increase in collaboration and communication reported among participants. As shown in Figures 5 and 6, a majority of respondents to post-workshop surveys report that it is “likely” or “very likely” that they would begin a new collaboration or research network as a result of participating in the workshop and/or participate in any planned “next steps” (e.g., contribute to a publication or wiki, organize a workshop or symposia). A limitation of this data, of course, is that it is based on only those who chose to respond to post-workshop surveys (which averages around 60%) and reflects participants’ best intentions. With the maturation of ADBC and iDigBio, future evaluation efforts should include additional documentation of collaboration such as joint journal articles, conference symposia, workshops, webinars and the like for which information is in the public domain; to date, efforts to obtain follow-up data from workshop participants themselves have not been fruitful. That said, despite the limitations of the post-workshop data, there is converging evidence from the annual community surveys. For example, 80% of respondents to the 2015 community survey “agree” or “strongly agree” that networking opportunities at workshops have increased access to experts and/or led to new collaborations (see Figure 3 above).



A potential negative impact of iDigBio and the associated workshops (or at least drawing attention to the workshops via a community survey) is that a subset of the collections community reports feeling isolated; survey respondents express concern that if they are not part of a TCN, RCN, or PEN, they do not benefit from iDigBio, while others note that lack of funding prevents them from attending professional conferences where they might interact with iDigBio personnel. It is worth noting that the cost of participating in iDigBio workshops has been covered in the past (and remote participation is free); while preference for acceptance to workshops may have

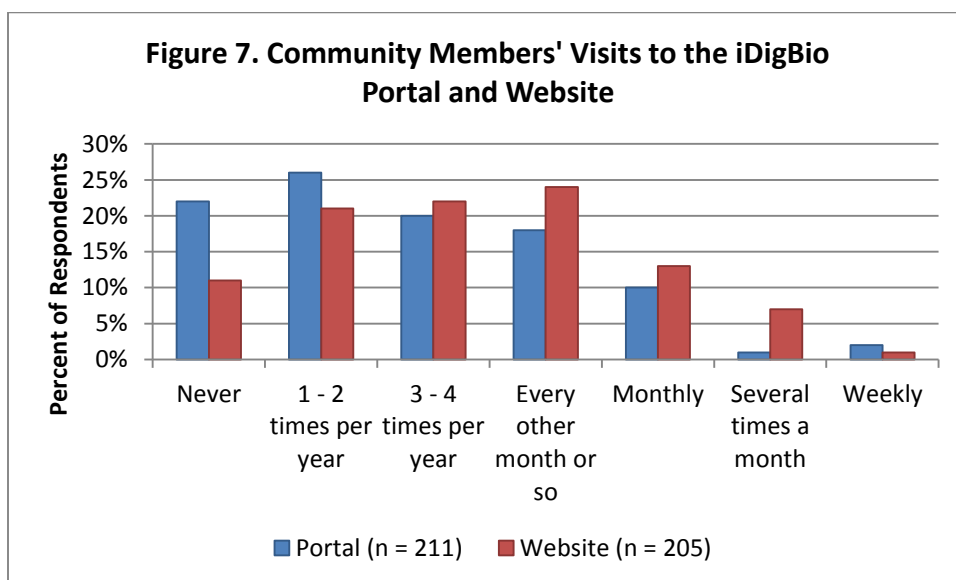
been given to members of TCNs, no survey respondent has commented that they have been denied access to workshops.

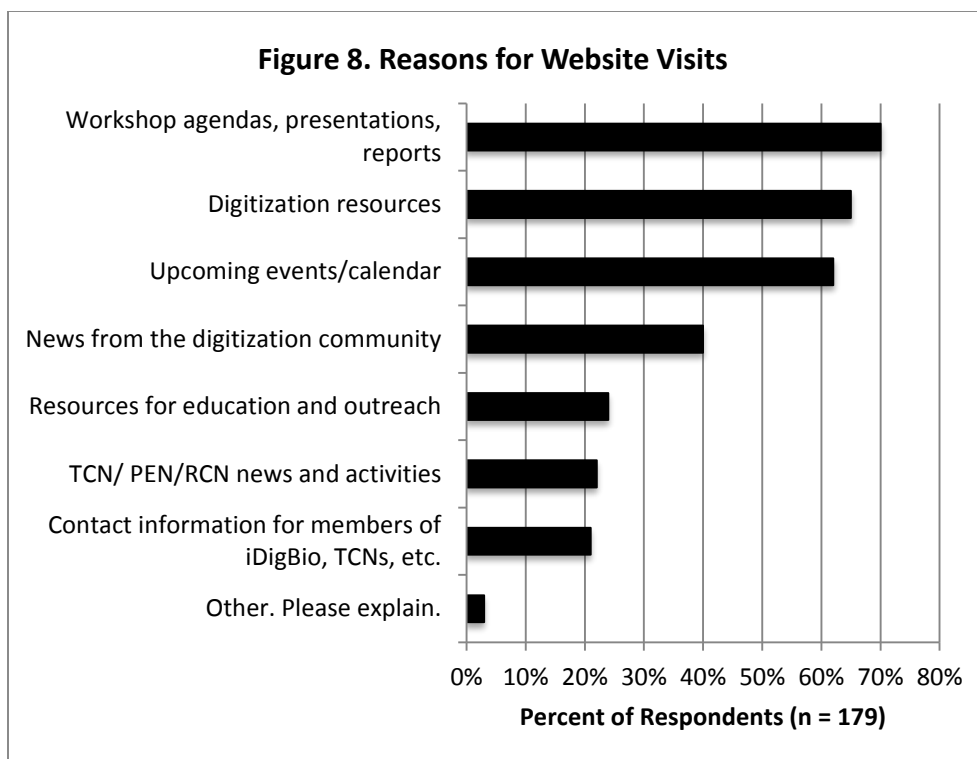
iDigBio has made concentrated efforts to reach out to the entire collections community, particularly those in small collections. A research survey on small collections undertaken by Gil Nelson (iDigBio/FSU) and Anna Monfils (Central Michigan University) in early 2015 led to over 120 individuals to request to be added to the Small Collections Network (SCNet) listserv. In partnership with SCNet, iDigBio has offered 16 no-cost webinars aimed at improving the capacity of those working in small collections.

Website and Portal

One of iDigBio's most impactful accomplishments is the creation of the iDigBio website. With approximately 17,000 users, the website serves as a centralized location for digitization resources and a place to learn about upcoming events and developments related to digitization in the collections community. Technical resources available on the website include data ingestion guidelines, workflows, GUID Guide, reviews of biological collections databases, tool, and data publishing portals among others. The website also provides links to the working groups associated with iDigBio and provides access to meeting minutes, products, and recordings. In addition, the website provides information about both past and upcoming events of interest to the community and is not limited to those sponsored by iDigBio. Those events that are sponsored by iDigBio have associated wikis, which include agendas, presentations, products and documents as well as recordings. As will be apparent below, the website is indeed perceived by many in the community as a highly valuable and unique resource. That said, our annual community surveys consistently reveal that a good percentage of users find the website difficult to navigate. This is especially true for those who visit the website infrequently and who have relatively little technical knowledge. Hopefully, iDigBio can reorganize its website content in the coming years in response to community requests to make it easier to find information.

Two-thirds of community respondents visit the iDigBio at least three to four times per year (see Figure 7). The most popular reasons for visiting the website are to access workshop agendas, presentation, and reports (70%) other digitization resources (65%), and to learn about upcoming events (62%) (see Figure 8). Further evidence of website popularity can be found by examining the number of times workshop and meeting recordings have been viewed. To date, there are over 400 Adobe Connect recordings of events that have been viewed nearly 6500 times in total (range = 1 to 604). Nearly 30% have been viewed 20 or more times.





When asked where they might locate the resources currently available on the website if it no longer existed, only 17% of respondents could identify specific sources and, in some cases, it appears those individuals were thinking about specimen records rather than digitization resources per se. Eleven percent reported they would search online ("random web search"), while 16% would rely on listservs, "word of mouth," personal contacts, and contacting museum professionals directly. Based on what we have learned about the apparent isolation of many in the collections community, having to reach out to others for assistance may prove a large obstacle for many. Indeed, the positive ratings of the networking opportunities offered at workshops no doubt reflect that participants make personal connections with individuals that they can contact later if needed.

Nineteen percent of respondents reported that they did not think they could find the resources now available on the iDigBio website anywhere else. As one individual observed, *"I have no idea. I don't think I could. One of the most valuable aspects of the website is all the wikis and being able to see past workshop presentations and other such documentation that may never be published but are essential resources."* Another noted that some of the resources would not even exist without iDigBio: *"There's no one place where this information would be available, and without iDigBio none of the workshop and working group resources would exist."*

Fourteen percent of respondents suggested various strategies for finding the information, but cited the amount of additional effort that would be required. Representative comments:

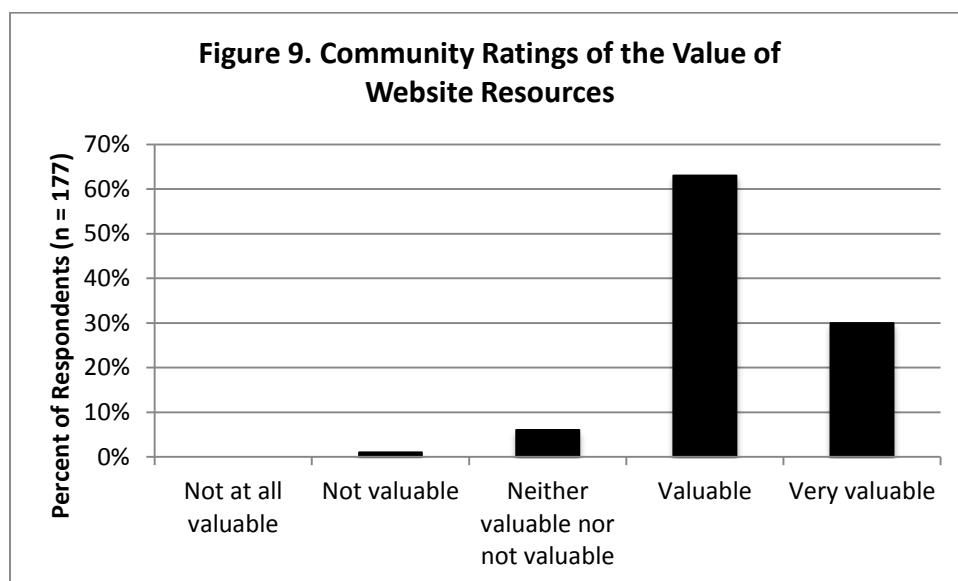
"I think that I would contact other museums to learn how they are doing the digitization process, image, workflows etc., but it would not be that easy, accurate or fast as we can do it using iDigBio website."

"I would have to search on the web for various digitization topics which would be time consuming and not always find me the results that I need. Also, I would have to contact other institutions to find out how they have implemented their digitization projects. For me, the Documentation/Data Ingestion page on the iDigBio website is very useful."

"I the case of digitization information, protocols, etc .I probably would NOT find it anywhere, except perhaps through a Google search. No place else has this compiled in this comprehensive way. THIS part has been absolutely irreplaceable as I began digitizing this spring."

"Some specimen records would come from searching GBIF, but iDigBio is a great help with resources for imaging and data management protocols as well as specimen records. I would probably end up reinventing the wheel if I didn't have iDigBio to connect me with people who may have already done what I need."

When asked to evaluate the value of the resources on the iDigBio website, over 90% of community respondents rate the resources available on the iDigBio website as either "valuable" or "very valuable" (see Figure 9.) Representative comments:

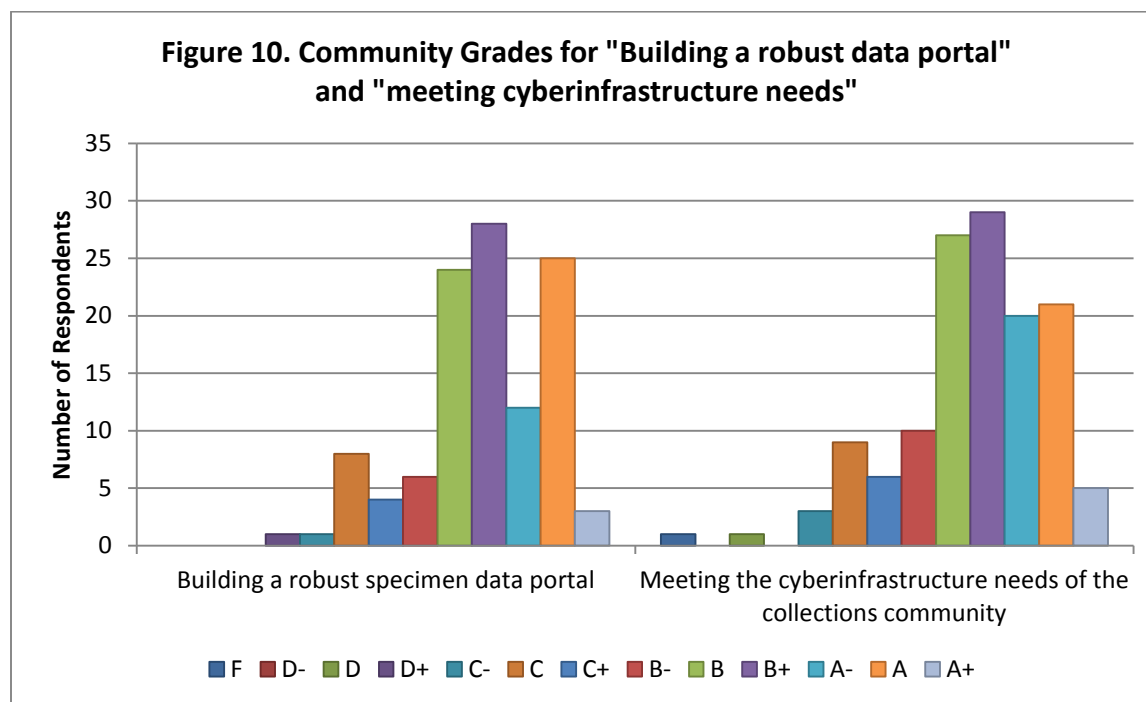


"It is an outstanding resource! It is packed with information, and has frequently saved me from wasting time figuring out solutions to problems already solved by somebody else." (Curator/university faculty affiliated with another digitization initiative)

"Although I personally have not used the websites and workshops extensively, my staff and graduate students have used them extensively. We have made data from tens of thousands of specimens available and thousands of images. Participation in this program has also led us to adopt Specify as our database, switching from Biota--this has been great!" (University faculty affiliated with a TCN)

As of late May 2015, the iDigBio search portal has ingested 448 recordsets containing a total of 28 million records for 84 million specimens and 5 million images. More than three quarters (78%) of respondents on the 2015 Community Survey reported visiting the iDigBio specimen portal (see Figure 7 above). The number of respondents who reported submitting data to the portal has approximately doubled since 2014 (there were not questions about the portal on the 2013 Community Survey), Nearly half (49%) of those with data reported submitting it to the portal. Of these, only 20% required more than minimal assistance to successfully submit data. Most respondents (72%) who required assistance were "satisfied" or "very satisfied" with the help received. As shown in Figure 10, levels of community satisfaction with the portal and efforts to meet the cyberinfrastructure needs of the community are high. Thirty-six percent of respondents give the portal building effort a grade in the "A" range while 43% give it a grade in the "B" range. Grades for meeting the cyberinfrastructure needs are slightly higher, with 35% of respondents granting a grade in the "A" range and 50% in the "B" range. As noted earlier, the lower grades

should be interpreted with caution as some individuals with little familiarity opted to give average grades of “C” instead of skipping the question.

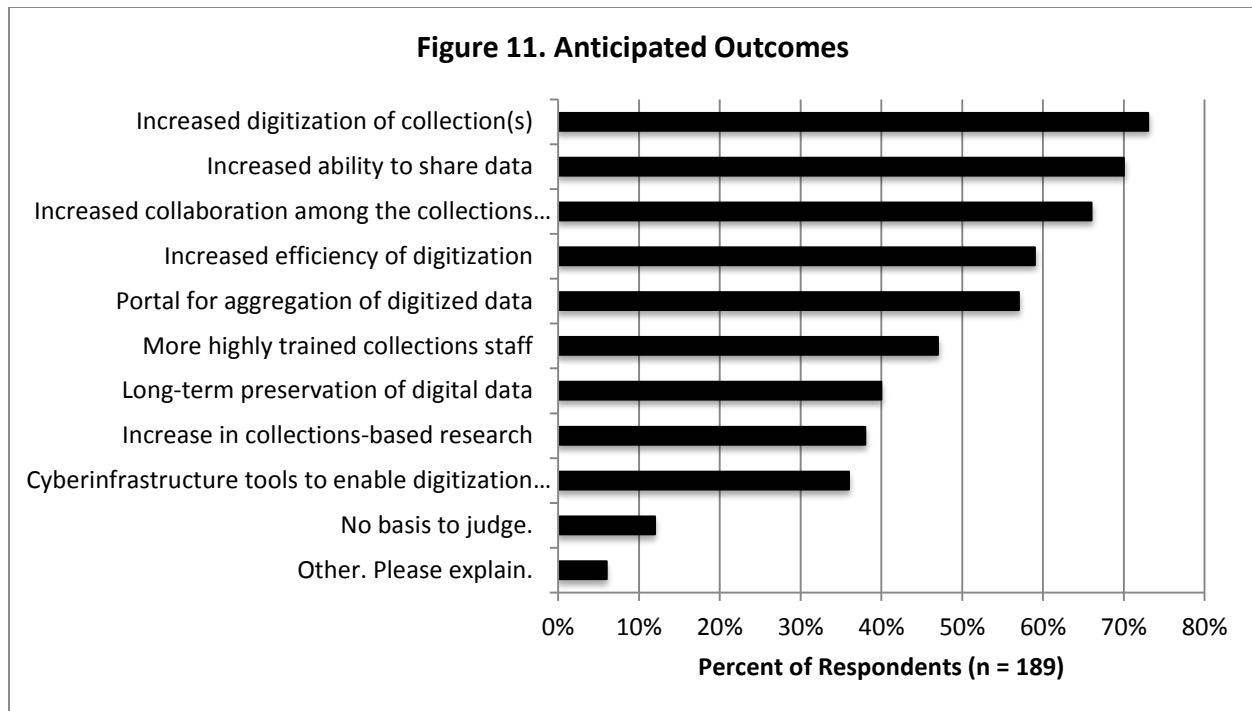


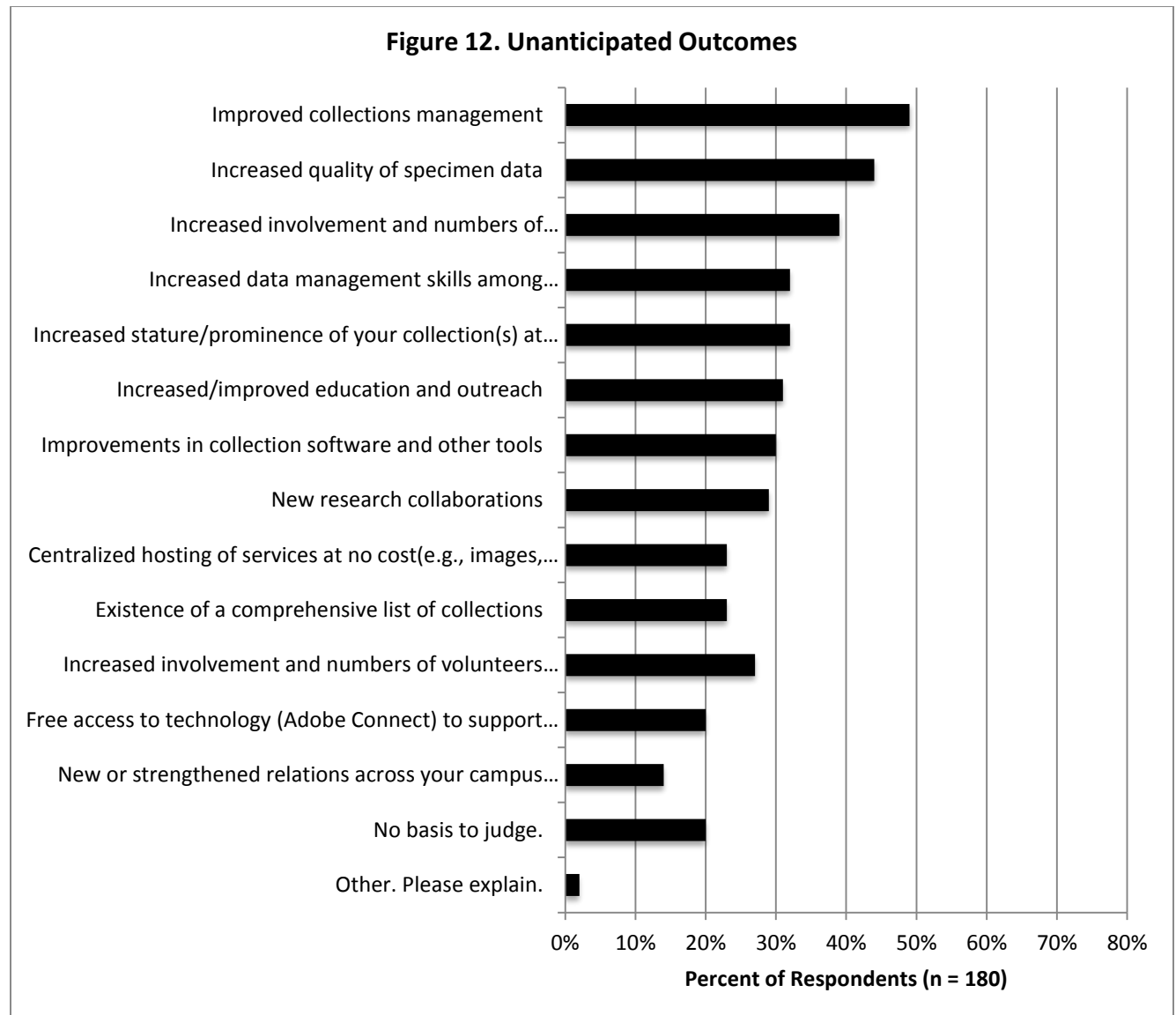
Anticipated and Unanticipated Outcomes

To further evaluate iDigBio impacts, we included questions on the 2015 Community Survey that asked respondents to reflect on outcomes they have personally experienced or observed as a consequence of iDigBio. We divided outcomes into those that should have been “anticipated”—that is, they reflect the goals of ADBC and the national digitization effort and metrics for our own implementation plan—and potential “unanticipated outcomes” based on observations previously shared by the iDigBio team and members of TCNs.

The most commonly experienced “anticipated outcomes” reported by respondents were (1) increased digitization of collections, (2) increased ability to share data, and (3) increased collaboration among collections. Three-quarters or more of those respondents who felt they were in a position to judge reported these outcomes (see Figure 11—note that the figure includes the percentage who responded “no basis to judge.” We included that percentage to provide a broader context for all of the survey results reported here).

The three most commonly experienced “unanticipated outcomes” were (1) improved collection management, (2) increased quality of specimen data, and (3) increased involvement and numbers of undergraduates working in collections. When those who answered “no basis to judge” are eliminated from the analysis, 50% or more reported these three outcomes (see Figure 12). Respondents were encouraged to describe additional outcomes as well.





Of course, not all of the outcomes are perceived as positive. Negative outcomes cited by individual respondents include a decrease in collaboration, especially among larger and smaller collections; the development of mediocre products as the result of developing multiple databasing tools (spreading the funding around); duplication of effort in developing a comprehensive list of collections; and concern about data quality.

Another respondent acknowledge the outcomes, but suggested they are now just beginning to emerge:

"I was being tough regarding the list [anticipated] above. iDigBio has accomplished all of these goals to some extent, but I think we have a ways to go regarding increasing collections based research, ability to share data (and reuse for research), and training of collections staff."

Additional outcomes, largely unanticipated, are described below:

"Our TCN is starting a list of collection benefits associated with digitization that we did not anticipate: finding types, pre-curation increases curation level, evaluation of overall specimen quality and preservation. Specimen

digitization prompts us to search of old field notes and digitize those as well, reconnect field notes with parts of the collections."

"I have witnessed first-hand an increase in quality of specimen data, as I sent a couple of corrections to collections managers. I only see that improving with the implementation of tools like Filtered Push."

"Increase in loan requests and questions about holdings since our data became available on Symbiota. Also able to map species distributions more clearly, leading to better questions about species ecology."

"My boss has finally gotten the message that through the process of digitization, the condition of the specimens and their organization has been greatly improved. As a result, we have been able to get a bit more institutional funds shunted toward digitization that were originally slated just for curation."

"Increased stature/prominence (and awareness of) our collection and institution in the community as a result of sharing the digital items through social media and websites."

"Physical infrastructure for curation also increased as a result of great visibility and activity."

"I think iDigBio has done an excellent job bringing to the table smaller collections that would never have otherwise participated in the national digitization effort. The resources and training offered by iDigBio are invaluable for such smaller collections, and would not have come from anywhere else."

"The iDigBio efforts have given me leverage to use internally in my organization to allocate more resources (hardware & salary) toward digitization and online deployment of data."

"We are developing innovative uses of plant collections to investigate the effects of climate change on plant leafing out times and fruiting times. This would have been more difficult prior to digitization."

"I think the public portals have influenced the administration here to begin upgrading data systems."

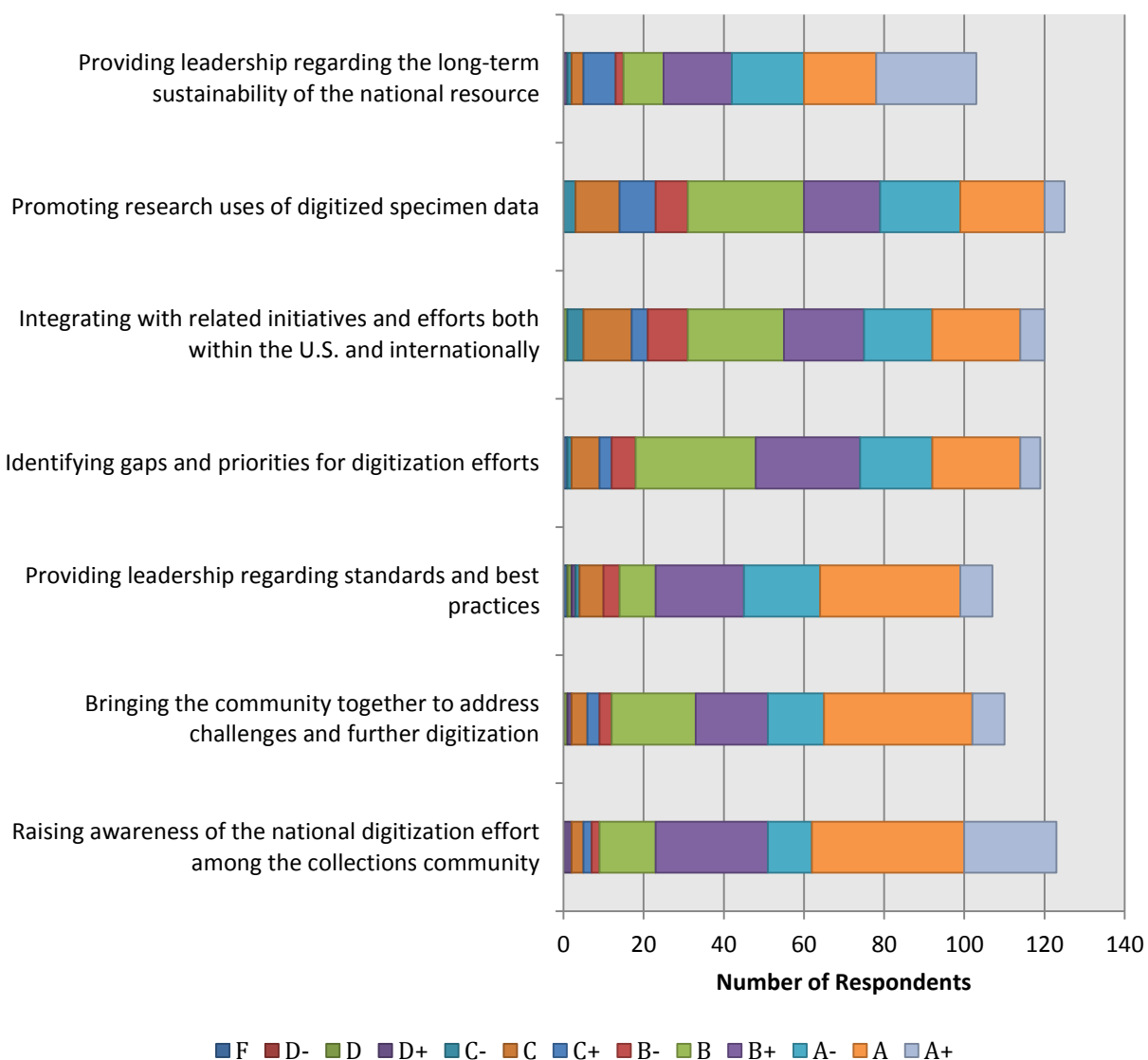
"It's nice to be able to augment incomplete specimen data with data from what are clearly "duplicates" at other institutions."

"They are learning: a. better / easier management of data inside spreadsheets b. how to use collaborative tools like Google Docs, Google Forms c. how to use web conferencing software like Adobe Connect and Google Hangouts All of these increase both the opportunity for collaboration, but also make it easier to collaborate. And many of these folks self-report they now use these tools (or similar) as they plan conferences / symposia, workshops."

Overall grades

Finally, as an overall measure of the impact iDigBio is having on the national collections effort, respondents were asked to grade the efforts across a range of goals. Grades for "training the collections community," "building a robust specimen data portal," and "meeting the cyberinfrastructure needs of the collections community" were presented in Figures 4 and 10 above. For these goals, the percentage of grade of B- or better were 89%, 79%, and 85%, respectively. The same finding holds for all the goals listed in Figure 13, with at least 82% of respondents awarded a grade of B- or better to each.

Figure 13. Community Grades for iDigBio Efforts



2015 iDigBio Annual Evaluation: Internal Communication and Leadership

2015 Annual Evaluation: Internal Communication and Leadership
prepared by Shari Ellis, Ph.D., May 2015

Summary

The annual survey was sent to 36 iDigBio personnel including the five PIs, senior and other staff, post-docs and graduate students; 28 individuals responded yielding a 78% response rate. Included among questions also presented to the broader collections and scientific communities were questions evaluating internal communication and leadership that were displayed to only respondents identified as members of iDigBio. These questions included 10 focusing on communication, 5 on work climate at iDigBio, and 4 focused on project leadership.

This year, iDigBio personnel were asked to self-identify as members of the leadership team to allow for comparisons between that group and everyone else. However, because respondents had the choice to respond via an anonymous link, it is not possible to know if the five individuals who identified as members of the leadership team are, in fact, the five PIs.

On average, members of the leadership team provided more positive ratings than other respondents. When possible, the results from this survey were compared to those from the 2014 annual survey or communication and leadership survey and few differences were found.

With respect to communication, while only a very few iDigBio personnel expressed negative attitudes, more than half gave a “neutral” response to a question about overall processes of communication. An area that might deserve additional attention is in clear communication about deadlines and priorities; ratings suggest that several team members and leaders recognize this as an issue of some concern although respondents offered few comments and hence little insight into exactly where the problems might lie.

Responses of a significant minority of non-leadership iDigBio personnel suggest they feel they are not as informed about project activities, events, and developments as they would like to be. Given the many channels of communication available (e.g., website, calendar of events, Facebook, Twitter, meeting notes), the underlying issue here may not be communication per se, but rather one of interested parties feeling that they are welcome to participate.

One aspect of communication that showed slight improvement is in “understanding one’s own roles and responsibilities,” but this was offset by less satisfaction with their “understanding of others’ roles and responsibilities.” Staffing of the project does require overlapping roles and responsibilities, so it is recommended that supervisors remain alert to potential confusions and conflicts that can result and communicate expectations clearly.

Comments from evaluations in past years suggested that communication between the IT team building the specimen portal and others, especially the scientists, was less than ideal. This led to several actions designed to improve communication. Responses to the two questions included in the present survey addressing communication between IT and the scientists were very

positive with nearly three-quarters of respondents rating the quality of communication highly and as improved.

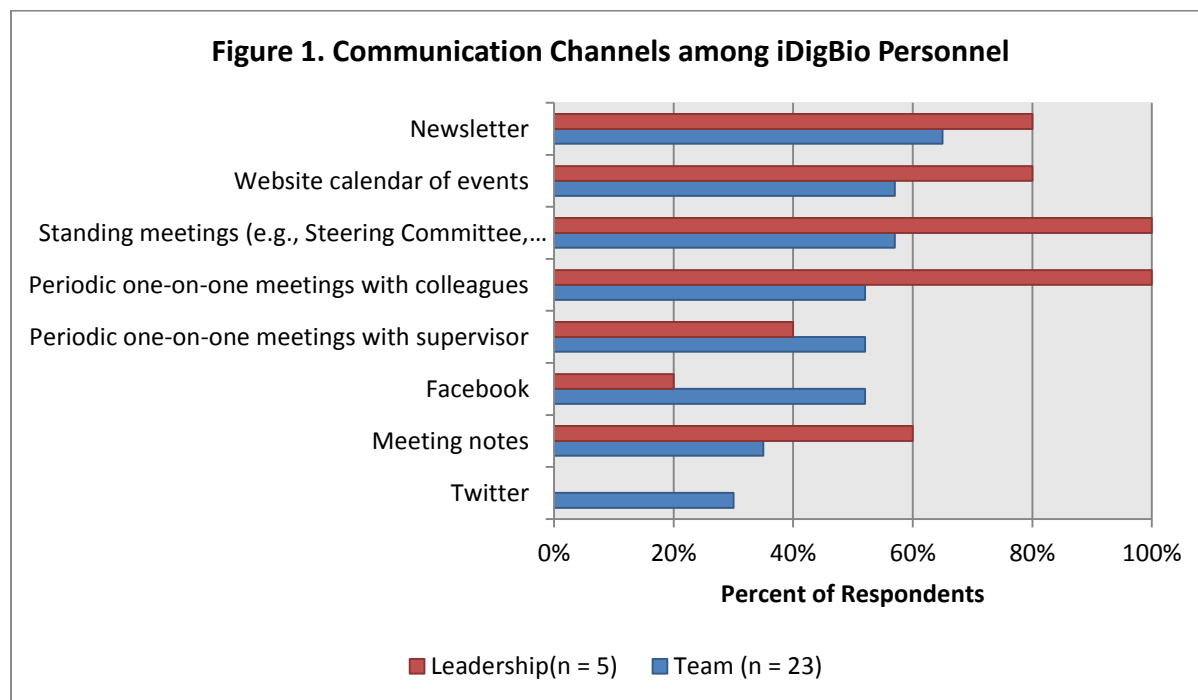
Attitudes toward the work climate at iDigBio are unchanged; a majority of both team members and leadership hold positive attitudes toward the work climate. That said, nearly 40% are neutral, at best, about workforce diversity at iDigBio. Increasing diversity remains a priority for iDigBio across all of its efforts.

Ratings of project leadership were positive with two-thirds of the non-leadership members rating overall leadership as “effective” or “very effective” and no one rating it as “ineffective” or worse. The weakest area under leadership is in “demonstrating a clear unity of purpose.” However, this may be due to the fact that members of the leadership team have designated areas of responsibility (e.g., administration, cyberinfrastructure, research, education and outreach) and potentially different priorities. On the other hand, some respondents attribute problems to the fact that not all of the PIs are uniformly engaged in the project.

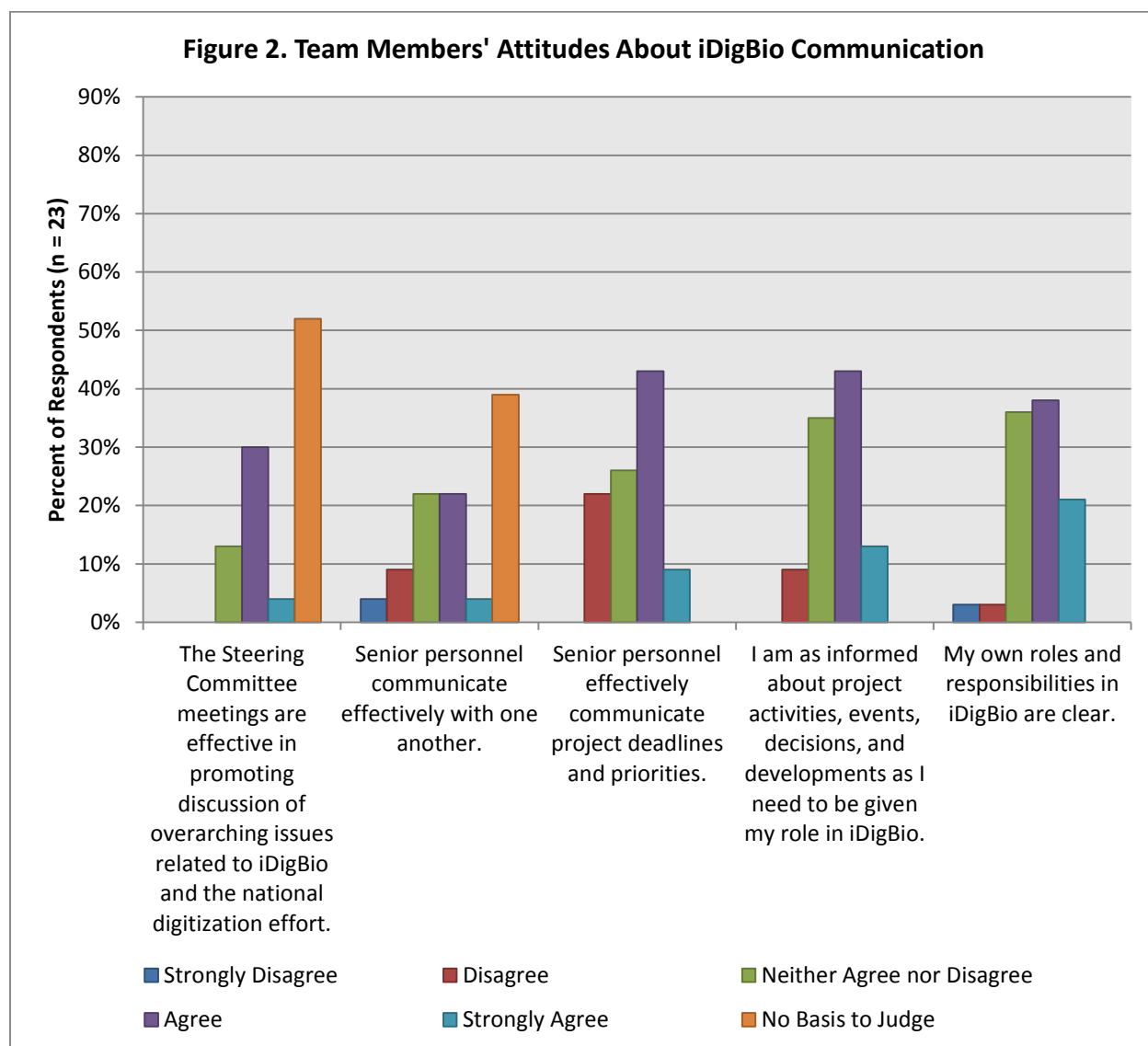
In sum, the results of the internal survey paint a portrait of a highly stable project with effective leadership, a positive work climate, and generally clear communication. There is also evidence of some areas of improvement and others that will need continued attention.

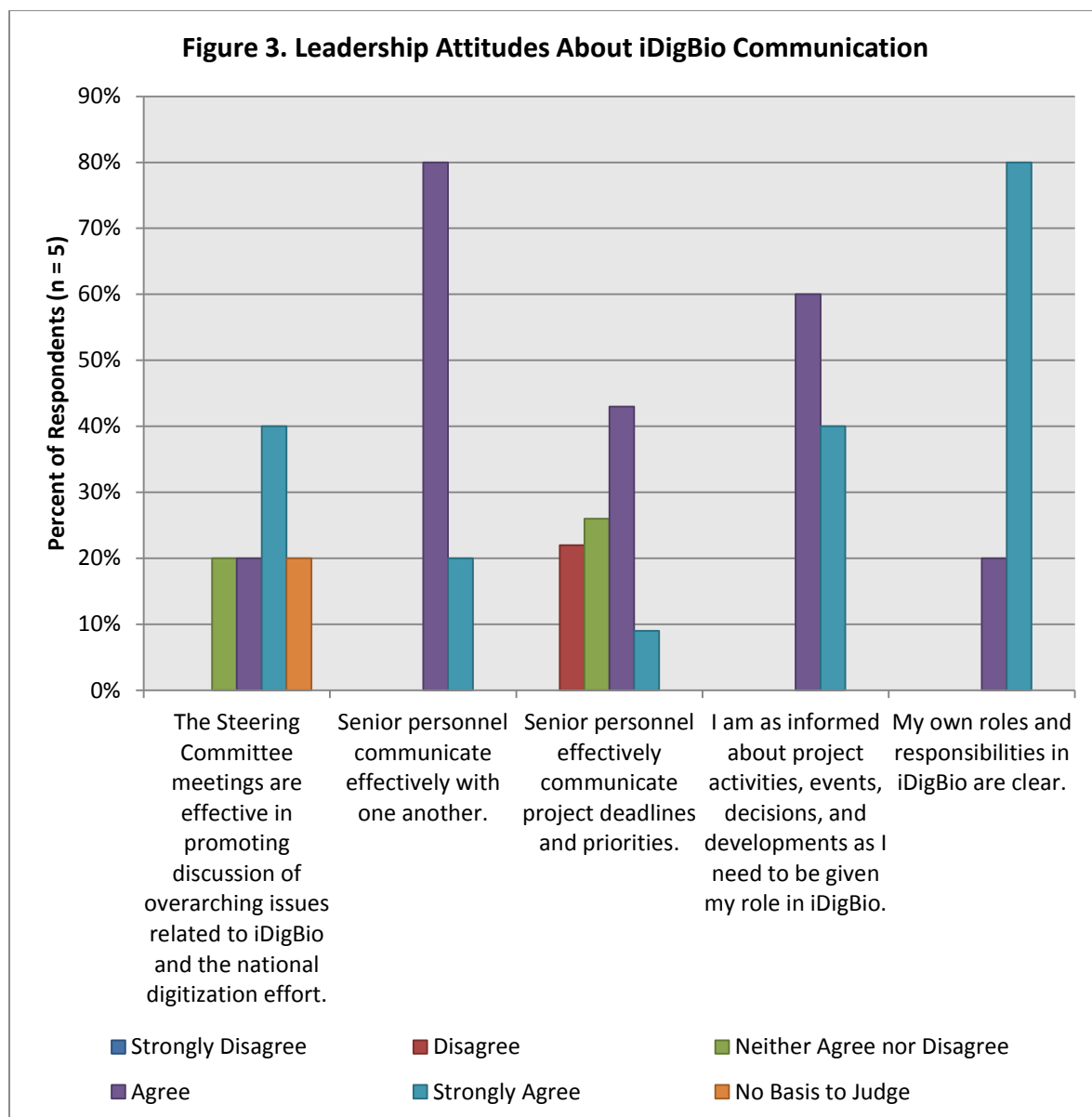
Communication

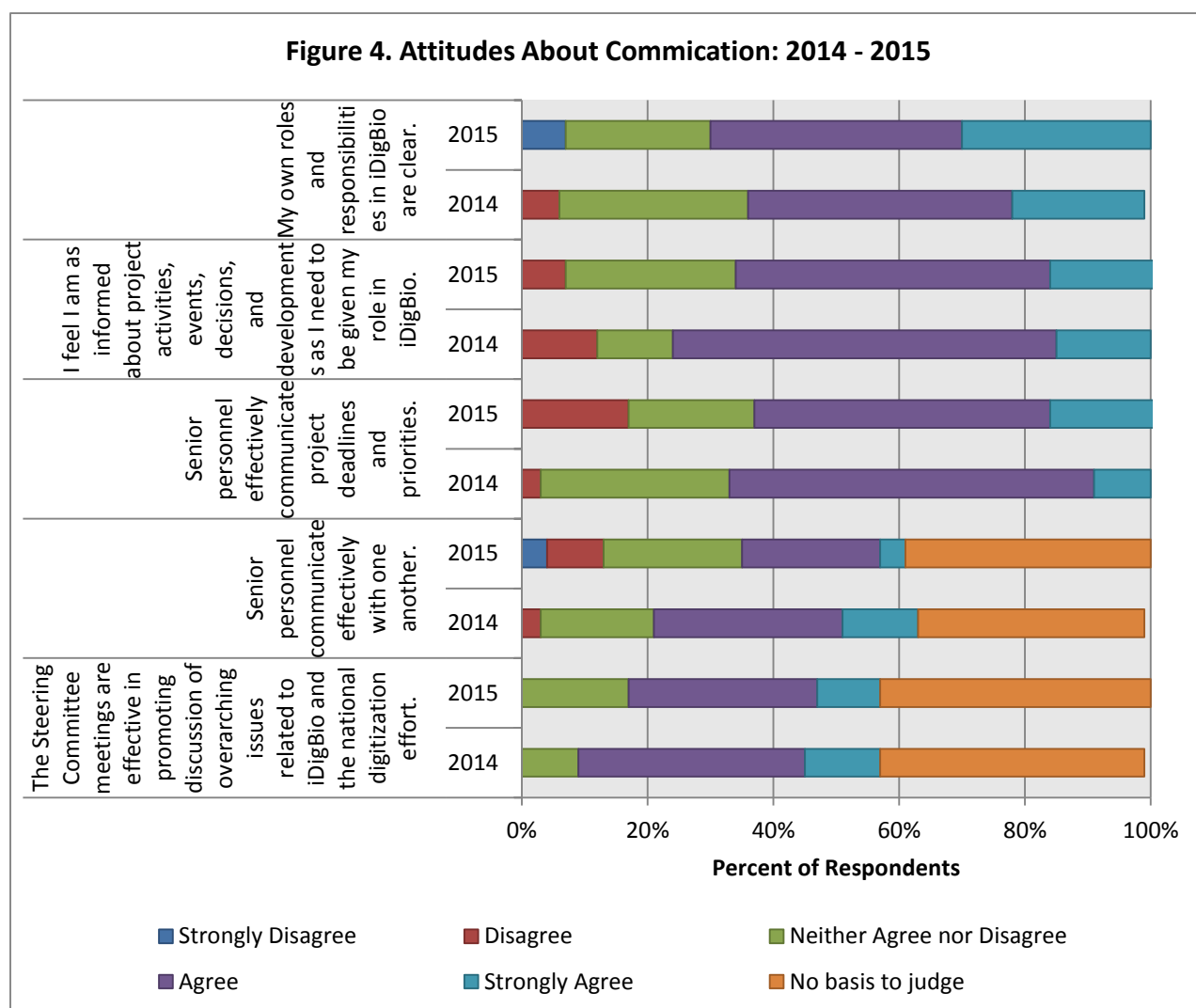
The most frequently used communication channel among all iDigBio personnel is the newsletter, followed the website calendar and standing meetings (see Figure 1).



