

## **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: 05/10/2016 - 00:27

### **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\\_May\\_2016.docx](https://www.idigbio.org/sites/default/files/webform/tcn-reports/SCAN_May_2016.docx)

**Southwest Collections of Arthropods Network Update**  
**May 27, 2016**  
**Neil Cobb**

**Progress in Digitization Efforts:**

We have exceeded our quota for digitizing labels from pinned specimens, the original goal was to obtain 736,736 records from the original 10 institutions and 958,736 total records when we included the three PEN projects. **Table 1** presents four sets of statistics derived from our data portal as of May 9, 2016. These contain the following data: 1) the original institutions that are funded by the NSF-ADBC program, 2) the three additional PEN grants; 3) institutions that have entered data into the SCAN portal but not funded by the NSF-ADBC program; 4) the total of these first three categories; 5) arthropod records produced by InvertEBase, and 6) the total records in the SCAN portal including museums that provide SCAN with an IPT or API to harvest their data and also provide data to aggregators GBIF and/or iDigBio. The purpose of serving this last category of data is to provide as complete as information as possible to persons

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 10 original museums receiving ADBC funding. SCAN PEN includes the three additional museums. SCAN non-funded numbers include 37 museums contributing cataloged specimen data and non-cataloged moth specimen data from 33 collections (5 private collections and 28 public museums). InvertEBase numbers refer to arthropod records contributed by the InvertEBase TCN. Total Served includes all SCAN data and other datasets with North American arthropod records (e.g., GBIF, Tri-Trophic TCN, iNaturalist).

	<b>SCAN Funded</b>	<b>SCAN PEN</b>	<b>SCAN non- funded</b>	<b>TOTAL SCAN</b>	<b>InvertEBase</b>	<b>Total Served</b>
Specimens	1,015,070	956,626	666,455	2,617,585	281,358	7,333,582
Georeferenced	851,018	596,677	365,217	1,782,218	77,160	5,363,889
Imaged	110,097	536	120,612	231,245	0	358,532
Species ID	549,532	335,945	434,154	1,297,814	76,578	3,870,997
Families	2,801	2,213	2,279	2,661	767	3,264
Genera	12,747	8,493	17,399	14,088	6,277	18,496
Species	29,753	25,333	46,684	56,646	19,172	95,021
Total Taxa	30,876	25,894	47,247	57,885	19,193	98,070

that are considering research projects. We do not serve all arthropod data available on aggregator portals, we focus on providers that have North American occurrence data that we have established an IPT link and the provider gives us explicit permission to serve their data. The only exception is North American spider data from GBIF.

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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 have 1,036,361 (108%) records to date for target ground-dwelling arthropod taxa and thus we expect to exceed 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 200,000 more ground-dwelling arthropod specimens by the end of the project and over 1.7 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. For the purpose of the bi-monthly reports I lumped all data provided by PEN institutions. For example, Ohio State University provided data prior to becoming a PEN collaborator and they have produced 415,076 records to date, of which only ~48,000 records represent the two focal taxa (Carabidae and Tenbrionidae) that they have targeted in their PEN project.

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). We have started to host iNaturalist records and 77% of those records have at least one image (145,484 total 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 <http://scan1.acis.ufl.edu/> .

**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 meeting this need by incorporating additional collections into the SCAN database, including observational records from iNaturalist.

**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 other Symbiota TCNs.

**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 and non-ADBC funded museums. Data are recorded from <http://symbiota1.acis.ufl.edu/scan/portal/imagelib/photographers.php>

Institution	# Images
<a href="#">Arizona State University Hasbrouck Insect Collection (ASU-ASUHC)</a>	1
<a href="#">C.P. Gillette Museum of Arthropod Diversity (CSU-CSUC)</a>	88
<a href="#">Colorado Plateau Museum of Arthropod Biodiversity (NAUF-CPMAB)</a>	2,300
<a href="#">Denver Museum of Nature &amp; Science (DMNS-DMNS)</a>	193
<a href="#">Entomology Collection at the Natural History Museum of Utah (UMNH-ENT)</a>	1,500
<a href="#">Essig Museum of Entomology (EMEC-EMEC)</a>	2,655
<a href="#">Florida Museum of Natural History, McGuire Center for Lepidoptera and Biodiversity</a>	148
<a href="#">Hymenoptera Institute Collection (UKY-HIC-HIC)</a>	27,067
<a href="#">Museum of Southwestern Biology, Division of Arthropods (UNM-MSBA)</a>	804
<a href="#">New Mexico State Collection of Arthropods (NMSU-NMSU)</a>	5,791
<a href="#">Ohio State C.A. Triplehorn Insect Collection (OSU-OSU)</a>	91
<a href="#">SDSU Terrestrial Arthropods Collection (SDSU-TAC)</a>	81,690
<a href="#">Texas Tech University - Invertebrate Zoology (TTU-TTU-Z)</a>	2,035
<a href="#">The Albert J. Cook Arthropod Research Collection (MSU-MSUC)</a>	109,266
<a href="#">UAM Insect Collection (UAM-UAM_ENT)</a>	4,445
<a href="#">United States National Museum, Entomology Collections (USNM-USNMENT)</a>	230
<a href="#">University of Arizona Insect Collection (UA-UAIC)</a>	3
<a href="#">University of Colorado Museum of Natural History Entomology Collection (UCB-)</a>	287
<a href="#">University of Hawaii Insect Museum (UHIM-UHIM)</a>	10,078
<a href="#">University of Kansas Natural History Museum Entomology Division (KU-SEMC)</a>	1
<a href="#">University of Tennessee at Chattanooga (UTC-UTCI)</a>	88
<a href="#">University of Vermont Zaddock Thompson Zoological Collection-Invertebrates</a>	2,300
<a href="#">Virginia Polytechnic Institute and State University Insect Collection (VPI-VTEC)</a>	193
<a href="#">Yale Peabody Museum, Entomology Division (YPM-ENT)</a>	1,500
iNaturalist	145,484
<b>Total Images Served on SCAN</b>	<b>410,080</b>

**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 83 data sets through SCAN (**Table 3**). There are five categories of data sets listed; 1) SCAN ADBC funded collections, including PEN projects; 2) SCAN collaborator collections that do not received ADBC funding, 3) Moth data collected from non-cataloged specimens, 4) Aggregator collections

(Data served directly to iDigBio/GBIF but also on SCAN) and 5) Arthropod records produced through InvertEBase. These latter two categories 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.

