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: 09/10/2015 - 19:00

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_September_2015.docx

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Southwest Collections of Arthropods Network Update

October 6, 2015

Neil Cobb

Progress in Digitization Efforts:

We are on target to exceed our quota for digitizing labels from pinned specimens, which is 736,736 records from the original 10 institutions and 958,736 records including the three PEN projects. T**able 1** presents four sets of statistics derived from our data portal as of September 5, 2015. These include the following data: 1) institutions that are funded by the NSF-ADBC program, including the 3 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.

Table 1. Number of specimen records digitized and associated summary statistics. From http://symbiota4.acis.ufl.edu/scan/portal/index.php . SCAN-funded numbers refers to the 13 museums receiving ADBC funding. SCAN non-funded numbers include 20 museums contributing cataloged specimen data and non-cataloged moth specimen data from 33 collections (5 private collections and 28 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	1,004,594	1,217,521	2,222,115	5,041,754
# Georeferenced	799,637	834,998	1,634,635	3,948,014
# Identified to species	556,725	481,993	1,038,718	2,484,262
# Families	1,239	1,436	2,007	2,114
# Genera	6,022	7,627	9,985	12,614
# Species	18,561	24,516	37,111	61,200
# All Taxa	19,350	25,096	38,211	64,024
# Types (all categories)	4,559	56,135	60,694	493,011
% Georeferenced	80%	69%	74%	78%
% Identified to Species	55%	40%	47%	49%

Although we have technically reached our goal for the 13 SCAN museums, we have not thoroughly reviewed all records produced by SCAN-funded museums 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 over 125,000 more records to meet our project goal. Ten museums are in a one-year no-cost extension and the one PEN museum (BYU) is in their second year. We estimate that we will digitize at least 800,000 ground-dwelling arthropod specimens by the end of the

project and over 1.2 million total specimens for the original 10 museums. The three additional PEN grants (Harvard, BYU, and Ohio State University) 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 was 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).

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 (ASU-ASUHIC	2,718
C.P. Gillette Museum of Arthropod Diversity (CSU-CSUC	49
Colorado Plateau Museum of Arthropod Biodiversity (NAUF-CPMAB	1,716
Denver Museum of Nature & Science (DMNS-DMNS	625
Hymenoptera Institute Collection (UKY-HIC-HIC	2,297
Museum of Comparative Zoology, Harvard University (MCZ	14,517
Museum of Southwestern Biology, Division of Arthropods (UNM-MSBA	193
National Park Collections at Northern Arizona University (NAUF-NPS	673
New Mexico State Collection of Arthropods (NMSU-NMSU	1,380
Ohio State C.A. Triplehorn Insect Collection (OSU-OSU	2,655
SDSU Terrestrial Arthropods Collection (SDSU-TAC	68
Texas Tech University - Invertebrate Zoology (TTU-TTU-Z	26,359
The Albert J. Cook Arthropod Research Collection (MSU-MSUC)	20
UAM Entomology Collection (UAM-UAM_ENT	2,921
University of Arizona Insect Collection (UA-UAIC	66,710
University of Colorado Museum of Natural History Entomology Collection (UCB-UCMC	2,035
University of Hawaii Insect Museum (UHIM-UHIM	49,705
University of Kansas Natural History Museum Entomology Division (KU-SEMC	4,445
University of Tennessee at Chattanooga (UTC-UTCI	11
Yale Peabody Museum, Entomology Division (YPM-ENT	10,022
SCAN Museums (All Images)	**181,060**
SCAN Museums (High-Resolution Images)	**94,350**
All Images served on SCAN	**189,119**

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 serving 10 collection datasets to serving 39 data sets through SCAN (**Table 3**) and an additional four institutions have committed to serving data. 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.

Table 3 List of Collection data sets being served on SCAN data portal.

	SCAN Funded Collections
1	**Arizona State University Hasbrouck Insect Collection (ASU-ASUHIC)**
2	**Brigham Young University Arthropod Museum (BYU-BYUC) (PEN)**
3	**C.P. Gillette Museum of Arthropod Diversity (CSU-CSUC)**
4	**Colorado Plateau Museum of Arthropod Biodiversity (NAUF-CPMAB)**
5	**Denver Museum of Nature & Science (DMNS-DMNS)**
6	**Museum of Comparative Zoology, Harvard University (MCZ) (PEN)**
7	**Museum of Southwestern Biology, Division of Arthropods (UNM-MSBA)**
8	**New Mexico State Collection of Arthropods (NMSU-NMSU)**
9	**Texas A&M University Insect Collection (TAMU-TAMUIC)**
10	**Texas Tech University - Invertebrate Zoology (TTU-TTU-Z)**
11	**University of Arizona Insect Collection (UA-UAIC)**
12	**University of Colorado Museum of Natural History Entomology Collection (UCB-UCMC)**
13	**Ohio State C.A. Triplehorn Insect Collection (OSU-OSU) (PEN)**

	SCAN Non-Funded Collections
1	**California Academy of Sciences Entomology (CAS-ENT)**
2	**Denver Botanic Gardens Collection of Arthropods (DBG-DBGA)**
3	**Dugway Proving Ground Natural History Collection (DUGWAY-DUG-ENT)**
4	**Entomology Collection at the Natural History Museum of Utah (UMNH-ENT)**
5	**Gregory P. Setliff Collection - Kutztown University (GPSC)**
6	**Hymenoptera Institute Collection (UKY-HIC-HIC)**
7	**National Park Collections at Colorado State University (CSU-CSUNPS)**
8	**National Park Collections at Northern Arizona University (NAUF-NPS)**
9	**SDSU Terrestrial Arthropods Collection (SDSU-TAC)**
10	**The Albert J. Cook Arthropod Research Collection (MSU-MSUC)**
11	**The Purdue Entomological Research Collection (PU-PERC)**
12	**University of Delaware Insect Research Collection (UD-UDCC)**
13	**University of Georgia Collection of Arthropods (UGCA-GMNH)**
14	**University of Hawaii Insect Museum (UHIM-UHIM)**

15	**University of Tennessee at Chattanooga (UTC-UTCI)**
16	**Utah Department of Agriculture and Food Entomology Collection (UDAF-UDAFE)**
17	**Western Washington University Insect Collection (WWU-WWUC) (LepNet)**
18	**Scarab Central (Observational, not served to iDigBio)**
19	**Moth Observation Database (Observational, not served to iDigBio)**
20	**Yale Peabody Museum, Entomology Division (YPM-ENT) (LepNet)**

	Ready to Serve Data
1	**Colección Zoológica de la Universidad Autónoma de Querétaro (UAQ-UAQE)**
2	**Florida Museum of Natural History, McGuire Center for Lepidoptera and Biodiversity (FLMNH-MGCL)**
3	**LTER Central Arizona Phoenix Arthropod Collection (ASU-CAPART)**
4	**Milwaukee Public Museum, Invertebrate Zoology-Insect Collection (MPM-MPM IZ)**
5	**Clemson University Arthropod Collection (CU-CUAC) (LepNet)**
6	**Enns Entomology Museum (UMOC-UMC) (LepNet)**
7	**Oregon State Arthropod Collection (OSU-OSAC) (LepNet)**
8	**R. M.Bohart Museum of Entomology (UCD-BMEC) (LepNet)**
9	**The Mississippi Entomological Museum (MSU-MEM) (LepNet)**
10	**University of Minnesota Insect Collection (MIN-UMSP) (LepNet)**
11	**William F. Barr Entomological Museum (UI-WEM) (LepNet)**
12	**Wisconsin Insect Research Collection (UW-WIRC) (LepNet)**

	Augmented Collections (Data served directly to iDigBio/GBIF but also on SCAN)
1	**AntWeb (CAS-ANTWEB)**
2	**Tri-Trophic Interactions - Texas A&M (TAMU-TAMU-TTI) (collaboration with Tri-Trophic)**
3	**UAM Entomology Collection (UAM-UAM_ENT)**
4	**University of Kansas Natural History Museum Entomology Division (KU-SEMC)**
5	**GBIF spider data**
6	**University of Alberta Museums Entomology Collection (UASM) (UAM-UASM)**

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: 09/13/2015 - 16:29

Progress in Digitization Efforts

Efforts So far, approximately 650,985 items have been digitized for this project (50,000 more that originally estimated), including xxx specimen labels and xxx supplemental images (e.g., specimen photographs, drawings, field notes). The major product of the project is the MycoPortal. To date 1,933,829 specimen records have been added to the portal. The Portal contains about 454,227 skeletal records (i.e. locality data yet to be added); 1,837,939 are records with complete text locality information and 276,749 records have geocoordinates.

