

# Bi-Monthly Progress Reports To iDigBio Submitted By Active Thematic Collections Networks (TCNs)

## December 2016

Reports included:

<input checked="" type="checkbox"/> InvertNet	<input checked="" type="checkbox"/> VACS	<input checked="" type="checkbox"/> MiCC
<input type="checkbox"/> LBCC	<input checked="" type="checkbox"/> FIC	<input checked="" type="checkbox"/> EPICC
<input checked="" type="checkbox"/> PALEONICHES	<input type="checkbox"/> MHC	<input checked="" type="checkbox"/> Cretaceous World
<input type="checkbox"/> MaCC	<input checked="" type="checkbox"/> GLI	<input checked="" type="checkbox"/> Megalopolis
<input checked="" type="checkbox"/> NEVP	<input checked="" type="checkbox"/> InvertEBase	<input checked="" type="checkbox"/> LepNet
<input checked="" type="checkbox"/> SCAN	<input checked="" type="checkbox"/> SERNEC	



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## Submission #941

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)

Submitted by [chdietri](#)

Thursday, December 15, 2016 - 14:11

130.126.115.104

### TCN Name:

InvertNet: An Integrative Platform for Research on Environmental Change, Species Discovery and Identification

### Person completing the report:

[chdietri@illinois.edu](mailto:chdietri@illinois.edu)

### Progress in Digitization Efforts:

During the past 2 months, work at the lead institution (INHS) has focused on capture of whole drawer image sets and upgrades to the [invertnet.org](http://invertnet.org) storage/backup systems and web portal infrastructure. Specifically, the latter involved inventorying current infrastructure and establishing methods for ongoing system maintenance, expansion of system storage capacity (installation of 6TB drives in system RAIDs, creating custom code to manage automated tape backup and archival transfer of data (including specimen images and metadata), and troubleshooting file ingestion processes to identify file transfer errors and replace corrupted files within the portal. The framework for a new portal system that provides a basic API interface has been developed. This will provide new and improved methods for interacting with [invertnet.org](http://invertnet.org) portal beyond the current system. Migration of existing data and custom code from the previous HUBzero/Joomla-based portal to the new system is now underway.

### 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:

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

### Share and Identify Education and Outreach (E&O) Activities:

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

**Attachment 1**

**Attachment 2**

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**Source URL:** <https://www.idigbio.org/node/564/submission/941>



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## Submission #930

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)

Submitted by [BruceL](#)

Saturday, December 3, 2016 - 14:16

24.124.69.244

### TCN Name:

Digitizing Fossils to Enable New Syntheses in Biogeography- Creating a PALEONICHES

### Person completing the report:

[blieber@ku.edu](mailto:blieber@ku.edu)

### 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 263,541 specimens databased. Further, we now have a total of 207,590 databased specimens that are also georeferenced. In addition, a total of 8,372 localities have been georeferenced. We have finished databasing our cnidarian holdings and have now moved on to database the Porifera. Other major taxonomic groups have been completely databased and georeferenced.

Regarding the portion of the project at the Paleontological Research Institution led by PI Jon Hendricks:

All remaining PaleoNiches funding will be used to 1) continue developing the Neogene Atlas of Ancient Life, 2) digitizing Neogene fossil specimens at PRI, and 3) developing curricular materials that utilize the products of the Digital Atlas project for K-16 educational purposes.

Since the last update, the following activities have been completed at PRI:

1) 31 family-level overviews have been added to the Neogene Atlas. Such overviews have now been completed for all bivalve families on the Neogene Atlas; two examples include overviews for the oysters (<http://neogeneatlas.org/families/ostreidae/>) and scallops (<http://neogeneatlas.org/families/pectinidae/>). Similar overviews will soon be developed for families of Neogene gastropods.

2) 84 photographs were taken of Neogene mollusk fossils. These were developed into 20 composite images (e.g., showing multiple individuals on each image, or individual specimens in multiple views) that were uploaded to the Neogene Atlas website.

3) About 60 lots of Neogene fossil specimens from a recently donated research collection were

digitized. It was determined early in this process that additional locality information--originally published in MS theses--was needed to make greater progress on this digitization effort. That information was recently attained and should allow substantial progress to be made on digitizing these important fossils over the next few months.

Both the Miami University Geology Museum and the Cincinnati Museum Center have completed the work on the project by sharing their data with iDigBio, thanks to the help and assistance of Joanna McCaffrey at iDigBio, as well as Andy Bentley at the University of Kansas.

**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:**

Another master's student at KU supported by the project has just completed his Master's degree.

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

N/A

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

N/A

**Share and Identify Education and Outreach (E&O) Activities:**

See material added to Digital Atlas of Ancient life website by Jon Hendricks mentioned above under heading of "Progress in Digitization Efforts"

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

Regarding the KU portion of the project since the last update submitted to iDigBio a graduate student supported by the project recently completed a collections visit to the University of Iowa paleontology repository as part of her work studying biogeographic patterns in Pennsylvanian cephalopods using GIS. Also, in early November, PI Lieberman attended the iDigBio 2016 Summit meeting in Chattanooga, Tennessee and presented a lightning talk on this TCN.

Regarding the PRI portion of the project in early November, PI Hendricks also attended the iDigBio 2016 Summit meeting in Chattanooga, Tennessee.

**Attachment 1**

**Attachment 2**

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**Source URL:** <https://www.idigbio.org/node/564/submission/930>



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## Submission #945

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)

Submitted by [psweney](#)

Friday, December 16, 2016 - 12:08

130.132.173.95

### TCN Name:

Mobilizing New England Vascular Plant Specimen Data to Track Environmental Change

### Person completing the report:

[sweeney0708@gmail.com](mailto:sweeney0708@gmail.com)

### 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 742,793 records and 767,132 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. We participated in the 2016 WeDigBio event.

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

nothing to report

### Share and Identify Education and Outreach (E&O) Activities:

We participated in the 2016 WeDigBio event.

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

nothing to report

### Attachment 1

## Attachment 2

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**Source URL:** <https://www.idigbio.org/node/564/submission/945>



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## Submission #942

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)

Submitted by [neilscobb](#)

Thursday, December 15, 2016 - 22:24

24.121.65.222

### **TCN Name:**

Southwest Collections of Arthropods Network (SCAN): A Model for Collections Digitization to Promote Taxonomic and Ecological Research

### **Person completing the report:**

[neilscobb@gmail.com](mailto:neilscobb@gmail.com)

### **Progress in Digitization Efforts:**

see attachment

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

see attachment

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

see attachment

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

see attachment

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

see attachment

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

see attachment

### **Share and Identify Education and Outreach (E&O) Activities:**

see attachment

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

see attachment

### **Attachment 1**

[SCAN\\_Dec\\_2016.docx](#)

### **Attachment 2**

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**Source URL:** <https://www.idigbio.org/node/564/submission/942>

**Southwest Collections of Arthropods Network Update**  
**January 6, 2017**  
**Neil Cobb**

**Progress in Digitization Efforts:**

The SCAN TCN grant ended July 1, 2016 although three of the ten collections will officially operate through a one-year no-cost extensions and all collections will continue to digitize. The Southwest Collections of Arthropods Network (SCAN) project focused on the following activities, 1) digitizing specimen label data 2) imaging of exemplar specimens; 3) added four PEN projects (Harvard, Ohio State University, BYU, and Academy of Natural Sciences Philadelphia) and one planned PEN with University of Texas – El Paso); 4) continued to solicit participation by non-SCAN museums; 5) leveraged SCAN project to secure a tenure-track systematist position at NAU; 6) developed framework for using data in ecological modeling; and 7) ASU continued to lead an education outreach application.

A) Digitization of labels: The 10 original SCAN institutions met their target quota for digitizing

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). Yellow cells represent estimates.

	SCAN Total	SCAN PEN Total	SCAN Broader Impact	Added Value Collections	InvertEBase	TOTAL	SCAN Original 10 Collections & Only Ground- Dwelling
Specimens	1,118,546	980,294	1,640,293	4,461,627	287,746	8,557,888	780,905
Georeferenced	950,314	618,624	1,177,666	3,599,874	78,460	6,505,147	733,726
Imaged	116,023	537	130,687	127,299	0	383,507	81,001
Species ID	608,916	348,665	800,563	2,524,527	79,643	4,388,719	475,122
Families	2,847	2,334	2,886	3,570	768	3,384	154
Genera	13,487	8,899	23,253	21,615	6,489	19,979	730
Species	32,144	26,001	63,458	72,331	19,834	103,354	1,739
Total Taxa	33,321	26,570	64,042	74,705	19,855	106,461	1,802
# of collections	10	4	41	15	2	72	10

Yellow cells represent estimates

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labels from pinned specimens (1,118,546 records). Of the 1,118,546 records, **Table 1** presents six sets of statistics derived from our data portal as of August 16, 2016. These include the following data: 1) The original 10 SCAN institutions funded by the NSF-ADBC program; 2) The three first PEN grants, the fourth PEN (ANSP) started July 1, 2016; 3) The 41 institutions that have entered data into the SCAN portal but not funded by the NSF-ADBC program; 4) Institutions that have agreed to have their data posted on SCAN as well as iDigBio; 5) the total of these first two categories; and 6) 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 the data aggregators GBIF and iDigBio. The purpose of serving aggregator data is to provide as complete information as possible to persons that are considering research projects.

Although we have technically surpassed our goal for the 12 SCAN museums (878,736 records), we have not thoroughly reviewed all records that SCAN-funded museums have produced to determine how many of those are strictly ground-dwelling arthropods, but we expect that 80% of those are target taxa and that we will need 80,000 more records to meet our project goal. Nine of the original 10 museums will request one-year no-cost extensions. We estimate that we will digitize over 1 million ground-dwelling arthropod specimens by the end of the project and possibly over 1.5 million total arthropod records.

Table 1 also shows the total number of records submitted by all 10 original SCAN collections that are restricted to ground-dwelling taxa targeted in the NSF proposal (Column 7; SCAN original 10 collections & only ground-dwelling). For the ground-dwelling arthropods alone we have exceeded our initial goal for images and specimen records. We expect to digitize at least 50,000 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. Table 1 shows all data provided by the PEN institutions, **Table 2** shows the target quotas for all SCAN collections, including the PEN institutions. The numbers in Table 2 for the PEN institutions only include records and taxa specified in the grant proposal and thus are much smaller than their numbers reported in Table 1.

**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> .

**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. 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

Table 2. Data for ADBC funded SCAN collections, the first two columns show target goals and the remainder of the columns show results for ground-dwelling arthropods.