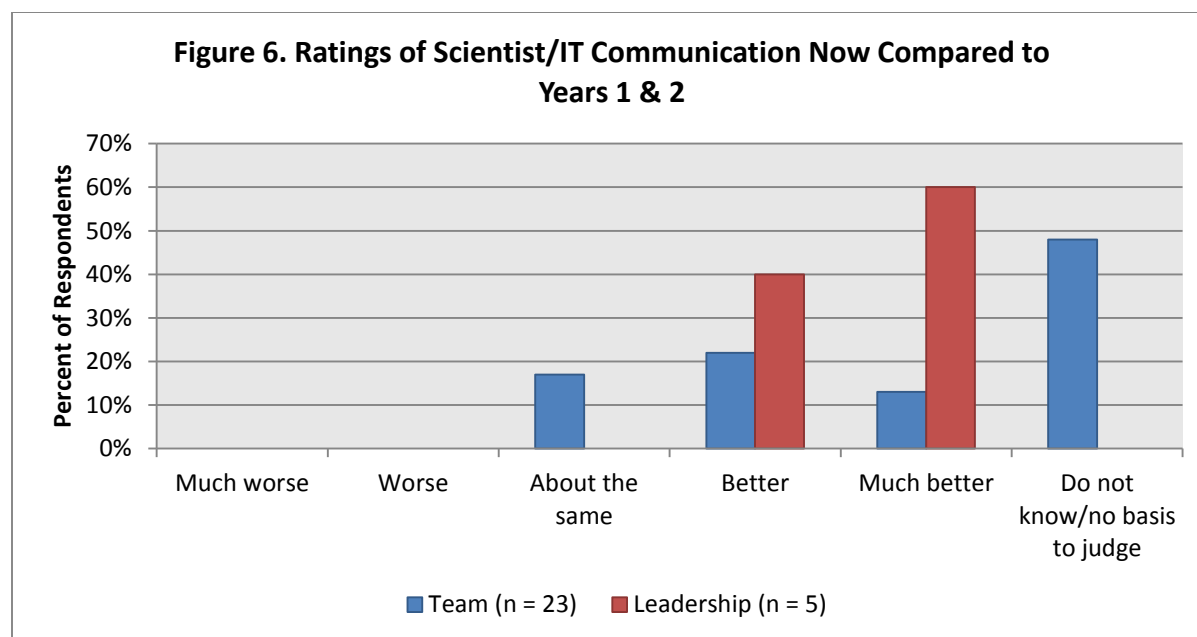
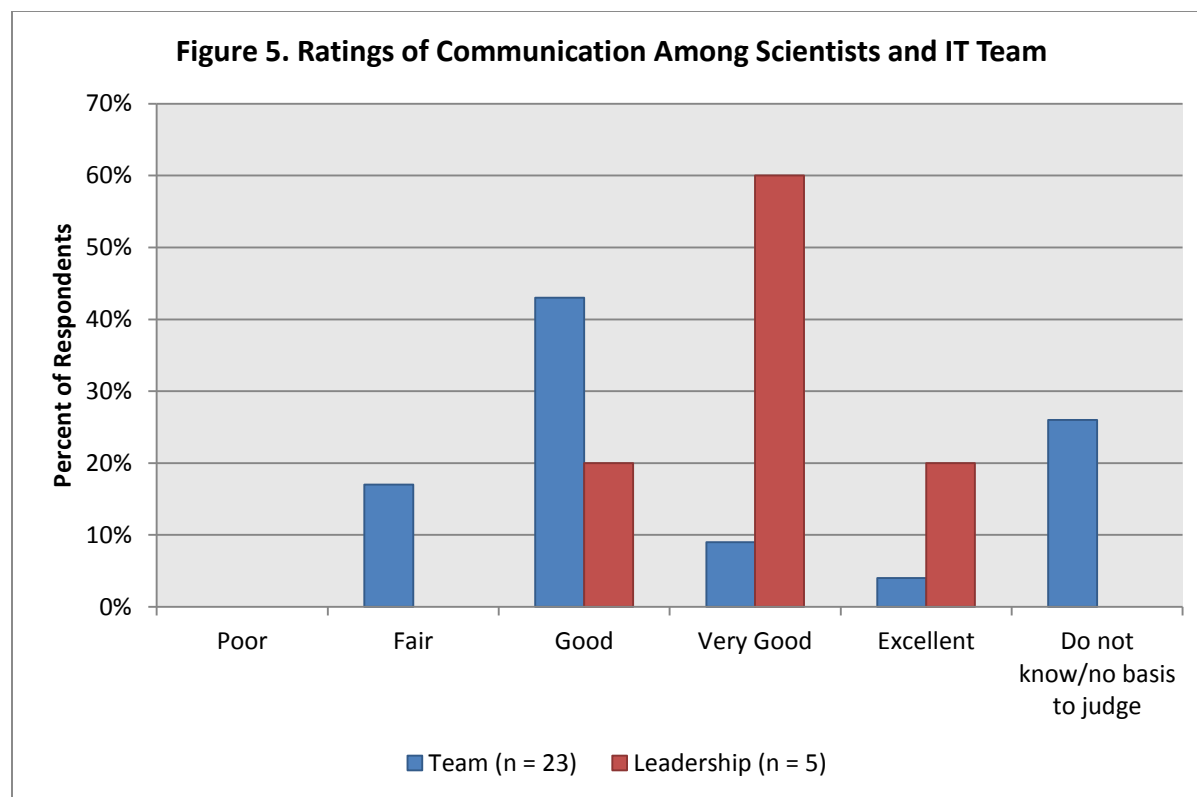
A significant number of iDigBio staff and students do not feel they have sufficient knowledge with which to rate the effectiveness of the Steering Committee meetings or communication among senior personnel. The percentage of those who “agree” or “strongly agree” that (a) their own roles are clear, (b) they are as informed as they need to be, and (c) senior leaders communicate effectively about project deadlines and priorities are 65%, 56%, and 52%, respectively (see Figure 2.) Overall, the senior leaders have more positive attitudes about project communication with a potential area of weakness being communication about deadlines and priorities (see Figure 3). Attitudes about communication within iDigBio are largely unchanged (see Figure 4), with the exception of effective communication about deadlines and priorities for which disagreement has increased from 3% to 17%.







During 2014, several strategies were employed to improve communication among scientists and the IT team, specifically those involved with portal development. These included more meetings between scientists and the developers (e.g., “portal stories”), increased frequency of Core Team meetings which include an IT representative and liaisons, and more thorough reporting about portal progress at Steering Committee meetings. To assess whether these efforts made a difference, we asked everyone to rate the quality of communication among the scientists and the IT team, and to compare it to the first two years of the project. (We did not ask that specific question in 2014). Over three-quarters (77%) of those who felt they were in a position to respond rated communication among the two groups as either “good,” “very good,” or “excellent” (see Figure 5), while 74% rate communication between the groups as “better” or “much better” than in the first two years of the project. The fairly large percentage (48%) of those who responded “no basis to judge” reflects, in part, the addition of new staff over the course of the project.



Members of the iDigBio team were also asked to rate their satisfaction with several aspects of project communication. One-half of non-leadership members were “satisfied” or “very satisfied” with their level of input into decision-making and their understanding of others’ roles and responsibilities, with a greater number reporting feeling “neutral” or “dissatisfied” with the overall processes of communication (see Figure 7). The leadership team, in contrast, was almost universally satisfied with project communication (see Figure 8). As shown in Figure 9, levels of satisfaction in 2015 were comparable to those in 2014. Because of the small number of respondents (33 in 2014 and 30 in 2015), small shifts appear more significant than they may really be. For example, while 10% of respondents in 2015 are dissatisfied with the level of input into decision-making compared to 3% in 2014, these figure represent an increase from 1 individual to 3.

When asked for comments regarding project communication, two individuals made note of the extremely complex nature of the project and the number of other commitments project members have—both of which contribute to communication challenges. Others suggested more “all hands” meetings to better facilitate communication throughout the project, and observed that they would like to be involved in more aspects of the project but often are not aware of opportunities until it is too late.

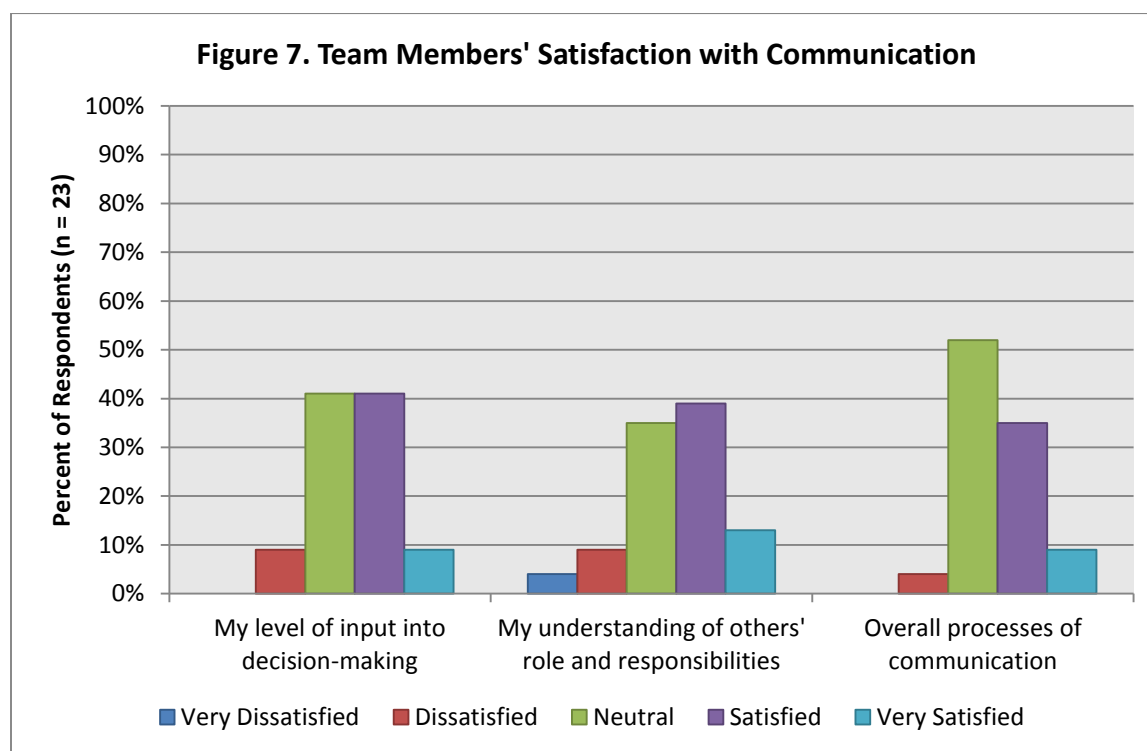


Figure 8. Leaderships' Satisfaction with Communication

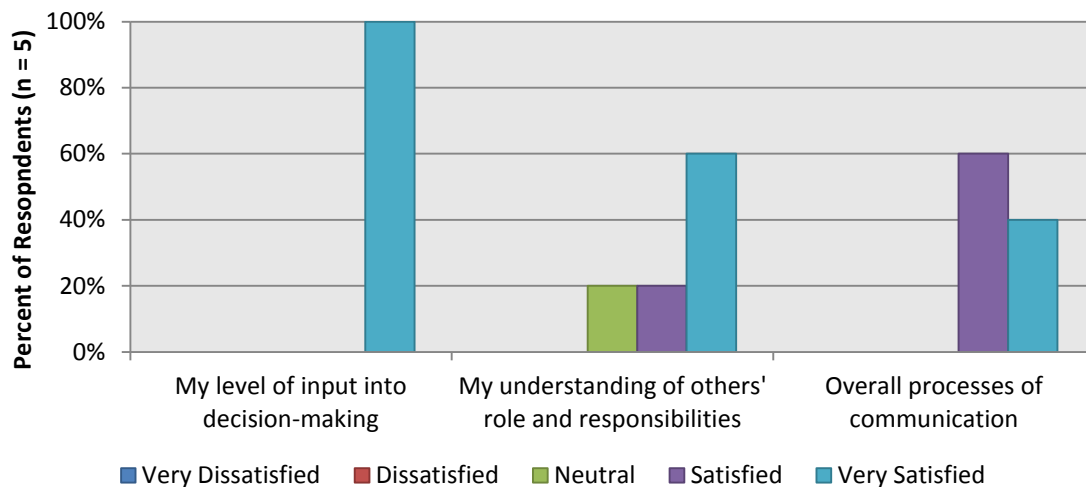
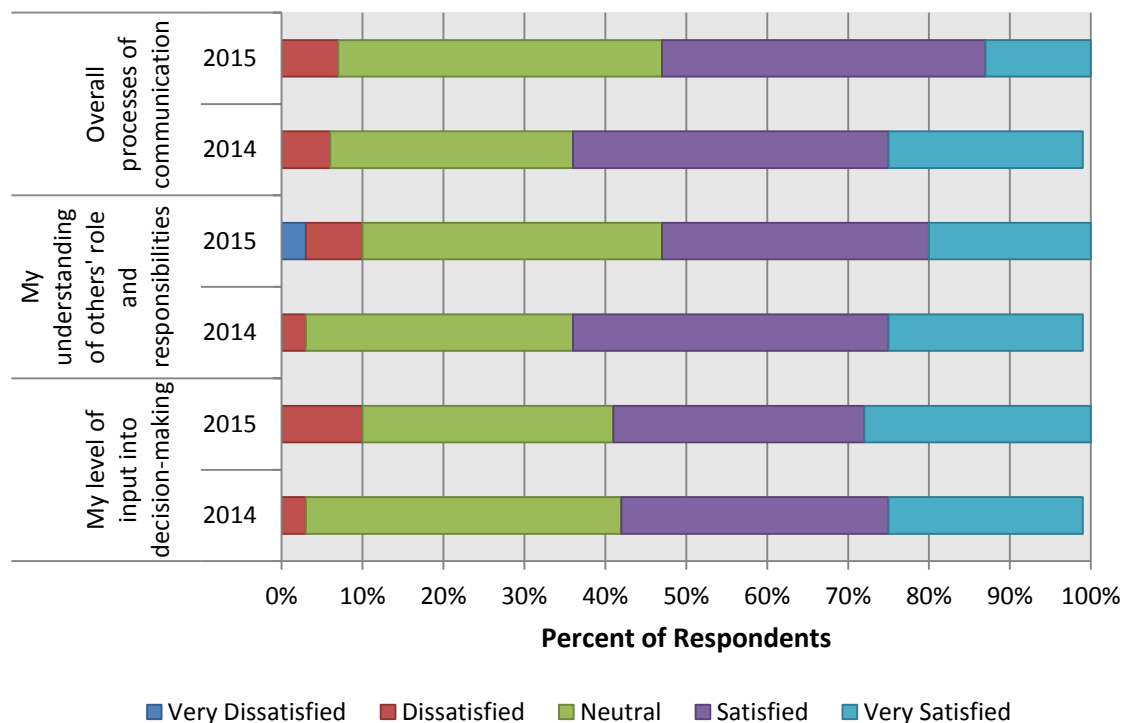


Figure 9. Satisfaction with Communication 2014-2015



Work Climate

A strong majority of both iDigBio team members and leadership hold positive attitudes about the work climate at iDigBio. For example, 68% of team members and all of those on the leadership team believe iDigBio personnel are motivated to function as a team, while 69% and 4 of 5 of the team and leadership respectively believe iDigBio in fact does successfully function as a team (see Figures 10 and 11). There were no significant differences in responses from 2014 to 2015 on the two questions included in both surveys (see Figure 12).

While one commenter described the team as “developed and improved,” another noted that it is difficult to answer questions about the team as a whole because some members function as a member of a team while others do not. Others pointed out that experience working on effective teams may be lacking among some members, professional development for staff is not encouraged as it is for students, recruitment of personnel has sometimes been “chaotic,” and that we should engage in more team-building activities such as monthly get-togethers (e.g., happy hour).

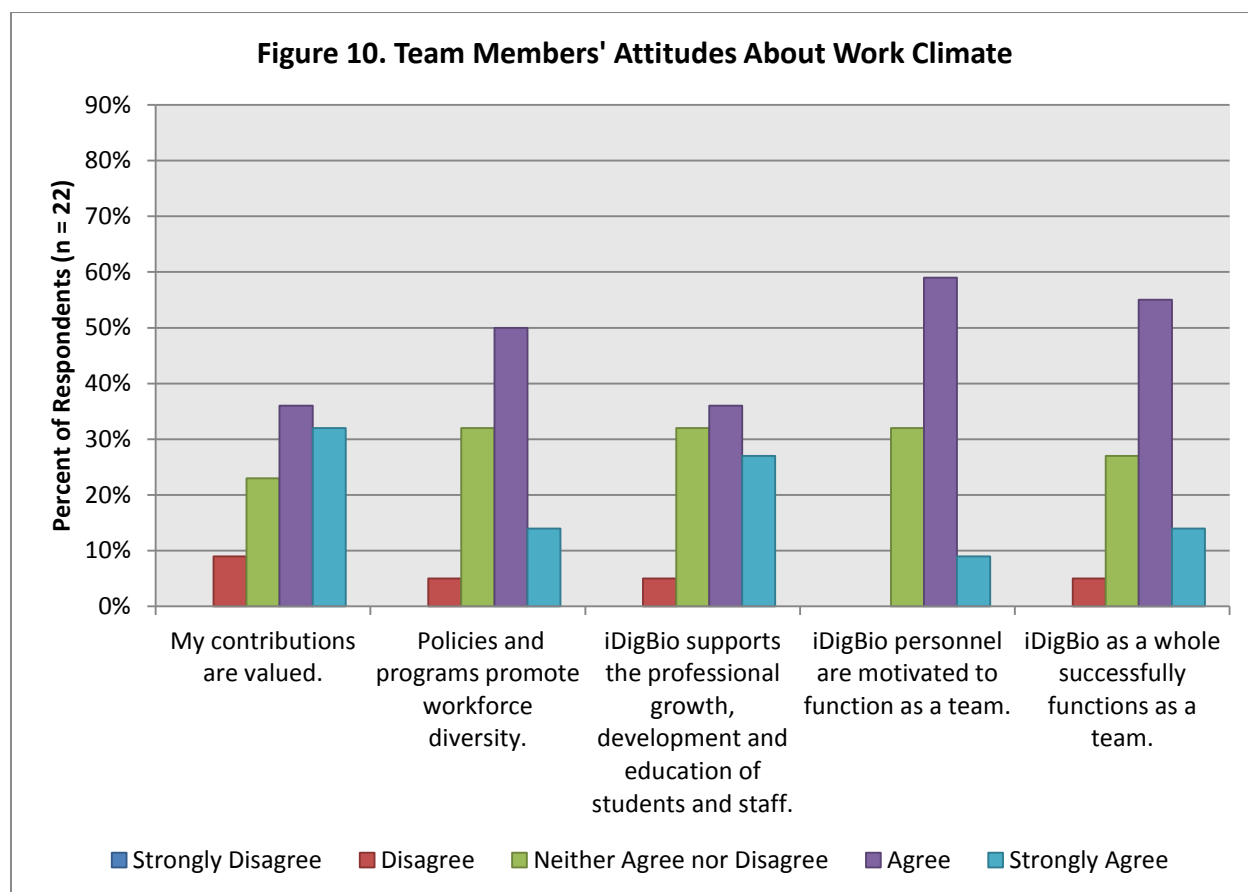


Figure 11. Leaderships' Attitudes About Work Climate

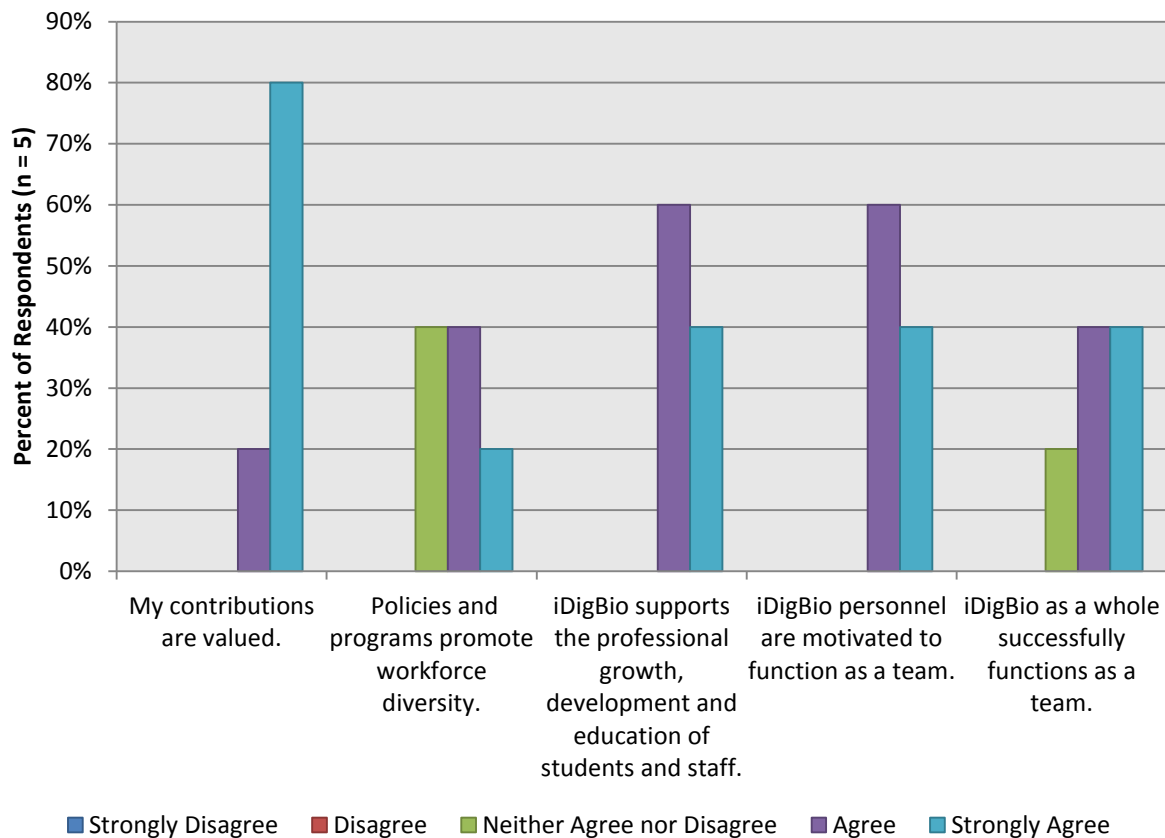
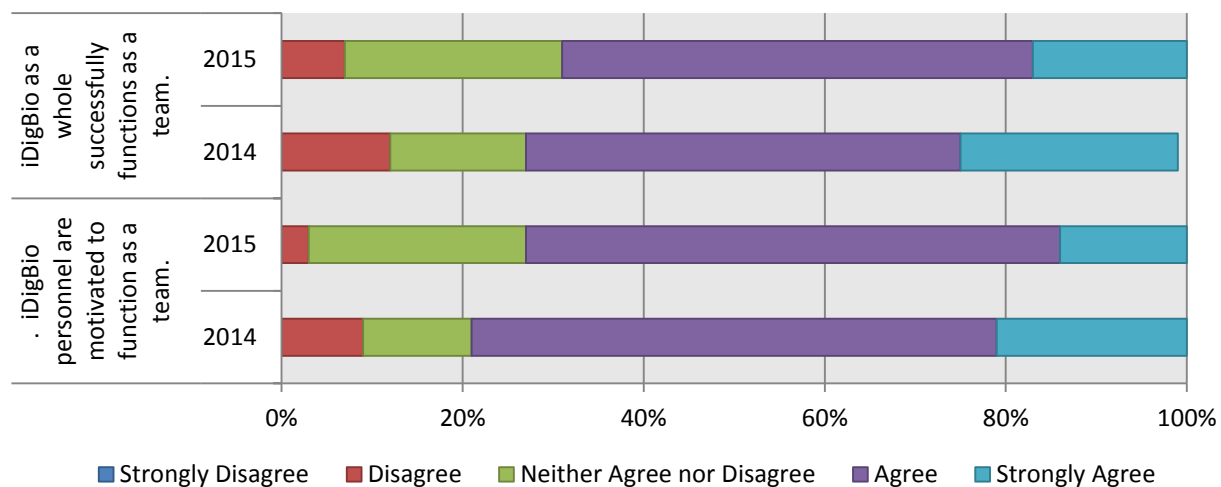


Figure 12. Attitudes Regarding Work Climate: 2014 - 2015



iDigBio Leadership

Overall, the majority of respondents expressed positive attitudes regarding iDigBio leadership, with those self-identifying as members of the leadership team holding somewhat more positive attitudes (see Figures 13 and 14). Because the 2014 question included a “no basis to judge” while the 2015 version did not, it is difficult to draw direct comparisons across the years. That said, the ratings of project leadership were essentially comparable.

There were few comments directly addressing project leadership, but respondents again mentioned that the PIs were not uniformly engaged. As one explained, *“It is clear that some members of the leadership team are significantly more engaged than others. I think this is disappointing and creates angst within the team.”*

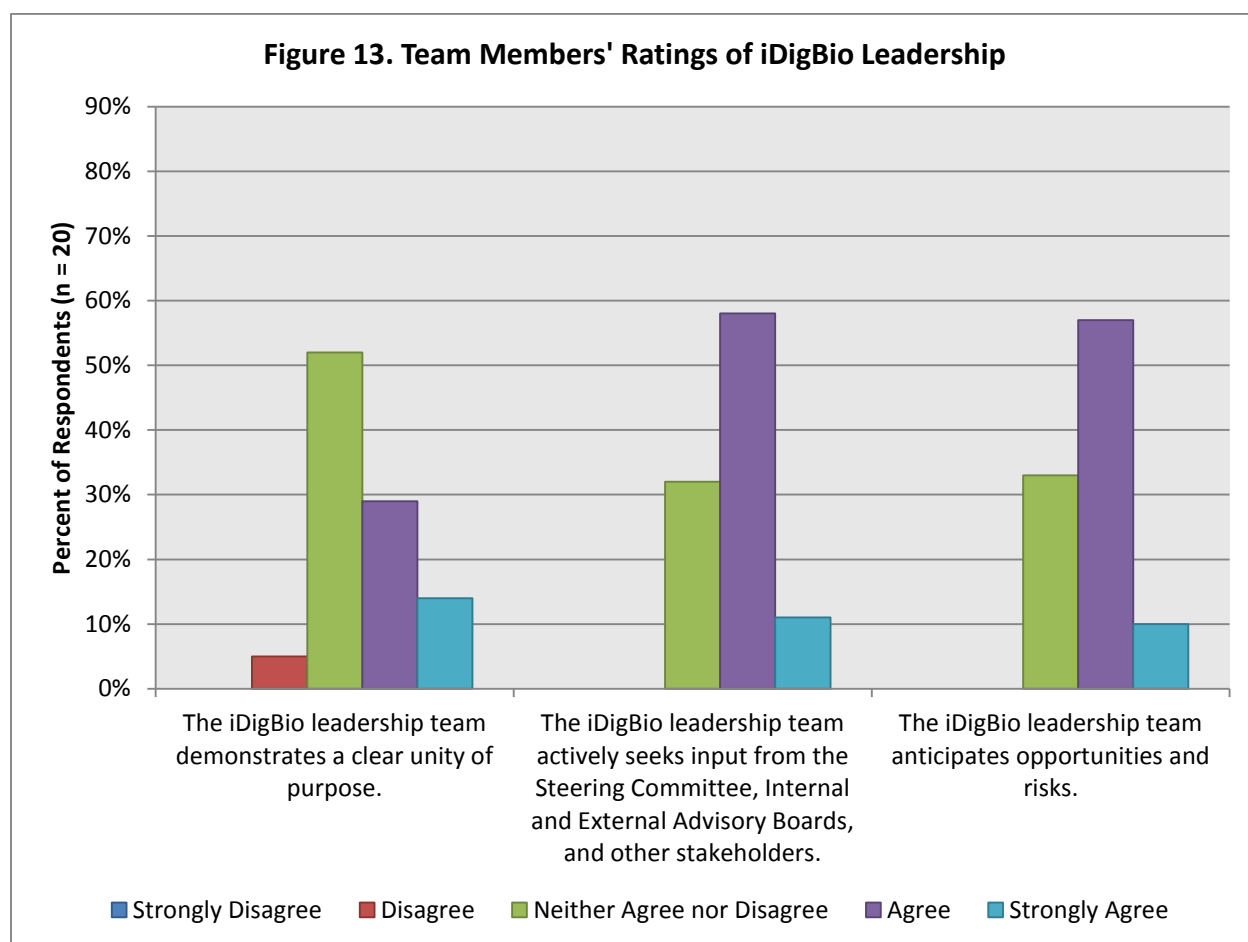


Figure 14. Leadership Self-Ratings

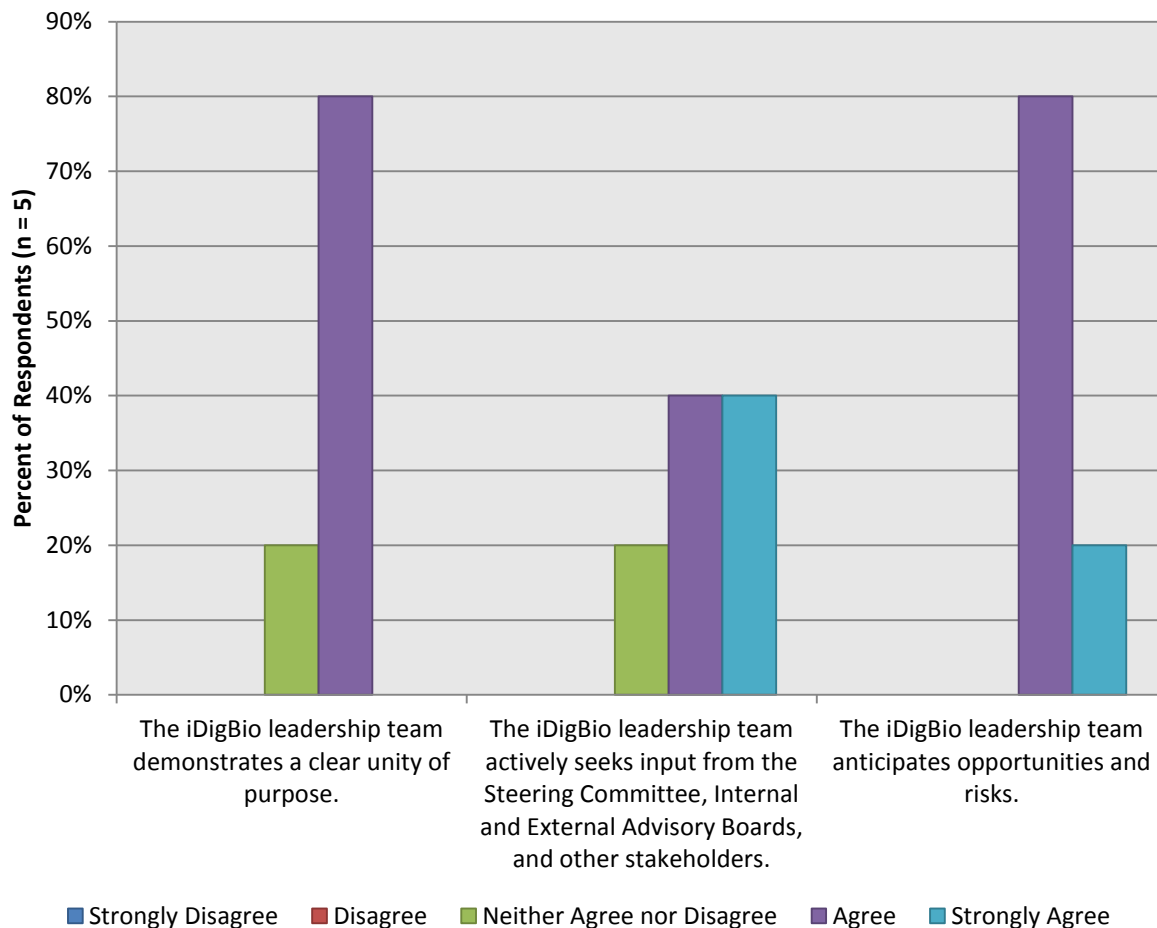


Figure 15. Ratings of Leadership 2014-2015

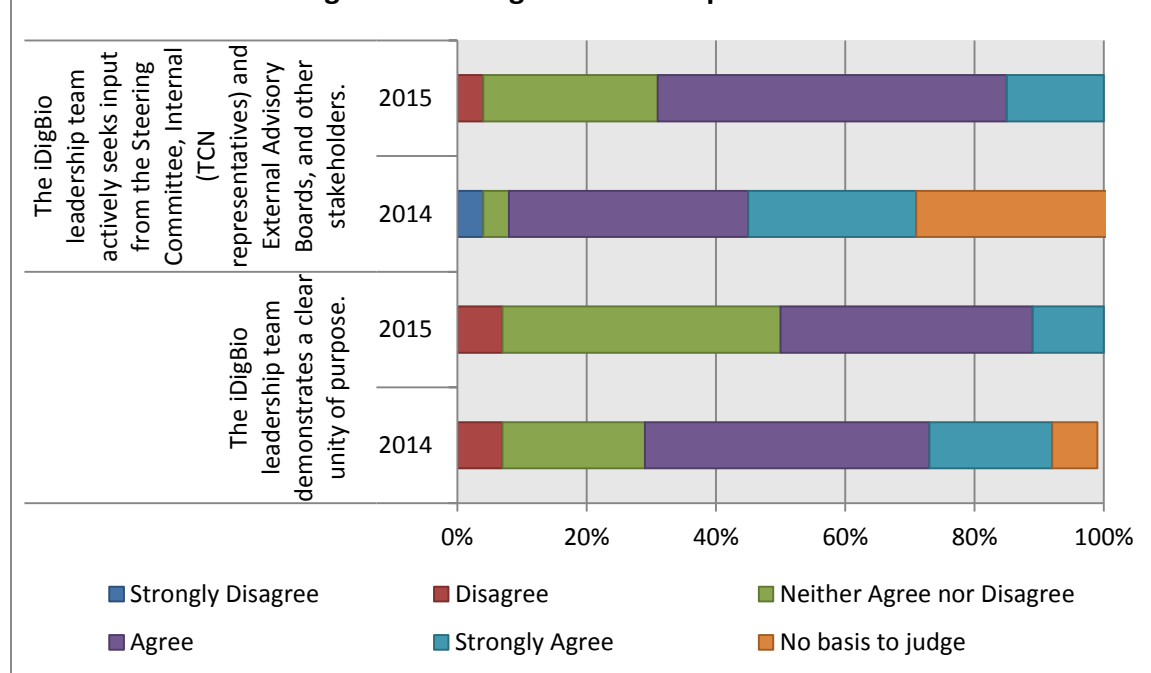
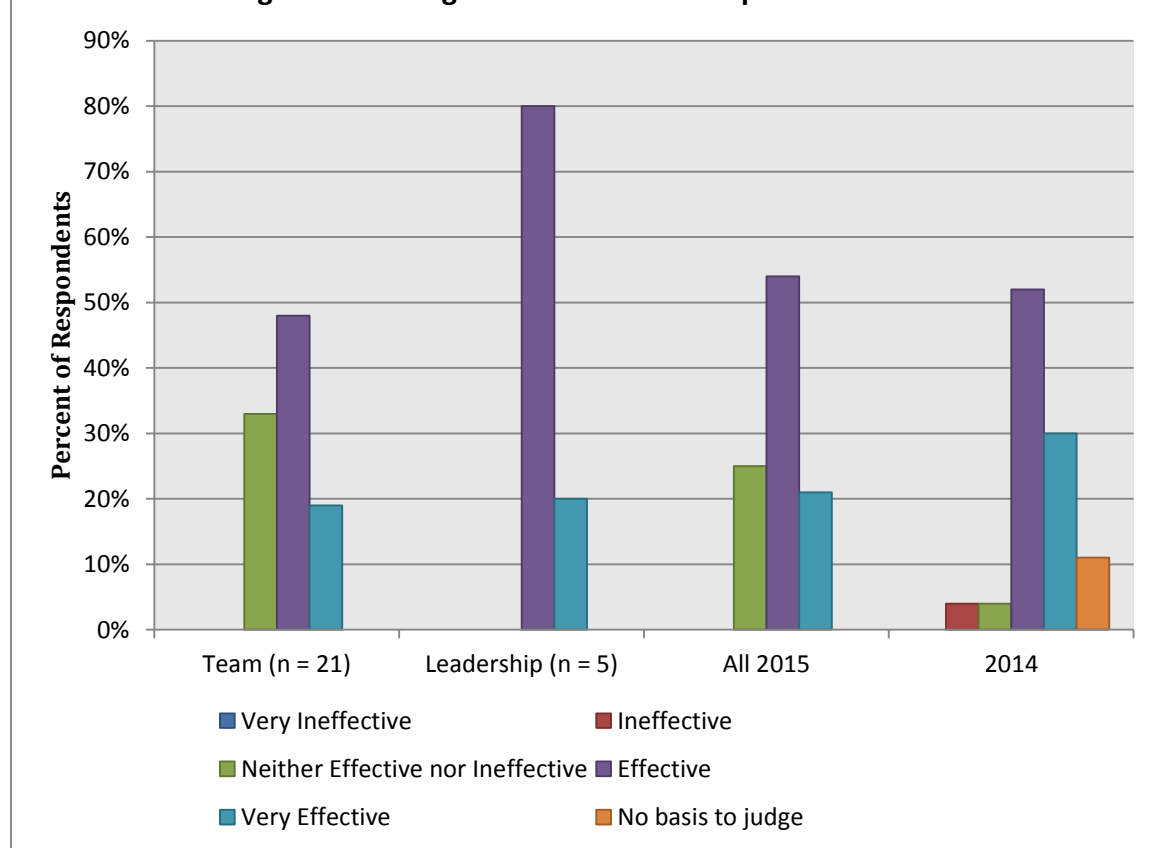


Figure 16. Ratings of Overall Leadership Effectiveness



2015 iDigBio Annual Evaluation: Community Survey

2015 iDigBio Community Survey Summary of Results

Summary

iDigBio conducts an annual survey of its internal team and the collections community, broader scientific community, partners, stakeholders, and others interested in the national digitization efforts. This year, nearly 250 individuals responded; among those representing the community about one-third were affiliated with a TCN or related network. The majority of respondents (over 70%) have engaged with iDigBio at a workshop, webinar, symposia or similar event.

The 2015 survey included questions on iDigBio leadership and communication and project impacts. The results are summarized in separate documents. The survey also focused heavily on the iDigBio portal and this topic has been largely neglected in prior surveys. Over 200 community respondents plus internal team members provided input on the portal. The number of respondents who have submitted data to the portal has doubled since 2014 and most report few or no problems with the process. Those who needed assistance are largely satisfied with the help they received. About half of the respondents who do have data have yet to submit it to the portal; they cited a number of barriers some of which iDigBio may be able to address. While respondents were generous with their feedback regarding the portal, most have favorable evaluations of its development.

Nearly one-half of community respondents visit the iDigBio website at least monthly, most often to access information related to workshops. This information on the website is highly valued by the community, although many observe that the sheer amount of material on the website makes it difficult to find what one is looking for.

Members of both the community and the internal team believe iDigBio is making effective use of the newsletter and social media to keep the community apprised of iDigBio activities. That said, few of those participating in the survey are active users of social media suggesting that it may be helpful to seek additional input from those who do use those tools.

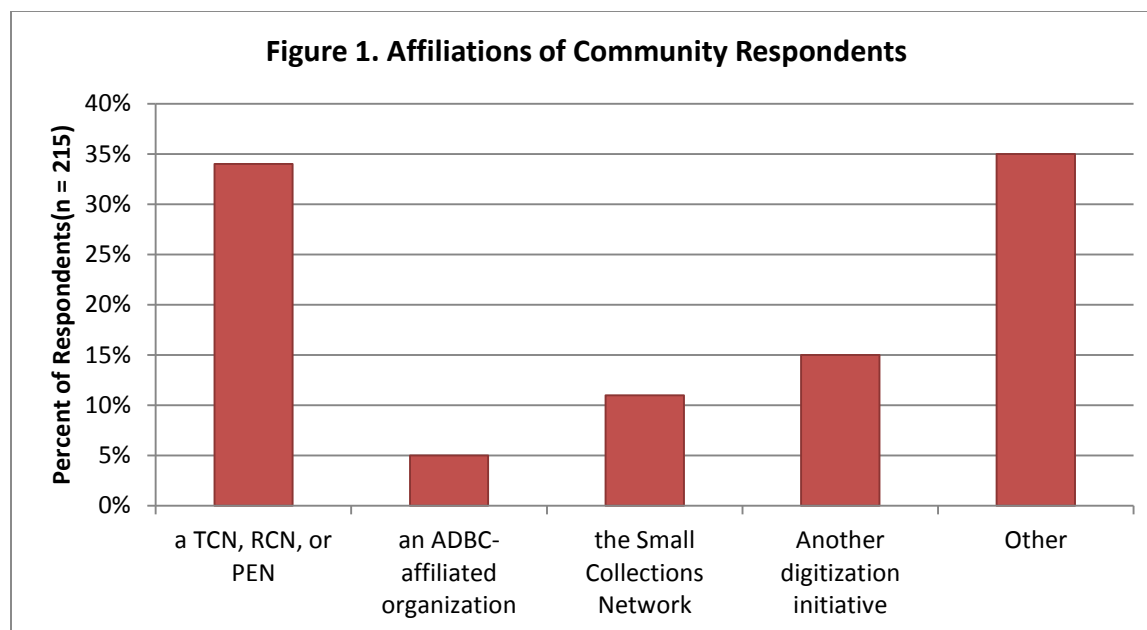
The community gives iDigBio high marks for its efforts toward achieving its major goals. When asked about priorities for the upcoming year, respondents most often cited continued training, software development, and bringing more data online. With respect to the most serious challenges facing the national digitization effort, respondents cited funding, time and staffing, and sustainability.

Approach

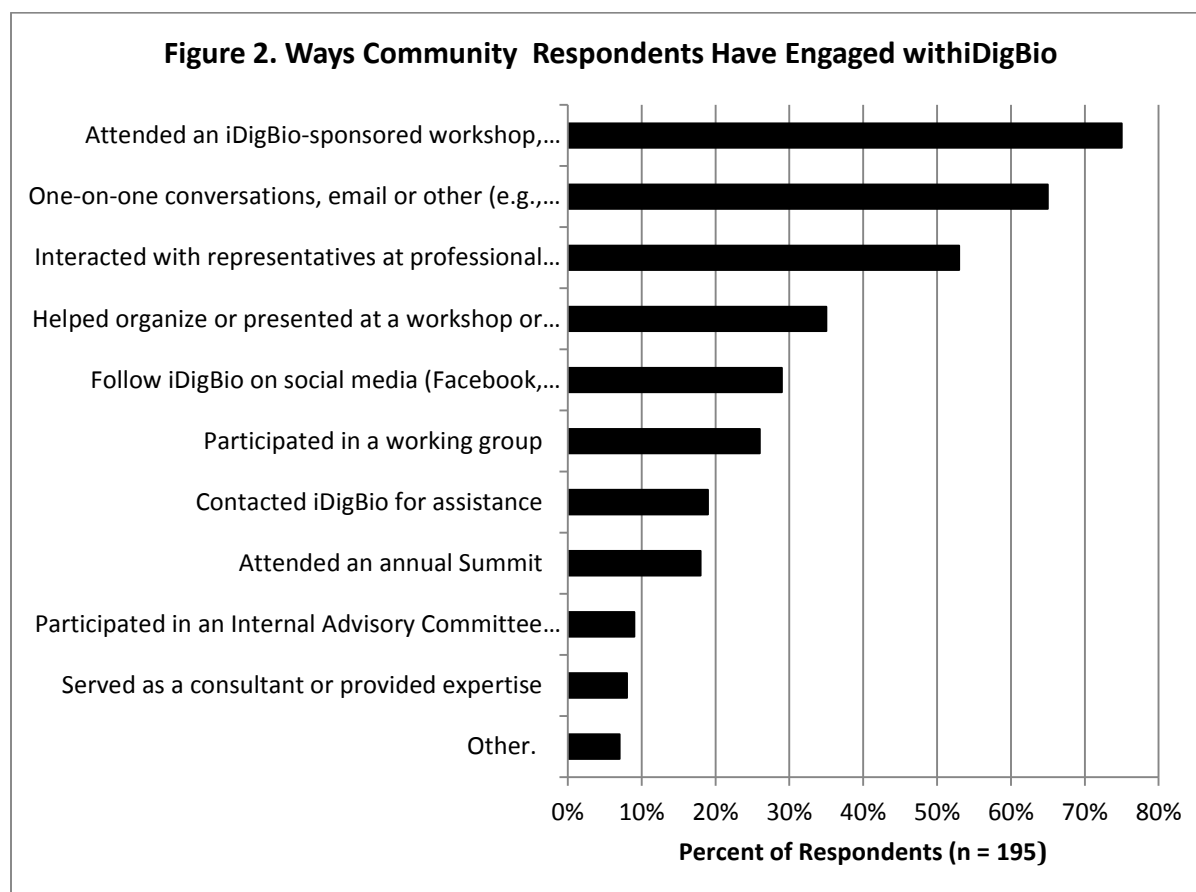
Invitations to participate in the 2015 Annual Community Survey were emailed to over 1300 individuals who have attended iDigBio events, subscribed to the newsletter, are affiliated with a TCN, or are collaborating/partnering with iDigBio in some way. To encourage broad representation, anonymous links to the survey were also provided via the newsletter, Facebook, and Twitter. Nearly 250 individuals responded (including iDigBio team members), yielding an 18% response rate, which is well above the 10% standard for industry surveys.

Respondents

One-third (34%) of respondents identified themselves as current members of a TCN, RCN, or PEN. Respondents who identified themselves as “other” included representatives of NSF Bio Centers, SPNHC, Specify, Vertnet, Symbiota/SEINet, Paleobiology Database, National Park Service, wildlife agencies, and unaffiliated museums and herbaria including several outside of the U.S., as well as university scientists, a high school AP Biology teacher, and members of former TCNs (see Figure 1). Forty-seven percent of respondents were male, 88% U.S. citizens, 82% not Hispanic/Latino, and 84% White; 13% and 14% of respondents selected “do not wish to provide” for the ethnicity and race questions, respectively.



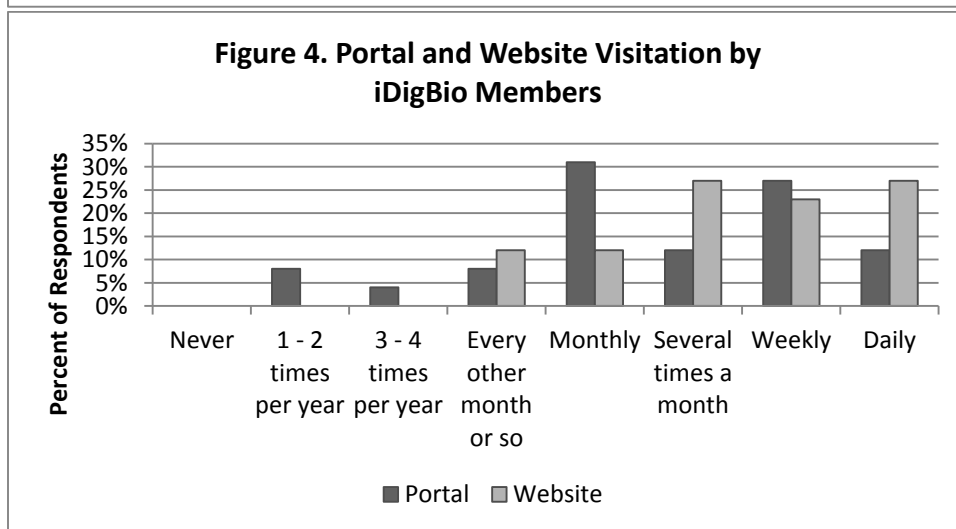
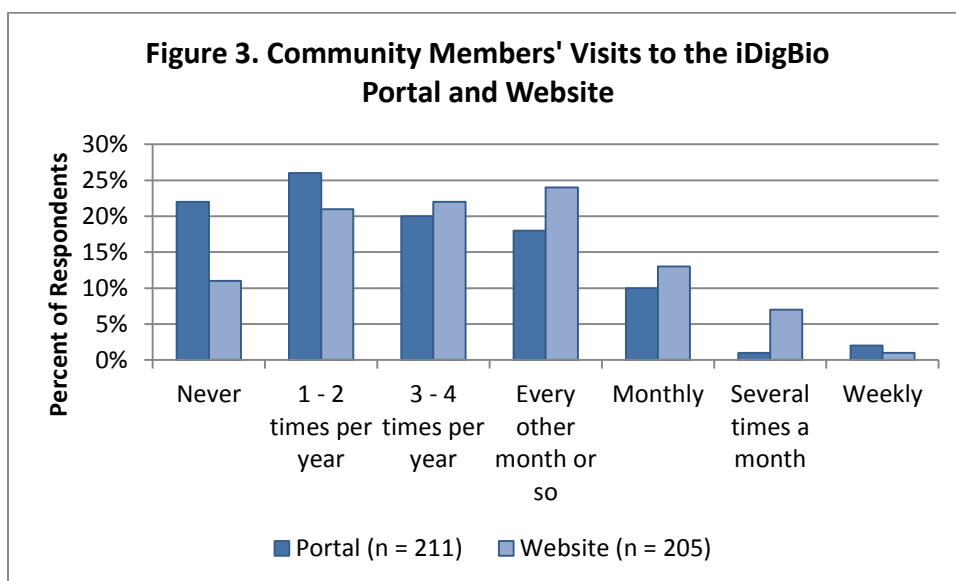
Community members who responded to the survey have engaged with iDigBio in a variety of ways, most often as a participant in workshop or webinar, hackathon, or symposium (see Figure 2).



Portal

The 2015 Community Survey focused heavily on the data portal with 16 questions devoted to the topics. The questions were formulated with the assistance of IT team member Andréa Matsunaga. The results are summarized below with verbatim comments presented in Appendices A – G; relevant (and likely redundant) comments are also dispersed in Appendices J, K, and L which include responses to questions about iDigBio’s success at achieving goals, priorities for the upcoming year, and challenges facing the digitization effort.

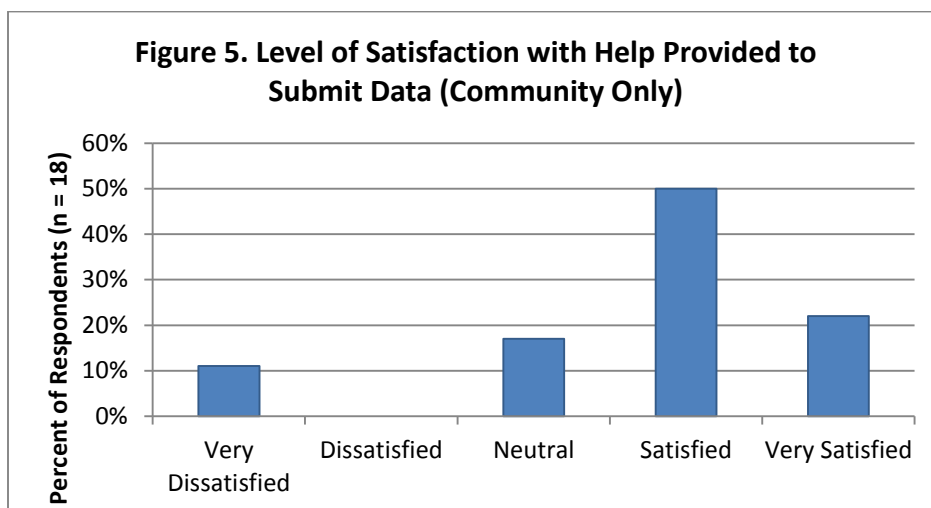
Visitation. Community members were about evenly split between those who visit the portal two or fewer times per year and those who visited three or more times. Two-thirds visited the website three or more times per year, with 11% claiming to have never visited it (see Figure 3). In contrast, 80% of iDigBio members visit the portal at least monthly, and 76% visit the website at least several times a month. (see Figure 4).