We are now in the one year no-cost extension for the project, so most institutions have already completed their digitization. Only the Farlow Herbarium of Harvard University, Miami University of Ohio, New York Botanical Garden and San Francisco State University probably have more than 10,000 to digitize. The focus of the work this year is completing that digitization, and completing records by adding geographical information.

Share and Identify Best Practices and Standards (including Lessons Learned)

Our best successes were in the initial training and orientation for the project. Keeping the participants in the habit of regular project updates were largely unsuccessful. Despite repeated attempts to get very simple monthly reports from participants (using a form that was distributed to all or even bi-monthly reports was mostly a failure. However, progress on the project has been steady and mostly satisfactory, I would have been much happier if the collaborators had stayed in closer touch but I was unsuccessful in finding a way to make this happen as I would have liked.

Identify Gaps in Digitization Areas and Technology

Nothing new to report

Share and Identify Opportunities to Enhance Training Efforts

Project staff member Michael York revised the georeferencing instructions for the Macrofungi Consortium training handbook, and also shared this document with the iDigBio Georeferencing working group.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

A transcription crowdsourcing workshop sponsored by the MaCC project was held at Botany 2015, led by Dr. George Weiblen of University of Minnesota and Mari Roberts of the LBCC and Tritrophic TCNs at NYBG.. There were about 20 participants in the workshop, which was held on the Sunday afternoon preceeding the meeting. In the workshop we discussed the general principles of crowdsourcing the transcription of label data, and compared the Notes From Nature and Symbiota crowdsourcing interfaces. We have collaborated in sharing expertise with setting up a citizen science/crowdsourcing program for transcribing specimen records. Mari Roberts, who is funded as Volunteer Coordinator for the Lichens, Bryophytes and Climate Change TCN, is stationed at NYBG, and thus interacts closely with other TCN projects here, and has incorporated experiences from all the TCNS that NYBG is involved in into the attached document.

Share and Identify Opportunities and Strategies for Sustainability

This is an on-going topic of discussion with Dr. Andrew Miller, PI of the new Microfungi TCN. Our long-term objective is to convince the Mycological Society of America to form a committee to provide oversight for the MycoPortal.

Other Progress (that doesn't fit into the above categories)

N/A

Attachment

N/A

THE MICROFUNGI COLLECTIONS CONSORTIUM: A NETWORKED APPROACH TO DIGITIZING SMALL FUNGI WITH LARGE IMPACTS ON THE FUNCTION AND HEALTH OF ECOSYSTEMS

Report submitted by: lippold2@illinois.edu
Report Submitted on: 09/24/2015 - 13:07

Progress in Digitization Efforts

- Institutional digitization and data upload ramping up with the start of the semester and the completion of training.
- Approximately 29,755 images uploaded.
- Approximately 88,433 records uploaded (81,845 = Unprocessed, 326 = Stage 1, 6237 = Stage 2,

Share and Identify Best Practices and Standards (including Lessons Learned)

- Created simplified image workflow documents for training and guidance on digitization and data upload. These can be found on our website under Resources (http://www.microfungi.org/index.php/resources).
- Revamped and simplified image processing steps t

Identify Gaps in Digitization Areas and Technology

- Lack of automated statistical report generation via MyCoPortal that indicate the number of images uploaded and Unprocessed, Stage 1, 2, 3 records uploaded to the portal; Symbiota software updated to now display the number of images and records uploaded

Share and Identify Opportunities to Enhance Training Efforts

- Project Leader, Project Manager, and ILL digitizer (3 total) trained by Scott Bates, Ed Gilbert, and Ben Brandt in Symbiota software and MyCoPortal usage from 7/6/15 to 7/9/15.
- Trained SYRF, WIS, INHS herbarium manager (4 total) in digitization and

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

- INHS Collection Manager included in on 7/22 training to get a better understanding of how Symbiota and digitization processes relate to her duties.
- GLI TCN digitizer included in on 8/11 training to understand digitization workflow and Symbiota functi

Share and Identify Opportunities and Strategies for Sustainability

- Discussed with Ed Gilbert and Phil Anders moving the MyCoPortal to the Illinois Natural History Survey on a permanent basis.
- PL is a member of the Symbiota Sustainability Committee, led by Neil Cobb.

Other Progress (that doesn't fit into the above categories)

- Established an Instagram for the project (@microfungi_inhs).
- Regularly updating the project Facebook page with project progress and interesting news and journal articles, which increased reached audience by 1/3rd.

Attachment

N/A

DIGITIZING FOSSILS TO ENABLE NEW SYNTHESES IN BIOGEOGRAPHY- CREATING A PALEONICHES

Report submitted by: blieber@ku.edu
Report Submitted on: 09/25/2015 - 11:13

Progress in Digitization Efforts

Regarding the University of Kansas portion of the project, led by PI Bruce S. Lieberman, we now have a total of 187,087 specimens databased. Further, we now have a total of 175,618 specimens that are georeferenced. In addition, a total of 7,775 localities have been georeferenced (as mentioned previously, thus the georeferencing component of our proposed work is completed). Since the last update to iDigBio, we have now completed databasing all of our targeted bivalves and are starting to database cnidarians. We have also completed imaging of all bivalves and most gastropods. Thus, the major component of our proposed taxonomic foci have now been completely databased, imaged, and georeferenced.

Regarding the Ohio University portion of the project, led by PI Alycia Stigall

Ohio University:

Major work has been undertaken related to transferring data from the web portal to the Digital Atlas of Ancient Life app. Within the Ordovician Atlas website, new content on gastropods and bryozoans has been published online.

Regarding the San José State University portion of the project, led by PI Jon Hendricks:

First, a new homepage for the Digital Atlas of Ancient Life was developed and put online (http://www.digitalatlasofancientlife.org). This new project portal page was developed using the Wordpress "X" theme, which will make it much easier to add future content, as HTML programming will not be necessary. The new page also adapts automatically to different screen sizes, making the homepage much more user-friendly on smartphones and tablets.

Second, an additional 139 species were added to the Neogene Atlas over the last two months, bringing the current total to 499 species now online (out of a planned 500 species). While we have nearly reached our project goal for numbers of species online, distributional maps still need to be generated for many of these species and this will be the focus of work on the Neogene Atlas between now and the next update. An undergraduate at SJSU has been trained on making these maps in GIS and is currently working on adding them to the Neogene Atlas.