Institution	SCAN Targets		SCAN Deliverables (August 16, 2016)							
	Specimen Records Quota	# of species to be imaged for SCAN	Total Specimen Records Provided	Total Specimen Records Georeferenced	Total Specimen Records Ided to Species	Number of Specimen Images Produced	Number of Families	Number of Genera	Number of Species	Total Taxa Recorded
Arizona State University	56,705	1,658	74,899	74,808	63,801	1,625	144	1,323	3,823	4,132
Colorado State University	36,090	918	87,189	74,398	80,120	40	289	1,530	3,787	4,004
Denver Museum of Nature & Science	61,123	3,235	127,880	123,385	56,990	241	178	873	2,383	2,540
New Mexico State University	23,819	1,784	80,362	39,937	54,789	647	493	2,928	5,950	6,064
Northern Arizona University	34,355	1,875	58,307	57,052	16,745	1,220	411	1,128	1,485	1,507
Texas A&M University	255,026	0	307,674	291,208	205,171	0	84	1,443	5,277	5,442
University of Arizona	90,045	0	95,777	81,355	68,896	87,079	84	942	3,388	3,454
University of Colorado at Boulder	68,797	1,740	80,836	80,817	412	584	152	1,074	2,223	2,530
University of New Mexico	36,124	1,740	36,919	36,866	17,819	75	425	1,844	2,976	2,985
Texas Tech University	74,652	2,175	173,833	124,784	46,788	24,515	589	1,415	3,083	3,222
<b>Total Original</b>	<b>736,736</b>	<b>15,125</b>	<b>1,123,676</b>	<b>984,610</b>	<b>611,531</b>	<b>116,026</b>	<b>1,157</b>	<b>6,339</b>	<b>20,076</b>	<b>20,902</b>
Harvard	90,000	217	87,658	39,471	63,452	28,440	1	NA	NA	1,456
BYU	52,000	300	53,918	47,780	44,633	66,566	118	602	1,966	2,119
Ohio State	80,000	0	55,484	55,481	29,113	0	4	NA	NA	NA
ANSP	54,000	0	NA	NA	NA	NA	NA	NA	NA	NA
<b>Total or Mean</b>	<b>1,012,736</b>	<b>15,642</b>	<b>1,320,736</b>	<b>1,127,342</b>	<b>748,729</b>	<b>211,032</b>	<b>1,280</b>	<b>6,941</b>	<b>22,042</b>	<b>24,477</b>

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 displays the number of images produced to date for all categories of SCAN contributions.

Table 3. 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>. Categories include 2= ADBC-funded collections (n=10), 1= Non-funded collections (n=14), and 0= added value collections (n=3).

Collection	# Images	Category
University of Arizona Insect Collection	87,079	2
Texas Tech University - Invertebrate Zoology	24,515	2
Arizona State University Hasbrouck Insect Collection	1,627	2
Colorado Plateau Museum of Arthropod Biodiversity	1,220	2
New Mexico State Collection of Arthropods	647	2
University of Colorado Museum of Natural History Entomology Collection	584	2
Ohio State C.A. Triplehorn Insect Collection	536	2
Denver Museum of Nature & Science	241	2
Museum of Southwestern Biology, Division of Arthropods	75	2
C.P. Gillette Museum of Arthropod Diversity	40	2
<b>TOTAL</b>	<b>116,564</b>	<b>10</b>
University of Hawaii Insect Museum	118,443	1
Yale Peabody Museum, Entomology Division	10,050	1
The Albert J. Cook Arthropod Research Collection	1,844	1
UAM Insect Collection	1,570	1
Tall Timbers Research Station Natural History Museum	1,372	1
Entomology Collection at the Natural History Museum of Utah	927	1
Archbold Biological Station Arthropod Collection	460	1
Hymenoptera Institute Collection	424	1
Virginia Polytechnic Institute and State University Insect Collection	384	1
University of Tennessee at Chattanooga	278	1
SDSU Terrestrial Arthropods Collection	138	1
University of Delaware Insect Research Collection	111	1
BLM Mother Lode Field Office: The Bees of Pine Hill Preserve	64	1
Florida Museum of Natural History, McGuire Center for Lepidoptera and Biodiversity	44	1
<b>TOTAL</b>	<b>136,109</b>	<b>14</b>
iNaturalist Research-grade Observations	121,285	0
Field Museum of Natural History Collection of Insects, Arachnids, and Myriapods	6,663	0
University of Kansas Natural History Museum Entomology Division	4,445	0
<b>TOTAL</b>	<b>132,393</b>	<b>3</b>
<b>GRAND TOTAL</b>	<b>385,066</b>	<b>27</b>



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## Submission #947

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)  
Submitted by mikewebster  
Friday, December 23, 2016 - 14:23  
128.84.6.98

### TCN Name:

Developing a Centralized Digital Archive of Vouchered Animal Communication Signals

### Person completing the report:

[mws244@cornell.edu](mailto:mw244@cornell.edu)

### Progress in Digitization Efforts:

During this reporting period we digitized over 1,300 audio recordings as part of our funded TCN project. This includes the digitization and archival work for all KU material (both anurans and birds), including a sizable body of material by curator and recordist Rafe Brown. Other major bodies of material worked on in this time period include 450 recordings from Emily Moriarty Lemmon and nearly 400 historical recordings from the Texas Natural History Collection.

### 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

### Share and Identify Education and Outreach (E&O) Activities:

Nothing to report

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

In late October we held an NSF sponsored workshop, with representation from iDigBio, to discuss and develop new methods to preserve and make accessible data from animal behavior research. This workshop was attended by nearly 40 participants, lasted for two days, and was hosted by the Cornell Lab of Ornithology.

**Attachment 1**

**Attachment 2**

**Source URL:** <https://www.idigbio.org/node/564/submission/947>



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## Submission #944

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)

Submitted by [tkarim](#)

Friday, December 16, 2016 - 10:26

128.138.65.156

### TCN Name:

Fossil Insect Collaborative: A Deep-Time Approach to Studying Diversification and Response to Environmental Change

### Person completing the report:

[talia.karim@colorado.edu](mailto:talia.karim@colorado.edu)

### Progress in Digitization Efforts:

The Museum of Comparative Zoology (Harvard) hosted our TCN meeting in November. This gave FIC-TCN members a chance to discuss various digitization efforts, issues with our data in the iDigBio portal (which some members were not aware of), future directions for research based on TCN data, and an opportunity to visit the rehoused fossil insect collection. Ricardo Perez de la Fuente also provided demonstrations of their imaging system and workflow and we were also to view the LepNet imaging station on a tour through entomology. The meeting also gave TCN members the chance to discuss progress made on iDigPaleo and future directions for the portal, as well as the eMuseum concept that was brought up at GSA (Denver) and the iDigBio Summit (Chattanooga).

3984 new specimens were databased during this reporting period and 4947 specimens were imaged.

Archival materials for the UCMP amber collection in 85 folders are now all scanned and will be uploaded to the Docubase database for use by researchers and possibly the public. While many of our TCN members are sharing data directly with iDigBio, Erwin (UCMP) has noticed an error with some of our data in the iDigBio portal related to incorrect taxonomy being filled in for some specimen records. We have been in touch with Joanna McCaffery and Alex Thompson and they indicated that it is an indexing issue with iDigBio's data ingestion. We are hoping that this issue will be rectified soon as it leads to very misleading search results.

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

The Virginia Museum of Natural History (VMNH) reports that using a two person team for digitization is three times more efficient than one person alone. In the case of the Solite insects, one person focused on imaging, assigning cataloging numbers, identification and relabeling of image files. The second person focused on image editing, filling metadata, and adding to/updating the database. With this division of labor and new, more efficient workflow, the digitization rate at VMNH increased 3-fold.



**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:**

Butts, Norris (Yale), and Karim (CU-Boulder) met with Rowan Lockwood (Paleobiology Database, The College of William and Mary) to discuss undergraduate curriculum development related to iDigPaleo, PDBD, and the ePANDDA project.

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

Butts, Norris, and Karim are continuing to explore various avenues for sustainability and enhancement of the FIC-TCN EnO portal iDigPaleo. They met with MacFadden (iDigBio) to discuss how iDigPaleo might be utilized in the eMuseum project discussed at the iDigBio Summit.

**Share and Identify Education and Outreach (E&O) Activities:**

The VMNH participated in several outreach events related to the TCN during the reporting period:

- Oct. 8 - Table display at Bugs, Beer & Barbecue event at VMNH with a Solite excavation earlier that day with students and professors from Appalachian State University and Virginia Tech.
- Nov. 17 - Appearance on 'Off the Tracks' with Lock Boyce on local BTW 21 in Collinsville, VA.
- Nov. 19 - North Carolina Fossil Fair held at the Greensboro Science Center in Greensboro, NC.

CU-Boulder, UCMP, and VMNH continue to share fossil insect posts on social media, with CU-Boulder maintaining the FIC-TCN Facebook page and Twitter feed. The VMNH has also utilized FaceBook Live video from the Solite Quarry to highlight the current excavation and digitization efforts.

Butts (Yale) will attend and present at the iDigBio E&O workshop, Dec 5-6, 2016, at the Smithsonian and will represent FIC TCN/iDigPaleo.

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

Karim and Zelagin (CU-Boulder) attended the iDigBio Summit.

**Attachment 1****Attachment 2**

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## Submission #937

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)

Submitted by [kmcameron](#)

Wednesday, December 14, 2016 - 12:19

128.104.98.139

### TCN Name:

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

### Person completing the report:

[kmcameron@wisc.edu](mailto:kmcameron@wisc.edu)

### 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:

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

### Share and Identify Education and Outreach (E&O) Activities:

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

#### Attachment 1

[GLITCN\\_progress report\\_DEC2016.pdf](#)

#### Attachment 2

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Source URL: <https://www.idigbio.org/node/564/submission/937>

***DATA PROGRESS SEE TABLES BELOW***

- 1) Share and Identify Best Practices and Standards (including Lessons**
- 2) Identify Gaps in Digitization Areas and Technology**
- 3) Share and Identify Opportunities to Enhance Training Efforts**
- 4) Share and Identify Collaborations with other TCNs, Institutions, and Organizations**
- 5) Share and Identify Opportunities and Strategies for Sustainability**
- 6) Other Progress (that doesn't fit into the above categories)**
  - Three of our TCN participants (Ken Cameron, Rich Rabeler, and Aaron Goldberg attended the iDigBio summit in Chatanooga, TN). A brief presentation was made.
  - Ken Cameron, Anna Monfils, and Andrea Miller attended the Upper Midwest Invasive Species Conference in La Crosse, WI. Oct 17-19. Two presentations were made.
  - A PEN proposal was submitted by the Milwaukee Public Museum to join our TCN.
  - The Learning Center team in collaboration with staff from the Morton Arboretum drafted the experience box activity guide consisting of an introduction, content background, three activities, student resources, and museum connections. Activities in the guide are recommended for grades 9-12 but can be adapted for use in grades 6-8. After undergoing a content review by scientific staff at the Morton Arboretum and an instructional design review by education staff at The Field Museum. These teams recommended revisions to the guide, and these have since been incorporated into the current version. In quarter one of 2017, the team plans to test the activities with an advisory group of educators who will make further recommendations, and these will be incorporated into the final draft before the experience box launch. The specimens that will be included in the box have been procured and mounted. Final treatments for educational use and experience box assembly will take place in 2017.
  - An updated report from the Michigan Consortium of Small Herbaria (Anna Monfils, reporting): “We can proudly point to the midwestherbaria.org portal and say the small collections in Michigan contributed 63,113 records to date, with over 22,000 transcribed labels providing valuable data to our ability to study Michigan's biodiversity. In addition, we can show 9 small herbaria in Michigan have been able to contribute over 10,000 records to a national effort to

describe invasive species in the Great Lakes region. Thanks to the combined and concerted effort of big and small collections.”

Additional items to note:

This relates to the value of the small collections and specifically detailed the TCN and MSHI:

Monfils, A.K. 2015. The role of small herbaria in documenting biodiversity through time and space: A vital link in understanding patterns of diversity in invasive macrophytes. 6th Annual Meeting of the Michigan Consortium of Botanists, Eastern Michigan University, Ypsilanti, MI.

Deb Linton, Libby Ellwood, Molly Phillips and I have been leading an effort to promote collections in undergraduate education. As an extension of AIM-UP, we were invited to present on some module using NHC data. This effort was funded by BCoN (with some travel money for Molly Phillips and Deb Linton from iDigBio and CMU respectively).