	<b>SCAN ADBC-Funded Collections</b>	<b>Specimens</b>
1	Museum of Comparative Zoology, Harvard University	487,397
2	Ohio State C.A. Triplehorn Insect Collection	415,076
3	Texas A&M University Insect Collection	231,480
4	Texas Tech University - Invertebrate Zoology	157,057
5	Denver Museum of Nature & Science	126,959
6	University of Arizona Insect Collection	90,238
7	C.P. Gillette Museum of Arthropod Diversity	83,814
8	University of Colorado Museum of Natural History Entomology Collection	80,836
9	New Mexico State Collection of Arthropods	78,872
10	Arizona State University Hasbrouck Insect Collection	74,691
11	Colorado Plateau Museum of Arthropod Biodiversity	58,191
12	Brigham Young University Arthropod Museum	54,153
13	Museum of Southwestern Biology, Division of Arthropods	32,932

<b>Table 3 (Continued)</b>		
	<b>SCAN collaborator collections (not funded through ADBC SCAN Project)</b>	<b>Specimens</b>
1	Yale Peabody Museum, Entomology Division	195,408
2	University of Hawaii Insect Museum	109,918
3	Santa Barbara Museum of Natural History Entomology Collection	107,223
4	The Albert J. Cook Arthropod Research Collection	80,726
5	Scarab Central: World Scarabaeoidea	37,999
6	Entomology Collection at the Natural History Museum of Utah	33,948
7	Hymenoptera Institute Collection	16,547
8	University of Tennessee at Chattanooga	11,761
9	R. M.Bohart Museum of Entomology	11,653
10	SDSU Terrestrial Arthropods Collection	4,240
11	University of Georgia Collection of Arthropods	3,343
12	University of Vermont Zadock Thompson Zoological Collection-	3,030
13	Virginia Polytechnic Institute and State University Insect Collection	3,006
14	The Purdue Entomological Research Collection	2,917
15	United States National Museum, Entomology Collections	2,498
16	Academy of Natural Sciences, Entomology Collection	1,983
17	National Museums of Kenya, Invertebrate Section	1,055
18	Dugway Proving Ground Natural History Collection	879
19	M. Andrew Johnston Collection	799
20	Western Washington University Insect Collection	656
21	Gregory P. Setliff Collection - Kutztown University	577
22	University of Delaware Insect Research Collection	563
23	Utah Department of Agriculture and Food Entomology Collection	425
24	Oregon State Arthropod Collection	420
25	Denver Botanic Gardens Collection of Arthropods	300
26	Milwaukee Public Museum, Invertebrate Zoology-Insect Collection	79
27	BLM Mother Lode Field Office: The Bees of Pine Hill Preserve	64
28	Florida Museum of Natural History, McGuire Center for Lepidoptera and	44
29	Ed V Gage Collection	1
30	Wichita State University Collection	1
	<b>Collections set up in SCAN but no records to date</b>	<b>Specimens</b>
1	BLM Mother Lode Field Office: The Bees of Pine Hill Preserve	0
2	Clemson University Arthropod Collection	0
3	Colección Zoológica de la Universidad Autónoma de Querétaro	0
4	Enns Entomology Museum	0
5	Florida Museum of Natural History, McGuire Center for Lepidoptera and Biodiversity	0
<b>Table 3 (Continued)</b>		

6	ILTER Central Arizona Phoenix Arthropod Collection	0
7	M. Andrew Johnston Collection	0
8	The Mississippi Entomological Museum	0
9	University of Minnesota Insect Collection	0
10	University of Nevada, Reno, Museum of Natural History	0
11	Wichita State University Collection	0
12	William F. Barr Entomological Museum	0
13	Wisconsin Insect Research Collection	0
	<b>Collections from Moth specimen survey (Chris Grinter - Coordinator)</b>	
1	Moth Observations Database: UC Berkeley	10,580
2	Moth Observations Database: UC Davis	5,145
3	Moth Observations Database: Denver Museum of Nature & Science	4,118
4	Moth Observations Database: LA County Museum of Natural History	4,097
5	Moth Observations Database: California Academy of Sciences	2,847
6	Moth Observation Database: Field Museum of Natural History	2,319
7	Moth Observations Database: California Department of Food and Agriculture	1,646
8	Moth Observations Database: Canadian National Collection	751
9	Moth Observations Database: Tom Dimock Personal Collection	689
10	Moth Observations Database: National Museum of Natural History	567
11	Moth Observations Database: UC Riverside	335
12	Moth Observations Database: Paul and Sandy Russel Personal Collection	315
13	Moth Observations Database: University of Connecticut	235
14	Moth Observation Database: Santa Barbara Museum of Natural History	211
15	Moth Observations Database: American Museum of Natural History	182
16	Moth Observations Database: San Diego Natural History Museum	155
17	Moth Observations Database: Peter Jump Personal Collection	63
18	Moth Observation Database: Kansas State University	61
19	Moth Observation Database: David L. Wikle Personal Collection	49
20	Moth Observations Database: Colorado State University, Fort Collins	25
21	Moth Observations Database: Chuck Harp Personal Collection	1
22	Moth Observations Database: Illinois Natural History Survey	1

<b>Table 3 (Continued)</b>		
	<b>Aggregator Collections (Data served directly to iDigBio/GBIF but also on SCAN)</b>	<b>Specimens</b>
1	University of Kansas Natural History Museum Entomology Division	1,250,770
2	Tri-Trophic TCN	759,378
3	AntWeb	562,638
4	UAM Insect Collection	250,054
5	North American Bee Collections	351,520
6	University of Alberta Museums Entomology Collection (UASM)	303,837
8	Tri-Trophic Interactions - Texas A&M	139,170
9	GBIF NA spiders Extract without Location Information	65,362
10	GBIF NA spiders Extract with Location Data	56,263
	<b>InverteBase TCN Records</b>	<b>Specimens</b>
1	Field Museum of Natural History Collection of Insects, Arachnids, and	268,672
2	Cleveland Museum of Natural History Invertebrate Zoology Collection	12,686