Third, we have finished adding taxa (especially gastropods) to the Pennsylvanian Atlas, bringing the final total to 272 species online (we initially planned to include 240 species). Most species now have associated distributional maps as well.
In terms of future work between now and the next update, PI Hendricks will focus on the development of new online content for both the Neogene Atlas and revised Digital Atlas of Ancient Life homepage. This will begin with construction of an integrated web-based guide to bivalve shell morphology (using the high-quality images associated with the Neogene Atlas) that will connect bivalve taxa in the Neogene Atlas with relevant informational content on the Digital Atlas homepage. Once these connections are worked out, they will be expanded to other taxa in both the Neogene and Pennsylvanian Atlases, connecting them both to the main Digital Atlas homepage.

Finally, for our PEN partners. First, Texas, PI: Ann Molineux, Co-PI: James Sprinkle

She is continuing to deal with ongoing treatments for her life threatening diagnosis and although she is starting to do better I did not want to bother her with a request for an update at this time but am hoping that she will be healthy enough that I can ask her in two months.

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 the material from their systematic collection.

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

Regarding the University of Kansas portion of the project, a new female graduate student has begun working on the project.

Regarding the Ohio University portion of the project, led by PI Alycia Stigall

Ohio University:
During the summer and early fall, we had a complete turnover among our student workers. Four new undergraduates are now working.

Miami University:
A new student has been hired for this academic year and is being trained in digitization. Construction on the new building to house the Geology Department and Museum continues.

Cincinnati Museum Center:
Two new students have been hired in order to leverage NSF funds to maximize the time available in our one year extension. Progress continues to make made on the goals of digitization and mobilization to DarwinCore for iDigBio ingestions.

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" has been published at Palaeontologia Electronica (an open-access online journal) http://palaeo-electronica.org/content/2015/1269-commentary-digital-atlas-of-ancient-life . This manuscript provides an overview of our Digital Atlas project.

Attachment

N/A

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: 09/25/2015 - 11:46

Progress in Digitization Efforts

FMNH Insects: Odonata (papered/pinned): 3,277; Blattodea (pinned): 1,280; Mantodea (pinned): 418; Hymenoptera (pinned): 9,461; Trichoptera (wet/pinned): 1,708; Plectoptera (wet/pinned): 1,538; Coleoptera (various water beetle families, wet): 1,099; (pinned): 2,866. 22,099 total records entered; batch uploading to FMNH's KE Emu database in progress.
FMNH Invertebrates: 12,152 records were entered into the collections database (5,653 freshwater bivalve records, 5,845 freshwater gastropod records, 654 terrestrial gastropod records). One summer intern and two current interns have labeled ca 2,500 freshwater mussel lots to date. Dr. Stephanie Clark continued work on the taxonomic authority file for North American non-marine mollusks. The bivalves are completed with 6,060 names and combinations captured in families Cyrenidae, Dreissenidae, Margaritiferidae and Unionidae (in addition to the previously completed Sphaeriidae with 432 entries). To date, 3,410 names and combinations in 39 land snail families have been added to the file.
Cleveland Museum of Natural History: Total of 6,328 specimens (Mantodea + Hymenoptera) uploaded to local database, Hymenoptera online (hol.osu.edu/inst-full.html?id=195) which is publicly accessible. An additional 235 specimens with data transcribed and 460 specimens with label images taken (Hymenoptera).
University of Michigan Museum of Zoology - Mollusks: Students digitizing specimens: 1 graduate (20 hours/week) and 5 undergraduate students (~10 hours/week); Setting up an imaging station equipped with Canon Rebel T5i camera, Cognisys StackShot Macro Rail, ZereneStacker software and HP Zbook 17 laptop computer; 3871 records entered to UMMZ Specify database during 6/16 – 9/23/2015 (freshwater bivalve: 123; freshwater snails: 1919; land snails: 1483)
University of Michigan Museum of Zoology – Insects: 2 students entering label data from Odonata, adding barcodes to envelopes/paper triangles; photographing enclosures/labels when appropriate. Anisoptera (dragonflies) completed @ 22,000+ specimens. Data incorporated into Filemaker and undergoing corrections/emendation. Zygoptera (damselflies) have been started, with 2800 specimens cataloged to date.
Auburn University Museum: 83,000 specimens databased; AUMNH fish collection now converted from Filemaker to Specify; ~75,000 records cleaned and reconfigured. Attachment server configured and image migration started.
Delaware Museum: We have completed data housekeeping for 7,500 freshwater bivalves and have begun the taxonomic/geography updates and data housekeeping for the freshwater gastropods. We have sent a draft translation table to Specify that identifies our current fields and how they map onto the Specify schema and are awaiting their response/edits. We anticipate the transition will be in progress by December 2015
Frost Entomological Museum: Odonata: over 16,900 images, with over 1000 specimens' label data transcribed (for preliminary niche modeling analyses, to be presented at the 2015 Entomological Collections Network meeting). Pollinators:5,530 images. No additional lice images.

Share and Identify Best Practices and Standards (including Lessons Learned)

FMNH Insects: data entry workflow modifications, pinned: bar code label staging for pick up improved; wet vials: staging tray design improved, allowing better label visibility. Improved data cleaning of data entry spread sheet by employing Open/Refine prior to batch uploading. Continued taxonomic authority file improvements for several North American arthropod groups. IPT transfer of data to Symbiota Portal in preparation.
FMNH Invertebrates: Digitizer Rachel Sommer was trained to use the Dragon NaturallySpeaking voice recognition program for data entry. Rachel then used Dragon for entering records into the EMu database. She was able to rewrite some of the verbal commands so they would respond how she wanted. However, many issues still persisted. These issues, along with the program's lag behind Rachel's speaking speed and subsequent confusion made the use of Dragon much slower than typing and impossible to use without her being in front of the computer to fix mistakes. Due to these reasons, she stopped using the Dragon voice recognition program and reverted to hand-typing the information.
Cleveland Museum of Natural History: nothing to report
University of Michigan Museum of Zoology: nothing to report
Auburn University Museum: None at this time
Delaware Museum: DMNH has begun documenting workflow based on experience improving the taxonomy/geography/housekeeping of the freshwater bivalves. This document will be refined as we move through the Specify transition and subsequent use of WorkBench to

add new data. We anticipate that this document will be used immediately to train a new Collections Manager, and after the InvertEBase grant is completed to facilitate the addition of marine taxa into the new DMNH mollusk database.
Frost Entomological Museum: 4 part-time staff working on imaging and digitization efforts, general SOP created for quick capture of pinned specimens with specific practices for bumble bees (Bombus spp.) and Lepidoptera. One of our priorities is to digitize pollinators, broadly defined. Our standard operating procedures (SOPs) are available on the Web: http://bit.ly/FrostSOPs

Identify Gaps in Digitization Areas and Technology

FMNH Insects: pre-curation of groups targeted for digitization required, benefiting the collection as a whole.
FMNH Invertebrates: nothing to report
Cleveland Museum of Natural History: nothing to report
University of Michigan Museum of Zoology: nothing to report
Auburn University Museum: Significant issues converting existing databases to Specify; problems with file headers (Specify does not use Darwin core formatting) and date formats (among others).
Delaware Museum: nothing to report
Frost Entomological Museum: We committed to TaxonWorks as our database. The prototype is available for testing, but our data are not yet available for sharing with GBIF and Symbiota (no ITP instance yet).