T. Barbaro, D. Bloom, J. Cook, S. Donovan, E. Ellwood, D. Linton, A.K. Monfils, M. Phillips, and J. Whorley 2016. Incorporating Digitized Natural History Collections Data into the Classroom. 2016 National Academies Special Topics Summer Institute on Quantitative Biology “Lowering the Activation Energy: Making Quantitative Biology More Accessible.” Raleigh, NC. (Resource Session and Poster Presentation).

As a product of the 2016 National Academies Special Topics Summer Institute on Quantitative Biology, a working group titled Biodiversity to Explore Applied Statistical: BEAST was formed. This group is working specifically to develop a biodiversity case study with data from the aquatics TCN to teach students basic statistical concepts (e.g. means, variance, t-tests, regression, etc.) and tools (Excel, R, etc.). So far the group has met twice outside the meeting and the module has been implemented at one institution.

In addition, the ScienceLive video that references the TCN is now posted on the AIM-UP! website: <http://aimup.unm.edu/about/videos.html>. It is the Aquatic Invasive Plants: Follow the Data video.

The CollectionsEducation.org group has given several presentations on the educational materials developed and the Aquatics TCN is recognized in each of these presentations (So is SERNAC so I made sure to include the Aquatics TCN). We are writing this up now for a manuscript with a plan to submit to Systematic Botany.

Krimmel, E.R., D.L. Linton, T.D. Marsico, A.K. Monfils, A.B. Morris, and B.R. Ruhfel. 2016. CollectionsEducation.org: Connecting students to citizen science and curated collections. Botany 2016 (Affiliated with Botanical Society of America and American Society of Plant Taxonomists). Savannah, GA. (Poster Presentation)

Krimmel, E.R., D.L. Linton, T.D. Marsico, A.K. Monfils, A.B. Morris, and B.R. Ruhfel. 2016. CollectionsEducation.org: Connecting students to citizen science and curated collections. 31st

Annual meeting of the Society for the Preservation of Natural History Collections, Berlin, Germany. (Poster Presentation)

- Krimmel, E.R., D.L. Linton, T.D. Marsico, A.K. Monfils, A.B. Morris, and B.R. Ruhfel. 2015. Connecting students to citizen science and curated collections. Botany 2015 (Affiliated with Botanical Society of America and American Society of Plant Taxonomists). Edmonton, Alberta, Canada.
- Krimmel, E.R., A.B. Morris, T.D. Marsico, A.K. Monfils, B.R. Ruhfel, and D.L. Linton. 2015. Connecting students to citizen science and curated collections: [www.collectionseducation.org](http://www.collectionseducation.org). 30th Annual meeting of the Society for the Preservation of Natural History Collections, Gainesville, FL.
- Krimmel, E.R., D.L. Linton, T.D. Marsico, A.K. Monfils, A.B. Morris and B.R. Ruhfel. 2015. Connecting students to citizen science and curated collections. Association of Southeastern Biologist 2015 Annual Meeting, Chattanooga, TN.

The aquatics TCN was introduced at the following meetings. Both of these meetings were hosted as part of a DEQ grant.

- 2014 Aquatic Invasive Species Monitoring and Management: Statewide Strategy Meeting. Michigan Department of Environmental Quality, Lansing, MI. Monfils, A.K, R. Hackett and A. Mahon. (full day meeting)
- 2014 Aquatic Invasive Species Monitoring and Management: Macrophytes Meeting. Rose Lake Wildlife Area, Michigan Department of Natural Resources, East Lansing, MI. Monfils, A.K. and R.A. Hackett. (Full day meeting)

\*\*\*\*\*

**The following partners are not yet ingested by iDigBio:**

Andrews University – MI Small Herbarium Consortium *\*not directly funded*  
Calvin College – MI Small Herbarium Consortium *\*not directly funded*  
Hope College – MI Small Herbarium Consortium *\*not directly funded*  
Western Michigan University – MI Small Herbarium Consortium *\*not directly funded*

Université de Montréal (Canadensys.net) *\*not directly funded. No GUIDS?*

New York State Museum *\*\* making good progress but behind schedule*  
University of Minnesota, Bell Museum of Natural History Mollusks *\*\* behind schedule*  
University of Notre Dame Herbarium *\*\* behind schedule due to loaned equipment*  
University of Wisconsin - Stevens Point Plants *\*\* behind schedule due to retirement*  
University of Wisconsin - Stevens Point Fish *\*\* behind schedule due to retirement*

Ohio State University, Herbarium *\*\* ?? making good progress / complete*  
Ohio State University, Mollusks *\*\* ?? making good progress / complete*  
Ohio University *\*\* ?? making good progress / complete*

## Great Lakes Invasives TCN Portal Collection Statistics (*as of Dec 15, 2016*)

**TARGETS:** 637,000 plants + 102K fish lots + 44K mollusk lots = **783,000 “specimens”**

**TOTALS FOR USA MUSEUMS: 823,019 records**, of which 611,073 (74%) have been imaged  
(+ *Canadensys* plant data increases the total to **945,835 records** and 625,351 images)

**PLANTS – USA: 677,899 specimen records; 566,264 (84%) imaged; 189,185 (28%) georeferenced**

Collection	Records	Imaged	Georeferenced
Albion College	1232	1223	16
Butler University, Friesner Herbarium	10678	5612	6
Calvin College	735	699	0
Central Michigan University	3742	3711	289
Eastern Michigan University Herbarium	2469	2345	620
Field Museum of Natural History	62462	53497	55158
Grand Valley State University	365	359	10
Hillsdale College Herbarium	344	342	15
Hope College	594	583	3
Illinois Natural History Survey	48506	23529	5334
J. F. Bell Museum of Natural History Herbarium	98505	44839	12991
Miami University, Willard Sherman Turrell Herbarium	18188	18152	3
Michigan State University	22174	22035	0
Morton Aboretum	18549	17137	1733
New York Botanical Garden	146990	141820	57213
New York State Museum, Albany	0	0	0
Ohio State University Herbarium - Plants	30395	29772	25663
Ohio University, Bartley Herbarium	4925	4904	0
Seney National Wildlife Refuge	207	207	0
University of Illinois Herbarium	21893	21795	0
University of Michigan Herbarium	75829	67808	7788
University of Notre Dame	0	0	0
University of Wisconsin-LaCrosse	6970	6948	4376
University of Wisconsin-Madison, WI State Herbarium	94351	91377	15907
University of Wisconsin-Milwaukee	7796	7570	2060
University of Wisconsin-Stevens Point	0	0	0

**FISH: 98,955 specimen records; 31,822 (32%) imaged; 24,229 (24%) georeferenced**

Collection	Records	Imaged	Georeferenced
Field Museum of Natural History - Fish	4855	1497	94
Illinois Natural History Survey - Fish	29905	12846	8325
J. F. Bell Museum of Natural History - Fish	15727	3533	13603
Ohio State University - Fish Division	9033	9005	0
University of Michigan - Fish	34834	643	1762
University of Wisconsin-Madison - Fish	4601	4298	445

**MOLLUSKS: 46,165 specimen records; 12,987 (28%) imaged; 12,516 (27%) georeferenced**

Collection	Records	Imaged	Georeferenced
Field Museum of Natural History - Mollusks	6438	0	159
Illinois Natural History Survey - Mollusks	12521	2963	11930
J. F. Bell Museum of Natural History - Mollusks	0	0	0
Ohio State University - Mollusc Division	2376	2350	0
University of Michigan Zoology- Mollusks	24299	7214	2
University of Wisconsin-Madison - Mollusks	531	460	425

**PLANTS – CANADA: 122,816 records; 14,278 (12%) imaged; 57,504 (47%) georeferenced**

Collection	Records	Imaged	Georeferenced
Green Plant Herbarium	18906	0	9832
Herbarium, Biodiversity Centre of Ontario	10230	10230	0
Herbier Louis-Marie (QFA)	13321	0	9895
Herbier du Québec (QUE)	504	0	504
Jardin Botanique de Montréal	1286	0	37
Marie-Victorin Herbarium	35383	394	13491
University of British Columbia Herbarium	26521	3654	14165
University of Manitoba	5745	0	5566
University of Toronto at Mississauga	10920	0	4014







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## Submission #933

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)

Submitted by [psierwald](#)

Tuesday, December 13, 2016 - 13:04

107.0.125.5

### TCN Name:

InvertEBase: Reaching Back to See the Future: Species-rich Invertebrate Faunas Document Causes and Consequences of Biodiversity Shifts

### Person completing the report:

[psierwald@fieldmuseum.org](mailto:psierwald@fieldmuseum.org)

### Progress in Digitization Efforts:

FMNH Invertebrates: 2823 records entered into the database by K. Griffin-Jakymec [KGJ] (132 freshwater bivalves; 219 FW gastropods; 2472 terrestrial gastropods); 698 new identifications added to previously entered records; 1230 lots identified by S. Clark [SC], several hundred additional lots by J. Gerber [JG]; contents of ca. 1600 matchboxes from the G. R. Webb Collection were sorted into ca. 1900 lots and their data researched by KJG; 1127 Webb lots with complete data entered by KGJ (included in above total); SC and JG continued working on mollusk names, making additions and changes and working on a complete, unified gastropod name file. Volunteers, an intern and KGJ re-labeled ca. 3000 previously digitized lots.

FMNH Insects: At present, 58,248 records have been entered into our KE EMu database (representing 107,199 total specimens databased and barcoded). In addition, two collection digitization specialists and one volunteer worked exclusively on Elmidae (Coleoptera) for five months entering over 30,000 records into KE EMu which accounts for 525,000 specimens. As the focus of aquatic invertebrates continues, data entry of Dytiscidae (pinned collection, Coleoptera) is currently in process.

Zoological Museum, Michigan, Invertebrates: 1 graduate (20 hours/week) and 7 undergraduate students (10 to 15 hours/week) entered 4,045 new records into UMMZ Specify database during 10/01-11/30/2016 (land snails 3,619; freshwater snails: 411); during the same period 1,290 data entries were georeferenced and 589 lots were imaged (freshwater bivalves: 313; freshwater snails: 276).

DMNH: The DMNH collection has made great progress in digitization since the last bi-monthly report. In September, we moved the unionid data into Specify, made it available on InvertEBase and then got ingested by iDigBio. Almost 8,000 DMNH freshwater bivalve records are available on-line and accessible to the public for the first time. Since September, we have shifted our focus to 5,000 freshwater snails records. Identifications have been updated, records standardized, and geographical data is being filled in by comparison to GNIS and other tools to facilitate georeferencing. We expect to upload these data to Specify by mid-January. The rate of progress is approximately 42 records per hour, and includes time to resolve duplicate record and other problem

lots.

CMNH: A total of 54,182 specimens have been digitized to date and include over 11,990 new records for the period 1 July-18 November 2016. Digitization of our Odonata collection was completed in September and a total of 4,844 specimens were digitized which represents 100% of our pinned and enveloped odonates (wet collection is not being digitized at this point in time). Digitization of Diptera has commenced with 7,178 records entered. An additional 4273 label images have been taken and are either transcribed to be entered or awaiting transcription (data entry assistant webpage was not working for ~3 weeks so participants continued with imaging of labels). Work Study students returned from summer break on 5 September.