Data submission. Nearly half (49%) of community respondents with data reported submitting it to the portal. Of these, only 20% required more than minimal assistance to successfully submit data. Most respondents who required assistance were “satisfied” or “very satisfied” with the help received (see Figure 5). Representative comments:

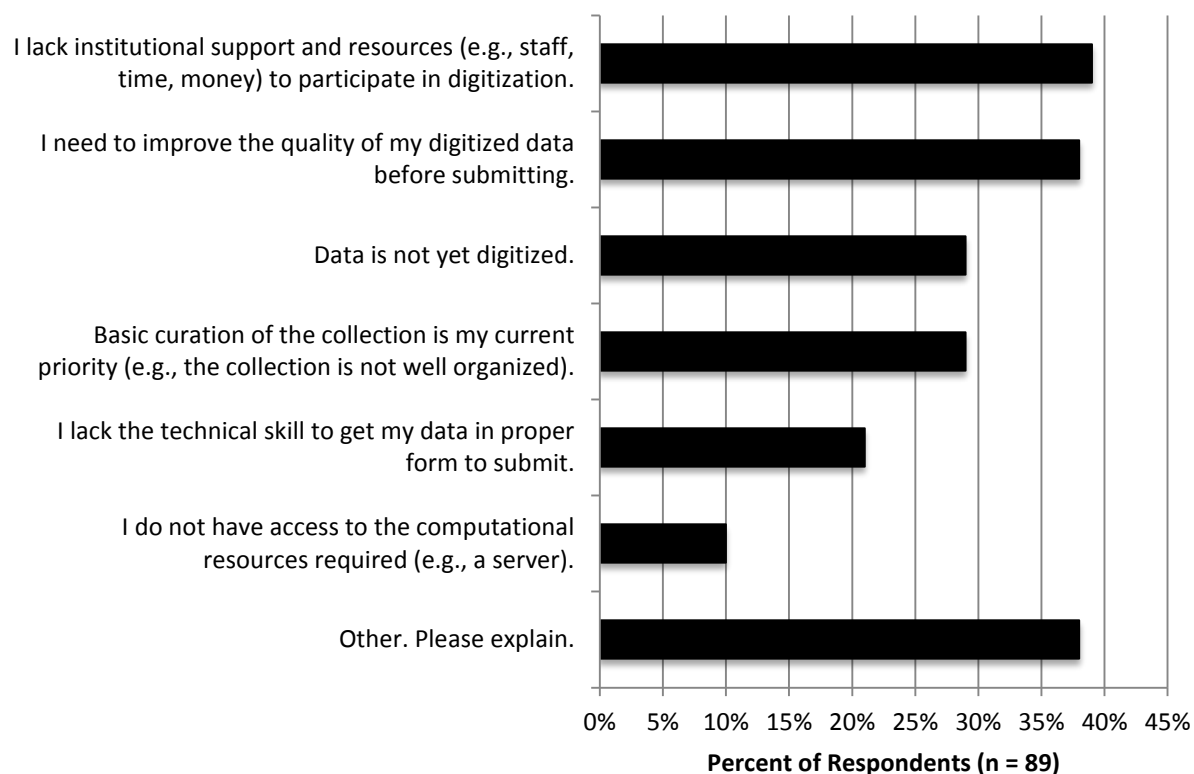
“Staff were very helpful and worked to make sure the data transfer went smoothly. I dealt most directly with Joanna McCaffrey. I was very impressed with how responsive and helpful she was in getting all the kinks worked out regarding the transfer of our data. She also helped get some of the other participants in our TCN, who were slacking a bit on the data transfer to iDigBio front, to get things moving in the right direction. I found her to be very personable and efficient.”

“Some of our data [are] very difficult as it does not fit into Darwin Core. It is a process to figure out what to do with those data, so sometimes it takes longer than I would hope. All of the persons involved have been very helpful.” (See Appendix A for additional comments about submitting data):



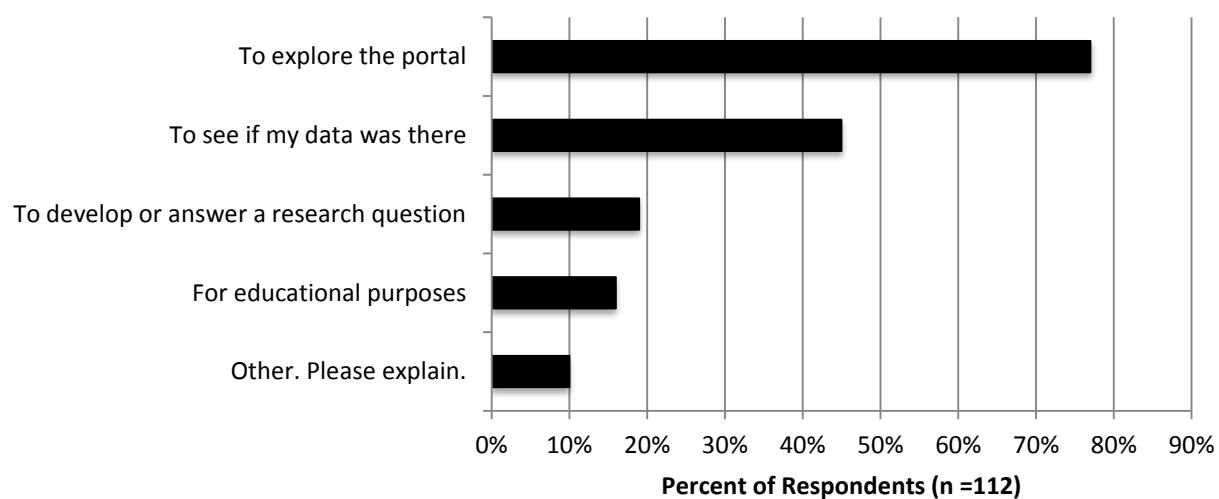
Barriers to data submission. Fifty-one percent of respondents with data have not yet submitted it to the iDigBio portal and 84% of these reported at least one barrier to submitting data (the remainder are submitting through other initiatives or are in the process of submitting data now). The most commonly cited barriers are lack of institutional support/resources and the belief that the quality of the digitized data needs to be improved prior to submission (see Figure 6). Some of the barriers cited are issues that iDigBio can potentially help with (e.g., lack of technical skill or computational resources). This suggests that iDigBio needs to continue widespread outreach to the collections community and possibly increase efforts to raise awareness of iDigBio resources. The responses of those who cited “other” barriers are provided in Appendix B.

Figure 6. Reported Barriers to Data Submission (Community Only)

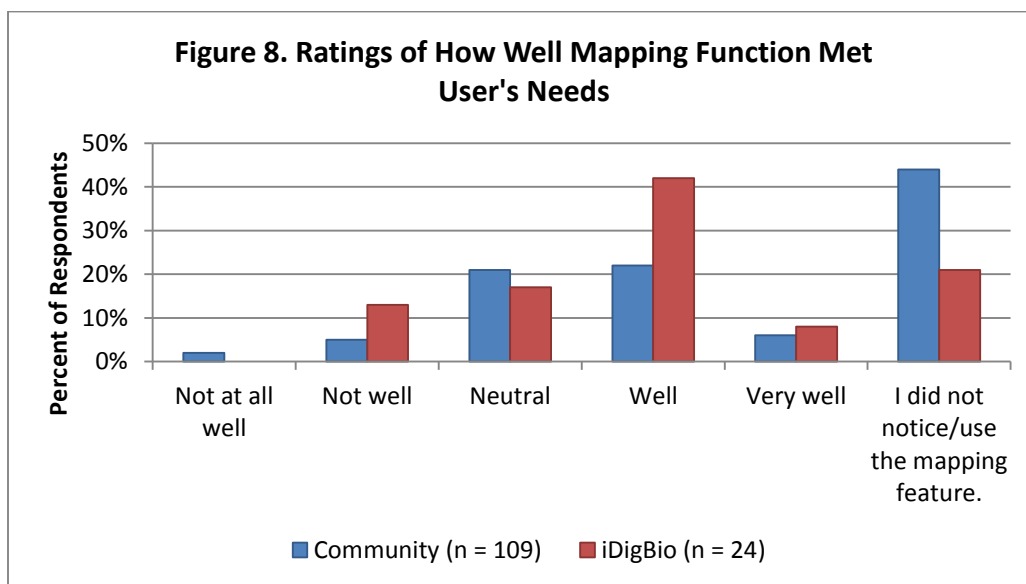


Portal Search. Fifty-three percent of community respondents who had visited the portal reported using the search function, mostly to explore (see Figure 7 and Appendix C for additional motivations.)

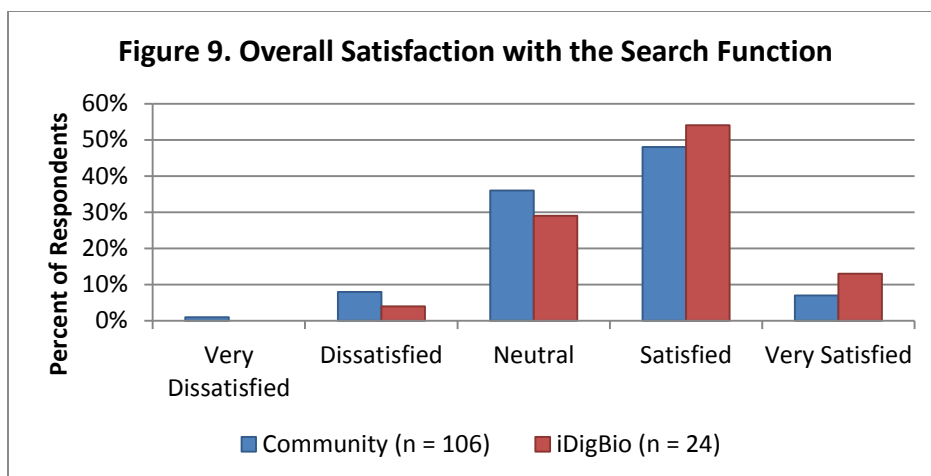
Figure 7. Motivation for Searching the Portal (Community Only)



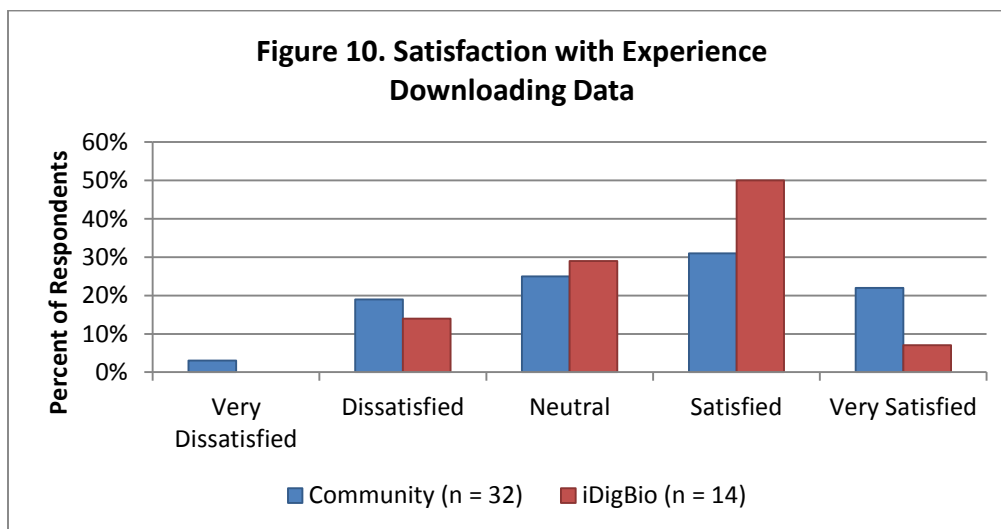
Over 40% of the community members who searched the portal either did not use or notice the mapping function. Of those who did, 50% thought the function worked “well” or “very well,” 38% were “neutral,” with the remaining thinking it did not work “well /work well at all.” Among the iDigBio team who used the mapping function, 63% thought it worked “well” or “very well” while 16% rated it as working “not well” (see Figure 8). Comments suggest that the map is “buggy,” can be difficult to center, and sometimes drops the user to a point off the map. One respondent suggested that the team focus less on the mapping feature and more on getting data (because good mapping alternatives are available elsewhere), while others would like additional mapping features to allow them to “get deeper into the data.”

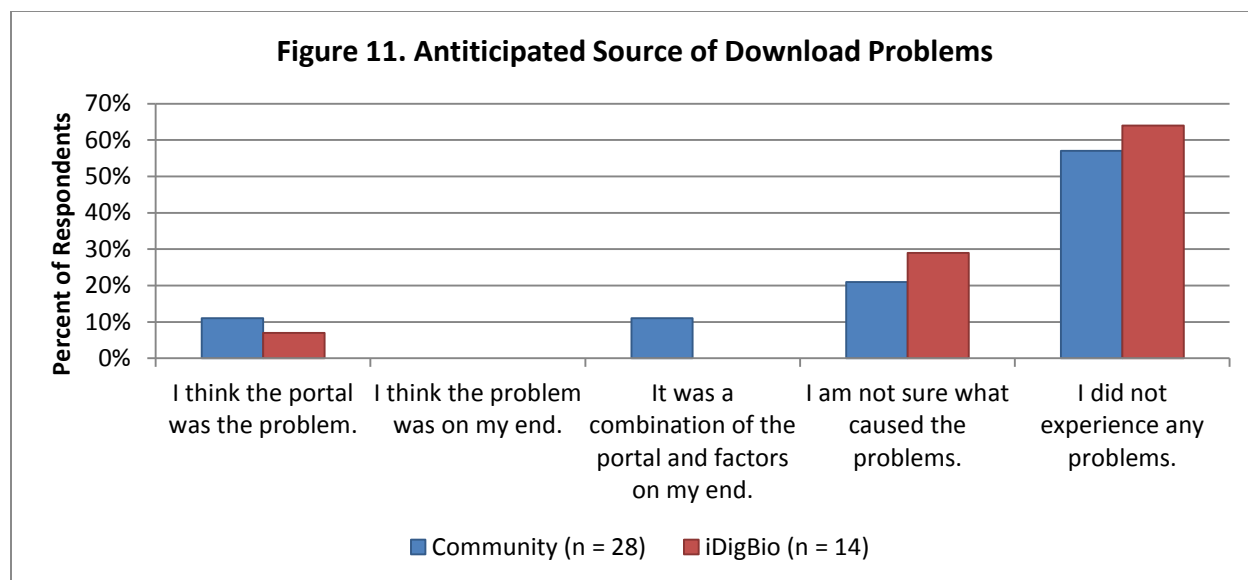


Nine percent of community members or 4% of iDigBio team are “dissatisfied” or “very dissatisfied” with the search function, with 55% and 67% of the respective groups are “satisfied” or “very satisfied” (see Figure 9). Comments suggest that users find the interface attractive, appreciate how quickly results are returned, and like the Encyclopedia of Life synonyms feature. Those who are satisfied with the search function find it easy to use and intuitive, while others users sometimes struggled. Users are divided on the issues of fields and taxa with some apparently wanted more of both and some wanting less. Respondents offered a variety of suggestions for improvement—some quite specific and perhaps idiosyncratic. Users would like the option of searching by institution, and note that additional features are needed to improve the usefulness for paleontological searches. The most serious criticism is that the searches did not always return all the information that the user expected based on their experiences with other data portals; this obviously threatens their confidence or trust in the data (see Appendices D, E, and G for verbatim comments).



Downloading specimen data experience. Only fifteen percent (32) of those who have visited the portal have downloaded data. Slightly more than half were “satisfied” or “very satisfied” with the experience, which reflects that users’ experiences varied—some had trouble downloading the data, some did not, and for some it took a long time (see Figures 10 & 11). Several users question the format of the output, noting that csv files are easier or that a FAQ sheet or other assistance is needed to help the user know how to view the data once they have it (see Appendix F).





Website

The survey included four questions about the iDigBio website. (A more in depth analysis of website usage as well as workforce training provided in a separate document—the Year 4 Impact Evaluation).

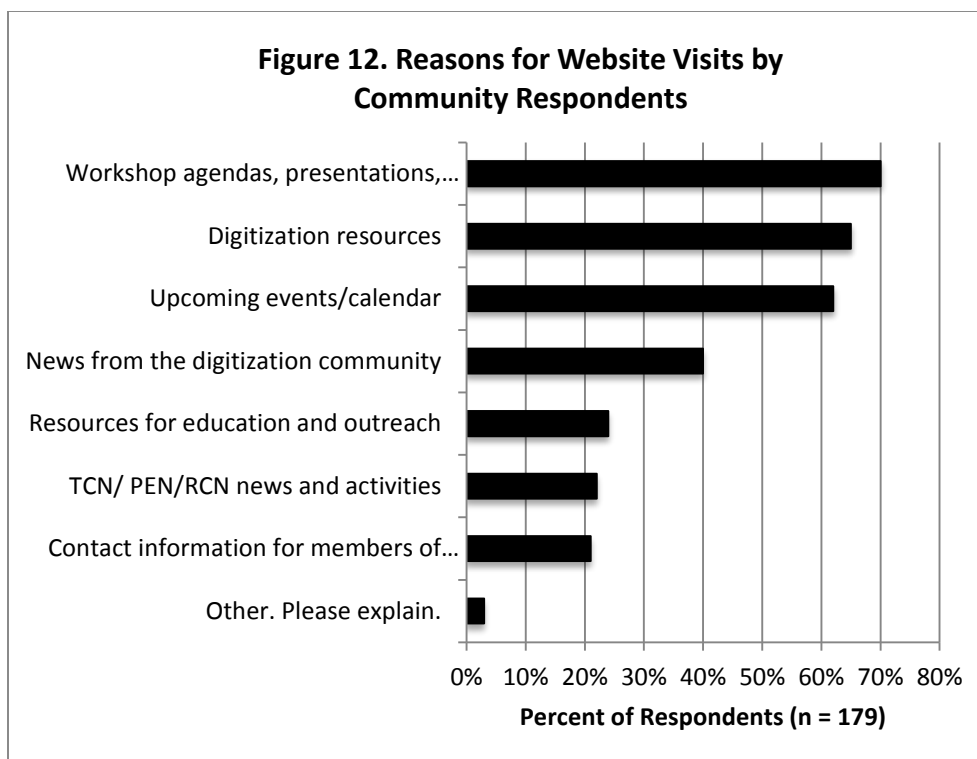
As shown in Figures 3 and 4 above, 89% of the iDigBio team visits the website at least monthly compared to 45% of the community respondents. The most common reasons the community visits the website are to access workshop agendas, presentations, and reports (70%), digitization resources (65%), and information about upcoming events (62%). (See Figure 12). When asked where they might find information currently available on the website if it did not exist, 19% of community respondents reported they did not think they would. As one individual observed, “*I have no idea. I don't think I could. One of the most valuable aspects of the website is all the wikis and being able to see past workshop presentations and other such documentation that may never be published but are essential resources.*” Another noted that some of the resources would not even exist without iDigBio: “*There's no one place where this information would be available, and without iDigBio none of the workshop and working group resources would exist.*”

While the website, and the information it contains, is highly valued by the community, comments suggest the website remains very difficult to navigate. Representative comments:

“It is often difficult to find specific information about digitization when I have looked for it. This could be partly due to the vast amounts of information on the iDigBio website. However, most of the information is in the form of adobe connect videos which makes it difficult to find anything specific without wading through an entire talk.”

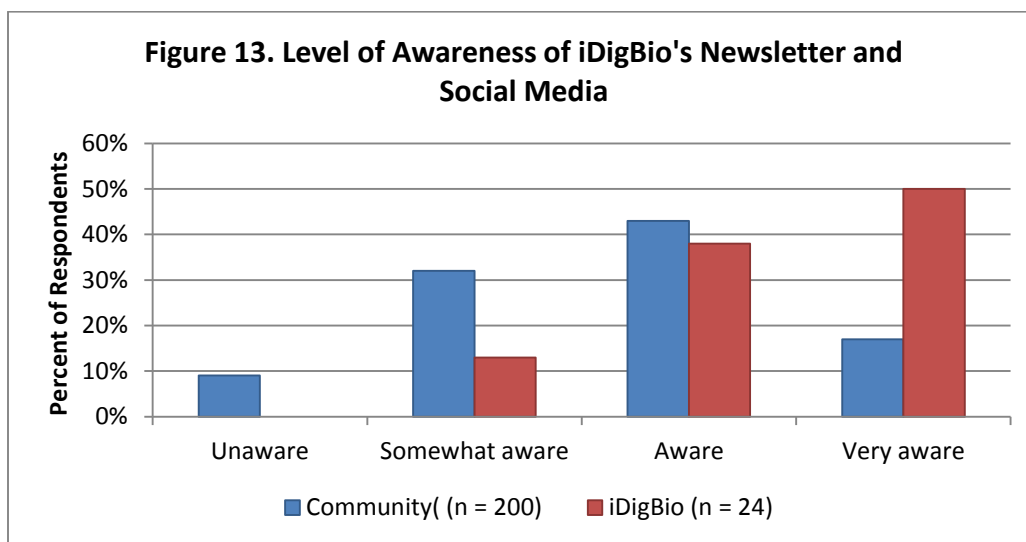
“As iDigBio has grown so has the website. It has gotten pretty overwhelming and this makes it hard to find what you need as times. I wish I had a suggestion as to how to deal with this situation.”

“It is not easy to determine from looking at the home page where to find information and results from past iDigBio workshops. I guess one can do a search, but if you don't remember the exact title of the workshop it may be hard to determine where that information is. It would be nice to have an easily accessible link in the home page to a page where we could browse for results and other materials of past workshops.” (See Appendix H for additional comments.)



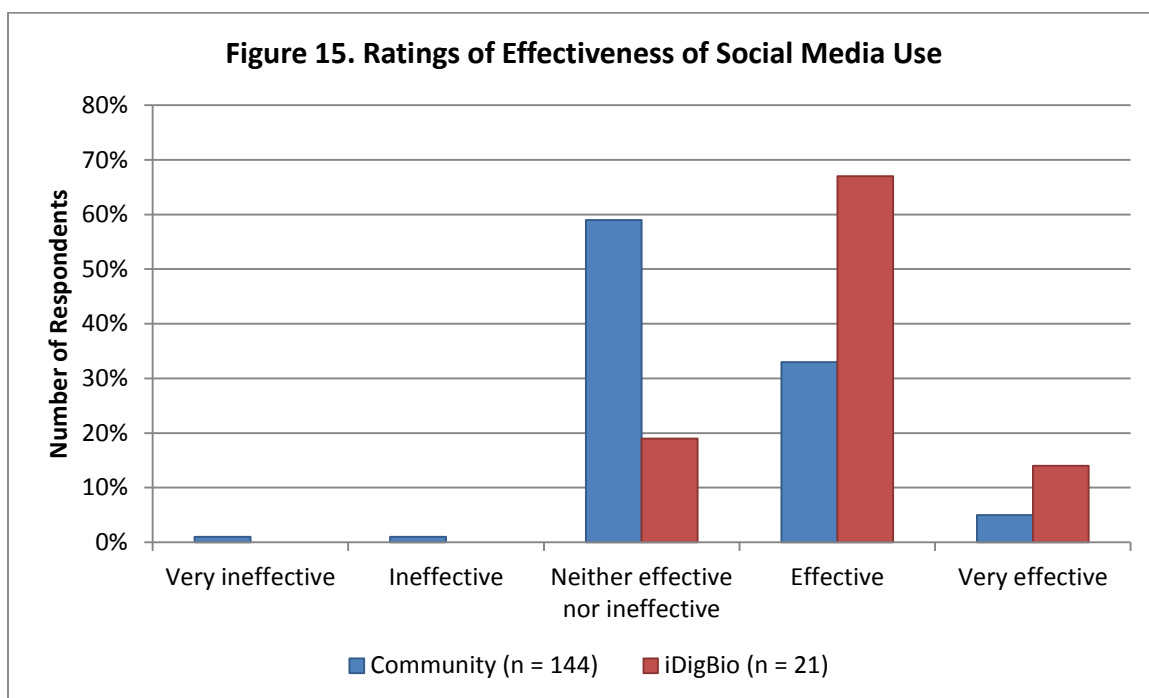
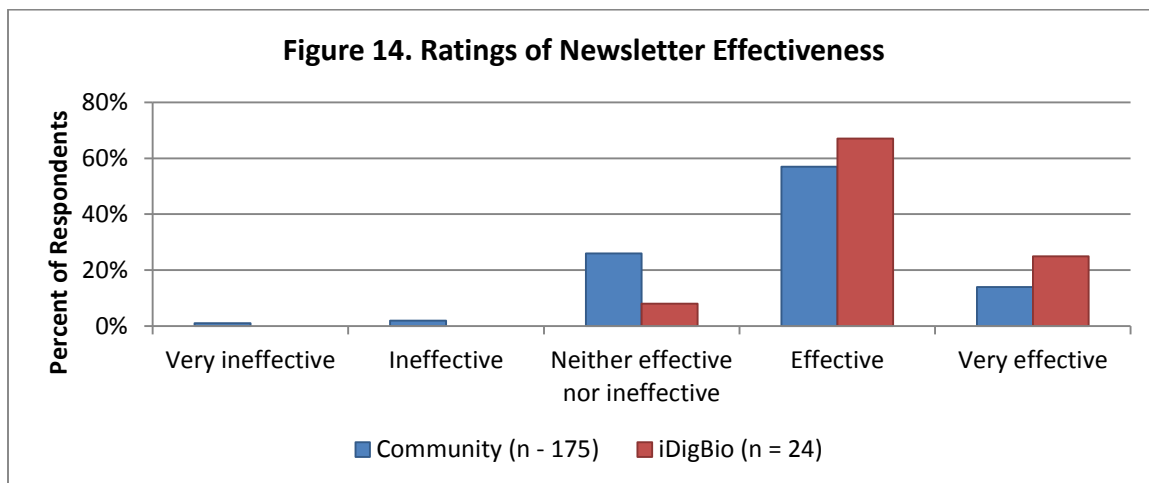
iDigBio Communication Efforts

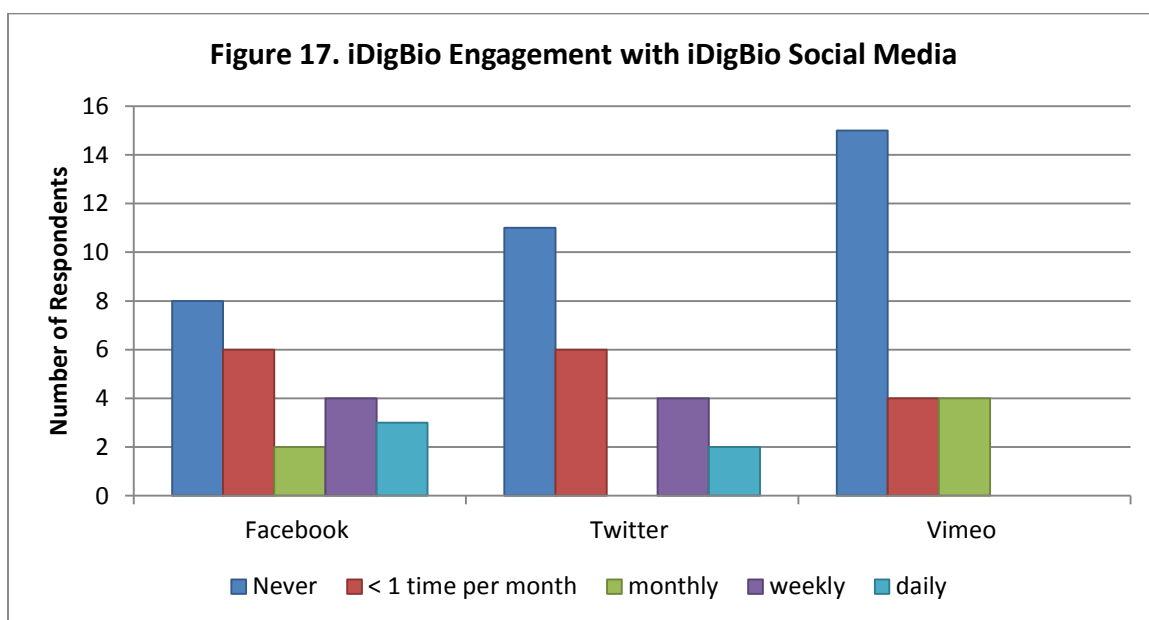
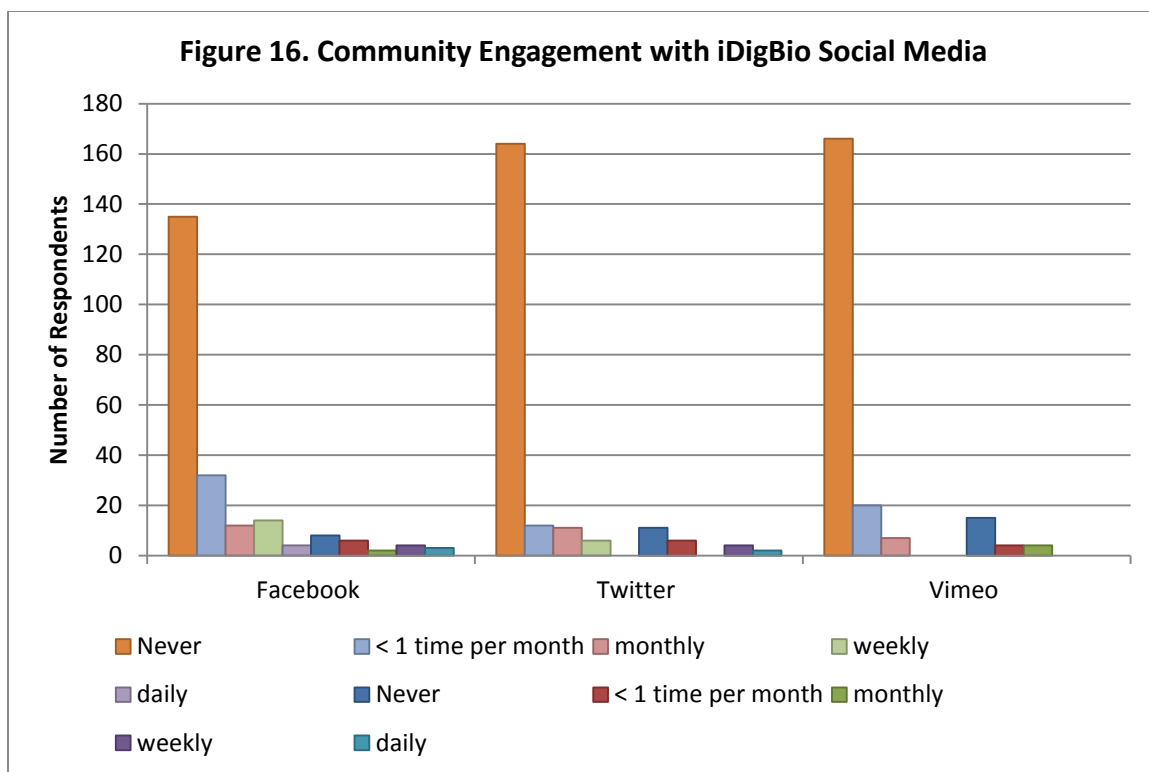
The survey included six questions about iDigBio's communication efforts with an emphasis on the use of social media. The majority (>90%) of the community and iDigBio team are at least "somewhat aware" of the newsletter (*iDigBio Spotlight*) and social media efforts (see Figure 13).



Over 90% of the iDigBio team and 71% of the community respondents rate the newsletter as "effective" or "very effective" at keeping the community informed about iDigBio activities, while 81% of iDigBio and 38% of the community respondents rate the social media efforts as "effective" or "very effective" (see Figures 14 and 15). The lower rating of social media use, particularly among the community respondents, likely reflects their active dislike of these communication channels. While the numbers of individuals following iDigBio on Facebook and Twitter has

increased steadily to over 700 and 800, respectively, the vast majority of respondents to the survey are not members of those groups (see Figures 16 and 17).





Several respondents did offer suggestions on ways to improve iDigBio's social media presence:

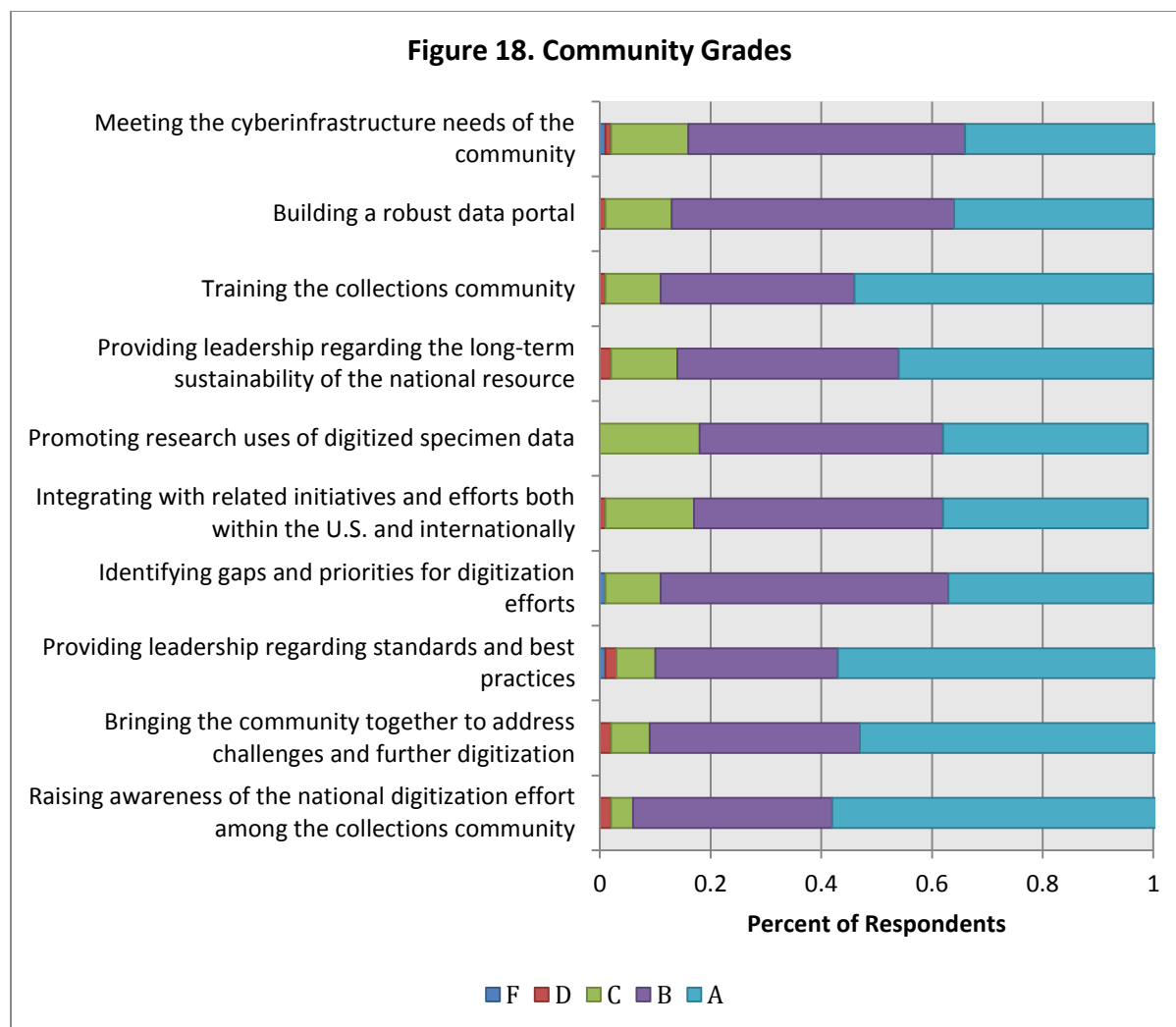
"It is great to see that iDigBio is using social media and is active. Perhaps it would be more effective to post fewer general interest stories. At times it seems that these stories are just being reposted without much thought about the content. In addition, many similar social media feeds are posting the same ones that week. I think this can dilute the message at times."

"While having the Facebook page share relevant articles is interesting & does lead me to sometimes find out about new things I hadn't heard of before, it would be good to also see the Facebook page talk more about what iDigBio is doing as far as events/workshops and updates from these events."

"Don't just have a facebook page. If you want to engage the community you have to go to their forums, they won't come to yours without a reason. Get involved in the identification forums for mushrooms and plants and look for opportunities to throw in a plug for iDigBio and show people how they can access the data themselves to answer their questions." (See Appendix I for additional comments.)

Overall Ratings of iDigBio

To gather an overall sense of how the community perceives iDigBio is performing, we asked the community to grade how iDigBio is performing in ten areas of impact. Respondents were allowed to assign plusses/minuses, but the grades are collapsed here for ease of presentation. As shown in Figure 18, the community clearly believes that iDigBio is performing well and making progress across all areas. For several reasons, however, the results should be interpreted with caution. On average, only about one-half of the respondents were comfortable assigning grades/answering these questions. Some who did nonetheless commented that they really had no basis to judge but did not realize that they had the option of skipping the question. (We did not include a "no basis to judge" option here in a misguided effort to *allow respondents to skip ahead*.) Comments provided by respondents also remind us that individuals vary widely in how they assign grades. As one respondent observed, *"Some are hard to judge. If you didn't get an A it doesn't mean you aren't doing well at it, but rather that that area might be the next to focus on."* Despite these limitations, we can conclude that overall the community believes iDigBio is doing well achieving its goals (see Appendix J for comments).



Priorities for the upcoming year

Both the community and members of the iDigBio team were asked to share their thoughts about the most important tasks iDigBio should focus on during the upcoming year and any ideas for new initiatives and activities. The most frequent response was workshops and training, followed by software development and bringing more data online (see Appendix K for all comments).

Biggest challenges

Both groups were also asked what they regard as the biggest challenges faced by the national digitization effort at this point in time and how iDigBio can help address these challenges. As in past years, the most common responses were funding, other resources (time and money), and sustainability. However, the community provided a wide variety of unique responses that have not been shared on prior surveys, perhaps reflecting the more diverse sample that completed the survey this year (see Appendix L for all comments and Appendix M for ways iDigBio might help address the challenges).

Appendix A. Comments about data submission and the nature of help required

- Our preference would have been to not do this step yet and just wait until we had our customized HUB interface built. But it didn't take too long to accomplish this - so that was fine.
- We got it worked out, fairly quickly and painlessly.
- I, and also staff members here, contacted iDigBio staff via email to set up the best way to provide our specimen data to iDigBio.
- Sent multiple emails to help submit data. Received very short terse answers that did not solve the problem or answer the question.
- We have partial data served through iDigBio but are still working to get our IPT properly interfacing to serve our full data
- I have requested assistance submitting data to iDigBio.
- Emailed members of tech staff
- Typically our workflow involves submission to Joanna with an initial review, then a secondary review by someone in the ACIS group
- For certain collections some manual manipulation is required.
- As a TCN, we were asked to contribute our data ASAP. We have a plan for providing data via a Hub developed as part of our TCN project, but in the meantime our institution has worked with iDigBio staff to make sure that specimen data can be directly sent to the iDigBio specimen portal via IPT directly from our collections management software system (Specify). To make sure that the data were feeding correctly, we needed to make a few adjustments to the IPT and this required communication with the iDigBio team.
- Reached out to Joanna McCaffrey
- In submitting data, trying to get our RSS feed set up - Joanne McCaffrey was most helpful.
- We worked with the lead data person on our TCN. Since we've moved to using an IPT server things have gotten easier (for everyone).
- We needed help with getting our specimen data and images uploaded. This was due to a variety of reasons, including the database we were using, figuring out the protocol for image uploading, and being sure that our fields matched.
- I mostly deal with iDigBio via VertNet
- Personal contact for advice and coordination.
- I needed help to determine how to map the fields in our in-house database to DwC.
- Some of our data flows into the portal from the Symbiota portal and I don't do anything. My problem right now is getting help with our CSBR data and images. . .we are working on a way to get the data to iDigBio as required by the grant, but so far haven't achieved that.

Appendix B. Barriers to data submission

Submitting through others (not a barrier)

- Our data is loaded to Symbiota portals, which in turn load to iDigBio
- We are working through various ADBC initiative rather than with iDigBio directly
- In process via Symbiota
- Data submission being done through InvertNet
- TCN will submit data
- Working with Consortium of Pacific Herbaria (CPH) which has not yet submitted data

In process

- Waiting for TCN Lead to provide necessary equipment.
- I work with collections, data production, but data management
- Our TCN is still in the early stages
- We will submit data soon
- It's underway, just not submitted at this time
- We are instituting GUIDs over the next 2 weeks then I'll be working on submitting data.
- Working on it, will soon submit

Not ready

- IPT portal not ready at our institution
- Not all data digitized yet
- Currently changing databases
- Data needs to be formatted for iDigBio ingestion and this is lower priority than other activities.

Confused

- Don't yet quite understand what the best order of operations is for us in getting data into iDigBio, VertNet, GBIF, other similar databases, our own online database, etc.
- I am unaware of how to submit data

Resources

- Lack of a position to help with data export
- Another staff member is involved in the submission but our data was not in the correct format.
- Time (n = 3)
- No director is currently available
- Insufficient resources allocated by projects to submit separate iDigBio datasets for every TCN/PEN that we are involved in.

Archive elsewhere

- Lack of time, and we archive elsewhere
- Located in Canada (probably will submit to Canadensys)
- Started databasing our herbarium specimens in collaboration with Sydney Herbarium

Other

- Other priorities have kept me from looking into this
- Motivating responsible staff to submit!!
- Fully digitized - may contribute
- Vertebrate fossil locality data restrictions - confidential data

Appendix C. Other motivations for searching the data portal

- To provide feedback for iDigBio about using the portal (n = 2)
- To see if the functionality has improved
- To find data on rare species for use in Natural Heritage Database.
- When deciding whether to catalog a specimen with no data, I use either VertNet or iDigBio to find out how many specimens of that species have been cataloged and if country only, how many.
- To see how data was standardized
- For documentation/data for a research paper
- Inquiry for project
- To establish user requirements
- Collections management (data QAQC in our database)
- To determine how others are recording their data

Appendix D. Comments about the search function

Positive Comments

- I like the ability to sort by clicking on column headers. Advanced search is excellent and powerful while still being intuitive. Love the tab design on specimen records, and the ability to view query results as a list, labels, or images.
- Nice to have a general simple search to begin. If that doesn't yield results, then the advanced search pops up. Very nice to keep a search going, without seeing the null set only. The simple search should search all available fields, not just the genus/species.
- Actually I have found everything I need, so I think it works well
- Fast response from server is a plus.
- The search is very quick.
- Specimen search worked quickly when correct parameters were entered (genus, country).
- I really like the search function. It is very easy to use, intuitive and based on Darwin Core.
- Really like the EOL integration to add synonyms. Like that you can add fields for searching wish you didn't have to remove other showing fields to be able to see the newly added fields on the screen...I realize that screen real estate is an issue. Layout in general is nice at both the record display and detail displays.
- The system worked well once we got into it.
- [I like] the standardization that has been done to allow cross collection searching.
- I do like the tiled results.
- The field selection and the quick response to queries. The Meta Data Fields included are very helpful and inclusive.
- I think it works well - with the exception of geological age, which is difficult to search for (which is a Darwin Core issue)
- The search is not immediately intuitive, but seems to be powerful once past the learning curve. I have not yet spent enough time to feel completely comfortable.
- Like the virtual pagination.
- Full-text searching works well. I also like the Add EoL synonyms feature and the auto-fill drop-downs that result when entering values into the advanced search boxes

Data are incomplete

Search functions are more difficult to use than the average Symbiota portal. The information that is returned is, for the most part less useful (and comprehensive) than that returned from a search of most Symbiota or herbarium-aggregated (e.g., Consortia of Pacific Northwest Herbaria) portals.

- Put specimen records in a sidebar rather than across the page where so much space is wasted. I did a search on a very common taxon in iDigBio portal and it returned 1,100 specimens. I did the same search in my regional portal and it returned 2,052 specimens. For this reason alone I can't really rely on iDigBio portal for reliable distribution data.
- Search functions do not display all data that are shared with other partners. Large data gaps exist for plant specimens. GBIF is a much better and professionally accepted tool.

Mapping issue

- I recognize that this is a work in progress. I was impressed with what was developed thus far and I feel that Andrea M and staff have done an excellent job with this and I'm sure further improvements will be made. If I had to point out specific problems some times I did have a bit of trouble getting the map to always center and some times I would be dropped down in a point outside of the field of view of the map. This is not meant as a critique of what was developed except in a constructive way.
- The functionality seems very basic at present and there are other sites (e.g., BISON) that have much more sophisticated mapping tools for the same kinds of data.
- It would be better if the map were zoomed in to the area that was covered by the specimens that had come up on the search.
- Symbiota mapping of results is better.
- The little Leaflet map in the corner of the search page is often buggy. It sometimes crashes or comes up blank. The specimen detail pages work very nicely.

- Some aspects are confusing, such as the "missing" or "present" buttons and the mapping features.

Fields are unclear

- It can be very tricky to figure out what the different fields mean. Is "collection code" an institution or a group of animals? Also, where does one find an "institution code"? Ultimately I was able to find my data, but it took several trials to find the 'magic' combination.
- There is no definition of a scientific name. In my mind it is the genus and the species, but no information is given
- No higher taxonomy, no unique records, disorganization of fields that are returned.
- Works pretty well. Some minor thoughts: 1) I sometimes wonder why I have to add a field instead of just having a long list of fields to search by (maybe expandable). I imagine the search might be faster this way, but that's just a guess. 2) I'm not crazy about this from the tutorial: "Note that 'Scientific Name', 'Genus' and 'Specific Epithet' are three separate fields, and different providers opted to fill only 'Scientific Name', only 'Genus' and 'Specific Epithet', or both. Thus, you might need to perform multiple searches to find all specimens of a species.". Perhaps there's a way for the search to parse out the Scientific Name for use in a search if we only search by Genus and/or Specific Epithet, and vice versa? 3) It seems that on rare (at least for me) occasions one might want to use an OR in the search. For example, if I want all species from one genus but only one species from another genus, I'd have to do two searches. If there was an OR operator, I could specify, for example, genus = 'Cicendela' OR scientific_name = 'Stylurus spiniceps'. But, it would be rare. 4) It's not clear to me if the portal follows one taxonomy, or if just uses the names given by the repositories verbatim. I see there is an "Add EOL" button which will get many synonyms but would still be nice to know how it works. Perhaps it's in the documentation somewhere and I missed it. Need to be able to search all fields as primary fields including paleontological/geological components; Not being able to easily search a particular institution; having taxonomic Hierarchy not as appears but alphabetical.
- The search itself is good, but the ability to add fields to the search and results is not obvious--I think this could be a barrier to first time users accepting and appreciating the usefulness of the portal.
- What doesn't work well is the fact that when you type in a genus species at the beginning search, it only pulls up the specimens with the subspecies left blank. In other words, if you search on for example, *Turdus migratorius* as a scientific name, you get 6196 records, if you add the field specific epithet and type *Turdus* in Genus and *migratorius* in species, there are 12,142 records, because there are 5946 of that species with a subspecific epithet. Essentially everything as species *T. migratorius* should be listed in the general search. Additionally, while you allow added fields to search in many ways, a few other fields should be in the standard search including Specific epithet, the institutional code (often when planning a museum visit the researcher wants to know what a museum has in their collection.)
- I do not like the boxes the search fields are in. Do not like having to have an email sent that links to a download.
- Needed higher taxonomy field names. Not sure I returned all specimens of group I was interested in.
- Once your initial search is built, things get confusing. Sometimes I run the same search twice, but get different results, because something was still checked that I thought I had cleared. The user interface isn't super intuitive.
- Basic textual search works well. Need advanced faceting though, like: [(A OR B) NOT C] AND D

Other

- I do not like that the portal saves my last search. Sometimes I revisit the portal weeks later and can't figure out why I'm not getting the results I should be until I realize there's a leftover search term hidden in there.
- Not very happy with the presentation of records as individual cards. A summary of X specimens from each country will be nice when searching for a species
- The output is not designed well. There is too much extra space and redundancy. You don't need Scientific Name and Genus columns. Capitalization and use of family names is inconsistent. iDigBio needs to add a translation layer to help add consistency to the disparate data. E.g., USA/United States/ United States of America could all be standardized. You need verbatim and standardized fields.