Share and Identify Opportunities to Enhance Training Efforts

FMNH Insects: improved training instructions and workflow demonstrations for untrained data entry personnel.
FMNH Invertebrates: None at this time
Cleveland Museum of Natural History: nothing to report
University of Michigan Museum of Zoology: None at this time
Auburn University Museum: None at this time
Delaware Museum: DMNH is touch with Andy Bentley at Specify and we are discussing the possibility of hosting a Specify Workshop at DMNH in mid-2015. If we move forward with this, 15-20 collections staff from outside institutions and 3 internal personnel will be involved. In particular, we would use this workshop as an opportunity to train a new Collections Manager in Specify.
Frost Entomological Museum: For his graduate course on insect systematics, Deans has developed a literature exercise and group discussion about the importance and use of collections. This lecture will be given as part of a similar course at Cornell as well, during a visit in October 2015. The slideshow and information sheet will be made available by the end of the semester.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

FMNH Insects, FMNH Invertebrates: Development of a PEN proposal with the Museum of Northern Arizona (MNA): arthropods and mollusks from the Colorado Plateau
Cleveland Museum of Natural History: Initiated discussion of potential collaboration with a local women's prison, Northeast Reintergration Center. Initial meeting on 1 July went well and we were invited back for a teleconference with other members of the Ohio State prison system on 4 September. So far both meetings have been very well received and the project may be used a test project of a new IT system to be rolled out within the prison. Given the security protocol and stages of approval needed, the earliest this collaboration could commence would be early next year.
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
Auburn University Museum: None at this time
Delaware Museum: nothing to report
Frost Entomological Museum: We continue to collaborate with the Speciesfile Group at the University of Illinois, in order to develop an efficient strategy for converting images of Odonata in envelopes to accessible data.

Share and Identify Opportunities and Strategies for Sustainability

FMNH Insects: None at this time
FMNH Invertebrates: None at this time
Cleveland Museum of Natural History: None at this time
University of Michigan Museum of Zoology:
Auburn University Museum: None at this time
Delaware Museum: None at this time

Frost Entomological Museum: None at this time

Other Progress (that doesn't fit into the above categories)

FMNH Insects: None at this time
FMNH Invertebrates: None at this time
Cleveland Museum of Natural History: None at this time
University of Michigan Museum of Zoology:
Auburn University Museum: None at this time
Delaware Museum: None at this time
Frost Entomological Museum: None at this time

Attachment

https://www.idigbio.org/sites/default/files/webform/tcn-reports/AMS2015%20InvertEBase%20poster%20FINAL%20%281%29.pdf

InvertEBase

Elizabeth K. Shea[1]* Rüdiger Bieler[2], Taehwan Lee[3], Diarmaid Ó Foighil[3], and Petra Sierwald[2]

[1]Delaware Museum of Natural History, 4840 Kennett Pike, Wilmington, DE 19807
[2]Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, IL 60605-2496
[3]University of Michigan, Museum of Zoology, Ann Arbor, MI 48109

INTRODUCTION: North America is projected to experience profound biodiversity change in coming decades that will have extraordinary and unpredictable consequences for all U.S. ecosystems. Understanding the scope of that change requires a high resolution picture of preexisting biodiversity levels. Natural history museums contain that information, but not in a form that is readily accessible to a broad variety of end users (Fig. 1).

Fig. 1. Millions of uncatalogued natural history specimens exist in Museums across the country. Unlocking the data associated with the Mollusk and Arthropod specimens that are part of the InvertEBase TCN will provide an extensive baseline of terrestrial and aquatic biodiversity of the eastern United States.

InvertEBase IS A 2015 ADBC TCN. InvertEBase is a new Thematic Collections Network (TCN), part of NSF's ADBC (Advancing Digitization of Biodiversity Collections) program; our TCN is comprised of 10 mollusk and arthropod collections in six major US natural history museums. The shared goal of all InvertEBase participants is rapid data entry of georeferenced locality data to form a solid foundation for distribution mapping and to examine change over time due to large scale perturbations (e.g., climate change, land-use change). The theme of this TCN is the biodiversity of megadiverse terrestrial and freshwater mollusk and insect fauna of the eastern United State. Once digitized and published, our data will be available in to address three major questions:

1. How evenly is insect and mollusk diversity distributed across the eastern United States?
2. What is the impact of climate change on insect and mollusk diversity and distributions across that area?
3. Are protected areas throughout North America positioned effectively to conserve insect and mollusk biodiversity?

JOINT OUTCOMES

The five collections work independently, and each has a set of goals particular to their collection; however, there are several shared outcomes across the five collections:

- A **standardized taxonomy for the freshwater gastropods and landsnails** will be developed and shared with WoRMS and MolluscaBase efforts.
- Symbiota will be the main data portal for research scientists who want to address the thematic questions identified in our proposal (see above). As researchers use the data they will propose changes that will be flagged and brought to the responsible collection for **curation and updating using FilteredPush technology** (Fig. 2).
- A focused **exhibit that describes the InvertEBase project, as well as the process and value of digitization**. Eighty percent of the exhibit will be standardized, and 20% will be customized to highlight the collaborating collections.
- Over **3 million specimens** of terrestrial and freshwater mollusks and arthropods of eastern North America **will be digitized and mobilized on the web**.

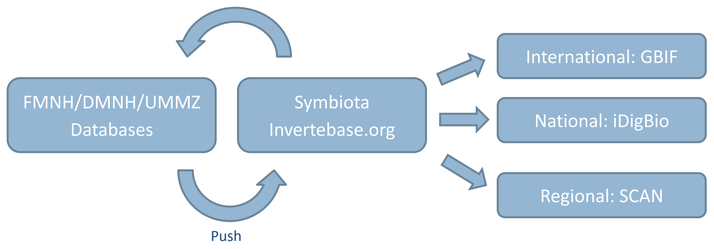

Fig. 2. Data Pathway. Filtered Push technology (NSF Award EF 14-01450) will work at the InvertEBase Symbiota Portal (www.invertebase.org) to flag questionable/outdated specimen data and send those back to the data's home institution for additional curation. The home institutions will investigate the recommended change and, if approved, make changes in the local databases and export updated information in the next data upload to the InvertEBase Symbiota portal. Additional data aggregators will be able to access our data by interfacing with Symbiota.

INDIVIDUAL OUTCOMES, YEAR 1 ACTIVITIES (SEPTEMBER 2014-SEPTEMBER 2015).

All collections made significant digitization progress in Year 1. In addition to the results outlined below, the Field Museum collaborated with the Cleveland Museum of Natural History to assess their Mollusk collection.

Fig. 3. Delaware Museum of Natural History. Hired a part-time database specialist and upgraded server infrastructure. Revised taxonomy, geography, agent names and inventoried 7500 freshwater unionid bivalve lots (pictured above). Prepared a translation table to map current fields on to the Specify v. 6 data schema.

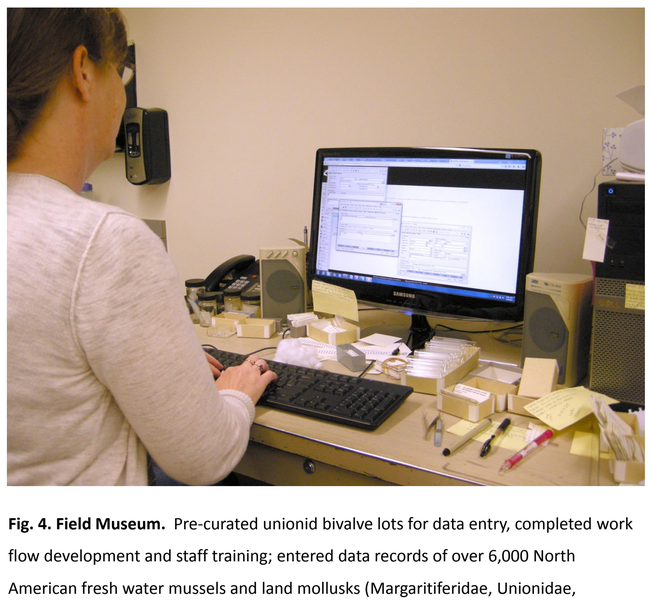

Fig. 4. Field Museum. Pre-curated unionid bivalve lots for data entry, completed work flow development and staff training; entered data records of over 6,000 North American fresh water mussels and land mollusks (Margaritiferidae, Unionidae, Sphaeriidae) directly into the FMNH collections database (Emu); prepared records for uploading to Symbiota; developed authority file for North American land and fresh water mollusk taxonomy.