Auburn: Work at the AUMNH during the last quarter has focused primarily on specimen databasing, georeferencing and data cleanup. Since the last reporting period ~40,000 records have been databased bringing the total database entry effort to date at 146,900 specimens databased. Of those we have georeferenced 97,847 specimens using a combination of R and Python Scripts and GeoLocate. Those 97K records represent those that have determined and roughly checked; the remaining taxa in our database are currently undetermined with respect to lat/long. The entire database has now been imported into Specify – all data entry from this point forward is done directly into Specify. We are currently working on a batch upload of the georeferenced data into the Specify database.

Frost: 32,532 Odonata specimens have been imaged and imported into our transcription/digitization workbench/database (TaxonWorks). More than 4,000 Odonata specimens/lots have been transcribed, with >8,000 georeferenced. A similar process has been applied to our butterfly collection, of which >4,400 specimens have been imaged and uploaded to the database. Our ethanol-preserved Anoplura and Mallophaga collection is actively being databased on a spreadsheet (DwCA); 260 lots have been digitized so far. Our hoverfly (Syrphidae), soldier fly (Stratiomyidae) and Aculeata collections have been staged for digitization. Our team now consists of 1 part-time, wagepayroll staff digitizing specimens and transcribing labels, and 1 grad student working on georeferencing odonates.

PEN grant: Chicago Academy of Sciences, start date: September 2016

CAS/PNNM Invertebrates: We have initiated data cleaning on malacology data.

CAS/PNN Insects: beginning taxonomic clean up in collaboration with FMNH entomology staff

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

FMNH Invertebrates: nothing to report

FMNH Insects: Experimented with creating unique macros in Excel to search for existing records in KE EMu in preparation for uploading spreadsheets. This may be a solution for importing spreadsheets maintained by volunteers or short-term visitors. Currently, entering data directly into the KE EMu database has again proven to be the most time-efficient, cost-effective means of recording specimen information. Data entry rates have gradually increased; this is due in part to the continued growth of diverse site and collection event information within the database.

Zoological Museum, Michigan, Invertebrates: nothing to report

DMNH: We have been developing workflows for novice collections to use as they begin to digitize their datasets and move them to Symbiota. Completed workflows include: "Minimum data required to set up a Symbiota presence" and "Moving data from Symbiota to iDigBio".

CMNH: We continue to update our workflow depending on the specimens at hand. From mid October to early November a bug in the online Data Entry Assistant for XBioD (OSU database that we use) prevented us from uploading any of our transcribed data for processing. During this time we focused on imaging for best time management.

Auburn: Database entry by students and staff was originally done in to excel spreadsheets with subsequent batch upload in to Specify. Entry in to Specify directly takes longer but drastically reduces user entry mistakes and time dedicated to downstream data check.

Frost: We continue to update our workflows, which are available as Google Docs (<http://bit.ly/FrostSOPs>). Additionally, we have published several posts on our blog about lessons we've learned, from alcohol vial best practices to georeferencing. These posts are available at: <http://sites.psu.edu/frost/category/curation/> and/or <http://sites.psu.edu/frost/tag/digitization/>

We've been testing the image => transcribe => georeference workflow. For some types of specimens (e.g., Odonata, which are almost 2 dimensional and very well protected as specimens) this flow was rapid. We've found that for pinned material and vials a straight transcription into spreadsheet (DwCA) might be faster.

PEN grant: Chicago Academy of Sciences

CAS/PNNM Invertebrates: nothing to report

CAS/PNN Insects: nothing to report

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

FMNH Invertebrates/Insects: KE EMu version 5.0 has just been released and installed. It is reported to perform faster. We will work towards verifying this.

Zoological Museum, Michigan, Invertebrates: nothing to report

DMNH: Rapid georeferencing of specimen data is the biggest hurdle we face. Finding ways to do this across all the three mollusk databases to streamline and standardize the process would be beneficial.

CMNH: nothing to report

Auburn: Batch georeferencing and data checking is very tedious and time consuming

Frost: nothing to report

PEN grant: Chicago Academy of Sciences

CAS/PNNM Invertebrates: nothing to report

CAS/PNN Insects: nothing to report

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

FMNH Invertebrates/Insects and DMNH: With the Field Museum, DMNH is developing a workshop on digitizing mollusks for the upcoming American Malacological Society meeting in July 2017. This workshop will reach out to other mollusk collections to discuss best practices developed during InvertEBase, data standardization, and georeferencing.

Zoological Museum, Michigan, Invertebrates: nothing to report

CMNH: nothing to report

Auburn: Nothing to report at this time

Frost: nothing to report

PEN grant: Chicago Academy of Sciences

CAS/PNNM Invertebrates: nothing to report

CAS/PNN Insects: nothing to report

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

FMNH Invertebrates/Insects: started collaboration with PEN partner Chicago Academy of Sciences. PIs Sierwald and Bieler collaborated with curators of Northern Arizona Museum and Virginia Museum of Natural History in the development of PEN proposals, submitted at the October 2016 deadline. Collaboration with Natural History Museum of Utah (collection manager Christy Bills) initiated to serve mollusk data on InvertEBase; collaboration with PI Shea (DMNH) development of an iDigBio workshop proposal

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

DMNH: nothing to report

CMNH: The collaboration between CMNH and Northeast Reintegration Center is still proceeding.

Auburn: nothing to report

Frost: We continue to collaborate with Matt Yoder and the Speciefile group in their development of TaxonWorks. Their system can now export data to Symbiota, and they've been working to customize or otherwise adapt their interface to meet our needs. Deans visited Yoder in November to discuss our TCN collaboration.

PEN grant: Chicago Academy of Sciences

CAS/PNNM Invertebrates: nothing to report

CAS/PNN Insects: nothing to report

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

Share and Identify Opportunities and Strategies for Sustainability:

FMNH Insects/Invertebrates: several small scale digitization projects added with use of FMNH in-house funding, development of PEN proposals

Zoological Museum, Michigan, Invertebrates: nothing to report

DMNH: Nothing to report at this time

CMNH: nothing to report

Auburn: nothing to report

Frost: nothing to report

PEN grant: Chicago Academy of Sciences

CAS/PNNM Invertebrates: nothing to report

CAS/PNN Insects: nothing to report

**Share and Identify Education and Outreach (E&O) Activities:**

FMNH Invertebrates: Undergraduate Intern Rachel Kisting (Roosevelt University) has been trained in zoological taxonomy and collection management methods and is now helping with re-labeling, re-housing and arranging newly digitized freshwater bivalves.

FMNH Insects: Hosted & participated in our second "Worldwide Engagement for Digitizing Biocollections (WeDigBio)". In order to build support for natural history collections and their digitization activities, and to increase digitization rates, we invited the public, including college, university and high school students to participate in this four-day transcription event. Over 200 volunteers gathered to help transcribe labels from specimens across the museum. Both attendance and the number of records transcribed surpassed the previous effort in 2015.

Zoological Museum, Michigan, Invertebrates: So far 1 high school volunteer, 15 undergraduate students and 1 master student have been hired and trained for data entry, molluscan taxonomy, museum curation, specimen imaging, and georeferencing.

DMNH: DMNH is a member of the E&O K-12 subcommittee and participated in the development of and attended the Dec 4-5 E&O workshop on engaging K-12 in collections based activities. The output of this meeting is a document that will provide guidance to biocollections professionals who are interested in reaching out to K-12 educators to developing appropriate materials on using digital collections in formal and informal educational environments as part of their broader impacts commitment.

CMNH: Collections Manager, Nicole Gunter, led a program for 25 Cuyahoga Community College students that highlighted the utility of biological collections and the digitization efforts at the museum.

Auburn: nothing to report

Frost: nothing to report

PEN grant: Chicago Academy of Sciences

CAS/PNNM Invertebrates: nothing to report

CAS/PNN Insects: nothing to report

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

FMNH: PIs Sierwald and Bieler attended the iDigBio Summit in Chattanooga, TN in October

Zoological Museum, Michigan, Invertebrates: So far 1 high school volunteer, 15 undergraduate students and 1 master student have been hired and trained for data entry, molluscan taxonomy, museum curation, specimen imaging, and georeferencing.

DMNH: nothing to report

CMNH: Collection manager Nicole Gunter presented about the collaboration with Northeast Reintegration Center at the Entomological Collections Network conference. A new CWRU work study student, Ama Carney was recruited in September. She is one of 3 students working on the grant with Joseph Nooger and Ben Shrager returning from last year's recruits. The Kurtlandia intern was offered part time employment to finish recurating the bee collection before digitization, of the 2800 bees in the collection 1984 have been recurated, these are in the process of being of being databased.

Auburn: nothing to report

Frost: PI Deans attended the iDigBio Summit in Chattanooga, TN in October

PEN grant: Chicago Academy of Sciences

CAS/PNNM: PIs Dawn Roberts and Erica Krimmel met with PIs Sierwald and Bieler from the FMNH, along with J. Gerber, to discuss CAS/PNNM's PEN project. Roberts and Krimmel attended the iDigBio Summit in Chattanooga, TN in October, shortly after CAS/PNNM's NSF PEN grant was awarded. Attending the event was informative and we learned much more about the range of projects funded through the ADBC program. We've filled the part-time collections technician, a position funded through our NSF PEN grant. Sam Howes joined our team on 11/29/2016.

### **Attachment 1**

[FINAL\\_Moving Data from Symbiota to iDigBio.docx](#)

### **Attachment 2**

[FINAL\\_Minimum Data Required to Set Up in Symbiota with Images.docx](#)

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**Source URL:** <https://www.idigbio.org/node/564/submission/933>

## Workflow: Minimum Data Required to Establish Your Collection in Symbiota

Elizabeth K. Shea  
Delaware Museum of Natural History

The first step in getting your data into your TCN's Symbiota portal (in our case, InvertEBase) is providing some skeleton information to Ed Gilbert at Symbiota. The information may be provided before you are ready to upload collections data - it acts like a place holder while you update and standardize your data. When you are ready to transition data, all the necessary infrastructure will be there waiting. If you are going to enter and manage data directly within Symbiota, you need to provide this information prior to starting data entry.

Responses to the following questions should be consistent with other data registries such as the Global Registry of Biodiversity Repositories (grbio.org). If your collection is not registered at GRBio, take the time now to get registered. Below each question there is a brief clarifying description, and the DMNH answers in italics as an example. The images that follow are marked where these answers show up on the InvertEBase Symbiota portal.

Once you have answered all these questions, send them to Ed Gilbert and create a user account within the portal. This is easy - typically done by clicking on the New Account link provided in the left menu or home page and following the directions.

### Questions to be answered and sent to Symbiota:

1. What is the title of your collection?
  - a. This is the formal name of your collection and will be listed on the search page
  - b. *Delaware Museum of Natural History – Mollusks*
2. What are your institution and collection codes
  - a. These acronyms are often used as shorthand and appear as a hyphenated binomial.
  - b. *Institution: DMNH; Collection: Mollusk*
3. What does your collection contain?
  - a. Provide a brief, general description of the collection holdings and preparation types.
  - b. *The Museum's mollusk collection consists of more than 2 million specimens, making it one of the largest in the United States. The 220,000 cataloged lots represent more than 18,000 species. Worldwide in scope and covering all seven living classes of mollusks, our holdings include marine gastropods (45%), land and freshwater gastropods (30%), marine bivalves (15%), freshwater bivalves (5%) and other (5%). The Museum's mollusk collection is primarily dry shells, with some alcohol preserved cephalopod specimens. Most specimens are recent; however there is some Cenozoic fossil material. Our type collection contains more than 1,200 lots.*
4. Who is your contact and what is the relevant email address?
  - a. Who should users get in touch with if they need additional help?
  - b. *Elizabeth Shea, [eshea@delmnh.org](mailto:eshea@delmnh.org)*
5. Where does information about your collection reside on your institution's website?
  - a. Provide a link to your home page. The DMNH Mollusk collection chose the department-level Mollusk web page, but could have equally chosen the division-level Collections and Research web page.
  - b. *<http://www.delmnh.org/mollusks/>*
6. What icon will you use to identify your collection?