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

Report submitted by: akuhn@illinois.edu  
Report Submitted on: 05/12/2016 - 14:40

### Progress in Digitization Efforts

- Miami University switched from MaCC to MiCC (week of 28Mar-1Apr2016)
- Purdue University's Arthur Fungarium (PUR) uploaded over 100,000 records (31Mar2016)
- Michigan State's collection (MSC) added to MyCoPortal to begin digitizing
- Teresa Iturriaga was hired to begin georeferencing the ILL Collection (25Apr2016)
- Digitization of NEB's collection began (Apr2016)
- Progress for April and May includes 29,195 new records and 73,515 new images uploaded to the MyCoPortal

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

- Improved efficiency of image processing procedures and created new workflow document for the project website

### Identify Gaps in Digitization Areas and Technology

Nothing to report

### Share and Identify Opportunities to Enhance Training Efforts

- Trained new team members (2 people) at Purdue (29Mar2016)
- Trained participants (5 people) at Academy of Natural Sciences (12Apr2016)

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

- PI serves as Co-Chair of the Symbiota Working Group and hosted a meeting on 25Apr2016

### Share and Identify Opportunities and Strategies for Sustainability

- Continuing work to develop new image ingestion protocol

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

N/A

### Attachment

N/A

## DIGITIZING FOSSILS TO ENABLE NEW SYNTHESSES IN BIOGEOGRAPHY- CREATING A PALEONICHES

Report submitted by: blieber@ku.edu  
Report Submitted on: 05/14/2016 - 13:29

### Progress in Digitization Efforts

Paleoniches Update, May 2016

Regarding the University of Kansas portion of the project, led by PI Bruce S. Lieberman, we now have a total of 240,758 specimens databased. Further, we now have a total of 198,590 databased specimens that are also georeferenced. In addition, a total of 7,985 localities have been georeferenced. Since the last update to iDigBio, we have hired a new collections manager who will begin working in approximately 2 weeks. We are also continuing to database and georeference our cnidarian holdings. Other major taxonomic groups have been completely databased and georeferenced. In addition, we have been granted a no cost extension and will be continuing our work on the project through June 2017.

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

Miami: we have completed, with a few exceptions, the electronic cataloging of our remaining specimens that were previously only in our paper catalog. Given that nearly all of the localities represented by these specimens are ones that we have already georeferenced, then it's mostly a matter of pairing the new entries with the appropriate locality information, putting the data into the proper format, and then uploading them into Specify. I will spend some time over the next few weeks getting the data into the proper format for uploading into Specify.

Ohio University:

As we wrap up NSF funding, our efforts have shifted from new content development to proofreading and general user improvement of the Ordovician Atlas. During the past two months, efforts have focused on editing and proofreading the 553 web pages within the Ordovician Atlas website. Two students have been engaged in this work through a combination of NSF and Ohio University funding. Web traffic has averaged nearly 500 visitors and 150 views per week during this interval.

Cincinnati museum center:

They have completed their work associated with the project and are working on sharing the records in their KeEmu database with iDigBio, and hope to have that accomplished sometime this summer.

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

Since the last report, PI Hendricks received a no-cost-extension from NSF to continue working on the Digital Atlas and outreach aspects of the PALEONICHES-TCN. Currently, Hendricks is focused on developing educational materials that tie in with the Neogene Atlas (<http://www.neogeneatlas.org>). First, he is writing a guide to snail shell morphology for all users of the website. This online guide will contain numerous novel images for teaching that will be made publically available through Creative Commons licensing. After this is complete, he will focus on developing a digital "scavenger hunt" classroom exercise wherein students will search for shells on the Neogene Atlas that show particular features (based on the content of the mentioned guide). His goal is to have both this user guide and scavenger hunt exercise completed and online by the time of the next update.

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

They have completed their work on this project.

And at Yale: From PI Susan Butts:

They have completed their work on 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)

A paper describing research results from our project has been published in the journal *Lethaia*. Bruce Lieberman from KU is a co-author along with a former graduate student Erin Saupe, who was supported by the grant, and is now a post-doc at Yale.

### Attachment

N/A

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## 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: 05/15/2016 - 22:31

### Progress in Digitization Efforts

All SERNEC:

There are 55 collections serving data through the SERNEC portal. There are currently 1,426,094 specimens records and 89,893 (6%) of those records are georeferenced. There are currently 744,691 imaged specimen images available.

Georgia:

GA imaged 15,500 specimens during the reporting period (114,000 to date).  
GAS imaged 3,426 specimens during the reporting period (6,345 to date).

Kentucky:

EKY is continuing to image. They are currently in the process of hiring two students to image over the summer months.  
KNK is currently in the process of hiring two students for summer imaging to begin May 30.

Mississippi: A new student will begin georeferencing on May 16, 2016. IBE continues to image and should be finished this summer.

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

All SERNEC:

The SERNEC – TCN protocols continue to be updated as needed and are posted on the SERNEC resources site (<http://sernec.appstate.edu/resources>).

### Identify Gaps in Digitization Areas and Technology

All SERNEC: Nothing to report.

Mississippi: MISSA needs to transfer images from their project server to the Symbiota portal. This work will take place during the next reporting period.

### Share and Identify Opportunities to Enhance Training Efforts

All SERNEC: Nothing to report.

Georgia: GA created a specimen imaging activity sheet for a Plant Taxonomy laboratory.

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

All SERNEC:

SERNEC members remain active in the Symbiota and Education and Outreach iDigBio working groups.  
SERNEC members participated in the Coding Phenological Data from Herbarium Sheets held in Berkeley, California on March 12th and 13th. More information can be found on the workshop website:  
[https://www.idigbio.org/wiki/index.php/Coding\\_Phenological\\_Data\\_from\\_Herbarium\\_Sheets](https://www.idigbio.org/wiki/index.php/Coding_Phenological_Data_from_Herbarium_Sheets)

### 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:       patrick.sweeney@yale.edu  
Report Submitted on:       05/16/2016 - 10:37

### **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 705738 records and 722349 images have been captured. We have begun to capture phenology data using new functionality in Symbiota.