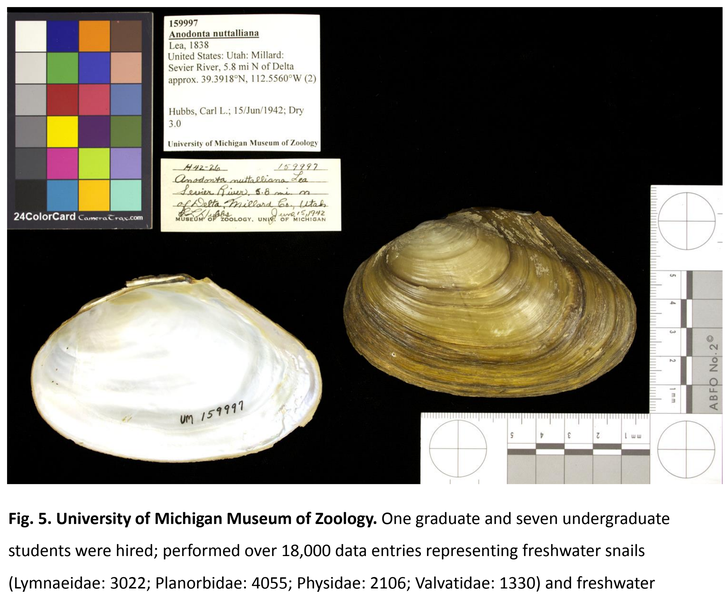

Fig. 5. University of Michigan Museum of Zoology. One graduate and seven undergraduate students were hired; performed over 18,000 data entries representing freshwater snails (Lymnaeidae: 3022; Planorbidae: 4055; Physidae: 2106; Valvatidae: 1330) and freshwater bivalves (Sphaeriidae: 4698); imaged over 3500 lots of unionids (pictured above), sphaeriids and pleurocerids; prepared for records upload to Symbiota.

Acknowledgements: This award is made as part of the National Resource for Digitization of Biological Collections through the Advancing Digitization of Biological Collections program to P. Sierwald (lead PI) and R. Bieler (EF 14-02667); E. Shea (EF 14-02697), D. O'Foighil (EF 14-04964) and James Hanken (EF 14-01450). All data resulting from this award will be available through the national resource (iDigBio.org).

PLANTS, HERBIVORES AND PARASITOIDS: A MODEL SYSTEM FOR THE STUDY OF TRI-TROPHIC ASSOCIATIONS

Report submitted by: moon@begoniasociety.org
Report Submitted on: 09/25/2015 - 14:11

Progress in Digitization Efforts

Plant Report:
NYBG volunteers (34) have transcribed 21,544 complete records since January 2014.
Total complete records transcribed from all institutions = 212,072
Total complete records from all institutions = 1,326,272
With Coordinates = 239,630 (22% georeferenced)

NY Submissions to iDigBio:
Vascular Specimens = 1,432,587
Media = 931,725
https://www.idigbio.org/portal/recordsets/36d35b23-113e-4633-90ec-19d265a3b5f6https://www.idigbio.org/portal/recordsets/36d35b23-113e-4633-90ec-19d265a3b5f6

We're continuing to contact partners to help them submit data to iDigBio. Most partners are set up or self-sufficient. We are meeting with MAINE in October and TEX at a later date.

Insect Report, all records delivered to iDigBio.

* Arthropod Easy Capture (AMNH) - Published the Collaborative databasing of North American bee collections within a global informatics network project 368,420

* Arthropod Easy Capture (AMNH) - Plants, herbivores, and parasitoids: A model system for the study of tri-trophic associations project 761,370

* INHS Insect collection RSS Feed 649,575 total, 64,640 specifically Hemiptera.

* Tri-Trophic Interactions - Texas A&M 139,170

* Snow Entomological Museum Collection 1,194,526 total, 91,474 specifically Hemiptera

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

AMNH Undergraduate summer intern, Heather Appleby, spent the summer learning R and using her new skills to advance our georeferencing needs. She is writing a blog post for iDigBio as one product. Training staff to use R (and other technologies) has greatly helped speed up productivity later in the project, as well as support them for future careers.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Other Events:
Katja Seltmann taught and helped organize the Managing Natural History Collections Data for Global Discoverability workshop in Tempe, AZ
https://www.idigbio.org/wiki/index.php/Managing_Natural_History_Collections_Data_for_Global_Discoverability

On October 24, 2015 from 1:00-5:00, NYBG will be hosting as an onsite transcription center for WeDigBio. Volunteers will be transcribing TTD records in a customized Symbiota crowdsourcing portal made by Ed Gilbert.
https://www.wedigbio.org/

Georeferencing plant specimens.
Our plant partners will be submitting their data as part of SEINet Symbiota portal. 1 volunteer, Maura Flannery has been practicing georeferencing NY localities. We anticipate her being comfortable enough to georeference specimens in Symbiota soon, mainly on partner records. We're considering setting up a bulk georeferencing training session with the partners moved to the SEINet portal so that everyone can consider options for finding volunteers for their collections in the future.

Share and Identify Opportunities and Strategies for Sustainability

Our plant partners will be submitting their data as part of SEINet Symbiota portal, rather than maintaining a separate TTD project portal. Supporting already existing portals makes a good deal of sense regarding sustainability, as many of our institutions are already participating in SEINet.

Other Progress (that doesn't fit into the above categories)

Our grant will be finished in December and we will be submitting our final report. This includes all subcontracts.

Attachment

N/A

MOBILIZING NEW ENGLAND VASCULAR PLANT SPECIMEN DATA TO TRACK ENVIRONMENTAL CHANGE

Report submitted by: p_sweeney@att.net
Report Submitted on: 09/28/2015 - 09:59

Progress in Digitization Efforts

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 517,355 records and 550,188 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.

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

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: 09/28/2015 - 10:00

Progress in Digitization Efforts

All SERNEC:
There are currently 42 collections serving data through the SERNEC portal.
There are currently 744,359 specimens records and 239,456 skeletal or partial records in the portal.

Notes From Nature had 224 users in the month of July and 155 the month of August. These volunteers transcribed 4173 records during this time. All of this effort was related to the Southeast Louisiana State University herbarium images.

Georgia:
GA: 22,2500 GA specimens were imaged during this time period (52,150 to date).

VSC: 1,600 COLG specimens imaged. Approximately 10% of these COLG specimens repaired by VSC personnel before imaging and also many annotated by VSC Curator J.R. Carter. Imaging by a work study student provided by Valdosta State University, Biology Dept. (i.e., not funded by this grant). A Drobo 5N data storage device with three 1TB drives was purchased to store COLG images locally.

GAS: Imaging station has been ordered and is in place. An additional laptop from GSU surplus was added to improve workflow. Specify software has been installed on the computers. The Biology Department has provided a graduate student RA position for one semester (i.e., not funded by this grant) to assist with the grant digitization activities.