- a. A small image that visually represents the collection. Most collections have used a logo of the parent institution.



- b.
7. What are your preferred usage rights?
  - a. Enter the shorthand version of how you would like your data to be attributed. Common examples include CCO 1.0 (Public-domain) or CC BY-NC (Attribution-Non-Commercial). To figure out which one you want to use, see: <https://creativecommons.org/share-your-work/> Conventional practice is to make data CC0 1.0.
  - b. [\*CC0 1.0 \(Public-domain\)\*](#)
8. Will Symbiota publish a snapshot of your data that will be periodically updated, or will you manage your data directly within the Symbiota portal?
  - a. This response gives a sense of how up-to-date the information is that is being accessed.
  - b. *Snapshot of data*
9. What is the source of the Global Unique identifier (GUID) for the specimen records?
  - a. This tells data harvesters what your persistent **G**lobally **U**nique **I**dentifier looks like and where it comes from. GUID is a generic term. A **U**niversal **U**nique **I**dentifier (UUID) is a particular type of GUID and is preferred. Darwin Core definition: <http://rs.tdwg.org/dwc/terms/index.htm#occurrenceID>. If you are managing data within Specify or another external system, the source is the Specify or other system. If you manage within Symbiota, than the answer is Symbiota. If you use a mash up of data (e.g., institution code:collection code:catalog number), you need to report that here.
  - b. *Specify*

A few examples of where these answers show up on the portal. Red numbers refer to the question/answers from the above list.

A. On the list of all collections that are searchable on the portal:

Home >> Collections

Specimens

Select/Deselect All

California Academy of Sciences (CAS-INVERT) [more info](#)

Colorado Plateau Biodiversity Center- Mollusk Collection (NAU-NAUF3A) [more info](#)

Delaware Museum of Natural History - Mollusks (DMNH-Mollusk) [more info](#)

**6** **1** **2**

[NEXT](#)

B. On the records returned from a search:

Home >> Collections >> Search Criteria >> Specimen Records

Species List Occurrence Records Maps

**Dataset:** DMNH-Mollusk **2**

**Taxa:** Unionidae

See Results in Table View

1 2 3 4 5 6 7 8 9 10 >> Last Page 1, records 1-100 of 6449

**Delaware Museum of Natural History - Mollusks** **1**

**6** *Alasmidonta marginata* Say, 1818

**DMNH:Mollusk** 51699 Stansbery, David; Clench, William 01 October 1971

United States, Tennessee, Hancock County, Clinch River, Kyles Ford

**2** [Full Record Details](#)



3. On the “more information page” for the collection

Home >> Collection Search Page >> Delaware Museum of Natural History – Mollusks Details

InvertEBase Data Portal Homepage

Search Collections

Map Search

Dynamic Checklist

Image Library

Search Images


---

Welcome Elizabeth!

My Profile

Logout

Sitemap



## 1 2

### Delaware Museum of Natural History – Mollusks (DMNH-Mollusk)

The Museum's mollusk collection consists of more than 2 million specimens, making it one of the largest in the United States. The 220,000 cataloged lots represent more than 17,000 species. Worldwide in scope and covering all seven living classes of mollusks, our holdings include marine gastropods (30%), land and freshwater gastropods (30%), marine bivalves (15%), freshwater bivalves (5%) and other (5%). The Museum's mollusk collection is primarily dry shells, with some alcohol preserved cephalopod specimens. Most specimens are recent; however there is some Cenozoic fossil material. Our type collection contains more than 1,200 lots.

**Contact:** Elizabeth Shea (eshea@delmnh.org) 4

**Home Page:** <http://www.delmnh.org/mollusks/> 5

**Collection Type:** Preserved Specimens

**Management:** Data snapshot of local collection database 7

**Last Update:** 27 September 2016

**Usage Rights:** CC0 1.0 (Public-domain) 2

**Collection Statistics:**

- 7926 specimen records
- 207 (3%) georeferenced
- 6540 (83%) identified to species
- 10 families
- 57 genera
- 252 species
- 256 total taxa (including subsp. and var.)

## **Workflow: Moving your data from a Symbiota portal (e.g., InvertEBase) to iDigBio**

Elizabeth K. Shea  
Delaware Museum of Natural History

The process of transferring data from Symbiota to iDigBio (or GBIF) is analogous to a dead drop from an old spy movie – you leave a package of information for iDigBio to pick up at an established place and time. In this case, you have to package your specimen information into a standardized Darwin Core Archive (DwC-A) data package and leave it in your Symbiota portal. A few lines of new code written by iDigBio programmers will allow iDigBio's harvesting algorithm to reach into your Symbiota portal, grab your DwC-A data package, and ingest it. At this point, your data will be discoverable by anyone using the iDigBio.org database. When you update or edit your dataset, you will want to re-create this DwC-A package so that iDigBio can re-harvest and have the most up to date information.

A DwC-A data package is a single, self-contained, compressed ZIP file that contains the following five files:

- **occurrences.csv** = comma delimited data file with occurrence records;
- **images.csv** = comma delimited data file containing URL addresses of where the physical images reside;
- **identifications.csv** = comma delimited data file containing identification history. This information typically only exists if managers enter identification adjustments via the Determination History tab within occurrence editor;
- **meta.xml**: XML file describing the structure of the archive file;
- **eml.xml**: XML file containing metadata of the collection (e.g. central contacts).

To create a new or update/refresh a DwC-A data package in Symbiota follow these steps (modified from the directions posted at <http://symbiota.org/docs/darwin-core-archive-data-publishing/>):

1. **Log in to Symbiota.org and navigate over to your collection information**
  - Log In→My Profile→Specimen Management→ and then your collection name.
  - If you don't see your collection name, you may not have the necessary administrative permissions. Contact your portal administrator.
2. **Review the metadata associated with your collection**
  - Under the Administration Control Panel→Edit Metadata and Contact Information.
  - In addition to your institution/collection codes and contact information, make sure to review data usage license and GUID (see below). There are green information icons that return detailed information if you click on them. Contact your portal administrator if you are unclear or need additional help.

- **License:** Add in the shorthand version of how you would like your data to be attributed. Common examples include CCO 1.0 (Public-domain) or CC BY-NC (Attribution-Non-Commercial). To figure out which one you want to use, see: <https://creativecommons.org/share-your-work/> Conventional practice is to make data CC0 1.0.
- **GUID source:** This field tells data harvesters what your persistent Globally Unique Identifier looks like and where it comes from. GUID is a generic term. A Universal Unique Identifier (UUID) is a particular type of GUID and is preferred. Darwin Core definition: <http://rs.tdwg.org/dwc/terms/index.htm#occurrenceID> Within the drop down menu, there are the following options.
  1. **Not defined:** Best not to pick this option. All records must have an occurrenceID defined to be published within a DwC-A file. If the GUID source is not defined, the data packaging will not work.
  2. **Occurrence ID:** If you manage your data within Specify (or another external system), choose this because you already have a Specify (or other) generated UUID.
  3. **Catalog Number:** You can use this option if your catalog number is configured as a Globally Unique Identifier (e.g. institutionCode:collectionCode:catalogNumber format type). Also called the Darwin Core Triplet, this is an old school approach.
  4. **Symbiota generated GUID (this is a UUID):** If Symbiota is your main collection data management system, this option is the easiest and more reliable methods for assigning robust GUIDs to your specimen records. Even if your catalog number is configured as a unique identifier (see #3), this is a more robust option when managing data within the portal.

- **Save edits**

### 3. Create your Darwin Core Archive (DwC-A) data package

- My Profile→Specimen Management→Click on Your Collection →Administration Control Panel→ Darwin Core Archive Publishing.
- If a DwC-A was previously published for your collection, information will be displayed describing the details of the archive.
- Review and modify the following default publishing options. Do you want to:
  - include determination history – these are the identifications
  - include image URLs –
  - redact sensitive locality data – this will obscure locality data for rare or imperiled taxa for the end user. In order to do this, Symbiota needs a list of the species of concern, and this list will be used by all collections within the Symbiota portal. The data are not lost, and are always retrievable by the host institution database administrators. More instructions can be found online at <http://symbiota.org/docs/specimen-search-engine/rare-and-threatened-species-protection/>
- Click on the Create/Refresh Darwin Core Archive button to build a new archive.
- Log out – you're done!

Now you can reach out to iDigBio (email Joanna McCaffrey at [jmccaffrey@flmnh.ufl.edu](mailto:jmccaffrey@flmnh.ufl.edu)) to register your collection and arrange for automated data harvesting.

**Acknowledgements:** This document is a distillation of information collected from multiple Symbiota.org and iDigBio.org web pages. Many thanks to Ed Gilbert, Joanna McCaffrey, and Petra Sierwald for their insights, comments and clarifications to an earlier version of this workflow.



Published on *iDigBio* (<https://www.idigbio.org>)

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## Submission #938

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)

Submitted by [mwdenslow](#)

Wednesday, December 14, 2016 - 19:38

98.245.84.251

### TCN Name:

SERNEC: The Key to the Cabinets: Building and Sustaining a Research Database for a Global Biodiversity Hotspot

### Person completing the report:

[michael.denslow@gmail.com](mailto:michael.denslow@gmail.com)

### Progress in Digitization Efforts:

All SERNEC:

There are 71 collections serving data through the SERNEC portal. There are currently 2,465,862 specimens records and 133,156 (5%) of those records are georeferenced.

There are currently 1,553,801 imaged specimen images available. There are currently 30 collections publishing to iDigBio.

Florida:

FSU annotated in-scope specimens in the Asteraceae in preparation for another major imaging push in Summer 2017. FLAS completed barcoding and imaging of the angiosperm general collections and has made substantial progress on the pteridophytes. Skeletal cataloging of the Gholson collections, except for listed species, is completed and imaging has started for those collections. In total, 12,355 additional specimens have been imaged. In-house cataloging of listed species continued. Scripts were written to fix image rotation issues, brightness and sharpness of the jpeg images and applied to all images created through October 2016. Barcoding of PIHG specimens started during this period. A new workflow design was developed and implemented for deployment of data and images to the SERNEC portal. 3995 images with skeletal data have been posted to SERNEC. Large sets are currently in final preparation for SERNEC.

Georgia:

6,100 GA specimens were imaged during this time period (187,800 to date). 92,103 images published as a Darwin Core Archive via the SERNEC portal to iDigBio. Skeletal data (species name, state, county) for 800 non-Georgia specimens entered into Specify.

At WGC, all 5009 images with associated (skeletal) data uploaded to the SERNEC portal.

At COLG, 4,421 specimens imaged by VSC personnel to date. Kevin Burgess (Curator COLG) plans to bring another batch of 1,500 specimens to VSC in February 2017.

8,455 GAS specimens were imaged during this time period (15,039 to date).

5000 barcodes were ordered for the AASU collection. Michele Guidone (AASU herbarium curator) has begun working with GAS on data transfer.

#### Kentucky:

EKY has 83% (63,302) of specimens imaged for the project.

KNK: Upon request, took and posted 11 images of Heuchera specimens to go with our records already at the SERNEC portal.

#### Mississippi:

Imaging of the IBE collection has been completed (~71,000). Transcription of label data for records at all MS herbaria continues.