### **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. In collaboration with Ed Gilbert, we implemented trait attribute scoring functionality within Symbiota.

### **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

**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: 05/16/2016 - 11:34

**Progress in Digitization Efforts**

See attached document.

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

See attached document.

**Identify Gaps in Digitization Areas and Technology**

See attached document.

**Share and Identify Opportunities to Enhance Training Efforts**

See attached document.

**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/Summary%2520report%2520GreatLakes\\_NSF\\_YearTWO.pdf](https://www.idigbio.org/sites/default/files/webform/tcn-reports/Summary%2520report%2520GreatLakes_NSF_YearTWO.pdf)

## **Integrated Project Summary report YEAR TWO (July 2015 – May 2016)**

Digitization TCN Collaborative Research:  
DOCUMENTING THE OCCURRENCE THROUGH SPACE & TIME  
OF AQUATIC NON-INDIGENOUS FISH, MOLLUSKS, ALGAE, & PLANTS  
THREATENING NORTH AMERICA'S GREAT LAKES (= "Great Lakes Invasives TCN [GLI]")

### **PARTICIPANTS**

Approximately 58 individuals from the 20 primary institutions funded by this effort have been engaged in the GLI-TCN during year two. These represent faculty, curators, permanent and temporary staff, graduate and undergraduate students. Additional participants will join the effort in year three as originally scheduled.

### **ACCOMPLISHMENTS**

The overall goals of the Great Lakes Invasives TCN project are:

- (1) To digitize ca. 1.73 million specimens from 2,550 species in 101 genera, specifically:
  - 1a) >637,000 plant specimens +
  - 1b) >102,000 fish lots (containing >681,000 fish specimens) +
  - 1c) >44,000 mollusk lots (containing >408,000 mollusk specimens)
- (2) To harvest & organize significant data associated with collections using Symbiota portal software
- (3) To share specimen images and data with the greater scientific community using project-specific Symbiota portal(s) and the iDigBio National Resource
- (4) To promote cross-collection efforts in the study of aquatic/invasive species among at least 18 herbaria + 8 zoological museums from 7 states + Canada
- (5) To promote the use of collections data by educators and the public

Specimen Digitization Year One + Two Cumulative:

**TARGETED PLANT SPECIMENS BY USA HERBARIA**

Records Uploaded to iDigBio, the GLI Portal and/or to another Symbiota Portal = **448,703**  
[of which 89,337 (20%) have been georeferenced; 340,366 (76%) imaged]

*In addition . . .*

Barcoded only = 15,232

Imaged only but image not yet uploaded to the portal: = 102,646

Databased only but not yet uploaded to a portal: = 147,848

Imaged and Databased but not yet uploaded to a portal: = 20,775

\*Note that the new 'Consortium of Midwest Herbaria' Symbiota portal, which is directly related to this TCN, now has **1,154,500** occurrence records available from 21 herbaria. Only a subset of these records represent the target taxa for the GLI-TCN, but all of these will eventually be ingested by iDigBio. This portal is being administered by the same team overseeing the GLI TCN.

**TARGETED PLANT SPECIMENS BY CANADA HERBARIA**

Records Transferred to the GLI Portal from Canadensys = **122,816**  
[of which 57,504 (47%) have been georeferenced; 14,278 (12%) imaged]

**TARGETED FISH**

Records Uploaded to iDigBio, the GLI Portal &/or another Symbiota Portal = **51,470**  
[of which 11,883 (23%) have been georeferenced; 18,802 (37%) imaged]

*In addition . . .*

Imaged but not yet uploaded to the GLI portal: = 8,800

Databased only but not yet uploaded to a portal: = 204,709

**TARGETED MOLLUSKS**

Records Uploaded to iDigBio, the GLI Portal &/or another Symbiota Portal = **30,011**  
[of which 5,979 (20%) have been georeferenced; 2,039 (7%) imaged]

*In addition . . .*

Barcoded Only = 200

Imaged only but image not yet uploaded to a portal: = 9,981

Databased only but not yet uploaded to a portal: = 16,308



### Other Activities in Year Two:

- Plant digitization was completed in year two by several institutional partners. Others are nearing completion. Fish and mollusk digitization efforts have ramped up considerably in the past year, with many databased records and images added to the portal since year one.
- Data from the unfunded Canadian partners via Canadensys was contributed to the GLI portal in July, 2015 adding >100,000 plant specimens records.
- Additional partners were trained in year two. Specifically portable digitization workstations were loaned to UW-LaCrosse and to Butler University, where staff and student workers received training in plant digitization. Data collection is underway by both partners.
- At least 6 TCN representatives attended the iDigBio summit in Washington, DC in November, 2015. Co-PI Andrew Simons gave a 10 minute presentation on the project.
- PI Cameron (WIS) attended the iDigBio workshop on using specimen data to address issues of global change 2-3 December, St. Louis, MO.
- Two members of this TCN attended an iDigBio workshop on data management and digitization in September, 2015. 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.
- PI Cameron prepared four bi-monthly progress reports for iDigBio and participated with others in regularly scheduled bi-monthly TCN Administration Meetings.
- PI Cameron and several Co-PIs have participated in the monthly Symbiota Working Group meetings via Adobe Connect.
- A new PhD graduate student Project Assistant at UW-Madison began participation in the TCN as part of his training in plant systematics and museum studies. Sept 2016.
- The PI assisted the Milwaukee Public Museum with submission of a PEN grant proposal to NSF to join the GLI TCN, which was deemed meritorious, but not recommended for funding.