Kentucky:
EKU - Imaged approximately 22,000 specimens during the reporting period. All equipment has been purchased and things are running smoothly.
NKU - Some records are now up on the SERNEC portal. The Ferns and Gymnosperms have been barcoded and skeletal records have been created. Most of the equipment is on hand. There have been some issue with compatibility of Windows 10 and Adobe Lightroom. No images have yet been taken.
MDKY – This collection is not yet on SERNEC portal. All equipment has been purchased. 3063 images have been taken so far. It is likely that no more work will take place until the next university break (Christmas break).
MUR – This collection is not yet on SERNEC portal. There are not going to load the collection until some georeferencing errors in current data are fixed. All equipment purchased has been purchased. No images have yet been created.

Mississippi:
One graduate student worked on the project for 20 hours per week during the reporting period. She participated in transcribing labels for the IBE collection and georeferencing records in the MISSA collection. During the reporting period, she georeferenced 3,300 records using the GeoLocate module within Symbiota.

South Carolina:
Starting in July three herbaria in the state have started to digitize specimens and entered skeletal data. CLEMS hired two part-time students in mid-July and they have digitized and done skeletal databasing for approximately 4,600 specimens. We setup a second digitizing unit at Furman University in mid-July, and two students there have digitized and entered skeletal database information for approximately 8,690 specimens. USCH has digitized and done skeletal databasing for approximately 5,345 specimens. CLEMS has also hired a Federal Work Study student to digitize and database specimens independently of ADBC project funding.

West Virginia:
West Virginia University has been purchasing equipment and lining up student hires.

Share and Identify Best Practices and Standards (including Lessons Learned)

All SERNEC:

The SERNEC Resources page (http://sernec.appstate.edu/resources) continues to be updated with revisions and new documents. We have begun publishing blog posts (e.g., http://sernec.appstate.edu/blog/2015/08/introduction-sernec-%E2%80%93-tcn-resources) on the SERNEC website in order to share information with interested parties in and outside of the project.

Mississippi:
Detailed instructions for using GeoLocate within Symbiota were developed for workers in the MISSA collection. This document is available from L. Wallace upon request and is posted on the SERNEC Resources page.

Identify Gaps in Digitization Areas and Technology

All SERNEC:
We are in the process of surveying our partner herbaria to assess their digitization rates and to determine if we are meeting our goals.

Mississippi:
There is a learning curve in georeferencing associated primarily with determining uncertainty. Having students georeference records by county helps them to learn locations, thereby speeding up the entire process. Records that have inconsistent information due to transcription errors are impediments as time is spent finding the correct county, road, etc.

South Carolina:
Our rate for digitizing specimens has been slow but has steadily increased as student workers have mastered the routine.

Share and Identify Opportunities to Enhance Training Efforts

All SERNEC:
Nothing to report.

Mississippi:
Training that involves hands-on use of the software has resulted in cleaner results compared to simply providing students with the instruction sheet. Going over difficult records has been especially helpful.

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

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: 09/28/2015 - 10:39

Progress in Digitization Efforts

Digitization efforts at CU have slowed as efforts to troubleshoot technical difficulties with imaging equipment continues. Christina Byrd, Paleontology Technician at VMNH, resumed her grant duties as of Sept 1st. VMNH has reorganized its fossil insect collection and updated 472 records. They have sent 583 digitized records to VertNet for publishing via their Integrated Publishing Toolkit. The Berkeley Fossil Insect PEN (BFIP) started June 1, 2015. Erwin hired summer personnel (Winnie Hsiung-GSR, Lin Wang-undergraduate work study, and volunteer Visiting Scholar Dr. Marwa Wafeeq El-Faramawi) and purchased imaging equipment: Canon 5D Mark III, a focusing rail, lights, Dell laptop, and the Zeiss Discovery V20 stereomicroscope, monitor, and computer and pre-imaging preparation supplies. BFIP digitized an uncatalogued amber collection of ~2500+ amber objects. Approximately 1650 amber pieces with inclusions in various degrees of completeness were identified and their metadata entered into a UCMP Excel bulk upload spreadsheet along with additional amber objects. An amber imaging system (Zeiss Discovery V20 stereomicroscope) is now in place and a tentative training session scheduled for the week of 9/21. Due to an ordering delay and other research demands, imaging the amber inclusions is now scheduled to begin Spring 2016. Currently, the cardboard slides and associated labels are being photographed by Meralina Morales (work study undergraduate) before the specimens are removed and rehoused. These specimen images will be available online and linked to their UCMP online record. To keep the BFIP on schedule, digitization of the Stewart Valley collection is now complete. Berkeley digitized 1557 Stewart Valley (SV) specimens in anticipation of grant funding and since June has added 109 more specimen records. Hsiung and El-Faramawi set up the Stewart Valley imaging station, established the workflow, and have taken 500 images (roughly 30% of the collection), 28 have been processed and are accessible online. The Berkeley Natural History Museum IT support team is working on a CalPhotos bulk uploader that will allow batch processing of images. A work study undergrad was hired for Fall 2016 to image the remaining SV specimens. An Undergraduate Research Apprentice will assist in the pre-image processing, CalPhoto uploads, and trained in insect anatomy and taxonomy to update specimen identifications and taxonomic fields. Yale has met their digitization goal with 100% imaged specimens and georeferenced localities, all of which has been transmitted to iDigBio and they continue to digitize recently acquired Green River Fm. fossil insects. MCZ has taken 2,100 additional images, accounting for about 1,900 specimens from the collection and assigned 300 new catalog numbers to unnumbered fossils found as they imaged the collection.

Share and Identify Best Practices and Standards (including Lessons Learned)

Initial work from BFIP revealed the fragile nature of the UCMP amber specimens and the urgent need to remove them from their non-archival quality cardboard slide holders and to assess their condition before doing the pre-imaging preparation initially outlined in the proposal. The thin plastic coverslip that slides into and over the specimen well (and on the specimen in many cases) is putting pressure on pieces that extend above the level of the well exacerbating the fracturing issues. What was thought to be an excellent means for storing and handling inclusion-bearing amber pieces has turned out to be one of the worse methods devised, especially for the larger specimens.

Identify Gaps in Digitization Areas and Technology

There is nothing to report.

Share and Identify Opportunities to Enhance Training Efforts

BFIP hired the first of what will be a number of undergraduates who will participate in the BFIP as Undergraduate Research Apprentices. This program gives students an opportunity to earn class credit and actively participate in research projects on campus.

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

CU is collaborating to share fossil ant image data with Ant Web (antweb.org). Yale now has an alpha version of iDigPaleo currently undergoing testing on Whirl-i-Gig's development server. It can be accessed at http://idigpaleo.whirl-i-gig.com. Because it is hosted on a development server and going through regular updates, performance is patchy, and significantly slower than the final version. However, it is possible to access extended functionality by registering. The toolset features currently available include browsing with various filtering options (including common names harvested from the Encyclopedia of Life); mapping of objects and datasets obtained from searches or by selection of records while browsing; and interactive image features, including comments, annotation, mark-up, and a measuring tool. This pilot version of iDigPaleo is configured for use as a tool for education, with registration categories that allow for creating and sharing virtual collections as the basis of classroom activities, and for educators to view and comment on annotations, measurements, and other activities undertaken by individual students or groups working with the on-line toolset. In July 2015, the Yale Peabody Museum carried out initial testing of iDigPaleo in a 2-day workshop in July, 2015 for middle and high school teachers. As part of

the workshop, teachers were given background information on the Fossil Insect Collaborative, the federal level digitization initiative and several examples of research methods and outcomes using digitized data (all non-insect projects) by PIs Butts and Norris and two postdoctoral fellows currently working with data from the Yale collections. A discussion of potential applicability to state curriculum goals was led by David Heiser and Armand Morgan from the Museum's education department. The schedule, many of the talks, notes, and lesson plans can be found on the workshop web page (http://peabody.yale.edu/collections/invertebrate-paleontology/idigpaleo-teacher-workshop-2015). Following this initial orientation, participants were basic training in the use of iDigPaleo by developer Seth Kaufman (Whirl-i-Gig) and then split into small groups to explore the available functionality. In the final session of the workshop, the attendees worked in teams to develop sample lesson plans (one middle school and one high school), which form the main products of the workshop. In addition, the participants provided valuable feedback on tools they would like to see developed, primarily more guided content and accompanying background materials for classroom use. They plan to explore development of these resources in year 3 of the project.