#### South Carolina:

To date we have completed and uploaded 17,003 specimens from the USCH collection, with all the images properly oriented, containing metadata and in jpeg format. The skeletal data for the USCH specimens has also been entered. At CONV, all 5,362 specimens have been imaged and the skeletal data has been entered. It remains to properly orient the images, convert them into jpeg format, add metadata, and then upload them. We expect to complete these tasks for the CONV collection in early spring, 2017. At USCS all 14,020 specimens have been imaged, properly oriented, converted into jpegs with metadata added, and uploaded. The USCS skeletal data has also been entered, and the USCS element of the SC project is complete. The FUGR collection is, for the most part, imaged with skeletal data entered for 13,867+ specimens. The Asteraceae remain to be imaged and fully processed, along with several hundred imaged specimens to upload. All of these images must still be properly oriented and converted to jpegs with metadata to be added and then uploaded. We expect to complete these tasks for the FUGR collection in late spring, 2017. To date CLEMS currently has imaged and entered skeletal data for 19,073 specimens. We expect to process these (that is, add metadata and convert them into jpeg format) and upload them by early spring, 2017. We anticipate a total of approximately 70,000 specimens to be fully processed and uploaded by mid to late spring 2017.

#### West Virginia:

MU & WVA each have 37,000 specimens imaged as of December 2016. MU has begun transcribing state/county info in Symbiota to facilitate future crowdsourcing. No students were hired through the grant this term (but five through Federal Work Study).

### **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>).

#### Louisiana:

Several work-study students have been hired to try alternate label digitizing processes. I am have been isolating the label portion of specimen images for OCR. I work with a 100 images at a time, using batching in Canon software. Using several image enhancements in Photoshop, the recognition success using ABBYY Fine Reader Pro for Mac has improved dramatically compared to the raw image. For good quality labels, accuracy is close to 100%. Typewritten or faded print is less accurate. The slow part of the process is parsing the fields. My current strategy is to isolate the fields using tabs/returns. The data then can be imported into Excel so that each field ends up in a separate cell. Then the students help by moving the data around in the spreadsheet until the data for each field ends up in the same column. At that point, the data can be uploaded into Symbiota. In one semester, it has been possible to process 10-15,000 labels.

Tennessee:

I have been involving independent study students to (1) boost digitization rates (as they are not counted against payroll), (2) train and evaluate potential students to hire (as this allow me one full semester to get to know and train them), (3) set up a hierarchy among workers (so paid students take ownership in the project as they are senior to the independent study workers), and (4) generate a population pool from which I can select paid student workers from.

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

All SERNEC:

Nothing to report.

Kentucky:

EKY: Our eBox light bulbs will likely burn out soon and we have replaced several so far. We have not been able to find replacements. The company that makes the eBox has discontinued these bulbs and no longer provides them as they have moved to LED on the new units. If someone finds a source for these fluorescent bulbs, please send a message to the group. We will not be able to afford the upgrading of our eBox to LED technology. And if our last bulbs go, we will not be able to complete imaging our specimens.

Louisiana:

As described previously, OCR can be improved significantly with image enhancement. But parsing and checking the data is slow.

Mississippi:

We lost the local hard drive storing images from MISSA and IBE. Most files had been transferred to our project server and we have re-imaged files that were completely lost in this crash (~400 specimen sheets). In the SilverImage software, some image files were named inconsistently relative to all other files. These files are being re-named manually before upload to the SERNEC portal.

West Virginia:

WVA subcontract budget was split to match F&A rate change periods. This has complicated fund allocation & spending (current labor funds are exhausted, with next batch to be released 1 Jan. 2017).

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

All SERNEC:

SERNEC prepared and presented a webinar which featured newly developed software interoperability between and GEOLocate and Symbiotia. It was presented as part of the Fall 2016 Symbiotia Webinar Series - Advanced Symbiotia features on November 11th 2016. A recording can be viewed here: <http://idigbio.adobeconnect.com/p1p120h7bgc/>

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

All SERNEC:

See webinar above.

West Virginia:

MU is continuing to help ready Burgundy Wildlife Education Center to digitize their collection; they are repairing and annotating specimens currently.

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

All SERNEC:  
Noting to report.

Mississippi:

The Mississippi State University library now hosts a digital repository, and they are looking for projects to include. Thus, MS is exploring this to see if we can have an additional portal specimens through the library.

### **Share and Identify Education and Outreach (E&O) Activities:**

All SERNEC:

The SERNEC – TCN played a major role in the WeDigBio event in October. SERNEC PIs held 9 onsite events and 15 SERNEC related expedition were hosted on Notes From Nature site during the event.

Florida:

Participated in the WeDigBio 2016 events: (1) four sections of Plant Bio Lab participated in-class at FSU, (2) the Field Botany participated in-class at FSU, (3) the FSU herbarium had a table at the St. Marks National Wildlife Refuge's Monarch Butterfly Festival where activities included participation in the Notes from Nature expedition entitled "WeDigFLPlants' Milkweeds of Florida—Monarch Butterfly Food Plants", (4) the Florida Museum of Natural History had a table at the Cultural Plaza Festival where activities included participation in the Notes from Nature expedition entitled "Fall Flowers of Alachua County, Florida."

Kentucky:

EKY participated in WeDigBio's Transcription Blitzes by having students transcribe label data. KNK presented at annual Kentucky Academy of Science meeting on the project and ways online records could be used in classes.

Mississippi:

MS participated in a First Year Experience course (all freshman are required to take one of these at MSU) focused on the museums and galleries on campus. In the class period, students were shown the herbarium, imaging equipment, and told about curating natural history collections.

West Virginia:

MU: We have now employed 21 undergraduate students, either through the ADBC grant or through Federal Work Study, for digitization efforts. Virtually all have been freshman with no prior familiarity with herbaria or collections.

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

All SERNEC:

Noting to report.

West Virginia:

MU will continue to involve undergraduate Work Study students in digitization efforts and refine protocols for dealing with naive students. WVA is hiring and will be training replacement students for graduating staff.

**Attachment 1**

**Attachment 2**



**Source URL:** <https://www.idigbio.org/node/564/submission/938>



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## Submission #940

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)

Submitted by [akuhn](#)

Thursday, December 15, 2016 - 12:18

192.17.34.169

### TCN Name:

The Microfungi Collections Consortium: A Networked Approach to Digitizing Small Fungi with Large Impacts on the Function and Health of Ecosystems

### Person completing the report:

[akuhn@illinois.edu](mailto:akuhn@illinois.edu)

### Progress in Digitization Efforts:

- 191,721 new records added to MyCoPortal
- University of Richmond (URV) collection added to MyCoPortal (16Sept2016)
- University of Mississippi (MISS) collection added to MyCoPortal (22Sept2016)
- Universidad de Buenos Aires (BAFC) collection added to MyCoPortal (4Oct2016) along with 1762 existing records
- René-Pomerlau Herbarium (QBFE) collection added to MyCoPortal (7Oct2016)
- Indiana University (IN) collection added to MyCoPortal (10Nov2016) and digitization of 3,813 specimens completed at University of Illinois
- The National Herbarium of Ethiopia (ETH) collection was added to MyCoPortal (28Nov2016)
- >80,000 existing records from OSC refined and uploaded to MyCoPortal collection
- First completely digitized collection, BRU, finished. All records have been completely transcribed and those with locality data have been georeferenced (14Dec2016)

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

- Workflow guide created to further understanding of batch updating Occurrence Records on the MyCoPortal (27Sept2016)

### Identify Gaps in Digitization Areas and Technology:

Nothing to report

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

- All workflow guides translated to Spanish

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

- Symbiota Working Group webinars presented in October and November on Creating and Using Taxonomic Keys and The GEOLocate Toolkitm respectively.  
[https://www.idigbio.org/wiki/index.php/SWG\\_Webinar\\_Series](https://www.idigbio.org/wiki/index.php/SWG_Webinar_Series)

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

- Link to all workflows and protocols added to iDigBio wiki (16Nov2016)  
[https://www.idigbio.org/wiki/index.php/Digitization\\_Workflows\\_and\\_Protocols#Workflows\\_and\\_Protocols](https://www.idigbio.org/wiki/index.php/Digitization_Workflows_and_Protocols#Workflows_and_Protocols)
- The mycoportal.org portal code file, and related SQL database, containing all digitized resource meta-data, is now replicated weekly as extracted compressed archives on distributed backup systems. Plans for the replication of additional project media files will be implemented in the near future.

**Share and Identify Education and Outreach (E&O) Activities:**

- MiCC featured in iDigBio newsletter, “Ghost Towns in MyCoPortal I: Nuttallburg and Lawrence William Nuttall” (<https://www.idigbio.org/content/ghost-towns-mycportal-inuttallburg-and-lawrence-william-nuttall>) (21Oct2016)

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

Nothing to report

**Attachment 1****Attachment 2**

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**Source URL:** <https://www.idigbio.org/node/564/submission/940>



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## Submission #929

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)

Submitted by [EPICC](#)

Friday, December 2, 2016 - 16:45

128.32.154.17

### TCN Name:

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

### Person completing the report:

[eclites@berkeley.edu](mailto:eclites@berkeley.edu)

### Progress in Digitization Efforts:

As of 11/28/2016, the TCN has digitized 505,490 specimens, including 24,478 that are currently searchable via the iDigBio portal. In addition we have photographed 17,808 specimens and georeferenced 10,796 localities.

Georeferencing: Georeferencing of all UCMP and partner localities from CA state plane 2 is complete. UCMP has begun georeferencing Alaskan localities, which present some additional challenges because of the lack of county names and more incomplete locality descriptions.

Original source material digitized: Ongoing transcription of CAS catalogs and field notebooks as well as the LSJU (Stanford University) catalogs. UCMP is scanning UC Davis locality registers describing Pleistocene localities. Some of this locality information is not currently present in the UCMP database. LACM has started transcription of old ledger books. These will be used: to a) identify ghost localities (an estimated 10% (~3000 localities) of their collection is presently not represented in their locality registry; b) create skeleton records that will allow for more efficient cataloguing of older collections, particularly those lacking registered localities.

Pre-digitization curation: LACM has begun using members of the Southern California Paleontological Society (avocational group) and volunteer teachers from Los Angeles Unified School District more extensively in both pre-digitization (washing, sorting, and IDing) and now cataloguing activities.

Serving data to iDigBio: The Burke Museum is beginning the process of serving their data to iDigBio through VertNet's portal. They are working with the designer of their museum-wide search portal to standardize their data in preparation for serving the data via IPT.

Workflows: UAM incorporated the physical location of 1514 specimens within the collection using the object tracking feature on Arctos.

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

Workflows: At LACM, efficiencies continue to be gained by relying on inventoried collections and collaborating with local and visiting taxonomic experts. UAM has stopped splitting lots; lots are now being assigned one UAMES number rather than each individual specimen being assigned its own number. Accordingly, we are not photographing every specimen within the lot, but choosing the best preserved specimen to photograph. At UCMP, PI Finnegan wrote R script to compare new UCMP specimen data to Austin Hendy's compiled taxonomic synonymies (contains 5300+ entries). Though UCMP is still working out a few bugs, this saves a lot of time compared to checking each name individually. UCMP also finds using OpenRefine to check for spelling errors and create consistent higher taxonomy provides a significant speed improvement over using Excel alone. Finally, at UCMP our student photographer is great at photography, but not so efficient in photo file management. From now on student will take photos and project staff will process them.

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

PRI needs to update their microscope camera set up. They have been investigating various options.