- It worked fine to find species and where they were collected from, but trying to select specimens for which meta-data like body size measurements are available was not easy.
- The searches I have conducted resulted in retrieving some of the data I was after. This will be highly useful as more museums that contain my taxa of interest come online. My only complaint is not really your fault - I want data from more museums that currently available.
- A lot of data from other digitization efforts are not yet incorporated which limits the utility of the search and geographic coverage.
- There are some things that could be added to facilitate paleo-related searches.
- Did not find it at all obvious. The term I would have used if given the choice would have been "unimpressed".
- My experience with the data results in the portal are completely defined by the quality of the data. Unfortunately, while some recordsets may be complete enough in itself, it may not be in harmony with the aggregate. E.g., higher taxonomy, clade info, locality info, phenology, habit are areas that challenge aggregate data homogeneity.
- Also the rights info provided is a real mess for users.
- It's frustrating not to be able to do some searches -- that would be simple in an SQL database...like select "distinct values" for a given field (like collector).
- I think the search interface is far behind what is available in so many other places where far fewer financial resources have been applied to the task. I would suggest stripping out all of the color graphics and just give a simple search interface with 10-15 fields common to all organismal groups. Visually I just can't quickly navigate to what I want.

Appendix E. Suggestions for improvement to the search and mapping functions

Mapping feature

- Map info windows need to be some work. Although I can see points, I have a hard time getting deeper into the data.
- Don't. Focus on getting data not on mapping. It is duplicative with a lot of other projects.
- I like being able to search by defining a polygon on a map, a la BISON. It's really useful for site-specific questions, where I will never be able to pull in every specimen with locality search terms alone.
- Rather than just plotting generic points on a map, it would be useful to be able to have different colored points representing values in other data fields (e.g., collection date range).

User interface

- The user interface (UI) should strive to be transparent, to get out of the way to the researcher. If the user is frustrated by the UI, and then by the data (data quality problems abound), they will lose trust/interest in our portal. We have made good strides to improving the UI in the last year. Keep it up. Listen to users.
- A more flexible search interface to search/filter more fields would be helpful.

Download formats

- It would also be good to consider providing other options besides DwC-A as download formats. Some users do not know what to do with this file when they get it. (Some don't know how to unzip). That's also an outreach issue for us. It may help to embed the portal tutorial instructions about DwC-A files as a README.txt, in the email that comes with the data set. Some help / explanation is also likely needed in the README.txt to understand the CITATION.txt file. Or perhaps these explanations can go in the email itself. Put dwc:georeferenceVerificationStatus with the Locality information (tab) -- IOW, where the georeference is displayed.
- Download CSV directly from results page.

Is it better to be more or less taxon heavy?

- Make the results display less 'taxon-heavy' - less displayed info about taxon hierarchy, more about the specimen itself.
- I guess I would emphasize to continue to make it possible and easy to search for as many terms on taxon and other fields as well to produce a most refined search as possible and also to easily extract the data collected.
- Don't display all the kingdom, phylla, etc. I know what I searched for and the portal vomits too much irrelevant information making the portal useless.
- Need to include a higher taxonomy set and curated by iDigBio, so we can be sure to obtain all specimens that belong to a certain family
- A standardized higher-classification is needed. Relying on higher-classifications provided by data providers is insufficient, as different classifications are in use by different providers. Some providers don't supply higher-classification at all. A standardized classification would allow end-users to construct searches that find all the records in the portal that meet their criteria.
- Most online portals are taxon specific, but since this one includes all of life (extinct and extant) it is difficult to sort out the classification hierarchy without some guidance. Which phylum name to choose? Are lichens fungi or something else? I can't remember the order name for beetles or fish. Do I really have to go to Wikipedia first to figure out the possible taxon name for starfish, then go back to the portal to see if there are any starfish records in there? Some guidance or dropdown menus would be helpful. Of course, pulling out certain higher taxon records requires that all records have taxonomy data completed. Many do not.
- Require some higher taxonomic names

Searching by institution

- Drop down lists might make some of the fields that don't have too many choices slightly easier to find the correct version of the institution or collection.

- Nice to be able to click on occurrences and have the records pop up. But the use of institutional acronyms is confusing at best. Understood that you don't want to take up space, but with so much data, should all users need to memorize every acronym? Why not just a pop up by institution if you are worried about space?
- Would like to be able to search by institution as well as by specific taxon

Other

- Add common name field (although I know it may be different in different areas)
- More specimen images of mollusks would be helpful
- Make it possible to search by or map georeferencing uncertainty.
- Map changes in species distribution over time, either as a series of maps or an animation.
- Needs a geospatial api and/or services
- I'd like to be able to search only specimens that have associated meta-data, or specimens that have associated tissues for DNA analyses.
- It's obvious you don't really search and use these data for any floristic or systematics work. Columnar output: Family, Scientific Name, Country/State/County (or equivalent), Collector, Collector #, Coll. Date
Specimen record screen: (NOT! in pages, less emphasis on technical fields) Scientific Name Collection + Catalog Number Collector and #, Collection Date Country / State / County: Locality Elevation, Geo. Coordinates Habitat Description Notes
- Allow all fields as primary fields for search including paleontological/geological components; Have taxonomic Hierarchy and paleontological/geological Hierarchy as appears as Hierarchical Trees not alphabetical.

Appendix F. Comments about downloading experience

- Why .txt., not .csv format? The latter opens nicely in spreadsheets.
- Downloading a massive XML files is not very useful to people uncomfortable with IT methods. How about a simple csv file or spreadsheet that can be opened in Excel.
- I was unable to open the file once it was downloaded.
- Data often are not matching what was on the screen search.
- Data was downloaded, but then what do I do with it? Need an FAQ on the download area on how to view/use the data.
- Its not exactly a problem, just took forever to sort through all of the downloaded data to get the 4 fields I was interested in.
- Trying to determine how to make the best use of this data and the format that is being given to me in the download.
- To be perfectly honest, I usually use the CNALH pages to access our data and the info on specimens from other institutions. Have had a few format problems (with how the page appears, things being missing, etc.) We communicated with someone and they fixed it.
- Downloading wasn't the problem. The lack of organization of the fields in the download was. Cleaning up / arranging the download took 2 weeks. It would be nice to pick the fields and be able to order the fields the way you want them in the download. Or at least arrange them alphabetically or group them by like information (ALL types of numbers, IRN, USI, Catalog should be grouped together). Taxon names - together (Order, Family, Genus species, common name) at least, then unique specimen info, then collecting info.
- The download works in a timely manner. You can download large datasets with no problem. The data are provided in a standard format, and the provided citation is well formatted and a very nice bonus.
- Data quality is the elephant in the room
- Data was difficult to use outside of the portal
- Occasionally, the download did not work, I had to contact ACIS. The 'time to download' did not seem accurate. It would be nice to be able to select the fields I'm interested in to download - as it is, I get all of them, and then I have to edit my file to clean it up for my purposes.
- I do see an issue with the estimator of time to download a data set. The portal software estimated 10 seconds for a 60 record data set. It took over a minute. A 4 record data set (also estimated as 10 sec, took over 30 sec). Note from restaurant management: overestimating your wait, and seating you before your overestimated time to a table -- is much better received by restaurant patrons, than telling them it will be 10 minutes -- and turns out to be 30.
- I would like to have some data cleaning steps performed by iDigBio while preparing the download. For example, if would be nice to be able to select what data fields I want returned.

Appendix G. Additional comments about the specimen portal

- Will there be a layer to allow editing? use, trust.
- It's very visually pleasing
- It's beautiful -- and there have been many positive community comments... some of which are heard indirectly such as: "I just wanted to tell you guys how much I appreciate all of the effort and patience it took to get these records added into iDigBio. It looks fantastic, and has a bunch of cool features i didn't even know about. I have already had comments from Canada, New Zealand, and Japan saying how much they like it."
- The portal's continual improvement should be commended.
- I like the clean lines of the portal. I think its looking good and I greatly appreciate how flexible the iDigBio team is and their willingness to make modifications. I expect as time goes on, we'll have more ideas for suggestions and I expect that they will be open to incorporating those modifications.
- I work with CNALH (lichenportal.org) directly, not through iDigBio. Through this survey I have learned that CNALH specimen records can be accessed through the iDigBio portal.
- I think it's an excellent tool that has wide-ranging utility. However, being a data manager myself (outside the U.S.), I don't use the portal as much as those working on biodiversity research.
- I just searched genera in two plant families I am most familiar with (Monimiaceae, Rubiaceae). As usual many collections are identified only to genus level, underscoring the need for identification by a specialist. Unfortunately there are not enough trained taxonomists available to do this for most families. Anyway, the iDigBio specimen portal is very useful and I hope to be able to submit digitized specimen data from Herbarium PTBG soon.
- I just tried to see if specimen data from our institution was already submitted to the iDigBio specimen portal but could not find how to search by institution.
- Rather than having to download the full set of Darwin Core fields for each specimen record, it would be nice to be able to select the particular fields downloaded. Most users are only going to use a few of the fields. To facilitate provenance tracking, you could make some fields mandatory (e.g., repository, taxon name) but still allow the user to select which other fields to download so that they aren't overwhelmed with irrelevant data that need to be deleted before an analysis can be performed.
- I find the Present / Not Present boxes to be counter-intuitive. To me they imply searching on a string of fields, but excluding (NOT) a particular word or phrase in another field. E.g., Query all fish in North America but NOT from the state of Mississippi. I would think to entire Mississippi as "Not Present" in the state field (the portal actually allows you to do that), but this is not what it means. Somehow needs to be clarified or do not allow the user to enter a search term when those boxes are checked.
- I plan to become more familiar with it in the next 6 months and so my answers may change. Right now I'm satisfied with the service and looking forward to learning more.
- I am curious to learn how commercial (business / entrepreneurial) stakeholders see the iDigBio specimen datasets.
- I'm really interested in use statistics (and seeing the same use statistics from all data portals) to help justify to administrators the value of digitizing. In addition to the number of specimens returned for view/download I'd also like to see how many searches return at least one specimen to give an index of how many people are doing searches. There's a big difference between hundreds of people each returning a small data set versus a couple of people downloading the entire set of databases.
- In my opinion going forward, I think what we need is a single portal to aggregate records, images, etc. and other smaller sub-portals can build off of this. iDigBio portal seems like a good candidate for this. Otherwise it's a new portal wanting records coming up continuously.

Additional Comments:

- I would like to know more about submitting my digitized and imaged specimens to iDigBio.
- How do I get connected to iDigBio specimen portal? Is our Herbarium (Lae Herbarium, Papua New Guinea) eligible?
- Please stop using the word data as if it were a singular word. Thank you.

- I fully support what you have done so far, and appreciate the training that has been made available (staff from my institution have attended a number of workshops and share the info). I think the effort is driving my institution to digitize the collections at a faster rate than would have been done without the federal support. That being said, we are still a couple of years behind in being ready to upload our collections data (e.g. still cleaning up and converting old databases to KE, still digitizing specimen data especially for invertebrate collections, etc.

Appendix H. Comments on the iDigBio Website

Difficult to find information (n = 13)

- It is often difficult to find specific information about digitization when I have looked for it. This could be partly due to the vast amounts of information on the iDigBio website. However, most of the information is in the form of adobe connect videos which makes it difficult to find anything specific without wading through an entire talk.
- The home page is pretty busy, and frequently hard to find things. Nice to have lots of fun images, but it doesn't help one (at least scientists) navigate the site. Choose your audience and tailor accordingly, rather than trying to be all things to all parties (research, public, etc.).
- As iDigBio has grown so has its website. It has gotten pretty overwhelming and this makes it hard to find what you need as times. I wish I had a suggestion as to how to deal with this situation.
- There is an awful lot going on there. It can be a little daunting trying to locate a particular resource. A slightly streamlined approach might help that.
- It can be very difficult to find information on the site. Not sure how to improve that.
- It is not easy to determine from looking at the home page where to find information and results from past iDigBio workshops. I guess one can do a search, but if you don't remember the exact title of the workshop it may be hard to determine where that information is. It would be nice to have an easily accessible link in the home page to a page where we could browse for results and other materials of past workshops.
- Cleaner presentation; categories clarified
- The home page is just too busy (as are many other pages). No matter how often I visit, I always have to stop and look carefully for the links I need - even if I've used them before.
- I often have to save newsletters because I have a hard time finding them on the website. A link on the homepage would be helpful.
- It is sometimes hard to remember where some resource was located on the site. Search works, but sometimes I just want to get to the past workshops wiki from the front page and I can't figure out how to do that with one click.
- There is so much stuff that it is hard to find what I need. I don't know how to make it easier to find things, though. Maybe there could be an assessment of what is used and what is not, and some of the stuff that doesn't get used much could be taken off?
- I have almost given up finding any of our own Drupal-based documentation. The new design of the 'cleaned up' the Digitization page is unusable. If the keywords are not right in the biblio source for the document, then good luck finding anything. We need a librarian to look over our document management scheme to help us.
- The website content organization needs improvement - most things require at least 3 clicks to get to something useful. There are still sections on the website that contain obvious "filler" content. The website search should be improved because it does not always yield expected results. For the future, I think we should move towards unifying the "website" and the "wiki" into one platform.

Lack of educational and outreach resources

- There's a distinct lack of education and outreach resources.
- Link more publications that exemplify the use of digitized data for education and research.
- The E&O portion of the web site is not good.

Be sensitive to those with less technical knowledge

- I understand it's a new modern digital age, but I, along with many others, did not grow up with this and some of the terms are ambiguous to me. For example--digitization community. What, really, does that even mean?
- A "For Dummies" section, most of the information presumes knowledge of certain terms that create extra hurdles for collections managers with less knowledge in technical areas or CMs that have less experience with natural sciences. For example I have both humanities and natural science collections and am much more knowledgeable in the humanities. Having to learn the technical jargon for both the science and data at the same time is slow and difficult work.

Other

- Get updates more regularly
- A subscribable calendar that could be added to a person's personal calendar interface (google, ical , outlook)
- The "search portal" button is some what hidden. The page is very interesting but maybe a little too busy. It to me a bit of searching to find it - and I knew to look for it.
- website is nice; main concern is how to use the data people are providing. I think (and thought from the very beginning, which I did voice) that more restrictions/direction should have been given to how people acquire & upload data to the portal. There are two ways to look at these data: from a collection management perspective/digitizing collection perspective and a data usage/ecological perspective. It can be done, but each side has to look at the data in a different way. Otherwise, organizing data for some analysis is way too time consuming
- Translate into multiple languages
- A way to search for particular topics say "Digitizing Paleontological Specimens" and only those resources that mention paleontological specimens would come up
- Build the MaxEnt SDM like Atlas of Living Australia into it. Can't be that hard...it's Java based and already designed for automated scripting. Or pay me to do it.
- It is s an outstanding resource! It's packed with information, and has frequently saved me from wasting time figuring out solutions to problems already solved by someone else.
- Ability to tag uploads so all images uploaded can later be retrieved via the api and downloaded as darwin archive.
- The website is difficult to navigate and has a pretentious attitude. Gives the impression they are better than smaller groups and only care about large institutions because these groups have larger collections and receive NSF funding.

Appendix I. Suggestions for ways to better use social media to raise awareness

Not interested in social media

- I do not use social media. (n = 14)
- I'm not a fan of social media in general so my opinion is biased. I follow iDigBio on Facebook but FB is notorious for not pushing everything to us. I much prefer the RSS feed.
- I can't answer this part of the survey because I haven't used the social media (I don't use social media too much) and I haven't checked the newsletter either. But that does not mean that it is ineffective, is just that I don't have twitter, I don't know what is Vimeo and I am in Facebook rarely. Sorry.
- I don't do social media of any form so don't really know if it is effective or not. At 61 years of age, and because I was primarily a preparator and not involved with databases. I didn't do computers until I was promoted to collection manager in my mid 40's. Younger people obviously got involved and probably benefit from social media.
- I follow iDigBio on Facebook. I see the posts and they are sometimes interesting but as a colleague of the project I don't feel the need to interact, and I don't know anyone from the broader community who follows iDigBio on social media so I can't comment on that effectiveness. I do not use twitter or vimeo
- Question the use of social media for this outlet with such low participation and few updates. Waste of NSF funds that could go to research. Low value.
- I don't use social media or the newsletter as a way of learning about what is going on with iDigBio, I have access to internal wiki/Redmine/mailling list which is more complete.

Consider new audiences (n = 3)

- Educators at the secondary level are, IMO, an untapped user base for the resources you provide.
- The broader community consists of many people not in college. I suggest "dumbing it down" to the level of the everyday broader community. Just my thoughts. However, if the intent of iDigBio is to involve academicians, mostly, then keep doing what you're doing.
- Get the word out outside of the museum community so that it is more visible in the scientific community outside of TCNs, PENs, & iDigBio Workshop participants

Post fewer general interest stories/more iDigBio focused (n = 5)

- It is great to see that iDigBio is using social media and is active. Perhaps it would be more effective to post fewer general interest stories. At times it seems that these stories are just being reposted without much thought about the content. In addition, many similar social media feeds are posting the same ones that week. I think this can dilute the message at times.
- Some of iDigBio's audience - very likely only a minority - is interested in deeper questions about iDigBio's informatics design research challenges and chosen pathways. We view iDigBio as more than a service, we view it as a biodiversity informatics research paradigm in development. And yet, to the extent that this actually applies, iDigBio seems to communicate very level officially and at that level. For instance, why is iDigBio's underlying "database" infrastructure the way it is. What are the benefits and costs of the current solution, where are future changes most likely? iDigBio has some outstanding thinkers and doers in this area but has apparently chosen to not have them join in much on the public communications front? That is my sense - the services are great, the underlying infrastructure solutions and trade-offs are a black box. This makes it harder to collaborate at that level.
- While having the Facebook page share relevant articles is interesting & does lead me to sometimes find out about new things I hadn't heard of before, it would be good to also see the Facebook page talk more about what iDigBio is doing as far as events/workshops and updates from these events.
- Do more science
- On Facebook, workshops could be advertised more clearly maybe...

Be more fun and interesting on Facebook (n = 3)

- A la Emily Graslie at the Field Museum -- I think we need a Facebook that is less "neutral." We need posts from "people" at iDigBio and from the community. The way our Facebook page works now -- it's a great resource to learn about what's happening both at iDigBio and in the biodiversity community -- but it

doesn't have the personal touch that creates conversations. Think of it as an extension of what Larry Page did in the NYT piece. These things can generate conversations. See links for literal examples of what I mean, what's possible. <https://www.facebook.com/TheBrainScoop> Note the interaction -- the conversations folks have about the posted pieces and with Emilie. I think (on our Facebook site) -- it's hard to "talk to an organization." We see "likes" and such on our pages, but not a lot of community conversation. Much easier to talk "to a person." Let's be brave and step out side the impersonal organizational wall. Just my two cents.

- Don't just have a Facebook page. If you want to engage the community you have to go to their forums, they won't come to yours without a reason. Get involved in the identification forums for mushrooms and plants and look for opportunities to throw in a plug for iDigBio and show people how they can access the data themselves to answer their questions.
- Maybe more jokes? I am being serious. I think we could have a bit more fun with what we are doing!

iDigBio is doing well with social media (n = 5)

- I think you do a great job of this.
- I only use FB, but I think they're doing a super job with this. I regularly share these posts with my FB community, and it's certainly sparked interest, even in my non-biology contacts!
- I get most of my iDigBio information via Twitter from Gil and Deb.
- It's serving my needs of getting updated information on activities.
- I'm currently on a "restricted social media diet", but from what I've seen the approach seems effective.

Use diverse communication channels (n = 8)

- Social Media is NOT all it's cracked up to be. Personally, I was on the FB quite frequently and saw many iDigBio posts, HOWEVER, I have very little time to piddle around with Social Media now that our TCN is up and running so I hardly ever seen anything on the FB (because I just don't check my FB account). Please don't ever consider opting for social media over a newsletter or vice versa...diversity of communication media is key.
- Not everyone uses social media and many people refuse to use social media. It should not be a primary means of raising awareness and engaging the community.
- Newsletter is effective.
- I love the newsletter, but do not typically engage in social media such as Facebook and Twitter.
- I like the newsletter. More news is always better.
- Focus on developing an active web page with current news and information regarding iDigBio activities.
- The newsletter format is very attractive. The Biodiversity Spotlight was a great addition.
- I am old school (prefer not to use social media) so rely on the newsletter but younger staff tend to use social media more.

Other

- Perhaps a short community survey and share results immediately
- Email works to keep me in touch about upcoming events

Appendix J. Explanations for grades

- While iDigBio does seem to enhance and facilitate digitization activities, it merely provides the resources and connections to promote research involving digitized specimen data. It would be great if there were more of a research focus, but that seems to be a priority that is to be sought after some extensive digitization efforts have been achieved nationally. Additionally, while iDigBio does provide leadership, it does cause me concern to see how this model will be sustainable or even persist beyond the funding regime outlined by the NSF ADBC. Sustainability of this model does seem to be questionable, in my opinion.
- Identify gaps and priorities: I think iDigBio could provide more leadership in this area. It is a fine line between guiding and letting the community naturally develop. Promoting research uses of digitized specimen data: I don't see much promotion outside of UF, but I do see a number of UF students supported. Sustainability: Very difficult topic that will require very strong leadership. I think some of this is going on, but I am not involved in those conversations. Need to see a stronger integration with GBIF and provide further data curation for data.
- Some are hard to judge. If you didn't get an A it doesn't mean you aren't doing well at it, but rather that that area might be the next to focus on.
- I don't see any international collaborations being pushed by iDigBio. I may be ignorant/unaware here. I also don't think iDigBio trains collections managers in a holistic way--while it may be true that iDigBio trains collections managers in digitization techniques and metadata management, the actual curation of specimens is not, I don't think, emphasized. There's a lot of hands-on specimen work (preparing specimens, etc.) that I don't know iDigBio teaches. That is basic stuff that is just as important as digitization and metadata management. I also don't know how much iDigBio promotes the use of specimen data in research--I haven't seen that--I've seen them showcase others' research sometimes, but not actually promote it. I may be ignorant here.
- The various vertebrate initiatives, MANIS, ORNIS, HerpNet, FishNet led the entire digitization initiative for a decade prior to iDigBio. The people involved with these systems were also involved with GBIF and have held workshops all over the world. As a vertebrate person, it seems to me that iDigBio basically took the ideas and extended them to invertebrates, botany and fossils, and as I do not have a good feel for other disciplines, I can't see how effective it has been to these other areas. I worry about VertNET funding as their migrators seem to do lots of permutations to the data to improve they data and I have no experience with what iDigBio is capable of.
- I think you have, so far, fallen short in the area of international data sharing. I think you may be changing that soon, however.
- I'd like to see more researchers using the data. I'm not sure how to make that happen.
- Promoting research - I do think that people need to be careful with using/analyzing these data. I see folks using them, presenting results, who don't really know about statistics, and I think this can be very dangerous...not really your problem, but it IS a problem with sharing data like this.
- iDigBio is great in connecting people from widely separated collections and/or small collections to show the importance of our aggregated data. I have been greatly helped by workshops and webinars, and have been able to increase the numbers of online specimen records from my collection.
- I expect promotion of research use of digitized collection to increase, but more long-term support for iDigBio and digitization is needed.
- Address data quality issues.
- Specimen portal is weakest outcome. Would like to see more support for other forms of programmatic access to datasets (e.g., via an R package like those written by ROpenSci). There are already many more mature portals available (GBIF, Vertnet etc) so not sure what iDigBio will offer that is different/better/unique.
- From where I sit, it seems that iDigBio's visibility is extremely low. VertNET and GBIF have a much higher profile and provide a lot more feedback to us, so it is extremely difficult for me to judge a lot of these questions.
- My institution is in Canada, which also has a national digitization initiative (not as inclusive or as far along). There is still progress to be made in integrating continent-wide initiatives.

- I gave you a B in research because I've only seen workshops focused at the collections community and none focused on how to do research with the collections. I'm a faculty member and collections director, so I want a workshop on research for undergrads, grads, and myself using the collections/iDigBio portal.
- Overall iDigBio has provided leadership in many of these venues, or promoted many of these topics among the collections community. I think the workshops have been one of the best things about iDigBio and bringing the community together.
- From my experience any time long term sustainability is discussed it does not seem like there is a plan in place beyond the hope that ADBC gets another round of funding.
- I think the idea is great, but it may take a long time to get the word out and for the collections community, especially the citizen scientist, to understand and believe in iDigBio.
- Based on the recent (April 2015) statements from Richard Lariviere and Kirk Johnson, those at the top of collections based institutions seem to be unaware of the groups (including iDigBio) that have been working for years and decades to get collections digitized and to make the resulting digital data available, searchable, and relational to a vast number of individuals and institutions around the world. If the heads of "the institutions" are unaware, not on board, or dismissive of the work that has been done and is being done, then I don't think iDigBio, Neotoma, Specify, SPNHC, or anyone else working on this issue is able to claim broad impact, heightened awareness, or leadership regarding the long-term sustainability of the national resource.
- More efforts to engage / reach out to museums "outside of the fold" would be great...i.e., what can be done to bring in the many small museums that dot the western US and have biological collections? A personal invite and direct effort may be what it takes.
- In regard to the "international" reach, iDigBio is still an unknown organization internationally in East Asia.
- See earlier comment about iDigBio vs Vertnet (and GBIF) Some of the lower grades may reflect that I don't know about these initiatives/efforts if they have been going on
- I do really appreciate the list of museums and have been checking this out to find out about other repositories in our area that we might collaborate with. The map is especially helpful! I've attended workshops and those are great. As a medium sized institution and smaller collection though, I still feel like we're trying to push forward with our digitization effort on our own.
- Sustainability needs to become a key focus.

Appendix K. Priorities for upcoming year

Workshops and training (n = 15)

- Workshops and training opportunities!
- Continue Webinars (n = 2)
- Continue training and support.
- Continue sponsoring the wonderful workshops and training opportunities.
- Continue hosting regional workshops and helping support attendance by interested participants. Continue to foster interaction among curators through workshops, especially interactions between large and small herbaria.
- Training! I am definitely biased though because I'm involved in training efforts. I have however been very impressed with iDigBio's efforts and interest in this area.
- Doing better at opening up workshops/seminars/etc to remote participation either live or viewable after the fact. I'm sure like many other places we don't have the funding to travel to FL.
- Workshop on getting specimen data out of Symbiota and into already existing databases (such as Specify) how to also incorporate edits to data made in Symbiota into these database records.
- Discussion (workshop?) on when the resources (time, personnel) for georeferencing historical specimens meets the law of diminishing returns. Should we worry about georeferencing marginal useful historic specimens?
- Continue with digitization and Citizen Science workshop training.
- Continued training on use of tools.
- Do a needs assessment for workshops now
- Develop a coordinate workshop plan
- Continue training (maybe by going on the road)

Support software development (n = 8)

- Continued support for the development of software and infrastructure to assist the collections management community.
- See prior comment on need for shared, central taxonomy webservice. It's insane that I'm plugging all these names into my own database and everyone else is doing the same. If a revision comes out with lots of name changes for a taxon how many different curators/collections managers are going to edit their own databases to update them to all those new names - this happens all the time, enormous waste of effort. Those edits should happen in only one place, and iDigBio taxonomy name server that everyone can benefit from sharing & linking to.
- Develop tools that would allow portal users to find only data that has been added or changed since their last visit/download. Right, easier said than done. Alternatively, provide fields that would allow easier reconciliation of data (e.g. date added, data edited).
- Data management for collections managers who keep specimen data/images in many different databases. How do we get these databases to talk to each other, so that collection managers don't have to update data twice (or three times, if you have data in three different databases).
- Tools and infrastructure for using digitized collections/data for research.
- Improvement to GeoLocate (or maybe just it's implementation within Specify). I find the maps Specify is using to be difficult to use- I'd love to see a topo background or even a background more like Google Maps.
- Tools for utilization of collection data to answer biogeographic questions.
- Provide direct support of projects and tools that have common goals.

Bring more data online (n = 6)

- At this point, for my particular ADBC-TCN, I think iDigBio's most important function this coming year will be to facilitate data uploading and sharing. Many of our collaborative have begun to image specimens this year, but have not yet begun (or are just beginning) to share those images and data. So we're in new territory once again, and iDigBio will be critical to us maintaining momentum.
- Mobilizing data.

- Make sure data from every regional portal is in iDigBio portal
- Bring more collections into the portal.
- Focus on integrating existing efforts to provide one-stop-shopping for digital collections data. Make all efforts to aggregate existing digital data resources.
- Continuing to bring more data online

Sustainability (n = 6)

- Getting as actively involved as possible in the ongoing NIBA/B.CON sustainability initiative
- Work to guarantee long-term sustainability of the digital archive and portal.
- It would be nice to help the larger institutions, as their digitization efforts mature, find a way to continue the digitization of accessions beyond their grants.
- Develop a post-TCN expertise list to promote sustainability
- Develop workshop sustainability plan
- Conduct exit interviews with retiring TCNs

Support small collections (n = 4)

- Perhaps more small, non-university based, historic collections could be identified by iDigBio and could be included in the digitization project
- Providing ways smaller institutions (or institutions with smaller budgets, anyway!) can undertake digitization projects. Perhaps create a venue for sharing manuals or DIY ideas created in the museum community.
- Outreach to small herbaria about submitting digitized and imaged collections.
- It would be nice to help these [large] institutions reach out to smaller institutions and form bonds that allow them to assist those smaller institutions in digitization efforts.

Improve the portal (n = 3)

- Improve search interface
- Improve search results page
- Download aspect of portal

Data quality (n = 3)

- Focus needs to turn to improving the quality of data and improving fitness for use
- Data quality issues. Collecting the minimum data.
- Figure out a way to indicate how trustworthy the data are. How trustworthy are identifications, locality info, etc.?

Funding (n = 3)

- Funding of digitization proposals.
- Networking users and educating administrators on ideas of where to look for funds to help in their efforts. Maybe provide advice on grant writing.
- Encouraging funding to smaller institutions and being more inclusive of programs that do not receive NSF TEN and PENs. These networks are difficult to penetrate and participate in. The iDigBio website is built solely for the purpose to distribute the data of these networks rather than encouraging collaborative networks between all institutions.
- Collections "not in peril" but still un-digitized have an impossible time getting funding for digitization. What other funding sources are available for digitization projects? Get the word out.

Data use for research purposes (n = 3)

- Figure out ways to get researchers to use the data
- More focus on research would be nice.

- Now that many herbarium specimens are available on-line, it would be a good idea to demonstrate their value in some innovative projects relating to current concerns of society, such as phenology and climate change, land use change, invasive species, and the conservation of endangered species.

Education and Outreach (n = 3)

- The site seems to be lacking in example lessons for teachers and professors to use in classrooms. It's critically important to get young people aware of the resources that specimen collections and their digitized data provide. Hack-a-thon type events where people pose questions and try to answer them with the data that is available could be a good way to get more people involved and inspire creative uses of the data.
- As a member (and president) of a fossil club, I know my fellow members know very little about iDigBio, even though we publish info about it in the newsletter. Perhaps some representative could do club outreach?
- I think creating more specimen-based resources, e.g. educational tools, and research products from the already digitized data would provide the community with tangible reasons to continue digitizing legacy collections.

Improve dissemination (n = 2)

- Perhaps organizing the digitization resources part of the website to make it easier to find information.
- Increase dissemination of best practices and standards resulting from the various workshops.

Other

- Understand and communicate what it means to be an aggregator. What sort of "ownership" of data is thereby implied? Can the ownership be re-distributed to the various sources? What kinds of social and technical solutions would that require?
- Some focus should be on addressing how much the basic curatorial work is important before taking on digitization tasks. Still a majority of organizations in North America and the world has not engaged with even basic pre-digitization curatorial work.
- We need a unified response to data redaction for sensitive species. We also need to address species nomenclature and all of its related issues.
- Focus the iDigBio message among iDigBio staff.
- The potential for out of control GUIDs and no "DNS-like" service for them. Standards for digital translation of location data; for example, Hawaii is geographically part of Oceania, but politically part of the USA (most of which is in North America), which goes into a database system hierarchy when location data are stored like Continent>Country>State>County, etc. What about political units that change since specimen collected (USSR -> Russia+Ukraine+'stans' or Prussia -> Germany, Poland, etc.) how should they be stored?
- Getting more data out of herbarium specimens. Let's note if they are in flower or note other phenological stages.
- Communication between computer tech people and science researchers -- a language and interest difference that needs to be bridged to optimize digitization efforts.
- International data sharing.
- We have been talking among various institutions in our state about how to share resources (people, equipment, expertise) statewide. iDigBio is well-coordinated at the national level, but perhaps there are ways to take advantage of state infrastructure? Could iDigBio help provide matching funds to buy the recommended imaging equipment if we could demonstrate we had a plan to share statewide through the state museum association or state historical society, regardless of research theme or taxon? Could we create a regional equipment loan pool, perhaps with student interns?

Appendix L. Biggest challenges facing the national digitization effort

Sustainability (n = 19)

- Long-term sustainability of iDigBio and the national digitization program iDigBio must take the lead in this.
- Sustainability. I am interested in participating in those Sustainability discussions, but have no answer...
- Sustainability (n = 3)
- Keeping the flow going after TCNs sunset (in the face of depleted funding). iDigBio can't do it alone without institutional support, government support.
- Sustaining the momentum we've created -- and with the small staff we've got, keeping up our efforts. We need more support staff...(iDigBio)
- The sustainability of the digitization effort and the central database have not been adequately addressed.
- Sustainability; provide examples of shoring up the institutional foundations so that they can function independently.
- Sustainability beyond NSF funding and into the future.
- As mentioned above - sustainability
- Finding a way to sustain digitization efforts until the job is finished, especially for taxa and collections left out of the current ADBC program
- Sustainability and increasing the amount of research derived from data obtained from iDigBio
- Long-term sustainability of the many related/parallel efforts.
- long-term sustainability of digital data, particularly for institutions with limited infrastructure.
- long-term sustainability and long-term coordination of digitization and data delivery activities.
- Sustainability. Mobilizing the data (i.e. digitization, cataloging) is one thing but what about the ongoing costs for the apparatus (whether database, API, website portal) to access this data? Grants can be applied to develop but none want to maintain or leverage forward to new uses, it seems. Related, we are challenged with keeping on experienced staff who developed these tools or workflows and know the data best.
- A better formatted plan for long term sustainability of digitization efforts. Collections are not static they will always need to be updated and it does not seem like enough thought is being put into how all of this data and infrastructure will be maintained and updated in a post ADBC world.
- Medium to long-term archive of data and images.

Funding (n = 18)

- Lack of funding and resources in collections to accomplish digitization. This is outside the scope of iDigBio but unfortunately is likely a key limiter on iDigBio's potential success.
- Finding sufficient funding for digitization
- Limited funding
- The biggest problem nationally is funding in museums. Nationwide museum are having difficulty finding money to hire people, pay for space improvements, or even upgrade data systems. Without more funding for museums, it make little difference if the data is available. Without funding at the museum level, georeferencing specimens, imaging of specimens or catalogs, or other digital info, cannot be generated let alone be made available. Collections are at risk everywhere. iDigBio has to press government at all levels to fund museums and collections.
- "Mothballing" of collections. Administrators still just don't get it. They tend to see systematic collections and systematic in general, as dinosaurs that take time, money and space away from more important endeavors. Collections based in university academic departments are particularly in jeopardy.
- Funding.
- Fund raising.
- I'm confused by NSF funding for initiatives like ADBC and iDigBio, while at the same time, some institutions are laying off their scientific (taxonomic/systematic) researchers and shuttering (or giving away) their collections. It's a strange dichotomy. Can iDigBio help prevent the shuttering of collections? It's quite scary.

- They are vast and widely distributed. Keep doing what you're doing, it's the funding stream that is needed as we all know digitization is costly.
- Museum budgets, particularly of small to medium sized institutions, is also a concern. How to support these digitization efforts; providing sufficient digital storage and growing IT needs that are shouldered by institutions as a result and having to balance these with other initiatives the museum wants/needs to focus its resources on.
- Shrinking taxonomic expertise and lack of funds for museums. Your small grants help, but it would be wonderful if the community of practice you are leading were to become powerful elements of change and improvement in the biodiversity collections arena.
- Lack of financial support from institutions for specimen collections.
- Providing resources for digitizing the parts of larger collections that are likely not ever to be included in any TCN efforts.
- Funding is undoubtedly the biggest challenge. With additional funding we could complete digitization of our herbarium. About 60% digitization of our collection was completed with NSF grant funding
- Continued funding for digitization activities that fall "outside the box" in terms of importance for immediate research activities - e.g. world collections housed in US institutions
- Funding!!!!
- Lack of accessible funding for small collections.
- Need more funding

Time & people (n = 16)

- It all takes a lot of time. I am all alone, and opportunity costs of time really limit me.
- Time and people.
- Time, money, staffing
- Lack of resources at institutions that will never receive NSF support.
- People and time
- The sense of urgency. The desire to undertake digital projects is great, but it always feels like its got to be done NOW and FAST and this is being projected from these meetings. Unless there are large budgets that can support those, things are going to take longer.
- Continuing problems with institutional funding, which affects staffing. At my institution we continue to work hard to educate our higher administration of the importance of the museum to research, teaching and outreach; because we are not a standard academic department, administrators don't readily understand what we do
- Time to complete digitization of current collection. I don't think you can help with that. I need more release time from teaching responsibilities.
- My greatest challenge is lack of resources (and especially personnel), both to capture the data and to update it and maintain quality control.
- Personnel and money. Everyone needs more people and more funding.
- Lack of time at an institution where teaching absorbs nearly all time.
- Funding people to do the work. Help with grant writing and finding granting agencies to fund the needed work to digitize.
- Time, money, and personnel. iDigBio can maintain a presence online and at professional meetings to continue promoting the circulation of ideas (among both small and large institutions) regarding how to streamline digitization and how to make it more cost effective.
- Funding/staffing at institutions doing the digitization.
- Lack of personnel do continue the efforts beyond funding by NSF
- Most natural history collections are understaffed, which has a negative impacts on the ability to get specimen records digitized and mobilized.
- Like most things we do, limitations are time and money (bodies & resources). People like me - associated with a university, have many teaching & research obligations beyond the time we may allocate to our collections and pushing an agenda forward.

Data quality (n = 4)

- Clean data, check and update taxonomic identifications
- Quality control for accumulated data from digitization projects: This is very difficult challenge given the shortage of biologists with time and expertise to annotate specimens accurately and the inherent difficulty in certain taxa of annotating from images. It might be reasonable to use a system like Notes from Nature to direct specimen images to taxonomists with expertise in particular groups, for review and annotation. The difficulty is providing incentives to taxonomic specialists who are already over-burdened with work.
- Data quality
- Conveying to users the importance of knowing the degree to which they can trust the data.

Training (n = 5)

- Collection managers need to understand that when they (or their graduate students, undergrads, or volunteers) enter data, they are acting as the source/gatekeepers to all data we see on data aggregators. Researchers who try to base their research on data in these portals seem to assume that all of the data available online represents an entire, complete, 100% accurate data set of all NHCs around the country. This is simply not true. I think more needs to be done to help collection managers understand the data they upload must be accurate to be used in this way, AND for researchers to better understand the mindset and challenges collections deal with as they upload their data. They need to understand WHY these data are not complete and 100% accurate. Because it is not due to a lack of trying on the collections' part - it is due to lack of funding/resources and a lack of training. Additionally, there is nowhere for someone to be officially trained in how to run a natural history collection other than to do research in the domain of their interest. Scientific research graduate programs do not usually emphasize the same values/skills that are necessary for collection management. Even beyond that, with this burgeoning field of biodiversity informatics that iDigBio is sort of leading the way on, there is nowhere for people to go to receive dedicated training on such a topic. It is important to have people who understand both the domain content/how natural history collections work, AND the technologies behind the national digitization effort.
- The biggest challenge is providing skills or training for understaffed and overwhelmed collection managers.
- I know from my experience, the smaller museums/collections have difficulty with time and resources to proactively participate in iDigBio but do appreciate all of the avenues available for further trainings and goals for the future.
- Lack of training in digitizing and curation of small collections Lack of understanding in public institutions of how to utilize small collections in education and public service as well as research.
- Continued training and further work directly with the community

Digitization challenges (n = 5)

- Finding efficient ways to digitize non-botanical collections without sacrificing data quality
- 3-D specimens (invert pins, spirit jars, etc).
- Finding ways to digitize collections that traditionally consist of huge numbers of specimens (insects, plants).
- There is also the problem of varying speed in digitizing specimens - some taxa are easier than others. The working groups help organize people with similar imaging problems.
- Development of multiple standards and workflows and best practices by multiple groups is very confusing, and the documents available from iDigBio only cover a small fraction of collections. Are there best practices for (say) birds? eggs? nests? snakes?

Lack of institutional support (n = 3)

- In my case: the lack of support by my institution. I have been told (in writing) that digitization work on collections should be done by collection managers only, not by researchers (=curators in my case). The TCN grant is not counted in my performance review. This is far beyond a personal problem, the

digitization work is not presented to the board of trustees, not presented to donors, women's board nor the public, my institution has almost no interest in a temporary exhibit about digitization.

- Lack of administrative recognition of the importance of biological collections. I wish I knew how iDigBio could help change this.
- Administrators often fail to recognize the importance of collections and I hope the digitization effort can help increase the utilization of collections in ways that administrators can appreciate.

Making the data ubiquitous and available (n = 4)

- Making the data ubiquitous and available.
- Availability and accessibility for downstream users. Organize a workshop for policy makers, environmentalists, etc.
- So many specimens, so little time... I think that getting the public involved in digitization is a great effort, but it is hard for little museum's to do so. I hope that as data become available online about specimens, more people will be using specimens for research both in classes and for furthering science
- Provide stable, long-term access to the data.

Other

- Data not being shared and misuse of shared data.
- Community consensus on the best ways to represent human knowledge for computer use, perhaps combined with the acknowledgement that computers and computer-literate humans are the audience for the digitized knowledge.
- Integrate many small data environments into fewer large ones without having low-level providers lose a sense of ownership.
- Maintaining momentum
- Not all museum collections are digitized so the data can be included in iDigBio
- Measureable metrics for data quality.
- Leveraging of existing expertise.
- Determining what are the next steps (e.g., tools, technology) to invest in for the community.
- Media storage and distribution--I think this could be a major hurdle to smaller collections that would depress efforts to digitally image and serve those data.
- The focus on small collection digitization has been great, but there are still several mid-sized to large collections that need help and have been unable to fit into the current funding efforts.
- Ethical dilemma in allocating resources between digitizing information and maintaining such data and taking care of physical specimens that are constantly susceptible to degradation and loss; various legal issues in managing access to digitized assets
- More publicity.
- Getting more international
- Thinking ahead to the future. What will happen when all specimens are digitized and the spotlight is gone from the collections community? Will we drive ourselves off a cliff?
- Taxonomic support and standardization for invertebrate groups (mostly use ITIS but sometimes find Wikipedia is more helpful - depending on the taxon, especially for synonyms)
- Ultimately, this effort has fostered a very specialized skillset at most institutions that will be hard to replace. Most collections managers are now managing two separate collections (physical and digital). There needs to be a game plan for the next generation of natural history collections managers i.e. how they will be trained and what skills they will need.
- Easy for small collections/institutions to be left behind, especially as the landscape keeps changing very fast and some don't have experts or researchers.
- Lots of collections held by university departments, county museums, etc that are not viewed as research collections--are these to be included in digitization effort?

- How to handle sensitive distributional data for rare species. Is it desirable to 'hide' distributional data in specimen records, and if so how do we decide which taxa's data should be 'hidden' and on what scale (state, region, or country).
- Too many groups, collections, institutions keep re-inventing the wheel, but not integrating with a central clearinghouse for digital collection data. The technical/IT challenges are too great for many smaller collections (and some larger ones) to start digitizing their data - need to make these resources as available and easy to use as possible.
- The biggest problem I see with our particular TCN (SCAN) is nomenclature. When we database, we record the determination verbatim off the det. label, but if the "portal" doesn't recognize Jr. synonyms our data becomes "lost" from searches (at least within the SCAN portal).

Appendix M. How can iDigBio help?

- iDigBio can help by identifying a standardized, open source collections management software program that could be used by collections of all sizes and that would facilitate the transfer of collections data to the iDigBio portal.
- I think the technology and how the moving parts fit together continues to be a huge obstacle for us. Many of us don't really understand how iDigBio can (or does) fit with Symbiota, Notes from Nature, GBIF, etc... we're just doing what we're told to do. The more we understand, the more we can facilitate our own progress. I think this is really just a time and experience issue, which iDigBio can help with.
- Address this challenge: small grants to hire part-time digitization assistants.
- iDigBio should support efforts to obtain funding for continued national digitization efforts.
- iDigBio helps through workshops (and webinars if we can't travel).
- iDigBio could play a part in advocacy at the national level and make sure these issues are not swept under the rug by institutions.
- iDigBio can help by offering suggestions and advice on how to raise the profile of our efforts, and how to engage more students and members of the wider community.

Appendix N. Final thoughts offered by community respondents

- Overall, iDigBio has done an excellent job -- really transformed the collections community. Although not perfect, I think iDigBio has done as well meeting their challenges as could be expected.
- Thank you for your invaluable work to strengthen our community.
- I'm glad you're out there!
- I think it is great the amount of information that is being provided. I think the next goal should be improving the way that information can be found and understood by people who need the information on the website. There is so much good information on the website (mostly in the form of talks) that it is overwhelming.
- the webinars and workshops are critical for collections managers who have limited institutional support. thank you
- This sort of thing needs to be made functional: <https://github.com/GlobalNamesArchitecture/GNITE> maybe iDigBio can make it happen?
- Monthly updates would be useful
- Keep up the good work!
- I remain concerned that iDigBio is not focusing on it main goals and is moving away from it's primary scope. Workshops are a great way to bring people together and learn new skills, however I think that fewer more focused workshops would be of greater benefit to the community. I am also concerend that iDigBio could use it extensive resources to support existing projects and technologies. There seems to be a take, but not give approach to supporting existing tools.
- Thank you!
- Keep herding those cats.
- The various specific collection portals (mycoportal, lichenportal, bryophyteportal, etc) need to have more search options in the public search. Search options equivalent to the editor search options would be ideal for researchers. This should be implemented ASAP in order to make the collections more accessible and valuable to researchers. We also need the exsiccati information and determination history information to store in the same table and display with the other collection information in the public records. All of the above recommendations have been voiced to Ed Gilbert (symbiota) on multiple occasions. I hope these things will happen soon.
- A worthy effort. I hope the rest of the U.S. understands the importance
- While I am no longer in the U.S., I am thrilled with the level of support and communication I continue to receive from iDigBio, particularly from Deb. You have all made a tremendous impact on the way the community thinks about collections management and data mobilization. Thank you!
- I'm still learning about iDigBio.
- Thank you for your help! For such a complicated and large organization, it runs amazingly well, from the website design, to the workshops, to small but important things like rapid reimbursement. Everyone there is incredibly patient, helpful, competent. It makes such a difference in terms of maintaining enthusiasm and forward momentum.
- iDigBio is awesome! I have been so impressed with the staff and their commitment to training, communication and infrastructure. In particular I have enjoyed working with Deb Paul, Francois Michonneau and Dan Stoner on training efforts, and Kevin Love has been amazing with his work on teleconferencing and videos making remote connections and online resources valuable and easy to use.
- although I personally have not used the websites and workshops extensively, my staff and graduate students have used them extensively. We have made data from tens of thousands of specimens available and thousands of images. Participation in this program has also led us to adopt Specify as our database, switching from Biota--this has been great!
- keep up the good work. I wish I could participate more often in webinars and other activities--I am very appreciative of offering workshops via webinar because of lack of time to travel, but the one time I was able to attend a face-to-face workshop it was great and I could really focus. It's the follow-up when replanted in my native, teaching & student driven environment that saps all available energy and time.
- Great job.

- The digitization effort needs Digital Collections Staff embedded within (or working closely with) physical Collections Managers....expecting the latter to do the job of both is a tall order. Current curators and collections managers NEED assistance (whether it be in the form of grants, letters of support, a blog for curators who are interested in approaching their administration about creating a new position and how to go about it, or just a general statement from iDigBio that recognizes the dichotomy and places a value on it) in securing these positions as regular paid staff.
- n/a
- Thank you for your hard work!
- I sort of feel like collections that aren't in a TCN or PEN are sort of left out of what's been going on at iDigBio (aside from providing our data or the Small Collections initiative). That's the majority of collections in the US, which is a problem. I haven't actually found a lot of useful stuff for our work digitizing on our own. For example, it would be great if there was a standard for higher geography- I'd be happy to follow it but I haven't seen or heard about it. I'd also love to see a page of resource for maps/gazeteers, particularly of foreign countries, to assist with georeferencing.

BI-MONTHLY PROGRESS REPORTS TO IDIGBIO
FROM
THEMATIC COLLECTIONS NETWORKS (TCNs)

SEPTEMBER 2014

NORTH AMERICAN LICHENS AND BRYOPHYTES: SENSITIVE INDICATORS OF ENVIRONMENTAL QUALITY AND CHANGE

Report submitted by: cgries@wisc.edu
Report Submitted on: 08/28/2014 - 11:21

Progress in Digitization Efforts

As of August 2014 the number for the LBCC are as follows:

Lichens: <http://lichenportal.org>

Herbaria actively submitting images or key stroked records to the portal: 58

Specimen records in portal: 1,294,847 (up by 17,735 since June 2014)

Specimen records with images: 599,924 (17,735 labels have been imaged since June 2014, plus 6,124 have been added to existing records)

Obviously, we are moving from the imaging phase to the transcription phase. As a measure for transcription activities we have chosen to report the numbers of records with locality information: 944,609

Bryophytes

<http://bryophyteportal.org>

Herbaria actively submitting images or key stroked records to the portal: 56

Specimen records in portal: 1,900,256 (up by 42,292 since June 2014)

Specimen records with images: 803,134 (42,292 labels have been imaged since June 2014, plus 2,978 have been added to existing records)

Records with locality information: 1,133,529

Share and Identify Best Practices and Standards (including Lessons Learned)

One lesson I learned this summer is that it is very difficult to find people willing to transcribe label images.