Share and Identify Opportunities and Strategies for Sustainability

There is nothing to report.

Other Progress (that doesn't fit into the above categories)

A Yale undergrad (Gwen Antell) who worked on the project has submitted an abstract on Strepsipterans from the Green River Formation for the Geological Society of America Annual Meeting (Baltimore, MD: November 2015). Dr. El-Faramawi began scanning the Amber Archives for BFIP. She has scanned the contents (i.e., correspondence, manuscripts, loan paperwork, and other related documents) of 40 of the 85 folders (nearly 50% completed). The associated metadata and pdfs will be uploaded to DocuBase (https://docubase.berkeley.edu/) and linked to the UCMP online finding aid for the "Amber Files" currently hosted by Archon (ArchivesSpace). The metadata will be batch uploaded followed by the pdf uploads. The pdfs will be downloadable from either DocuBase or ArchivesSpace. Though not a task funded by the BFIP, this resource will be used in highlighting the rich history of the amber collection, is useful to the current curatorial staff and for developing outreach and education activities relating to archives. MCZ hosted and assisted Mr. Manuel Dehon and Prof. Denis Michez, from the University of Mons, who both visited the MCZ fossil insect collection to examine extinct bees (Hymenoptera: Anthophila) for coding their diagnostic characters and including them in phylogenies with extant taxa. They also provided images of two of the most iconic fossils from the MCZ, i.e., Meganeuropsis permiana and Prodryas persephone, to Michael Engel for a publication in the journal Current Biology on insect evolution. Lastly, we held a virtual TCN meeting at the end of September to introduce new collaborators and gauge the current status of the overall project.

Attachment

N/A

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: 09/28/2015 - 11:29

Progress in Digitization Efforts

See attached report

Share and Identify Best Practices and Standards (including Lessons Learned)

See attached report

Identify Gaps in Digitization Areas and Technology

See attached report

Share and Identify Opportunities to Enhance Training Efforts

See attached report

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

See attached report

Share and Identify Opportunities and Strategies for Sustainability

N/A

Other Progress (that doesn't fit into the above categories)

N/A

Attachment

https://www.idigbio.org/sites/default/files/webform/tcn-reports/GLIReport_092315.pdf

GREAT LAKES INVASIVES TCN – Bi-Monthly Report **Through Sept. 15, 2015**

Our four regional 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 (not photographed yet): 1000 (WIS) + 42,090 (NY) + 18,358 (ILLS) **= 61,448**
- Imaged only AND image uploaded to the portal (i.e., no data record yet): 6608 (OSU) + 9804 (ALBC) + 33,618 (MIN) **= 50,030**
- Imaged only but image not yet uploaded to the portal: 36,027 (NY) + 21,744 (F) + 18,358 (ILLS) + 5924 (MIN) **= 82,053**
- Databased only (skeletal or complete record) AND data uploaded to a portal (i.e., but not imaged yet): 6613 (MOR) **= 6613**
- Databased only but not yet uploaded to a portal: 69,462 (NY) + 30,588 (F) + 28,571 (ILLS) + 9624 (MOR) **= 138,245**
- Imaged and Databased but not yet uploaded to a portal: 33,054 (MICH)
- Both Image AND a Data Record Uploaded to iDigBio, to the GLI portal directly, or to another Symbiota portal: 59,000 (NY) + 16,800 (MICH) + 18,906 (TRT) + 3412 (CMC) + 38,253 (ILLS) + 10,219 (MOR) + 20,365 (MIN) + 79,535 (WIS) + 60 (ILL) + 10,230 (OAS) + 504 (QUE) + 13321 (QFA) + 1286 (JBM) + 35,383 (MT) + 7386 (MSC) + 26,521 (UBC) + 5745 (WIN) + 10,920 (TRTE) + 7255 (UWM) + 17,546 (MU) **= 382,647**

FISH:

- Imaged only AND image uploaded to a portal (i.e., no data record yet): 0
- Imaged only but image not yet uploaded to a portal: 1117 (F) + 450 (ILLS) **= 1567**
- Databased only (skeletal or complete record) AND data uploaded to a portal (i.e., but not imaged yet): 24,000 (ILLS) + 4709 (F) **= 28,709**
- Databased only but not yet uploaded to a portal: **200,000** (MICH: UMMZ) complete, but waiting for corresponding images to be completed before uploading
- Both Image AND a Data Record Uploaded to iDigBio, to the GLI Portal directly or to another Symbiota Portal for editing before transfer to GLI Portal: 262 (MICH: UMMZ) + 3522 (OSU) + 1371 (MIN) **= 5155**

MOLLUSKS

- Imaged only but image not yet uploaded to a portal: **3345** (MICH: UMMZ)
- Databased only (skeletal or complete record) AND data uploaded to a portal (i.e., but not imaged yet): **2000** (ILLS)
- Databased only but not yet uploaded to a portal: **16,688** (MICH: UMMZ)
- Both Image AND a Data Record Uploaded to iDigBio, to the GLI Portal directly or to another Symbiota Portal for editing before transfer to GLI Portal: **855** (MICH: UMMZ)

2) **Share and Identify Best Practices and Standards (including Lessons Learned)** Nothing to report

3) Identify Gaps in Digitization Areas and Technology

Having institutions from our region transfer images to us has proven to be somewhat complicated. We used Google Drive, since UMICH has unlimited space, but it was a bit convoluted to successfully download 19,000 images/160 GB from MU, since Google Drive limits the size of each download to a 2 GB zip file. Therefore, had to use a special computer program to do this. (MICH)

4) Share and Identify Opportunities to Enhance Training Efforts

The Field and Morton are working in tandem with the N.W. Harris Learning Collection at the Field Museum to develop an "Experience Box." This learning tool will be on loan available to area teachers. The Experience Box will contain lesson plans and tangible specimens for students to learn from hands on experience. The included specimens will represent native and non-indigenous species and provide valuable resources for students to generate real, meaningful data. As of September 15, we have had an initial meeting with the Field Museum educational staff and are planning regular meetings arranged to facilitate further collaboration. At the initial meeting we were introduced to examples of existing Experience Boxes and the loan system already in place at the Field Museum.

Two members of this TCN attended an iDigBio workshop on data management and digitization. This provided us with an opportunity to learn new skills as well as discuss issues and help other researchers working in other TCNs or other digitization projects.

5) **Share and Identify Collaborations with other TCNs, Institutions, and Organizations** We have been working with a few other institutions that are considering submitting a PEN proposal. At least one is likely to.

6) **Share and Identify Opportunities and Strategies for Sustainability**
Nothing to report

7) **Other Progress (that doesn't fit into the above categories)** Obtained 19,000 images and their corresponding skeletal records from MU; uploaded 17,800 of those images + records to the portal. (MICH).