## Outreach Activities in Year Two:

- 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, 2015, 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. Scientific content of the Experience Box was reviewed by Dan Larkin at the University of Minnesota. We are on track to have the Experience Box in classrooms mid to late 2016.
- The Education and Outreach Coordinator attended the Michigan Consortium of Botanists meeting on October 24, 2015. At this meeting she presented our TCN’s outreach strategies and networked with botanists interested in sharing the Experience Box’s educational materials. Half of the day’s presentations were focused on invasive species research, reporting, and control strategies. Of particular interest was learning more about MISIN (Midwest Invasive Species Information Network). MISIN has an online invasive species records database and specializes in optimizing occurrence reporting. We will be contributing our data records to MISIN.
- The Outreach Coordinator (MOR) is writing tutorials for databases receiving records from the TCN. These will be used in teacher training and professional user workshops.
- Native and invasive look-alikes identification materials’ first draft is almost complete. The guide includes line drawings, herbarium specimen images, and in-situ photos. The ID guide will be included in the Experience Boxes and will be available online.
- The Outreach Coordinator began sharing data with MISIN, GLANSIS, and GISD. We shared select images with GLANSIS and Bugwood depending on which species they wanted. More images will be uploaded to Bugwood in the future.
- The Outreach Coordinator is attending iDigBio Education and Outreach working group webinars and is collaborating with other members of the working group to submit proposals for the 2017 National Science Teachers Association Conference and the 2016 meeting of the National Association of Environmental Educators.
- A news story out of the Univ of Michigan, “Digitizing the U-M Herbarium collections: Great Lakes invasive species update”, was published Sept 11, 2015.

### Highlights of IT Activities

- AZ State Univ (representing Symbiota) has employed two programmers and one data jockey contributing to the maintenance, development, and overall support of the infrastructure supporting the TCN data portals, including the Aquatic Invasive and Midwest consortium projects.
- Roughly 60-80% of the ASU effort spent on the TCN related tasks involve server and database maintenance, data migration, data cleaning, and other non-development (programming) tasks. The remaining tasks tend to involve programming, software development and maintenance of the portal software (e.g. updates, repairing buggy code) . One can access full details of the programming tasks via the code repository submission history links listed below. Over the 2015 period, the ASU Symbiota team submitted 470 code submissions, which is probably more than any other year since the original Symbiota grant.

### **PUBLICATIONS AND PRODUCTS**

- Three primary websites have been developed specifically for this project:  
<http://herbarium.wisc.edu/GreatLakes.htm> &  
<http://greatlakesinvasives.org> &  
<http://midwestherbaria.org>
- An undergraduate Biology major completed 3 hours of Directed Study at UW-Madison on the topic of “Spatial and temporal spread of non-indigenous species of the Great Lakes using herbarium data at a regional scale” which resulted in an unpublished student thesis.
- At least three abstracts have been submitted by Co-PIs who will be presenting papers and posters about the TCN at national meetings in summer-fall 2016.
- Partners at Univ of Michigan & Central Michigan Univ produced an outstanding online video showcasing the project . . . *“Aquatic Invasive Plants: Following the Data”* Science LIVE. <https://vimeo.com/156926248>

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

Report submitted by: chdietri@illinois.edu  
Report Submitted on: 05/19/2016 - 16:59

### **Progress in Digitization Efforts**

Digitization efforts are ongoing at INHS and several collaborating institutions, focusing primarily on whole drawer scanning of insects but also including the INHS crayfish collection. To date, 51,669 total images have been uploaded including 3,448 whole drawer image sets.

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

Nothing new to report.

### **Identify Gaps in Digitization Areas and Technology**

Due to ongoing maintenance issues with our current cyberinfrastructure, permanent IT staff at INHS/U of Illinois have developed a plan to migrate into a different platform over the next 7 months. The current system provides basic image display, record browsing, and simple metadata tag assignment but the current HUBzero software is no longer supported, and is not sustainable for future development. Software upgrades along with complete content migration, functional improvements, and the completion of hardware infrastructure integrations will provide an appropriate platform for disseminating specimen level data and images for biodiversity scientific inquiry from both scientists and nonscientists. Invertnet.org software updates will build on existing hardware infrastructure, with minimal additional infrastructure investments, using cost effective open source software which is well established as a sustainable technology, provides an up to date code base, is thoroughly documented, and flexible in order to encourage future development of applicational functions to continue to make data accessible to invertnet collaborators and stakeholders.

### **Share and Identify Opportunities to Enhance Training Efforts**

Nothing new to report.

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

Invertnet collaborator Jen Zaspel (Purdue U.) is working with the developers of Inselect, a software package that facilitates automated segmentation and annotation of whole-drawer images containing multiple specimens. The Inselect development team is working on customizing the software so that annotations captured for top-down drawer images can be automatically applied to tilted images of the same drawer included in Invertnet drawer image sets.

### **Share and Identify Opportunities and Strategies for Sustainability**

See above under "Identify Gaps in Digitization Areas..."

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

Nothing new 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: eclites@berkeley.edu  
Report Submitted on: 05/20/2016 - 16:35

### Progress in Digitization Efforts

As of 5/20/2016, the TCN has digitized 116,713 specimens and photographed 12,758 specimens. 7534 TCN specimens are currently being served to iDigBio via the Berkeley Natural History Museum's IPT. We have also georeferenced 4993 localities.

**Georeferencing:** UO has completed cleaning of Oregon locality data shared from other TCN partners, and has begun collaborative georeferencing work of all Oregon localities from TCN. Many of the localities shared from other TCN partners had issues with their political geography and/or were not from marine rocks. UO compiled a list of problems and their potential corrections to share at the next TCN meeting. UO has created a workflow to average georeference data for their localities in Specify to the nearest 0.1 degree. It involves a MySQL script run on the database in a database manager, so it may not be an ideal solution for all TCN partners, but it works. They will share it with partners at the next TCN meeting. At UCMP, georeferencing of USGS localities marked on paper maps is nearly finished. Georeferencing of township and range coordinates from AK, CA, OR and WA using AllTopo continues. UCMP has begun using ArcGIS for georeferencing including compiling reference layers for AK and testing georectifying maps using ArcGIS. Students at UCMP transcribed hundreds of localities from ledger books to facilitate future georeferencing. At the Burke, hand-drawn maps were photographed and attached to locality records.

**Formations:** Collaboration with Chuck Powell at USGS continues to improve and refine CA concordance of marine formations.

**Taxonomy:** LACM and CAS continue to refine and revise their taxonomic concordances. TCN partners have started to compare their specimen data with these sources and update their identifications as appropriate. The Burke are generating species checklists for Washington and Oregon, including name status and synonymies. UCMP checked all Kettleman Hills specimen records using OpenRefine for internal consistency and corrected records as appropriate.