Identify Gaps in Digitization Areas and Technology

nothing to report

Share and Identify Opportunities to Enhance Training Efforts

We have just started regular Symbiota training sessions through iDigBio's Adobe Connect. The first happened on Tuesday, August 26 and was attended by 14 people. Julie Smith is responsible for scheduling and Ed Gilbert did the presentation. Julie is now available for questions and has been in contact with many Symbiota users from our project.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

nothing to report

Share and Identify Opportunities and Strategies for Sustainability

nothing to report

Other Progress (that doesn't fit into the above categories)

nothing to report

Attachment

N/A

DIGITIZING FOSSILS TO ENABLE NEW SYNTHESSES IN BIOGEOGRAPHY- CREATING A PALEONICHES

Report submitted by: blieber@ku.edu
Report Submitted on: 08/28/2014 - 12:41

Progress in Digitization Efforts

Paleoniches Update, August 2014

Regarding the University of Kansas portion of the project, led by PI Bruce S. Lieberman and co-PI Una Farrell, we now have a total of 135,197 specimens databased. Of these, there are a total of 131,078 specimens databased that have clean, proofed localities. Further, we now have a total of 113,003 specimens that are georeferenced. In addition, a total of 7,465 localities have been georeferenced, meaning that we have effectively completed the entire georeferencing component of our proposed work. Also, imaging of several of the Pennsylvanian species have been completed and these images have been sent on to Jonathan Hendricks, PI at SJSU, for incorporation into the Pennsylvanian digital atlas (see below for further discussion). Finally, in other relevant news, Una Farrell attended the most recent SPNCH annual meeting in Cardiff, Wales, UK, and presented a poster describing our work on the TCN, and an abstract on "Data, Digitization, and Discovery in the Paleoniches TCN" authored by post-doc Michelle Casey, co-PI Una Farrell, and PI Bruce S. Lieberman was accepted for presentation in the session "Advancing the Digitization of Paleontology and Geoscience Collections: Projects, Programs, and Practices I" at the 2014 Annual Meeting of the Geological Society of America in Vancouver.

Further, during the last three months, PI's B. Lieberman, J. Hendrickson, and co-PI J. Beach began working with the consulting developer of the Paleoniches iPad Atlas application (Rod Spears Consulting) to specify the requirements and design for a prototype. The Atlas app will leverage considerable pre-existing software developed for the Specify Software Project, for Specify Insight an iPad app for browsing biological collections data. We have identified methods for creating a data pipeline for pushing project specimen text and image data from the Paleoniches web portal to the iPad. Working with PI Jon Hendrickson, we are developing software code and a file format to dump project data from the project web portal (Word Press/MySQL) to SQLite the database platform used on the iPad. User interface design discussions are underway; data exploration capabilities will include specimen search, mapping, and image browsing. We expect to have a prototype version of the Atlas app with data from two major project groups in Fall 2014.

The iPad screen images in the attached file (along with the rest of the report) are from the Specify Insight App, but they provide an idea of the visual style of the Paleoniches Atlas application.

Regarding the Ohio University portion of the project, led by PI Alycia Stigall

Ohio University:

Three new undergraduate students began work on the Ordovician Atlas. These new students plus a returning MS student and two returning undergraduates will continue Atlas development during the 2014-2015 Academic year.

Currently, there are 81 species and 64 genera live on the Ordovician Atlas. Photo processing for the arthropods is complete. All but three photographs are processed for the brachiopods, and about half the photographs for the bryozoans are processed. Photographs for the remaining phyla are less than halfway processed. Published descriptions have been located for the majority of the brachiopods and arthropods. Bryozoans and crinoids are currently being researched. In June, the Ordovician Atlas website was opened as an interactive display in the Cincinnati Museum Center's 'Cincinnati Under the Sea' exhibit.

Cincinnati Museum Center:

A temporary exhibit, "Cincinnati Under the Sea" was opened in June which showcases the spectacular fauna of the Cincinnati, Ohio region was opened at the Cincinnati Museum Center. Included in this exhibit is computer interface so patrons can interact with the Digital Atlas of Ordovician Life.

Both student interns that were working on georeferencing during the 2013-2014 academic year have moved on to full-time employment. However, with the new FY 2014-15 upon us, a new University of Cincinnati student was hired and will be starting August 18th. His main goal will be to complete georeferencing the Ohio, Indiana, and Kentucky site records in KeEmu which will target most known Cincinnati specimen records in the collections.

Miami University:

No students were employed during the summer semester, but new students will be recruited to continue digitization efforts with the start of the 2014-2015 academic year.

Regarding the San José State University portion of the project, led by PI Jon Hendricks:

Since the last update, undergraduate and graduate student assistants have continued to generate content for the Neogene and Pennsylvanian components of the "Digital Atlas of Ancient Life" and have put it online.

One notable accomplishment since the last update is that the migration of Neogene content from the old Digital Atlas page (<http://www.geosun.sjsu.edu/~jhendricks/AtlasTemp/>) to the new WordPress-based page (<http://www.neogeneatlas.org>) is now complete; the old website will soon be taken offline. New content has been added to the Neogene Atlas for the bivalve families Arcidae, Glycymeridae, Ostreidae, and Mytilidae and the gastropod family Muricidae. Content generation for the bivalve family Pectinidae is currently in progress. Species-level pages are now online for 284 Neogene species (out of 500 planned pages).

Another important accomplishment is that the revised webpage for the Pennsylvanian Atlas is now accessible online at: <http://www.pennsylvanianatlas.org>. We have just begun adding species-level pages to this Digital Atlas.

Finally, PI Hendricks learned that his abstract (with co-authors) on the Neogene Atlas of Ancient Life was accepted for presentation in the session "Advancing the Digitization of Paleontology and Geoscience Collections: Projects, Programs, and Practices I" at the 2014 Annual Meeting of the Geological Society of America in Vancouver.

(Also see Jon's activities mentioned above under KU pertaining to the development of the portable device app.)

Finally, for our PEN partners. First, Texas, PI: Ann Molineux, Co-PI: James Sprinkle

During the next reporting period to accomplish their goals they plan to:

1. Complete the ongoing development of portal connection to GBIF via VertNet and thence to iDigBio HUB.
2. Concentrate on stage/age resolution for more of the records.
3. Increase the rate of georeferencing of localities.
4. Attach more images to records so they can become available to the TCN via the HUB.

Above are the four items that they recorded on the official NSF annual progress report:

1. We have now a data set with VertNet awaiting their processing prior to iDigBio access
2. Lou Zachos has just completed his update of the Paleogene and Neogene with stage/age resolution added and his entire database is now formatted for workbench upload into Specify.
Jim Sprinkle has resolved the early Paleozoic records to stage where possible. This data is being added into Specify. This is an ongoing process that would be much speedier were there an update function with Specify workbench.
3. Georeferencing is complete for the Zachos collection and will be added with (2)
4. About 1900 image attachments have been made. These include whole drawer images, specimen images, labels, field images, and notebooks.

And at Yale: From PI Susan Butts:

We have selected the top taxa from the Ordovician and the Pennsylvanian (50 most abundant genera from each time period) and are proceeding to digitize that material from our systematic collection. Since the previous report, 825 specimens have been cataloged. 237 of those have been fully digitized and are available online. 184 georeferenced localities were added to or modified in the database. An additional 4,366 images (specimens which were already cataloged electronically but in need of imaging) are ready to be uploaded in the next batch upload.

The multimedia interactive kiosk is nearing completion. The kiosk is centered on fossils of the Ordovician. It features a touchscreen monitor which features fossil identification and videos and text about the activities within the Invertebrate Paleontology Division. When

it is deployed in the public area of the museum, it will be manned by an EVolutions interpreter (from the SciCORPS program), who will assist kiosk visitors in keying out common Ordovician taxa. Videos include: behind the scene tours of the collections, interviews with scientists describing their work on Ordovician fossils, how fossils are identified and digitized, information about the geologic history during the Ordovician, and the rationale for why we digitize fossils – to track biodiversity in the context of climate change.

Share and Identify Best Practices and Standards (including Lessons Learned)

Nothing to report.

Identify Gaps in Digitization Areas and Technology

Nothing to report.

Share and Identify Opportunities to Enhance Training Efforts

Nothing to report.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Nothing to report.

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report.

Other Progress (that doesn't fit into the above categories)

Nothing to report.

Attachment

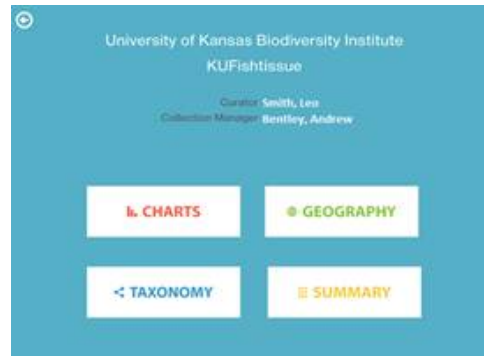
<https://www.idigbio.org/sites/default/files/webform/tcn-reports/iDigBioupdateAugust2014.pdf>

Paleoniches Update, August 2014

Regarding the **University of Kansas** portion of the project, led by PI Bruce S. Lieberman and co-PI Una Farrell, we now have a total of 135,197 specimens databased. Of these, there are a total of 131,078 specimens databased that have clean, proofed localities. Further, we now have a total of 113,003 specimens that are georeferenced. In addition, a total of 7,465 localities have been georeferenced, meaning that we have effectively completed the entire georeferencing component of our proposed work. Also, imaging of several of the Pennsylvanian species have been completed and these images have been sent on to Jonathan Hendricks, PI at SJSU, for incorporation into the Pennsylvanian digital atlas (see below for further discussion). Finally, in other relevant news, Una Farrell attended the most recent SPNCH annual meeting in Cardiff, Wales, UK, and presented a poster describing our work on the TCN, and an abstract on “Data, Digitization, and Discovery in the Paleoniches TCN” authored by post-doc Michelle Casey, co-PI Una Farrell, and PI Bruce S. Lieberman was accepted for presentation in the session “Advancing the Digitization of Paleontology and Geoscience Collections: Projects, Programs, and Practices I” at the 2014 Annual Meeting of the Geological Society of America in Vancouver.

Further, during the last three months, PI's B. Lieberman, J. Hendrickson, and co-PI J. Beach began working with the consulting developer of the Paleoniches iPad Atlas application (Rod Spears Consulting) to specify the requirements and design for a prototype. The Atlas app will leverage considerable pre-existing software developed for the Specify Software Project, for *Specify Insight* an iPad app for browsing biological collections data. We have identified methods for creating a data pipeline for pushing project specimen text and image data from the Paleoniches web portal to the iPad. Working with PI Jon Hendrickson, we are developing software code and a file format to dump project data from the project web portal (Word Press/MySQL) to SQLite the database platform used on the iPad. User interface design discussions are underway; data exploration capabilities will include specimen search, mapping, and image browsing. We expect to have a prototype version of the Atlas app with data from two major project groups in Fall 2014.

The iPad screen images below are from the Specify Insight App, but they provide an idea of the visual style of the Paleoniches Atlas application.



Regarding the **Ohio University** portion of the project, led by PI Alycia Stigall

Ohio University:

Three new undergraduate students began work on the Ordovician Atlas. These new students plus a returning MS student and two returning undergraduates will continue Atlas development during the 2014-2015 Academic year.

Currently, there are 81 species and 64 genera live on the Ordovician Atlas. Photo processing for the arthropods is complete. All but three photographs are processed for the brachiopods, and about half the photographs for the bryozoans are processed. Photographs for the remaining phyla are less than halfway processed. Published descriptions have been located for the majority of the brachiopods and arthropods. Bryozoans and crinoids are currently being researched. In June, the Ordovician Atlas website was opened as an interactive display in the Cincinnati Museum Center's 'Cincinnati Under the Sea' exhibit.

Cincinnati Museum Center:

A temporary exhibit, "Cincinnati Under the Sea" was opened in June which showcases the spectacular fauna of the Cincinnati, Ohio region was opened at the Cincinnati Museum Center. Included in this exhibit is computer interface so patrons can interact with the Digital Atlas of Ordovician Life.

Both student interns that were working on georeferencing during the 2013-2014 academic year have moved on to full-time employment. However, with the new FY 2014-15 upon us, a new University of Cincinnati student was hired and will be starting August 18th. His main goal will be to complete georeferencing the Ohio, Indiana, and Kentucky site records in KeEmu which will target most known Cincinnati specimen records in the collections.

Miami University:

No students were employed during the summer semester, but new students will be recruited to continue digitization efforts with the start of the 2014-2015 academic year.

Regarding the **San José State University** portion of the project, led by PI Jon Hendricks:

Since the last update, undergraduate and graduate student assistants have continued to generate content for the Neogene and Pennsylvanian components of the “Digital Atlas of Ancient Life” and have put it online.

One notable accomplishment since the last update is that the migration of Neogene content from the old Digital Atlas page

(<http://www.geosun.sjsu.edu/~jhendricks/AtlasTemp/>) to the new WordPress-based page (<http://www.neogeneatlas.org>) is now complete; the old website will soon be taken offline. New content has been added to the Neogene Atlas for the bivalve families Arcidae, Glycymeridae, Ostreidae, and Mytilidae and the gastropod family Muricidae. Content generation for the bivalve family Pectinidae is currently in progress. Species-level pages are now online for 284 Neogene species (out of 500 planned pages).

Another important accomplishment is that the revised webpage for the Pennsylvanian Atlas is now accessible online at:

<http://www.pennsylvanianatlas.org>. We have just begun adding species-level pages to this Digital Atlas.

Finally, PI Hendricks learned that his abstract (with co-authors) on the Neogene Atlas of Ancient Life was accepted for presentation in the session “Advancing the Digitization of Paleontology and Geoscience Collections: Projects, Programs, and Practices I” at the 2014 Annual Meeting of the Geological Society of America in Vancouver.

(Also see Jon’s activities mentioned above under KU pertaining to the development of the portable device app.)

Finally, for our PEN partners. First, **Texas**, PI: Ann Molineux, Co-PI: James Sprinkle

During the next reporting period to accomplish their goals they plan to:

1. Complete the ongoing development of portal connection to GBIF via VertNet and thence to iDigBio HUB.
2. Concentrate on stage/age resolution for more of the records.
3. Increase the rate of georeferencing of localities.
4. Attach more images to records so they can become available to the TCN via the HUB.

Above are the four items that they recorded on the official NSF annual progress report:

1. We have now a data set with *VertNet* awaiting their processing prior to *iDigBio* access
2. Lou Zachos has just completed his update of the Paleogene and Neogene with stage/age resolution added and his entire database is now formatted for workbench upload into *Specify*.

Jim Sprinkle has resolved the early Paleozoic records to stage where possible. This data is being added into *Specify*. This is an ongoing process that would be much speedier were there an update function with *Specify* workbench.

3. Georeferencing is complete for the Zachos collection and will be added with (2)
4. About 1900 image attachments have been made. These include whole drawer images, specimen images, labels, field images, and notebooks.

And at **Yale**: From PI Susan Butts:

We have selected the top taxa from the Ordovician and the Pennsylvanian (50 most abundant genera from each time period) and are proceeding to digitize that material from our systematic collection. Since the previous report, 825 specimens have been cataloged. 237 of those have been fully digitized and are available online. 184 georeferenced localities were added to or modified in the database. An additional 4,366 images (specimens which were already cataloged electronically but in need of imaging) are ready to be uploaded in the next batch upload.

The multimedia interactive kiosk is nearing completion. The kiosk is centered on fossils of the Ordovician. It features a touchscreen monitor which features fossil identification and videos and text about the activities within the Invertebrate Paleontology Division. When it is deployed in the public area of the museum, it will be manned by an EVolutions interpreter (from the SciCORPS program), who will assist kiosk visitors in keying out common Ordovician taxa. Videos include: behind the scene tours of the collections, interviews with scientists describing their work on Ordovician fossils, how fossils are identified and digitized, information about the geologic history during the Ordovician, and the rationale for why we digitize fossils – to track biodiversity in the context of climate change.

FOSSIL INSECT COLLABORATIVE: A DEEP-TIME APPROACH TO STUDYING DIVERSIFICATION AND RESPONSE TO ENVIRONMENTAL CHANGE

Report submitted by: talia.karim@colorado.edu
Report Submitted on: 09/02/2014 - 11:50

Progress in Digitization Efforts

All TCN members are continuing to database and image specimens. The AMNH reports that they have added nearly 3,000 records for their Dominican Amber Collection as well as several hundred images. The CUMNH has updated their web portal (invertpaleosearch.colorado.edu) with the addition of many newly digitized specimen records and images. Harvard-MCZ reports that they have added about 1600 images, accounting for about 1200 specimens from the collection. They also just received the equipment for setting up a second rock fossil imaging system and an amber imaging system (the latter to be integrated in a pre-existing stereomicroscope), and are planning on hiring two part-time digitization assistants this fall.

S. Butts (PI-Yale Peabody) and C. Norris (co-PI-Yale Peabody) are having bi-weekly meetings with Whirl-i-gig about the development of the iDigPaleo data aggregation portal. Over the summer they have been collecting sample datasets from Fossil Insect TCN members and are working on how the data will be aggregated and shared with iDigBio. CUMNH has set up an IPT to provide data and is working to solutions for image linking. AMNH will be providing straight from Specify. Yale is creating an IPT. We are hoping for a beta version of iDigPaleo to be ready later this fall (2014) or early winter (2015).

T. Karim (co-PI-CUMNH) worked with J. McCaffery (iDigBio) this summer to improve the quality of data being shared with GBIF through the CUMNH IPT server. Image URLs are now being served to GBIF and data are more accurately mapped.

Share and Identify Best Practices and Standards (including Lessons Learned)

Nothing to report.

Identify Gaps in Digitization Areas and Technology

Nothing to report.

Share and Identify Opportunities to Enhance Training Efforts

Nothing to report.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

The CUMNH and AMNH have been in touch with the Specify team regarding the recent changes to the data model and the location of Paleo Context information. The AMNH will be moving this table to their locality table (following the Swedish Museum of Natural History) and the CUMNH will be moving the Paleo Context to Collecting Event (following the U. of Kansas). The CUMNH was ask by Specify to send them a copy of their Specify database to act as a test conversion. Karim tested the converted database and found no issues with the conversion.

Our TCN has attended a web meeting and plans to work on the AR flashcard project. We have selected at least one specimen for the project (Tse Tse fly from the CUMNH collection) and TCN members at the INHS will be experimenting with amber photogrammetry this month in hopes that we might be able to submit another specimen to the project. The reflective surface of the amber might make photogrammetry impossible though.

T. Karim worked with G. Nelson (iDigBio) and T. White (Yale Peabody) to finalize details of the Geoscience Digitization session being held at the Annual Geological Society of America Meeting (Oct. 2014). Over 35 abstracts were submitted and the session was expanded by GSA from a half day to a full day session with a poster session. Details and abstracts can be found here:

<https://gsa.confex.com/gsa/2014AM/webprogram/Session35281.html>

<https://gsa.confex.com/gsa/2014AM/webprogram/Session36614.html>

<https://gsa.confex.com/gsa/2014AM/webprogram/Session36615.html>

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report.

Other Progress (that doesn't fit into the above categories)

Sam Heads (PI-INHS) published a paper on a new pygmy cricket from the Sanderson Dominican Amber collection they are digitizing as part of the TCN project. The press release included a video narrated by David Attenborough (<https://www.youtube.com/watch?v=kN8pGc3-odY&feature=youtu.be&list=UUzq2rnoZ4iC-30wYZkqRrGw>).

Attachment

N/A

PLANTS, HERBIVORES AND PARASITOIDS: A MODEL SYSTEM FOR THE STUDY OF TRI-TROPHIC ASSOCIATIONS

Report submitted by: moon@begoniasociety.org
Report Submitted on: 09/02/2014 - 14:40

Progress in Digitization Efforts

Number of insects (labels transcribed) for the TTD-TCN project: 1,054,638
Number of plants (imaged, labels transcribed) for the TTD-TCN project: 479,162
Number of other records aggregated by project: 1,206,250

Share and Identify Best Practices and Standards (including Lessons Learned)

Continuing work with Joanna regarding best practices for including project attribution information. Important if we are to share other data, besides TCN data, aggregated in our database(s).

Identify Gaps in Digitization Areas and Technology

Improved methods for sharing georeferenced localities, or searching by a database of already georeferenced localities.

Share and Identify Opportunities to Enhance Training Efforts

On 8 July 2014, 24 high school students from the Everett Children's Adventure Garden (ECAG) came to the Herbarium for a tour and a presentation on the digitization workflow at NYBG. The following week, 8 of the students volunteered to come in for training on data entry in Symbiota. From 15 July 2014 – 26 August 2014, the students came in once a week to transcribe records, contributing ca.1350 complete specimen records to the project. High school volunteers come to ECAG about 4 times a year so we plan to continue this relationship with them.

Mari Roberts met with Marisa Miller, an AP Environmental Science teacher from East-West School of International Studies who will be implementing our crowdsourcing module into her classroom. She will train students in data capture and they will gain extra credit points for their efforts.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Katja Seltmann began working with Yonggang Liu to upload insect images using the image appliance. Kim Watson has been working with the image appliance to upload large image files.

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report.

Other Progress (that doesn't fit into the above categories)

Nothing to report.

Attachment

N/A

THE MACROFUNGI COLLECTION CONSORTIUM: UNLOCKING A BIODIVERSITY RESOURCE FOR UNDERSTANDING BIOTEC INTERACTIONS, NUTRIENT CYCLING AND HUMAN AFFAIRS

Report submitted by: barbara.thiers@gmail.com
Report Submitted on: 09/02/2014 - 15:35

Progress in Digitization Efforts

To date, 431,220 specimens have been newly digitized (imaged and label data at least partially databased) of a projected 603,620 for the project. Thus, the digitization component of the project is approximately 71% complete. The total number of searchable records in the Mycoportal is now 1,714,065, or 401,245 more than originally projected. The reason the actual number is so much larger than anticipated is that we have had more records contributed from institutions not funded by the project than originally anticipated. To date, eight of the 32 funded institutions have completed their digitization work and five others are 70% or more complete.

In this third year of the project, more effort is being devoted to record completion. Of the 431,220 records newly created during the project, 349,133 have all collection event data transcribed from the specimen label, leaving 82,475 records for which the remaining collection event data must be added.

Share and Identify Best Practices and Standards (including Lessons Learned)

Nothing new to report

Identify Gaps in Digitization Areas and Technology

There are two gaps in Symbiota that we are attempting to address with a new subcontract to Arizona State University. One change is to make it possible to sort collections in table view in Symbiota -- this will make it possible to group records for editing that will have similar values that can quickly be added to a set of records. The other is to incorporate the data parsing protocols in Salix into Symbiota.

Share and Identify Opportunities to Enhance Training Efforts

nothing new to report -- training aspect of this project is completed.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

This summer we purchased imaging equipment for the New York State Museum and spent three days training them to digitize their fungal, bryophyte and lichen, vascular plant and algal specimens so that they can participate in a variety of TCN projects.

Share and Identify Opportunities and Strategies for Sustainability

nothing new to report.

Other Progress (that doesn't fit into the above categories)

We have three institutions that are now just beginning funded work on the project. University of Arizona, which was included in the original proposal but deferred participation until the third year; Purdue University, which has just had a new subcontract activated (using funds originally awarded to University of Mississippi, which decided against participating in the project; and University of Vermont, which was recently awarded a PEN grant for adding their specimens to the project.

Attachment

N/A

THE MACROALGAL HERBARIUM CONSORTIUM: ACCESSING 150 YEARS OF SPECIMEN DATA TO UNDERSTAND CHANGES IN THE MARINE/AQUATIC ENVIRONMENT

Report submitted by: Chris.neefus@unh.edu
Report Submitted on: 09/02/2014 - 16:30

Progress in Digitization Efforts

In the first year of the project, the digitizing institutions have:

Created 382,035 specimen records

Imaged 109,022 specimens

Fully transcribed 57,964 labels

Georeferenced 40,773

Uploaded 189,905 specimen records to the portal

Share and Identify Best Practices and Standards (including Lessons Learned)

nothing to report

Identify Gaps in Digitization Areas and Technology

nothing to report

Share and Identify Opportunities to Enhance Training Efforts

nothing to report

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

We have suggested a symposium on algal specimen digitization at next summers Phycological Society of America meeting in Philadelphia.

Share and Identify Opportunities and Strategies for Sustainability

nothing to report

Other Progress (that doesn't fit into the above categories)

nothing to report

Attachment

<https://www.idigbio.org/sites/default/files/webform/tcn-reports/digitization%20numbers.xlsx>

Digitizing Institution	Collection	Collection Size	Records Created	Imaged	Fully Transcribed	Geo-referenced	On Portal
University of New Hampshire	NHA	85,000	59,727	54,000	16,992	9,283	59,727
	CONN	2,145	2,145	1,973	1,973	2,089	2,145
Field Museum	F	109,505	30,000			0	967
University of Michigan	MICH	60,000	23,987	21,427	7,775	256	23,987
Bishop Museum	BISH	78,795	52,131	4,420	11,846	24,073	0
University of California - Berkeley	UC	202,000	80,000				0
	GMS	5,294	5,294	0	5,294	36	5,294
	DAV	1,958	1,958	1,958	1,958	1,616	1,958
	HSC	2,000	259	259	184	2	259
New York Botanical Garden	NY	150,000	76,824	11,756	4,792	1,503	76,824
University of North Carolina	NCU	60,000	14,508	8,019	2,916	1,867	14,508
Duke University	DUKE	19,000	16,000	4,186	4,186		4,186
University of Washington	WTU	25,000	14,180				0
	FHL	4,972	4,972			0	0
	ALA	7,182	0	1,021	0	0	0
University of Alaska	ALAJ	8,300	50	3	48	48	50
Totals			382,035	109,022	57,964	40,773	189,905

0.574087 0.3052263 0.2147021

INVERTNET: AN INTEGRATIVE PLATFORM FOR RESEARCH ON ENVIRONMENTAL CHANGE, SPECIES DISCOVERY AND IDENTIFICATION

Report submitted by: chdietri@illinois.edu

Report Submitted on: 09/02/2014 - 17:53

Progress in Digitization Efforts

At the lead institution, 14 drawer digitizing systems have been completed and fully tested except for the tilting camera head. We experienced some additional delays in manufacturing this part of the production systems so, to provide a backup solution, we are now working on two alternative machine configurations simultaneously. The two configurations are identical except for the camera head and some details of the machine control software related to the different geometries of the two alternative heads. Because we are still not sure how much time it will take to complete the manufacture of the more complicated, tilting heads, we are now pursuing a second option, which is to replicate the 3-axis head on the prototype machine that is now in operation at INHS. This prototype is fully tested and capable of capturing the perpendicular and tilted images of drawers needed to expose the data labels on the pins but requires an additional 3 minutes to capture an image set for one drawer (15 minutes versus 12 minutes for the 5-axis system). The prototype system also has the drawback of having to tilt the drawer four times (front, back, left, right) in order to capture a full set of images for each drawer, which involves additional handling of each drawer and some additional risk of specimen damage. We will continue to pursue these two tracks in order to minimize further delays until we can make a final determination on which alternative is the most viable, given our desire to finish the project by the end of year 4 (June 2015). Most other aspects of the drawer digitization workflow are in place and operational but additional development is underway to optimize image stitching to increase speed and accuracy, to make the graphical user interface for the machine control software more user friendly, and to finalize user's guides and training materials for the drawer digitization system. Summaries for numbers of collection objects digitized project-wide are available at invertnet.org.

Share and Identify Best Practices and Standards (including Lessons Learned)

nothing to report

Identify Gaps in Digitization Areas and Technology

nothing to report

Share and Identify Opportunities to Enhance Training Efforts

nothing to report

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

nothing to report

Share and Identify Opportunities and Strategies for Sustainability

nothing to report

Other Progress (that doesn't fit into the above categories)

nothing to report

Attachment

N/A

MOBILIZING NEW ENGLAND VASCULAR PLANT SPECIMEN DATA TO TRACK ENVIRONMENTAL CHANGE

Report submitted by: p_sweeney@att.net
Report Submitted on: 09/04/2014 - 09:56

Progress in Digitization Efforts

Capture of collection level-information (i.e., "pre-capture") is almost complete. At this stage approximately 800,000 specimens have been pre-captured -- with at least current identification captured. As part of the primary digitization phase, approximately 177,500 records and 158,000 images have been captured.

Share and Identify Best Practices and Standards (including Lessons Learned)

nothing to report

Identify Gaps in Digitization Areas and Technology

nothing to report

Share and Identify Opportunities to Enhance Training Efforts

nothing to report

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

We continue to collaborate with, iPlant, the FilteredPush project, the Symbiota team, and iDigBio. We are collaborating with Melody Basham (Arizona State U.), iDigBio, and other TCNs to develop a Augmented Reality tool that will be useful in K-12 education.

Share and Identify Opportunities and Strategies for Sustainability

nothing to report

Other Progress (that doesn't fit into the above categories)

nothing to report

Attachment

N/A

SOUTHWEST COLLECTIONS OF ARTHROPODS NETWORK (SCAN): A MODEL FOR COLLECTIONS DIGITIZATION TO PROMOTE TAXONOMIC AND ECOLOGICAL RESEARCH

Report submitted by: neilscobb@gmail.com
Report Submitted on: 09/09/2014 - 15:20

Progress in Digitization Efforts

see attached

Share and Identify Best Practices and Standards (including Lessons Learned)

We are identifying best practices on a weekly basis and sharing those with respective people within SCAN.

Identify Gaps in Digitization Areas and Technology

We need to harvest additional data (i.e. beyond SCAN) to better understand the biogeography of arthropod taxa. We are partially meeting this need by incorporating GBIF into the SCAN database.

Share and Identify Opportunities to Enhance Training Efforts

Nothing new to report, we are working on activities already described in previous reports.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

We are primarily working with Tri-Trophic TCN in order to develop questions for analyzing ADBC data. We presented a joint paper at the 21st Century meeting May 5, 2014. We are working with Katja Seltsmann and others in developing workflows for modeling.

Share and Identify Opportunities and Strategies for Sustainability

We have a sustainability plan for Colorado State University, they are finished using their NSF funding <http://scan1.acis.ufl.edu/content/sustainability>.

Other Progress (that doesn't fit into the above categories)

We are starting to share North American data from other sources to increase the quantity of data. These will greatly increase the usability of the existing SCAN data, especially understanding species distributions and more complete species lists. We are hosting North American data from GBIF and are in the process of hosting data from Tri-Trophic TCN and other non-TCN arthropod data sets that have been harvested by iDigBio. With these additional records we are currently serving over 4.9 million records for 57,229 species.

Attachment

https://www.idigbio.org/sites/default/files/webform/tcn-reports/SCAN_Sept_2014.docx

Southwest Collections of Arthropods Network Update

September 12, 2014September 12, 2014

Neil Cobb

Progress in Digitization Efforts:

We are on target to meet our second-year quota for digitizing labels from pinned specimens.

Table 1 presents three sets of statistics as of Sept 3, 2014. These include data from institutions that are funded by SCAN, institutions that are entering data into the SCAN portal but not funded by SCAN, and the total records in the SCAN portal. We have added
Sept

Table 1. Number of specimen records digitized and associated summary statistics. From <http://symbiota4.acis.ufl.edu/scan/portal/index.php>

	SCAN funded	SCAN non-funded	TOTAL SCAN
# Specimen Records	667,341	128,380	795,721
# Georeferenced	506,003	40,619	546,622
# Identified to species	429,353	73,451	502,804
# Families	687	41	728
# Genera	6,729	1,403	8,132
# Species	15,076	4,721	19,797
% Georeferenced	76%	32%	69%
% Ided to Species	64%	57%	63%

We have also started creating high-resolution images taken by a subset of SCAN museums that are committed to producing specimen images. Table 2 lists the number of images posted on SCAN by these participating museums. Our goal is to produce ~16,000 high-resolution images suites. An image suite consists of 1-5 images representing different aspects of a specimen. This will translate into approximately 40,000 images. We are currently behind on our projections due to unexpected logistical challenges but we expect to continue to greatly increase our productivity over the fall, 2014. The major addition to images is from the University of Hawaii, which has uploaded

Table 2. Number of images posted on SCAN portal from SCAN museums that are focused on producing high-resolution images of specimens. Data are recorded from <http://symbiota1.acis.ufl.edu/scan/portal/imagelib/photographers.php>

Institution	# High-Resolution Images
Arizona State University	1,716
Colorado State University	49
Northern Arizona University	1,020
Denver Museum of Nature and Science	617
University of New Mexico	80
Northern Arizona University - NPS	673
New Mexico State University	910
Texas Tech University (mostly low-res images)	24,993
University of Arizona (low res images)	38,890
University of Hawaii (low res images)	517
University of Colorado	0
TOTAL	69,465

Share and Identify Best Practices and Standards (including Lessons Learned):

We are identifying best practices on a weekly basis and sharing those with respective people within SCAN.

Identify Gaps in Digitization Areas and Technology:

We need to harvest additional data (i.e. beyond SCAN) to better understand the biogeography of arthropod taxa. We are partially meeting this need by incorporating GBIF into the SCAN database.

Share and Identify Opportunities to Enhance Training Efforts:

Nothing new to report, we are working on activities already described in previous reports

Share and Identify Collaborations with other TCNs, Institutions, and Organizations:

We are primarily working with Tri-Trophic TCN in order to develop questions for analyzing ADBC data. We presented a joint paper at the 21st Century meeting May 5, 2014. We are working with Katja Seltsmann and others in developing workflows for modeling.

Share and Identify Opportunities and Strategies for Sustainability:

We have a sustainability plan for Colorado State University, they are finished using their NSF funding <http://scan1.acis.ufl.edu/content/sustainability>.

Other Progress (that doesn't fit into the above categories): We are starting to share North American data from other sources to increase the quantity of data. These will greatly increase the usability of the existing SCAN data, especially understanding species distributions and more complete species lists. We are hosting North American data from GBIF and are in the process of hosting data from Tri-Trophic TCN and other non-TCN arthropod data sets that have been harvested by iDigBio. With these additional records we are currently serving over 4.9 million records for 57,229 species.

DEVELOPING A CENTRALIZED DIGITAL ARCHIVE OF VOUCHERED ANIMAL COMMUNICATION SIGNALS

Report submitted by: msw244@cornell.edu
Report Submitted on: 09/11/2014 - 15:15

Progress in Digitization Efforts

We have now completed the first year of activities for this project. The key outcome from our Year 1 activities has been the digitization of many hours of audio recordings to create over 10,100 new media specimens, as detailed below. These recordings ("media specimens") are now available through, and playable at, the Macaulay Library website (MacaulayLibrary.org), and we are developing plans to push the data to iDigBio and VertNet. The list below details the major bodies of material digitized during the latest reporting period:

(1) Bird audio recordings. We have now digitized 1,025 recordings of analog audio tape recordings (325+ since the last report), in particular material from recordist Daniel Lane (Louisiana State University) collected in Peru and Ecuador during the late 1990's. We also have digitized a total of 1,004 recordings (125+ since last report) made by researcher Kristof Zyskowski (Yale Peabody Museum).

(2) Anuran audio recordings. We have now begun work on the very large body of neotropical frog recordings collected by William Duellman (University of Kansas); to date 274 of these have been digitized and archived in the Macaulay Collection. Additional bodies of anuran audio material, mostly open reel and cassette tapes, have been delivered from the Smithsonian Institution and University of Texas.

(3) Fish EOD recordings from Cornell University Museum of Vertebrates. Macaulay Library staff worked with CUMV research technician John Sullivan (supported by this award) and researcher Carl Hopkins to develop and test protocols for the digitization, archival, web-presentation, and delivery of electric organ discharge (EOD) signal data from mormyrid and gymnotiform fishes (a signal modality that does not lend itself to current audio standards).

With these media now digitized and archived at the Macaulay Library, particularly the large body of material from KU, the stage is set to create the links across databases between physical specimen and media specimen.

Share and Identify Best Practices and Standards (including Lessons Learned)

The Macaulay Library uses an audio archival standard of 96kHz 24-bit, the audio standard recommended by Sound Directions: Best Practices for Audio Preservation <<http://www.dlib.indiana.edu/projects/sounddirections/papersPresent/index.shtml>> and a standard

Identify Gaps in Digitization Areas and Technology

There are no accepted standards for the preservation and subsequent presentation of electric organ discharges produced by e-fish. During the past year, Macaulay Library audio archival staff worked with staff at CUMV to develop archival and web-proxy presentation protocols in collaboration with e-fish researchers that will serve as a model format for EODs.

Share and Identify Opportunities to Enhance Training Efforts

Personnel from this TCN project visited partner institutions and participated in meetings/summits to facilitate the work undertaken and for exchange of information. For example, Smithsonian researcher Addison Wynn visited the Macaulay Library in August 2014 to assist with metadata entry and digitization of specimens, Texas research Travis LaDuc will be visiting the Macaulay in October 2014 for the same purpose, and Co-PI Ed Scholes attended and gave a presentation at the 'Collections for the 21st Century' Symposium (May 2014). Importantly, the iDigBio Steering Committee approved our proposal to conduct a workshop on digitization of vertebrate specimens, to be held in early May 2015 at Cornell.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

No collaborations with other TCNs at this time, but we are exploring data-cleaning and geo-referencing capabilities developed by other TCNs.

Share and Identify Opportunities and Strategies for Sustainability

National-level reporting of iDigBio achievements, e.g. Heretofore resources now available to the public.

Other Progress (that doesn't fit into the above categories)

In addition to the digitization outcomes detailed above, several of the partner institutions have made significant progress on data cleaning and data migration in preparation for linking their specimens to digitized audio recordings. For example, CUMV recently completed the migration of its specimen data from Specify to Arctos, making all specimen records accessible online to anyone at http://arctos.database.museum/cumv_all. Individual records now have stable GUIDs that can be linked to Macaulay Library media records, and these data are now being pushed to FishNet 2, VertNet and GBIF on a regular basis. Incorporation of these data into the iDigBio portal is planned for the future. Similarly, CUMV staff are continuing to complete clean up of specimen metadata (e.g, georeferencing locality data, taxonomy, etc.), and have begun adding links to online resources tied to their voucher specimens (i.e., GenBank records, DOIs and citations for publications citing e-fish vouchers, etc.), and have starting adding images of electric fish voucher specimens (e.g., see <http://arctos.database.museum/guid/CUMV:Fish:96774>).

Attachment

N/A

BI-MONTHLY PROGRESS REPORTS TO IDIGBIO
FROM
THEMATIC COLLECTIONS NETWORKS (TCNs)

DECEMBER 2014

DEVELOPING A CENTRALIZED DIGITAL ARCHIVE OF VOUCHERED ANIMAL COMMUNICATION SIGNALS

Report submitted by: msw244@cornell.edu
Report Submitted on: 11/25/2014 - 10:37

Progress in Digitization Efforts

Our TCN project has now digitized over 11,500 audio recordings from several different TCN partners. These recordings ("media specimens") are now available through, and playable at, the Macaulay Library website (MacaulayLibrary.org), and data are being pushed to iDigBio and VertNet. The list below details the major bodies of material digitized during the latest reporting period:

(1) Kansas University Biodiversity Institute (ornithology). We have recently digitized 228 recordings of analog audio tape recordings from the Philippines and Mognola, collected by KU researcher Peter Hosner. With this addition, all of the analog recordings from the KU Ornithology group have been digitized, including material from recordists/collectors Hosner, Robbins, and Andersen.

(2) Anuran audio recordings. We have made substantial progress on digitizing analog audio recordings from a number of different TCN partners. First, we have made substantial progress on digitizing the very large body of neotropical frog recordings collected by William Duellman (University of Kansas); to date 826 of these have been digitized and archived in the Macaulay Collection (550 newly archived since the last report). We have also digitized 125 hours of anuran material from the Smithsonian Institution, and this material is in the process of being archived at the Macaulay Library. Finally, we have received and accessioned 1,040 analog tapes from the Texas Natural History Collections, to be digitized in the near future.

(3) Insect recordings. Macaulay Library staff have now received the first 20 open-reel tapes of orthopteran recordings from researcher David Weissman. This material will be digitized in the near future, and will be associated with specimens deposited at the California Academy of Sciences.

With these media now digitized and archived at the Macaulay Library, particularly the large body of material from KU, the stage is set to create the links across databases between physical specimen and media specimen.

Share and Identify Best Practices and Standards (including Lessons Learned)

The Macaulay Library uses an audio archival standard of 96kHz 24-bit, the audio standard recommended by Sound Directions: Best Practices for Audio Preservation <<http://www.dlib.indiana.edu/projects/sounddirections/papersPresent/index.shtml>> and a standard adopted by leading audio archival institutions such as the Library of Congress and The British Library.

Identify Gaps in Digitization Areas and Technology

There are no accepted standards for the preservation and subsequent presentation of electric organ discharges produced by e-fish. During the past year, Macaulay Library audio archival staff worked with staff at CUMV to develop archival and web-proxy presentation protocols in collaboration with e-fish researchers that will serve as a model format for EODs.

Share and Identify Opportunities to Enhance Training Efforts

Personnel from this TCN project visited partner institutions and participated in meetings/summits to facilitate the work undertaken and for exchange of information. In particular, Matthew Medler (Cornell), Rafe Brown (Kansas Univ) and Robin Abraham (also KU) participated in the iDigBio summit in late October 2014.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

No collaborations with other TCNs at this time, but we are exploring data-cleaning and geo-referencing capabilities developed by other TCNs.

Share and Identify Opportunities and Strategies for Sustainability

National-level reporting of iDigBio achievements, e.g. Heretofore resources now available to the public.

Other Progress (that doesn't fit into the above categories)

Nothing to report.

Attachment

DIGITIZING FOSSILS TO ENABLE NEW SYNTHESSES IN BIOGEOGRAPHY- CREATING A PALEONICHES

Report submitted by: blieber@ku.edu
Report Submitted on: 11/25/2014 - 13:01

Progress in Digitization Efforts

Paleoniches Update, November 2014

Regarding the University of Kansas portion of the project, led by PI Bruce S. Lieberman and co-PI Una Farrell, we now have a total of 143,294 specimens databased. Of these, there are a total of 138,393 specimens databased that have clean, proofed localities. Further, we now have a total of 115,418 specimens that are georeferenced. We are now close to completing all of the cephalopods and bivalves we aimed to database. In addition, a total of 8,007 localities have been georeferenced, meaning that we have effectively completed the entire georeferencing component of our proposed work.

Further, PI's B. Lieberman, J. Hendricks, and co-PI J. Beach have continued to work with the developer of the Paleoniches iPad Atlas application (Rod Spears Consulting) and they have designed a prototype. A set of screen shots of the prototype are attached as a pdf.

Regarding the Ohio University portion of the project, led by PI Alycia Stigall

Progress was made on two major initiatives during this quarter: georeferenced data were ingested into iDigBio and GBIF and georeferenced species locality maps were deployed within the Ordovician Atlas.

We are excited to have successfully exported the Ohio University Invertebrate Paleontology Kallmeyer collection data from within Specify to a Darwin Core Archive file that was made available via a newly established IPT via VertNet. These data were then made available to GBIF (www.gbif.org/dataset/3c001217-eea8-4f59-8b28-885699f8cd6c) and iDigBio (<https://www.idigbio.org/portal/recordsets/0d05a365-36e8-4150-a350-23ed33f79b17>).

Work on the Ordovician Atlas website continues by a group of one grad and five undergraduate students. Currently, the Ordovician Atlas contains 84 genus and 117 species pages that are live. The Arthropods and Graptolites are completed, with the Edrioasteroids, Porifera, and brachiopods close to completion.

The major innovation on the Atlas website since the last report, is that species and genus locality maps have been incorporated into the pages that display data dynamically queried from iDigBio. These maps were developed using the iDigBio api to genus and species pages (example here: <http://www.ordovicianatlas.org/atlas/arthropoda/trilobita/asaphida/asaphidae/isotelus/isotelus-maximus/>). This new feature was featured in the iDigBio newsletter for November (<http://us4.campaign-archive1.com/?u=5c564b4cf1e8157b450723e1c&id=bef6df12dd&e=b17da2d5a2>)

Miami University

Over the last two months, Hauer had one undergraduate student, Maggie Perme, working on georeferencing. In that time, she has georeferenced approximately 115 locations, which correspond to about 300 specimens. The localities are all non-Shideler localities in Ohio.

Cincinnati Museum Center

In terms of specimen digitization, since the beginning of September, the new UC student intern, Ian MacAdam, has been focusing on georeferencing Indiana locality records. He has worked a total of 126 hours and has georeferenced 533 locality records for a total of 2,745 georeferenced catalogue records. In total, we now have 1,874 sites georeferenced and 15,568 catalogue records in Emu with georeferencing data.

Regarding the San José State University portion of the project, led by PI Jon Hendricks:

Since the last update, PI Hendricks (San José State University; SJSU) and his students have continued to develop and add content to the Neogene Atlas of Ancient Life, with the assistance of Invertebrate Paleontology staff at the Florida Museum of Natural History. In particular, the bivalve family Pectinidae has now been added to the website. Species-level page are now online for 302 species (out of 500 planned pages).

The student at SJSU responsible for developing the Wordpress sites for the Neogene and Pennsylvanian Atlases graduated and attained a full time job elsewhere. This student was also responsible for adding content to the Pennsylvanian Atlas. PI Hendricks is currently in the process of developing a “user guide” for adding content to the Neogene and Pennsylvanian Atlases, which will assist the next individual who takes on this part of the project. We expect that the addition of new content to the Pennsylvanian Atlas (much of which has already been generated) will resume by the time of the next report. PI Hendricks is currently on sabbatical leave in Ohio; he plans to hire a new student assistant upon returning to San José in January.

(Also see Jon’s activities mentioned above under KU pertaining to the development of the portable device app.)

Finally, for our PEN partners. First, Texas, PI: Ann Molineux, Co-PI: James Sprinkle

The following is progress made thus far:

1. For the Ordovician 2,283 records and 6,900 specimens are databased with 1,133 specimens georeferenced.
2. For the Carboniferous 14,149 records and 43,000 specimens are databased with 3,845 specimens georeferenced.
3. For the Paleogene/Neogene 23,272 records and 70,000 specimens are databased with 7,406 specimens georeferenced.
4. For the Quaternary 12,310 records and 37,000 specimens are databased with 3,913 specimens georeferenced

Further, 3,200 images have been attached in Specify with 10,000 more imaged and awaiting attachment. There are also 20,000 type and figured specimens attached in PaleoCentral.org. In addition, PaleoCentral.org with deep time mapping is in beta testing. Finally, the data are currently with VertNet as they get their migration system to adapt to handle invertebrate specimens. The first pass reports have been examined and they should be in iDigBio soon.

And at Yale: From PI Susan Butts:

We are working on digitizing the most abundant taxa from the Ordovician and the Pennsylvanian (50 most abundant genera from each time period) and are proceeding to digitize that material from our systematic collection. Since the previous report, we have modified or inserted 5,600 records in KE EMu. Each of these records has 1-3 images (depending on the preservation of the fossil) and georeferenced.

Share and Identify Best Practices and Standards (including Lessons Learned)

N/A

Identify Gaps in Digitization Areas and Technology

N/A

Share and Identify Opportunities to Enhance Training Efforts

N/A

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

N/A

Share and Identify Opportunities and Strategies for Sustainability

N/A

Other Progress (that doesn't fit into the above categories)

Finally, in other relevant news, Una Farrell attended the most recent iDigBio Summit IV, and presented a poster and a lightning talk describing our work on the TCN. In addition, post-doc Michelle Casey and co-PI Jim Beach each gave talks in the session "Advancing the Digitization of Paleontology and Geoscience Collections: Projects, Programs, and Practices I" at the 2014 Annual Meeting of the Geological Society of America in Vancouver.

Co-PI Farrell traveled to New Haven to help Yale PEN personnel PI Briggs, Senior Personnel Butts, and Museum Assistant Utrup. This occurred over a two day meeting on November 8 and 9 and progress, practices and protocols for digitization, and future directions were discussed.

The Ohio University group has also been very active this quarter in promoting the Ordovician Atlas project in scientific community. Posters on the Ordovician project were presented at the International Paleontological Society Meeting in Mendoza, Argentina (<http://www.ipc4mendoza2014.org.ar/abstracts/>) and as part of the Digitization symposium at the Geological Society of America meeting in Vancouver, Canada (<https://gsa.confex.com/gsa/2014AM/webprogram/Paper244473.html>). Additionally, a paper on the Ordovician project has been accepted for publication (due Dec 22, 2014) in the Estonian Journal for Earth Sciences.

In October, PI Hendricks from SJSU gave a presentation on the Neogene Atlas of Ancient Life in the session "Advancing the Digitization of Paleontology and Geoscience Collections: Projects, Programs, and Practices I" at the 2014 Annual Meeting of the Geological Society of America in Vancouver. The presentation PowerPoint file was uploaded to the GSA website for anyone to view.