Records were obtained from several Canadian herbaria during this period, thereby contributing to the large increase in plant specimen numbers.

INVERTNET: AN INTEGRATIVE PLATFORM FOR RESEARCH ON ENVIRONMENTAL CHANGE, SPECIES DISCOVERY AND IDENTIFICATION

Report submitted by: chdietri@illinois.edu
Report Submitted on: 09/28/2015 - 11:52

Progress in Digitization Efforts

Digitization efforts are ongoing at INHS and collaborating institutions, with a total of 7893 slide boxes, 6373 vial racks, and 2492 whole drawers digitized so far. A working group consisting of INHS and U of Illinois GSLIS personnel and a representative of the Volition, Inc., video game design company was formed to begin designing an educational video game/crowd-sourcing application for capturing label data from specimen images. The group has been meeting weekly and has created several design documents. Collaborator D. Dubin of U of I GSLIS has requested funding for a research assistant with programming skills to support this effort.

Share and Identify Best Practices and Standards (including Lessons Learned)

Nothing to report.

Identify Gaps in Digitization Areas and Technology

One problem with existing crowd-sourcing applications for specimen data transcription is that they are not sufficiently fun or engaging to attract large numbers of users. Gamefication is a strategy that may be used for this purpose but it has not been applied successfully to this kind of crowd sourcing.

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

Documenting Fossil Marine Invertebrate Communities of the Eastern Pacific - Faunal Responses to Environmental Change over the last 66 million years

Report submitted by: crmarshall@berkely.edu
Report Submitted on: 09/28/2015 - 12:03

Progress in Digitization Efforts

We held our first meeting of all the TCN's institution on Sept 17-19, with an agenda designed to get us all on the same page with respect our goals and approaches, potential partners and collaborators, novel education and outreach activities, as well as outline the best practices we hope to develop for paleontological data. These will be outlined in future reports.

Share and Identify Best Practices and Standards (including Lessons Learned)

Nothing to report (yet!).

Identify Gaps in Digitization Areas and Technology

Nothing to report (yet!).

Share and Identify Opportunities to Enhance Training Efforts

Nothing to report (yet!).

Share and Identify Collaborations with other TCNs, Institutions, and Organizations

Nothing to report (yet!).

Share and Identify Opportunities and Strategies for Sustainability

Nothing to report.

Other Progress (that doesn't fit into the above categories)

N/A

Attachment

N/A

DEVELOPING A CENTRALIZED DIGITAL ARCHIVE OF VOUCHERED ANIMAL COMMUNICATION SIGNALS

Report submitted by: es269@cornell.edu
Report Submitted on: 09/29/2015 - 11:33

Progress in Digitization Efforts

During the reporting period, our TCN digitized over 1000 audio recordings from several TCN partners. These recordings ("media specimens") are now available through the Macaulay Library website (MacaulayLibrary.org), and data are in the process of 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 digitizing anuran recordings associated with specimens from several TCN partners. During this reporting period we completed over 600 recordings associated with specimens from the Smithsonian Institution and the Texas Natural History Collection.
Orthopterans: Digitization continued on the David Weissman orthopteran collection with over 400 recordings processed since the beginning of August.

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

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: 10/12/2015 - 14:00

Progress in Digitization Efforts

See Attached Chart

Share and Identify Best Practices and Standards (including Lessons Learned)

We have been working on improving methods for imaging bound exsiccatae.

Identify Gaps in Digitization Areas and Technology

Imaging and transcribing bound exsiccatae is more challenging than individual flat sheets. A best practices document (video?) would be helpful.
Transcribing old handwritten labels can be difficult. It is made more challenging by the fact that place names were often Latinized and many collectors used abbreviations. It would be helpful to have a working group to share knowledge and ideas.

Share and Identify Opportunities to Enhance Training Efforts

see above

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)

N/A

Attachment

https://www.idigbio.org/sites/default/files/webform/tcn-reports/digitization%20numbers%2010-12-15.xlsx

				Percent Complete				
Digitizing Institution	**Start**	**Collections**	**Specimens**	**Records Created**	**On Portal**	**Imaged**	**Transcribed**	**Geo-referenced**
University of New Hampshire	Year 1	10	131,675					
New York Botanical Garden	Year 1	5	169,150					
University of North Carolina	Year 1	7	48,320					
University of Michigan	Year 1	5	95,892					
University of Washington	Year 1	3	36,102					
Duke University	Year 1	1	19,000					
University of Alaska SE	Year 1	1	9,889					
Bishop Museum	Year 1	1	65,000					
Field Museum	Year 1	1	47,798					
Oregon State University	Year 1	1	12,109					
University of Guam	Year 1	1	13,600					
University of California - Berkeley	Year 2	9	228,861					
University of Hawaii	Year 2	1	2,401					
Harvard University	Year 2	1	150,000					
Academy of Natural Sciences	Year 3	1	37,000					
University of Vermont	Year 3	1	3,500					
	Totals	49	1,070,297	682,747	620,450	499,851	399,286	252,954

				Change in Percent Complete				
Digitizing Institution	**Start**	**Collections**	**Specimens**	**Records Created**	**On Portal**	**Imaged**	**Transcribed**	**Geo-referenced**
University of New Hampshire	Year 1	10	131,675					
New York Botanical Garden	Year 1	5	169,150					
University of North Carolina	Year 1	7	48,320					
University of Michigan	Year 1	5	95,892					
University of Washington	Year 1	3	36,102					
Duke University	Year 1	1	19,000					
University of Alaska SE	Year 1	1	9,889					
Bishop Museum	Year 1	1	65,000					
Field Museum	Year 1	1	47,798					
Oregon State University	Year 1	1	12,109					
University of Guam	Year 1	1	13,600					
University of California - Berkeley	Year 2	9	228,861					
University of Hawaii	Year 2	1	2,401					
Harvard University	Year 2	1	150,000					
Academy of Natural Sciences	Year 3	1	37,000					
University of Vermont	Year 3	1	3,500					
	Totals	49	1,070,297	32,007	96,765	100,225	81,918	46,597

				Change in Number Complete				
Digitizing Institution	**Start**	**Collections**	**Specimens**	**Records Created**	**On Portal**	**Imaged**	**Transcribed**	**Geo-referenced**
University of New Hampshire	Year 1	10	131,675	14197	14197	14087	17621	1612
New York Botanical Garden	Year 1	5	169,150	-110	-110	5976	82	-43
University of North Carolina	Year 1	7	48,320	744	744	893	720	710
University of Michigan	Year 1	5	95,892	3793	3793	3776	1597	1321
University of Washington	Year 1	3	36,102	4663	4663	3529	4659	4591
Duke University	Year 1	1	19,000	0	0	0	0	0
University of Alaska SE	Year 1	1	9,889	0	0	0	0	0
Bishop Museum	Year 1	1	65,000	0	0	0	0	0
Field Museum	Year 1	1	47,798	0	0	7	669	0
Oregon State University	Year 1	1	12,109	0	0	0	0	0
University of Guam	Year 1	1	13,600	0	0	0	0	0
University of California - Berkeley	Year 2	9	228,861	0	9420	3523	648	638
University of Hawaii	Year 2	1	2,401	0	0	0	0	0
Harvard University	Year 2	1	150,000	8720	8720	6561	531	0
Academy of Natural Sciences	Year 3	1	37,000	0	0	0	0	0
University of Vermont	Year 3	1	3,500	0	0	0	0	0
	Totals	49	1,070,297	32,007	41,427	38,352	26,527	8,829
				32007	41427	38352	26527	