**Original source material digitized:** At the Burke, one PhD dissertation was scanned. CAS has on-going transcription of the H.G. Schenck Collection catalogs (50% complete). Ongoing digital scanning of CAS Geology Catalogues. 1.5 of eight CAS catalogues has been transcribed (2,393 unique records).

**Data cleaning:** Continued compilation and cleaning of currently databased locality data at CAS (6,989 unique records) for batch georeferencing. Continued cleaning and restructuring of currently databased records (FileMaker Pro) for conversion to Specify7 via MySQL (approx. 60% complete). New MySQL database created to accommodate the work being done under this grant is fully functional and receiving new records. This database will eventually serve as the database for the entire CAS fossil collection.

**Workflows:** NMNH received Golden Thread photography system and plans to begin trials using it soon.

**Pre-digitization curation:** Inventory of collections has continued at LACM. Considerable "unknown" localities (not previously identified in locality registry) are being found in the collection. This will add 100s (probably less than a 1000) of additional localities that are within the scope of the EPICC grant. LACM continues rehousing and splitting of specimen lots, as well as specimen washing and preparation. PRI continues to prepare specimens for digitization by checking taxonomy and authorities, as well as separating and segregating material by locality.

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

**Workflows:** Having a species checklist within the database speeds data entry considerably. Databasing then photographing mass groups leads to the fastest workflow. UCMP created a worksheet to accompany each drawer as it is being cataloged. The sheet tracks who is labeling the specimens and completing the spreadsheet to upload specimens, who uploaded the spreadsheet into the database and who did the final checks before putting the tray away. The sheet also records the original location of the tray in the collection as well as the locality numbers and specimen numbers in the tray. These sheets will be archived once the drawers are returned to the collection. UCMP agreed upon image acquisition standards for specimen photography based on imaging trials.

Georeferencing: GeoLocate cannot handle locality strings with carriage returns, special characters (“, ‘, /) or more than 250 characters. UO has been cleaning the Oregon data to fix this issue.

### Identify Gaps in Digitization Areas and Technology

Workflow: At the Burke, some specimens are not identified, and some specimens require differing levels of preparation and cataloging effort, which can slow progress at times. Workflow is uneven.

Cataloging and Databasing: LACM is still awaiting arrival of KE-Emu platform, but design is well underway. They anticipate data migration in late 2016. LACM now needs a second digitization workstation. Equipment will be purchased shortly so that they can accommodate two simultaneous cataloging stations.

Georeferencing: UAM reports that old specimens with poor locality data (e.g. on east side of mountain) has made georeferencing difficult. Working with local communities to gather additional georeferencing data might be a useful avenue to explore. UO is having trouble with GeoLocate using previously georeferenced sites to help inform the work of georeferencing new sites from other TCN partners. They are actively pursuing a solution.

Photography Equipment/Storage: UCMP has ordered and received the components for a dedicated photo station in order to take photos tethered to the computer.

Sending data to iDigBio via IPT: PRI is waiting for VertNet to reply in reference to serving their first test batch of records.

### Share and Identify Opportunities to Enhance Training Efforts

Burke currently has one student trained in georeferencing and two students trained in cataloging and databasing specimens. CAS has trained 1 postdoc and 2 graduate students in taxonomic identification techniques, digitization standards and techniques, collections cataloging and handling protocols. Trained 3 CAS Careers in Science high school interns in specimen image acquisition, photo stacking and editing, and cataloging techniques. Trained 8 CAS Careers in Science high school interns in cataloging techniques and collections handling protocols. Trained 3 volunteers in cataloging techniques and collections handling protocols.

Attended 2 iDigBio webinars hosted by the Paleo Digitization Working Group. Christine Garcia attended the iDigBio vertebrate digitization workshop at UCB. LACM ran an informal georeferencing clinic for student interns, volunteers and research associates. UCMP trained one undergraduate student in transcribing localities from USGS ledgers. Extensive training for one undergrad in specimen photography, including using low-angle light to introduce shadow and how to use a StackShot system for image stacking.

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

Made standard views of invertebrates document available via our TCN webpage. LACM continues to work with students from California State University Dominguez Hills and Long Beach City College on photography, cataloging, and pre-digitization activities. LACM has a formal agreement with CSUDH in doing this, and considers them an EPICC collaborator. LACM has trained and have working for them a number of volunteers from the Southern California Paleontological Society. They expect a 2-3 fold increase in SCPS members volunteering for us by the end of 2016. UCMP corresponded with museum staff at San Diego Natural History Museum and Chuck Powell (USGS, retired) about georeferencing resources for Baja California. UCMP corresponded with Alaska Heritage Resources Survey and State of Alaska Geospatial Analyst on best tools to determine the appropriate Alaska TRS meridian based on the topographic map quadrangle.

### Share and Identify Opportunities and Strategies for Sustainability

Attract student interns from underprivileged local education institutions. LACM currently has 7 such students (5 minority students). The students earn credit and are doing extraordinary work for no cost. LACM will employ some of these students as they complete their semester-long internship, and they will serve as mentors to the next cohort. Working with amateur paleontology organizations, who are very enthusiastic for participation in genuine scientific investigations/activities.

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

Our next TCN virtual meeting will be held June 8.

At the Burke, specimen data is available and searchable through the Burke Museum website, which is updated daily.

### Attachment

N/A

## 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: 05/23/2016 - 16:36

### Progress in Digitization Efforts

#### AMNH:

- The AMNH has completed the most complex part of the fossil insect databasing: the amber collection. Amber is very challenging because individual pieces often contain multiple inclusions, and pieces are typically lens-shaped, the latter making it difficult for photomicrography unless some preparation is done.

#### CU-Boulder:

- Acquired 1211 images from March 1st, 2016-May 20th, 2016.
- 701 new specimen records were added to Specify during this period and several hundred additional records have been updated with respect to determination and body description.
- D. Zelagin, collections assistant, continues to image our type specimens and general collection of Green River insects.
- We are still working through issues with our imaging equipment and had to have the flash box repaired again. We were able to obtain a loner flash box from Visionary Digital while ours was out for repair, so we haven't had to take a break from imaging.
- We hired two new undergraduates to work on imaging and data entry over the summer.