PEN partners at Yale Briggs and Butts presented on the PaleoNICHES PEN at the Geological Society of America Annual Meeting (Vancouver, BC – October, 2014). Butts and Co-PI at KU Farrell created a protocol (written procedure and scripts) for batch automated re-numbering and attachment of records from source files, specifically targeted at Specify users. This protocol will be made available to other Specify users.

Finally, PI's Hendricks, Stigall, and Lieberman are finalizing a manuscript that provides an overview of the Digital Atlas project. We plan that this will be submitted for review sometime in December and we will provide an update on its progress towards publication in the next report.

Attachment

https://www.idigbio.org/sites/default/files/webform/tcn-reports/POC_Screenshotsoptimized.pdf

Neogene Atlas iPad App

Proof of Concept
Screen shots

Digital Atlas of Ancient Life Electronic Field Guide

Funding for development and construction of this app was provided by the National Science Foundation. The Neogene Atlas of Ancient Life is one component of the overarching Digital Atlas of Ancient Life project.

▶ **START**

🌀 **BROWSE**



Phylum:
Mollusca

Class:
Bivalvia



Order:
Bivalvia



Order: **Bivalvia**



Family:
Ostreidae



Family:
Ostreidae



Family:
Ostreidae



Family:
Ostreidae



Family:
Ostreidae



Family:
Ostreidae

Phylum:
Mollusca

Class:
Bivalvia



Order:
Bivalvia



Family:
Ostreidae



Genus:
Undulostrea



Species:
Undulostrea locklini
(Gardner, 1945)



Information



Geological Range

Late Pliocene; Extinct.

Paleogeographic Distribution

Southern Florida to Georgia.

Stratigraphic Occurrences

Late Pliocene

Duplin / Raysor formations (GA)

Raysor Formation (GA)

Tamiami Formation (S. FL)

Tamiami Formation (Ochopee Lime
stone) (S. FL)

Tamiami Formation (Pinecrest Beds)



Phylum:
Mollusca

Class:
Bivalvia



Order:
Bivalvia



Family:
Ostreidae

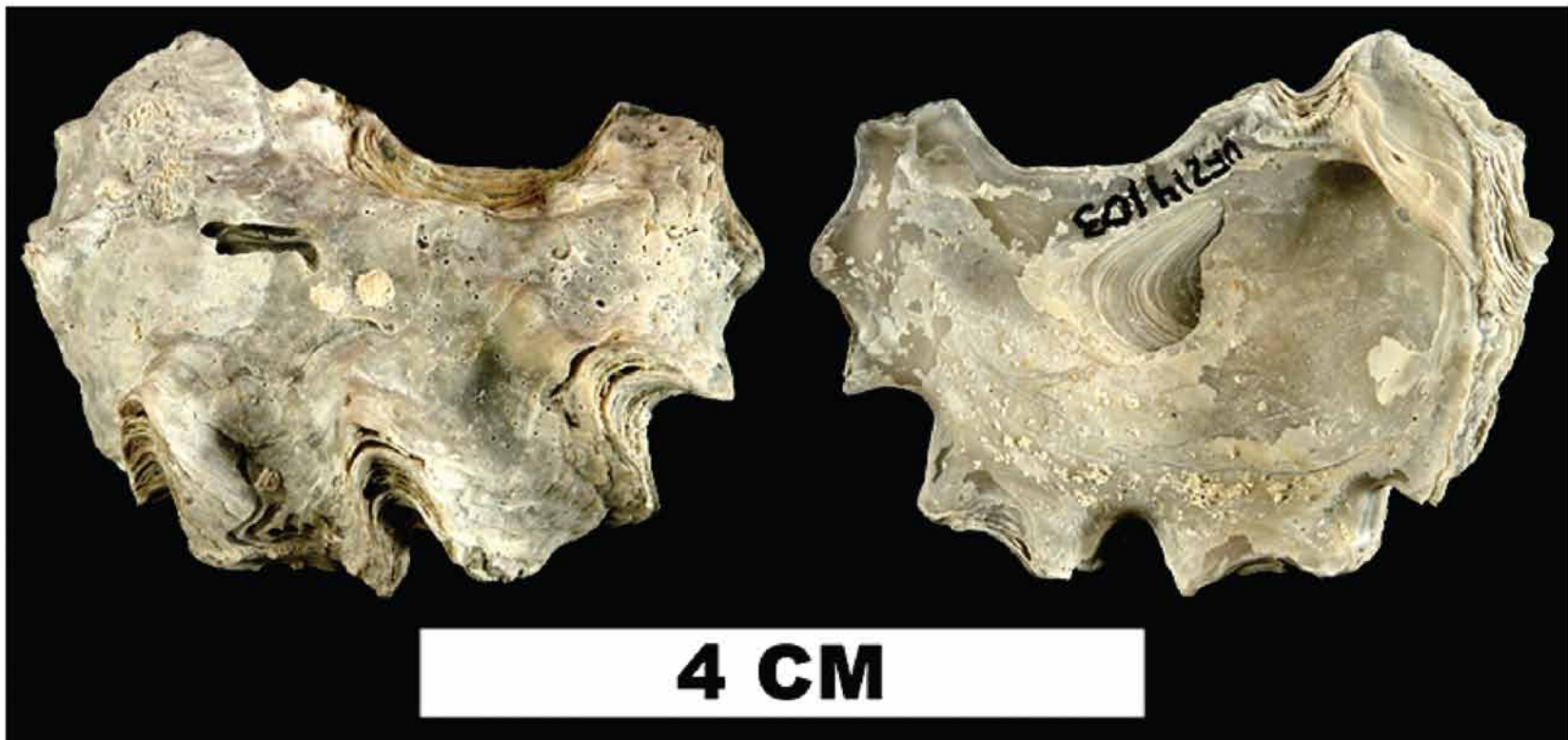


Genus:
Undulostrea



Species:
Undulostrea locklini
(Gardner, 1945)

Images



Phylum:
Mollusca

Class:
Bivalvia



Order:
Bivalvia



Family:
Ostreidae



Genus:
Undulostrea



Species:
Undulostrea locklini
(Gardner, 1945)

Maps

Late Pliocene Map



Late Pliocene Map



Late Pliocene Map





Gastropods

Arthropods

Bivalves

Corals

Echinoderms

Brachiopods

Bursidae



Orthaulax gabbi



Orthaulax gabbi

Conidae



Orthaulax gabbi



Orthaulax gabbi



Orthaulax gabbi



Orthaulax gabbi



Orthaulax gabbi



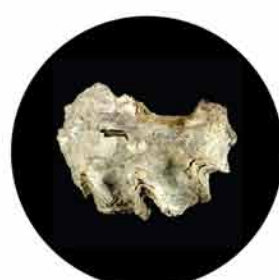
Orthaulax gabbi



Orthaulax gabbi



Orthaulax gabbi



Orthaulax gabbi



Orthaulax gabbi

GREAT LAKES INVASIVES: DOCUMENTING THE OCCURRENCE THROUGH SPACE AND TIME OF AQUATIC NON-INDIGENOUS FISH, MOLLUSKS, ALGAE, AND PLANTS THREATENING NORTH AMERICA'S GREAT LAKES

Report submitted by: kmcameron@wisc.edu
Report Submitted on: 11/25/2014 - 16:24

Progress in Digitization Efforts

First GLI TCN report, representing three months' of effort to date.

Our four regional data processing centers (New York Botanical Garden, Field Museum, Univ of Michigan, and Univ of Wisconsin-Madison) report the following:

Plants:

Specimens Barcoded Only: 47,198 (NY) + 1,325 (IL) = 48,523
Barcoded and Imaged to Date: 4,136 (MI) + 760 (IL) + 12,324 (NY) + 14,936 (WI) = 32,156
Databased to Date: 15,127 (MICH) + 3,437 (NY) + 45,574 (WI) = 64,138
Uploaded to the GLI Symbiota Portal: = 45,574 (WI)

Mollusks:

Only Michigan has made progress so far:
884 lots of invertebrates have been imaged, representing 2 genera and 4 species.
4363 records of invertebrates have been completed, representing 4 genera and 126 species.

Fish:

Nothing yet to report

Share and Identify Best Practices and Standards (including Lessons Learned)

We are in the progress of reviewing our traditional workflows (i.e., those used by our participants under other TCNs such as 'tri-trophic') and experimenting with new workflows for the fish collections. Best practices should emerge after our Dec 15, 2014 meeting (see below) and during year 1.

Identify Gaps in Digitization Areas and Technology

Nothing yet to report.

Share and Identify Opportunities to Enhance Training Efforts

GLI TCN participants from five states will be meeting in Chicago, IL (at their own expense) for a scheduled meeting on December 15th. This will allow for discussion and training on extant methodologies being used by those who have started imaging, data processing, etc. We also plan to discuss suggested workflows proposed by iDigBio for the three different collection types we represent (3D wet things in jars, 3D dry things in boxes, and 2D dry things on paper).

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

A subset of herbarium TCN members has begun formation of a Symbiota portal for Great Lakes Herbaria under the SEINET umbrella (separate from this GLI TCN). This will provide an editing platform for our TCN records from the Great Lakes area in order to benefit from duplicate-matching/georeferencing that may have already been entered via other Symbiota portals when processing OCR from imaged specimens currently lack data records.

The University of Michigan participants working on mollusks are collaborating with the Invert EBase TCN to make sure that data flows to both projects.

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report

Other Progress (that doesn't fit into the above categories)

After December 1 most key senior personnel will have been hired. NYBG hired their first project intern recently . Michigan has hired its Regional Project Manager; Field Museum and UW-Madison have new Project Managers scheduled to begin on Dec 1. The IT Specialist associated with the Lichen/Bryophyte TCN has begun working with our GLI TCN as he transitions from the older to the newer project.

Project Webpage established- <http://herbarium.wisc.edu/GreatLakes.htm>

TCN Symbiota Portal established - <http://greatlakesinvasives.org/portal/index.php>

Attachment

FOSSIL INSECT COLLABORATIVE: A DEEP-TIME APPROACH TO STUDYING DIVERSIFICATION AND RESPONSE TO ENVIRONMENTAL CHANGE

Report submitted by: talia.karim@colorado.edu
Report Submitted on: 11/26/2014 - 15:14

Progress in Digitization Efforts

AMNH: We will probably finish the entire collection of Dominican and Mexican amber by the end of December (images and databasing). This will be about 6,000 pieces alone, approximately 8,000 inclusions. Then it will be on to the Baltic collection (smaller, but with lots of rarities), then Cretaceous.

CU, Boulder: We are continuing to database, image, and enhance records in our Specify database. We currently have 47,994 insect and spider records in Specify, and 9,553 images attached to those records.

Harvard-MCZ:

- Since our last report (September) we have taken about 1600 images more, accounting for about 1400 specimens from the collection.
- Hired two digitization assistants, Patrick McCormack and John Mewherter, working part time. Date of start: beginning of October.
- Developed and started to use a script to 1) update the specimen's determinations in MCZbase as they are imaged and 2) check for inconsistencies, like overlooked specimens.
- Added about 400 entries to the database of F.M. Carpenter's bibliographic collection on fossil insects.

Yale-Peabody: We have completed our electronic cataloging as outlined in the grant proposal and have nearly half of our specimens imaged. As a result of improved visibility of our fossil insect collections we have received, and continue to receive, large quantities (1000s) of fossil insects from an avocational collector and are incorporating this material into our digitization efforts (2957 cataloged, 1903 imaged, since the start of the FIC).

VMNH: Fossil insect digitization paused - exception: periodic digitization of newly excavated Solite material (insects, vertebrates, plants). Due to the departure of Dooley (PI) that occurred at the museum a few months ago, priorities were shifted and grant funding was put on hold until a new curator can be hired (expected date July 2015). Byrd is currently acting as collections manager of the paleontology department.

Share and Identify Best Practices and Standards (including Lessons Learned)

Nothing to report.

Identify Gaps in Digitization Areas and Technology

Yale-Peabody: The balance between the desire for high resolution photography and a rapid imaging rate is, as always, difficult to maintain.

CU, Boulder: Need for better and easier access to archival storage for large files. At present, these files are stored on the PETA Library (CU research computing project funded by NSF) are not accessible to the public or easily sharable. Botany is working with our research computing group on campus to try and work through some of these issues.

Share and Identify Opportunities to Enhance Training Efforts

Nothing to report.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

AMNH: Planning an amber preparation and imaging workshop for February 2015. The workshop will be open to all TCN members as well as a select few additional invitees.

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report.

Other Progress (that doesn't fit into the above categories)

Yale-Peabody:

- Butts and Norris continue to have biweekly Skype and quarterly face-to-face meetings with Seth Kaufman (Whirl-i-Gig) on the development of functionality for iDigPaleo and incorporation of datasets from the FIC PIs. A prototype of the database is available at: <http://idigpaleo.whirl-i-gig.com/>.

- A prototype of the database is available at: <http://idigpaleo.whirl-i-gig.com/>. The database currently has datasets from UC Boulder, Yale Peabody Museum and the Harvard Museum of Comparative Zoology. With these datasets registered users can browse, curate collections, filter by institution, location, age and/or taxonomy, and comment and tag images. Curated collections (galleries) can be used to auto-generate field guides and classroom handouts. The latest meeting with Whirl-i-Gig discussed the next functions to add: mapping (including paleomapping utilizing GPplates), incorporation of common names, and the reporting of comments to institutions.

CU, Boulder:

- Smith presented an overview of the TCN at the GSA annual meeting, "The Fossil Insect Collaborative: An NSF-Funded Paleontology Collections Digitization Project"

- Karim presented a talk on compression fossil digitization workflows at the GSA annual meeting, "Fossil Insect Digitization Workflow at the University of Colorado." Two graduate students funded on the TCN, Walker and Levy, were co-authors on the talk.

- Smith and Heads (PI INHS) organized a fossil insect symposium for the annual ESA meeting, "How the Fossil Record Can Contribute to Our Understanding of Insect Ecology and Evolution"

- Smith presented "Macroevolutionary history of the Coleoptera: A quantitative analysis of fossil occurrences" at the ESA session.

- Karim presented an update of the TCN at the ECN meeting in Portland, "The Fossil Insect Collaborative Year 2: data acquisition, publication, and use"

Harvard-MCZ:

- Perez de la Fuente presented "Digitization of the fossil insect collection from the Museum of Comparative Zoology" at the 4th International Paleontological Congress in Mendoza (Argentina), that took place from Sept 28th to Oct 3rd. Authors: Ricardo Pérez-de la Fuente and Brian D. Farrell.

- Provided support and technical means to Prof. Alexander Rasnitsyn, from the Paleontological Institute of Moscow, during a visit to the MCZ to study Paleozoic insects, from Sept 15th to Sept 17th.

- Collaborated in a side project with Dr. Eric S. Chivian, founder and Director of the Center for Health and the Global Environment at Harvard Medical School, on dragonfly wing topography related to flight kinematics in insects. Obtained images and 3D models from extant dragonflies with the equipment and software used to digitize the fossil insect collection.

- Shared fossil insect images and expertise with Rosie Powell-Tuck, from Colossus Productions, UK, working on a new 3D Attenborough documentary on animal flight.

INHS:

- Heads presented at the ESA annual meeting, "Fossil insects from the Lower Cretaceous Crato Formation of Brazil"

- J. Thomas (Heads lab manager, undergraduate student) presented at the ESA annual meeting, "Rediscovery of the Milton Sanderson Dominican amber collection"

Attachment

NORTH AMERICAN LICHENS AND BRYOPHYTES: SENSITIVE INDICATORS OF ENVIRONMENTAL QUALITY AND CHANGE

Report submitted by: cgries@wisc.edu
Report Submitted on: 11/26/2014 - 18:48

Progress in Digitization Efforts

As of November 2014 the number for the LBCC are as follows:

Lichens:

<http://lichenportal.org>

Herbaria actively submitting images or key stroked records to the portal: 64

Specimen records in portal: 1,594,005 (up by 299,158 since August 2014)

Specimen records with images: 620,085 (20,161 labels have been imaged since August 2014)

Records with locality information: 1,274,404 (329,795 locality information where added since August 2014)

Bryophytes:

<http://bryophyteportal.org>

Herbaria actively submitting images or key stroked records to the portal: 58

Specimen records in portal: 2,039,717 (up by 139,461 since August 2014)

Specimen records with images: 925,662 (122,528 labels have been imaged since August 2014)

Records with locality information: 1,214,101 (80572 locality information where added since August 2014)

Share and Identify Best Practices and Standards (including Lessons Learned)

nothing to report

Identify Gaps in Digitization Areas and Technology

nothing to report

Share and Identify Opportunities to Enhance Training Efforts

Regular Symbiota training sessions are being held remotely.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Share and Identify Opportunities and Strategies for Sustainability

Other Progress (that doesn't fit into the above categories)

Attachment

SERNEC: THE KEY TO THE CABINETS: BUILDING AND SUSTAINING A RESEARCH DATABASE FOR A GLOBAL BIODIVERSITY HOTSPOT

Report submitted by: tmarsico@astate.edu
Report Submitted on: 11/30/2014 - 17:25

Progress in Digitization Efforts

The grant has been set up at the lead institution in Arkansas (STAR), and the subaward at APCR also has been executed. One collection in Arkansas, STAR, has all the flowering plant vouchers from within the state imaged and databased. This represents 16,791 collections. These were databased in Specify. All of these collections are available for viewing and searching online at herbarium.astate.edu. In the coming months we have planned to deposit these digital accessions in Symbiota and iDigBio. APCR is obtaining details about purchasing barcodes before imaging. STAR is working with UARK to begin imaging set up with them. Marsico will be attending the SERNEC training meeting in Valdosta, Georgia in January 2015.

Share and Identify Best Practices and Standards (including Lessons Learned)

We will keep good notes in Arkansas about what we learn as we set up mobile imaging stations. Currently we have nothing to report here.

Identify Gaps in Digitization Areas and Technology

Nothing to report.

Share and Identify Opportunities to Enhance Training Efforts

Nothing to report.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Nothing to report.

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report.

Other Progress (that doesn't fit into the above categories)

Nothing to report.

Attachment

PLANTS, HERBIVORES AND PARASITOIDS: A MODEL SYSTEM FOR THE STUDY OF TRI-TROPHIC ASSOCIATIONS

Report submitted by: moon@begoniasociety.org
Report Submitted on: 12/01/2014 - 08:04

Progress in Digitization Efforts

Plant Digitization Numbers:

Total Skeletal records completed in Symbiota during the course of the project: 81,734 (NY = 50,702)
Total Complete Records = 1,248,123
Total Specimens Imaged = 976,658 (NY = 237,604)
Total Images uploaded to iDigBio = 435,265

Insect Digitization Numbers (as of October 20, 2014):

1,081,834 specimens data captured
593,251 specimens georeferenced
785,320 data records provided to iDigBio

Our project plans to continue digitization with the current funding through July 2015.

Share and Identify Best Practices and Standards (including Lessons Learned)

Continue to work with EOL and iDigBio to export associations data as a DwC-A extension and improved attribution for our dataset.

Identify Gaps in Digitization Areas and Technology

We need guidelines from iDigBio that are explicit about the statistics we are collecting regarding digitization rates. Our project adds in curation to time for digitization, others do not. Because the digitization would not happen without this level of curation, we feel we should include it. Ultimately, these differences will make it difficult to sum across efforts.

Share and Identify Opportunities to Enhance Training Efforts

Nothing to report.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Katja Seltmann is actively working with iDigBio to organize a Data Carpentry workshop series. Ongoing collaboration with SCAN to summarize insect digitization efforts to date.

Joint presentations at the Entomological Society of America and Entomological Collections Network.
N. Cobb, K.C. Seltmann and N. Franz. 2014. Title: The current state of arthropod biodiversity data: Addressing impacts of global change. Entomological Collections Network. November 2014. Portland, OR.

K.C. Seltmann and D. Paul. Title: Recreating biomes one label at a time. Entomological Society of America. November 2014. Portland, OR.

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report.

Other Progress (that doesn't fit into the above categories)

Nothing to report.

Attachment

INVERTNET: AN INTEGRATIVE PLATFORM FOR RESEARCH ON ENVIRONMENTAL CHANGE, SPECIES DISCOVERY AND IDENTIFICATION

Report submitted by: chdietri@illinois.edu
Report Submitted on: 12/01/2014 - 09:54

Progress in Digitization Efforts

University of Illinois personnel delivered and set up twelve robotic drawer digitizing systems at collaborating institutions (Purdue, Michigan State U., Carnegie Museum, South Dakota State U., North Dakota State U., Minnesota, U. Wisconsin-Madison, Milwaukee Public Museum, U. Missouri, U. Kansas, Kansas State U., and Iowa State U.) and collaborators were trained in their use. A user's manual and troubleshooting guide was also developed and delivered to collaborators. Collaborators have been capturing images and sending image sets to the U. of Illinois for processing (stitching and posting on InvertNet.org). The InvertNet technical team is continuing to test and optimize image capture workflows to improve speed and image quality. They are also optimizing the image ingest workflow to facilitate more rapid uploading of image sets to the cyberinfrastructure platform.

Share and Identify Best Practices and Standards (including Lessons Learned)

Nothing to report.

Identify Gaps in Digitization Areas and Technology

A major gap in existing technology is in stitching software. Available stitchers are too slow to work in real time, so we have not yet installed stitching software on the local computers used to operate the drawer digitizing system but, rather, are having collaborators save and send raw image sets to the U of Illinois for processing. We are working with open-source software to create a real-time stitcher by parallelizing some of the processes, but need to overcome some technical hurdles first.

Share and Identify Opportunities to Enhance Training Efforts

Nothing to report.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Nothing to report.

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report.

Other Progress (that doesn't fit into the above categories)

Attachment

INVERTEBASE: REACHING BACK TO SEE THE FUTURE: SPECIES-RICH INVERTEBRATE FAUNAS DOCUMENT CAUSES AND CONSEQUENCES OF BIODIVERSITY SHIFTS

Report submitted by: psierwald@fieldmuseum.org
Report Submitted on: 12/01/2014 - 10:50

Progress in Digitization Efforts

Invertebase TCN-wide activities: Preparation for digitization, capture of collection level-level information at all participating collections (Field Museum Nat Hist; Cleveland Museum Nat Hist; Auburn University Museum; University of Michigan Museum; Delaware Museum Nat Hist; Frost Ent Museum). Development of digitization workflow protocols

Field Museum Nat Hist: digitization of arthropod and invertebrate type material (including specimen imaging) through other funding ongoing, digitization staff search for Invertebrate TCN ongoing.

Cleveland Museum Nat Hist:

Auburn University Museum: Personnel digitizing specimens: 2 undergraduates (10 hours/week each); 4 graduate students (2 at 15 hours/week and 2 at 4 hours/week). Purchased 2 laptop workstations and 3 barcode readers. Established initial protocols for digitization and adding barcodes to pinned specimens (2 dimensional format). Specimen digitization started – Ephemeroptera, Odonata, Orthoptera, Phasmida, Dermaptera – 12,525 specimens digitized and barcoded (21 Nov 2014).

University of Michigan Museum of Zoology: 1. Three undergraduate students were hired for mollusk data entry. These new students plus two returning students (one Ph.D. and one undergraduate curatorial assistant) and two new undergraduate students hired for the Great Lakes Invasives TCN will continue data entry into the UMMZ Mollusk Division Specify database. 2. Since September 2014, total 4886 records, representing three freshwater snail families (Lymnaeidae: 717; Pysidae: 311; Valvatidae: 1035) and one bivalve family Sphaeriidae (2823), were entered.

Delaware Museum Nat Hist: We have begun updating the taxonomy of the unionid bivalves in the DMNH collection according to Musselp website.

Frost Ent Museum:

Share and Identify Best Practices and Standards (including Lessons Learned)

Field Museum Nat Hist: nothing yet to report

Cleveland Museum Nat Hist:

Auburn University Museum: nothing yet to report other than rate of digitization increasing; logistics of organizing workers and volunteers problematic due to limited workstations.

University of Michigan Museum of Zoology: nothing yet to report

Delaware Museum Nat Hist: DMNH has meetings set up on 2 December with senior staff from the Academy of Natural Sciences of Philadelphia to discuss grant administration and financial reporting best practices.

Frost Ent Museum:

Identify Gaps in Digitization Areas and Technology

Field Museum Nat Hist: Nothing yet to report

Cleveland Museum Nat Hist:

Auburn University Museum: Tremendous variation in label quality – unlikely something that can be automated.

University of Michigan Museum of Zoology: nothing yet to report

Delaware Museum Nat Hist: Sourced a new server and laid out a timeline for installation with our IT partners.

Frost Ent Museum:

Share and Identify Opportunities to Enhance Training Efforts

Field Museum Nat Hist: nothing yet to report

Cleveland Museum Nat Hist:

Auburn University Museum: Nothing yet to report

University of Michigan Museum of Zoology: nothing yet to report

Delaware Museum Nat Hist: Using the Specify Friday afternoon HelpCast webinars to get familiar with database operation.

Frost Ent Museum:

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Invertebase TCN (P. Sierwald) established collaboration with SCAN TCN (Neil Cobb) for collaborative portal development and collaborative FilteredPush development, collaborative taxonomic thesaurus development with SCAN

Field Museum Nat Hist: nothing yet to report

Cleveland Museum Nat Hist:

Auburn University Museum: Collections acquisition for digitization (marine mollusks) - East Carolina University

University of Michigan Museum of Zoology: The University of Michigan participants are collaborating with the Great Lakes Invasives TCN to make sure that data flows to both projects.

Delaware Museum Nat Hist: nothing yet to report

Frost Ent Museum:

Share and Identify Opportunities and Strategies for Sustainability

Field Museum Nat Hist: nothing yet to report

Cleveland Museum Nat Hist:

Auburn University Museum: Nothing yet to report

University of Michigan Museum of Zoology: nothing yet to report

Delaware Museum Nat Hist: nothing yet to report

Frost Ent Museum:

Other Progress (that doesn't fit into the above categories)

Field Museum Nat Hist: Invertebase TCN (PS) established Invertebase Symbiota Portal in collaboration with Ed Gilbert and Nico Franz. PIs P. Sierwald and R. Bieler attended TCN summit IV in Gainesville. Conducted three Invertebase TCN members meetings at the TCN summit IV in Gainesville. Developed management plan for taxonomic authority files (Arthropods: currently Deans, Svenson, Lee and Sierwald; mollusks: Bieler, Lee, and Shea)) and georeferencing (leader R. Bieler).

Cleveland Museum Nat Hist: taxonomic thesaurus development Hymenoptera. PI G. Svenson attended TCN summit IV in Gainesville.

Auburn University Museum: Nothing yet to report

University of Michigan Museum of Zoology: taxonomic thesaurus development Odonota. T. Lee attended TCN summit IV in Gainesville.

Delaware Museum Nat Hist: Taxonomic thesaurus development for North American land and fresh water mollusks with FMNH, especially freshwater unionid bivalves. Developing protocols and timeline for hiring temporary staff for data manipulation and entry. PI E. Shea attended TCN summit IV in Gainesville.

Frost Ent Museum: PI A. Deans attended TCN summit IV in Gainesville.

FilteredPush development: PI Hanken and TCN member David Lowery attended TCN summit IV in Gainesville.

Attachment

MOBILIZING NEW ENGLAND VASCULAR PLANT SPECIMEN DATA TO TRACK ENVIRONMENTAL CHANGE

Report submitted by: p_sweeney@att.net
Report Submitted on: 12/01/2014 - 12:24

Progress in Digitization Efforts

Capture of collection level-information (i.e., "pre-capture") is complete. Approximately 800,000 specimens have been pre-captured -- with at least current identification captured. As part of the primary digitization phase, approximately 231,000 records and 160,500 images have been captured.

Share and Identify Best Practices and Standards (including Lessons Learned)

nothing to report

Identify Gaps in Digitization Areas and Technology

nothing to report

Share and Identify Opportunities to Enhance Training Efforts

nothing to report

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

We continue to collaborate with, iPlant, the FilteredPush project, the Symbiota team, and iDigBio. We are collaborating with Melody Bashram (U. of AZ), iDigBio, and other TCNs to develop a Augmented Reality tool that will be useful in K-12 education.

Share and Identify Opportunities and Strategies for Sustainability

nothing to report

Other Progress (that doesn't fit into the above categories)

nothing to report

Attachment

SOUTHWEST COLLECTIONS OF ARTHROPODS NETWORK (SCAN): A MODEL FOR COLLECTIONS DIGITIZATION TO PROMOTE TAXONOMIC AND ECOLOGICAL RESEARCH

Report submitted by: neilscobb@gmail.com
Report Submitted on: 12/08/2014 - 14:05

Progress in Digitization Efforts

See attachment

Share and Identify Best Practices and Standards (including Lessons Learned)

See attachment

Identify Gaps in Digitization Areas and Technology

See attachment

Share and Identify Opportunities to Enhance Training Efforts

See attachment

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

See attachment

Share and Identify Opportunities and Strategies for Sustainability

See attachment

Other Progress (that doesn't fit into the above categories)

See attachment

Attachment

https://www.idigbio.org/sites/default/files/webform/tcn-reports/SCAN_November_2014.docx

Southwest Collections of Arthropods Network Update

December 10, 2014

Neil Cobb

Progress in Digitization Efforts:

We are on target to meet our third-year quota for digitizing labels from pinned specimens (525,349 specimens of ground-dwelling arthropod taxa). Table 1 presents three sets of statistics as of December 1, 2014 from our data portal. These include data 1) from institutions that are funded by the NSF-ADBC program; 2) institutions that are entering data into the SCAN portal but not funded by the NSF-ADBC program, 3) the total of these first two categories; and 4) the total records in the SCAN portal. The fourth column includes records from the first three columns as well as all records we have ingested from aggregators GBIF and iDigBio. The purpose of serving aggregator data is to provide complete information to persons that are considering research projects. Although we have already surpassed our goal of 525,349 specimen records, we have not thoroughly reviewed the 720,254 records that SCAN-funded museums have produced to determine how many of those strictly ground-dwelling arthropods, but we expect that 70% or those are target taxa and that we only need ~20,000 more records to meet our project goal by July 1, 2015. The biggest challenges will be to increase the value

Table 1. Number of specimen records digitized and associated summary statistics. From <http://symbiota4.acis.ufl.edu/scan/portal/index.php>

	SCAN funded	SCAN non-funded	TOTAL SCAN	Total Served
# Specimen Records	720,254	127,193	847,992	4,972,417
# Georeferenced	527,748	49,255	578,289	3,970,404
# Identified to species	462,765	62,933	526,232	2,997,916
# Families	713	358	751	1,448
# Genera	7,069	3,356	8,588	19,626
# Species	16,183	6,836	20,780	57,851
% Georeferenced	73%	39%	68%	80%
% Identified to Species	64%	49%	62%	60%

A subset of SCAN museums are creating high-resolution images and three museums are creating low resolution images that include the specimen and labels in the same image. Table 2 lists the number of images posted on SCAN by participating museums. Our goal is to produce 15,125 high-resolution images suites. An image suite consists of 1-5 images representing different aspects of a specimen. This will translate into approximately 40,000 images. We are currently behind on our projections due to unexpected logistical challenges but we expect to continue to greatly increase our productivity over the fall, 2014. Three museums are producing low-resolution images (University of Hawaii, University of Arizona, and Texas Tech University). Texas Tech University has produced about 2,000 high-resolution images as part of their 25,238

images uploaded. We currently have 7,869 high-resolution images and we will continue to focus resources towards the continued imaging of exemplar specimens.

Table 2. Number of images posted on SCAN portal from SCAN museums that are focused on producing high-resolution images of specimens. Data are recorded from <http://symbiota1.acis.ufl.edu/scan/portal/imagelib/photographers.php>

Institution	# High-Resolution Images
Arizona State University	1,984
Colorado State University	49
Northern Arizona University	1,020
Denver Museum of Nature and Science	624
University of New Mexico	135
Northern Arizona University - NPS	673
New Mexico State University	1,384
Texas Tech University (mostly low-res images)	25,238
University of Arizona (low res images)	48,798
University of Hawaii (low res images)	10,533
University of Colorado	0
TOTAL	90,438

Share and Identify Best Practices and Standards (including Lessons Learned):

We are identifying best practices on a weekly basis and sharing those with respective people within SCAN.

Identify Gaps in Digitization Areas and Technology:

We need to harvest additional data (i.e. beyond SCAN) to better understand the biogeography of arthropod taxa. We are partially meeting this need by incorporating GBIF into the SCAN database.

Share and Identify Opportunities to Enhance Training Efforts:

Nothing new to report, we are working on activities already described in previous reports

Share and Identify Collaborations with other TCNs, Institutions, and Organizations:

We are primarily working with Tri-Trophic TCN in order to develop questions for analyzing ADBC data. We presented a joint paper at the Entomological Collections Network meeting November 15, 2014.

Share and Identify Opportunities and Strategies for Sustainability:

We have a sustainability plan for Colorado State University, they are finished using their NSF funding <http://scan1.acis.ufl.edu/content/sustainability> .

Other Progress (that doesn't fit into the above categories): We are continuing to share North American data from other sources to increase the quantity of data. These will greatly increase the usability of the existing SCAN data, especially understanding species distributions and more complete species lists. We are hosting North American data from GBIF and are in the process of hosting data from Tri-Trophic TCN and other non-TCN arthropod data sets that have been harvested by iDigBio. With these additional records we are currently serving over 4.9 million records for 57,851 species.

SERNEC: THE KEY TO THE CABINETS: BUILDING AND SUSTAINING A RESEARCH DATABASE FOR A GLOBAL BIODIVERSITY HOTSPOT

Report submitted by: emilylgillespie@gmail.com
Report Submitted on: 12/08/2014 - 17:54

Progress in Digitization Efforts

We received final word of funding in August 2014. I received account numbers, enabling purchasing and hiring, in Oct 2014. As of today (8 Dec 2014) I have received all equipment but a laptop, which is in-house but being 'imaged' by the IT specialist, and I have been able to get a student hire through HR as of this week.

We have been preparing the herbarium this semester for digitization, particularly clearing space, reading cabinets for maneuverability, reorganizing according to APG, training students in navigating the collection, and making purchases and payroll requests.

As of Dec. 8, 2014, we have begun selecting specimens and barcoding. We've barcoded about 500 sheets in the last 10 days, and we will begin imaging the moment our laptop is connected to our camera and we troubleshoot the workflow. I anticipate that we will move fairly quickly as soon as spring semester begins.

Share and Identify Best Practices and Standards (including Lessons Learned)

I've discovered that preparation is a huge undertaking, if you're dealing with a collection that isn't completely up to date curation-wise (I am fairly new at my institution). This is a step that should not be underestimated by curators. However, I was able to fill the time it took my grants office to process my grant for this purpose, so it worked out well.

Identify Gaps in Digitization Areas and Technology

nothing to report so far.

Share and Identify Opportunities to Enhance Training Efforts

I have about six federal work study students who are going to ultimately be helping with this effort; one of them is officially hired by the grant so far. This one student is proofreading and troubleshooting protocols as I write them, before we train the other students. This will hopefully minimize stops/restarts as well as student frustration.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

nothing to report so far

Share and Identify Opportunities and Strategies for Sustainability

nothing to report so far

Other Progress (that doesn't fit into the above categories)

nothing to report so far

Attachment

THE MACROFUNGI COLLECTION CONSORTIUM: UNLOCKING A BIODIVERSITY RESOURCE FOR UNDERSTANDING BIOTEC INTERACTIONS, NUTRIENT CYCLING AND HUMAN AFFAIRS

Report submitted by: barbara.thiers@gmail.com
Report Submitted on: 12/09/2014 - 15:42

Progress in Digitization Efforts

There are currently 1,779,399 records available for searching the MycoPortal. My best guess is that this includes at least 75% of all records that have been created so far -- there are a few institutions that have rather convoluted systems for getting data from their own systems in to the MycoPortal, and so they only do uploads every few months. As best I can tell, there are still between 100-200k specimens to be digitized for this project

Share and Identify Best Practices and Standards (including Lessons Learned)

In recent months we haven't been following up with all participants the way we did at the beginning of the project, and this is a mistake. I feel that we have lost touch a bit with some of the participants who do not seem to be making particularly good progress. So, I intend to have the project coordinator do a year end outreach to all participants, and then re-establish more regular contact after that.

Identify Gaps in Digitization Areas and Technology

We still struggle with record completion but with funding from the MaCC project, we have commissioned some changes to Symbiota that should make record completion go much faster. These involve the ability to sort records in table view, and also improved data parsing through the incorporation of Salix data parsing techniques.

Share and Identify Opportunities to Enhance Training Efforts

Nothing to report at this time.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

We anticipate that the Symbiota improvements described above will help all of the TCNs that use Symbiota.

Share and Identify Opportunities and Strategies for Sustainability

Nothing new to report

Other Progress (that doesn't fit into the above categories)

We are in a transitional situation with the MaCC project at the moment, since the Portal Manager, Scott Bates, has left the project. I am in the process of figuring out how to manage his subcontract going forward, and how to maintain the level of service that we have provided up until now.

Attachment

BI-MONTHLY PROGRESS REPORTS TO IDIGBIO
FROM
THEMATIC COLLECTIONS NETWORKS (TCNs)

FEBRUARY 2015

SOUTHWEST COLLECTIONS OF ARTHROPODS NETWORK (SCAN): A MODEL FOR COLLECTIONS DIGITIZATION TO PROMOTE TAXONOMIC AND ECOLOGICAL RESEARCH

Report submitted by: neilscobb@gmail.com
Report Submitted on: 01/14/2015 - 18:26

Progress in Digitization Efforts

see attached

Share and Identify Best Practices and Standards (including Lessons Learned)

see attached

Identify Gaps in Digitization Areas and Technology

see attached

Share and Identify Opportunities to Enhance Training Efforts

see attached

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

see attached

Share and Identify Opportunities and Strategies for Sustainability

see attached

Other Progress (that doesn't fit into the above categories)

see attached

Attachment

https://www.idigbio.org/sites/default/files/webform/tcn-reports/SCAN_January_2015.docx

Southwest Collections of Arthropods Network Update

March 3, 2015

Neil Cobb

Progress in Digitization Efforts:

We are on target to meet our third-year quota for digitizing labels from pinned specimens (525,349 specimens of ground-dwelling arthropod taxa). Table 1 presents three sets of statistics as of December 1, 2014 from our data portal. These include data 1) from institutions that are funded by the NSF-ADBC program; 2) institutions that are entering data into the SCAN portal but not funded by the NSF-ADBC program, 3) the total of these first two categories; and 4) the total records in the SCAN portal. The fourth column includes records from the first three columns as well as all records we have ingested from aggregators GBIF and iDigBio. The purpose of serving aggregator data is to provide complete information to persons that are considering research projects. Although we have already surpassed our goal of 525,349 specimen records, we have not thoroughly reviewed the 746,410 records that SCAN-funded museums have produced to determine how many of those strictly ground-dwelling arthropods, but we expect that 70% or those are target taxa and that we only need ~4,000 more records to meet our project goal by July 1, 2015.

Table 1. Number of specimen records digitized and associated summary statistics. From <http://symbiota4.acis.ufl.edu/scan/portal/index.php>. SCAN-funded numbers refer to the 12 museums receiving ADBC funding. SCAN non-funded numbers include nine museums contributing cataloged specimen data and non-cataloged moth specimen data from 22 collections (5 private collections and 17 public museums). Total Served includes all SCAN data and other datasets with North American arthropod records (e.g., GBIF, Tri-Trophic TCN).

	SCAN funded	SCAN non-funded	TOTAL SCAN	Total Served
# Specimen Records	746,410	134,578	880,988	5,371,762
# Georeferenced	544,874	52,686	597,560	4,342,496
# Identified to species	470,785	66,356	537,141	3,098,473
# Families	718	362	776	1,450
# Genera	7,037	3,463	8,923	20,014
# Species	16,569	7,016	21,558	58,709
% Georeferenced	73%	39%	67%	81%
% Identified to Species	63%	49%	61%	58%

A subset of SCAN museums are creating high-resolution images and three museums are creating low resolution images that include the specimen and labels in the same image. Table 2 lists the number of images posted on SCAN by participating museums. Our goal is to produce 15,125

high-resolution images suites. An image suite consists of 1-5 images representing different aspects of a specimen. This will translate into approximately 40,000 images. We are currently behind on our projections due to unexpected logistical challenges but we expect to continue to greatly increase our productivity over the fall, 2014. Three museums are producing low-resolution images (University of Hawaii, University of Arizona, and Texas Tech University). Texas Tech University has produced about 3,000 high-resolution images as part of their 25,238 images uploaded. We currently have 9,527 high-resolution images (out of 95,805 total images) and we will continue to focus resources towards the continued imaging of exemplar specimens.

Table 2. Number of images posted on SCAN portal from SCAN museums that are focused on producing high-resolution images of specimens. Data are recorded from <http://symbiota1.acis.ufl.edu/scan/portal/imagelib/photographers.php>

Institution	# Images
Arizona State University	2,006
Colorado State University	49
Northern Arizona University	1,020
Denver Museum of Nature and Science	624
University of New Mexico	135
Northern Arizona University - NPS	673
New Mexico State University	1,384
Texas Tech University (mostly low-res images)	25,238
University of Arizona (low res images)	48,98
University of Hawaii (low res images)	636
University of Colorado	15,242
TOTAL	95,805

Share and Identify Best Practices and Standards (including Lessons Learned):

We are identifying best practices on a weekly basis and sharing those with respective people within SCAN.

Identify Gaps in Digitization Areas and Technology:

We need to harvest additional data (i.e. beyond SCAN) to better understand the biogeography of arthropod taxa. We are partially meeting this need by incorporating GBIF into the SCAN database.

Share and Identify Opportunities to Enhance Training Efforts:

Nothing new to report, we are working on activities already described in previous reports

Share and Identify Collaborations with other TCNs, Institutions, and Organizations:

We are primarily working with Tri-Trophic TCN in order to develop questions for analyzing ADBC data. We presented a joint paper at the Entomological Collections Network meeting November 15, 2014.

Share and Identify Opportunities and Strategies for Sustainability:

We have a sustainability plan for Colorado State University, they are finished using their NSF funding <http://scan1.acis.ufl.edu/content/sustainability> .

Other Progress (that doesn't fit into the above categories): We continue to provide North American data we have obtained from other sources to increase the quantity of data available to SCAN users. These will greatly increase the usability of the existing SCAN data, especially understanding species distributions and more complete species lists. We are hosting North American data from GBIF and are in the process of hosting data from Tri-Trophic TCN and other non-TCN arthropod data sets that have been harvested by iDigBio. With these additional records we are currently serving over 4.9 million records for 58,709 species.

FOSSIL INSECT COLLABORATIVE: A DEEP-TIME APPROACH TO STUDYING DIVERSIFICATION AND RESPONSE TO ENVIRONMENTAL CHANGE

Report submitted by: adrian.carper@gmail.com
Report Submitted on: 01/30/2015 - 10:22

Progress in Digitization Efforts

The AMNH Paleontological Collection (PEC) initially entered and further modified over 5000 collection objects in amber from three major localities (the Burmese, New Jersey and Baltic deposits). Additionally, over 5,500 new records of fossil arthropods from the Dominican Republic have been databased, with 500 entries since Dec 1st. All of these are being exported to the recently updated Specify database for consistent data entry from volunteers and students. Editing will continue to be done by PI, D. Grimaldi, and by Curatorial Specialist, P. Nascimbene, with taxonomic names/terms/fields revised where necessary. PEC has now accumulated more than 4000 images of individual inclusions in amber (spanning 75 drawers of specimens), with two volunteers assisting in specimen preparation and photomicrography.

CU-Boulder Invertebrate Paleontology added 302 new specimen records to its Specify database since Dec 1st and is working to convert collection and determination dates from co-opted text fields into a standard ISO format within Specify. The initial conversion should be completed by the end of Jan 2015, though manual revision of partial dates will subsequently be needed. Similar updates and data validation are also being performed on the "Type Status" field to match current standard database formats. An additional 1,037 images have also been acquired.

The Harvard Museum of Comparative Zoology (MCZ) has taken 1350 additional images from 1200 collection specimens since Dec 1st. An additional 200 new catalog numbers have been assigned to unnumbered fossils found as the collection is imaged. MCZ has also completed databasing of F.M. Carpenter's alphabetically organized bibliographic collection on fossil insects by adding the final 200 entries.

The Virginia Museum of Natural History (VMNH) has taken a hiatus from insect digitization over the last few months due to a salvage operation of the Triassic insect-bearing beds at the Solite Quarry, which will ultimately result in the collection of a large number of additional insects. The salvage operation was funded by National Geographic Society, and VMNH has provided additional funding to extend the Paleontology Technician position for an additional year, to ensure completion of the insect digitization project.

Share and Identify Best Practices and Standards (including Lessons Learned)

PEC has updated record dating and georeferencing. The most accurate date for individual amber deposits, based on radiometric dating where possible, is being shared across institutions to standardize specimen dating. Also, utilizing the GeoLocate function in Specify, information is being entered for entire deposits, giving access to an interactive map, precise coordinates, and range/margin of error, which can be applied to future collection objects entered into the database. This also allows georeferencing information to be standardized and shared across institutions.

Identify Gaps in Digitization Areas and Technology

PEC found it necessary to utilize an updated version of Specify that allows associations between collection objects and localities (called the Swedish model), given that typically, all specimens from individual amber localities share the same geological and geographical information.

Share and Identify Opportunities to Enhance Training Efforts

The Division of Invertebrate Zoology at AMNH will host the next TCN Workshop/Meeting on February 26 and 27, 2015. There will be presentations and demonstrations / workshops on the digitization of fossils in amber, including preparation, imaging, etc.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

CU-Boulder PI, D. Smith, is co-organizing a session with D. Paul and V. Blagoderov on digitization for the 2015 Society for the Preservation of Natural History Collections (SPNHC) annual meeting in Gainesville, FL. Co-PI T. Karim and digitization specialist, G. Nelson, have also submitted a proposal to iDigBio and the Geological Society of America (GSA) for a digitization session at the 2015 GSA annual meeting in Baltimore, MD.

Share and Identify Opportunities and Strategies for Sustainability

There is nothing new to report.

Other Progress (that doesn't fit into the above categories)

The fossil insect collection and digitization workspace at MCZ was moved at the end of December to the Northwest Building, in which the rest of MCZ's paleontology invertebrate collections are now kept. This move is included in a general restructuring that the MCZ is suffering in order to accommodate future changes. The new space is better equipped in terms of space and fossil preparation, providing, for instance, a polisher that can be used to remove fractured surfaces in old amber samples to improve the visibility of their inclusions prior to imaging them. During the move, MCZ transferred and pre-cleaned "rediscovered" fossil insect material that had been stored apart from the rest of the collection, originally inside wooden drawers found in an industrial unit in Cambridge. The current MCZ entomology curators were unaware of the material. Rough accounts estimate that this new material represents about 20,000 fossil insect specimens, namely rock fossils from the Permian of Kansas and Elmo and the Eocene Green River Fm, which had been excavated and/or curated by Prof. F.M. Carpenter, former curator of fossil insects at the MCZ and who passed away two decades ago. Preliminary inspections of this material show that most of the samples are in excellent condition and have a great scientific potential. Although this material was not in our current records and lacks modern catalog numbers, it shows some degree of processing, as most of the specimens are marked on the rock surfaces and identification numbers were assigned to them. Some specimens are even taxonomically determined. Most of the samples were kept (even stacked up) inside the wooden drawers without being boxed or multiple of them were stored in dusty cardboard boxes, so often samples were exposed to suffer damage by friction. Samples were thus transferred to plastic boxes or their cardboard boxes were cleaned. Mechanical protection was ensured preventing direct contact between fossiliferous surfaces, often using plastic or paper layers. Boxes were stored as in the rest of collection, i.e., in cardboard trays that are kept inside metal drawers placed into metal cabinets. Nine cabinets were required, which joined the official MCZ collection.

Attachment

Nothing to report.

INVERTEBASE: REACHING BACK TO SEE THE FUTURE: SPECIES-RICH INVERTEBRATE FAUNAS DOCUMENT CAUSES AND CONSEQUENCES OF BIODIVERSITY SHIFTS

Report submitted by: eshea@delmnh.org
Report Submitted on: 02/02/2015 - 13:58

Progress in Digitization Efforts

Field: Generated data entry spreadsheet with North American geographic file, drop-down menus to county level. Insects: designed and tested complete workflow and taxonomic authority file (spread sheet with drop down menus) for papered and pinned FMNH Odonata data entry, uploaded workflow and Odonata taxonomic authority file on InverteBase google drive. Odonata digitization in progress, close to 1,000 Odonata digitized, barcodes are added, through pre-curation major improvement of FMNH Odonata collection. Invertebrates: taxonomic authority file under development. Identified mollusk collection units for digitization.

Cleveland: We consulted with staff at C.A Triplehorn Insect Collection, Ohio State University who maintain database and server, a well-developed 2-step digitization protocol and full-time Biodiversity Informatics Manager. We have since transcribed label data from more than 1,500 mantid specimens which approximately half have been entered in to the OSU DEA2 database. We are starting digitization efforts on Hymenoptera with a newly installed thermal printer generating barcode labels.

Auburn: Additional two undergraduate students hired. Total of 26,109 specimens digitized; currently working through Hemiptera.

Michigan: Three undergraduate students were newly hired in January making total six undergraduates working on data entry. Total 2917 records representing three freshwater snail families (Lymnaeidae: 403; Planorbidae: 632; Pysidae: 953; Valvatidae: 292) and one bivalve family Sphaeriidae (637) were entered during 22 Nov. 2014- 22 Jan. 2015.