LACM has still not implemented KEEMu, although they have a fully working copy being tested. Data cleaning continues and migration will not be undertaken until they are satisfied with data quality and integration (multiple generations of cataloguing efforts). LACM has increasing difficulty dealing with shared files among multiple workstations and personnel. Dropbox has been favored until now, but they need to seek other collaborative alternatives (cheap ones if possible).

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

Sara Legler (Burke Museum) and Edward Davis (UO) attended iDigBio's Georeferencing for Research Use workshop in October. Sara has been using skills learned at the workshop to clean and standardize the Burke Museum's locality data.

Erica Clites (UCMP), Chrissy Garcia (CAS) and Liz Nesbitt (Burke Museum) attended the iDigBio Annual Summit Meeting in Chattanooga, TN. Clites presented the EPICC TCN update, led a meeting of the paleo TCNs and participated in breakout sessions on data quality (note taker), effectively managing your digitization project, attribution and citation. Garcia participated in several breakout sessions including those focused on what to digitize next, extending data schemas, research applications of collections data, and NSF reporting protocols. Nesbitt participated in several breakout sessions as well.

Nick Famoso (UO) guest-hosted a one hour webinar via AdobeConnect for undergraduates working on the EPICC project at all institutions. This meeting was recorded and made available to all TCN members. Message boards were created for communication directly between undergraduates at different institutions.

UCMP part-time staff participated in several R classes. A new undergraduate student received 4 hours of training in georeferencing from UC Berkeley's Museum of Vertebrate Zoology. UCMP's volunteer photographer trained the undergraduate student taking EPICC photos in use of StackShot. UCMP is using the Stackshot to photograph large specimens and others with features better captured in multiple shots. LACM has now implemented use of the Cognysis Stackshot and trained their primary photographer in its use.

EPICC project staff at multiple institutions (Burke, UCMP, UO) continue to communicate about georeferencing best practices and protocols, especially tips and tricks for using the GeoLocate collaborative portal.

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

Holly Little will participate in the TDWG meeting being held in Costa Rica this month, and is a member of the Paleobiology interest group, that plans to discuss expanding DwC terms used for paleontology. CAS has decided to proceed with development of fields and controlled vocabulary (including definitions) for treatment of ichnofossil taxa, which are currently unrepresented by DwC. This was decided after discussions on the matter during the "Extending data schemas" breakout session at the 2016 iDigBio Annual Summit meeting, and subsequent discussions with Gil Nelson and the iDigBio team. CAS will develop these fields collaboratively within the TCN and share them for review with the Fossil Insect Collaborative and Paleoniches TCN.

LACM continues to collaborate with the Southern California Paleontological Society. Tours of local natural history collections by LACMIP staff to view best practices, curatorial approaches, and outreach activities at other institutions, including Santa Barbara Museum of Natural History and Raymond Alf Museum of Paleontology.

Collaborated with San Diego Museum of Natural History and UC Riverside on PEN proposals.

UCMP staff continue to collaborate with iDigBio staff to plan the third iDigBio Paleo Digitization meeting, to be held in Berkeley in March 2017.

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

Use of volunteers from avocational groups with either taxonomic expertise or interest in participating in pre-digitization curation. Reach out to community college and local universities for non-paid Student interns. Look for opportunities to involve STEM teachers (often participating in summer training programs) to assist in digitization and outreach activities.

#### **Share and Identify Education and Outreach (E&O) Activities:**

Students continue to work in the collections at multiple museums, cataloging specimens, georeferencing localities and helping with other tasks. To date, the TCN has trained 12 undergraduates, 4 graduate students, 3 recent college graduates, 5 high school students, 5 teachers and 8 other volunteers. At UCMP one student was trained in label printing and another in georeferencing via the GeoLocate collaborative portal.

The VFE team (primarily White, Ross, Duggan-Haas and Clites) presented on the Kettleman Hills VFE at the Geological Society of America meeting. All members of the team are now writing text and assembling photos and other media for the Kettleman Hills VFE. The advisory board is currently being finalized and is expected to meet in person in Feb. 2017. This meeting will take place just before the fieldwork for the Purisima Formation VFE (Santa Cruz, CA area). Some of the modules being developed (i.e. how to identify fossils and how to collect museum specimens) will also be used in future VFEs.

CAS showcased EPICC specimens and discussed the EPICC project at the Annual Bay Area Science Festival (11/5). Continued involvement with CAS Careers in Science internship program. LACM gave collection tours and talks to El Camino College Geology Club and Geology classes, Association of Women Geoscientists.

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

We held a very successful second annual TCN meeting hosted by the Burke Museum. All institutions were well-represented at the meeting. Topics of discussion included: DwC taxonomic terms, how to gain efficiencies in the cleaning and verification of taxonomic data, building and sharing taxonomic trees in Specify, how the EPICC project is fitting in with other institutional priorities, positive outcomes and challenges, setting priorities for Year Two and other topics.

At LACM, community college students from El Camino College and Glendale Community College are involved in publishable independent research.

**Attachment 1**

**Attachment 2**

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**Source URL:** <https://www.idigbio.org/node/564/submission/929>



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## Submission #931

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)

Submitted by [BruceL](#)

Saturday, December 3, 2016 - 17:04

24.124.69.244

### TCN Name:

The Cretaceous World: Digitizing Fossils to Reconstruct Evolving Ecosystems in the Western Interior Seaway

### Person completing the report:

[blieber@ku.edu](mailto:blieber@ku.edu)

### Progress in Digitization Efforts:

Regarding the University of Kansas portion of the project, led by PI Bruce S. Lieberman, associated with this project we have databased 12,303 Cretaceous specimens. Most of these specimen records are also georeferenced. At present we are focusing on databasing our ammonoids, as these represent a significant part of our collection strengths. In addition, associated with this project a total of 759 localities have been georeferenced thus far, 293 since our last reporting period.

Regarding the Paleontological Research Institution portion of the project, led by PI Jonathan Hendricks

Most of the new Cretaceous Atlas of Ancient Life website has been programmed and is now online (<http://www.cretaceousatlas.org/>). TCN partners have begun providing Hendricks with photos of species and these are being processed and uploaded to the website as they come in. For example, see the following entry for a species of ammonoid:

<http://www.cretaceousatlas.org/species/hoploscaphites-comprimus/>

2) Work has begun on construction of the planned online, open-access paleontology “textbook” (termed the Digital Encyclopedia of Ancient Life) which may be accessed at <http://www.digitalatlasofancientlife.org/learn/>. Thus far, work has focused on development of the “Nature of the Fossil Record” chapter, which is nearly finished: <http://www.digitalatlasofancientlife.org/learn/nature-fossil-record/>

Between now and the next report, attention will be focused on addition of species to the Cretaceous Atlas website and continued development of the Digital Encyclopedia, particularly a “chapter” on fossil mollusks, which will serve as a model for the other taxonomic chapters of the new website.

Regarding the Yale University portion of the project, led by PI Susan Butts and PI Chris Norris,



during this period:

#WIS localities georeferenced in this reporting period: 42

#WIS specimens have you databased (in EMu) in the reporting period: 7,693

#WIS specimen records do you have TOTAL in your database: 19,020

#WIS have you imaged in the reporting period? 5,472 uploaded (we have uploading backlog due to a glitch that has been fixed)

#WIS specimens have you imaged TOTAL: 10,024 (most from multiple orientations)

Are you sending data to iDigPaleo?

Yes – full data and images (search portal is not yet up though)

Are you sending data to iDigBio? Please provide details.

-YES – full data and images

Regarding the Fort Hays State University portion of the project, led by PI Laura Wilson:

#WIS localities georeferenced in this reporting period: 278

#WIS specimen records do you have TOTAL in your database:

985 Invertebrate Specimens +/- 40 specimens w/o Period information

2138 Vertebrate Specimens +/- 90 other Cretaceous specimens +/- 154 w/o Period information

\*\*we will be working on refining temporal and stratigraphic information for questionable specimens

Regarding the University of Colorado portion of the project, led by PI Talia Karim:

#WIS localities Georeferenced: 25

#WIS specimens added to the DB: 0

#WIS specimens records total in DB: 6,547

#WIS have you imaged: 0

#WIS specimens imaged total: 0

Are you sending data to iDigPaleo: yes

Are you sending data to iDigBio: yes

Other: We are interviewing undergraduates and should have one hired by the first week in December to assist with data entry. Karim setup an Adobe connect meeting for the TCN group to learn more about GeoReferencing. D. Zelagin (Digitization assistant) has been working through the online Georeferencing tutorials and is now starting to Georeference in excel. We are in the process of adding the required data fields to our Specify forms and are working out a few kinks.

Regarding the University of New Mexico portion of the project, led by PI Cori Myers:

They databased and georeferenced 112 specimens in xls - currently working to push this data into Specify as a batch

They purchased database computer and installed Specify software, including downloading geography, lithostratigraphy, and taxonomy relational trees for the WIS database.

They have begun talking to UNM databasing team for IT assistance in pushing data to iDigBio

They hired both an undergrad and graduate student to be involved with their databasing efforts.

Regarding the American Museum of Natural History portion of the project, led by PI Neil Landman and co-PI Ruth O'Leary:

#WIS specimens have you databased (in EMu) in the reporting period: Intern is currently working on Fossil Fish. There are 416 specimens in the db but also an additional 243 that we may be able to include if we can gather enough locality data. All 659 specimens are databased but in some cases the data needs to be verified and augmented. In this reporting period, the intern has checked all 659 catalog cards to verify and edit data and has checked 55 specimens labels to verify and edit data from that source.

#WIS specimen records do you have TOTAL in your database: ~15,300

#WIS have you imaged in the reporting period? 0

#WIS specimens have you imaged TOTAL: 101 images comprising 11 species of mollusks (primarily ammonites) have been sent to Jonathan Hendricks for inclusion in the Digital Atlas of Ancient Life. These also include detailed locality information so that distributional maps can be created for these species.

Are you sending data to iDigPaleo? Images have been sent to Jonathan Hendricks which will be provided to iDigPaleo

Are you sending data to iDigBio? Please provide details. Not yet but will definitely do this.

Regarding the University of Texas portion of the project, led by PI Ann Molineux:

#WIS localities georeferenced in this reporting period:

Of the current 5119 unique locality names, 2024 are georeferenced.

#WIS specimens have you databased (in Specify) in the reporting period:

652 records were added

#WIS specimen records do you have TOTAL in your database:

25,000 records (60,000 specimens)

#WIS have you imaged in the reporting period?

674 image records have attached images in Specify, each with full metadata record

3D scans- 6 specimens

#WIS specimens have you imaged TOTAL:

3D scans- 25 specimens <https://sketchfab.com/NPLcollections/models>

Are you sending data to iDigPaleo?

Yes. A sample data set has been sent to whirligig for testing in iDigPaleo

Are you sending data to iDigBio? Please provide details.

Yes. <https://www.idigbio.org/portal/recordsets/7b0809fb-fd62-4733-8f40-74ceb04cbcac>

The files may also be accessed through GBIF

Regarding the South Dakota School of Mines & Technology portion of the project, led by co-PIs Laurie Anderson and Maribeth Price:

Their activities associated with the grant will begin in earnest when their new students begin in January.

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

Regarding the Fort Hays State University portion of the project

-as we have been locating the material in our cabinets, we realized that we could also data check and update the paper specimen cards as we went, which, in theory, saves a lot of time for someone in the future. One of our undergraduates is also a native Kansan and has done a lot of fossil collecting in local areas. His knowledge of fossil localities has been invaluable, as a huge portion of our collection was collected in Kansas. He has been able to correct many of the data points that are landing in incorrect counties or that are not labeled on the geolocate website and have thus been difficult to pinpoint.