#### Yale-Peabody:

- Digitization is complete and all data are being shared with iDigBio.

#### VMNH:

- 657 specimen records and 657 images are now available through VertNet and in turn iDigBio, GBIF, and iDigPaleo, with 1953 specimen records and 1787 images awaiting upload to the VertNet IPT for dissemination to the aggregators.
- We are using Flickr to host the images for the specimen records being shared to iDigBio. As a small museum, VMNH can utilize this free image-hosting resource that not only allows us to publish our images online but within a platform that appeals to a wider public audience.

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

Harvard-MCZ: Developed a technique for dissolving lacquer that was originally applied to the surface of compression fossils to increase its contrast, and that as it fractured over time was today hampering the observation of the specimens. A treatment with ethanol is first used, followed by one with acetone and mechanical removal of the partially dissolved lacquer.

### Identify Gaps in Digitization Areas and Technology

There is nothing to report.

### Share and Identify Opportunities to Enhance Training Efforts

There is nothing to report.

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

We are continuing to work with the ePANDDA group to share data between iDigBio, iDigPaleo, and the Paleobiology Database. Representatives from iDigPaleo attended the latest ePANDDA meeting and are planning to attend the next end user meeting in September at the GSA annual meeting in Denver.

### Share and Identify Opportunities and Strategies for Sustainability

There is nothing to report.

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

We are in the process of planning our next TCN meeting, which will be held at the MCZ in November 2016 directly after the iDigBio summit.

Harvard-MCZ:

Hosted and assisted Mr. Richard Kelly, from the University of Bristol (UK), visiting the MCZ fossil

### **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: 05/24/2016 - 12:50

### Progress in Digitization Efforts

There are just over 1 million macroalgal herbarium specimens in the consortiums collections. To date, 721,514 specimen records have been uploaded to the macroalgae.org portal. of those, 557,046 have been imaged, 432,891 are completely transcribed and 358,163 have been georeferenced.

See the attached file for details.

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

nothing to report.

### Identify Gaps in Digitization Areas and Technology

A protocol/workflow document for digitizing bound exsiccatae would be very useful. Most of the loose herbarium sheets in our collections have been imaged, but there are a significant number of bound exsiccatae to be digitized.

### Share and Identify Opportunities to Enhance Training Efforts

nothing to report. All of the digitizing centers in the project have the training they need and can train new personnel at their institutions

### 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%205-10-16.pdf>

Digitizing Institution	Start	Collections	Specimens	Percent Complete				
				Records Created	On Portal	Imaged	Transcribed	Geo-referenced
University of New Hampshire	Year 1	10	131,835					
New York Botanical Garden	Year 1	5	169,150					
University of North Carolina	Year 1	7	55,339					
University of Michigan	Year 1	5	95,892					
University of Washington	Year 1	3	36,102					
Duke University	Year 1	1	22,014					
University of Alaska SE	Year 1	1	9,889					
Bishop Museum	Year 1	1	65,000					
Field Museum	Year 1	1	48,237					
Oregon State University	Year 1	1	12,120					
University of Guam	Year 1	1	13,600					
University of California - Berkeley	Year 2	9	228,862					
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	1,080,941	744,454	720,991	557,046	482,399	358,163

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## NORTH AMERICAN LICHENS AND BRYOPHYTES: SENSITIVE INDICATORS OF ENVIRONMENTAL QUALITY AND CHANGE

Report submitted by: cgries@wisc.edu  
Report Submitted on: 05/24/2016 - 18:17

### Progress in Digitization Efforts

As of May 2016 the number for the LBCC are as follows:

Lichens:

<http://lichenportal.org>

Herbaria actively submitting images or key stroked records to the portal: 81

Specimen records in portal: 1,927,043 (up by 20,370 since January 2016)

Specimen records with images: 710,752 (6671 labels have been imaged since January 2016)

Records with locality information: 1,918,540 (20,373 locality information where added since January 2016)

Currently 47% of lichen records are fully georeferenced

Bryophytes:

<http://bryophyteportal.org>

Herbaria actively submitting images or key stroked records to the portal: 75

during this period UBC withdrew its 167840 specimen records from the portal

Specimen records in portal: 2,224,726 (up by 52,788 since January 2016)

Specimen records with images: 1,194,637 (41,005 labels have been imaged since January 2016)

Records with locality information: 2,181,265 (50,482 locality information where added since January 2016)

Currently 28% of bryophyte records are fully georeferenced

### 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

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

N/A

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## DEVELOPING A CENTRALIZED DIGITAL ARCHIVE OF VOUCHERED ANIMAL COMMUNICATION SIGNALS

Report submitted by: msw244@cornell.edu  
Report Submitted on: 05/25/2016 - 16:06

### Progress in Digitization Efforts

Our TCN project has now digitized audio recordings from several different TCN partners, with 1,611 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. During the reporting period we have digitized 273 recordings from the Texas Natural History Collection, 133 recordings by Roy McDiarmid, 126 recordings by William Pyburn, and numerous recordings by additional researchers studying frogs.

**Orthopterans:** We have continued digitization work on the David Weissman orthopteran collection, with 459 new orthopteran recordings added during the reporting period.

**Birds:** We have also continued digitization work on the LSU bird collection by archiving 324 recordings from collector/recordist Dan Lane and 64 recordings by Mercedes Foster.

### 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

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

## 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: 06/01/2016 - 13:01

### Progress in Digitization Efforts

Progress in Digitization Efforts: \*

FMNH Invertebrates: R. Sommer entered 6413 records into collections database (573 freshwater bivalves, 2225 freshwater gastropods, 3615 terrestrial gastropods). S. Clark corrected 2051 names/combinations in 30 land snail families to the reference standard set late last year. Under the new standard set in February an additional 15 land snail families for a total of 1361 names/combinations have been completed, as well as 4 freshwater snail families for a total of 117 names/combinations. J. Gerber did troubleshooting for problematic freshwater bivalve names from the backlog and general collection. R. Sommer updated the taxonomy of the freshwater bivalves (Unionidae, Margaritiferidae, Sphaeriidae, Dreissenidae, and Cyrenidae) previously databased by her.