Delaware: We have reached out to Specify personnel to discuss timeline for DMNH Mollusk database creation and how the two new major upgrade releases (Specify 6.6 and Specify 7) will impact our conversion.

Frost: We finished scanning the sucking louse collection (Insecta: Anoplura), just over 15,000 slides, using InvertNet's slide-scanning protocol. The images are stored locally on 4 redundant hard drives, pending transfer to InvertNet. We also finalized our dragonfly envelope imaging strategy and have begun imaging our synoptic collection (stored separately from the rest). More than 1,800 Odonata have been imaged.

Share and Identify Best Practices and Standards (including Lessons Learned)

Field: purchased and/or tested all equipment: barcode cutter, stage for pinned insect for quick label imaging, photographic station for label imaging tested

Cleveland: nothing to report

Auburn: nothing to report

Michigan: nothing to report

Delaware: nothing to report

Frost: After experimenting with a 16-cell dragonfly template and a single specimen template we've determined to image the specimens one at a time (less error prone, same time per specimen). An image of the template is available online, and we are running tests that use scripts to separate fields (identifier, specimen, metadata, color standard). Results will inform our future efforts.

Identify Gaps in Digitization Areas and Technology

Field: label imaging techniques to be demonstrated via video conference in March to resolve label imaging issues

Cleveland: We have been working to resolve label imaging procedure, but have not settled on an optimal protocol.

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Michigan: nothing to report

Delaware: We have received an updated quote for a server to house collections database and identified technology deficits in DMNH computing architecture that will need to be resolved prior to installation.

Frost: Lighting for our Odonata imaging is sufficient for digitization, but needs to be brighter to make the images more useful for research beyond label transcription. We are using four 100w-equivalent daylight spectrum compact fluorescent bulbs. We are likely to move to a flash-based workflow starting late January 2015.

Share and Identify Opportunities to Enhance Training Efforts

Field: Insects digitization person hired, prospective student summer intern interviewed

Cleveland: Three work-study students from Case Western Reserve University were hired and are assisting in digitization.

Auburn: Additional 2 undergraduates hired and trained.

Michigan: Nothing to report.

Delaware: We continue to seek out opportunities for new hire and CM to attend web meetings regarding Specify.

Frost: We are advertising within the Penn State system to bring in undergraduate researchers. Selected participants will assist in digitizing the collection, while also addressing basic research questions. A curriculum is being developed for this activity (we expect it to take awhile to develop).

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Field: Insects and Invertebrates: Sierwald and Bieler further developing InvertEBase Symbiota portal

Cleveland: We are working with the Biodiversity Informatics Manager, Joe Cora, at OSU reporting issues experienced to help develop their database further.

Auburn: Nothing to report

Michigan: The University of Michigan participants are collaborating with the Great Lakes Invasives TCN to make sure that data flows to both projects.

Delaware: Nothing to report.

Frost: We are working with the Speciesfile group to parse data from the Odonata images. Scripts have already been written, and tests are ongoing. The slide scans will also be part of this process, in collaboration with Julie Allen (INHS).

Share and Identify Opportunities and Strategies for Sustainability

Field: Nothing to report

Cleveland: Nothing to report.

Auburn: Nothing to report

Michigan: Nothing to report.

Delaware: Nothing to report.

Frost: Nothing to report.

Other Progress (that doesn't fit into the above categories)

Field: Nothing to report

Cleveland: A thermal printer was purchased for printing barcodes.

Auburn: Nothing to report

Michigan: Nothing to report.

Delaware: We have a new grant-supported staff member starting on/about Feb. 1

Frost: Nothing to report.

Attachment

Nothing to report.

NORTH AMERICAN LICHENS AND BRYOPHYTES: SENSITIVE INDICATORS OF ENVIRONMENTAL QUALITY AND CHANGE

Report submitted by: cgries@wisc.edu
Report Submitted on: 02/05/2015 - 16:57

Progress in Digitization Efforts

As of February 2015 the number for the LBCC are as follows:

Lichens:

<http://lichenportal.org>

Herbaria actively submitting images or key stroked records to the portal: 65

Specimen records in portal: 1,722,502 (up by 128,497 since November 2014)

Specimen records with images: 660,324 (40,239 labels have been imaged since November 2014)

Records with locality information: 1,398,530 (124,126 locality information where added since November 2014)

Bryophytes:

<http://bryophyteportal.org>

Herbaria actively submitting images or key stroked records to the portal: 59

Specimen records in portal: 2,075,953 (up by 36,236 since November 2014)

Specimen records with images: 952,375 (26,713 labels have been imaged since November 2014)

Records with locality information: 1,264,019 (49,918 locality information where added since November 2014)

Share and Identify Best Practices and Standards (including Lessons Learned)

Our digitization coordinator participated in the workshop entitled 'Workflows for Herbarium Digitization' and contributed to a composite set of workflow documents that capture the best of what has been learned in our community over the past few years of ADBC activity.

Identify Gaps in Digitization Areas and Technology

none to report

Share and Identify Opportunities to Enhance Training Efforts

nothing to report.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Nothing to report.

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report.

Other Progress (that doesn't fit into the above categories)

Nothing to report.

Attachment

Nothing to report.

GREAT LAKES INVASIVES: DOCUMENTING THE OCCURRENCE THROUGH SPACE AND TIME OF AQUATIC NON-INDIGENOUS FISH, MOLLUSKS, ALGAE, AND PLANTS THREATENING NORTH AMERICA'S GREAT LAKES

Report submitted by: kmcameron@wisc.edu
Report Submitted on: 02/06/2015 - 17:00

Progress in Digitization Efforts

see attachment

Share and Identify Best Practices and Standards (including Lessons Learned)

see attachment

Identify Gaps in Digitization Areas and Technology

see attachment

Share and Identify Opportunities to Enhance Training Efforts

see attachment

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

see attachment

Share and Identify Opportunities and Strategies for Sustainability

see attachment

Other Progress (that doesn't fit into the above categories)

see attachment

Attachment

https://www.idigbio.org/sites/default/files/webform/tcn-reports/GLITCN_progress%20report_Jan2015_0.pdf

GREAT LAKES INVASIVES TCN – Bi-monthly report Dec 1, 2014 – Jan 30, 2015

Second GLI TCN report, representing five months' of effort to date.

Our four regional data processing centers (NY Botanical Garden, Field Museum, Univ of Michigan, and Univ of Wisconsin-Madison) report the following from their constituents:

1) Progress in Digitization Efforts TO DATE

PLANTS:

Specimens Barcoded Only: 3,923 (NY) + 4,000 (ILLS) + 264 (MINN) = **8,187**

Barcoded and Imaged to Date: 27,536 (WIS) + 12,243 (NY) + 12,452 (OSU) + 163 (MINN) + 8,674 (MICH) + 159 (ILLS) + 2,695 (F) + 4880 (MU) = **68,802**

Databased to Date: 45,401 (WIS) + 8,110 (NY) + 27,500 (MINN) + 15,127 (MICH) + 27,000 (ILLS) + 9,478 (F) = **132,616**

Uploaded to the GLI Portal directly or to another Symbiota Portal for editing before transfer to GLI Portal: 45,401 (WIS) + 7,849 (MICH) + 5,783 (F) + 42 (MINN) + 9,624 (MOR) + 9,804 (ALBC) = **78,503**

MOLLUSKS:

Barcoded and Imaged to Date: **1,617** lots (MICH) have been imaged, representing 3 genera and 5 species.

Databased to Date: **6,594** records added by MICH, representing 6 genera and 92 species.

Uploaded to the GLI Portal or another Symbiota Portal: 2,341 images from MICH have been processed and, of these, **1,404** have been uploaded to the GLI portal.

FISH:

Databased to Date: 27,145 (ILLS) + 81,324 specimens [in 4,709 lots (F)] = **108,469**

Georeferenced: 25,000 (ILLS)

2) Share and Identify Best Practices and Standards (including Lessons Learned)

We continue to experiment with alcohol resistant barcode options. Researchers at Ohio State have learned that after several months, the adhesive backing on standard vinyl barcodes used by the herbarium has not dissolved.

Our plant workflow offers efficiencies that take advantage of duplicates from institutions that are not funded through our TCN. Records (complete or skeletal) and images are uploaded mostly to the larger Midwest Consortium of Herbaria Symbiota Portal, a subset of the larger SEINET portal. Transcription and Georeferencing takes place there prior to the completed record being migrated into the GLI Portal. This offers a higher probability of encountering a duplicate in the nationwide portal.

Lesson learned: there is no substitute for a face-to-face meeting, especially at the start of a collaborative project that crosses disciplines. At their own personal expense, 20 participants from MN, WI, IL, MI, & OH traveled to the Field Museum in Chicago on December 15 for a TCN workshop. This was a critically important meeting that brought the participating botanists and zoologists together – many for the very first time, and possibly last. A request for minimal financial support for the workshop to iDigBio was rejected. To their great credit the Field Museum covered the cost of parking and lunch for the participants, instead; the TCN is extremely grateful for this.

3) Identify Gaps in Digitization Areas and Technology

Still trying to resolve best practices for physical application to and use of barcodes on liquid preserved fish and 3D mollusk specimens. Their use is not routine among these collection managers.

4) Share and Identify Opportunities to Enhance Training Efforts

Having current employees train new hires is efficient, and also beneficial for constantly revising and updating the workflow with potential improvements.

5) Share and Identify Collaborations with other TCNs, Institutions, and Organizations –

Project managers have discussed mollusk imaging with Paul Callomon at Philadelphia Academy of Natural Sciences.

We have loaned a digitization workstation to participants at UW-Milwaukee, thereby starting to bring in some of the smaller but important institutions.

6) Share and Identify Opportunities and Strategies for Sustainability

Nothing to report

7) Other Progress (that doesn't fit into the above categories)

We have constructed and implemented a custom 'app' that allows for the creation of skeletal records of imaged data before uploading into Symbiota in order to accelerate the transcription process. It is available to downloading on our project website together with installation and use instructions.

University of Michigan PI Rabeler represented the project at an iDigBio Herbarium Workflows workshop at Valdosta State University, 26-30 January 2015.

DIGITIZING FOSSILS TO ENABLE NEW SYNTHESIS IN BIOGEOGRAPHY- CREATING A PALEONICHES

Report submitted by: blieber@ku.edu
Report Submitted on: 02/07/2015 - 13:18

Progress in Digitization Efforts

Paleoniches Update, February 2015

Regarding the University of Kansas portion of the project, led by PI Bruce S. Lieberman and co-PI Una Farrell, we now have a total of 151,873 specimens databased. Of these, there are a total of 147,550 specimens databased that have clean, proofed localities. Further, we now have a total of 122,714 specimens that are georeferenced. We have now completed databasing all of the cephalopods we aimed to database. We are almost finished databasing our bivalves and have begun databasing our gastropods. In addition, a total of 8,114 localities have been georeferenced. Thus we have effectively completed the entire georeferencing component of our proposed work. We have also since the last update to iDigBio significantly expanded the number of species that have been imaged, especially focusing on adding crinoids and both articulate and inarticulate brachiopods.

Regarding the Ohio University portion of the project, led by PI Alycia Stigall

In the last two months, several new genus and species pages have been released on the Ordovician Atlas website. The addition of maps to live pages is complete, and we continue to put maps on pages that are not currently live. In addition, members of the Stigall lab visited the Cincinnati Museum Center in December to photograph ~30 specimens for the website. Currently, the website has 130 species pages live, and all the cephalopods, arthropods, brachiopods, crinoids, graptolites, and corals are now live. We are currently focusing our efforts to finish and make live the gastropod, rhombiferan, and bivalve species pages.

Miami University

During December 2014 and January 2015, there has been no activity due to the fact that no students were available to work during the holiday break and Miami's J-term (January term).

Cincinnati Museum Center

Since the middle of November, Brenda Hunda's University of Cincinnati student intern Ian MacAdam, has been focusing on georeferencing locality records. He has worked a total of 76.5 hours and has georeferenced 727 locality records, with his cumulative total of 1260 sites. His work to date has resulted in 6621 catalogue records with georeferenced site data. For the project as a whole to date 2,602 site records have been georeferenced resulting in 19,533 georeferenced catalogue records in Ke Emu. This constitutes georeferencing of 28.75% of our Invertebrate Paleontology collection.

Regarding the San José State University portion of the project, led by PI Jon Hendricks:

Since the last update, PI Hendricks (San José State University; SJSU)—in collaboration with Invertebrate Paleontology staff at the Florida Museum of Natural History—has continued to develop and add content to the Neogene Atlas of Ancient Life. In particular, seven additional families of gastropods have been added since the last update (distributional maps for these will be published online soon). Species-level pages are now online for 332 species (out of 500 planned pages).

Hendricks is currently recruiting a new undergraduate student assistant to help with the development of content for the Pennsylvanian Atlas. The new student assistant will be hired, trained, and actively generating new web content for the Pennsylvanian Atlas by the time of the next update.

Finally, for our PEN partners. First, Texas, PI: Ann Molineux, Co-PI: James Sprinkle

1. We have a data set with VertNet awaiting their re-processing prior to iDigBio access. Data was run through the migrator and we are now expecting a rerun with relevant tweaks to the migrator to accommodate our data set. Ironically the dataset currently with VertNet is now somewhat behind the times so we'll need to send an update!

2. Georeferencing is at 32%
3. About 3300 image attachments have been made. These include whole drawer images, specimen images, labels, field images, and notebooks. We have to pass through two updates of the database before we can batch upload the bulk of the images files. We expect this to happen in the next month.
4. The deep time version of PaleoCentral is ready, Tomislav Urban is bullet proofing at the moment.

And at Yale: From PI Susan Butts:

We are working on digitizing the most abundant taxa from the Ordovician and the Pennsylvanian (50 most abundant genera from each time period) and are proceeding to digitize that material from our systematic collection. We have done at least one drawer of the top 50 most abundant Ordovician fossils and at least 18 of the top 50 Pennsylvanian drawers (5 are in progress). At this rate, we will certainly achieve our digitization goals by the end of this project (June 2015). We have roughly 550 specimen images (most with three views) awaiting upload to the database.

Since the previous report, we have modified or inserted 1,202 records in KE EMu. We have attached photos to 1,113 additional records (1-3 photos per specimen). All items digitized via our PEN are now available to iDigBio via the Peabody IPT.

Share and Identify Best Practices and Standards (including Lessons Learned)

N/A

Identify Gaps in Digitization Areas and Technology

N/A

Share and Identify Opportunities to Enhance Training Efforts

N/A

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

N/A

Share and Identify Opportunities and Strategies for Sustainability

N/A

Other Progress (that doesn't fit into the above categories)

A manuscript by PI's Hendricks, Stigall, and Lieberman—titled “The Digital Atlas of Ancient Life: delivering information on paleontology and biogeography via the web” was submitted for peer review to *Palaeontologia Electronica* (an open-access online journal) on December 18, 2014. This manuscript provides an overview of our Digital Atlas project and goals for the paleontological community.

Attachment

Nothing to report.

THE MACROFUNGI COLLECTION CONSORTIUM: UNLOCKING A BIODIVERSITY RESOURCE FOR UNDERSTANDING BIOTEC INTERACTIONS, NUTRIENT CYCLING AND HUMAN AFFAIRS

Report submitted by: barbara.thiers@gmail.com
Report Submitted on: 02/08/2015 - 11:23

Progress in Digitization Efforts

Since our last report (December 2014), 90,530 specimen records have been added to the Portal. This represents about 80% of the records actually created during this period. The total number of records available for searching in the MycoPortal stands at 1,803,604, approximately 400,000 more than promised in the original proposal. Fourteen of the participating institutions have completed their digitization work. We estimate that there remain to be digitized about 250,000 images across the 21 institutions still participating institutions.

Share and Identify Best Practices and Standards (including Lessons Learned)

Nothing new to report.

Identify Gaps in Digitization Areas and Technology

We have identified as many gaps as we can reasonably address in this proposal.

Share and Identify Opportunities to Enhance Training Efforts

Nothing new to report.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Using funds from the Macrofungi grant, we have paid for some additional work that will benefit all Symbiota portals. It is now possible to sort records in edit view on any indexed field, which will greatly expedite record completion/

Share and Identify Opportunities and Strategies for Sustainability

The most important step toward sustainability that we can make is to continue the digitization to include all fungi. A proposal to ADBC is pending.

Other Progress (that doesn't fit into the above categories)

Plans are in development for a large presence for the MaCC project at Botany 2015. There will be a workshop for attendees, and also a high school teacher's workshop and special field trip for high school teachers.

Attachment

Nothing to report.

INVERTNET: AN INTEGRATIVE PLATFORM FOR RESEARCH ON ENVIRONMENTAL CHANGE, SPECIES DISCOVERY AND IDENTIFICATION

Report submitted by: chdietri@illinois.edu
Report Submitted on: 02/09/2015 - 09:06

Progress in Digitization Efforts

Software for the InvertNet whole drawer digitization system was upgraded to include feature-point-based stitching software written by co-PI John Hart that automatically stitches sets of images to create whole-drawer gigapixel-scale zoomable panoramas in near real time (~3 minutes per image set) on the local computer that also controls the robot and captures and saves the raw images to disk. This upgrade has been installed on the production system at INHS and will be installed remotely on the systems at collaborating institutions within the next few weeks. We are also upgrading camera head hardware to address some camera motion issues and improve the speed of image stitching. Replacement parts are being manufactured and should be ready to send to collaborators with the new software in the next few weeks. Images and metadata for approximately 100 drawers have been captured at INHS and are in the queue for upload to invertnet.org. Collaborators at most institutions have now scanned at least a few of their drawers but some have opted to wait until we can provide the above mentioned upgrades before proceeding further.

Share and Identify Best Practices and Standards (including Lessons Learned)

Nothing to report.

Identify Gaps in Digitization Areas and Technology

Nothing to report.

Share and Identify Opportunities to Enhance Training Efforts

Nothing to report.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Nothing to report.

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report.

Other Progress (that doesn't fit into the above categories)

Nothing to report.

Attachment

Nothing to report.

INVERTEBASE: REACHING BACK TO SEE THE FUTURE: SPECIES-RICH INVERTEBRATE FAUNAS DOCUMENT CAUSES AND CONSEQUENCES OF BIODIVERSITY SHIFTS

Report submitted by: adeans@gmail.com
Report Submitted on: 02/09/2015 - 09:59

Progress in Digitization Efforts

Field: Generated data entry spreadsheet with North American geographic file, drop-down menus to county level. Insects: designed and tested complete workflow and taxonomic authority file (spread sheet with drop down menus) for papered and pinned FMNH Odonata data entry, uploaded workflow and Odonata taxonomic authority file on InvertEBase google drive. Odonata digitization in progress, close to 1,000 Odonata digitized, barcodes are added, through pre-curation major improvement of FMNH Odonata collection. Invertebrates: taxonomic authority file under development. Identified mollusk collection units for digitization
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Share and Identify Opportunities and Strategies for Sustainability

Field: Nothing to report

Cleveland: Nothing to report.

Auburn: Nothing to report

Michigan: Nothing to report.

Delaware: Nothing to report.

Frost: Nothing to report.

Other Progress (that doesn't fit into the above categories)

Field: Nothing to report

Cleveland: A thermal printer was purchased for printing barcodes.

Auburn: Nothing to report

Michigan: Nothing to report.

Delaware: We have a new grant-supported staff member starting on/about Feb. 1

Frost: Nothing to report.

Attachment

Nothing to report.

PLANTS, HERBIVORES AND PARASITOIDS: A MODEL SYSTEM FOR THE STUDY OF TRI-TROPHIC ASSOCIATIONS

Report submitted by: moon@begoniasociety.org
Report Submitted on: 02/09/2015 - 10:05

Progress in Digitization Efforts

Plant Digitization Numbers:

Total Skeletal records completed in Symbiota during the course of the project: 81,734 (NY = 50,702)

Total Complete Records = 1,248,123

Total Specimens Imaged = 976,658 (NY = 237,604)

Total Images uploaded to iDigBio = 435,265

Insect Digitization Numbers:

Total Complete Records = 1,211,000

The TTD-TCN expects to continue digitizing at a high rate until summer 2015. Afterward, we will focus on data cleaning, data sharing and georeferencing until the final day of the project (December 31, 2015).

Share and Identify Best Practices and Standards (including Lessons Learned)

The TTD-TCN has been using the iDigBio portal in several research efforts. From these we produced a list of improvements to share with the group. We suggest a general call for IAC members to provide detailed feedback.

Download format and term definitions

The columns after download are not in logical order. All columns that are identifiers should be clustered together, locality information clustered together, collecting event clustered etc. Within the clusters the data elements can be in a loose order, but the elements should be together.

Several terms are included in the download that represent the same information, but are named only slightly different (ex.

VerbatimEventDate, verbatimEventDate). These should be merged in the download file or at least returned next to each other in the download file.

There is no document that defines the terms. One should be provided. Further, those definitions should have URI identifiers so that individuals can reuse them with confidence (including them in a meta.xml).

Portal behavior

When searching the portal, certain fields should not be exact match. These include Collector and Locality fields. There are others, but these were the most limiting.

Higher taxonomy should be included to improve the search. Family name being the most important. If it is not in the dataset from the provider, it should automatically be added upon ingestion to iDigBio. Without the higher taxonomy, a user will miss specimen records they are likely looking for.

Minor issues

Terms should be evaluated for continuity. The term "row number" contains a space.

Ideally would like a tsv as well as a csv download.

Identify Gaps in Digitization Areas and Technology

Nothing to report this period.

Share and Identify Opportunities to Enhance Training Efforts

Mari Roberts (NYBG) is pushing forward with using volunteers for transcribing records. Right now she has total of 4 volunteers coming to the Garden to transcribe labels and 2 volunteers who transcribe from home. She is attending local career fairs to increase this number.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Katja Seltmann (AMNH) has been working with iDigBio to organize the Field to Database and Data Management workshops.

Share and Identify Opportunities and Strategies for Sustainability

I am not sure how this translates into sustainability, but on a number of occasions now we have been asked the question "Do you have an API?". Our answer has been "No, but iDigBio does". A robust API is software that is difficult to maintain, and one of t

Other Progress (that doesn't fit into the above categories)

Nothing to report this period.

Attachment

Nothing to report.

MOBILIZING NEW ENGLAND VASCULAR PLANT SPECIMEN DATA TO TRACK ENVIRONMENTAL CHANGE

Report submitted by: p_sweeney@att.net
Report Submitted on: 02/09/2015 - 10:39

Progress in Digitization Efforts

Capture of collection level-information (i.e., "pre-capture") is complete. Approximately 800,000 specimens have been pre-captured -- with at least current identification captured. As part of the primary digitization phase, approximately 280,000 records and 231,000 images have been captured.

Share and Identify Best Practices and Standards (including Lessons Learned)

nothing to report

Identify Gaps in Digitization Areas and Technology

nothing to report

Share and Identify Opportunities to Enhance Training Efforts

nothing to report

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

We continue to collaborate with, iPlant, the FilteredPush project, the Symbiota team, and iDigBio. We are collaborating with Melody Bashram (U. of AZ), iDigBio, and other TCNs to develop a Augmented Reality tool that will be useful in K-12 education. PI Sweeney participated in the Herbarium Digitization Workflows workshop (Jan 2015) that was hosted by iDigBio and SERNEC. NEVP advised SERNEC on their overall data workflow, particularly aspects related to the flow of data to and from iPlant.

Share and Identify Opportunities and Strategies for Sustainability

nothing to report

Other Progress (that doesn't fit into the above categories)

nothing to report

Attachment

Nothing to report.

DEVELOPING A CENTRALIZED DIGITAL ARCHIVE OF VOUCHERED ANIMAL COMMUNICATION SIGNALS

Report submitted by: msw244@cornell.edu
Report Submitted on: 02/09/2015 - 12:46

Progress in Digitization Efforts

Our TCN project has now digitized over 13,000 audio recordings from several different TCN partners. These recordings ("media specimens") are now available through, and playable at, the Macaulay Library website (MacaulayLibrary.org), and data are being pushed to iDigBio and VertNet. The list below details the major bodies of material digitized during the latest reporting period:

The collection of anuran recordings from famed herpetologist William Duellman is now completely archived: 1,334 total archived recordings, with 957 associated physical specimens; 500+ of these recordings have been archived since November 2014 update.

We have initiated digitization/archival work for recordings from the David Weissman Orthopteran Collection: 526 recordings archived in December and January.

We have also initiated digitization/archival work for the AMNH anuran collection: 350+ Rex Cocroft recordings archived in December and January.

We have now digitized the first 100 tapes (out of 1,040) of anuran recordings from Texas Natural History Collections.

Share and Identify Best Practices and Standards (including Lessons Learned)

The Macaulay Library uses an audio archival standard of 96kHz 24-bit, the audio standard recommended by Sound Directions: Best Practices for Audio Preservation <<http://www.dlib.indiana.edu/projects/sounddirections/papersPresent/index.shtml>> and a standard adopted by leading audio archival institutions such as the Library of Congress and The British Library.

Identify Gaps in Digitization Areas and Technology

There are no accepted standards for the preservation and subsequent presentation of electric organ discharges produced by e-fish. During the past year, Macaulay Library audio archival staff worked with staff at CUMV to develop archival and web-proxy presentation protocols in collaboration with e-fish researchers that will serve as a model formats for EODs.

Share and Identify Opportunities to Enhance Training Efforts

Personnel from this TCN project visited partner institutions and participated in meetings/summits to facilitate the work undertaken and for exchange of information. In particular, Matthew Medler (Cornell), Rafe Brown (Kansas Univ) and Robin Abraham (also KU) participated in the iDigBio summit in late October 2014.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

In January, Macaulay Library staff visited partner institution Museu Paraense Emílio Goeldi to retrieve analog (48 cassettes) and digital recordings for digitization and archival.

Share and Identify Opportunities and Strategies for Sustainability

National-level reporting of iDigBio achievements, heretofore resources now available to the public.

Other Progress (that doesn't fit into the above categories)

Nothing to report.

Attachment

Nothing to report.

THE MACROALGAL HERBARIUM CONSORTIUM: ACCESSING 150 YEARS OF SPECIMEN DATA TO UNDERSTAND CHANGES IN THE MARINE/AQUATIC ENVIRONMENT

Report submitted by: Chris.neefus@unh.edu
Report Submitted on: 02/11/2015 - 11:50

Progress in Digitization Efforts

See attached chart

Share and Identify Best Practices and Standards (including Lessons Learned)

Several members of the Macroalgal TCN participated in the recent Herbarium Digitization Workflow workshop at Valdosta State University. The participants are updating the workflows published on the iDigBio website and plan to finish by the end of March.

Identify Gaps in Digitization Areas and Technology

nothing to report

Share and Identify Opportunities to Enhance Training Efforts

See the first entry above regarding the recent Herbarium Digitization workshop.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Nothing to report.

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report.

Other Progress (that doesn't fit into the above categories)

Nothing to report.

Attachment

<https://www.idigbio.org/sites/default/files/webform/tcn-reports/digitization%20numbers.pdf>

Digitizing Institution	Start	Collections	Specimens	Percent Complete				
				Records Created	On Portal	Imaged	Fully Transcribed	Geo-referenced
University of New Hampshire	Year 1	10	131,468	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
New York Botanical Garden	Year 1	5	163,350	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of North Carolina	Year 1	7	74,166	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of Michigan	Year 1	5	91,683	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of Washington	Year 1	3	37,154	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Duke University	Year 1	1	19,000	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of Alaska	Year 1	1	8,300	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Bishop Museum	Year 1	1	78,795	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Field Museum	Year 1	1	37,494	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Oregon State University	Year 1	1	9,000	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of Guam	Year 1	1	13,600	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of California - Berkeley	Year 2	9	228,764	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of Hawaii	Year 2	1	2,000	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Harvard University	Year 2	1	150,000	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Academy of Natural Sciences	Year 3	1	37,000	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of Vermont	Year 3	1	3,500	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Totals		49	1,085,274	527,387	422,658	311,399	222,656	134,935
				<div></div>	<div></div>	<div></div>	<div></div>	<div></div>

SERNEC: THE KEY TO THE CABINETS: BUILDING AND SUSTAINING A RESEARCH DATABASE FOR A GLOBAL BIODIVERSITY HOTSPOT

Report submitted by: michael.denslow@gmail.com
Report Submitted on: 03/10/2015 - 13:43

Progress in Digitization Efforts

All SERNEC:

The primary focus has been on purchasing imaging equipment and barcodes. Some collections have also started on pre-digitization curation. Collections that have already had imaging equipment (e.g., GA) have started imaging.

Arkansas: Barcodes have been purchased for APCR and UARK, and >600 barcodes have been attached at APCR as part of pre-digitization curation activities. All imaging station equipment has been ordered for the APCR and STAR imaging stations.

Florida: FSU is supervising 11 undergraduate student interns who are preparing the FSU specimens for imaging that will occur this summer. This preparation includes barcoding, annotating to the currently accepted names, and marking each folder as "in" or "out" with regards to the SERNEC -TCN project scope. This will enable the imaging technicians to move quickly through the collection. FSU has been corresponding with UCF, UWF, and Selby to schedule the visits of the imaging technicians to those institutions over the summer. UF has also purchased barcodes.

Georgia: All subcontracts have been set up. 6,000 barcodes have been purchased for WGC (University of Western Georgia). The GA Herbarium staff transported WGC specimens to GA for imaging. The GA staff imaged the entire WGC collection (5,009 specimens). GA is now preparing to start imaging the southeastern U.S. specimens at GA herbarium.

Kentucky: All subcontracts have been set up and all institutions are in the process of purchasing imaging station equipment.

South Carolina: All equipment for the imaging stations including barcodes have been purchased. Several potential student workers have been identified and will begin the imaging capture in June.

Virginia: The subcontract with Longwood University (FARM) was finalized and funds dispersed to them. Equipment for all Virginia imaging stations has been ordered.

West Virginia: WVU has been working on getting their subcontract finalized. MU has barcoded several hundred specimens. Two student employees have also been hired. All remaining equipment has been received and an imaging station is now installed.

Share and Identify Best Practices and Standards (including Lessons Learned)

All SERNEC:

In January several TCN representatives attend the iDigBio Workflow workshop in Valdosta, Georgia (<https://www.idigbio.org/content/bringing-herbarium-workflows-date>). This was an opportunity to share best practices and standards across TCNs. Previously published workflows were updated and the SERNEC – TCN is in the process of tailoring these to the specific needs of the project.

The primary focus of updating the workflow documentation at this time is for image station set up, imaging capture, image processing and image archive. These documents are currently in preparation with Project Manager Denslow, PI Gillespie and Appalachian State University Research Assistant Joseph McKenna taking the lead.

A majority of the state leads were able to attend the Valdosta workshop. The discussions were very fruitful. Having representatives of other TCNs at the workshop was of tremendous benefit to the fledgling TCN. The face-to-face meeting was a very effective way to iron out problems and identify bottlenecks. We would advise all new TCNs to include funding for at least one initial organizing meeting that is face-to-face.

Identify Gaps in Digitization Areas and Technology

Nothing to report

Share and Identify Opportunities to Enhance Training Efforts

All SERNEC:

Denslow, Gilbert, Franz, Brown and Murrell have submitted an abstract to hold a Symbiota workshop at SPNHC 2015 in Gainesville. The workshop will focus on herbarium related topics, but is open to all who are interested in using Symbiota software.

Murrell, Denslow, and Mast will attend the planning meeting for WeDigBio at the Smithsonian in March. WeDigBio is planned as a 4-day global transcription blitz in October and annually thereafter. Part of the WeDigBio plan is to share protocols for hosting onsite, half- or full-day transcription parties during the blitz. SERNEC is planning to host 10-20 onsite transcription blitz parties at its institutions during WeDigBio 2015.

Gillespie (Marshall University) is working toward compiling statistics and evidence related to student worker efficiency and training best practices. These data will be presented in talks at ASB and SPNHC during Spring 2015.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

All SERNEC:

Collaboration with the New England Vascular Plant TCN has taken place on issues related to image archiving. The SERNEC – TCN is following a similar process and is learning from the work that the New England Vascular Plant TCN has already done. We are gaining knowledge from the relationship already established between NEVP TCN and iPlant.

Share and Identify Opportunities and Strategies for Sustainability

All SERNEC:

WeDigBio could be part of a long-term strategy to sustain digitization beyond the SERNEC – TCN current funding cycle.

Mississippi: The MSU Herbarium is represented on the MSU Museums and Galleries Committee, which is tasked with increasing

Other Progress (that doesn't fit into the above categories)

All SERNEC:

The Project Manager position was filled in December and Denslow began work in January.

Appalachian State University is making use of a Research Assistant (Joe McKenna) assigned to Murrell to assist with the development of best practices documents for the TCN.

Attachment

Nothing to report.

BI-MONTHLY PROGRESS REPORTS TO IDIGBIO
FROM
THEMATIC COLLECTIONS NETWORKS (TCNs)

MAY 2015

FOSSIL INSECT COLLABORATIVE: A DEEP-TIME APPROACH TO STUDYING DIVERSIFICATION AND RESPONSE TO ENVIRONMENTAL CHANGE

Report submitted by: adrian.carper@gmail.com
Report Submitted on: 03/30/2015 - 14:59

Progress in Digitization Efforts

Since February, the University of Colorado Museum of Natural History (UCB) has taken 975 additional images of XXX specimens. The Harvard University Museum of Comparative Zoology (MCZ) has taken 1900 images accounting for about 1600 specimens from their collection. In addition, MCZ has assigned 180 new catalog numbers to unnumbered fossils found as they imaged their collection. The American Museum of Natural History (AMNH) has entered over 5000 collection objects in amber from three major localities (the Burmese, New Jersey and Baltic deposits) and close to 6,000 new records of fossil arthropods from the Dominican Republic. All of these are now being exported to a customized Specify database hosted on the AMNH server, so that students and volunteers will be able to continue data entry in this format. In addition they have imaged more than 4000 inclusions in amber.

Share and Identify Best Practices and Standards (including Lessons Learned)

The AMNH is sharing the most accurate dates for each amber deposit (based on radiometric dating methods where possible) and georeferenced locality information to help standardize these fields across institutions.

Identify Gaps in Digitization Areas and Technology

It was necessary for AMNH to update Specify to allow associations between collection objects and localities, given that typically, all specimens from individual amber localities share the same geological and geographical information.

Share and Identify Opportunities to Enhance Training Efforts

There is nothing to report.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

MCZ collaborated in the Smithsonian and National Geographic documentary "World's Biggest Beasts." MCZ filmed an interview and other scenes, provided images and videos of *Meganeuropsis americana*, and gave scientific advice on a reconstruction of the fossil. In addition, the Virginia Museum of Natural History (VMNH) collaborated with the American Museum of Natural History (AMNH) in regards to preparing and conserving the VMNH collection of insects in amber.

Share and Identify Opportunities and Strategies for Sustainability

There is nothing to report.

Other Progress (that doesn't fit into the above categories)

The AMNH hosted the 2nd Annual Fossil Insect Collaborative TCN Meeting, during which special presentations and workshops were given on the preparation and conservation of fossil resins and their inclusions, as well as digital photomicrography. We also determined at this meeting to utilize GeoLocate's Collaborative Georeferencing Portal to share geographical information on specific fossil insect localities across institutions.

Attachment

Nothing to report.

SOUTHWEST COLLECTIONS OF ARTHROPODS NETWORK (SCAN): A MODEL FOR COLLECTIONS DIGITIZATION TO PROMOTE TAXONOMIC AND ECOLOGICAL RESEARCH

Report submitted by: neilscobb@gmail.com
Report Submitted on: 04/05/2015 - 13:12

Progress in Digitization Efforts

See Attached

Share and Identify Best Practices and Standards (including Lessons Learned)

See Attached

Identify Gaps in Digitization Areas and Technology

See Attached

Share and Identify Opportunities to Enhance Training Efforts

See Attached

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

See Attached

Share and Identify Opportunities and Strategies for Sustainability

See Attached

Other Progress (that doesn't fit into the above categories)

See Attached

Attachment

https://www.idigbio.org/sites/default/files/webform/tcn-reports/SCAN_March_2015.docx

Southwest Collections of Arthropods Network Update
May 14, 2015
Neil Cobb

Progress in Digitization Efforts:

We are on target to meet our third-year quota for digitizing labels from pinned specimens (736,736 records). **Table 1** presents four sets of statistics derived from our data portal as of March 31, 2015. These include the following data: 1) institutions that are funded by the NSF-ADBC program, including the 2 PEN grants; 2) institutions that have entered data into the SCAN portal but not funded by the NSF-ADBC program; 3) the total of these first two categories; and 4) the total records in the SCAN portal. The fourth column includes records from the first three columns as well as all records we have ingested from aggregators GBIF and iDigBio. The purpose of serving aggregator data is to provide as complete as information as possible to persons that are considering research projects.

Although we have technically reached our goal for the 10 original SCAN museums (735,956 records), we have not thoroughly reviewed all records that SCAN-funded museums have produced to determine how many of those strictly ground-dwelling arthropods, but we expect that 80% or those are target taxa and that we will need 147,000 more records to meet our project goal. Six museums will request one-year no-cost extensions. We estimate that we will digitize

Table 1. Number of specimen records digitized and associated summary statistics. From <http://symbiota4.acis.ufl.edu/scan/portal/index.php>. SCAN-funded numbers refer to the 12 museums receiving ADBC funding. SCAN non-funded numbers include nine museums contributing cataloged specimen data and non-cataloged moth specimen data from 22 collections (5 private collections and 17 public museums). Total Served includes all SCAN data and other datasets with North American arthropod records (e.g., GBIF, Tri-Trophic TCN).

	SCAN funded	SCAN non-funded	TOTAL SCAN	Total Served
# Specimen Records	798,066	179,993	978,059	2,463,522
# Georeferenced	583,925	86,662	670,587	1,878,576
# Identified to species	506,053	83,309	589,362	1,287,089
# Families	747	388	787	894
# Genera	7,611	3,919	9,380	13,917
# Species	17,497	7,997	22,944	41,639
% Georeferenced	73%	48%	69%	76%
% Identified to Species	63%	46%	60%	52%

789,000 ground-dwelling arthropod specimens by the end of the project and over one million total specimens for the original 10 museums. The two additional PEN grants (Harvard and BYU) are on track to meet their quotas.

A subset of SCAN museums are creating high-resolution images and three museums are creating low resolution images that include the specimen and labels in the same image. **Table 2** lists the number of images posted on SCAN by participating museums. Our goal is to produce 15,125 high-resolution images suites. An image suite consists of 1-3 images representing different aspects of a specimen. This will translate into approximately 40,000 images.. Three museums are producing low-resolution images (University of Hawaii, University of Arizona, and Texas Tech University). Texas Tech University has produced about 3,000 high-resolution images as part of their 25,529 images uploaded. We currently have 10,361 high-resolution images (out of 84,135 total SCAN images) and we are serving a total of 121,864 images.

Share and Identify Best Practices and Standards (including Lessons Learned):

We are identifying best practices on a weekly basis and sharing those with respective people within SCAN.

Identify Gaps in Digitization Areas and Technology:

We need to harvest additional data (i.e. beyond SCAN) to better understand the biogeography of arthropod taxa. We are partially meeting this need by incorporating GBIF into the SCAN database.

Share and Identify Opportunities to Enhance Training Efforts: Nothing new to report, we are working on activities already described in previous reports

Share and Identify Collaborations with other TCNs, Institutions, and Organizations:

We are primarily working with Tri-Trophic TCN in order to develop questions for analyzing ADBC data.

Share and Identify Opportunities and Strategies for Sustainability:

We have a sustainability plan for Colorado State University, they are finished using their NSF funding <http://scan1.acis.ufl.edu/content/sustainability> .

Table 2. Number of images posted on SCAN portal from SCAN museums that are focused on producing high-resolution images of specimens. Data are recorded from

<http://symbiota1.acis.ufl.edu/scan/portal/imagelib/photographers.php>

Institution	# Images
Arizona State University Hasbrouck Insect Collection	2,194
C.P. Gillette Museum of Arthropod Diversity	49
Colorado Plateau Museum of Arthropod Biodiversity	1,562
Denver Museum of Nature & Science	625
Museum of Southwestern Biology, Division of Arthropods	193
National Park Collections at Northern Arizona University	673
New Mexico State Collection of Arthropods	1,380
SDSU Terrestrial Arthropods Collection	49
Texas Tech University - Invertebrate Zoology	25,492
University of Arizona Insect Collection	51,281
University of Colorado Museum of Natural History Entomology Collection	636
University of Hawaii Insect Museum	25,529
University of Tennessee at Chattanooga	1
UAM Entomology Collection	2,881
Yale Peabody Museum, Entomology Division	9,319
SCAN Museums (All Images)	84,135
SCAN Museums (High-Resolution Images)	10,361
All Images served on SCAN	121,864

Other Progress (that doesn't fit into the above categories): We continue to provide North American data we have obtained from other sources to increase the quantity of data available to SCAN users. We have grown from 10 collection datasets to serving 28 data sets through SCAN (**Table 3**). These will greatly increase the usability of the existing SCAN data, especially understanding species distributions and more complete species lists. We are re-building our data harvested from North American data from GBIF and are in the process of hosting data from other non-TCN arthropod data sets that have been harvested by iDigBio.

THE MACROFUNGI COLLECTION CONSORTIUM: UNLOCKING A BIODIVERSITY RESOURCE FOR UNDERSTANDING BIOTEC INTERACTIONS, NUTRIENT CYCLING AND HUMAN AFFAIRS

Report submitted by: barbara.thiers@gmail.com
Report Submitted on: 04/29/2015 - 15:39

Progress in Digitization Efforts

Since our last report (February 2015), 27,028 specimen records have been added to the Portal. This represents about 90% of the records actually created during this period. The total number of records available for searching in the MycoPortal stands at 1,830,665, approximately 400,000 more than promised in the original proposal. Sixteen of the participating institutions have completed their digitization work. We estimate that there remain to be digitized about 250,000 images across the 19 institutions still participating institutions.

Share and Identify Best Practices and Standards (including Lessons Learned)

We have summarized our best practices for engaging citizen scientists in the form of a guide for other institutions to use to get started on this activity. This was a joint project between MaCC and LBCC

Identify Gaps in Digitization Areas and Technology

nothing to report

Share and Identify Opportunities to Enhance Training Efforts

1. See above under "Share and Identify Best Practices" above

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

The guide for engaging Citizen Scientists is a collaboration with the Lichens, Bryophytes and Climate Change project.

Share and Identify Opportunities and Strategies for Sustainability

Other Progress (that doesn't fit into the above categories)

Institutions are preparing annual reports for year three of the project, and collaborators who need more time to finish their projects are requesting no-cost extensions.

Attachment

<https://www.idigbio.org/sites/default/files/webform/tcn-reports/Get%20Started%20with%20Crowdsourcing.pdf>

Get Started with Crowdsourcing

Set goals and write a plan.

- What will the volunteers accomplish by the end of the project?
- What duties and responsibilities will be required of volunteers?
- What is the minimum number of hours required of volunteers?
- What forms of compensation will be offered (discounts, networking, events, etc.)?
- Who will have the primary responsibility for the volunteers?

RECRUITMENT



- Designate a staff employee as the Volunteer Coordinator.
- Develop relationships with career or internship centers at colleges and universities.
- Reach out to intern coordinators or career counselors who can inform students and departments of digitization opportunities.
- Post job listings on websites (Indeed, Monster, Volunteer Opportunities NYC).
- Promote your volunteer needs to local employment organizations and youth employment projects (NYC Department of Youth & Community Development).
- Partner with your volunteer services and education department. They can send volunteer applications to you or inform applicants of your digitization needs.

TRAINING



- One of the challenges that employers face is the amount of work that goes into training volunteers. Train your first volunteer(s) then have one of their early tasks be to create a training technique for future volunteers.
- Provide an orientation, including an overview of our mission, a tour, and introductions to the staff.
- Create a standardized presentation and training program.
- Delegate beginning to end projects.
- Volunteers choose a specific genus or geographic region to work on.
- Provide optional training sessions in georeferencing so students can learn the value of GIS analysis.

MANAGEMENT



- Track volunteer progress (# of records transcribed, # specimen labels, # specimen images, # of hours, etc.) in a Google spreadsheet that can be accessed from any computer.
- This will keep track of volunteers who transcribe from home.
- Know what has been done, who did the work, and the outcomes for the overall project.
- Periodically provide feedback to volunteers on their work.

Crowdsourcing Module Management

- The crowdsourcing module is used to make unprocessed records accessible for data entry by the general user who does not have explicit editing rights for a particular collection.
- Short Form -vs- Long Form: In order to simplify data entry, a shortened form is presented to the user with only a select number of fields displayed. A link to the upper right of the form allows the user to toggle between the long and short form.
- Data Protection: Certain data fields are not available for editing by the general user. These fields include catalog number, scientific name, and all fields in the determination and image tabs. However, users with explicit editing rights for a particular collection will have access to all fields and editing tabs.

1. Select records for crowdsourcing

- Skeletal records set under the processing status "Unprocessed" – are submitted to the crowdsourcing module and are available for the queue.

- Note: Records must have images of collector labels in order to be transcribable.

Adding records to the queue:

- Visit the Administration Control Panel for collection.
- Click the "Processing Toolbox" link.
- Click the "Crowdsourcing Module" tab.

Make records available for editing:

- Click the "Add to Queue" link next to "Available to Add".
- Choose Criteria and click "Add to Queue".

2. Transcribing information

Create an account:

- Volunteers must first create an account on the [Bryophyte Portal](#) and login (no additional permissions are required).
- After creating an account, navigate to the [Crowdsource tab](#).
- Access a table of records for a particular collection by clicking the value in the "Open Records" field within the Collection table.
- In table view, click value in "Symbiota ID" field to edit records and view collector labels.

Get started:

- Begin transcription of collector and locality information.
- For General Transcribing instruction, refer to "[Crowd Sourcing: Get Involved](#)" page for the MycoPortal.
- For detailed instructions, see the [Digitization Guidelines](#) for digitizers.
- Keep an eye out for [Exsiccati Titles](#).

3. Reviewing submissions

- Visit the "Crowdsourcing Module" as described above.
- The module separates volunteers and approved editors into two tables. You may individually check records per transcriber or batch edit all records that need approval.
- To batch edit, click the "Review" link that is next to "Pending Approval".

Approve records:

- Set points, add comments, and edit records as desired.
- Click checkbox(s).
- Click "Submit Reviews".
- After submission, points will be allocated to each volunteer and their score will appear on the Crowdsourcing Score Board.
- Reviewed records will be set to the Processing Status "Closed (Reviewed)".

DIGITIZING FOSSILS TO ENABLE NEW SYNTHESIS IN BIOGEOGRAPHY- CREATING A PALEONICHES

Report submitted by: blieber@ku.edu
Report Submitted on: 04/30/2015 - 15:51

Progress in Digitization Efforts

Paleoniches Update, May 2015

Regarding the University of Kansas portion of the project, led by PI Bruce S. Lieberman and co-PI Una Farrell, we now have a total of 178,889 specimens databased. Of these, there are a total of 176,003 specimens databased that have clean, proofed localities. Further, we now have a total of 138,575 specimens that are georeferenced. We have now completed databasing all of the cephalopods we aimed to database. We are almost finished databasing our bivalves and have begun databasing our gastropods. In addition, a total of 8,219 localities have been georeferenced. Thus we have completed the entire georeferencing component of our proposed work. We have also since the last update to iDigBio significantly expanded the number of species that have been imaged, especially focusing on adding nautiloids and other mollusks.

Further, PI's B. Lieberman, J. Hendricks, and co-PI J. Beach have continued to work with the developer of the Paleoniches iPad Atlas "app" (Rod Spears Consulting) and we are getting much closer to completion of this important outreach aspect of the project. The architecture for the app is finished from a programming perspective and all that remains is the ingestion of our data. As of now, the plan is for data ingestion to occur for the Pennsylvanian and Neogene components of the atlas hopefully by mid-May with the Ordovician component to follow a few weeks after that. Thus we are hoping at least for now that the "app" will be made freely available on the "App Store" sometime in mid-June.

Regarding the Ohio University portion of the project, led by PI Alycia Stigall

The Digital Atlas of Ordovician Life is currently up to 173 species pages live. This is over 100 pages more than we had made available this time last year. The Bryozoan pages are currently the primary focus of development efforts, with a few gastropod, bivalve, and echinoderm pages remaining to be made live. The most recent addition to the website are 3D models of fossils that are embedded in the pages. Although we cannot make models for all the species present in the Atlas, we hope to make models for the most common species (trilobites, brachiopods, crinoids). Within the last week, five new students have been trained to work on the website to develop content. It is our sincere hope that all the pages we have will be completed and make live by the end of this year. The newly acquired Stocker Collection, which includes about 30,000 invertebrate specimens, is currently being identified. Georeferencing of species will likely take place later this year/early next year.

Cincinnati Museum Center

Since the beginning of December 2014, the UC student intern on the project, Ian MacAdam, has been focusing on georeferencing Ordovician locality records from the United States. He has worked a total of 245 hours and has georeferenced 1,571 locality records. In total, we now have 4,316 sites georeferenced resulting in 29,253 catalogue records in Emu with georeferencing data. This is 43% of our digital database georeferenced to date.

Miami University

Progress continues with georeferencing as well as relocating specimens due to the renovations currently ongoing at Miami University.