Our two undergraduates often work on geolocating and transferring data into a single database but on different computers/at different stations. Unfortunately, when they're determining locality numbers at the same time, they occasionally use the same locality number, which is problematic. This was resolved by simply giving them different tasks while they were working at the same time, rather than having them geolocate at the same time.

Regarding the University of Texas portion of the project,

3D scanning is quite time intensive, especially if you wish to prepare good files for online access. Poorly described localities increase the time for georeferencing and in some instances are not viable data.

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

Regarding the Fort Hays State University portion of the project,

We only recently received our imaging equipment in the mail, so we haven't had the opportunity to take any photos yet, but that will begin soon. We also don't have a best-practice guide for that so we're hesitant to begin if we will have to start over. We also have a large collection of WIS material that hasn't been accessioned. Once that is added to the catalog, we will be able to begin digitizing that as well.

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

N/A

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

Regarding the YPM portion of the project, they are collaborating with the Fossil Insect Collaborative (YPM PIs are both PIs on both TCNs). Further,

-Susan Butts and Jessica Utrup (IP Division staff) led public tours (24 people total) of the YPM Invertebrate Paleontology Division collections, emphasizing Cretaceous World collections and research.

-Susan Butts gave a Peabody Gallery Talk on Nov 17th about the Cretaceous World digitization project, research, and the utility of museum collections.

-Maya Juman, student digitizer, led public tours (8 people total) of the YPM Invertebrate Paleontology Division collections, emphasizing Cretaceous World collections and research.

- YPM staff Jessica Utrup and Susan Butts also led an on line webinar to help various members of the project understand and proceed with georeferencing.

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

N/A

### **Share and Identify Education and Outreach (E&O) Activities:**

Regarding the Paleontological Research Institution portion of the project, they did work providing content for the Digital Atlas and Digital Encyclopedia of Ancient Life described above under "Progress in Digitization Efforts".

Regarding the Fort Hays State University portion of the project,

Our graduate assistants have been posting #365scienceelfies and #SternbergMuseum photos on Instagram and Facebook that show some of our progress.

We discussed some WIS fossils and live organisms with preschoolers in "Natural History for Preschoolers". The program has been hosted in our "Bringing Fossils to Life" exhibit and compares modern specimens (particularly Chelonia) to some of the fossils we have.

Regarding the University of Texas portion of the project, Staff and students have been part of several outreach activities within UT and community organizations.

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

Regarding the University of Kansas portion of the project, In the middle of September PI Lieberman and co-PI Chris Beard went to western Kansas and visited some of the classic fossil bearing localities in the Cretaceous chalk. These deposits preserve spectacular specimens of mosasaurs, pterosaurs, fishes, and also invertebrates. The goal was to document these localities using gigapan images so that researchers and general public from around the US (and the world) can view the localities, see what they look like, and get a feel for what it is like to be out conducting field work in these chalk deposits. The gigapan images have been made available for two of the most famous localities:

Monument Rocks:

<http://www.gigapan.com/gigapans/ae6cb3eb6ad55f0ca0598c188c19e328>

and Castle Rock:

<http://www.gigapan.com/gigapans/40f8c5b70c9a09f7f4fb09ba8814dbe8>

We will also share these images via our Digital Atlas of Ancient Life website.

In the future and as part of the project we will be adding various metadata to these images on the web that will include information on and images of fossils discovered here, famous paleontologists who have visited these places, the environments preserved, etc.

In early November, PI Lieberman attended the iDigBio 2016 Summit meeting in Chattanooga, Tennessee and presented a lightning talk on this new TCN.

Regarding the Paleontological Research Institution portion of the project, In early November, PI Hendricks attended the iDigBio 2016 Summit meeting in Chattanooga, Tennessee.

Regarding the University of Texas portion of the project, Our TACC programmer Tomislav Urban is currently at the University of Kansas developing deep time app for the Specify web version Specify 7. The forms on the Specify side are done and tested. Some changes are still needed on the paleolocation.org side.

**Attachment 1**

**Attachment 2**

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## Submission #939

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)

Submitted by [cskema](#)

Thursday, December 15, 2016 - 12:05

165.123.74.113

### TCN Name:

The Mid-Atlantic Megalopolis: Achieving a greater scientific understanding of our urban world

### Person completing the report:

[cskema@upenn.edu](mailto:cskema@upenn.edu)

### Progress in Digitization Efforts:

Please see attached.

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

Nothing to report.

### Identify Gaps in Digitization Areas and Technology:

Please see attached.

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

Nothing to report.

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

Please see attached.

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

Nothing to report.

### Share and Identify Education and Outreach (E&O) Activities:

Nothing to report.

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

Nothing to report.

### Attachment 1

[2016\\_11\\_MAM\\_Bi-monthly\\_Progress\\_Summary.pdf](#)

### Attachment 2

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Source URL: <https://www.idigbio.org/node/564/submission/939>





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## Submission #943

### Submission information

Form: [TCN Bi-Monthly Progress Report to iDigBio](#)

Submitted by [neilscobb](#)

Thursday, December 15, 2016 - 23:37

24.121.65.222

### TCN Name:

Lepidoptera of North America Network: Documenting Diversity in the Largest Clade of Herbivores

### Person completing the report:

[neilscobb@gmail.com](mailto:neilscobb@gmail.com)

### Progress in Digitization Efforts:

see attachment

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

see attachment

### Identify Gaps in Digitization Areas and Technology:

see attachment

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

see attachment

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

see attachment

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

see attachment

### Share and Identify Education and Outreach (E&O) Activities:

see attachment

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

see attachment

### Attachment 1

[LepNet\\_dec\\_2016\\_nc.docx](#)

### Attachment 2

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Source URL: <https://www.idigbio.org/node/564/submission/943>





**Lepidoptera of North America Network**  
**January 6, 2017**  
**Neil Cobb**

**Progress in Digitization Efforts:**

The LepNet grant was initiated on July 1, 2016 and there are currently 26 ADBC funded museums and one non-funded museum (Oklahoma State University). Twenty-six museums have established a collection on the LepNet Portal and have served data. Twenty museums are serving DwC archives to iDigBio and six museums are still establishing connections with the LepNet portal. To date we have produced 335,935 records (Table 1). We also serve an additional 146,657 records from 35 non-ADBC funded museums and 165,371 records from iNaturalist.

**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 LepNet <http://www.lep-net.org/> .

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

We need to harvest additional data (i.e. beyond LepNet) to better understand the biogeography of Lepidoptera taxa. We are meeting this need by incorporating additional collections into the LepNet database, including observational records from iNaturalist.

**Share and Identify Opportunities to Enhance Training Efforts:** We will develop resources on the WordPress site <http://www.lep-net.org/> .

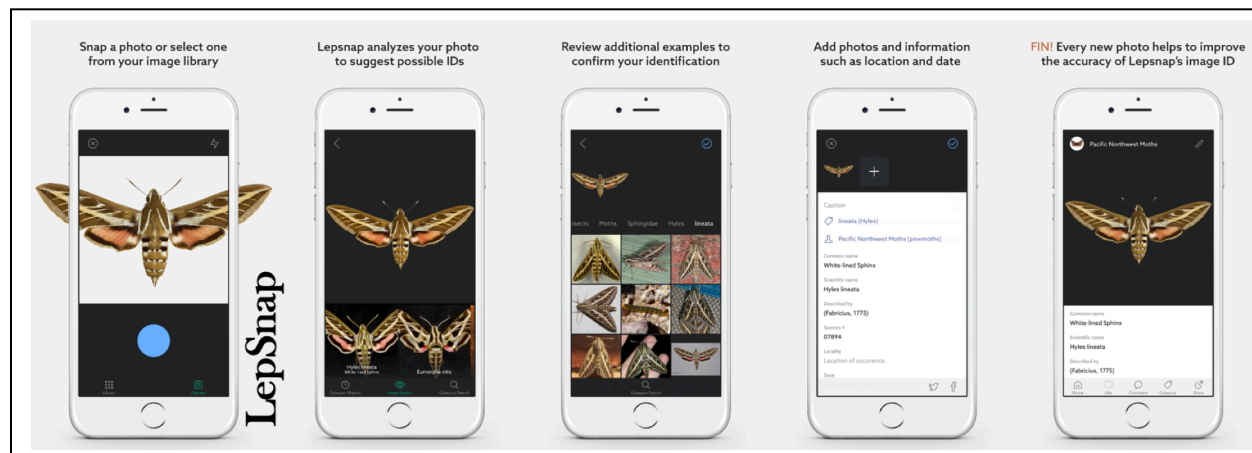
**Share and Identify Collaborations with other TCNs, Institutions, and Organizations:**

We are primarily working with other Symbiota TCNs and other Symbiota portals.

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

We have not made sustainability plans to date.

**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



LepNet users. We are making significant progress in developing our LepSnap app.



Table 1. Number of specimen records digitized and associated summary statistics. From <http://symbiota4.acis.ufl.edu/scan/lepnet/portal/index.php> .

Collection	Total Expected records	Total Expected records Dec 2016	Records delivered Dec/16	Percent of expected
Entomology Collection, Natural History Museum of Utah	7,416	927	18,614	2008%
Yale Peabody Museum, Entomology Division	149,293	18,662	150,421	806%
K-State Museum of Entomological and Prairie Arthropod Research	28,043	3,505	16,611	474%
New Mexico State Collection of Arthropods	10,676	1,335	5,366	402%
Mississippi Entomological Museum	136,559	17,070	46,124	270%
The Albert J. Cook Arthropod Research Collection	128,022	16,003	33,559	210%
Museum of Comparative Zoology, Harvard University	105,045	13,131	25,244	192%
Arizona State University Hasbrouck Insect Collection	44,622	5,578	9,983	179%
Western Washington University Insect Collection	3,800	475	656	138%
Colorado Plateau Museum of Arthropod Biodiversity	14,112	1,764	2,314	131%
Denver Museum of Nature & Science	25,835	3,229	4,092	127%
U Alaska Insect Collection	59,291	7,411	4,655	63%
C.P. Gillette Museum of Arthropod Diversity	155,086	19,386	11,740	61%
University of Delaware Insect Research Collection	7,732	967	479	50%
Ohio State C.A. Triplehorn Insect Collection	54,373	6,797	1,913	28%
Oregon State Arthropod Collection	146,703	18,338	420	2%
R. M.Bohart Museum of Entomology	148,826	18,603	130	1%
Florida Museum of Natural History, McGuire Center for Lepidoptera and Biodiversity	248,500	31,063	44	0%
University of Georgia Collection of Arthropods	28,500	3,563	3	0%
Milwaukee Public Museum	51,133	6,392	3	0%
Academy of Natural Sciences Entomology Collection	51,473	6,434	0	0%
Clemson University Arthropod Collection	16,607	2,076	0	0%
The Purdue Entomological Research Collection	12,476	1,560	0	0%
University of Minnesota Insect Collection	61,000	7,625	0	0%
University of Nevada, Reno, Museum of Natural History	16,000	2,000	0	0%
William F. Barr Entomological Museum	26,029	3,254	0	0%
Tall Timbers Research Station Natural History Museum <sup>1</sup>	0	0	1,235	100
The Sam Noble Museum Department of Recent Invertebrates <sup>1</sup>	0	0	2,329	100
<b>Total</b>	<b>1,737,152</b>	<b>217,144</b>	<b>335,935</b>	<b>155%</b>