FMNH Insects: 36,375 specimens databased and barcoded to date with continued focus on Hymenoptera.

Zoological Museum, Michigan, Invertebrates: Students digitizing specimens: 1 graduate (20 hours/week) and 5 undergraduate students (~10 hours/week); 3351 records entered to UMMZ Specify database during 1/1 – 3/24/2016 (freshwater snails: 2004; land snails: 1847) Zoological Museum, Michigan, Insects: Two students at ca. 10 hrs/week until early May. May 12 and after 1 student at 24 hrs/week, cataloguing NA damselflies from UMMZ collection. Since January, approximately 4,715 damselflies catalogued. Since Starting the Zygoptera, they have catalogued over 10,000 specimens at the UMMZ. In addition, images have been taken of the paper triangles that contain extra information or have poorly written labels to be deciphered later.

DMNH: Work at DMNH proceeds on two fronts. First, we are updating data within the freshwater snails, particularly the families Pleuroceridae, Paludomidae and Pachychilidae. We have inventoried and improved the geography in over 7,000 lots, and have found and entered new data for over 850 lots. Second, we have begun the transition of our database to Specify v. 6. We have installed the database on our server, imported the schema and forms, and are working with dummy data to establish our workflows. Additional collaboration with Specify is expected as we move through the process.

CMNH: A total of 30,488 invertebrate specimens have been databased, primarily representing Mantodea (1,878) and Hymenoptera (28, 606). Of these records, ~10,000 were databased from Jan1-Mar 28 2015. An additional ~200 specimens have had barcodes added and labels imaged, and are awaiting transcription. Approximately 50% of the Hymenoptera collection is now digitized.

Auburn: Work at the AUMNH has included two major initiatives – continued data entry and georeferencing. Since the last reporting period ~20,000 records have been databased. Flat data format (entry) has been converted over to Specify/Access for important into GeoLocate - ~90,000 records have been batched georeferenced; we are now working out approaches to check latitude longitude records.

Frost: Currently 3 part-time assistants digitizing specimens, as well as 2 interns. To date, 25,738 odonate images taken, with approximately 17,000 uploaded to TaxonWorks. Collecting event data transcribed for over 1000 images.

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

FMNH Invertebrates: nothing to report

FMNH Insects: Currently in the process of establishing standards for EMu data entry for the insect division. This will reduce time spent on data clean-up in preparation for spreadsheet import. Enlisted the help of volunteers to work on updating taxonomic authority files of a select group of insects to properly identify and label unit trays within collection drawers. This pre-curation process enables staff to quickly enter specimen data without spending time on taxonomy. Attempted label imaging and determined this approach would be far more useful for large batches of specimens with identical collecting data. This did not prove to be time efficient for single, unique labels of collecting data. Depending on the insect group, the collecting data will be more suited to label imaging, e.g. specimens of Coleoptera are collected in far greater numbers within a single collection event than Odonata, therefore more individuals will share the exact same data.

Zoological Museum, Michigan, Invertebrates: nothing to report

Zoological Museum, Michigan, Insects: I find that it is best to not go back and “fix” records until the bulk of the records have been obtained – otherwise it’s just repeating effort. As one might expect with a large collection, many localities appear repeatedly that lack county names, etc., or are misspelled. It’s best to do a batch edit as the last part. I estimate that we will end up cataloging 20,000 Zygoptera before we are finished, as more specimens in triangles fit in a drawer than the Anisoptera. Sometimes we see 400 specimens in a drawer in tiny paper triangles, and that also slows down the process.

DMNH: DMNH is compiling information on how to setup a server and datasets for Specify and will share them when completed. The intended audience for this summary is Collections Staff of small museums who function without an on-site IT department.

CMNH: nothing to report

Auburn: nothing to report at this time

Frost: Currently making a Standard Operating Procedure document for best practices for georeferencing, based in part on the GBIF best practices doc. This will help part-time staff continue to next step of transcription on TaxonWorks.

### Identify Gaps in Digitization Areas and Technology

FMNH Invertebrates: nothing to report

FMNH Insects: Determined the possibility of using a Virtual Basic script written to simplify and expedite the process of refining spreadsheets to be imported into EMu. This will be tested shortly.

Zoological Museum, Michigan, Invertebrates: nothing to report

Zoological Museum, Michigan, Insects: nothing to report

DMNH: The family Pleuroceridae is almost 90% uncataloged. Over 750 new records were added.

CMNH: nothing to report

Auburn: Working out approaches to compile and georeference records.

Frost: nothing to report

### Share and Identify Opportunities to Enhance Training Efforts

FMNH Invertebrates: nothing to report

FMNH Insects: nothing to report

Zoological Museum, Michigan, Invertebrates: nothing to report

Zoological Museum, Michigan, Insects: nothing to report

DMNH: nothing to report

CMNH: nothing to report

Auburn: nothing yet to report

Frost: nothing to report

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

FMNH Invertebrates: nothing to report

FMNH Insects: nothing to report

Zoological Museum, Michigan, Invertebrates: nothing to report

Zoological Museum, Michigan, Insects:

DMNH:

CMNH: Received an update from Northeast Reintegration Center that their new IT system is currently being tested. We await further news on the upgrade of their IT system. Received a donation of ~4,000 identified hymenopteran specimens from Dave Horn, these are currently being digitized before being incorporated in to the Hymenoptera collection.

Auburn: nothing to report

Frost: nothing to report

### Share and Identify Opportunities and Strategies for Sustainability

FMNH Invertebrates: nothing to report

FMNH Insects: nothing to report

Zoological Museum, Michigan, Invertebrates: The University of Michigan participants are collaborating with the Great Lakes Invasive's TCN to make sure that data flows to both projects.

Zoological Museum, Michigan, Insects: I believe we will be importing our records into Specify, and then to the TCN via the IPT.

DMNH: nothing to report

CMNH: nothing to report

Auburn: nothing to report

Frost: nothing to report

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

FMNH Invertebrates: J. Gerber interviewed volunteer applicants. Three new volunteers were chosen, have been trained and have started to process newly databased lots (labeling, housing, numbering, etc.). R. Sommer printed new labels for 9000 databased biva

### Attachment

N/A