Regarding the San José State University portion of the project, led by PI Jon Hendricks:

Since the last update, PI Hendricks (San José State University; SJSU)—in collaboration with Invertebrate Paleontology staff at the Florida Museum of Natural History—has continued to develop and add content to the Neogene Atlas of Ancient Life. In particular, seven additional families of gastropods have been added since the last updated (distributional maps for these will be published online soon). Species-level pages are now online for 332 species (out of 500 planned pages).

Hendricks is currently recruiting a new undergraduate student assistant to help with the development of content for the Pennsylvanian Atlas. The new student assistant will be hired, trained, and actively generating new web content for the Pennsylvanian Atlas by the time of the next update.

(Also see Jon's activities mentioned above under KU pertaining to the development of the portable device app.)

Finally, for our PEN partners. First, Texas, PI: Ann Molineux, Co-PI: James Sprinkle

They have been continuing their push to add and refine specimen data for collections in the Cambro-Ordovician, Carboniferous, and Paleogene/Neogene. The most recent additions have come for the Johns and Craddock collections (Paleozoic).

Imaging has been continuing and the current attachments in Specify breakdown is as follows:

Of the 3682 attachments, 2923 are attached to Collection Objects, 214 are attached to Localities, 112 are attached to Storage, 420 are attached to Field Notebook pages and 13 are attached to Preparations. This reflects an increase of almost 400 since the last update. However, they have waited until Specify was modified to allow us to bulk upload most of our images, both high resolution and lower resolution specimen with label and drawer imagery. Our new completion date of October 2015 will ensure enough time to get those images attached using a more efficient method and ensure standard, adequate metadata for those media files.

The first dataset has been migrated through VertNet to GBIF and iDigBio. The process was slow and the extension will now enable us to update that dataset with more extensive and higher quality (further refined) data.

The new Paleocentral.org is in beta testing and still buggy, plus needs improvements to the GUI. For example <http://paleocentral-qa.tacc.utexas.edu/specimen/list>, and search for Pleurocystites or Katian gaps are evident, not all images are yet uploaded, and the dataset is not a live connection and lacks the latest refine and georeferencing. But that link and the <http://paleocentral-qa.tacc.utexas.edu/specimen/show/48#prettyPhoto>, are examples of the new capabilities with more robust chronostratigraphy, complete US geological coverage and mapping in Google Earth and modified UTIG PLATES projections. This will be a major area of concentration during the next reporting period.

And at Yale: From PI Susan Butts:

They are working on digitizing the most abundant taxa from the Ordovician and the Pennsylvanian (50 most abundant genera from each time period) and are proceeding to digitize that material from our systematic collection. They have done at least one drawer of the top 50 most abundant Ordovician fossils and 27 of the top 50 Pennsylvanian drawers (3 are in progress). At this rate, they will certainly achieve their digitization goals by the end of their project (June 30, 2015).

Since the previous report, they have modified or inserted 904 records in KE EMu. We have attached photos to 2,464 additional records (1-3 photos per specimen). They have over 500 specimen images (most with three views) awaiting upload to the database.

The EVOLUTIONS (Peabody afterschool program for high school students in the greater New Haven area) multimedia kiosk is expected available in the museum exhibition space by the end of May. The cart was designed and created by EVOLUTIONS interns with the assistance of Senior Personnel Butts and Museum Assistant Utrup. It is a multimedia touch screen cart with actual fossil specimens. It will be attended by SciCORPS cart in the Peabody's public exhibitions area for the duration of the grant (after the grant, other members of SciCORPS (the special group in EVOLUTIONS that involves most of the upperclassmen with 75 hours of EVOLUTIONS training under their belts) will be trained to man the cart as well. SciCORPS students will invite museum visitors to use the kiosk and provide additional guidance as visitors identify 13 common fossils of the Ordovician Cincinnati Arch from actual specimens using a key developed for this project.

Share and Identify Best Practices and Standards (including Lessons Learned)

N/A

Identify Gaps in Digitization Areas and Technology

N/A

Share and Identify Opportunities to Enhance Training Efforts

N/A

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

N/A

Share and Identify Opportunities and Strategies for Sustainability

N/A

Other Progress (that doesn't fit into the above categories)

We have also just had a paper accepted at *Global Ecology and Biogeography* describing research activities associated with the project. In particular, we used Ecological Niche Modeling of the Neogene mollusk collections to look at the relative controls that the Fundamental and Realized niches playing in determining macroevolutionary patterns. This work was led by a former graduate student at KU, Erin Saupe (now a post-doc at Yale), who was supported by our TCN project and also involved Bruce Lieberman (KU), Jonathan Hendricks (SJSU) and Roger Portell (FLMNH).

A manuscript by PI's Hendricks, Stigall, and Lieberman—titled “The Digital Atlas of Ancient Life: delivering information on paleontology and biogeography via the web” was submitted for peer review to *Palaeontologia Electronica* (an open-access online journal) on December 18, 2014. This manuscript provides an overview of our Digital Atlas project and goals for the paleontological community.

Attachment

Nothing to report.

NORTH AMERICAN LICHENS AND BRYOPHYTES: SENSITIVE INDICATORS OF ENVIRONMENTAL QUALITY AND CHANGE

Report submitted by: cgries@wisc.edu
Report Submitted on: 05/01/2015 - 17:31

Progress in Digitization Efforts

As of May 2015, the number for the LBCC are as follows:

Lichens:

<http://lichenportal.org>

Herbaria actively submitting images or key stroked records to the portal: 71

Specimen records in portal: 1,776,338 (up by 53,836 since February 2015)

Specimen records with images: 664,375 (4051 labels have been imaged since February 2015)

Records with locality information: 1,521,436 (122,906 locality information where added since February 2015)

Bryophytes:

<http://bryophyteportal.org>

Herbaria actively submitting images or key stroked records to the portal: 62

Specimen records in portal: 2,092,273 (up by 16,320 since February 2015)

Specimen records with images: 988,122 (35,747 labels have been imaged since February 2015)

Records with locality information: 1,337,129 (73,110 locality information where added since February 2015)

Share and Identify Best Practices and Standards (including Lessons Learned)

nothing to report

Identify Gaps in Digitization Areas and Technology

nothing to report

Share and Identify Opportunities to Enhance Training Efforts

The LBCC volunteer coordinator Mari Roberts has developed a crowdsourcing manual for using Symbiota for lichen and bryophyte label transcription.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Nothing to report.

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report.

Other Progress (that doesn't fit into the above categories)

Nothing to report.

Attachment

Nothing to report.

MOBILIZING NEW ENGLAND VASCULAR PLANT SPECIMEN DATA TO TRACK ENVIRONMENTAL CHANGE

Report submitted by: patrick.sweeney@yale.edu
Report Submitted on: 05/05/2015 - 12:24

Progress in Digitization Efforts

Capture of collection level-information (i.e., "pre-capture") is complete. Approximately 800,000 specimens have been pre-captured -- with at least current identification captured. As part of the primary digitization phase, approximately 349,000 records and 330,000 images have been captured.

Share and Identify Best Practices and Standards (including Lessons Learned)

nothing to report

Identify Gaps in Digitization Areas and Technology

nothing to report

Share and Identify Opportunities to Enhance Training Efforts

nothing to report

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

We continue to collaborate with, iPlant, the FilteredPush project, the Symbiota team, and iDigBio. We are collaborating with Anne Bashram (U. of AZ), iDigBio, and other TCNs to develop a Augmented Reality tool that will be useful in K-12 education. PI Sweeney has been working with iDigBio and other ADBC TCNs to produce a Herbarium workflows paper; this work builds on the Jan 2015 workshop that was hosted by iDigBio and SERNEC. NEVP continues to advise SERNEC on their overall data workflow, particularly aspects related to the flow of data to and from iPlant.

Share and Identify Opportunities and Strategies for Sustainability

nothing to report

Other Progress (that doesn't fit into the above categories)

nothing to report

Attachment

Nothing to report.

GREAT LAKES INVASIVES: DOCUMENTING THE OCCURRENCE THROUGH SPACE AND TIME OF AQUATIC NON-INDIGENOUS FISH, MOLLUSKS, ALGAE, AND PLANTS THREATENING NORTH AMERICA'S GREAT LAKES

Report submitted by: kmcameron@wisc.edu
Report Submitted on: 05/05/2015 - 15:48

Progress in Digitization Efforts

See attached pdf entitled "GLITCN_progress report_May2015"

Share and Identify Best Practices and Standards (including Lessons Learned)

See attached pdf entitled "GLITCN_progress report_May2015"

Identify Gaps in Digitization Areas and Technology

See attached pdf entitled "GLITCN_progress report_May2015"

Share and Identify Opportunities to Enhance Training Efforts

See attached pdf entitled "GLITCN_progress report_May2015"

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

See attached pdf entitled "GLITCN_progress report_May2015"

Share and Identify Opportunities and Strategies for Sustainability

See attached pdf entitled "GLITCN_progress report_May2015"

Other Progress (that doesn't fit into the above categories)

See attached pdf entitled "GLITCN_progress report_May2015"

Attachment

https://www.idigbio.org/sites/default/files/webform/tcn-reports/GLITCN_progress%20report_May2015.pdf

GREAT LAKES INVASIVES TCN – Bi-monthly report Feb 1, 2015 – April 30, 2015

Third GLI TCN report, representing eight months' of effort to date.

Our four regional data processing centers (NY Botanical Garden, Field Museum, Univ of Michigan, and Univ of Wisconsin-Madison) report the following from their constituents:

1) Progress in Digitization Efforts TO DATE -- Visit GreatLakesInvasives.org

PLANTS:

Specimens Barcoded Only: 32,415 (NY) + 18,189 (ILLS) + = **50,604**

Barcoded and Imaged to Date: 58,698 (WIS) + 59,517 (NY) + 6,606 (OSU) + 3,981 (MIN) + 17,891 (MICH) + 520 (ILLS) + 9,402 (F) + 2,309 (MOR) + 4,880 (MU) = **163,804**

Databased to Date: 58,698 (WIS) + 16,275 (NY) + 35,840 (MIN) + 17,742 (MICH) + 27,000 (ILLS) + 15,020 (F) + 12,078 (MOR) = **182,653**

Uploaded to iDigBio, the GLI Portal directly or to another Symbiota Portal for editing before transfer to GLI Portal: 58,698 (WIS) + 13,349 (MICH) + 520 (ILLS) + 5,783 (F) + 4,616 (MIN) + 9,624 (MOR) + 9,804 (ALBC) + 21,452 (NY) + 160 (MSU) + 6,606 (OSU) + 214 (UWM) = **130,826**

- Note that the new 'Consortium of Midwest Herbaria' Symbiota portal, which is directly related to this TCN, now has 782,296 occurrence records available from 21 herbaria. All of these will eventually be ingested by iDigBio. Visit MidwestHerbaria.org

MOLLUSKS:

Barcoded and Imaged to Date: **3,045** lots imaged to date, representing 3 different genera (UMMZ)

Databased to Date: all specimen records (ca. 2,000 - ILLS) + 11,461 records added to date, representing 29 genera and 289 species (UMMZ) = **13,461**

Uploaded to iDigBio, the GLI Portal or another Symbiota Portal: 1,404 (UMMZ) have been uploaded to the GLI portal + all specimen records (ca. 2,000 - ILLS) uploaded to the iDigBio web portal = **3,404**

FISH:

Specimens Barcoded Only: **976** (MIN)

Barcoded and Imaged to Date: 493 (MIN) + 130 (F) + 636 (OSU) = **1,259**

Databased to Date: 27,145 (ILLS) + 1,469 (MIN) + 81,324 specimens [in 4,709 lots (F)] = **109,938**

Uploaded to iDigBio, the GLI Portal &/or another Symbiota Portal: 505 (MIN) + 636 (OSU) to GLI + all specimen records (27,145 - ILLS) uploaded to the iDigBio web portal = **28,286**

2) Share and Identify Best Practices and Standards / Lessons Learned

Some participants report that they have discovered a lot of issues with their Specify database, and are fixing these before photographing specimens; this will soon determine the final imaging rate at which they can move forward with animal digitization. “We have discovered a lot of old specimens sitting on the shelf which were never entered into our electronic database, a function of the history of the collection.”

A squeeze tank, long used by ichthyologists to photograph specimens in the field, works well for specimens up to 10cm in length and a student worker can photograph 60 specimens in three hours. We have not tried to photograph larger specimens or eccentrically shaped fishes such as catfish.

Another institution states that “we find that our photography of fish specimens works best when the specimens are submerged in ethanol in a glass pan that is suspended approximately one foot above the stage of a camera stand illuminated by two fluorescent lamps. The stage is matte black. This setup allows for the fish to be in focus while the background is somewhat blurred. The digitization process is smoothest when two students are working simultaneously; one student prepares the specimens and labels for imaging while the other operates the camera, scans the barcode, enters label information, and checks the quality of the photograph.”

A herbarium partner shares “We write an “I” by the barcode to indicate that specimen has been imaged. This way we will know in the future what specimens have images and which ones aren’t as new herbarium specimens get added to folders that have already been imaged.”

Likewise some are using an inexpensive red ink stamp “imaged” to mark sheets that have been photographed for one project or another.

3) Identify Gaps in Digitization Areas and Technology

The lack of a single protocol for fish imaging has been a source of frustration for some. Likewise the inconsistent use of disuse of barcodes to serve as GUIDs has been a source of great debate among the zoologists in our TCN.

One partner shares that . . . “Digitization of alcohol preserved specimens will always be slow due to the handling time involved. We will never achieve the levels of throughput that botanical collections can generate. The utility of barcodes in alcohol preserved collections is debatable and several groups in our TCN have not elected to use them as their lots already have unique identifiers; we have elected to use them in the Bell Collections as the barcodes can be generated within SPECIFY from our catalog numbers. Thus the barcodes do not add an additional number to track and with the work flow we have developed, serve a useful tool in matching the specimen data to the photograph.”

4) Share and Identify Opportunities to Enhance Training Efforts

Nothing to report

5) Share and Identify Collaborations with other TCNs, Institutions, and Organizations –

Nothing to report

6) Share and Identify Opportunities and Strategies for Sustainability

Nothing to report

7) Other Progress (that doesn't fit into the above categories)

Larger institutions such as NY and F are establishing IPT methods to upload data directly to iDigBio or to other repositories. For example, Field reports that "Botany will soon be able to publish its own KE EMu data --and images-- to GBIF. Once there, the data can be captured using the correct project code or name as a filter, and then it can then be posted to the Great Lakes TCN." A revised and reversed workflow (i.e., from iDigBio back to the TCN portal) will need to be considered in order to capture all relevant data in developing the Great Lakes Invasives portal as a focused tool for invasive species biologists.

Submitted by Ken Cameron, May 5, 2015

INVERTEBASE: REACHING BACK TO SEE THE FUTURE: SPECIES-RICH INVERTEBRATE FAUNAS DOCUMENT CAUSES AND CONSEQUENCES OF BIODIVERSITY SHIFTS

Report submitted by: eshea@delmnh.org
Report Submitted on: 05/05/2015 - 16:22

Progress in Digitization Efforts

Field: Insect Digitization: completed digitization of insect orders (pinned): Odonata – 3277; Blattodea – 1280; Mantodea – 296. Wet specimens: Trichoptera – 286; trained prospective summer intern, Trichoptera will be completed during summer 2015. Currently ongoing: digitization of all Nearctic Apidae (Hymenoptera). Next anticipated steps: batch uploading of digitized data into FMNH EMU database; continued development of Symbiota portal. Ongoing: digitization of pinned Nearctic Apidae. Invertebrates: full time digitizer hired March 2. Dr. S. Clark (land and fresh water mollusks specialist) is preparing the North American taxonomic authority file for fresh water and land mollusks.

Cleveland: Mantodea from the Smithsonian Collection continue to be digitized using the two-step xBio:D database developed by Ohio State University. To date over 1000 specimens have been digitized by the 3 work study students from Case Western Reserve University and is currently ongoing. Our new thermal printer is up and running and we have designed and printed 2D barcodes for digitization of the CMNH Entomology collection. Efforts have begun to digitize the Hymenoptera. .

Auburn: nothing to report.

Michigan: nothing to report due.

Delaware: Freshwater unionid bivalves: we have updated taxonomy in accordance with the MusselP website and filled in geography. Agent field housekeeping has resulted in the discovery of full first and last names for: 108 of 116 donors (93%); 19 of 25 identifiers (76%), and 10 of 18 catalogers (55%). Many of these were previously entered as initials only. We resolved 3,395 collectors to 409 unique collectors. We are currently mapping fields from MOLCOL to match the highly resolved Specify schema. We also have a new volunteer who arrived with an interest in freshwater bivalves and photography. We have identified and initiated hiring of a summer short-term temporary undergraduate student as an "Inventory Specialist".

Frost: The collection of lice mounted on slides was imaged using a flatbed scanner, with the resulting ~900 images (of approximately 15,000 specimens) sent to Matt Yoder (Speciesfile Group, University of Illinois) for parsing. More than 13,000 Odonata specimens and lots were images, using a standard template. The first batch of Odonata images (n=10,000) were sent to Matt Yoder for parsing. We continue to work on the imaging of odonates in the collection, with particular focus on taxa organization in preparation for new cabinets (arriving mid-June). And we've moved towards imaging pollinators, which are mostly on pins. A template has been established, and several hundred bees have been imaged. The team is mulling over refinements, e.g., how we can make the workflow more efficient and the images higher quality, before progressing further with pinned insects.

Share and Identify Best Practices and Standards (including Lessons Learned)

Field: produced batch of notched forceps to manipulate pinned labels, ready to distribute forceps to collaborating institutions and others. Developed racks for organizing and holding ethanol vials and dry vials for easy data entry, current experiments with Dragon Naturally Speaking for data entry underway in Invertebrates and Insects. Pinned Insect Lego manipulator is currently being built.

Cleveland: Developed mount for USB microscope camera used in association with chromebooks.

Auburn: nothing to report

Michigan: nothing to report

Delaware: nothing to report

Frost: We have published a manual that describes our Odonata-in-envelopes imaging process. This manual is available for anyone to use (under a CC BY license) - <http://scholarsphere.psu.edu/files/x346dt992> - and will be updated soon to include post-imaging processing.

Identify Gaps in Digitization Areas and Technology

Field: workflow currently under comparison: data entry directly from labels on pinned specimens vs. generating label images with data entry from label images.

Cleveland: nothing to report

Auburn: nothing to report

Michigan: nothing to report

Delaware: nothing to report

Frost: Our primary gap is manpower. We addressed this by hiring Emily Sandall full time and adding an hourly worker. We're also advertising for two more hourly data entry positions.

Share and Identify Opportunities to Enhance Training Efforts

Field: first experiments with high school intern conducted in preparation for summer internship period employing high school and undergraduate interns in various Insect digitization efforts

Cleveland: nothing to report

Auburn: nothing to report

Michigan: nothing to report

Delaware: nothing to report

Frost: We published our odonata imaging manual and have recruited a new person in to the project (Carlie Harding). She is being trained in digitization and is helping us with our training materials.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Field: PI Sierwald collaborating with Neil Cobb, Northern Arizona University Flagstaff, for further development of taxonomic authority files. Focus: produce authority files in a timely fashion and enhance sharing protocol, timely updates are a the next problem to solve.

Cleveland: nothing to report

Auburn: nothing to report

Michigan: nothing to report

Delaware: Visited the Academy of Natural Sciences in Philadelphia and learned about how Dragon Naturally Speaking is integrated into their ongoing collection inventory.

Frost: We continue to collaborate with the InvertNet TCN at the University of Illinois. By using their slide imaging protocol, we expect to be able to seamlessly add our images to their database in the next few months. We also have strengthened our collaboration with the Speciesfile Group at the University of Illinois (primarily through Matt Yoder). They are developing an image parser that will facilitate future efforts to transcribe label data.

Share and Identify Opportunities and Strategies for Sustainability

Field: nothing to report

Cleveland: nothing to report

Auburn: nothing to report

Michigan: nothing to report

Delaware: nothing to report.

Frost: We are posting our standard operating procedures to robust repositories, primarily Penn State's Scholarsphere (<https://scholarsphere.psu.edu/>) but also soon FigShare (<http://figshare.com/>). Our strategy to sustain access to our specimen data is to disseminate them broadly.

Other Progress (that doesn't fit into the above categories)

Field: Establishing protocol for monitoring various collection improvements caused or initiated during digitization: e.g., (among others) report on specimen quality, evaluating data quality, specimen rehousing, re-labeling, recognition of types. Invertebrates: co-PI Bieler to Cleveland Museum of Natural History for assessment of Cleveland Museum Mollusk Collection: digitization priorities, historic and research quality, alternate deposition of specimens.

Cleveland: Visited by FMNH as above, also discussed current digitization workflow, tools and potential solutions for digitizing enveloped specimens.

Auburn: nothing to report

Michigan: nothing to report

Delaware: Discussed InvertEBase with Board of Trustees and staff during DMNH's ongoing Strategic Planning activities. Preparing a Board presentation for June that describes how the grant has improved our collection and provided new opportunities for partnerships.

Frost: nothing to report

Attachment

Nothing to report.

INVERTNET: AN INTEGRATIVE PLATFORM FOR RESEARCH ON ENVIRONMENTAL CHANGE, SPECIES DISCOVERY AND IDENTIFICATION

Report submitted by: chdietri@illinois.edu
Report Submitted on: 05/06/2015 - 09:06

Progress in Digitization Efforts

Drawer digitizing robots at all collaborating institutions have been upgraded with new camera head parts that improve stability and image quality. Most collaborators are now digitizing drawers. Removeable hard drives containing drawer images have been received from 8 collaborators and are being uploaded into the InvertNet cyberinfrastructure/storage system. 50 drawers are now viewable on invertnet.org. The InvertNet technical team continues to provide support to collaborators by fixing software bugs and addressing hardware problems. We anticipate that most drawer images will have been captured by the original project end date of June 30, although we have been granted a 1-year no-cost extension. Work on incorporating a crowd-sourcing application into the cyberinfrastructure to facilitate transcription of label data from pinned specimens is ongoing.

Share and Identify Best Practices and Standards (including Lessons Learned)

Nothing to report.

Identify Gaps in Digitization Areas and Technology

Nothing to report.

Share and Identify Opportunities to Enhance Training Efforts

Nothing to report.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Nothing to report.

Share and Identify Opportunities and Strategies for Sustainability

Because we are nearing the end of life of the funded project, we are in the process of transferring responsibilities for maintenance of InvertNet cyberinfrastructure to IT personnel at the Illinois Natural History Survey. These personnel are now working with the InvertNet technical team to receive training and will assume responsibility for maintenance of the CMS and backup systems within the next month.

Other Progress (that doesn't fit into the above categories)

Nothing to report.

Attachment

Nothing to report.

PLANTS, HERBIVORES AND PARASITOIDS: A MODEL SYSTEM FOR THE STUDY OF TRI-TROPHIC ASSOCIATIONS

Report submitted by: moon@begoniasociety.org
Report Submitted on: 05/06/2015 - 09:17

Progress in Digitization Efforts

Botanical Numbers:

Partners have completed 140,466 records over the course of the project.

Of these completed, 17,151 were transcribed by volunteers at NYBG.

Total Symbiota complete records = 1,253,054

Total Symbiota skeletal records = 360,206

Total Images uploaded to iDigBio = 489,628

Total Images uploaded to DiscoverLife = 168,992

Total images received at NY to Date = 839,780

Entomological Numbers:

1,081,934 transcribed insect records, 53% georeferenced

Share and Identify Best Practices and Standards (including Lessons Learned)

Nothing new to report.

Identify Gaps in Digitization Areas and Technology

Ability to model and share associations between taxa.

Share and Identify Opportunities to Enhance Training Efforts

Botanical partners (under Mari Roberts) have developed a robust volunteer label transcription effort.

10 part-time volunteers, each of them come in once a week for a half-day or work from home.

Events:

March 19th - Attended the St. John's University Non-profit Career Fair to recruit students for the summer.

March 25th and April 1st - 2-day Georeferencing Workshop for Volunteers. One veteran volunteer, Dr. Maura Flannery, will be batch georeferencing specimens and transcribing records over the summer.

June 9th - Goldman Sachs Volunteer Event scheduled. 8 employee volunteers will attend a one-day digitization workshop.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

TTD-TCN has worked with the Collaborative databasing of North American bee collections within a global informatics network project to share 367,977 Apidae records with iDigBio

All TTD data and bee data are now shared with EOL through Globi portal. An example search of the Globi portal

(<http://www.globalbioticinteractions.org/#sourceTaxon=Ufens&interactionType=interactsWith&accordingTo=amnh.org>)

Through Globi EOL Traitbank will have access to TTD data.

Share and Identify Opportunities and Strategies for Sustainability

Katja Seltmann, Deb Paul, and others organized a very successful Field to Database workshop. The demand for this workshop and others in the series is very high. Workshops of this type could be offered for a small fee.

Other Progress (that doesn't fit into the above categories)

Nothing to report.

Attachment

Nothing to report.

SERNEC: THE KEY TO THE CABINETS: BUILDING AND SUSTAINING A RESEARCH DATABASE FOR A GLOBAL BIODIVERSITY HOTSPOT

Report submitted by: michael.denslow@gmail.com
Report Submitted on: 05/06/2015 - 16:35

Progress in Digitization Efforts

All SERNEC:

The SERNEC portal (<http://sernecportal.org/>) currently has 22 TCN institutions hosted. The portal now hosts 444,975 specimen records.

The SERNEC - TCN developed a new tool that allows users to create skeletal records in Symbiota for newly generated images. There are currently 139,835 skeletal records in the SERNEC portal.

Georgia:

GA has imaged 9,405 specimens to date. Richard Carter (VSC), Steven Hughes (GA) and Wendy Zomlefer (GA) met with Kevin Burgess and Julie Ballenger (COLG) in February to discuss the imaging of COLG. The imaging will be completed by VSC. A second follow up meeting was held at the Association of Southeast Biologist conference in Chattanooga, Tennessee to finalize plans for COLG imaging. Alan Harvey (GAS) has begun the process of ordering imaging equipment. GAS will also image AASU.

North Carolina:

NCU is working on converting their local Specify database from version 5.2.3 to Specify 7 so that the 140,000+ records can be loaded more easily into the SERNEC portal. Michael Lee (NCU) and Theresa Miller (Specify) are actively working on this task. This process will also facilitate the repatriation of data to the local NCU database in future years of the project.

NCU currently has 42 specimens (20 with images) in the SERNEC portal. Shanna Oberreiter (NCU) is concentrating on loading Type specimens at this time.

A new intern named Billy Marinello will act as the Felton Herbarium Intern for this summer at NCU. He has previously been working as an imaging technician on another TCN, which should greatly facilitate his work on the SERNEC - TCN. He is scheduled to begin his Internship on May 11.

South Carolina:

All needed equipment has been purchased and received. In addition, specimen barcodes have been purchased and received. Work has begun on hiring students to work at FUGR and USCH. One prospective student has already been identified to work at CLEMS.

Virginia:

Four undergraduate student workers have been selected at GMUF for part-time summer imaging. Their start dates are tentative pending final delivery of imaging equipment that is on order. All barcodes have been delivered and are being dispersed to partner herbaria in South Carolina.

Share and Identify Best Practices and Standards (including Lessons Learned)

All SERNEC:

We have completed several pieces of documentation for the project. These are currently shared publicly here: <http://bit.ly/1aOhFow> for anyone to access. These documents include the equipment list for the project, as well as protocols for barcoding, image archive, image processing, image capture, image station set up and skeletal data entry. We continue to refine and edit these documents as they get utilized by our partner institutions.

The image archive protocol utilizes iPlant's Discovery Environment for a safe and secure centralized archive of specimen images for the project.

The Symbiota skeleton record interface that was developed for the SERNEC - TCN can also be leveraged by anyone using Symbiota. This new tool was recently announced on the Symbiota list serve and we anticipate that it will prove useful to other projects.

Georgia:

Steven Hughes and Wendy Zomlefer (GA) have designed laminated hangtags to number cabinet shelves for imaging, facilitating movement of whole shelves of specimens from their home cabinet and their return to the cabinet after imaging.

North Carolina:

An NCU volunteer named James Fickle is constructing a custom "mobile herbarium case" which will assist with predigitization curation.

Virginia:

GMUF advertised for student imaging positions within the Biology Department combined with a SurveyMonkey application. This process made finding and selecting workers very efficient.

Identify Gaps in Digitization Areas and Technology

Nothing to report

Share and Identify Opportunities to Enhance Training Efforts

All SERNEC:

To complement our written documentation we are also hosting webinars, in person training sessions and video tutorials. We are making a concerted effort to distribute this information and invite other interested parties outside of the SERNEC – TCN.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

All SERNEC:

We have regular correspondence with iDigBio staff and other TCNs, especially the New England Vascular Plant and Tri-trophic TCNs. These resources have been invaluable to helping the SERNEC – TCN progress in year 1.

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report

Other Progress (that doesn't fit into the above categories)

Nothing to report

Attachment

Nothing to report.

THE MACROALGAL HERBARIUM CONSORTIUM: ACCESSING 150 YEARS OF SPECIMEN DATA TO UNDERSTAND CHANGES IN THE MARINE/AQUATIC ENVIRONMENT

Report submitted by: Chris.neefus@unh.edu
Report Submitted on: 05/07/2015 - 16:34

Progress in Digitization Efforts

See attached file

Share and Identify Best Practices and Standards (including Lessons Learned)

nothing to report

Identify Gaps in Digitization Areas and Technology

nothing to report

Share and Identify Opportunities to Enhance Training Efforts

nothing to report

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Presented overview of the project and portal demonstration at the Northeast Algal Symposium

Share and Identify Opportunities and Strategies for Sustainability

nothing to report

Other Progress (that doesn't fit into the above categories)

nothing to report

Attachment

<https://www.idigbio.org/sites/default/files/webform/tcn-reports/digitization%20numbers%205-7-2015.pdf>

Digitizing Institution	Start	Collections	Specimens	Percent Complete				
				Records Created	On Portal	Imaged	Transcribed	Geo-referenced
University of New Hampshire	Year 1	10	134,819	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
New York Botanical Garden	Year 1	5	163,350	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of North Carolina	Year 1	7	74,733	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of Michigan	Year 1	5	91,683	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of Washington	Year 1	3	37,154	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Duke University	Year 1	1	19,000	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of Alaska	Year 1	1	8,300	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Bishop Museum	Year 1	1	78,795	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Field Museum	Year 1	1	38,320	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Oregon State University	Year 1	1	9,000	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of Guam	Year 1	1	13,600	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of California - Berkeley	Year 2	9	228,850	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of Hawaii	Year 2	1	2,000	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Harvard University	Year 2	1	150,000	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Academy of Natural Sciences	Year 3	1	37,000	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
University of Vermont	Year 3	1	3,500	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Totals		49	1,090,104	585,036	500,403	375,267	285,610	187,722
				<div></div>	<div></div>	<div></div>	<div></div>	<div></div>

DEVELOPING A CENTRALIZED DIGITAL ARCHIVE OF VOUCHERED ANIMAL COMMUNICATION SIGNALS

Report submitted by: msw244@cornell.edu
Report Submitted on: 05/13/2015 - 15:26

Progress in Digitization Efforts

Our TCN project has now digitized audio recordings from several different TCN partners, with 1,472 recordings archived during this reporting period. These recordings ("media specimens") are now available through, and playable at, the Macaulay Library website (MacaulayLibrary.org), and data are being pushed to iDigBio and VertNet. The list below details the major bodies of material digitized during the latest reporting period:

Anurans: We have continued prioritization of digitizing anuran recordings associated with specimens from several TCN partners. Principal among these are 600+ digitized recordings associated with specimens at the Smithsonian Institution, including material from recordists Cocroft (350), Heyer (136), and Rand (137). This brings the total number of digitized Smithsonian recordings to nearly 1,000. We have also initiated digitization of recordings associated with specimens at the Texas Natural History Collections: 333 recordings archived, all from open reel tapes from the 1950s! This recordings join the now-completed digitized collection of anuran recordings from famed herpetologist William Duellman: 1,334 total archived recordings, with 957 associated physical specimens.

Orthopterans: We have continued digitization work on the David Weissman orthopteran collection: 400+ recordings archived Feb-Apr 2015, bringing total archived recordings to 950.

Birds: We have also continued digitization work on the LSU bird collection by archiving 84 recordings from collector/recordist Dan Lane. Dan is now using our newly developed data entry tool, which should increase the efficiency with which his recordings can be digitized and archived.

Share and Identify Best Practices and Standards (including Lessons Learned)

The Macaulay Library uses an audio archival standard of 96kHz 24-bit, the audio standard recommended by Sound Directions: Best Practices for Audio Preservation <<http://www.dlib.indiana.edu/projects/sounddirections/papersPresent/index.shtml>> and a standard adopted by leading audio archival institutions such as the Library of Congress and The British Library.

Identify Gaps in Digitization Areas and Technology

There are no accepted standards for the preservation and subsequent presentation of electric organ discharges produced by e-fish. During the past year, Macaulay Library audio archival staff worked with staff at CUMV to develop archival and web-proxy presentation protocols in collaboration with e-fish researchers that will serve as a model formats for EODs.

Share and Identify Opportunities to Enhance Training Efforts

Personnel from this TCN project visited partner institutions and participated in meetings/summits to facilitate the work undertaken and for exchange of information. In particular, Matthew Medler (Cornell), Rafe Brown (Kansas Univ) and Robin Abraham (also KU) participated in the iDigBio summit in late October 2014.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

In May our TCN organized and hosted a major workshop and meeting on digitization of vertebrate specimens, co-organized and supported by iDigBio. This workshop was a major success, with participation by over 70 researchers/staff from museums and other institutions from across the country. Key foci and themes from the workshop included digital media (audio and video recordings associated with specimens, etc), CT and microCT scans of specimens, and resources/strategies to support digitization efforts at smaller institutions. The workshop also included tours of the Cornell Museum of Vertebrates, tours of state-of-the-art facilities for bio-imaging and digital biodiversity media, and field workshops on collecting biodiversity media. Additional details can be found in the workshop reports.

Share and Identify Opportunities and Strategies for Sustainability

National-level reporting of iDigBio achievements, heretofore resources now available to the public.

Other Progress (that doesn't fit into the above categories)

Nothing to report.

Attachment

Nothing to report.

2014 Report of the iDigBio External Advisory Board

2014 iDigBio External Advisory Board (EAB) membership:

- Linda Ford, Harvard University
- Donald Hobern, Global Biodiversity Information Facility
- Paul Kimberly, National Museum of Natural History
- Mary Klein, NatureServe
- Vince Smith, Natural History Museum, London
- Barbara Thiers, New York Botanical Garden

During the iDigBio Summit IV in Gainesville, Florida, 27-28 October 2014, the EAB reviewed progress and directions within iDigBio. This review included the following:

- Attendance by five members of the EAB (all excluding Vince Smith) in plenary and working group sessions of the Summit
- Discussion of all EAB members (Vince Smith by telephone) with iDigBio PIs and staff and NSF Observers, 27 October 2014 (minutes included as *Attachment 1*)
- Closed discussion by all EAB members, 27 October 2014
- Closed discussion by five EAB members (all excluding Vince Smith), 28 October 2014

Progress with iDigBio implementation

- EAB members commend iDigBio for progress during the first phase of the project, and in particular during the past year
- iDigBio workshops, working groups and digitization resources are providing significant leadership and coordination for mobilization and use of US natural history collections
- iDigBio has made significant progress in integrating species occurrence data and multimedia resources through the iDigBio portal
- Updates from TCNs during the Summit showed that the TCN model is serving to foster an exciting range of active and expanding communities with interesting and valuable research focus
- TCNs are successfully mobilizing and organizing significant rich specimen-based datasets with many additional properties beyond those accessible through the iDigBio portal

EAB Recommendations

The EAB makes the following recommendations for future development and sustainability of iDigBio. We indicate whether iDigBio should address each matter as a priority in the short term (within 3 years) or as part of a long-term strategy for growth and sustainability (within 10 years).

Vision and strategy

Short term recommendations (within 3 years)

- iDigBio must clarify its unique niche within biodiversity research, biodiversity informatics and research infrastructure. The EAB strongly urges iDigBio to undertake a stakeholder analysis, in particular to address the following questions:
 - Which communities have a need for specimen data mobilized through iDigBio?
 - Which of these communities should be served directly through iDigBio tools and which can be served via other intermediaries (which should themselves be identified as key consumers of iDigBio products)?
 - In what form do these communities require data to be delivered (raw data from collections; normalized curated views; summary metrics and indicators; infographics; geospatial products; etc.)?
 - Which other stakeholders might serve as alternative or complementary channels for use of data from iDigBio?
 - How should the mission of iDigBio relate to these other stakeholders and how should unnecessary duplication and competition be avoided?
 - What are the responsibilities, tools and services which are part of iDigBio's core mission (and which only iDigBio is positioned to deliver)?
 - What secondary areas should iDigBio address to maximize the effectiveness of its delivery in core areas?
 - How does iDigBio build partnerships to avoid gaining responsibility to maintain an unsustainable number of products and services?
- iDigBio should in particular urgently clarify its role and responsibilities in relation to BISON. Is BISON a customer, key partner, or channel? The current division of responsibility appears to be based on a division between federal and non-federal data sources and on iDigBio mobilizing globally relevant content rather than purely addressing national perspectives. Present plans seem to allow for significant duplication in effort, particularly around the presentation of data for spatial planning and conservation, and a need for bidirectional data exchange to ensure data completeness. A key use of specimen data is to support spatial planning and conservation, and iDigBio certainly needs to demonstrate the value of its data delivery in supporting these requirements. However, iDigBio could rely on BISON or other channels to deliver appropriate tools (including integration of relevant non-collection data, which needs to happen but which seems to be outside iDigBio's mission) and could itself focus on high-value data management for rich integrated collection data (see more below). The EAB encourages iDigBio to distinguish between the value of its work for a particular application and the degree to which iDigBio itself needs to own delivery for the application.
- iDigBio must also urgently clarify how it will work with GBIF. The EAB believes that synergies and expected linkages between iDigBio and GBIF are clear, but note that several Summit attendees raised questions on the relationship and particularly on whether data resources

needed to be separately registered with iDigBio and GBIF. It is important to clarify data pathways and collaborative opportunities with GBIF. Similar clarification may also be needed between iDigBio and other data integration networks such as VertNet and the Encyclopedia of Life.

- In general, the EAB emphasizes that there should not be a radical departure from the current focus areas for iDigBio. Significant effort is still required in the following areas:
 - Changing the culture of institutions so that digitization becomes a normal routine element within everyday collections activities.
 - Engaging with ALL US natural history collections including the Smithsonian as partners in mobilizing specimen data.
 - Developing and promoting best practices for collection digitization.
 - Providing training and support for collections staff in digitization and data management procedures.
 - Adopting and promoting data standards to enable collection managers and taxonomists to standardize rich and consistent content for each taxonomic group (extensions to Darwin Core properties, standardization of vocabularies, mobilization of multimedia, sequences, morphometric data, taxon interaction data, etc.).
 - Providing rich integration of all data from existing and future TCNs and from taxonomic or regional networks.
 - Providing tools and best practices for rapid establishment of new TCNs and other networks.
 - Developing robust long-term repositories and research infrastructure tools for preservation, curation, enhancement and use of iDigBio data.
 - Contributing to the development of a research culture based on citation and recognition for contribution of open data.
- Consequently, the EAB urges caution around expansion of iDigBio effort into new areas. Linkages with education, conservation, citizen science and other user communities may increase impact and enhance understanding of needs. This may in turn lead to greater sustainability. However, as far as possible, iDigBio should ensure that partners with responsibilities in these areas assume responsibility for development and delivery of any resulting products.
- In regard to digitization through TCNs, the EAB is concerned that priority may have been given to lowest-cost solutions rather than to ensuring that digitization efforts are not only efficient and cost-effective but also capture sufficient data elements and multimedia to support user needs. It is important for iDigBio to understand and respond to the actual data needs of expected users and this should be taken into account when planning any ADBC digitization. Consideration should also be given to likely future costs if the same specimens require further digitization work at a later date. The EAB recognizes that iDigBio does not have responsibility for TCN funding decisions, but believes that iDigBio can influence this by continuing to define best practice for specimen digitization for different taxa, by contributing to standards definition for

taxon-specific data elements and by integrating all data elements from TCNs through a single portal.

- It should be possible to explore relationships between specimens of host plants, herbivorous insects and their parasitoids within the iDigBio portal. The portal should expose a rich graph of interconnected data elements - specimens, sequences, trees, etc. A focus on rich data integration, rather than simply on data management to address TCN research needs, will highlight the opportunity for iDigBio to develop as a virtual natural history collection supporting modern taxonomy.
- iDigBio should work with NSF to require funded collections to share relevant data through iDigBio, and to work with TCN PIs on digitization compliance issues.
- Limited guidance was supplied to EAB members on their roles and responsibilities. For next year's Summit, the EAB should be provided with a robust agenda and necessary documents ahead of time.

Long term recommendations (within 10 years)

- There needs to be a gradual shift towards establishing an achievable sustainability strategy - especially with an eye towards long-term data management, training and facilitation of the community of practice. This will only be achievable if iDigBio has a well-defined and unique niche. The EAB emphasizes the importance of developing sustainable funding and governance models at the earliest possible opportunity.
- ADBC lacks a component with an explicit responsibility to coordinate taxonomic expertise from throughout the collections network. iDigBio has responsibility only for content integration. The sustainability and quality of these data will depend on continued and deepening engagement with collection managers and taxonomists to use iDigBio services and to correct, update and enrich data. This implies the need for iDigBio to consider expanding its vision to becoming an expert community network as well as a content network, probably in collaboration with one or more professional societies. A network combining content and expertise would be well positioned to provide high quality syntheses of knowledge and would therefore be likely to address more of the needs of users of biodiversity information.

Attachment 1 – Minutes from EAB meeting, 27 October 2014

Meeting Date/Time: October 27, 2014 / 4:15-5:30 PM EDT with an EAB-only session from 5:30-6:15 PM EDT

Attendees:

- **External Advisory Board:** Vince Smith, Donald Hobern, Paul Kimberly, Barbara Thiers, Linda Ford, Mary Klein
- **iDigBio PIs:** Larry Page, Bruce MacFadden, José Fortes, Greg Riccardi, Pam Soltis
- **iDigBio Staff:** David Jennings, Shari Ellis, Austin Mast
- **NSF Observers:** Roland Roberts, Judy Skog

Adobe Connect Recording: <http://idigbio.adobeconnect.com/p95crp8ve76/>

Action Items

- (David Jennings) Provide the EAB with copies of iDigBio's Cooperative Agreement and FY3 Annual Report including copies of the annual evaluation and last year's EAB report. *[Completed on 10/28/2014]*

Meeting Minutes

Role of the External Advisory Board

"External Advisory Board (EAB) whose membership will be subject to the approval of NSF's cognizant program official and will meet at least once a year; provide written and verbal advice to the national resource on its activities, including progress and integration of digitization projects, research, education and outreach activities among all funded institutions; advise the national resource leadership on strategic directions and management policies."

iDigBio Progress Report

An overview of iDigBio's progress by staff was not provided during the EAB meeting. The meeting occurred during iDigBio's Summit IV where everyone heard about iDigBio's activities through presentations, posters, and demonstrations. iDigBio feels that having the EAB meeting at the Summit is an effective way to communicate its activities and collaborations.

iDigBio intends to continue conducting EAB meetings annually at the Summit unless the EAB objects. No objections were raised.

EAB Report

iDigBio reminded EAB that the EAB report is due to NSF within 21 days of the meeting. The EAB agreed, which precipitated an EAB-only session at the end of the meeting.

Specific advice from the EAB to iDigBio

iDigBio is in year four of the original 5-year grant and will be submitting a proposal for renewal next year.

iDigBio is particularly interested in what activities the EAB thinks iDigBio should pursue in the renewal years 6-10.

Questions & Responses

Is iDigBio planning to stay the course, or does iDigBio have more than one phase in mind for the project?

- Phase one (years 1-5) has been focused on data mobilization.
- Phase two (years 6-10) will transition to a focus on data uses in education and research.
 - iDigBio envisions that the next few years will be push-and-pull with the collections community.
 - iDigBio now has enough data in the portal to identify research applications, but iDigBio expects this to result in some push back from the community to improve and expand the data.
 - iDigBio will attempt to pull more (and better quality) data from the collections community.
 - iDigBio will need to provide data and training for research and actively promote research.
 - Ultimately, iDigBio's goal should be to address higher-level questions with collection data.
 - iDigBio wants to develop research capacity outside its current network and collaborate with other groups.
- Other foci mentioned:
 - Sustainability
 - Continue connecting the collections community through workshops and other events ("social sustainability").
 - Getting data for the portal from other sources (including international).
 - Education and Outreach
 - K-12 and undergraduate education
 - Increasing public participation
 - Examples given included fossil clubs and hackathons (CitScribe and CitStitch).

Would focusing on research mean less focus on digitization?

- Years 6-10 will still contain workshops and support for digitization training because there is still need in the collections community for digitization support.
- As TCN projects mature, iDigBio will move towards data uses and providing training and support for research and education.

What are iDigBio's plans for participation in K-12 and undergraduate education?

- iDigBio would like for years 6-10 to have a K-12 outreach component.
 - iDigBio wants digitization to become a household term.
 - New science standards make iDigBio's topics easier to integrate into K-12 curricula.

- iDigBio is in the process of hiring an Education & Outreach Coordinator to help develop education and outreach programs.

How is iDigBio planning to connect with conservation use?

- Conservation is one of the rationales for the ADBC program.
- iDigBio involvement in policy-making needs to be approached with care, but conservation uses for specimen data is a direction that iDigBio should move towards.

Is promoting and conducting conservation planning and research iDigBio's niche? Would there be a duplication of effort from other entities?

- iDigBio wants to avoid duplication of effort, but there is a high level of expertise in iDigBio that should be exploited.
- iDigBio could be an organization that informs conservation policy as one of its roles.
- Collections are the most reliable and verifiable sources of information for species distributions.

How does iDigBio avoid "ownership" of services (i.e., iDigBio is responsible for running services for the long term)?

iDigBio could stick with providing infrastructure and tools for TCN research (and other endeavors) as its focus.

Does iDigBio really know who its customers are?

- There was agreement that it would be a useful exercise to identify iDigBio's customers.
- iDigBio needs to reach out beyond traditional uses of specimen data.
- Field biologists are an untapped resource because they are interested in expertly identified photographs for use in identification in the field.

When does iDigBio become recognized as "THE place to go"? When will iDigBio become the authority for specimen data?

Eventually iDigBio will reach a tipping point where everyone who has a collection knows about iDigBio, and all researchers will cite iDigBio when using collections data. **This should be a goal of iDigBio.**

Is there funding to promote use of specimen data (directed to NSF observers)?

- NSF is providing multiple methods of support for collections-based research:
 - New Research Coordination Network will examine ways to sustain the national digitization network.
 - NSF Challenge Award for imaging insect trays.
 - New postdoctoral awards for research utilizing collections (innovative research and mentoring for future careers).
- NEON has a biodiversity component.
- Any project on biodiversity that receives funding from NSF should be talking with iDigBio.

Do you expect ADBC and TCNs to continue existing in the same form over the next 10 years (directed to NSF observers)?

- ADBC was developed to get digitization programs up and running and to give institutions resources to start digitizing their collections.
- NSF envisions the next 6 years will be mostly similar to what the program is doing now because there is still a long way to go.
 - The project only has around 500 collections (200 institutions) of the approximately 1500 collections in the U.S.
- NSF really wants this project to change attitudes in collection management and shape interest in digitization and data sharing.
- NSF anticipates that somewhere around year 8 there will be discussion about where the project should go next.
- NSF stressed that as a “national resource” where data are available to everyone, iDigBio could be a role model for other large projects.

Specific Advice

- iDigBio should incorporate the Smithsonian Institution’s (SI) data.
 - SI would also like to participate more actively with the TCNs.
- iDigBio should determine what exactly its niche is.
 - Should iDigBio focus efforts in one realm, or plan to cover all of these topics but have overlap with multiple entities?
 - The key will be to determine iDigBio’s unique contribution and then sustain only the unique infrastructure. iDigBio can then partner to cover gaps and/or overlap.
- iDigBio should seek to answer: Who are your key partners? Who are your customers? What do you need to be able to deliver? The answers to these questions will help guide what to focus on in years 6-10.
- There may be opportunities to develop monetary contracts with institutions to run digitization programs and supply data storage and personnel training. This could be one aspect of a long-term sustainability strategy.
- The research uses seems to be developing naturally, but iDigBio should increase engagement with all user groups which may benefit from specimen data.
- iDigBio serves as a network to bring together data from taxonomic experts and could also serve as a network for expert services and interpretations of these data. iDigBio should explore possible models to provide an integrated network for data and expertise, perhaps through partnership with expert societies.
- iDigBio should consolidate its successes and continue with the roles it has already undertaken (e.g., connecting the community, facilitating digitization, etc.). At the same time, iDigBio should ensure that its activities will support expected uses and that all data mobilized through TCNs are managed and curated in a persistent and sustainable way.
- A diversity of interest communities are mobilizing on the web and providing a lot of energy in amateur naturalist communities forming around taxonomic groups. iDigBio could use these communities as a

resource. These amateur communities can be more than customers; they could be partners (para-curators).